ALPINE PARKS 2030

Biodiversity conservation for generations to come

FINAL REPORT • 2023

alparc
Together for the Alps

Federal Ministry
for the Environment, Nature Conservation,
Nuclear Safety and Consumer Protection

ALPENKONVENTION
CONVENTION ALPINE
ALPSKA KONVENCIJA
CONVENZIONE DELLE ALPI

EDITORIAL

The Alps are well-known for their beautiful and dramatic landscapes, their rich biodiversity, and their long history of human settlement and development. The diverse flora and fauna are often unique to this part of the world and help make the Alps such an attractive place to visit and live. The iconic mountain ranges have also been shaped by their inhabitants, creating a patchwork of traditional landscapes that define the region.

However, the ecosystems and cultural landscapes of the Alps are increasingly coming under pressure from many sides, including the climate crisis and unrelenting land consumption, which is causing habitats to shrink and become more fragmented. Our common goal must be to protect the special natural and cultural Alpine environments, and to actively work for their sustainable development.

To address these and other cross-border topics, the Alpine countries and the European Union came together in the 1990s to create the Alpine Convention. The aim was to strengthen cooperation on shared challenges and to facilitate an Alpine-wide approach to problem-solving. One of the Convention's first Protocols – the Nature Protection and Landscape Conservation Protocol – commits the signatories to protect and conserve Alpine nature and ecosystems across borders and sectors. Biodiversity and ecosystems are logically one of the priorities, together with climate change and quality of life, addressed in the Alpine Convention's current Multi-Annual Work Programme until 2030. The two objectives in the area of biodiversity are: contributing to the achievement of the European and international objectives to protect, preserve, and restore biodiversity and ecosystems in the Alps; and strengthening the Alpine Convention's own biodiversity and ecosystem-related activities and integrating the topic into the work of all its bodies.

The recent decisions and results of the Parties to the Convention on Biological Diversity (CBD) in December 2022 reflect the growing global awareness of the urgency of addressing the biodiversity crisis. The Kunming-Montreal post-2020 global framework adopted by the CBD will form the background of our work in the Alpine Convention in the coming decade. Achieving the global goals and reaching the targets, such as the conservation of at least 30% of terrestrial areas by 2030, is something that no single country or organisation can do by itself. This is a task that requires action at all levels, from global, transnational, national, and down to the local stakeholders. Cooperating within the Alpine Convention can help the Contracting Parties translate these goals into an Alpine context. Transnational cooperation can also facilitate the monitoring of the state of biodiversity in the Alps and support the development of protected areas.

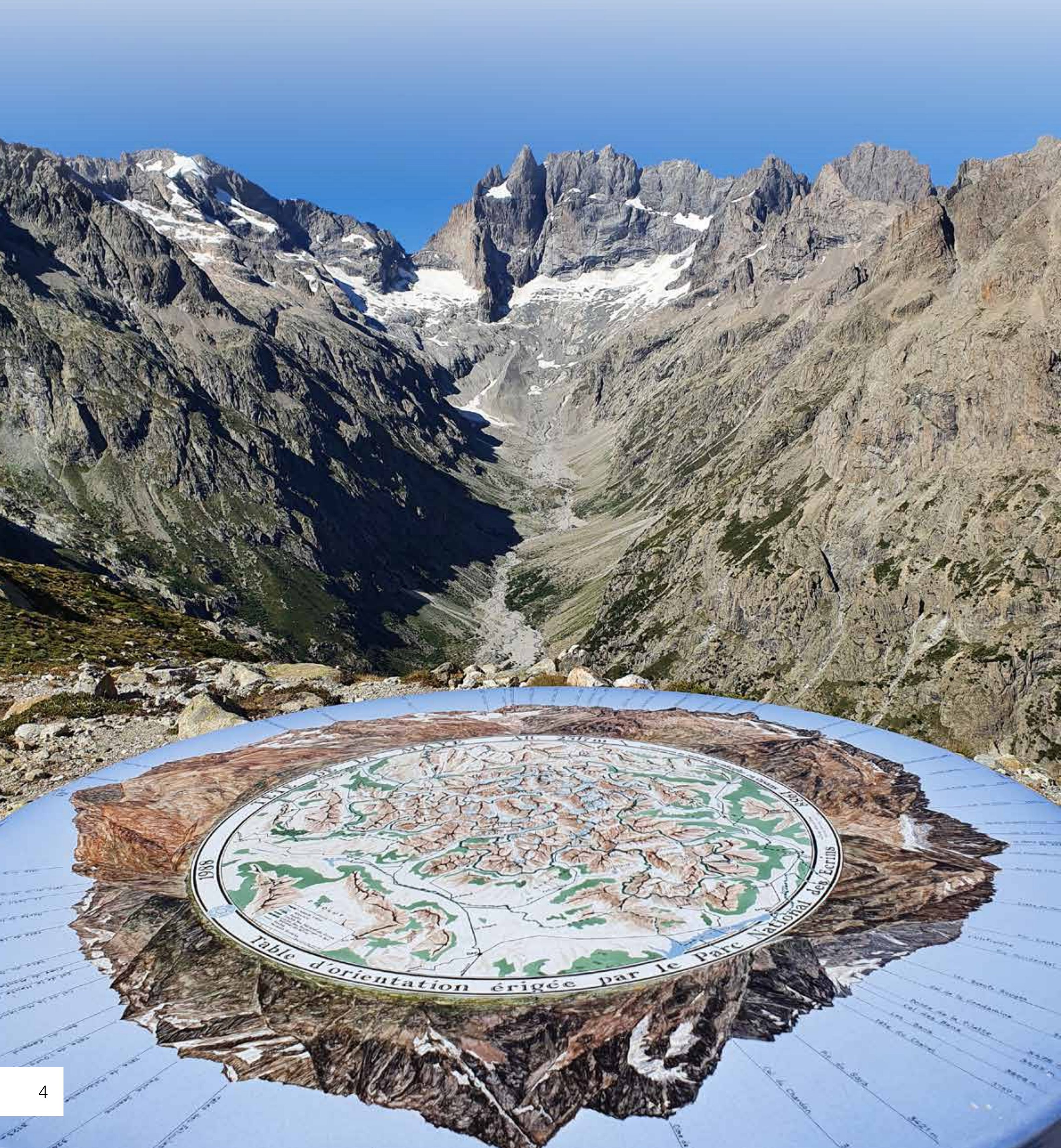
Protected areas play a vital role in the Alps and in particular in nature conservation. Their mission is to preserve the natural heritage of the Alps. The protected areas, mostly managed by public bodies, are implementing the Alpine Convention on the ground. To achieve efficient protection, they need to work as an Alpine-wide network, as required by Article 12 of the Nature Protection Protocol and concretely fostered by ALPARC, a strong partner within the Alpine Convention ever since 1995.

The Alps may indeed seem like a continual natural space when seen from afar. In reality, however, they are characterised by varying degrees of fragmentation. As this publication shows, biodiversity protection remains quite heterogenous in the Alps, with protected areas varying in size, strength, and connectivity, and not all ecosystems being covered equally. "Alpine Parks 2030" is a comprehensive assessment of the state of Alpine protected areas. It offers data and scenarios as well as food for thought on how to address the challenges of consolidating the network of nature protection in the Alpine region. It therefore serves as a timely Alpine contribution to the international discussions and developments in the field of biodiversity and I am thankful to ALPARC for this, as well as to the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection which financially supported this work.

Alenka Smerkolj
Secretary General of the Alpine Convention

A

PREFACE AND CONTENT



PREFACE

Collaborating to enhance biodiversity in the Alps has been ALPARC's goal since the network was created in 1995.

The Alps and especially the Alpine parks provide the framework for international cooperation to achieve this goal. Alpine parks encompass landscapes rich in biodiversity, and they have been tackling the manifold problems of today (biodiversity loss, climate change, land-use conflicts) for decades in their daily work – well before these topics appeared on the political agenda.

Assessment of the efficacy of management measures, such as approaches to habitat management, species protection, and park management, immediately demonstrates that Alpine protected areas in the Alps differ notably from one another even if they have the same denomination.

Different legal frameworks in the Alpine states and regions, differing missions and goals based on protected area categories, and different means (resources, staff, etc.) account for much of this disparity.

Nevertheless, the ultimate goal is always to contribute to the conservation of biodiversity and intact habitats either as the overall objective or as a result of sustainable practices of land-use implemented by the different protected areas.

The Alpine Convention, as an international treaty, provides an overarching legal framework of biodiversity protection policies and promotes international cooperation between the Alpine countries. As part of this Convention, ALPARC focuses particularly on contributing to the implementation of the Convention's Nature Protection Protocol.

The following technical report on the current situation in the Alpine protected area system, including gaps and perspectives, shows that there is a high but often under-utilised potential for more efficient biodiversity protection. Strategic implementation of ecological connectivity, more coherent and better coordinated spatial planning within the intensively used Alpine spaces, and increased cooperation between Alpine protected areas – both on the thematic and the territorial level – can all make significant contributions.

This report highlights strengths and weaknesses and illustrates the potential and the perspectives available to achieve the goal of the COP 15 – Biodiversity Convention announced in Montreal in December 2022: to efficiently protect 30% of the land.

Ecological connectivity plays a key role that can be enhanced by other factors to meet the COP 15's Biodiversity aspirations.

Leveraging the strength of an international convention for the Alps could achieve this goal at a transnational and Alpine level by affirming the ALPARC slogan – "The Alpine protected areas – together for the Alps".

Dr. Peter Oggier
President ALPARC

Dr. Guido Plassmann
Director ALPARC

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Overall Coordination

Dr. Guido Plassmann, ALPARC

Editors and Main Authors

Dr. Guido Plassmann, ALPARC

Oriana Coronado-Cortes, ALPARC
(Mapping and data analysis)

Contributions

Karin Svadlenak-Gomez (Chapter 1)

Dr. Sven Oehm (contributions to Chapter 2)

Dr. Yann Kohler (contributions to Chapter 3)

Graphical Edition

Jean Marie Bernier, www.graphi.media

Picture Credits

See Page 360

ALPARC,

256, Rue de la République,
73 000 France
www.alparc.org

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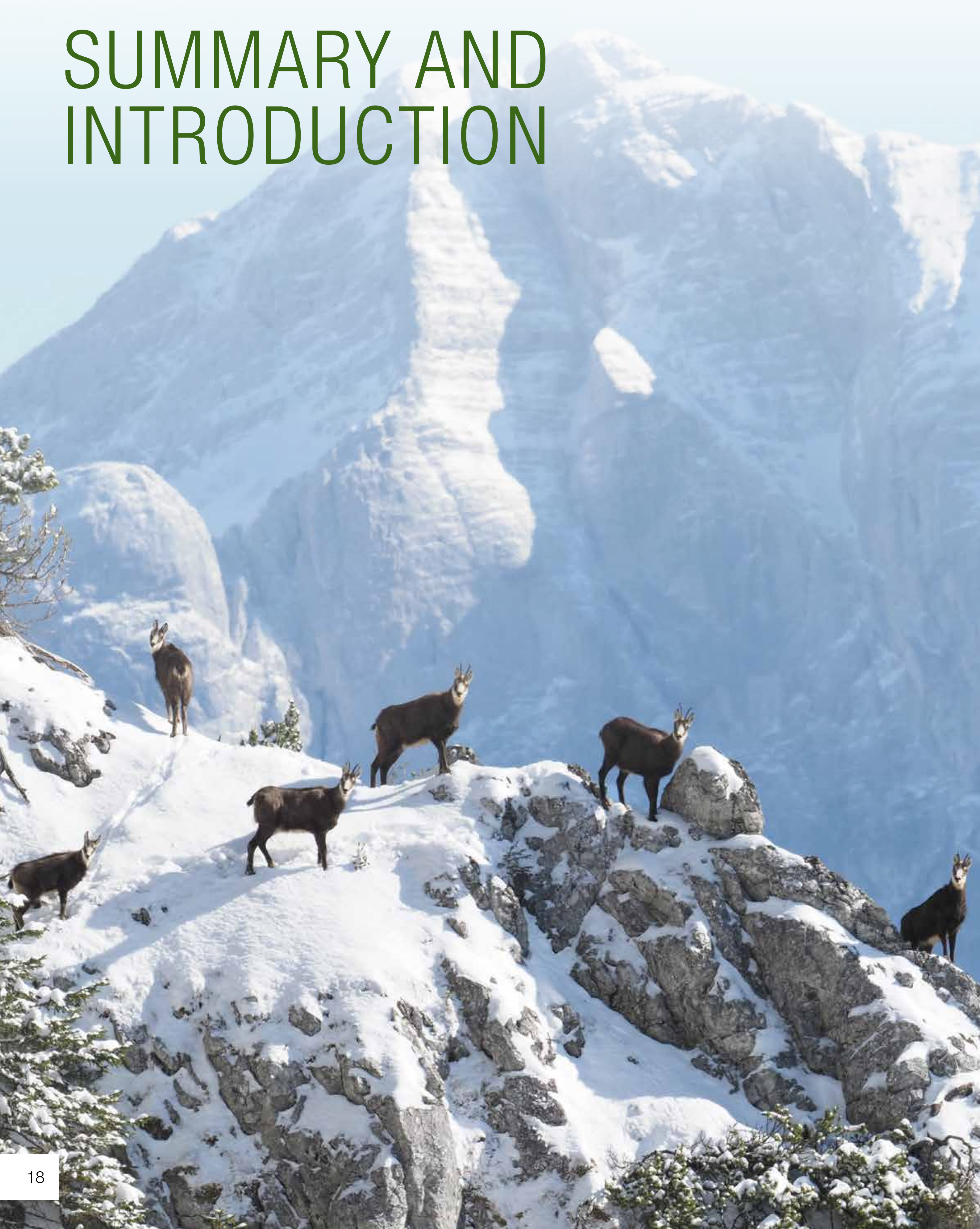
B

SUMMARY AND INTRODUCTION



B.1

SUMMARY

The decision of the COP 15 (Biodiversity), in December 2022, coincided with the completion of work on this report. While, as of July 2022, the IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services) generally expressed pessimism about the evolution of global biodiversity, the decision of COP 15 to protect 30% of the earth's marine and terrestrial biodiversity by 2030 is a clear call for change and more effective protection of biodiversity by protected areas. For the Alps, with a large number of very heterogeneous protected areas, this decision demands more coordinated strategies between the Alpine countries in favour of protected areas within the framework of the Alpine Convention.

The Alpine protected areas currently represent a very large mosaic of different situations and types even within the same categories and denominations. Harmonisation of management standards has not yet been achieved and does not always enjoy strong political support. Of the 28.5% of protected areas within the Alpine Convention, only a third are effectively protected, or around 10% of the entire surface area. The path to achieving the COP 15 goal is still long and complex as not all protected areas have an IUCN category that would facilitate the strategy. Furthermore, there are important land-use conflicts that are exacerbated by a deteriorating climate situation.

In general, the Alps are still lacking in large strong protected areas, and, according to the analysis we completed within this work, it seems difficult to establish such large surfaces with a strong protection status due to the historic and often intensive land use practices of the Alpine territory. The solution can only come from targeted strategies and measures, such as stronger protection at lower altitudes, better connection between protected areas through adapted measures, and effective defragmentation (ecological connectivity). In the best-case scenario, these solutions would be negotiated with stakeholders and the local population to improve the area's protection status wherever possible through more consistent rules for Alpine land use that include the needs for intact habitats.

Expression of the "ecological significance" of existing and future protected areas was one of the most difficult features to define for the Alpine territories as Alps-wide data for biodiversity and species distribution are often not available. The integration of Key Biodiversity Areas (KBA) and Nature 2000 sites, both of which reflect ecological importance of the concerned territory, helped to fill this gap. More than two-thirds of the strong protected areas of the Alps overlap with those KBA's.

Our most important conclusions are: **Alpine protected areas are too small, too high, and, especially in the case of the strong protected areas, not well enough interconnected; they also lack sufficient common management approaches beyond regions and national borders**. All of these factors contribute to inadequate ecological process protection in the Alps, and Wilderness remains an exception in the Alpine space occupying only a very low percentage of the surface area (0.4% of the Alpine Convention perimeter, IUCN I a+b).

The most promising approach to maintaining biodiversity in the long run is to promote more ecological connectivity within a global planning framework of connectivity combined with local actions that include stakeholders and the local population.

To achieve the 30% goal, three essential strategies are needed: a) to identify all potentially ecologically interesting areas with potential to be protected and integrate those areas into spatial planning procedures; b) to be creative and innovative concerning the forms and types of protected areas to be adapted for local or regional situations with the clear condition that they must contribute to effective biodiversity protection, and last but not least c) to incorporate the local population in the planning and management questions. We will not sustainably achieve the 30% goal in the Alpine region without our populations!

The final section of the report tried to develop suggestions for a future protected areas scenario in the Alps. It seems very difficult to achieve the 30% goal of effective protected areas within the existing network. **Success would require a significant increase (by at least 25%) in the most ecologically valuable spaces that combine important extension, a high protection status, a well-balanced altitudinal distribution, and a high degree of connectivity criteria with a very low presence of infrastructure or settlements (open space).** Furthermore, addressing the criterion of "efficient protection" requires us to **provide a real protection status to all so-called "weak protected areas"**, to guarantee that all KBA's are also covered by the same (strong) protection status, and, finally, to ensure a high degree of ecological connectivity.

As the probability of the implementation of these important measures within the existing framework is low and unrealistic in the near future, we enhanced our approach with a final spatial planning simulation to identify areas that are potentially interesting for the 30x30 goal

beyond the existing protected area network. The results of important projects of the last years (mainly INTERREG Alpine Space) informed our proposal for a spatial planning system to reach the 30x30 goal of COP 15. Based on the combination of areas identified as ecologically favourable by this report with areas having a low degree of fragmentation and spatial development, new areas were identified with potential for integration into the protected areas network. Those with ecological significance yet lacking a **strong protection status could be considered in a spatial planning strategy integrating the 30% goal of effective protected areas in the Alps.**

We are aware that this goal of 30% is based on national boundaries. Nevertheless, it makes perfect sense to apply it to the Alps as a common biogeographical region unified by an international treaty, the Alpine Convention.

This report illustrates the state of the protected areas with their most important, primarily quantitative characteristics, delivers data for future expertise and studies, and, finally, proposes strategic intervention measures to reach the 30x30 goal of better protection of biodiversity for generations to come.

B.2

GLOSSARY

We provide you with a glossary defining basic terms and concepts and our understanding of them. This will help avoid misunderstanding and ensure that we have common ground for the technical terms being used.

Blue Infrastructure: *Blue infrastructure describes a "water network that supports native species, maintains natural ecological processes, prevents flooding, sustains air and water resources and contributes to the health and quality of life of local communities". (Eionet)*

Climate Change Resilience: "*Climate resilience is a component of the broader concept of resilience. It refers to the capacity of human and natural systems to learn, adapt and transform in response to risks induced or exacerbated by climate variability and change.* **Climate risks** *are a function of the interaction between: i) environmental hazards triggered by climate variability and change; ii) exposure of human, natural and infrastructure systems to those hazards; and iii) the systems' vulnerabilities (e.g., its sensitivity or susceptibility to hazards, and the constraints on capacity to adapt and cope.)" (IPCC 2018)*

Governance: The term describes the structures of decision making in terms of distribution of power, authority and responsibility. It illustrates who is involved in the decision-making process and how this process is regulated; accountability is also included. There are several governance types for protected areas, and it must be decided for each site which setup is the most appropriate. The main objective must always be to deliver effective conservation measures while respecting the rights of relevant stakeholders and their livelihoods (according to Borrini-Feyerabend et al. 2014).
"*The IUCN definition takes a dynamic perspective: it's the "interactions among structures, processes and traditions that determine how power and responsibilities are exercised, how decisions are taken and how citizens and other stakeholders have their say". Simply put this means it is about who makes decisions, how the decisions are made and how appropriate, adaptive and fair those decisions are. Governance is commonly discussed in two dimensions: governance diversity (or governance type) and governance quality". (IUCN)*

Green Infrastructure: Green Infrastructure is *"a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings". (European Commission 2013)*

Natura 2000: *"Natura 2000 is an ecological network composed of sites designated under the Birds Directive (Special Protection Areas, SPAs) and the Habitats Directive (Sites of Community Importance, SCIs, and Special Areas of Conservation, SACs)". (European Commission)*
"Natura 2000 is not a system of strict nature reserves from which all human activities would be excluded. While it includes strictly protected nature reserves, most of the land remains privately owned. The approach to conservation and sustainable use of the Natura 2000 areas is much wider, largely centred on people working with nature rather than against it". (European Commission)

Other effective area-based conservation measures: *"Other effective area-based conservation measure" means "a geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity with associated ecosystem functions and services and, where applicable, cultural, spiritual, socioeconomic, and other locally relevant values". (CBD 2018)*

Strong Protection: There is no general definition of the terms strong or strict protection status of protected areas. In order to provide a working definition that is both applicable and meaningful, we propose the following: Strictly protected areas in the Alps are considered wilderness zones, core zones of National Parks, nature reserves, and some Italian nature parks. This corresponds to IUCN categories I, II, III[1] and IV. This is in line with the definition taken from the French strategy for protected areas 2020-2030. The definition reads as follows:
"A protected area under strong protection is defined as a natural space in which the main pressures generated by human activities on the ecological environment are significantly reduced, in a sustainable manner, thanks to the implementation of appropriate regulations and/or management, combined with effective control of the activities concerned". (Translated by the author)

Wilderness Area: *"A wilderness is an area governed by natural processes. It is composed of native habitats and species and large enough for the effective ecological functioning of natural processes. It is unmodified or only slightly modified and without intrusive or extractive human activity, settlements, infrastructure or visual disturbance". (Wild Europe)*

[1] Category III Protected Areas are usually quite small in surface, even though the conservation measures are similar to those in category II protected areas. Due to the small size these areas are not considered in the GIS analysis, which takes into account sites larger than 100 ha.

B.3

INTRODUCTION

The Alpine protected area policy is a hundred years old. However, in addition to the classic protected area concepts in the form of National Parks and nature reserves, new entities have been added without checking for consistency in their management. Today, the Alps represent a mosaic of various forms of protected areas, the objectives of which are not necessarily comparable between all Alpine states, even with the same designations.

Since 1995, ALPARC has been the platform for cooperation between Alpine protected area managers within the framework of the Alpine Convention and, since 2015, also within the framework of the EUSALP. It is therefore natural for ALPARC to address the question of the further development of protected area forms, to seek opportunities for strengthening cooperation between the Alpine states on this issue, and to promote this process by directly involving the protected area managers and their higher authorities.

Initial work on protected area concepts has been carried out by ALPARC since 1997 based on a comparative approach. Further work, events and publications on this topic have been realised by ALPARC during its more than 25 years of collaboration with experts in this field. Particularly noteworthy in this context are the two current publications:

- Plassmann G., Kohler Y., Badura M., Walzer C. (2016): Alpine Nature 2030. Creating [ecological] connectivity for generations to come. Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. Berlin 251 p.
- Broggi M., Jungmeier M., Plassmann G. et al. (2017): Die Schutzgebiete im Alpenbogen und ihre Lücken. In „Natur und Landschaft“, Jhrg. 92, Heft 9/10, Seiten pp. 432 etc.

The management of protected areas in the Alps are constantly under consideration, also within the framework of international associations such as the IUCN or the WWF – but these are usually not very “Alps-specific”. ALPARC has focussed on this topic for many years, especially within the framework of the Alpine Convention. ALPARC is an accomplished and internationally recognised partner with the largest network of protected areas and experts on this concrete and forward-looking issue for Alpine nature conservation within the framework of a European nature conservation strategy.

The **Alpine Convention** refers to the importance of this issue as an instrument of international law in several articles of the Protocol **“Nature Conservation and Landscape Management**”. It played a central role in the present project.

The motivation and urgency of this project is well described in the summary of the recently published and above article in the journal “Natur und Landschaft”:

“Protected areas are central elements of nature conservation. Large protected areas should make their contribution to the conservation of biodiversity, but this does not always succeed. The stronger the protection, the more likely it is to be limited to a few high elevation sites shaped by anthropogenic activity. Deficits exist in the forest, in near-natural rivers and in general in the lowlands, especially in peri-urban areas. In terms of geographical representation, there are deficits in large-scale protected areas on the eastern edge of the Alps, in Liguria and on the edge of the Western Alps. Protected areas are also heavily isolated in the transition area between the Alps and their foreland, especially due to intensively used valleys. After all, a variety of terms and different objectives make a cross-border comparison difficult. Parks of new character should act as a model of extensive nature conservation, and large-scale wilderness areas would also be desired. Parks of the future must also develop into a living instrument for activating the local population and into model areas for benefit and burden balancing between urban and rural areas”.

(Broggi M., Plassmann G., Jungmeier M., Scherfose V., Solar M., 2017)

That is the summary of the current situation. The aim of this project is, on the basis of this knowledge, to propose solutions on how to counter the gaps in the network of protected areas in the Alps. Furthermore, it strives to promote greater cooperation between the Alpine protected areas towards a coherent network of protected areas with largely harmonised and thus more efficient management measures, considering local and regional specifics.

LONG-TERM GOAL (VISION):

Establishment of a coherent transnational spatial network of protected areas with harmonised objectives and management that meets the specific ecological, economic, social, and cultural requirements of the Alps.

PROJECT RESULTS, PRODUCTS AND IMPACTS

The decisive and desired result of the project is to map a path toward a more efficient and coordinated protected area policy throughout the Alps. The results of the individual chapters are intended to provide technical support for this process and to highlight particular perspectives.

Specifically, the project is intended to contribute to:

a) harmonising the management and measures of the existing protected areas more internationally in the sense of an Alpine-wide protection of biodiversity and

b) to define new forms of protected area where necessary and meaningful. The involvement of the local population in a new protected area policy with horizon 2030 is essential.

Long-term effects are the implementation of an Alpine-wide coordinated protected area policy and an increasingly up-to-date adaptation of protected area management and the types of protected areas as well as their protection status with regard to informed and responsible nature conservation.

The recent decision from the COP 15 Biodiversity by December 22 has an impact on the results and simulations of possible future protected areas within this report.

B.4

EINLEITUNG

Die alpine Schutzgebietspolitik ist hundert Jahre alt. Zu den klassischen Schutzgebietskonzepten in Form von Nationalparken und Naturschutzgebieten kamen neue dazu, ohne jedoch die Kohärenz ihres Managements untereinander zu prüfen. Heute stellen die Alpen ein Mosaik verschiedenster Schutzgebietsformen dar, deren Zielsetzungen selbst bei gleichen Bezeichnungen nicht unbedingt zwischen allen Alpenstaaten vergleichbar sind.

ALPARC ist seit 1995 die Plattform zur Zusammenarbeit der alpinen Schutzgebietsverwalter im Rahmen der Alpenkonvention und seit 2015 auch im Rahmen der EUSALP. Es ist daher natürlich, dass ALPARC sich der Frage der weiteren Entwicklung der Schutzgebietsformen widmet, Möglichkeiten einer stärken Zusammenarbeit der Alpenstaaten zu diesem Thema anstrebt und diesen Prozess mittels eines direkten Einbezugs der Schutzgebietsverwalter und ihrer vorgesetzten Behörden fördert.

Erste Arbeiten zum Thema Schutzgebietskonzepte wurden auf der Basis eines vergleichenden Ansatzes bereits seit 1997 von ALPARC erstellt. Weiterführende Arbeiten, Veranstaltungen und Veröffentlichungen zu diesem Thema wurden von ALPARC im Laufe seiner über 25-jährigen Tätigkeit immer wieder gemeinsam mit Experten dieses Themas realisiert. Besonders zu erwähnen sind in diesem Zusammenhang die beiden aktuellen Veröffentlichungen:

- Plassmann G., Kohler Y., Badura M., Walzer C. (2016): Alpine Nature 2030. Creating [ecological] connectivity for generations to come. Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit. Berlin 251 S.
- Broggi M., Jungmeier M., Plassmann G. et al. (2017): Die Schutzgebiete im Alpenbogen und ihre Lücken. In „Natur und Landschaft“, Jhrg. 92, Heft 9/10, Seiten 432-439.

Überlegungen zum Schutzgebietsmanagement der Alpen werden immer wieder geführt, auch im Rahmen internationaler Verbände wie der IUCN oder dem WWF – allerdings sind diese meist nicht sehr „alpenspezifisch“. Auch ALPARC arbeitet seit vielen Jahren zum Thema, besonders im Rahmen der Alpenkonvention.

ALPARC ist hierfür sicher ein kompetenter und sehr internationaler Partner mit dem größten Netzwerk von Schutzgebieten und Experten zu dieser konkreten und für den alpinen Naturschutz zukunftsweisenden Fragestellung im Rahmen einer europäischen Naturschutzstrategie.

Die **Alpenkonvention** weist auf diese Thematik in ihrer Bedeutung als völkerrechtliches Instrument in mehreren Artikeln des Protokolls **„Naturschutz und Landschaftspflege“** hin. Sie spielte eine zentrale Rolle bei dem vorliegenden Projekt.

Die Motivation und Notwendigkeit dieses Projektes ist in der Zusammenfassung des kürzlich erschienen und oben genannten Artikels in der Zeitschrift „Natur und Landschaft“ gut beschrieben:

„Schutzgebiete sind zentrale Elemente des Naturschutzes. Großschutzgebiete sollten ihren Beitrag zur Erhaltung der Biodiversität leisten, was aber nicht immer gelingt. Je stärker der Schutz, desto eher ist dieser auf wenige anthropogen überformte Hochlagen beschränkt. Defizite bestehen im Wald, bei naturnahen Flüssen und ganz allgemein in den Tieflagen, insbesondere in peri-urbanen Räumen. In der geographischen Repräsentanz bestehen Defizite von großflächigen Schutzgebieten am Ostalpenrand, in Präligurien sowie am Rand der Westalpen. Schutzgebiete sind zudem im Übergangsbereich zwischen den Alpen und ihrem Vorland v. a. durch intensiv genutzte Täler stark verinselt. Eine Begriffsvielfalt und unterschiedliche Zielstellungen machen schließlich einen länderübergreifenden Vergleich schwierig. Parks neuer Prägung sollen als Modell eines Extensiv-Naturschutzes wirken, auch großflächige Wildnisgebiete wären erwünscht. Parks der Zukunft müssen sich zudem zu einem lebendigen Instrument der Aktivierung der lokalen Bevölkerung und zu Modellgebieten des Nutzen- und Lastenausgleichs zwischen Stadt und Land entwickeln.“

(Broggi M., Plassmann G., Jungmeier M., Scherfose V., Solar M., 2017)

Das ist die Feststellung der aktuellen Situation. Ziel dieses Projektes war es, auf der Basis dieser Erkenntnis, Lösungen vorzuschlagen wie den Lücken im Schutzgebietsnetzwerk der Alpen begegnet werden kann. Im Weiteren, wie eine stärkere Zusammenarbeit der alpinen Schutzgebiete hin zu einem kohärenten Netzwerk von Schutzgebieten mit weitgehend harmonisierten und somit effizienteren Managementmaßnahmen gefördert werden kann unter der grundsätzlichen Berücksichtigung lokaler und regionaler Spezifika.

LANGFRISTIGES ZIEL (VISION):

Aufbau eines kohärenten staatenübergreifenden räumlichen Schutzgebietsnetzwerks mit harmonisierten Zielen und Management das den speziellen ökologischen, ökonomischen, sozialen und kulturellen Anforderungen der Alpen gerecht wird.

PROJEKTERGEBNISSE, PRODUKTE UND AUSWIRKUNGEN

Das entscheidende Projektergebnis besteht darin, einen Prozess zu einer effizienteren und alpenweit abgestimmten Schutzgebietspolitik zu lancieren. Die Ergebnisse der einzelnen Kapitel sollen diesen Prozess fachlich unterstützen und Perspektiven aufzeigen.

Konkret soll das Projekt dazu beitragen um:

a) das Management und die Maßnahmen der bestehenden Schutzgebietsformen stärker international zu harmonisieren im Sinne eines alpenweiten Schutzes der Biodiversität und

b) dort wo nötig und sinnvoll neue Schutzgebietsformen zu definieren. Die Einbindung der lokalen Bevölkerung in eine neue Schutzgebietspolitik mit dem Horizont 2030 ist dabei wesentlich.

Langfristige Auswirkungen sind die Umsetzung einer alpenweit abgestimmten Schutzgebietspolitik und eine, den Anforderungen des Naturschutzes zunehmend zeitgemäße Anpassung des Schutzgebietsmanagements und der Schutzgebietstypen sowie ihres Schutzstatus.

Die jüngste Entscheidung der COP 15 Biodiversität wird ein wesentlicher Impuls für die Ergebnisse und Simulationen möglicher zukünftiger Schutzgebiete innerhalb dieser Studie sein.

B.5

INTRODUCTION

La politique des espaces protégés dans l'arc alpin a 100 ans. Les types d'aires protégées classiques tels que les parcs nationaux et les réserves naturelles ont été complétés par de nouvelles formes, sans que l'on cherche à s'assurer de la cohérence entre les modes de gestion de ces différentes entités. Aujourd'hui, les Alpes sont couvertes d'une mosaïque d'aires protégées de types très différents, dont les objectifs ne sont pas nécessairement comparables d'un État alpin à l'autre, y compris lorsqu'elles portent le même nom.

ALPARC est depuis 1995 la plate-forme de coopération des gestionnaires d'espaces protégés alpins dans le cadre de la Convention alpine, et depuis 2015 également dans le cadre de la SUERA. Il est donc naturel qu'ALPARC se penche sur la question du développement de nouvelles formes d'aires protégées. ALPARC vise dans ce contexte à renforcer la coopération entre les États alpins et à favoriser ce processus par le biais d'une implication directe des gestionnaires d'espaces protégés et de leurs autorités de tutelle.

ALPARC mène depuis 1997 des études sur les différents types d'aires protégées sur la base d'une approche comparative, et a réalisé régulièrement pendant plus de 25 ans des travaux complémentaires, des événements et des publications sur ce thème, en collaboration avec des experts. On évoquera notamment les deux publications les plus récentes :

- Plassmann G., Kohler Y., Badura M., Waltz C. (2016) : Alpine Nature 2030. Creating [ecological] connectivity for generations to come. Ministère fédéral de l'environnement, de la protection de la nature, de la construction et de la sûreté nucléaire. Berlin, 251 p.
- Broggi M., Jungmeier M., Plassmann G. et al (2017) : Die Schutzgebiete im Alpenbogen und ihre Lücken. In « Natur und Landschaft », 92ème année, vol. 9/10, pp. 432-439.

De nombreuses réflexions ont déjà été engagées sur la gestion des espaces protégés dans les Alpes, y compris dans le cadre d'organisations internationales telles que l'UICN ou le WWF, mais ces réflexions ne sont en général pas particulièrement « spécifiques aux Alpes ». ALPARC travaille depuis de nombreuses années sur cette thématique, en particulier dans le cadre de la Convention alpine. ALPARC regroupe le plus grand réseau d'espaces protégés et d'experts sur cette question concrète, essentielle pour l'avenir de la protection alpine dans le cadre d'une stratégie européenne de protection de la nature, et est donc à ce titre un partenaire compétent et très international.

En tant qu'instrument de droit international, la **Convention alpine** fait référence à cette thématique dans plusieurs articles du Protocole **« Protection de la nature et entretien des paysages »**. Elle jouera un rôle central dans le présent projet.

La motivation et la nécessité de ce projet sont bien décrites dans le résumé de l'article récent évoqué ci-dessus, publié dans la revue « Natur und Landschaft » :

« Les espaces protégés sont un élément fondamental de la protection de la nature. Les grands espaces protégés ont vocation à contribuer au maintien de la biodiversité, mais n'y parviennent pas toujours. Plus le statut de protection est élevé, plus les aires protégées sont limitées à des sites anthropisés de haute montagne. Des déficits sont relevés dans les zones forestières, aux abords des cours d'eau proches de l'état naturel, et plus généralement dans les plaines, notamment dans les zones périurbaines. Au niveau géographique, on observe un déficit de grands espaces protégés dans les contreforts orientaux des Alpes, dans le secteur de l'avant pays de la Ligurie et à la lisière des Alpes occidentales. Par ailleurs, les espaces protégés situés dans la zone de transition entre les Alpes et les Préalpes sont fortement isolés les uns aux autres par la présence de vallées dominées par des pratiques agricoles intensives. Enfin, la diversité des concepts et des objectifs rend la comparaison difficile entre les différents pays alpins. De nouveaux types de parcs pourraient faire office de modèles pour une protection extensive de la nature. Il serait aussi souhaitable de créer de grandes zones de nature sauvage. Les parcs du futur doivent également devenir un instrument vital pour l'implication de la population locale, ainsi que des modèles pour une répartition équitable des charges et des bénéfices entre la ville et la campagne. »

(Broggi M., Plassmann G., Jungmeier M., Scherfose V., Solar M., 2017)

Ceci reflète la situation actuelle. L'objectif de ce projet était de proposer, sur la base de ce constat, des solutions pour combler les lacunes du réseau des espaces protégés dans les Alpes. Il visait également à poser les jalons d'une coopération renforcée entre les espaces protégés alpins, afin de créer un réseau cohérent d'espaces protégés dotés d'instruments de gestion largement harmonisés, et donc plus efficaces tout en prenant en compte les spécificités régionales et locales.

OBJECTIF À LONG TERME (VISION) :

Mise en place d'un réseau d'espaces protégés transnational et cohérent, avec des objectifs et des modèles de gestion harmonisés répondant aux exigences écologiques, économiques, sociales et culturelles spécifiques à la région.

RÉSULTATS DU PROJET, PRODUITS ET EFFETS

Le principal résultat du projet est le lancement d'un processus en vue de la mise en place d'une politique des espaces protégés plus efficace et mieux concertée à l'échelle alpine. Les résultats des différents chapitres fourniront un appui technique à cette démarche et mettront en lumière les perspectives.

Concrètement, le projet devrait contribuer:

a) à une meilleure harmonisation internationale de la gestion et des activités des différentes formes d'aires protégées existantes, dans le sens d'une protection de la biodiversité à l'échelle alpine,

b) à la définition de nouvelles formes d'espaces protégés là où c'est nécessaire et utile. L'implication de la population locale jouera un rôle essentiel dans une nouvelle politique des espaces protégés à l'horizon 2030.

Les effets à long terme seront la mise en œuvre d'une politique des espaces protégés concertée à l'échelle alpine, ainsi qu'une adaptation de la gestion des espaces protégés, des types d'espaces protégés et de leur statut de protection aux exigences modernes de la protection de la nature.

La récente décision de la COP 15 Biodiversité sera une impulsion essentielle pour les résultats et simulations d'éventuelles futures aires protégées dans le cadre de cette étude.

B.6

INTRODUZIONE

La politica delle aree protette dell'arco alpino ha cento anni. Oltre ai classici concetti di area protetta sotto forma di parchi nazionali e riserve naturali, ne sono stati aggiunti di nuovi senza, tuttavia, verificare la coerenza della loro gestione. Oggi le Alpi rappresentano un mosaico di varie forme di aree protette, i cui obiettivi non sono necessariamente comparabili tra tutti gli Stati alpini, anche con le stesse denominazioni.

Dal 1995 ALPARC è la piattaforma per la cooperazione tra i gestori delle aree protette alpine nell'ambito della Convenzione delle Alpi e dal 2015 anche nell'ambito di EUSALP. È quindi naturale che ALPARC affronti la questione dell'ulteriore sviluppo delle forme di area protetta, cerchi opportunità per rafforzare la cooperazione tra gli Stati alpini su questo tema e promuova questo processo coinvolgendo direttamente i gestori delle aree protette e le loro autorità superiori.

Dal 1997 ALPARC ha iniziato a lavorare sui concetti di area protetta adottando un approccio comparativo. Ulteriori lavori, eventi e pubblicazioni su questo argomento sono stati realizzati da ALPARC nel corso di oltre 25 anni di attività insieme ad esperti in questo campo. Particolarmente degne di nota in questo contesto sono le due pubblicazioni seguenti:

- Plassmann G., Kohler Y., Badura M., Walzer C. (2016): Alpine Nature 2030. Creare connettività [ecologica] per le generazioni a venire. Ministero federale per l'ambiente, la conservazione della natura, l'edilizia e la sicurezza nucleare. Berlino 251 p.
- Broggi M., Jungmeier M., Plassmann G. et al. (2017): Die Schutzgebiete im Alpenbogen und ihre Lücken. In „Natur und Landschaft", Jhrg. 92, Heft 9/10, Seiten 432-439.

Le considerazioni sulla gestione delle aree protette nelle Alpi sono effettuate ripetutamente, anche nell'ambito di associazioni internazionali come la IUCN o il WWF – ma queste di solito non sono molto "specifiche per le Alpi". Anche ALPARC lavora da molti anni su questo tema, soprattutto nell'ambito della Convenzione delle Alpi. ALPARC è certamente un partner competente e molto internazionale con la più grande rete di aree protette ed esperti su questo tema concreto e lungimirante per la conservazione della natura alpina nel quadro di una strategia europea di conservazione della natura.

La **Convenzione delle Alpi** fa riferimento a questo tema nella sua importanza come strumento di diritto internazionale in diversi articoli del Protocollo **"Conservazione della natura e gestione del paesaggio**". Svolgerà un ruolo centrale nel presente progetto.

La motivazione e l'opportunità di questo progetto sono ben descritte nella sintesi dell'articolo di cui sopra recentemente pubblicato sulla rivista "Natur und Landschaft":

"Le aree protette sono elementi centrali della conservazione della natura. Le grandi aree protette dovrebbero dare il loro contributo alla conservazione della biodiversità, ma questo non sempre riesce. Più forte è la protezione, più è probabile che sia limitata a poche aree in quota non trasformate dall'attività umana. Permangono lacune nelle aree forestale, nei fiumi e in generale nelle pianure, specialmente nelle aree periurbane. In termini di rappresentazione geografica, mancano aree protette di grande superficie sul lato orientale delle Alpi, in Liguria e ai margini delle Alpi occidentali. Le aree protette sono anche fortemente isolate nell'area di transizione tra i territori tipicamente alpini e quelli circostanti, soprattutto a causa delle valli intensamente antropizzate. Dopo tutto, una varietà di termini e obiettivi diversi rende difficile un confronto al di là dei confini. I parchi di nuova concezione dovrebbero fungere da modello di conservazione estensiva della natura e anche aree selvagge su larga scala sarebbero auspicabili. I parchi del futuro devono inoltre diventare uno strumento di sviluppo sostenibile per la popolazione locale e aree modello per bilanciare costi e benefici tra aree urbane e rurali".

(Broggi M., Plassmann G., Jungmeier M., Scherfose V., Solar M., 2017)

Questa è l'analisi della situazione attuale. L'obiettivo di questo progetto è, sulla base di queste conoscenze, proporre soluzioni su come contrastare le lacune nella rete delle aree protette nelle Alpi. Inoltre, come promuovere una maggiore cooperazione tra le aree protette alpine verso una rete coerente di aree protette con misure di gestione ampiamente armonizzate e quindi più efficienti, tenendo

OBIETTIVO A LUNGO TERMINE (VISIONE):

Creazione di una rete spaziale transnazionale coerente di aree protette con obiettivi e gestione armonizzati che soddisfi le specifiche esigenze ecologiche, economiche, sociali e culturali delle Alpi.

RISULTATI, PRODOTTI E IMPATTI DEL PROGETTO

Il risultato decisivo del progetto è quello di avviare un processo verso una politica delle aree protette più efficiente e coordinata in tutto l'arco alpino. I risultati capitoli hanno lo scopo di fornire supporto tecnico per questo processo e di evidenziare particolari prospettive.

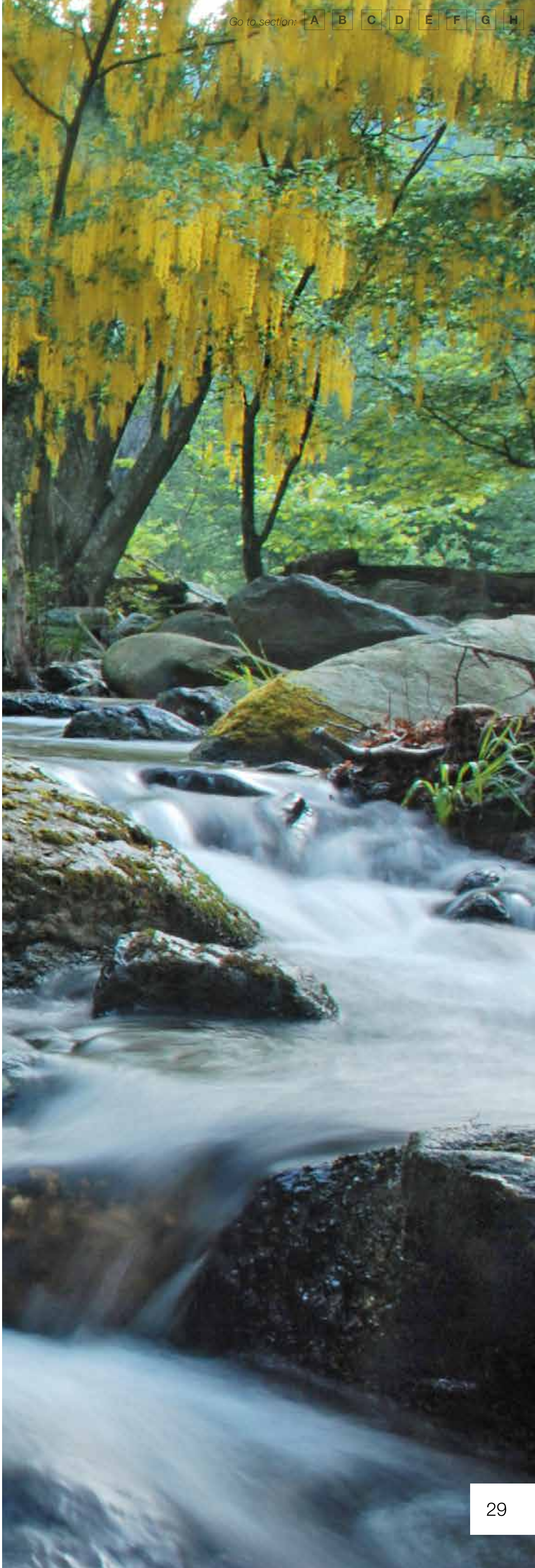
In particolare, il progetto intende contribuire:

a) ad armonizzare a livello internazionale la gestione e le misure di protezione delle aree protette esistenti, nel senso di una protezione della biodiversità a livello alpino e

b) a definire nuove forme di area protetta, ove necessario e significativo. Il coinvolgimento della popolazione locale in una nuova politica delle aree protette con orizzonte 2030 è essenziale.

Gli effetti a lungo termine sono l'attuazione di una politica delle aree protette coordinata a livello alpino e un adattamento constante della gestione delle aree protette e dei tipi di aree protette, nonché il loro livello di protezione, allo scopo di attuare pratiche di conservazione della natura informate e responsabili.

La recente decisione della COP 15 Biodiversità sarà uno slancio essenziale per i risultati e le simulazioni di possibili future aree protette all'interno di questo studio.



B.7

UVOD

Politika zavarovanih območij v Alpah je stara že sto let. Klasičnim konceptom zavarovanih območij v obliki narodnih parkov in naravnih rezervatov so se pridružili novi, vendar brez preverjanja skladnosti njihovega medsebojnega upravljanja. Danes so Alpe mozaik različnih vrst zavarovanih območij, katerih cilji med alpskimi državami niso nujno primerljivi, tudi če imajo enako poimenovanje.

ALPARC je od leta 1995 platforma za sodelovanje med upravljavci zavarovanih območij v Alpah v okviru Alpske konvencije, od leta 2015 pa tudi v okviru EUSALP. Zato je naravno, da se ALPARC ukvarja z vprašanjem nadaljnjega razvoja oblik zavarovanih območij, da išče načine za krepitev sodelovanja med alpskimi državami na tem področju in da ta proces spodbuja z neposrednim sodelovanjem upravljavcev zavarovanih območij in njihovih nadrejenih organov.

Začetno delo na področju konceptov zavarovanih območij je ALPARC opravljal od leta 1997 na podlagi primerjalnega pristopa. V svojem več kot 25-letnem delovanju je ALPARC skupaj s strokovnjaki s tega področja večkrat opravil nadaljnje delo, dogodke in publikacije na to temo. V zvezi s tem je treba posebej omeniti dve najnovejši publikaciji:

- Plassmann G., Kohler Y., Badura M., Walzer C. (2016): Ustvarjanje [ekološke] povezanosti za prihodnje generacije. Zvezno ministrstvo za okolje, varstvo narave, gradbeništvo in jedrsko varnost. Berlin 251 str.
- Broggi M., Jungmeier M., Plassmann G. et al. (2017): Zavarovana območja v alpskem loku in njihove vrzeli. In »Natur und Landschaft«, Jhrg. 92, Heft 9/10, Seiten 432-439.

Razmišljanja o upravljanju zavarovanih območij v Alpah so pogosta tema tudi v okviru mednarodnih združenj, kot sta IUCN ali WWF, vendar običajno niso preveč »alpsko specifična«. Tudi ALPARC se že vrsto let ukvarja s to temo, zlasti v okviru Alpske konvencije. ALPARC je v tem pogledu vsekakor kompetenten in zelo mednarodni partner z največjo mrežo zavarovanih območij in strokovnjakov za to konkretno in v prihodnost usmerjeno vprašanje varstva alpske narave v okviru evropske strategije varstva narave.

Alpska konvencija to vprašanje, ki je pomembno kot instrument mednarodnega prava, omenja v več členih protokola »**Varstvo narave in upravljanje krajine**«. V tem projektu bo imela osrednjo vlogo.

Motivacija in nujnost tega projekta sta dobro opisani v povzetku nedavno objavljenega in zgoraj omenjenega članka v reviji »Natur und Landschaft«:

»Zavarovana območja so osrednji element ohranjanja narave. Velika zavarovana območja bi morala prispevati k ohranjanju biotske raznovrstnosti, vendar to ni vedno uspešno. Močnejše kot je varstvo, večja je verjetnost, da bo omejeno na nekaj antropogeno deformiranih višav. Primanjkljaji so v gozdovih, ob naravnih rekah in na splošno v nižinah, zlasti na obmestnih območjih. Glede na geografsko zastopanost so pomanjkljiva obsežna zavarovana območja na vzhodnem robu Alp, v Preliguriji in na robu zahodnih Alp. Poleg tega so zavarovana območja na prehodnem območju med Alpami in njihovim predgorjem zelo izolirana, predvsem zaradi intenzivno izkoriščenih dolin. Nazadnje, zaradi različnih izrazov in različnih ciljev je meddržavna primerjava težavna. Parki novega tipa bi morali delovati kot model ekstenzivnega varstva narave; zaželena bi bila tudi obsežna območja divjine. Parki prihodnosti se morajo razviti tudi v živ instrument za aktiviranje lokalnega prebivalstva in v vzorčna območja delitve koristi in bremen med mestom in državo.«

(Broggi M., Plassmann G., Jungmeier M., Scherfose V., Solar M., 2017)

Takšne so trenutne razmere. Cilj tega projekta je bil na podlagi teh ugotovitev predlagati rešitve za odpravo vrzeli v alpskem omrežju zavarovanih območij. Poleg tega pa tudi, kako spodbuditi tesnejše sodelovanje alpskih zavarovanih območij v smeri povezanega omrežja zavarovanih območij s pretežno usklajenimi in s tem učinkovitejšimi upravljavskimi ukrepi ob upoštevanju lokalnih in regionalnih posebnosti.

DOLGOROČNI CILJ (VIZIJA):

Vzpostavitev skladne nadnacionalne prostorske mreže zavarovanih območij z usklajenimi cilji in upravljanjem, ki ustreza posebnim ekološkim, gospodarskim, socialnim in kulturnim potrebam Alp.

REZULTATI, IZDELKI IN UČINKI PROJEKTA

Odločilni rezultat projekta je začetek procesa za učinkovitejšo in na celotnem območju Alp usklajeno politiko zavarovanih območij. Rezultati posameznih poglavij naj bi zagotovili tehnično podporo temu procesu in nakazali perspektive.

Konkretno naj bi projekt prispeval k:

a) močnejšemu usklajevanju upravljanja in ukrepov obstoječih oblik zavarovanih območij na mednarodni ravni v smislu varstva biotske raznovrstnosti na celotnem območju Alp in

b) opredelitvi novih oblik zavarovanih območij, kjer je to potrebno in primerno. Vključevanje lokalnega prebivalstva v novo politiko zavarovanih območij s časovnim okvirom do leta 2030 je bistvenega pomena.

Dolgoročni učinki so izvajanje usklajene politike zavarovanih območij na celotnem območju Alp in vse sodobnejša prilagoditev upravljanja zavarovanih območij, vrst zavarovanih območij in njihovega varstvenega statusa zahtevam varstva narave.

Nedavna odločitev COP 15 o biotski raznovrstnosti bo pomembna spodbuda za rezultate in simulacije morebitnih prihodnjih zavarovanih območij v okviru te študije.

C

CHAPTER 1
EVALUATION OF EXISTING PROTECTED AREA TYPES AND THEIR MANAGEMENT

WORKING HYPOTHESES[1]

1. Protected areas account for 28% of the Alpine Convention perimeter, but they are subject to significant differences in protection status, ranging from weak to strong protection.
2. Transboundary protected areas goals are not well harmonised and are missing a common legal framework
3. A special wilderness protection is necessary
4. Protected areas territories with the same denomination differ in their mission, protection status and significance
5. Even protected areas with comparable missions are not necessarily harmonised and are not always placed in the same political context
6. International coordination of management measures is not sufficient
7. Attribution of protected areas to the IUCN categories is still not complete
8. Indicators for the integration of human activities in protected areas are needed

[1] Working Hypotheses in green have a strong territorial or spatial context, in orange they are rather linked to management issues.

C.1

CLASSIFICATION

C.1.1

WHY AND WHERE DO WE NEED PROTECTED AREAS?

The Alps encompass a highly diverse system of landscapes and ecological processes, some of which have arisen from their geological, climatological and biological evolution, and parts of which have been shaped by hundreds of years of human habitation and land-use. Today´s Alps are cultural landscapes, especially in the lower regions, but human impact is felt even at high elevations. They are not, then, wilderness areas in the sense of pristine nature, untouched by human activity. Nevertheless, they are in some ways also “wild” places, places where natural spaces have been transformed, but where ecological processes can still occur without much anthropological influence (Plassmann 2016).

Threats to natural spaces in the Alps occur from many sources and are primarily anthropogenic. There are, on the one hand, direct and immediate threats, such as the increase in leisure activities that may have negative impacts on wildlife and biologically diverse ecosystems, and the progressive fragmentation of landscapes by the construction of infrastructure, land use changes (e.g., the abandonment of traditional farming practices that foster biodiversity) and intensive use of natural resources. On the other hand, there are harder-to-pin-down threats posed by climate change, which brings with it changes in the distribution of vegetation and wildlife, as well as in meteorological patterns. All this, and especially the land fragmentation, results in shrinking habitats for wildlife. Without protection and restoration, certain habitat types may be lost altogether, while others are turned into isolated islands that do not allow the migration of species between habitat fragments.

The importance of protected areas is recognised by national governments in Article 8 of the Convention on Biological Diversity (CBD) and through the Programme of Work on Protected Areas (PoWPA), which was adopted in 2004 and sets out 16 goals and several targets. The Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets were adopted in 2010 in Nagoya, Japan, at the 10th Conference of the Parties to the CBD. These are widely recognised as a comprehensive framework for all the biodiversity-related conventions and the entire United Nations system. This framework explicitly includes at least 17 percent of terrestrial lands to be protected by 2020.

Mountains are specifically mentioned in paragraph 7 of Article 20 of the Convention text. There is also the Programme of Work on Mountain Biodiversity: This Programme of Work contains provisions on how to plan, establish and manage protected areas in mountain ecosystems, including buffer zones around protected areas (Decision VII/27); the establishment of effective national, regional and international networks of mountain protected areas, and the promotion of integrated transboundary cooperation (CBD 2007).

As of 2018, terrestrial protected areas covered just under 15% of the Earth’s land surface (UNEP-WCMC, IUCN and NGS 2018). This is an increase compared to previous reporting periods, and yet, legally protected does not necessarily mean effectively protected for biodiversity conservation, nor are all ecosystem types equally represented in this global protection statistic. Furthermore, only about 20% of key biodiversity areas are completely protected (UNEP-WCMC, IUCN and NGS 2018). Jones et al. (2018) studied the extent to which protected areas are under human pressure by comparing a comprehensive global map of human pressure on the environment (the human footprint dataset) to the location of protected areas.

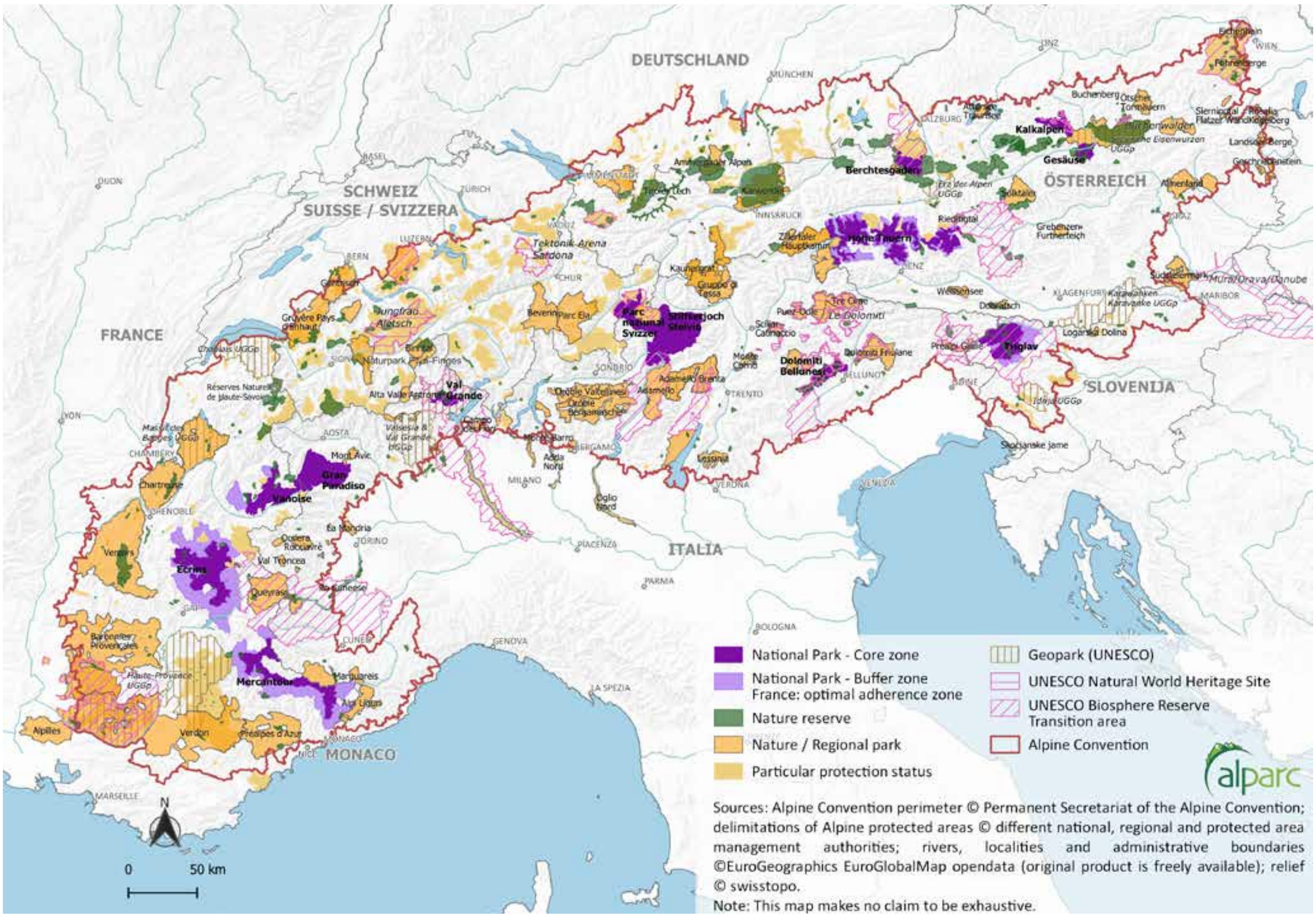
They found that a third of this area globally is significantly impacted by intensive human activity (Jones et al. 2018). Only the most remote northern regions remain nearly untouched. Even there, however, scientists have observed and documented impacts due to climate change and air pollution.

Strict biodiversity conservation areas (IUCN categories I and II) experience less human pressure than those that allow a broader range of activities (for example, sustainable use of natural resources, as in IUCN categories III to VI). This does not mean that biodiversity conservation is not possible in such areas. Some protected areas are deliberately placed in areas of high human activity, for example to connect more strictly protected areas and thereby ensure an ecological continuum that allows species to move or migrate in accordance with their natural behaviour or in response to external pressures. Creating ecological connectivity is a key component of wildlife conservation, as species' populations confined to small, isolated areas may be unable to adapt to climate change by moving, and they may be subject to inbreeding depression if there is no genetic exchange with other populations.

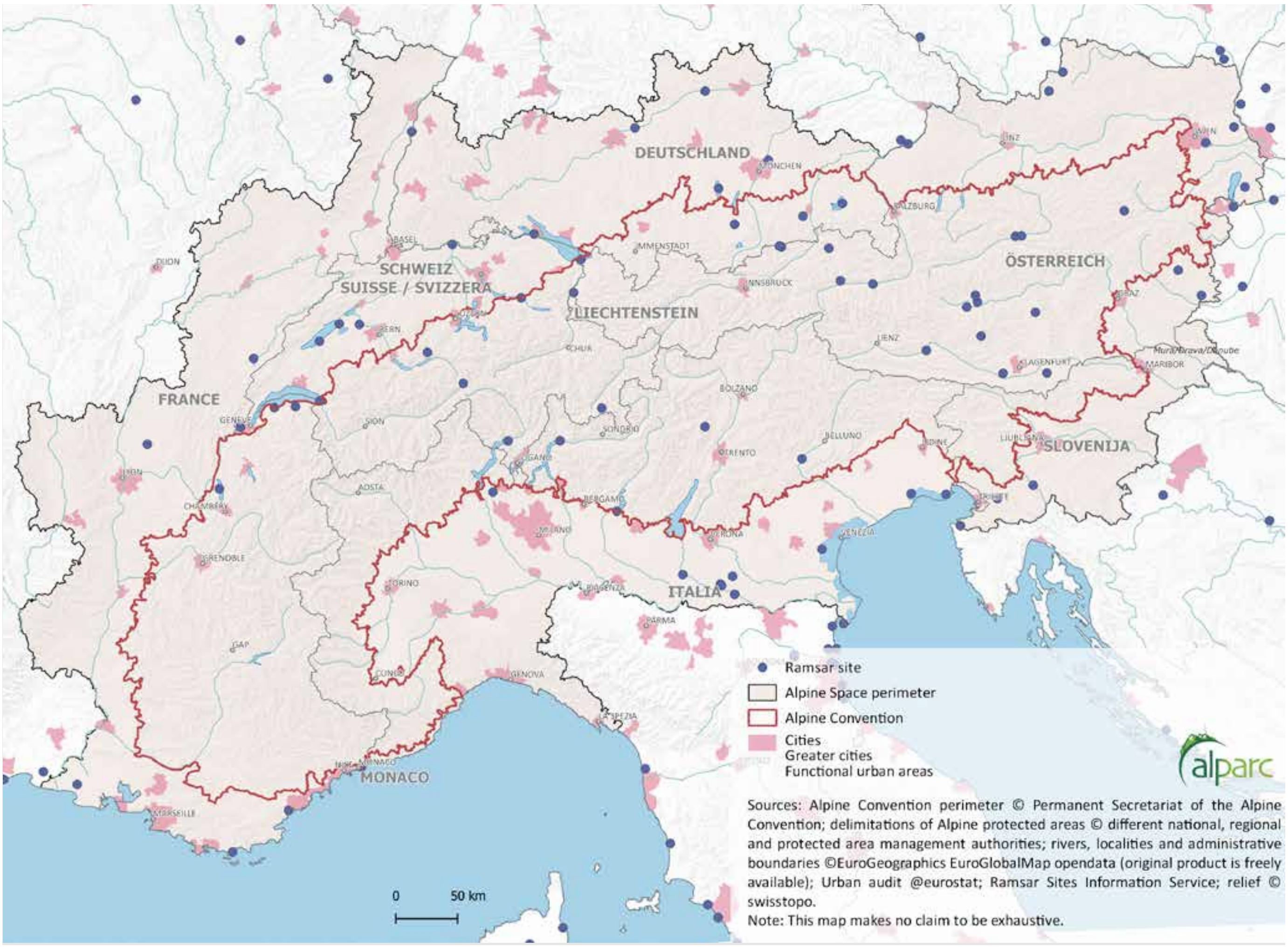
About 28.5% of the territory within the Alpine Convention boundaries is under some form of protection, a lot more than the global average number of 15% (UNEP-WCMC, IUCN and NGS 2018; Broggi et al. 2017). At first glance, it seems that this is a high degree of protection, but only a small part of this conforms to IUCN protection categories I, II, and IV, i.e., to the more strictly protected categories (Plassmann 2016). For example, the core area of National Parks in the Alpine Convention perimeter covers 3.72%. Furthermore, according to the analysis by Jones et al. (2018), for example in Austria, while overall the land area protected is large, almost a third of this is located in areas subject to intense human pressure, while only 0.46% is in areas of low human pressure (using the footprint measurement approach).

In Liechtenstein, 40% of protected land is located in areas of high human pressure (Jones et al. 2018). In addition, the distribution of protected areas across different elevation levels is uneven, with the most strictly protected areas (e.g., the core zones of National Parks) found at the highest elevations, where there is little human settlement to limit conflicts with human land-use (Broggi et al. 2017).

Map 1: Protected Areas in the Alpine Convention Area



Map 2: Ramsar Sites in Alpine Countries



Source: (Ramsar Sites Information Service, Ramsar Convention Secretariat 2023)

Across the Alps, there is an uneven geographical representation of protected areas with a priority focus on nature protection. Alpine aquatic ecosystems are insufficiently protected, and there are too few Ramsar sites.[1]

The predominance of human pressures on Alpine protected areas has to do with the Alps location in the densely settled European continent, and with the long history of Alpine settlement and human activity. Natural phenomena and human activities have both turned the Alpine region into a mosaic of very diverse ecosystems of largely agricultural landscapes with more recent incorporation of recreational and industrial use.

The first National Parks in the Alps were established in 1914 (Plassmann 2016). There are now numerous protected areas in the Alps, almost 25% of the region being protected in one form or another, and they enjoy special status. However, the level of protection differs greatly depending on their purpose and the community structure in the surroundings (protected landscapes, regional nature parks, biosphere reserves, preserves, nature and National Parks, biotopes, nature protected areas, integral protected areas, etc.). The influence of all these protected areas and the way they are managed differ from one country and one Alpine region to another.

There have been numerous ideas about the protection of natural habitats depending on trends in differing epochs and developments. It all began in 1914 with the founding of the first Alpine National Park in Switzerland, until now the only such park in the country. It represents the first integrated reserve in Europe and the first National Park in the Alps based on an initiative of the Swiss Research Society and the Swiss Society for Nature Protection. There were other early Alpine initiatives at that time, including the “Plant Preservation Area Königssee” (the heart of the future National Park Berchtesgaden) from 1910 on, or the “Berarde Park” in 1913, a “forerunner” for France since it represented the future heart of the National Park “Les Écrins”.

[1] Ramsar site figures in ha, excluding sites outside the Alpine area: 56,243 overall; Austria: 27,477; Bavaria: 8,740; France: 12,110; Italy: 2,660; Liechtenstein: 101; Slovenia: 0; Switzerland: 5,155 (including Le Rhone genevois-Vallons de l’Allondon et de La Laire) (Ramsar Convention Secretariat 2014)

The inauguration of the National Park Gran Paradiso (I), in 1922, was based on a closed shooting area of 1856, founded in the reign of King Victor Emmanuel II to protect the last remaining Alpine ibex. The National Park Stilfser Joch was founded under the Mussolini regime in 1935 and covers a very large territory between the Trentino, South Tyrol/Alto Adige and Lombardy regions, and is currently the largest National Park in Italy. It suffers, however, from a lack of acceptance and a complicated ordinance giving rise to conflicts over the use of the area (skiing, hunting, agriculture). The majority of the National Parks were founded from the 1960's onwards, e.g., Triglav (Slovenia), La Vanoise (France) 1963, Les Écrins (France) 1973, Berchtesgaden (Germany) 1978, and Mercantour (France) 1979. These new foundations have often been characterised by conflicts of interest, especially with skiing resorts. Thus, it is not surprising that a few of these parks have been considered as zones to offset increasing tourism that puts great strain on the environment.

The establishment of the three parts of the National Park Hohe Tauern took more than ten years (Carinthia 1981, Salzburg 1984 and Tyrol 1991). To a greater extent than the parks that were established earlier, these parks embody the concept of settling in the area, and, at least initially, a lesser orientation towards pure nature protection. Thus, for example, hunting is partly permitted, even if carefully regulated, and the forest can be used in the traditional way. In 1987 the National Park Nockberge in Carinthia was founded following a local initiative against the creation of an extensive skiing area (in a referendum, 94% of the citizens voted against that project). All the same, the creation of National Parks rests on a relatively shaky footing.

The last wave of new park took place in the 1990s: in Italy Dolomiti Bellunesi 1990, Val Grande 1992, and in Austria Kalkalpen 1997, and Gesäuse 2003. These most recent National Parks in the Alps enjoy stricter protection, and the National Park Val Grande contains the first integral nature protection area in the Alps (del Pedum, 973 hectares), which was founded in 1967. Only the National Park Les Écrins commands an area with comparably strict nature protection (Lauvitel, 700 hectares). The total protection enjoyed by these areas can only be compared with the Swiss National Park, where any straying from the paths is forbidden. It should be noted that, at the end of the 20th century and after a phase of creating less strictly regulated National Parks, the original idea of the first National Parks in the Alps regained prominence – that of the "wilderness". The international recognition attained since September 2006 through tighter regulation of all three parts of the National Park Hohe Tauern bears witness to this.

This return to the origins was also made possible by the greater complementarity of the Alpine protected areas that had developed since the end of the last century. The absence of additional forms of protected areas in Austria, such as the regional parks (a protected area variant with more regional development emphasis), which mainly developed in France from the 1970s and which mark a turning point in spatial nature conservation, made it necessary to adapt the National Park concept in a country that was never really affected by the rural exodus and in which the regional political force (federalism) did not allow too strong a centralistic influence in nature conservation.

In the meantime, and especially from the beginning of the 1980s, the Italian regions of the Alps initiated a massive wave of foundation of nature and regional parks. They have a stronger protection status than their French "counterparts", but their administration differs greatly from one region to another, from one province to another (autonomous status). Nonetheless, they are very efficient instruments for protecting species and habitats, as well as innovative areas (e.g., Adamello Brenta and the reintroduction of bears; Prealpi Giulie and quality local products). At the end of the last century there were around 60 such areas in the Italian Alps.

At the end of the 1990s, a number of "nature parks" were founded in Austria, mainly based on the concept of sustainable development. In Switzerland the same evolution took place since 2007 with the Swiss natural regional parks. At the same time, the National Parks began striving for stricter regulations, allowing them to be officially recognised as National Parks within the framework of the IUCN, where, for example, they now meet the criteria of hunting-free areas (e.g., Hohe Tauern National Park).

The Alps thus command a complementary series of protected areas in which the planning (management, division into zones) and the application of proven methods of management are increasingly setting international standards (the observation of species, the restoration of natural spaces, systems providing geographical information, data banks and the interpretation of satellite and aerial photos). Long-term measures of management and planning are combined with extensive protected areas where interference is prohibited (e.g., the integral protected areas).

The strictly protected zones of these protected areas were mostly established at high average altitudes – more than two-thirds of National Parks in the Alps are located at an elevation above 2,000 metres. Thus, they are not representative of all important habitats at all levels of altitude. At lower altitudes, human settlement and activity pressures are especially high.

In the most important Alpine valleys, there are high concentrations of human habitation and economic activities, which has resulted in fragmentation of the landscape. Alpine biodiversity conservation policy over the past 100 years or so has concentrated on protecting certain areas as isolated nature reserves without connecting them to protected corridors that would allow an exchange between them. What conservation today must aim for is a “permeable landscape matrix” (Plassmann 2016), which enables the movement of fauna across the entire Alpine arc and beyond into adjacent regions. Initiatives such as the Alpine Carpathian corridor need to be implemented across all Alpine countries.

People, fauna, and flora all benefit from protected areas. The protection of landscapes maintains important ecological processes that benefit human health (e.g., freshwater provision, clean air, climate modulation, physical and psychological well-being), provides areas suitable for recreation, ensures quality of life, and creates income opportunities (especially from tourism, traditional farming products, sustainable forest management, etc.). Nevertheless, social barriers, lack of awareness, and short-term economic interest create barriers for effective nature protection. To be successful, local stakeholders and populations must participate in planning and implementing Alpine nature protection, and for this, a lot of awareness raising and appropriate (trans-sectoral) policies are essential.

C.1.2

PROTECTED AREA CLASSIFICATIONS ACCORDING TO IUCN

The IUCN protected area management categories classify the wide variety of protected areas into six categories, with category I being subdivided into categories Ia and Ib. The underlying indicators for these classes are the management objectives of the respective protected areas. They move from very strict protection, where human use is severely restricted, through various intermediate levels, all the way to areas where the focus is on the sustainable use of natural resources by humans (Table 1) (Dudley 2013). The general idea behind the creation of these categories was to establish a worldwide system that allows for comparison between protected areas of the same category – no matter the national or regional official designation. This is clearly a complicated task, given the diversity of national protected area categories, management objectives and legal frameworks (Worboys et al. 2015). Nonetheless, the classification provides a good framework that allows for an appropriate way to classify such a heterogeneous group of entities. The system is always being further developed to respond to emerging needs as a powerful tool that supports biodiversity conservation through protected areas.

The categories are presented in the table below, a table in the Annex aims to match existing Alpine protected area designations with these categories.

Table 1: IUCN Protected Area Classifications, Characteristics and Alpine Examples

IUCN Category	Definition	Alpine examples
Category Ia – Strict Nature Reserve	Protected areas with a **strict biodiversity protection focus** for globally outstanding ecosystems, species or geodiversity features, and human visitation is strongly restricted	Swiss National Park, Réserve intégrale de Lauvitel (France)
Category Ib – Wilderness Area	Usually, large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, **protected and managed to preserve their natural condition**	Val Grande National Park Riserva Integrale del Pedum (Italy) Dürrenstein Wilderness Area (Austria)
Category II – National Park	Large natural or near natural areas with **the goal to protect large-scale ecological processes, plus the species and ecosystems characteristic of the area**; human visitation is allowed for recreational and cultural uses	Kalkalpen National Park (Austria)
Category III – Natural Monument or Feature	Generally, quite small and set up to **protect a specific natural monument** (e.g., a landform, a cave or other geological or culturally influenced feature) with high visitor value, managed similarly to category II	Balcon du Mont-Blanc, Haute-Savoie (France)
Category IV – Habitat/Species Management Area	Set up for the **protection of particular species or habitats**, which is reflected in management interventions and may be relatively small; sometimes a “stop-gap” measure (e.g., to secure stepping-stones, breeding sites, etc.); may be located in significantly modified and fragmented areas	Biotopo palude di Cima Corso (Cima Corso Swamp) (Italy)
Category V – Protected Landscape/ Seascape	A protected area where the interaction of people and nature over time has produced **an area of distinct character with significant ecological, biological, cultural and scenic value, which is considered worth protecting** (e.g., unique or traditional land-use patterns); potential for ecological restoration	Kozjansko Regional Park, Biosphere Reserve and Natura 2000 area (Slovenia)
Category VI – Protected Area with sustainable use of natural resources	Generally, large, protected areas that **conserve ecosystems and habitats, together with associated cultural values and traditional natural resource management systems** (“sustainable use” <u>as a means</u> to achieving nature conservation); no large-scale industrial harvest	Großes Walsertal Biosphere Park (Austria)

Source: (Dudley 2013)

C.1.3

INTERNATIONALLY RECOGNISED PROTECTED AREA CATEGORIES

Apart from nationally or regionally recognised protected areas there are internationally recognised categories of protected areas. These different categories can overlap and be complementary in their functionality regarding biodiversity protection.

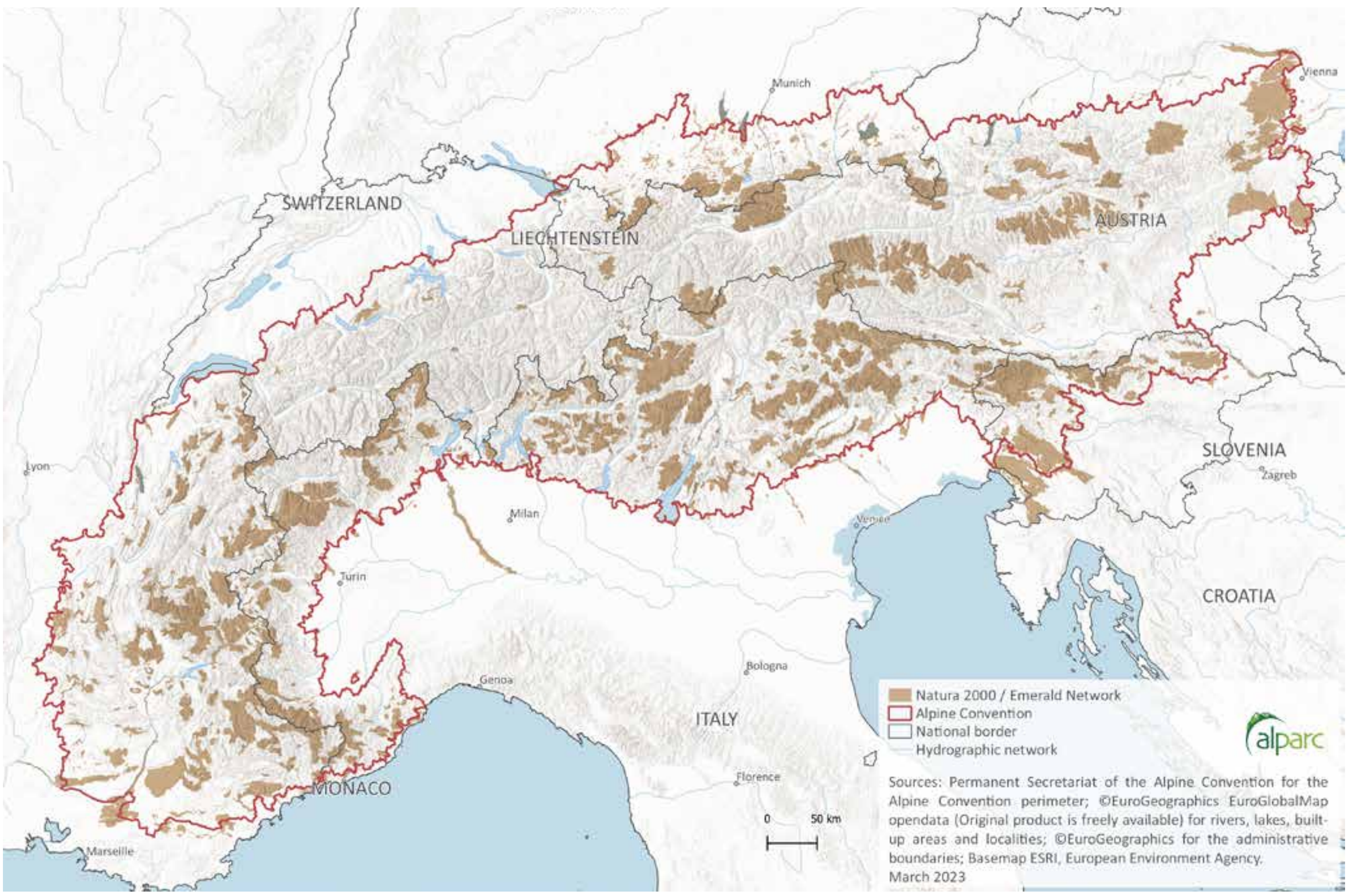
Within the European Union, the Habitats Directive and the Birds Directive are the main instruments that guide conservation policies. Annex I lists 233 European natural habitat types, including 71 priority sites (i.e. habitat types in danger of disappearance and whose natural range mainly falls within the territory of the European Union) (European Commission 2020).

Natura 2000 is the main instrument of the European Union's biodiversity conservation policy. It is an ecological network spread throughout the Union, established under the **92/43/CEE "Habitats Directive"** to ensure the long-term maintenance of natural habitats and threatened or rare flora and fauna species.

The **Natura 2000 network** consists of the Sites of Community Interest (SIC), identified by the Member States under the Habitat Directive, which are subsequently designated as Special Conservation Zones. It also includes the Special Protection Zones (SPAs) established under the **2009/147/CE "Birds Directive"** on the conservation of wild birds. This network covers all EU member states and has the general objective to protect targeted species and habitats of European or international interest. Such sites must have management plans that encourage human activities that work with, rather than against nature.

The European Union is also a Contracting Party to the Bern Convention. It therefore has obligations arising from the Convention, particularly with respect to habitat protection. Therefore, it produced the Habitats Directive in 1992, and subsequently set up the Natura 2000 network. As such the Natura 2000 sites are considered as the contribution from the EU member States to the Emerald Network. The Natura 2000 network is thus complementary to the **Emerald Network** (Council of Europe 2020a). These two categories follow the same principles and are generally equivalent. EU member states designate Natura 2000 sites and non-EU member states designate Emerald sites.

Map 3: Natura 2000 and Emerald Network Sites in the Alps



Both designations create European ecological networks. For our context this is relevant for Switzerland, which is not an EU member (Council of Europe 2020a).

The obligations of the European Union and non-EU countries (in the Alpine case only Switzerland) under the Convention on Biological Diversity are also considered through the establishment of these networks. The EU updated its Biodiversity Strategy in May 2020, when it issued a new strategy entitled “EU Biodiversity Strategy for 2030. Bringing nature back into our lives”. Among other proposals, the EU wants to establish binding targets to restore damaged ecosystems and rivers, improve the health of EU protected habitats and species, bring back pollinators to agricultural land, reduce pollution, increase green European cities, enhance organic farming and other biodiversity-friendly farming practices, and improve the health of European forests.

In particular, the strategy document acknowledges that the existing European protected area network is inadequate to protect biodiversity effectively, and that the target of 17% coverage, as outlined in the Biodiversity Convention (“Aichi targets”), is insufficient according to scientific studies. At least 30% of Europe’s lands and seas are supposed to be transformed into effectively managed protected areas, and at least 10% of agricultural areas are to be returned to high-diversity landscape features. Of all protected areas, at least a third should, according to this strategy, be strictly protected. Furthermore, all protected areas are expected to clearly define conservation objectives and measures. The strategy includes a goal to set up ecological corridors to prevent genetic isolation, allow for species migration, and maintain and enhance healthy ecosystems (EC 2020). European countries are now also in the process of updating their older biodiversity strategies.

On the international level, UNESCO provides three categories of protected area designation:

- UNESCO World Natural Heritage sites
- UNESCO Man and the Biosphere reserves
- UNESCO Global Geopark reserves

UNESCO World Heritage sites are subdivided into three categories, namely natural world heritage sites, cultural world heritage sites and mixed sites. This label is the crown jewel of protected areas. UNESCO has so far accepted 1121 world heritage sites worldwide, including 869 cultural, 213 natural and 39 mixed sites. In the Alps there are five natural World Heritage sites (UNESCO 2020). In this context it is the natural and mixed sites that are of relevance.

To be included on the world heritage list, a site needs to prove its “outstanding universal value” and present a management plan that clearly describes how this value is to be conserved for future generations. The main objective of world heritage sites is the preservation of these values, which are, in most cases, based on biodiversity or the beauty of untouched nature. World heritage sites can be surrounded by buffer zones that help to prevent a direct influence of human activities on the actual site.

UNESCO Biosphere reserves are officially designated through UNESCO’s Man and Biosphere Programme (MAB), which encourages the sustainable use of biodiversity. Sites that have earned this status are areas where innovative and interdisciplinary approaches to sustainable development and resource management as well as interactions between nature and society can be tested. The objectives are thus a combination of biodiversity conservation and sustainable development. A triple-zoning approach helps to identify appropriate management measures for the respective zones and their management objectives.

UNESCO Global Geopark reserves are areas of international geological significance that follow a holistic, bottom-up management approach, integrating the concepts of sustainable development, education and nature protection. They are areas for raising awareness of the key issues facing society, such as climate change and natural disasters.

A further category of protected areas are important bird areas designated as **Ramsar sites (wetlands of global importance)**. A Ramsar site is a wetland site deemed to be of international importance under the Ramsar Convention (short for “The Convention on Wetlands of International Importance Especially as Waterfowl Habitat”) (Ramsar Convention Secretariat 2020). Many internationally important wetlands extend across national borders. In these cases, a Transboundary Ramsar Site can be created. Ramsar sites are required to have management plans. The Convention uses a broad definition of wetlands, several of which are found in the Alpine region. Those wetlands that can be found in the Alps include all lakes and rivers, underground aquifers, swamps and marshes, wet grasslands, peatlands, and human-made sites such as fishponds and reservoirs. There are numerous small and a few larger Ramsar sites in the Alps.

In addition, there are sites that have been granted a "**European Diploma**" (Council of Europe 2020b). These are not separate protection categories but are a type of prestigious award given by the Council of Europe as a stimulus for the efficient protection and management of landscapes, reserves or natural monuments and sites with special European significance. It is granted to protected areas for outstanding scientific, cultural or aesthetic qualities, if they are also subject to a suitable conservation scheme. The Diploma is awarded for a limited duration — it may be withdrawn if actions take place that may cause harm to the area. The Diploma has a unique supervisory mechanism. An annual report must be sent to the Council of Europe by the authorities responsible for the management of each Diploma holding area and aimed to present the actions and measures taken by the managing authorities over the past year to comply with the recommendations and/or conditions attached to the European Diploma. The year before the validity of the European Diploma is due or in the event of a serious threat to an area or a substantial deterioration of the site, an on-the-spot appraisal may be decided by the Group of Specialists on the European Diploma for Protected Areas and conducted by independent experts. It thus acts as a stimulus for the preservation and improvement of the site. In the Alps, nine protected areas have been awarded this Diploma (Council of Europe 2020b).

On an international level, there have been discussions on the expansion and increased effectiveness of global protected areas. This was as well a central topic on the IUCN World Congress 2021 in Marseille, France.

C.1.4

THE ALPINE MOSAIC OF PROTECTED AREA TYPES

The protected area systems across the Alps vary significantly between the different countries. In terms of legislation, governance levels and responsibilities, management objectives and management practice, and official designation there are differences but also some common ground. In the following chapters the situation in the respective countries will be presented; followed by analysis and comparison between the systems.

Across the Alpine countries, according to the Alpine Convention at national and regional level there are different levels of protection (Alpine Convention 2013, p. 41), and variations of areas with particular protection among and within countries (for example, landscape reserves in Germany). The principal levels of protection (with associated IUCN category equivalents that sometimes vary from one country to another) are:

Table 2: Alpine Protected Area Types

PA type	IUCN Category
National Parks	II/V
Nature reserves	IV
Regional nature parks	II/IV/V
Other areas with particular protections	
Wilderness areas/strictly protected reserves	I (Ia/Ib)
Landscape protection areas	IV/V
Protected parts of a landscape	III
Special conservation areas/Natura 2000 sites or Emerald sites	IV or other
Natural monuments/ natural areas	III/IV/V
Natural forest reserves/ strict protection forests	I/IV
Quiet zones/ extraordinary protected area	I, II, III, V
Area of relevant environmental interest (only in Italy)	-
Gardens and parks, municipal or intermunicipal parks (Italy)	-
Natural recreation areas (only in Italy)	-
Ensembles (new in 2020, Bolzano Province)	-
International designations	
UNESCO Biosphere reserves	various
UNESCO Global Geopark reserves	various
UNESCO World Natural Heritage sites	various
Ramsar sites	various

The "**wilderness area**" (**IUCN cat. Ib**) was added in here, as there is an official wilderness area in the Alps (in Austria), and something akin to it in France (Lauvitel). It is one of the strictest types of protection. From a biodiversity conservation point of view, there should be more such areas. Wilderness reserves should allow natural processes to take place, and only under very extraordinary circumstances should there be any management by humans. This protection level is defined by IUCN as areas strictly set aside to protect biodiversity and where human visitation (essentially only for scientific research and monitoring), use and impacts are strictly controlled and limited to ensure protection of the conservation values (Dudley 2013). This form of protection is very rare in the Alps. (In fact, only a small subset of the Wilderness Area Dürrenstein in Austria is classified as category Ib, the other part is considered Ia.)

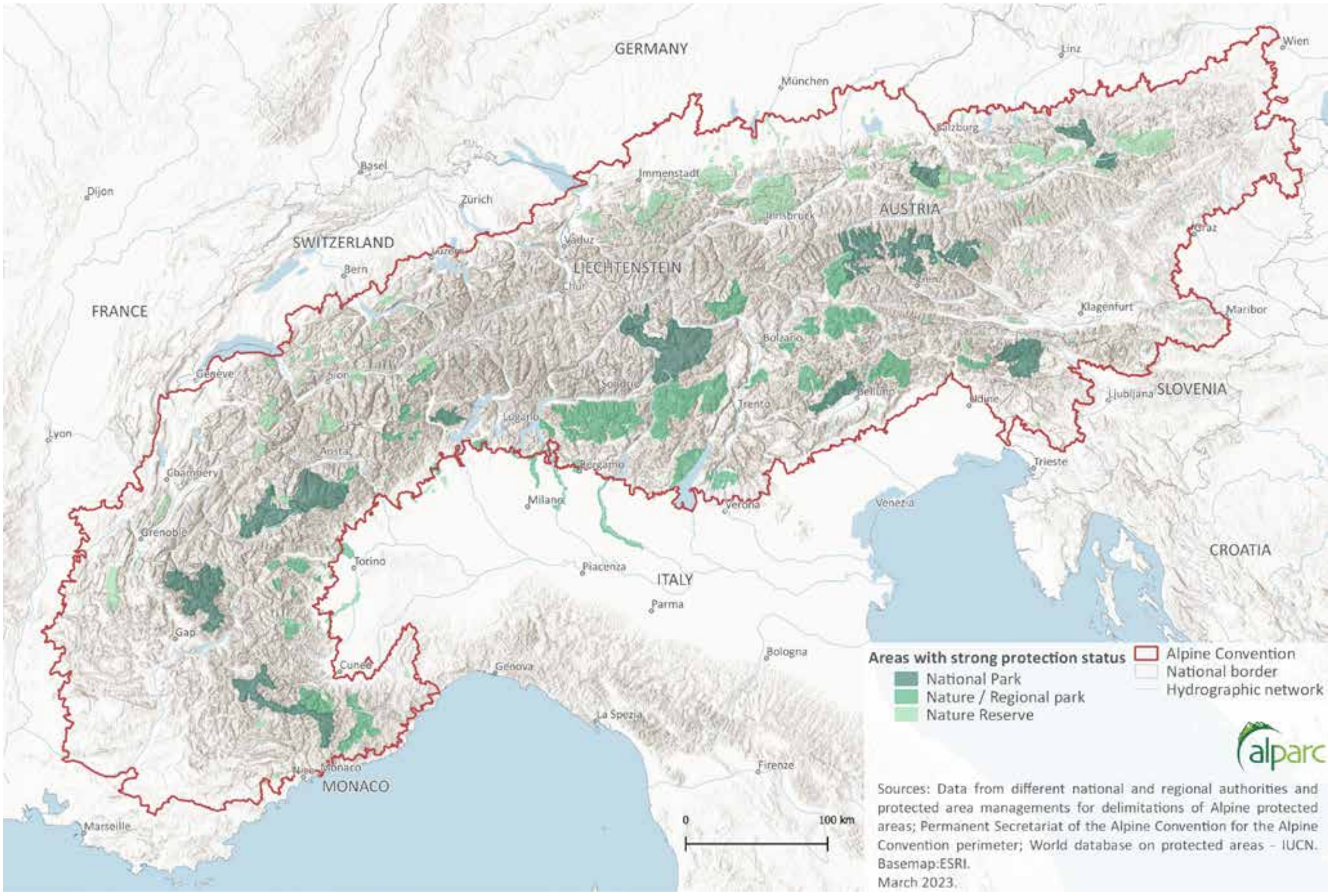
Even stricter is the protection under **IUCN category Ia**, which is a strict nature reserve generally established exclusively for scientific field work. The Swiss National Park is classified as IUCN Category Ia, the only strictly protected National Park in the Alps. In France and Italy, there are some IUCN category Ia areas, labelled as *réserves intégrales* and *riserve integrali* respectively). However, for the most part these are very small in extent.

In general, it can be said that National Parks are designated to protect the ecological integrity of one or more ecosystems, and the laws exclude uses or claims detrimental to the objectives of this designation. National Parks are also often meant to provide a base for spiritual experience, research, education and recreation for visitors. As mentioned, the exact types of activities allowed in National Parks vary from country to country. From a regulatory point of view, National Parks usually consist of two distinct components: a "core" area (IUCN Category II), where the State ensures maximum protection of the natural heritage and strictly regulates human activities, and peripheral zones (IUCN Category V), where local municipalities are supposed to voluntarily undertake sustainable development policies aimed at helping to protect the National Park's core. Wilderness areas (IUCN Category Ia) may be established in the core area to provide strict protection of flora and fauna for scientific purposes.

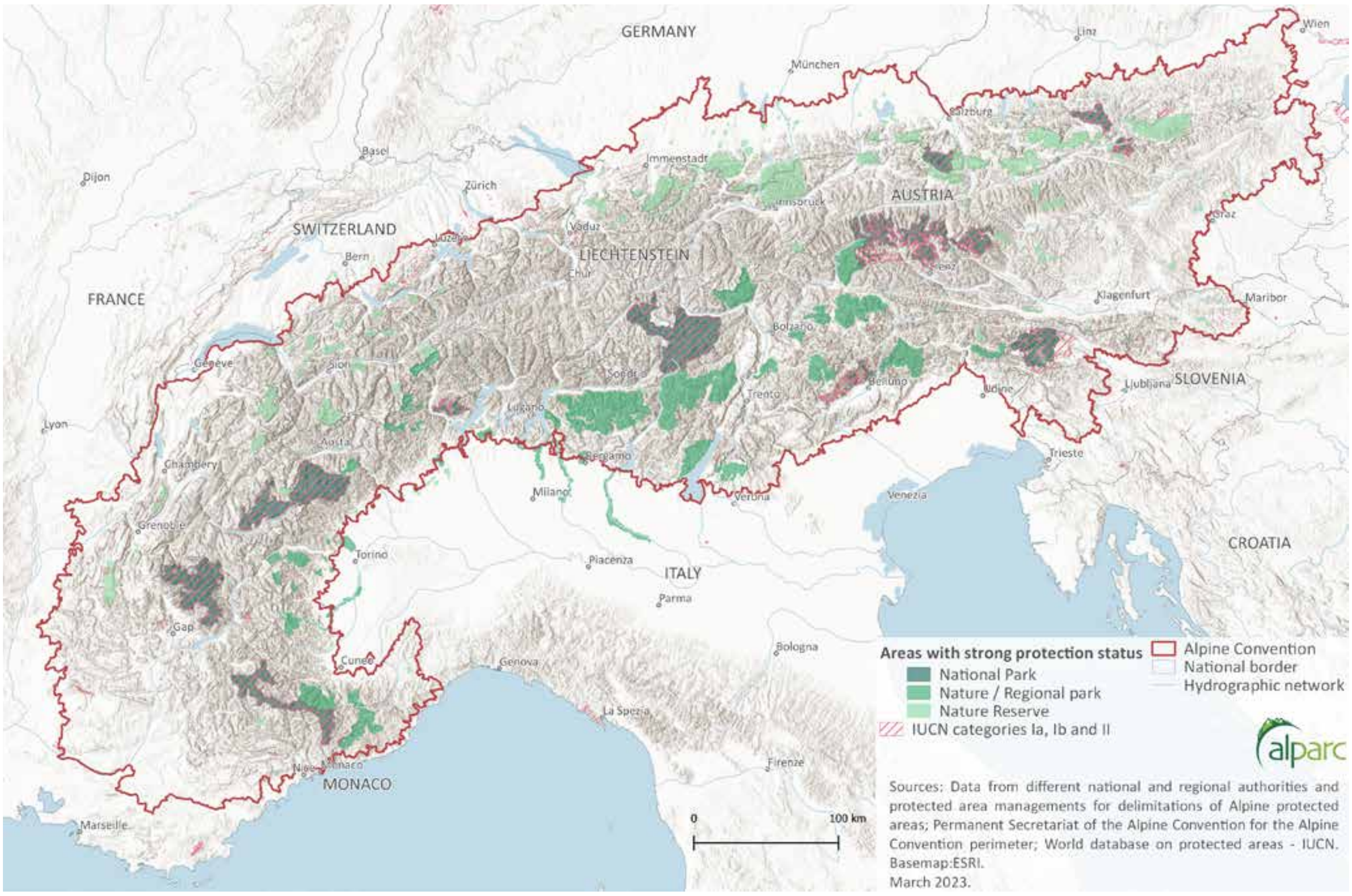
Note that some areas designated as "special conservation areas" are sites under the **Natura 2000** network (see above). There is a degree of overlap between terrestrial Natura 2000 networks and nationally designated sites, and this includes different IUCN protected areas categories. (There are also nationally designated protected areas that are not part of the Natura 2000 network.)

It should also be noted that there are overlaps among other designations. For example, nature parks may overlap with landscape protection areas, quiet zones, nature reserves, natural monuments or Natura 2000 sites, and vice versa. The same goes for the various UNESCO reserve types. All of these overlap with other protection categories where they exist. The category example for a UNESCO Biosphere Reserve in Austria, for example, draws on the Salzburger Lungau & Kärntner Nockberge Biosphere Reserve. It overlaps with various Natura 2000 sites, nature reserves, landscape protection areas, and natural monuments. Thus, no single IUCN protection category can be assigned to such UNESCO reserves, only to particular components of these reserves.

Map 4: Areas with Strong Protection Status



Map 5: Alpine Protected Areas (APA) with Strong Protection Status and IUCN Categories Ia, Ib and II



In order to establish a common understanding of the different approaches and protected area categories in the Alpine countries, the relevant categories of each country are listed in the following subchapters. To the extent possible, the structure of country chapters includes general information on governance of protected areas (legal situation), different protected area types, and, for each type of the IUCN category equivalent (where applicable), management goals (where applicable) and relation to other national protection categories, as well as information on the designated administrative responsibility. Some of this information is also contained in summary form in the Annex table. Information on the legal competence in the various countries is based on information from the European Environment Agency (EEA 2020a).

C.1.5

GOVERNANCE, STRATEGIES, PROTECTION TYPOLOGIES, AND PROTECTION GOALS IN ALPINE COUNTRIES

C.1.5.1

AUSTRIA

Governance

The Austrian Federal Constitution declares nature conservation as responsibility of the federal states ("Länder"). It does not have an overarching federal nature conservation act. The offices of the state governments are responsible for nature and landscape protection in Austria. In the nature conservation and National Park laws as well as in the cave[1] laws of the federal states, the development of a diverse nature and landscape as the foundation of life for people, animals and plants are set as goals. Interventions in the protected areas are either prohibited or restrictions on use are foreseen. The protection of wild plants and wild animals is, therefore, regulated by the nature conservation laws and species protection ordinances as well as the hunting and fishing laws of the federal states.

When the federal government participates in nationally significant projects such as the establishment of National Parks, it must conclude a state treaty between the federal government and the respective federal state, in accordance with Article 15a of the Federal Constitutional Law, which also defines the cornerstones for the establishment and operation of the respective National Park: area, objectives, administration, tasks, financing and any advisory boards or boards of trustees (Nationalparks Austria 2018).

This also affects the implementation of the two EU directives on biodiversity conservation, the Birds Directive and the Habitats Directive, which must be implemented through many different federal state laws in each of the nine state laws. The most important of these laws are those on nature conservation, hunting, fishing, National Parks, and spatial planning and planning laws, as well as the regulations based on them. The member states are obliged to designate the nominated areas as "Special Protected Areas". Most of the Austrian federal states have stipulated in their nature conservation laws that the state government must protect the nominated Natura 2000 sites with protected area regulations. In some state nature protection laws (Burgenland, Vienna, Vorarlberg) the protection category "European protection area" is provided for this (Umweltbundesamt 2020b).

The legal autonomy of the federal states has caused a relatively fragmented body of environmental legislation and inconsistent implementation and enforcement (OECD 2013).

National strategies

Although Austria´s nature protection laws are defined at federal state level, the national government, through its responsible Ministries, issues guidelines and elaborates strategies. There are three Austrian strategies with particular relevance for biodiversity (BMK 2020).

The third Austrian 2020+ Biodiversity Strategy of 2014 (based on the equivalent EU Strategy "Our life insurance, our natural capital: an EU biodiversity strategy to 2020") defines fields of action, goals and measures for Austria to, at least, slow the further loss of species and habitats. The "Biodiversity Strategy Austria 2020+" comprises five fields of action with 12 targets: Action area 1 - Know and recognise biodiversity; Action area 2 - Sustainable use of biodiversity; Action area 3 - Reduce biodiversity pollution; Action area 4 - Preserve and develop biodiversity; Action area 5 - Ensure biodiversity worldwide. To this end, 12 targets and more than 140 measures were formulated (CBD 2020b).

[1] Limestone caves in numerous Austrian Länder

Target 1	The significance of biodiversity is acknowledged by society
Target 2	Biodiversity research and monitoring activities are extended
Target 3	Agriculture and forestry support conservation and improvement of biodiversity
Target 4	Game and fish stocks are adapted to natural environment conditions
Target 5	Tourism and leisure activities are in line with biodiversity objectives
Target 6	Energy supply is biodiversity-friendly
Target 7	Pollution is reduced
Target 8	Negative impacts of invasive alien species are reduced
Target 9	Incentives with negative impact on biodiversity, including subsidies, are abolished or adapted
Target 10	Species and habitats are conserved
Target 11	Biodiversity and ecosystem services are taken into account in spatial planning and transport/mobility
Target 12	Contribution to overcome global biodiversity crisis has been made

In relation to Target 10 (species and habitats conservation), the Austrian strategy clearly mentions the need to create “barrier-free landscapes” to enable organisms to adapt to the evolving environmental conditions (climate effects; functional migratory corridors). It also states a need to develop options for designating natural areas (non-intervention areas with a wilderness character) in the framework of existing protected-area concepts by means of contractual nature conservation. Furthermore, the strategy mentions the goal of developing options for the conservation of biodiversity hotspots outside protected areas.

In the federal state of Styria, a Styrian Biodiversity Strategy (“Naturschutz Strategie Steiermark 2025”) was elaborated in 2017.

Following the issuance of a follow-up strategy to 2030 by the European Union, Austria has also launched a review of its biodiversity strategy. From July to December 2019, a participatory biodiversity dialogue was launched by the national government to obtain expert proposals for a new biodiversity strategy for 2030. At the time of writing this process is ongoing.

The Floodplain strategy for Austria 2020+

Experts for floodplains define goals, principles, measures, and ways to secure the floodplains and river landscapes in the long term. Over the next few years, this strategy is to be implemented in partnership with all those affected. This floodplain strategy was elaborated between the federal government (BMLFUW) and the federal states, with the support of NGOs and technical experts. This is based on the structure of the National Wetlands Strategy (1999) and is also compatible with the 2020+ biodiversity strategy.

The Forest strategy Austria 2020+

This strategy aims to ensure that the ecological, economic, and social dimensions of sustainable forest management are balanced and optimised. Representatives of 85 organisations collaborated on the Austrian Forest Strategy 2020+. The diverse tasks of forests are covered in the Forest Strategy 2020+ in seven special fields of action, including climate change and climate protection, forest and species protection, income security, provision of the renewable raw material wood, bioeconomy, protection against natural hazards, the use of the forest for leisure activities, and science and research. For each of these fields of action, seven strategic goals for the sustainable securing of forest functions and forest impacts were defined and strategic priorities were derived from each of them.

Typology of Protected Areas

Of the protected area types mentioned above, the following exist in Austria (as of 2018) (Umweltbundesamt 2020c).

Some of these typologies exist throughout Austria, others only in certain federal states. National Parks, nature reserves and landscape protection areas, as well as natural monuments, exist throughout Austria. Other categories, such as “protected part of the landscape” or “nature park” exist only in some of the states. The protection provisions for the protected area categories vary, as do the conditions for each individual area, which are defined in the respective area ordinances. Agriculture and forestry, hunting and fishing, are allowed “to the usual extent” even in the protected areas (Umweltbundesamt 2020c).

In Austria, as of December 2018, 21.7% of the federal territory falls under the legally more strictly protected areas (wilderness area and National Park, Natura 2000 sites, nature reserves). In addition, 24.5% are protected less strictly (for example as Protected Landscape Area, Protected Landscape Parts, UNESCO Biosphere Reserves, etc.[1] (Umweltbundesamt 2020a). Overall, this means that 28.3% of Austria’s territory is protected - of course, not all of it in the Alpine region.

[1] In June 2019, the “Lower Murtal” biosphere park was added with a total area of 130 km2. This biosphere reserve, which is recognized by UNESCO, has not yet been included in the figures for Austria.

Table 3: Typology of Protected Areas - Austria

PA type	IUCN Category	Primary goal	Legal competence
National Parks (Nationalparks)	II/V	biodiversity conservation	Federal state government (Amt der Landesregierung)
Nature reserve (Naturschutzgebiete)	IV	biodiversity conservation	Federal state government
Regional nature parks (Naturparke)	V	recreation, regional development	Regional association
Other areas with particular protections			
Wilderness area/strictly protected area (Wildnisgebiet)	I	biodiversity conservation	Federal state government
Landscape protection area (Landschaftsschutzgebiete/Natur-Landschaftsschutzgebiete)	IV/V	landscape protection	Federal state government
Protected parts of a landscape (geschützte Landschaftsteile)	III	landscape protection	Federal state government
Special conservation area/Natura 2000 sites	IV or other	biodiversity conservation	Federal state government
Natural monument/natural area (Naturdenkmäler)	III	conservation	Federal state government
Natural forest reserve/strict protection forest (Naturwaldreservat)		biodiversity conservation	Public/private partnership (Contractual protection)
Quiet zone (Ruhegebiete - only in Tirol)	V	wildlife protection	Tirol state government
Regional protected areas		various	Municipalities (Gemeinden)
International designations			
UNESCO Biosphere reserves	various	harmonised management of biological and cultural diversity	Federal state government
UNESCO Global Geopark reserves	various	protecting global geodiversity	Federal state government
UNESCO World Natural Heritage sites	various	conservation of natural sites of outstanding universal value	Federal state government
Ramsar sites	various	conservation and wise use of wetlands	Federal state government

Wilderness area
(IUCN category I)

The Rothwald primeval forest is the first area in Austria that follows the concept of the "Wilderness Areas", the highest protection category of the IUCN. The primeval forest is located near the Lower Austria/Styria border and includes areas that serve scientific research (IUCN category Ia) as well as parts that are administered as wilderness areas (IUCN category Ib). It is also located in the Natura 2000 area "Ötscher-Dürrenstein"(Umweltbundesamt 2020d).

At the end of 2019, a long planned second Wilderness Area inside Hohe Tauern National Park was officially designated. The Sulzbach valleys - with more than 6,700 hectares - became an internationally recognised and protected wilderness area with IUCN Category 1b at the end of 2019. A management plan had been prepared for the period 2016 to 2026. The area had been declared a wilderness area by the state government of Salzburg ordinance in 2017 (Salzburger Landesregierung 2017).

The purpose stipulated in the law is to ensure the natural dynamics of the area under special protection, including its flora and fauna, create a wilderness area that is primarily shaped by natural processes and is free from human interference. According to the management plan, the wilderness area is protected by the surrounding National Park core, natural and outer zone areas acting as a buffer zone (Salzburger Nationalparkfonds Hohe Tauern 2018).

Zoning at Wilderness Area Dürrenstein

A wilderness area must be divided int zones in accordance with the IUCN guidelines and to determine the planned and permitted measures. The following zones apply in the Dürrenstein wilderness area (Expertise France 2020):

The "nature zone", in which no further measures take place (exception: the wildlife regulation). Visitors can also walk through parts of this zone as part of guided hikes. Approx. 88% of the wilderness area belongs to this zone.

The "natural zone with silvicultural management", in which, for a limited period of time, spruce forests are converted into mixed forests with more deciduous trees. Less than 5% of the total area of the wilderness area needs to be converted.

In the "Management Zone Alpine Pasture" and the "Management Zone Forest Pasture" grazing is permitted to the extent necessary for nature conservation reasons. Many rare species of plants and insects still find habitat on the Alpine pasture. e.g., the black grouse and ptarmigan. The "Kalkrasen Management Zone" fulfils the same purpose. These significantly anthropogenically influenced habitats represent approx. 7% of the protected area.

Natural predators such as lynx or golden eagle occur only occasionally in the wilderness area. To ensure the natural forest-game structure, the administration has implemented "wildlife ecological management" to regulate the species of deer and chamois according to ecological criteria. This area comprises approximately 25% of the entire wilderness area.

A small area for visitors has been established in an area of less than 1% of the wilderness area.

(Wildnis Dürrenstein 2020)

National Parks
(IUCN Category II (core)/V (buffer zone))

The Austrian National Parks are established around core areas surrounded by so called National Park regions. Of the six Austrian National Parks, three are in the Alps (Hohe Tauern (1,857 km²), Kalkalpen (209 km²) and Gesäuse (110 km²) covering a combined surface of around 2,200 km². They are relatively young parks with creation dates ranging from 1981 to 2002.

Austrian National Parks generally correspond to category II of the IUCN Protected Areas Categories system. Here and in other Alpine countries, a National Park can contain various other protected areas with different designations. The National Park Hohe Tauern encompasses the Sulzbachtäler wilderness area, which is category Ib.

The objective of National Parks is to forego any economic use on at least 75% of the area, which is a prerequisite for the recognition as a protected area according to the IUCN Management Category II. The Austrian National Park Strategy 2020 (Nationalparks Austria 2018) sets out a clear list of 12 goals[1], ranging from scientific research on biodiversity trends to the implementation of management plans in all Austrian parks, to harmonisation of laws and regulations with the goals of the National Parks and the long-term securing of National Park areas. It also includes a list of evaluation parameters.

The priority objective of this category is the conservation of biodiversity and habitats, but other goals, such as scientific research and regional economic development, are increasingly being integrated into the management tasks. They are seen as lead projects that give impulse for tourism, economy and environmental education.

Nature reserves (Naturschutzgebiete)

A nature reserve is a largely natural or near-natural area that is characterised by the existence of habitats worth protecting and/or the occurrence of rare or endangered animal and plant species. The protection of these natural assets stands in the foreground and, any interference incompatible with the protection goal must be prevented.

The nature reserve type is one of the most important categories of land protection in Austria. As a rule, however, agricultural and forestry uses are permitted "to the present extent", even if, in principle, any interference with nature is prohibited. In certain cases, this can lead to conflicts of interest. Management

[1] Goal 1: In the natural zone, there is a natural development according to the IUCN guidelines

Goal 2: Species and habitats are protected in the best possible way

Goal 3: The level of awareness and acceptance of National Parks is high

Goal 4: Nature experiences are varied

Goal 5: Scientific knowledge of the status and trends of biodiversity has improved

Goal 6: The goals of the National Parks are increasingly taken into account in the region

Goal 7: Institutionalise national and international cooperation

Goal 8: Management plans are available for all National Parks and are being implemented

Goal 9: National Park employees are highly motivated and qualified

Goal 10: Relevant legislation is harmonized with the goals of the National Parks

Goal 11: Financing is ensured

Goal 12: National Park areas and nature conservation services are secured in the long term plans, which were drawn up for nature reserves in some federal states, determine the measures necessary to maintain the ecosystem and regulate the uses in terms of the protection goals (Umweltbundesamt 2020c).

There are also some special protection areas, often located inside National Parks or Nature Parks. Special protection areas are distinct forms of nature reserves. In contrast to a "normal" nature reserve, any intervention in nature is prohibited. Exceptions can be granted, including measures for conventional agriculture and forestry. The exercise of fishing and hunting requires a permit. For the special protection of plants and animals, a ban on entry is also possible.

Kalkalpen National Park – several protection designations in one park

The Kalkalpen National Park was officially inaugurated in 1997 with an area of 165.09 km^2 but has steadily expanded over the last few years, and its current size is 208.56 km^2. Its mid-term goal is the creation of a protected area where natural development processes are permanently ensured, and 75% of the National Park area is wilderness area.

Before its formal foundation, in cooperation with representatives of interest groups, a system of "contract nature protection" was developed for conservation in the federal state of Upper Austria. This was a decisive breakthrough in the negotiations with the landowners. Farmers and other landowners formed an association and participated in the planning process. Goals and tasks that are being pursued in the National Park include biodiversity conservation, scientific research, education, visitor experiences, and natural area management.

In 2004, the Kalkalpen National Park was declared a Natura 2000 area, as well as a Ramsar-site (Convention on Wetlands of International Importance). Furthermore, since 2017, the old red beech forests in the Kalkalpen National Park and in the Dürrenstein wilderness area have been awarded the status of UNESCO world natural heritage. The red beech forests of the Kalkalpen National Park and the primeval beech forest of the Dürrenstein wilderness area represent the entire beech range of the Alps. Together, the two protected areas contribute around 7,120 hectares of beech forests to this World Natural Heritage category.

The example of Kalkalpen National Park shows that more than one protection category or designation can overlap in the same place. In this case, the labels "National Park", "Natura 2000", "wetland of global importance", and "UNESCO world natural heritage" all apply.

(NP Kalkalpen 2011)

OTHER DESIGNATIONS

Landscape protection areas (Landschaftsschutzgebiete)

A landscape protection area is an area with a special character, high aesthetic value or recreational value of the landscape. The primary purpose of this category is to preserve the landscape, rather than the species or ecosystems in it. The special importance of the area for the population or tourism should be secured. Landscape protection areas can also serve as buffer zones around nature reserves, which are subject to stricter protection regulations. Often, more traditional types of agriculture are practiced in landscape protection areas. As a rule, certain projects are prohibited or subject to an authorisation (Umweltbundesamt 2020d).

In Austria, landscape protection areas are the most widespread among the protection categories. In 2017 there were 258 landscape protection areas.

Protected parts of the landscape, natural monuments, quiet areas, etc.

There are 14 different types of protected areas in Austria with different levels of protection. Some types are limited to one or more federal states (Umweltbundesamt 2020d).

- A protected part of the landscape is – in contrast to the usually large-scale landscape protection areas – a small-scale, protected section of the landscape.
- A natural monument is a protected natural structure that should be preserved in the public interest because of its scientific, historical, or cultural significance or because of its peculiarity, beauty, rarity, or its special character for the landscape.

Protected area categories that only occur in individual federal states are:

- Protected habitat (Burgenland)
- Protection zone according to the shipping law (Burgenland)
- Plant protection area (Salzburg, Vorarlberg)
- Protected natural structures of local importance (Salzburg)
- Protected biotope (Vienna)
- Ecological development area (Vienna)
- Special protection area (Salzburg, Tyrol)
- Quiet area (Tyrol)
- Quiet zone (Salzburg, Vorarlberg: However, only one area is designated as a quiet zone, the Vergalda valley in St. Gallenkirch, Vorarlberg)
- Local protected area (Vorarlberg)
- Protected area according to the local law (Styria)

Nature parks

Nature parks in Austria include landscape areas that are particularly well suited for relaxation or for imparting knowledge about nature due to their landscape characteristics. “Nature park” is not a separate protection category but a distinction that is awarded to nature reserves or landscape protection areas (Umweltbundesamt 2020d). In Austria, the label is managed by an association, the Association of Nature Parks Austria. There are 48 nature parks with an area of approximately 500,000 hectares.

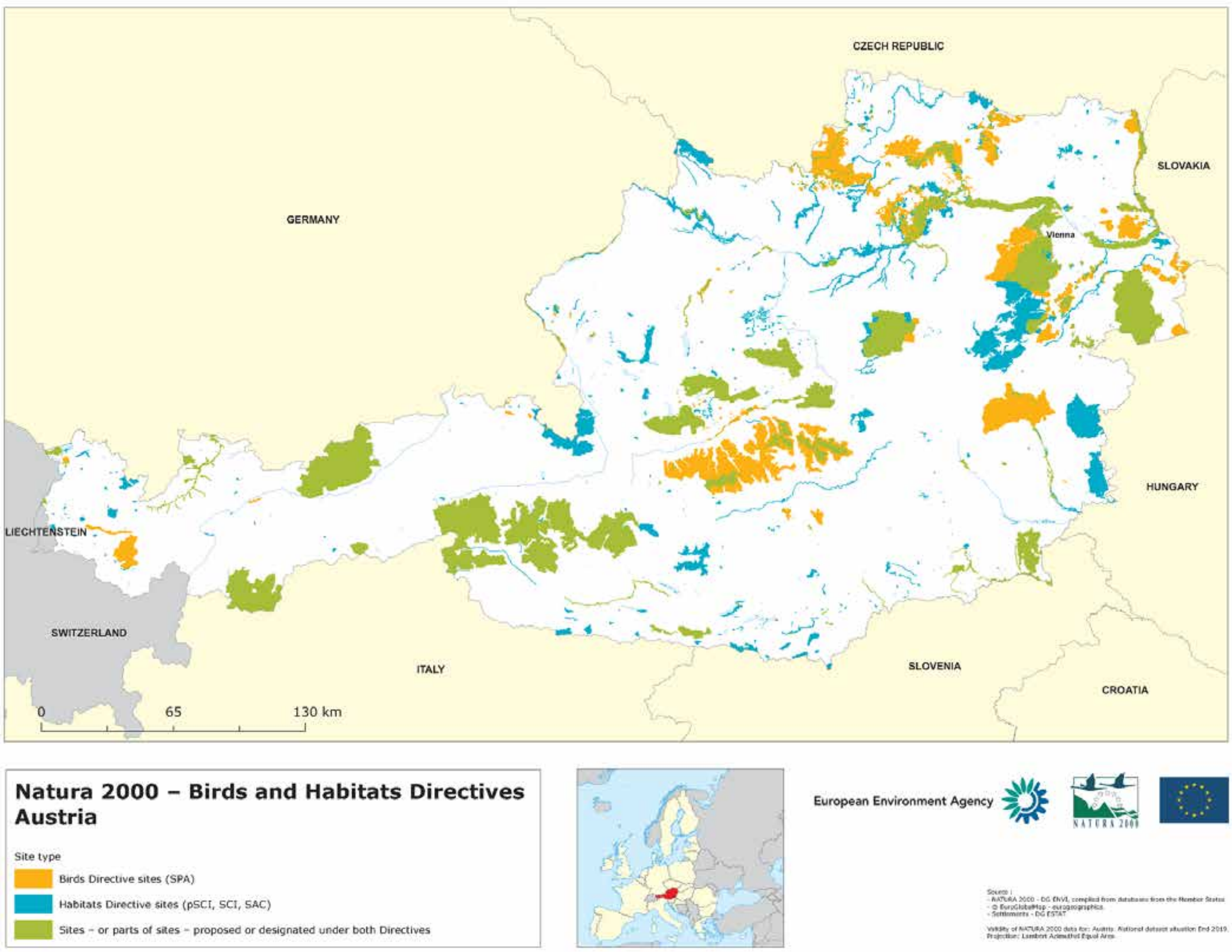
The predominant forms of protection in Austria, which is also generally the case for the Alps, are the less strictly protected categories. Strictly protected areas only constitute a small percentage in the overall picture.

EUROPEAN AND INTERNATIONAL DESIGNATIONS

Natura 2000

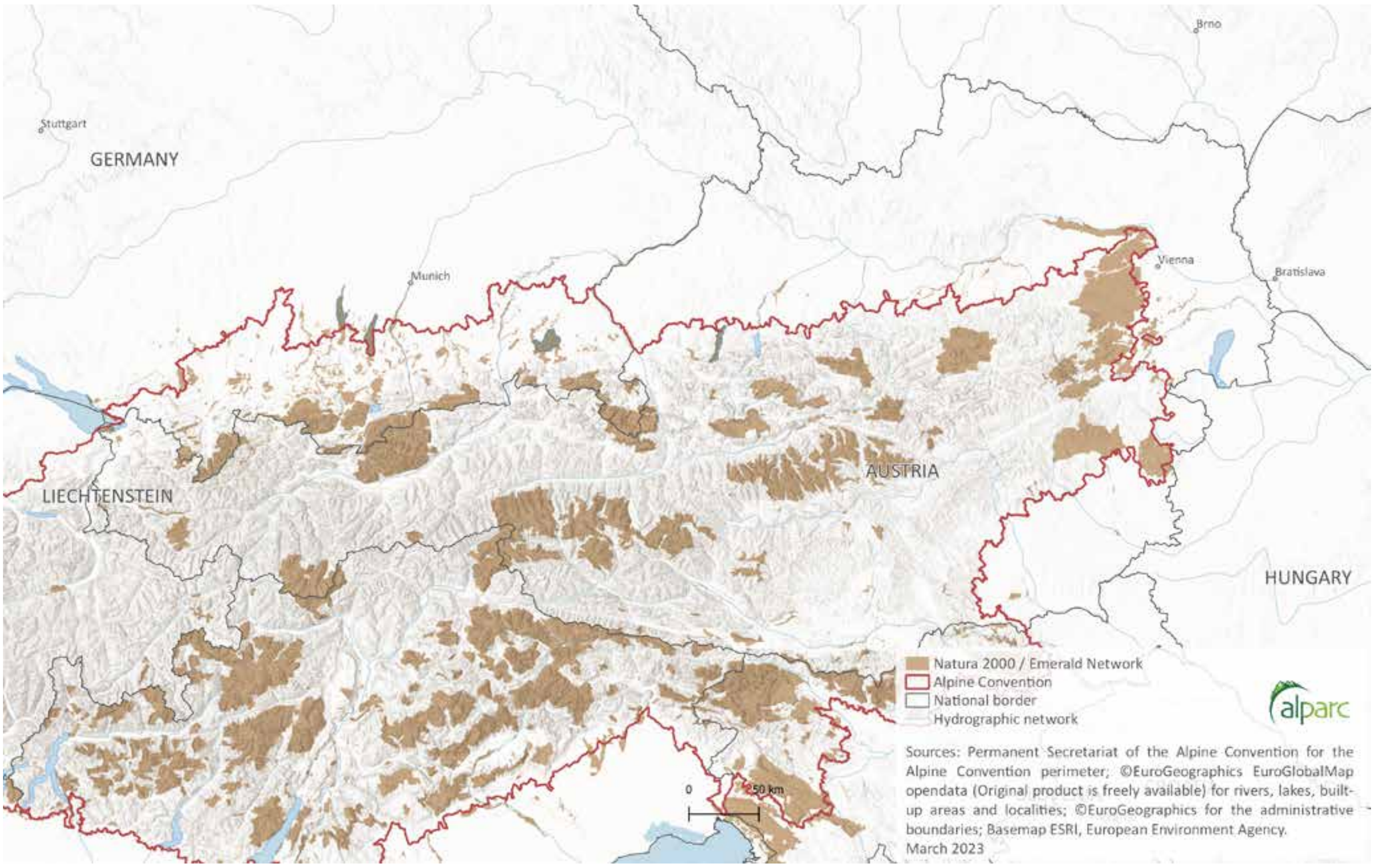
Austria has designated a total of 250 Natura 2000 sites, which take up 15.3% of the federal territory (as of December 2018). In addition to these European protected areas, which are already designated by federal state laws, another 100 additional Natura 2000 sites had been nominated as of December 2018 (Umweltbundesamt 2020c). These include protected areas in the categories of National Park, nature reserve, landscape conservation area and protected landscape section as well as areas that do not yet have a protection category.

Map 6: Natura 2000 Sites in Austria (2019)



Source: (EEA 2020b)

Map 7: Natura 2000 Sites in the Austrian Alps



UNESCO Biosphere Reserves

Austria currently has several UNESCO Biosphere Reserves. It used to have eight, but the designations for four of them were withdrawn in 2014 and 2016 respectively as they didn't fulfil all conditions for biosphere reserves. (UNESCO 2019a).

The Salzburger Lungau and Kärntner Nockberge Biosphere Reserve (148,914 ha with a core area of 13,422 ha) is the biggest Biosphere Reserve in Austria, encompassing the federal states of Salzburg and Carinthia. It provides a representative example of inner-Alpine landscapes with high mountains and deep valleys. It is a richly structured landscape ranging from 600 m to 3,000 m above sea level and includes typical ecosystems of the Central Alps, such as mountain meadows and marshes with great biodiversity. Ecotourism is popular in the reserve. The biosphere reserve Lungau is not yet officially designated but is listed as part of the Nockberge Reserve (Umweltbundesamt 2020c).

Six villages within a single Alpine valley form the Grosses Walsertal Biosphere Reserve (19,200 ha, with a core area of 4,010 ha), situated in the western part of Austria. The valley is a prime example of a living cultural landscape, where, since its occupation by the Walser people in the 13th and 14th centuries, a system of highly adapted mountain farming, pasture and extensive forestry has been developed.

The newest Biosphere Reserve, the Lower Mura Valley Biosphere Reserve, designated in 2019, is located in the southeast of Austria and borders the Slovenian Mura River Biosphere Reserve. It extends over 13,180 ha, with a core area of just 200 ha. The area is of natural, historical and cross-border importance due to its location along the border with Slovenia and its participation in the European Green Belt. Next to the Danube floodplains, this area is Austria's second largest alluvial forest on a large river. The river landscapes and the accompanying floodplain forests were not previously represented among the ecosystem types in Austria's biosphere reserves.

The "Nagelfluhkette Nature Park" was decreed initially as a Biosphere Reserve in Austria but has recently be changed to the status of "Nature Park".

UNESCO World Natural Heritage Sites

Such sites are very rare in the Alps. Austria has one such site, the Ancient and Primeval Beech Forests of the Carpathians and Other Regions of Europe, a transboundary area that spans 12 countries.

UNESCO Global Geoparks

Austria has three Geoparks, including Ore of the Alps UNESCO Global Geopark, the Styrian Eisenwurzen UNESCO Global Geopark, and the transnational Karawanken /

Karavanke UNESCO Global Geopark (Austria and Slovenia) (UNESCO 2019b).

The Ore of the Alps UNESCO Global Geopark in Salzburg derives its name from a historic copper ore mining site, where copper was mined since prehistoric times making it the interlace most important mineral resource of the Middle Ages. The Eisenwurzen, with an area of 586 km^2, is the largest nature park of Styria in the Eastern Alps. The landscape is dominated by mountains up to 1,000 m, broad valleys of the main rivers Enns and Salza, and deep gorges of its tributaries. It is one of the key areas for the tectonic interpretation of the Northern Calcareous Alps. The Geopark owes its name to the large number of small ironworks using the raw material from the nearby opencast mine Erzberg, which were closed down with the rising industrialisation of the 19th C.

The largest UNESCO Global Geopark is the transnational Karawanken Geopark, which is named after the mountain chain that connects and divides the regions on both sides of the border of Slovenia and Austria. The Geopark is located between two Alpine mountains over 2,000 metres: Mt. Petzen/Peca and Mt. Koschuta/Košuta. The Geopark's administrative borders follow the borders of fourteen municipalities. The area extends over 1,067 km^2 and has been marked by its former rich mining and ironworks tradition.

Ramsar Sites

In 2023 Austria has 23 sites designated as Wetlands of International Importance (Ramsar Sites), with a total surface area of 124,968 hectares (RSIS 2020a). There are many small sites within Austria´s Alpine region. The Nationalpark Kalkalpen is the largest Ramsar site there, with 18,532 ha. Second largest is the Wilder Kaiser in Tyrol, with 3,781 ha that combine different wetland types including mires, bogs, fens, creeks, brooks, meadows, wet pastures, and freshwater springs. The Rhine Delta site in Vorarlberg is 2,065 ha and consists of open water, fens, wet meadows, tall sedge communities, reedbeds and riverine forest. It is an important area for waterbirds; almost the entire Alpine breeding population of merganser molts here (RSIS 2020a).

European Diploma

Within the National Park Hohe Tauern is the Krimml Waterfalls Natural Site (Austria), which has been awarded the European Diploma (see above) by the Council of Europe. With a drainage area of 110.7 km^2, a total fall of 380 metres and an average discharge of 7 m^3 of water per second, they are among the great waterfalls of the world (Council of Europe 2020b).

C.1.5.2

FRANCE

Governance

In France, a protected area can be created at any of six different administrative levels, from global to local (UN system and regional conventions, European Union, Central Government, Regional authorities, Departmental authorities, local authorities) (IUCN France 2013). The French conservation law provides for public consultation mechanisms that are open to local stakeholders. This is termed the "Grenelle principles", which gave NGOs a place in national policy formulation as far as decisions of the Ministry of Environment are concerned. For example, local councillors have seats on the management boards of National Parks, and Natura 2000 sites have local advisory steering committees that are responsible for planning and follow-up of management activities. However, representation of environmental conservation stakeholders in other sectors that also affect biodiversity (e.g. agriculture, economic affairs) is limited and thus restricts the cross-sectoral treatment of biodiversity in sectoral policies (OECD 2016).

Key instruments supporting biodiversity conservation in France include regulatory approaches, economic instruments, and other tools (e.g., zoning natural areas of ecological, fauna and flora interest; hunting reserves; green and blue infrastructure; and various labelling and certification schemes). In addition to designating protected areas at national, regional, or local levels, there are bylaws for the conservation or reduction of certain species (OECD 2016).

The distinction between regulatory protection and contractual protection is important, as contractual protections can be more easily removed than regulatory ones. Concretely the protection of natural areas falls under three legal forms in France (IUCN France 2013):

- Regulatory protection (a regulation or prohibition of human activities concerning the management of fauna, flora, and ecosystems).
- Land purchase and management for biodiversity protection (purchase of land for protection — an approach preferred in areas threatened by urban development or, conversely, marked by the abandonment of agricultural and grazing practices that support biodiversity.
- Contractual protection through management agreements — an approach that also regulates land use but involves delegating management of a natural area to a third party by contract.

Furthermore, like in other countries, several international labels and certifications aim to protect and enhance species, habitats and landscapes classified as unique in the context of global criteria. The various protection tools are complementary and can overlap. A single tool can also fall under two different approaches, such as when a nature reserve is established by decree (regulatory protection) and its management is based on agreements with local stakeholders (contractual protection) (IUCN France 2013).

In January 2020, the French Biodiversity Agency merged with the National Agency for Wildlife to form the French Office for Biodiversity (OFB), under the tutelage of the Ministry of Ecological and Solidarity Transition and the Ministry of Agriculture and Food. The objective of this office is to coordinate all the action relating to the governance of biodiversity in France. The OFB exists to provide technical support to protected area managers and contribute to national strategies related to protected areas.

In practice, protected areas are managed by a wide range of stakeholders (IUCN France 2013). The central government (Ministry of Environment, working with the Ministry of Agriculture and Fisheries for some protection types) is directly responsible for most protected area types. In the regions, Regional Directorates for Environment, Planning and Housing (DREAL) and prefectures function as representatives of the central government. Management tasks may be performed by designated public entities or, in some cases, by private institutions, such as NGOs, foundations, or landowners. In addition, there are scientific and technical advisory bodies that provide guidance on draft legislation, regulations, and the establishment of protected areas. These include the National Council for Nature Conservation and, in the regions, the Regional Natural Heritage Scientific Councils.

A 2016 OECD report points out that, as far as areas under regulatory protection are concerned, France is below its above-mentioned target of 2% of metropolitan land area by 2020, with only 1.39% of the territory highly protected in 2019. Only 0.7% of the territory was IUCN Category I and II, compared to an OECD average of 3%. However, the overall percentage of territory under some form of protection (i.e. regulatory and contractual taken together) has doubled between 1998 and 2015 (OECD 2016) and, as of 2019, has reached 25.9% of the territory (OECD 2020).

France has special protection plans for particular species and also protects their habitats, but, according to the above-mentioned OECD report, the country is taking insufficient measures for species affected by intensive agriculture, and the capacity to conserve large carnivores (wolf, lynx, bear) is uncertain. For most threatened species there is currently no Action Plan and no list indicating the species requiring "special protection measures since they are specifically threatened” as required according to article 14.2 of the Protocol Nature Protection and Landscape Conservation’ of the Alpine Convention (Alpine Convention 1991). There are, however, also notable successes, such as the reintroduction and conservation of various species of vulture in the Massif Central, the Pyrenees, Corsica, and the Alps. A case in point is the Bearded Vulture, which was locally extinct and reintroduced into the Pyrenees, Corsica, and the Alps, and which is now successfully protected through an Action Plan. The plan also intends to ensure connectivity between the Alps and the Pyrenees for Bearded Vulture populations.

National strategies

France prepared a National Biodiversity Strategy 2011-2020 in 2011 (CBD 2020b). It includes 20 targets/areas of work (CBD 2020a).

Target 1	Foster, enrich and share a nature-oriented culture
Target 2	Reinforce mobilisation and citizen initiatives
Target 3	Turn biodiversity into a positive issue for decision-makers
Target 4	Preserve species and their diversity
Target 5	Build a green infrastructure including a coherent network of protected areas
Target 6	Preserve and restore ecosystems and their functioning
Target 7	Include preservation of biodiversity in economic decisions
Target 8	Develop innovations for and through biodiversity
Target 9	Develop and perpetuate resources for biodiversity
Target 10	Turn biodiversity into a driver for development and for regional cooperation in the overseas entities
Target 11	Control pressures on biodiversity
Target 12	Safeguard sustainability of biological resource use
Target 13	Share equitably the benefits arising out of the utilisation of biodiversity on all scales
Target 14	Ensure consistency across public policies on all scales
Target 15	Ensure ecological efficiency of public and private policies and projects
Target 16	Develop national and international solidarity amongst territories
Target 17	Reinforce green diplomacy and international governance for biodiversity
Target 18	Develop research, organise and perpetuate the production, analysis, sharing and dissemination of knowledge
Target 19	Improve expertise, in order to build capacity, to anticipate and to act, mobilising all sources of knowledge
Target 20	Develop and organise mainstreaming of biodiversity issues in all education and training courses

In its recent National Plan for Biodiversity (Plan Biodiversité), published in July 2018, France committed to making biodiversity an environmental priority. This plan has six strategic axes, 24 objectives, and 90 actions. The Biodiversity Plan aims to strengthen action in the most threatened ecosystems. Protecting biodiversity is also defined as strengthening the regime and expanding the network of protected areas, and, in particular, the management of the existing areas (Ministère de la Transition Écologique 2019).

A new National Biodiversity Strategy has been launched in 2021.

France currently has two protected area strategies: the strategy for the creation of protected areas (SCAP), which aims to place 2% of the metropolitan (i.e. belonging to continental France, rather than to overseas territories) land area under regulatory protection by the end of 2019; and the national Strategy for the Creation and Management of Marine Protected Areas (SAMP), one of the main objectives of which is to protect at least 20% of waters under French jurisdiction by 2020. These strategies are being evaluated and revised for the adoption of new goals in 2020 (Réserves Naturelles de France 2019). The national strategy aims to improve the coherence, representativeness, and efficiency of the network of terrestrial protected areas in mainland France.

The SCAP is based on a national methodology and analysis of the natural (fauna, flora, and habitats) and geological heritage coordinated by the National Museum of Natural History at the request of the Ministry of the Environment, Energy and the Sea. This methodology is validated under the aegis of a national steering committee incorporating representatives of administrator’s networks of natural spaces, socioeconomic structures, and nature conservation NGOs. The first diagnosis, realised in 2009, identified gaps in the national protected areas network and brought to the foreground national priorities in terms of preservation of the natural heritage.

A national list of species and habitats considered a priority for the establishment of new protected areas was built by mobilising scientific experts of many national institutions. This process in ongoing.

The process builds on an iterative process of diagnosis of the protected areas network and aims to review the national priorities of creation of protected areas according to diagnostic results and the advancement of scientific knowledge (Muséum National d’Histoire Naturelle 2020c).

In March 2020, the French Protected Areas Commission (CAP) met to discuss the new draft protected areas strategy. France launched a new protected areas strategy at the World Conservation Congress in September 2021 in Marseille. The CAP draws attention to the need to ensure coherence between the ambitions of the national strategy and the objectives of the post 2020 strategic framework. This consistency concerns both the quantitative targets and the reference to certain concepts (strict protection, AMCEZ, areas of particular importance for biodiversity): the provisional document mentions 30% of terrestrial and marine protected areas and other effective conservation measures by areas in 2030, covering 60% of areas of particular importance for biodiversity, with 10% of strict protection. The rapid dynamics that are leading to the steady loss of biodiversity puts into question the fixed nature of protected areas and challenges their objective of long-term preservation of species and habitats, particularly in isolated and small areas, and in the most vulnerable ecosystems, which includes the Alpine ecosystems (CAP 2020).

Typology of Protected Areas

From the general typology of Alpine protected areas, the following are in use in France. Of the four main types of protected areas in France the first three, National Parks, Natural Reserves, and Biological Reserves are considered the most strictly protected. In fact, wilderness areas and core areas of National Parks, Managed Biological Reserves, Wilderness Biological Reserves,

National Hunting and Wildlife Reserves, National Nature Reserves and Regional Nature Reserves, are all under some form of regulatory protection (Muséum National d'Histoire Naturelle 2020b). The peripheral zones of National Parks and Regional Nature parks, on the other hand, are managed under contractual protection.

National Parks

The mission of National Parks is threefold: knowledge and protection of natural and cultural heritage, support for local actors towards exemplary sustainable development, and raising environmental awareness among the general public.

Table 4: Typology of Protected Areas – France

PA type	IUCN Category	Primary goal	Legal competence
National Parks	(IUCN cat. II/V)		National government (MoE) (regulatory) (core)/municipalities (contractual) (periph-ery)
National Nature Reserve or réserve intégrale & regional nature reserve	IV/Ia		National government (MoE) (regulatory) / regional government (regulatory)
Regional Nature parks	V		Regional government (prefecture)
Other areas with particular protections			
Landscape protection area	V		National government (MoE) (regulatory)
Protected parts of a landscape	III		National government in cooperation with the Regions and departments
Special conservation Area/Natura 2000 sites	IV or other		National government in cooperation with the Regions and departments
Natural monument/natural area (sites classés/sites inscrits)	III		National government (MoE)
Biological reserve (Réserve biologique dirigée (IV) or Réserve biologique intégrale (Ia)	Ia/IV		National government (regulatory)
Protection forest			National (Ministry of Agriculture) (forestry, legislative and administrative acts)
National hunting and wildlife reserves	V		Local government (prefecture) / national Agency of Hunting and Wildlife (regulatory)
Biotope protection areas	IV		Departmental level (prefecture) (regulatory)
International designations			
UNESCO Biosphere reserves	various	harmonised management of biological and cultural diversity	National government in cooperation with the Regions and departments
UNESCO Global Geopark reserves	various	protecting global geodiversity	National government in cooperation with the Regions and departments
Ramsar sites	various	conservation and wise use of wetlands	National government in cooperation with the Regions and departments

In 2006, the legislation for National Parks in France was completely revised replacing the law of 1960. The main changes regarded zoning and governance issues, giving way for a more decentralised approach. The core zone is under *regulatory* protection, while the peripheral zones are under *contractual* protection. It is up to the communities in the proposed optimal adhesion area to adhere to the Charta of the park. The Charta is a document that defines the policy and cooperation between the park authorities and the local political authorities for a period of 15 years. Furthermore, it provides guidelines for the sustainable development project, which involves the municipalities, stakeholders, and the National Park. The level of adherence varies significantly amongst the three parks: Ecrins 90%, Mercantour 75% et Vanoise 7% (Mountain Wilderness France 2016). This is probably linked to the economic and touristic structure of the respective regions.

The level of local and regional stakeholder integration in the process of Charta development seems to be an important factor for acceptance and allegiance of communities to the parks. This new setup updated tasks for the management of the National Parks. The land use planning in the adhesion zone, in cooperation with the economic, social and cultural council (Conseil Economique, Social et Culturel), has become an inherent activity of park management. This has made park management more complex, while budget and staff resources have not increased correspondingly.

The three French National Parks that lie within the Alps cover an area of around 2,100 km² with their respective core zones (zone centrale), representing around 5% of the French Alps. Within the core zones, wilderness areas ("réserves intégrales") can be established. So far only one sizable site has been designated as such: the area of Lauvitel (689 ha) within the Ecrins National Park. These core zones are surrounded by peripheral areas ("aire d'adhésion optimale"). The core zone is an area of strict protection where the State supervises human activities, while the peripheral areas are managed according to a sustainable development policy by municipalities (IUCN France 2013).

Three Alpine National Parks are located at high altitudes. 80% of the Les Ecrins and La Vanoise National Parks lay above 2,000 m. The Mercantour National Park is different in this aspect covering areas down to 600 m and thus

Ecrins National Park, a park with the sought-after European Diploma

The Ecrins National Park is a high mountain National Park with elevations ranging from 667 to 4,102 m (Barre des Ecrins), stretching over 92,000 ha. The park is jointly owned by the local authorities (73%), the state (24%) and individual landowners (3%). It offers more than 150 peaks above 3,000 metres height to hikers and trekkers, as well as many square km of glaciers. Topographically unique valleys make up a diverse mosaic of ecosystems and climate zones. Because of this, the Ecrins National Park hosts about 1,800 plant species including 168 of high heritage value, and more than 350 vertebrate species, including 206 species of community interest, including Ocellated lizards, snow voles, and ptarmigans.

The park management is implementing a number of measures to preserve the environment despite a high visitor volume. Public utilities (parking sites, picnic sites, walking paths, etc.) are created using traditional techniques (without importing external materials), allowing reversible constructions, respecting the "naturalness" of the environment. A programme of agri-environmental measures (supported by the European Union) is being developed to maintain traditional grazing activities, without which traditional Alpine pastures and grasslands would revert to bush and forest.

Unique among French continental National Parks, Ecrins also contains a strict wilderness reserve of IUCN classification 1a, Lauvitel (700 ha, ranging from 1,500 m to 3,169 m elevation), created in 1955 to survey the natural evolution of ecosystems (mountain pastures and spruces) and species. This strict nature reserve is closed to the public and is mainly dedicated to monitoring and academic research, including the study of mountain ecosystems dynamics, particularly in connection with climate change. The Lauvitel "integral reserve" (a special category of protected areas in France, which can also be termed a wilderness area) was created in 1995 in the Lauvitel valley. It aims to "monitor the natural dynamics of ecosystems not subject to human action" in the heart of the Ecrins National Park that surrounds it. For a long time, it was the only integral reserve in a French National Park, and, in 2012, it was certified in the IUCN category "1a". The management of the Lauvitel wilderness area, through its creation decree, is very rigorous: All entries must be authorised, and scientific studies must be undertaken without significant impact on the natural environment.

(Council of Europe 2020b; Parc national des Ecrins 2018) featureing around 18% forest cover of its total surface (Broggi, Staub and Ruffini 1999).

Apart from Lauvitel, there are some other very small areas designated with IUCN protection level Ia, but these are so-called “Forest Integral Biological Reserves” and have quite small footprints (often around one square km) (IUCN and UNEP-WCMC 2016).

Nature reserve (réserve naturelle)

The priority objective of this category is the conservation of special features or parts of ecosystems (IUCN France 2013).

Nature reserves exist on national and regional levels, the only difference being that governance and responsibility lay with the national and regional government structures respectively. These reserves are usually targeted at relatively small areas with protection focused on certain ecosystem aspects. Thus, the 26 reserves located in the Alps represent little more than 1% of the French Alps, covering about 500 km².

Protection measures are less strict than in National Parks but still considerable. Some of these areas might, nevertheless, feature ski tourism with its classic infrastructure and environmental impact. As described for the National Parks, even the nature reserves mostly lie above 1,500 m and thus represent only selected ecosystems.

Each site is managed by a local body in consultation with local stakeholders, which is responsible for developing and implementing the management plan. Management is carried out under the responsibility of the prefect (IUCN France 2013).

Biological reserve (réserve biologique)

A biological reserve is a protected area in a forest environment or in an environment associated with the forest (moors, ponds, peat bogs, dunes). This status applies to forests managed by the National Forestry Office and aims to protect remarkable or representative habitats. Biological reserves are among the priority areas covered by the aforementioned Strategy for the Creation of Protected Areas. Depending on habitats and management guidelines, a distinction is made between managed biological reserves (Réserve biologique dirigée), where conservation management is established (under IUCN category IV) and wilderness biological reserves (Réserve biologique intégrale) where the forest is left to evolve freely (which may fall under IUCN category Ia).

These areas are usually rather small. The 26 biological reserves (>100 ha) located in the Alps cover a total surface of around 13,300 ha or 133 km². Such reserves are created by interministerial decree at the federal level and are managed by the National Forests Office (ONF – Office National des Forêts). They are often used to strengthen the protection status of a certain area within other, less strictly protected areas.

Regional nature parks (Parcs naturels régionaux)

A Regional nature park is an inhabited rural area that is nationally recognised for its valuable local heritage and landscape but also for its fragility. The priority objective of this category is sustainable regional development, protecting and promoting the natural resources, human resources and cultural heritage by implementing an innovative and environmentally-friendly policy of land-use planning and economic, social and cultural development (FPNRF 2020b; 2020a). The conservation of biodiversity is not one of the main goals of management.

Regional nature park activities are underpinned by a binding charter, a contractual document drawn up on the initiative of the region prior to classifying the park and defining the respective 12-year sustainable development plan for the region. The charter, which is subject to a public enquiry, establishes the objectives to be achieved and the associated measures, which must specifically seek to protect and manage the natural, landscape and cultural heritage and regional development. The State classifies the area based on a proposal from the region. Actions are decided and implemented by a mixed park planning and management committee consisting of at least the municipalities and intermunicipal authorities with an interest in the park, and the departments and regions. The charter takes precedence over urban planning documents drawn up by the municipalities and intermunicipal authorities, and intermunicipal local urban development plans and must be compatible with the latter if they exist.

The French part of the Alps contains six regional nature parks that cover an area of over 7,000 km², which are mostly located in the peripheral areas of the Alps at lower altitudes than the other categories already described. Because of their focus on sustainable development the effects for habitat and ecosystem conservation are relatively small and not sufficient for effective biodiversity conservation. These areas are sometimes quite densely inhabited and feature important civil and industrial infrastructure. Nevertheless, the regional nature parks base their development on a charter focused on sustainable development as a core principle. Within these parks, zoning can play a significant role in establishing areas that are more likely to conserve biodiversity. Some of the nature parks include nature reserves with relatively strict environmental protection regimes, as described above.

EUROPEAN AND INTERNATIONAL DESIGNATIONS

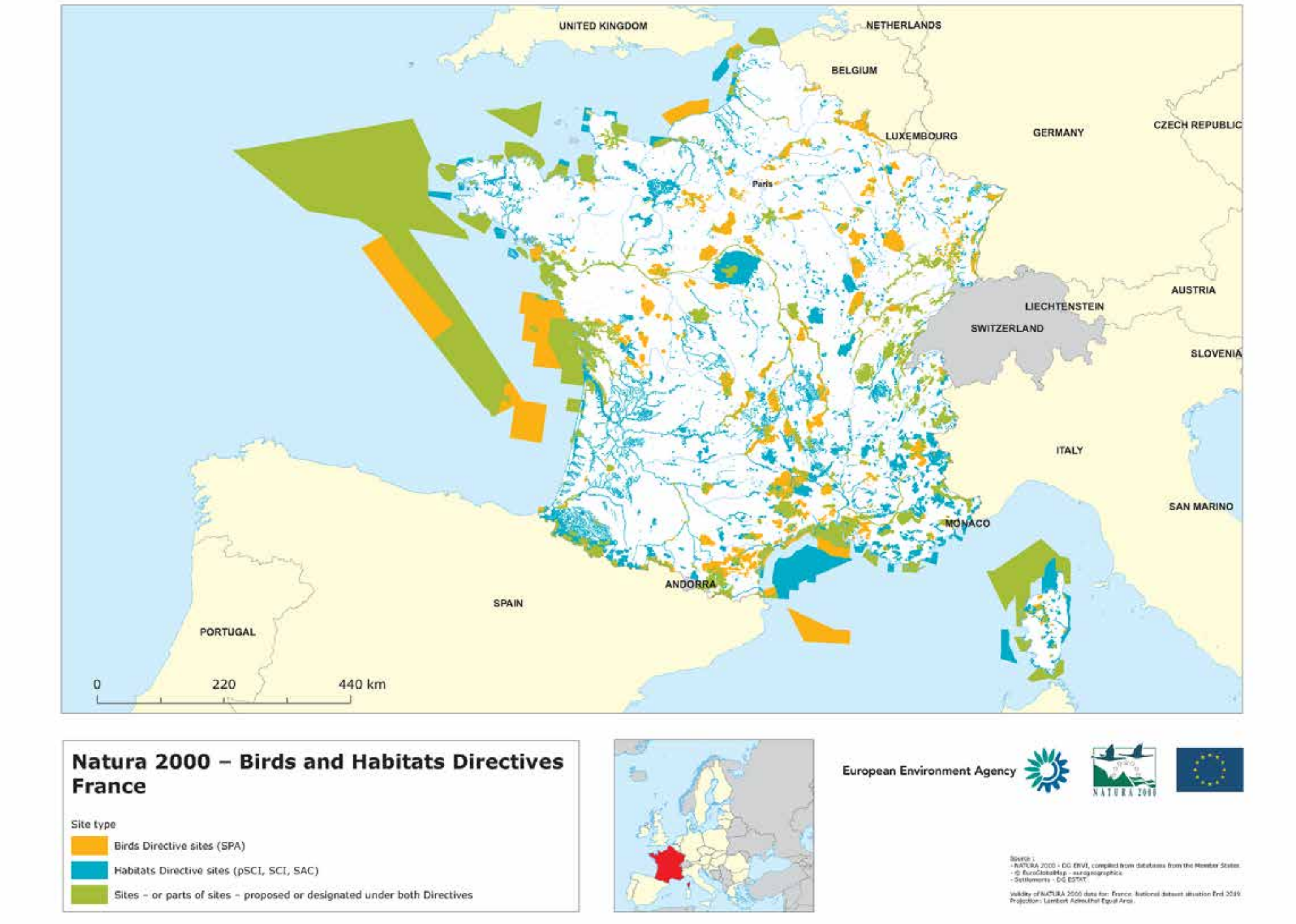
Natura 2000

France has 1,776 Natura 2000 sites, including marine reserves (Centre de ressources Natura 2000, 2015). About 12.9% of metropolitan France´s land area is designated as Natura 2000 area. Of this, some 35% is forested.

More than three quarters of the French Natura 2000 sites are also covered by another protection status. Half of the area of National Parks is classified as Natura 2000 (more than 90% of which are in the core zone of National Parks). In Regional Nature parks, depending on the location, there are between three and 37 Natura 2000 sites (Centre de ressources Natura 2000 2015).

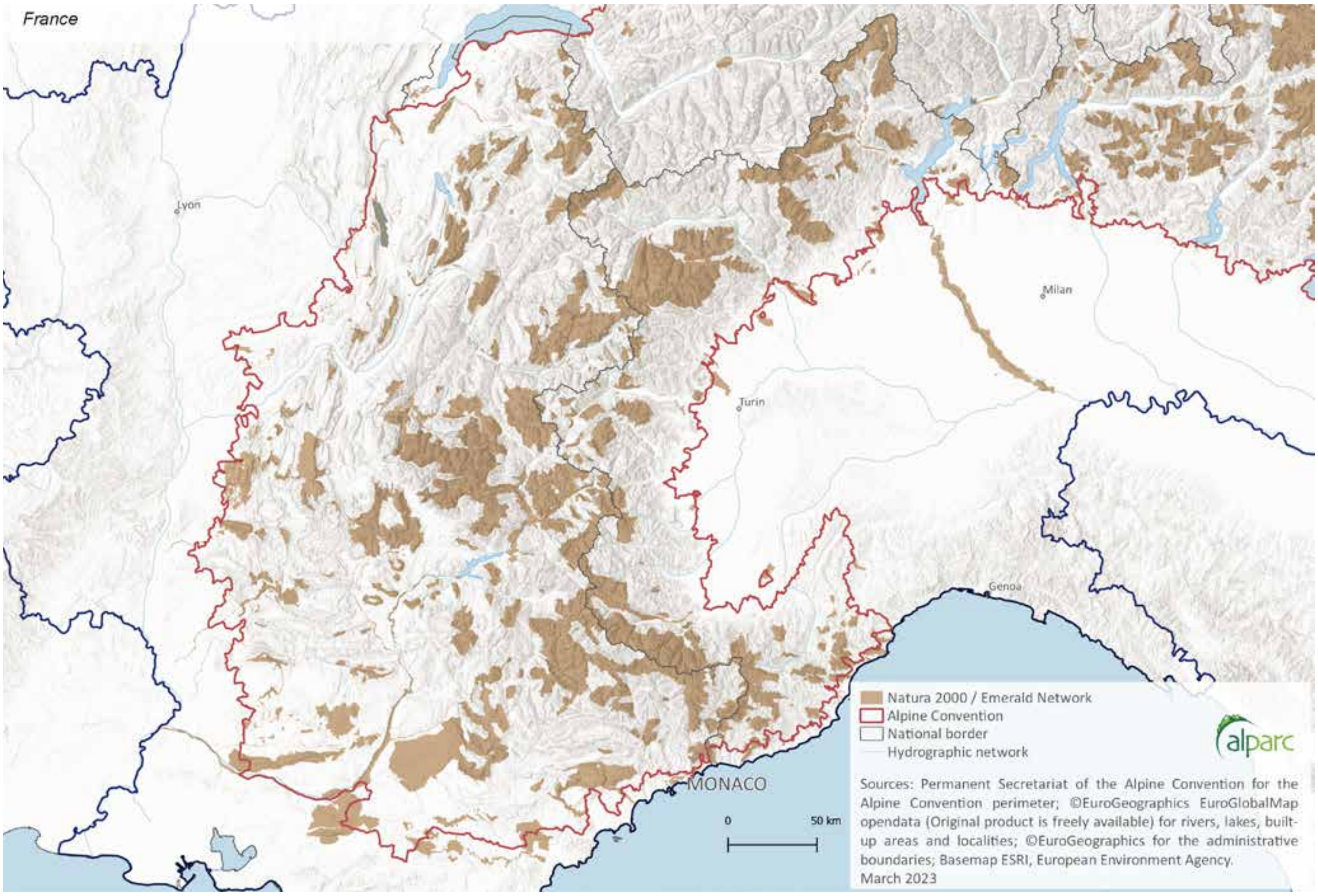
There are 126 Natura 2000 sites in the region Provence-Alpes-Côte-d'Azur, totalling 1,829,134.58 ha (Musée National d'Histoire Naturelle 2020a). In the Rhône-Alpes region, there are 166 Natura 2000 sites.

Map 8: Natura 2000 Sites in France (2019)



Source: (EEA 2020b)

Map 9: Natura 2000 Sites in the French Alps



UNESCO Biosphere Reserves

In total, France has 14 UNESCO Biosphere Reserves, but only three (four if you count the Gorges du Gardon Biosphere) are located in the Alps (UNESCO 2019a).

Italy shares with France the transboundary Mont-Viso Biosphere Reserve (427,080.7 ha: France: 133,164 ha; Italy: 293,916.7 ha), which is a glacial cirque situated between the Alpine mountains and the Mediterranean. It is surrounded by river valleys and high-altitude lakes and contains over 1,331 km² a mosaic of ecosystems ranging from the arid and rocky landscape found in the high altitudes of the Monviso massif. (at a maximum elevation of 3,841 m) to the unusual forest ecosystem, which hosts, among others, Pinus cembra.

The Luberon Lure Biosphere Reserve (244,645 ha, with a core area of 25,314 ha) includes the Luberon Natural Regional Park. It is bordered to the south and east by the synclinal fold of the Durance, one of the largest rivers southeast of the Rhône, which feeds important wetland habitats. The site is made up of Mediterranean plains and hills irrigated by several rivers. The east-west-oriented mountain ranges of Provence dominate, with some influence from the Alps. These are the Luberon massif (1,125 m) and the Vaucluse Mountains (1,256 m).

The Mont Ventoux Biosphere Reserve stretches over 89,408 ha, with a core area of 2,126 ha. Mont Ventoux (1,909 metres above sea level) is located in-between the Alpine massif to the north and the Mediterranean massifs to the south and comprises a diverse relief with a mosaic of microclimates and habitats. The mountain hosts an exceptional floristic and faunistic richness thanks to its intermediate position between the Mediterranean and the Alps and the orientation of its slopes.

Outside the Alps, but near their perimeter, is the Gorges du Gardon Biosphere Reserve (45,501 ha, core 7,800 ha), located in the Gard department in Southern France. The area is typical Mediterranean landscape, with scrubland, green oaks, the Gardon River and cliffs. This area contains endangered and protected species such as Egyptian vultures, Bonelli's eagle and the Woodcock orchid.

UNESCO Global Geoparks

France has a total of seven UNESCO Global Geoparks, of which three are in the Alpine region (UNESCO 2019b).

Chablais UNESCO Global Geopark (872 km²) along the 50 km that separate Lac Léman (Lake Geneva) and the Joux Plane Pass (Morzine - Avoriaz) reveals the story of the formation of the Alps but also the recent glacial events that have carved out the landscape.

The 2,300 km^2 Haute-Provence UNESCO Global Geopark is the largest geological open-air museum in France. The reserve includes 18 geological sites more than 300 million years old, which contain numerous fossil-rich materials and fascinating rock formations.

The Bauges Massif (856 km^2) Geopark in the north-western part of the Alps coincides with the existent Regional Nature park. The territory now appears as a water tower with numerous karstic networks, deep and narrow canyons and waterfalls supplying the two largest natural lakes in France. Some Natura 2000 sites and Wild Fauna National Reserves preserve natural heritage in this Geopark.

Ramsar Sites

France currently has 50 sites designated as Wetlands of International Importance (Ramsar Sites), with a surface area of 3,742,034 ha (RSIS 2020b).

In the Alpine region, there are the 5,500 ha area Lac du Bourget - Marais de Chautagne, and the 1,915 ha Rives du Lac Léman, both in the Département of Rhône-Alpes. Lac du Bourget is one of the largest French Alpine lakes (4,500 ha). Apart from the lakeside town Aix-les-Bains, more than half of the lake shores remain natural, either rocky or covered with reedbeds. During winter, the lake harbours more than 20,000 waterbirds that also use the nearby part of the Rhône River, and the lake provides an important spawning ground for fish. Lac Léman is the second most important wintering area for waterbirds in France. Breeding and staging birds use the site, which also supports various mammals and a rich flora, including several rare plant species. The area is threatened by commercial activities, including fishing, and significant shoreline development (RSIS 2020b).

In Haute-Savoie, there is Impluvium d'Evian, a site of 3,275 ha, where the popular mineral waters of Evian have their origin. The site is composed of seasonal and permanent freshwater marshes, forested and non-forested peatlands, rivers and streams. Although the site does not support an outstanding number of species, it provides an important habitat for endangered butterfly species and orchids.

There are also some in the Région Provence Alpes Côte d'Azur.

European Diploma

The Alpine National Parks Ecrins, Mercantour, and Vanoise have been awarded the prestigious European Diploma. The Ecrins National Park contains the unique continental strict reserve of the French National Parks network, listed in the Ia-strict nature reserves category of the International Union for Conservation of Nature. This wilderness area is closed to the public and is mainly dedicated to monitoring and academic research, including the study of mountain ecosystems dynamics, particularly in connection with climate change (Council of Europe 2020b).

The Mercantour National Park is twinned with the Parco Naturale Alpi Marittime, which occupies the northern slope of the Argentera-Mercantour massif, and with which it constitutes a protected complex of almost 100,000 hectares considered to be the most important centre of endemism in the Alpine chain (Council of Europe 2020b).

La Vanoise is located in the Savoie department and is an Alpine landscape comprising 107 peaks of 3,000 m or more sharing a 14 km long border with the Gran Paradiso National Park in Italy. These two parks together represent the largest nature reserve in Central Europe (125,000 ha) (Council of Europe 2020b).

C.1.5.3

GERMANY

Governance

Germany has a key federal environmental framework 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: the Federal Nature Conservation Act (Bundesnaturschutzgesetz - BNatSchG) (Bundestag 2013). This also lays the foundation for all types of protected areas, in addition to protection of particular species. In general, the protected status of parts of nature and landscape is established by legal declaration, which determines the goals of protection and all related necessary duties and prohibitions, as well as all measures necessary to reach the goals and the appropriate authority to take such measures. The details of individual protected areas are then determined and implemented by state law (*Landesrecht*). It is also possible to protect areas across state boundaries.

The protection area categories applicable in Germany are based on the BNatSchG. The protected areas can be differentiated with regard to their size, their purpose and their protection goals and the usage restrictions derived from them. The most important categories of protected areas are nature reserves, National Parks, biosphere reserves, landscape protection areas and nature parks as well as the protected areas according to Natura 2000. They can overlap or sometimes even be congruent.

Declaration of a National Park or National Natural Monument, as well as changes to those designations, are issued in consultation with the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection and the Federal Ministry for Digital and Transport.

Currently, there is no action plan for protected areas on the federal level. There is a document in preparation, but it is not yet available.

Bavaria is the only German federal state (Land) within the Alpine Convention boundary. (The wider Alpine Space Boundary or wider yet, the EUSALP boundary, also contains the federal state of Baden-Württemberg.)

A complex network of authorities coordinates all matters related to area and species protection in Bavaria. The Bavarian State Office of Environment, Landesamt für Umwelt (LfU), is responsible for the identification and assessment of habitats and species, the establishment of programs, the establishment of Red Lists of endangered plant and animal species at provincial level, the species and habitat protection program and species support programs. For the implementation of the Bavarian Nature Conservation Act (for example, contract nature conservation, protected area designation), the independent cities and county offices are responsible as lower nature protection authorities, and the Government is responsible as the higher nature protection authority. For the implementation of the European Habitats and Birds Directive, the StMUV (Bayerisches Staatsministerium für Umwelt und Verbraucherschutz) is in charge as the highest nature conservation authority on the regional level. The establishment of nationwide landscape plans in Bavaria is within the authority of the municipalities.

Bavaria has its own Nature Conservation Act (*Bayerisches Naturschutzgesetz*) (Landtag des Freistaates Bayern 2011). This law includes provisions for the protection of areas and individual components of nature. Some definitions deviate from the provisions of the federal law (in particular concerning biosphere reserves and “nature parks” (*Naturparke*) – the latter are meant to protect landscape or nature with a focus on recreational use and sustainable economic development).

Furthermore, Bavaria developed two essential documents for biodiversity: the strategy for the conservation of biodiversity (Bayerische Staatsregierung 2008) and its biodiversity program 2030 (Bayerische Staatsregierung 2014). Both documents contain important information on the role of protected areas in conservation efforts while still emphasising the role of other land-use forms. The biodiversity program 2030 identifies four essential points of intervention:

- Protection of species diversity
- Protection of habitats
- Ecological connectivity
- And complementary measures.

So-called “green lists” (*Grüne Listen*) document all types of protected areas in Bavaria (Bayerisches Landesamt für Umwelt 2018a). As of the end of 2018, Bavaria listed 1,326 protected areas, amounting to around 68% of the total land area in the federal state. This sounds like an extraordinarily high number, but it’s important to recognise that the bulk of these are landscape protection areas (30.04% of the total land area of Bavaria) and nature parks (32.14%), which are not strictly protected.

National Parks, which are the largest contiguous areas with the strictest protection criteria, only amount to 0.63% of the overall land area. The National Park Bayerischer Wald, founded in 1970 as Germany’s first National Park, has an area of 242.06 km^2 and is classified as a Special Protection Area (Birds Directive), but is not located inside the Alpine area.

The only Alpine National Park is Berchtesgaden National Park, founded in 1978, which now has an area of 20,824 ha.

National strategies

The latest German Biodiversity Strategy was prepared in 2016, entitled Nature Conservation Action Programme 2020 (Naturschutz-Offensive 2020). It succeeded the National Biodiversity Strategy of 2007 (CBD 2020b). It includes ten action areas (and measures until 2020). Action area 6 foresees the preparation of a National Action Plan for Protected Areas. It is important to notice that the German Nature Protection Law was modified in late 2022 to facilitate the development of renewable energies. The consequences for protected areas will be evaluated in the upcoming years.

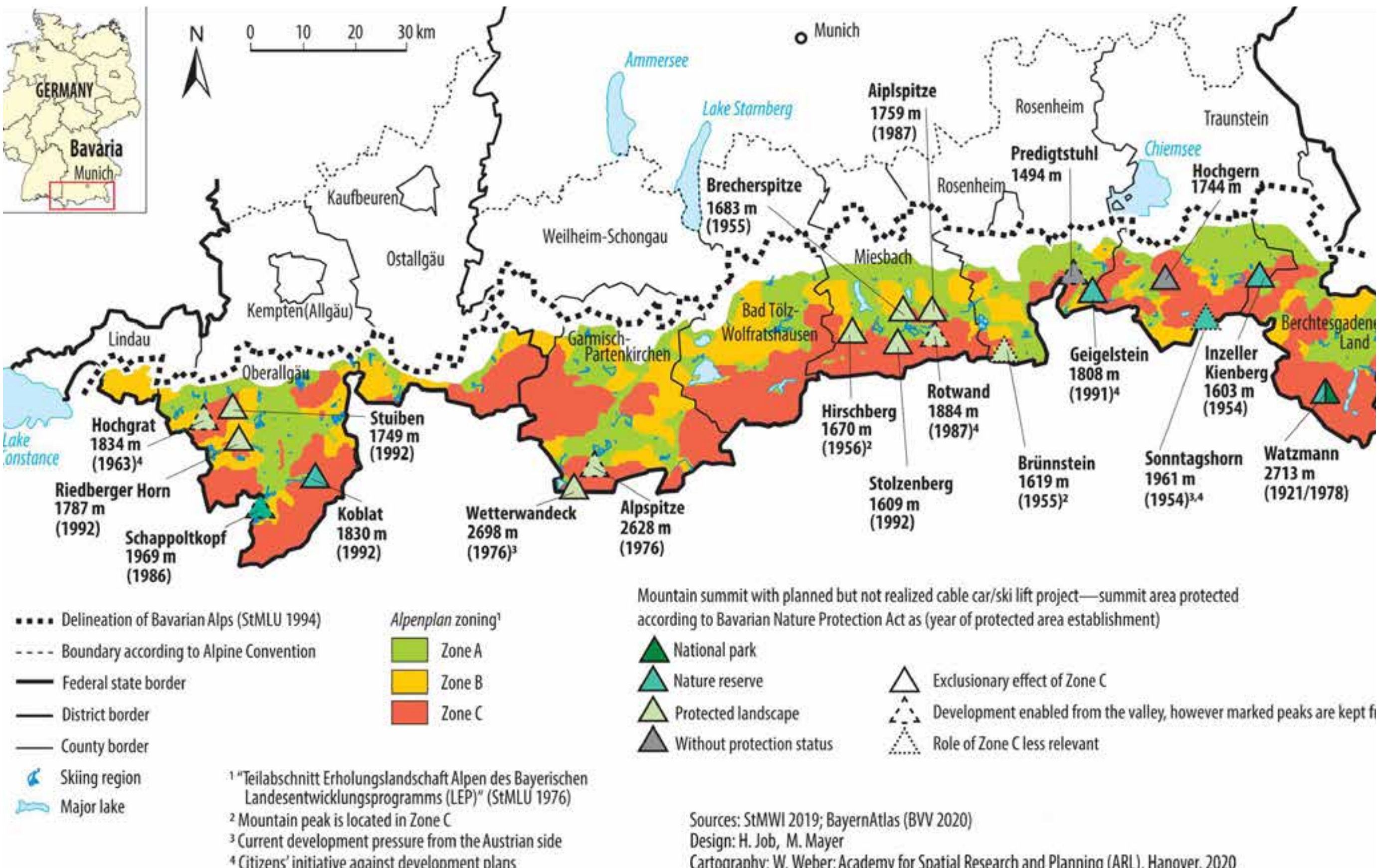
ACTION AREA I.	FIELD AND MEADOWS - CULTIVATED LANDSCAPES FOR MAN AND NATURE
	Abolish agricultural subsidies after 2020 - Pay farmers for specific nature conservation services
	Review the 2017 CAP - Strengthen greening
	Joint Task of “Rural Development” with a focus on nature conservation
	Grassland initiative to extensify fens
	Ban the cultivation of genetically modified agricultural products
	Adopt a comprehensive strategy on nitrogen
	Give appropriate consideration to biodiversity impacts when approving pesticides
	No further arable land to be used for biomass cultivation once Germany has reached the 2.5 million hectare limit.
ACTION AREA II.	**COASTS AND MARINE WATERS - MORE THAN AN ECONOMIC ZONE**
	Adopt eco-friendly fishing policies
	Manage Germany’s marine protected areas in the North and Baltic Seas in line with best conservation practices, and enforce environmentally friendly fishing methods
	No-take zones (NTZ) in marine and coastal protected areas
ACTION AREA III.	**FLOODPLAINS - MORE SPACE TO SUPPORT LIFE BETWEEN WATER AND LAND**
	“National Blue Ribbon Programme” for eco-friendly river development
	National flood protection programme: Giving back space to our rivers
ACTION AREA IV.	**FORESTS - WOODLAND MANAGEMENT IN HARMONY WITH NATURE**
	Contract-based nature conservation programmes for forests
	Best conservation practice in public forests
	10 percent of public woodland allowed to develop naturally
	Practise fuel wood production on an eco-friendly scale

ACTION AREA V.	WILDERNESS - FREEDOM FOR NATURAL ADVENTURES
	Initiative for more wilderness in Germany
	Public relations work for more wilderness
ACTION AREA VI.	**PROTECTED AREAS, NATURE 2000 AND INTERLINKED BIOTOPES - HABITATS AND LIFELINES FOR FAUNA AND FLORA**
	“National Action Plan for Protected Areas”
	Improve the conservation status of species and habitats
	Cross-Lander network of interlinked biotopes
	“Green Infrastructure Concept”
	“Land Protection Action Plan”
	Careful, eco-friendly siting of renewable energy installations
ACTION AREA VII.	**GREENING OUR CITIES - ENGAGING WITH NATURE AT HOME**
	Use urban development funding to make cities greener
	Help municipalities to conserve local biological diversity
	More funding for the United Nations Decade on Biodiversity
	“Cultural and religious diversity and nature conservation” alliance
ACTION AREA VIII.	**INTERNATIONAL RESPONSIBILITY - NATURE KNOWS NO BORDERS**
	More funding for biological diversity worldwide
	Consumer behaviour and biological diversity initiative
	Make the international trade in wild species sustainable
	Economic dialogue on biodiversity
	Strengthen global forest protection and reforestation
ACTION AREA IX.	**KNOWLEDGE AND UNDERSTANDING - PRESERVING AND SHARING OUR KNOWLEDGE OF NATURE**
	Introduce comprehensive, nationwide biodiversity monitoring
	Central, publicly accessible information system on flora and fauna
	Taxonomy training initiative by the Federal Government and Lander
	Establishment of a “Red List Centre”
ACTION AREA X.	**FINANCING - NATURE IS A PROFITABLE INVESTMENT**
	New EU funding programme for nature conservation
	Develop and strengthen the National Biological Diversity and “chance.natur” nature conservation programmes

Concerning the National Action Plan for Protected areas, which is foreseen in the German Biodiversity Strategy, in 2016 the Federal Agency for Nature Conservation *(Bundesamt für Naturschutz BfN)* published a call for proposals. The action plan for Germany is intended to contribute to fulfilling Germany's global commitments under the CBD and helping to maintain global biodiversity. The plan will be cooperatively developed in the next few years. For this purpose, further federal-state talks are planned to jointly shape the entire process for developing the plan. A research and development project that will develop the necessary foundations is envisioned. It should serve as a beacon for further development of the protected areas and the transnational protected area system. The federal and state governments will select fields of action that require a coherent approach to improve the protected areas with a view to protecting biodiversity in an implementation period until 2030 (Umweltministerkonferenz 2016).

A Bavarian particularity is the **"Alpine Plan" (Alpenplan)**, a land-use planning document from the 1970s. The Alpine Plan is an important element of the Bavarian State Development Programme that even fifty years after its creation regulates conflicting stakeholder interests in the Bavarian Alps through zoning regulations. The plan was established in order to preserve the Bavarian Alps from over-development by touristic infrastructure, and particularly ski lifts. When the pressure to develop in the Alps grew in the 1960s, the number of voices urging caution increased. Even then, the Alpine region was considered to be threatened, and Bavarian environmentalists recognised with a great deal of foresight that it was precisely the intact natural and cultural landscapes of the Alpine region that generated tourist interest. Construction projects on the Watzmann, the Rotwand and the Riedberger Horn particularly motivated proponents from the Bavarian State Agency for Nature Conservation and from the German Alpine Association (DAV) to develop an overall concept for both preservation and development of the Alps. In 1972, the ordinance "Recreational Landscape in the Alps" became legally binding. The Bavarian Alpine Plan became part of the Bavarian State Development Program (LEP) in 1976. The repeatedly praised specialty of the Alpenplan is its holistic approach. Its initiators wanted to organise economic development and nature conservation within a clear framework under one roof. Contiguous ecosystems should be protected while municipalities and builders should have long-term planning security for their projects, and all these activities should support protection of natural resources for the various tourist interests (Bund Naturschutz in Bayern e.V. 2020).

Map 10: The Zones of the Bavarian Alpine Plan



Source: (Job et al. 2020)

The plan establishes three zones, A, B and C, that define the respective restrictions. While in zone A new infrastructure is generally permitted, it must still undergo a basic environmental pre-assessment. In zone B, any development is more restricted, and, in zone C, new infrastructure can be built only in rare, exceptional cases. The plan has helped to preserve many natural spaces in the Bavarian Alps and can be seen as an exemplary piece of sustainable and inclusive land-use planning. Today 43% of the Bavarian Alps are classified as zone C, 22% as zone B, and 35% as zone A (Job et al. 2013).

The history of the strictest protection zone C deserves particular recognition because, for almost 50 years, it remained intact - until now, when a controversial change to the LEP for development of ski infrastructure on the Riedberger Horn is being considered.

As a model, the Bavarian Alpine Plan is exemplary despite its age, it could represent a modern instrument for the entire Alps - clear, simple, and communicable, although not easy to implement at the Alpine level. It supports nature-oriented tourism by keeping spaces free for a natural mountain experience. It aims to maintain a balance between summer and winter tourism, avoiding the construction of large winter ski tourism infrastructure. Maintaining protected quiet zones not only conserves vital animal and plant habitats, but also protects against natural hazards (e.g., slope erosion, avalanches, and floods), because the quiet zones protect intact mountain forests and slopes.

Concerning the goals of large protected areas in Germany (such as National Parks), the BfN has outlined the goals and the need for action for the large protected areas in a position paper (BfN 2010). This foresees the following priorities for the further development of protected areas in Germany, in particular for the development of large protected areas:

- Further development of quality criteria and standards for (large) protected areas,
- Development of a National Action Plan for Protected Areas,
- Regular evaluation of protected areas,
- Implementation of research and development projects as well as conferences on the protected area system or on individual (large) protected area types regarding current issues,
- Increasing the proportion of (ecological) process protection areas in accordance with the so-called 2% and 5% targets of the National Biodiversity Strategy,
- Improvement of protected area management and communication of best practice examples, strengthening the resilience of protected areas to negative impacts,
- Improvement of research and monitoring, establishment and implementation of an integrative monitoring for National Parks and biosphere reserves
- Securing sustainable financing,
- Cross-border and cross-border cooperation,
- Implementation of federally funded projects inside large conservation areas.

An example of the protective power of the Alpenplan

The effectiveness of the Alpine Plan was highlighted in 2017, when the Bavarian cabinet wanted to erect a “ski swing” (skiing lift infrastructure) in the middle of the highest protection zone, on the Riedberger Horn. The Riedberger Horn in the Allgäu is one of the most ecologically valuable and simultaneously most unstable areas in the Bavarian Alpine region. It is home to one of the largest populations of black grouse (five percent of the national grouse population).

The Horn is also one of the most beautiful hiking mountains in Bavaria, a retreat for red list species, and also for people who are looking for peace and quiet. Construction of ski infrastructure there would require changes to the Alpine Plan´s provisions for the Riedberger Horn, which the Cabinet attempted in 2017. After protests and a norm review action suit filed by the BN in 2018, the changes were reversed. For now, it seems that the Alpine Plan is still a political planning tool to be reckoned with.

(Bund Naturschutz in Bayern e.V. 2020)

Typology of Protected Areas

The following protected area types exist in Bavaria.

Table 5: Typology of Protected Areas – Bavaria

PA type	IUCN Category	Primary goal	Legal competence
National Parks	II/V		State government (Bayerische Staatsregierung) / National government (Bundesamt für Naturschutz)
Nature reserves	IV		State government (Bayerische Staatsregierung) / National government (Bundesamt für Naturschutz)
Nature parks			State government (based on proposal by Landkreis or Kommune)
Other areas with particular protections			
Landscape protection areas	IV/V		District administration - Untere Naturschutzbehörde
Protected parts of a landscape	III		District administration
Special conservation areas/Natura 2000 sites	IV or other		State government (Bayerische Staatsregierung)
National natural monuments	III/IV/V		State government (Bayerische Staatsregierung)
Natural forest reserves/ strict protection forests	I/IV		State government (Bayerische Staatsregierung)
Quiet zones/ extraordinary protected area	I, II, III, V		State government (Bayerische Staatsregierung)
International designations			
UNESCO Biosphere reserves	various	harmonised management of biological and cultural diversity	State government (Bayerische Landesregierung)
Ramsar sites	various	conservation and wise use of wetlands	State government (Bayerische Landesregierung)

National Parks

Bavaria has two National Parks (National Park Berchtesgaden being the only one in the Alpine area), and a series of other types of protected areas, including nature reserves, landscape protection areas, nature parks, and biosphere reserves, natural monuments, natural forest reserves. The plentiful Natura 2000 sites often overlap with otherwise designated protected areas.

In Bavaria, a National Park is legally decreed by the state government with the consent of the State Parliament (Bayerisches Landesamt für Umwelt 2018c).

National Parks are defined as landscapes that, because of their natural balance, their layout, their diversity or their beauty, are of paramount importance for protection. They have to be at least an area of 10,000 ha. National Parks are composed of a core zone and a buffer zone.

Berchtesgaden Alpenpark & Nationalpark – an example of integrated landscape planning with local participation

The Bavarian nature protection law, Bayerisches Naturschutzgesetz – BayNatSchG, defines the regulations concerning the only Bavarian Alpenpark and the Berchtesgaden National Park, in the Ordinance on the Alpine and Berchtesgaden National Park (1987).

A landscape plan was set up as a non-binding specialist plan for the National Park, which lays down the overarching objectives for the development of the landscape, the limits of the buffer zone, as well as the measures of nature conservation and landscape management. For the Alpenpark, the goals are to preserve and protect the area with its special beauty and singularity, to ensure public access to scenic splendour, to prevent landscape fragmentation, and to devise suitable areas for recreation. For the National Park, the goals are more clearly oriented toward biodiversity protection. Its aims are to protect nature in its entirety; to conserve, scientifically observe, research, and develop the natural and near-natural plant and wildlife populations; and to develop the territory of the population for educational and recreational purposes without jeopardising the conservation goals.

(Nationalparkverwaltung Berchtesgaden 2020; Steinert et al. 2014; Bayerische Staatsregierung n.d.)

With regard to the National Park Berchtesgaden, the following measures are in place: in the core zone, which complies with the 75% rule set up by IUCN, there is no management of ungulates, with the exception of potential intervention in the case of an emerging disease crisis. In the buffer zone there is management of ungulates, mostly roe deer, red deer and chamois.

There are no settlements in the core zone, but there are individual buildings that provide accommodation, or former forest service huts. There are also no settlements in the buffer zone, but there are individual buildings, such as mountain huts or the ensemble of buildings on St. Bartholomä, which is a historical and cultural "ensemble".

The National Park overlaps with other designations (e.g., Natura 2000) and forms the core zone of the UNESCO Biosphere Reserve Berchtesgadener Land. There are monitoring activities with differing intensity and objectives in both zones.

Nature reserves

Nature reserves are created for the special protection of nature and landscape, in particular, for the preservation, development, or restoration of ecosystems or ecological assemblies of certain wild animal and plant species. Biodiversity protection is at the heart of the conservation concept. Together with National Parks, nature reserves form the most strictly protected areas under nature conservation law.

The designation of nature reserves is the responsibility of the higher nature conservation authorities of the district governments. Care and monitoring are the tasks of the lower nature conservation authorities (Bayerisches Landesamt für Umwelt 2018c).

At the end of 2018, Bavaria had 598 nature reserves extending over 165,625 ha (2.34% of its territory) (Bayerisches Landesamt für Umwelt 2018b).

Nature parks

Nature parks are large areas of at least 20,000 ha, many of which have already been designated as protected landscape areas or nature reserves. They support responsible recreation, nature and tourism through sustainable nature and environmentally compatible land use. Most of them should be landscape or nature reserves, have a large variety of species and biotopes and a landscape characterised by diverse uses. The underlying idea is protection through use. In contrast to National Parks, nature parks are planned, structured, and further developed. A nature park is usually initiated by the district or the municipality. In Bavaria a nature park is then designated by the highest nature conservation authority, the Bavarian State Ministry of the Environment and Consumer Protection (StMUV) (Bayerisches Landesamt für Umwelt 2018c).

Currently there are only two such parks in the Alpine part of Bavaria. Created in 2017, the Ammergau Alps Nature park is a 22,700 ha nature park in the Upper Bavarian Alps with a predominantly touristic objective. The Nagelfluhkette nature park is a cross-border nature park in the Nagelfluhkette in the Allgäu Alps, between the German region of Allgäu and the state of Vorarlberg. The nature park is the first cross-border nature park between Germany and Austria. It was founded in Bavaria in 2008 and in Vorarlberg, Austria in 2014.

Landscape protection areas

Landscape protection areas (Landschaftsschutzgebiete) serve primarily to protect the natural balance and its functionality. In addition to the flora and fauna, the soil, groundwater and surface water, the climate, or the landscape itself can be subject to protection. An area can also be designated as a landscape conservation area due to its special importance for recreation. Areas in which nature-compatible use by humans should be preserved or reintroduced can also be placed under landscape protection. Compared to nature reserves, the focus is thus more on the protection of abiotic resources.

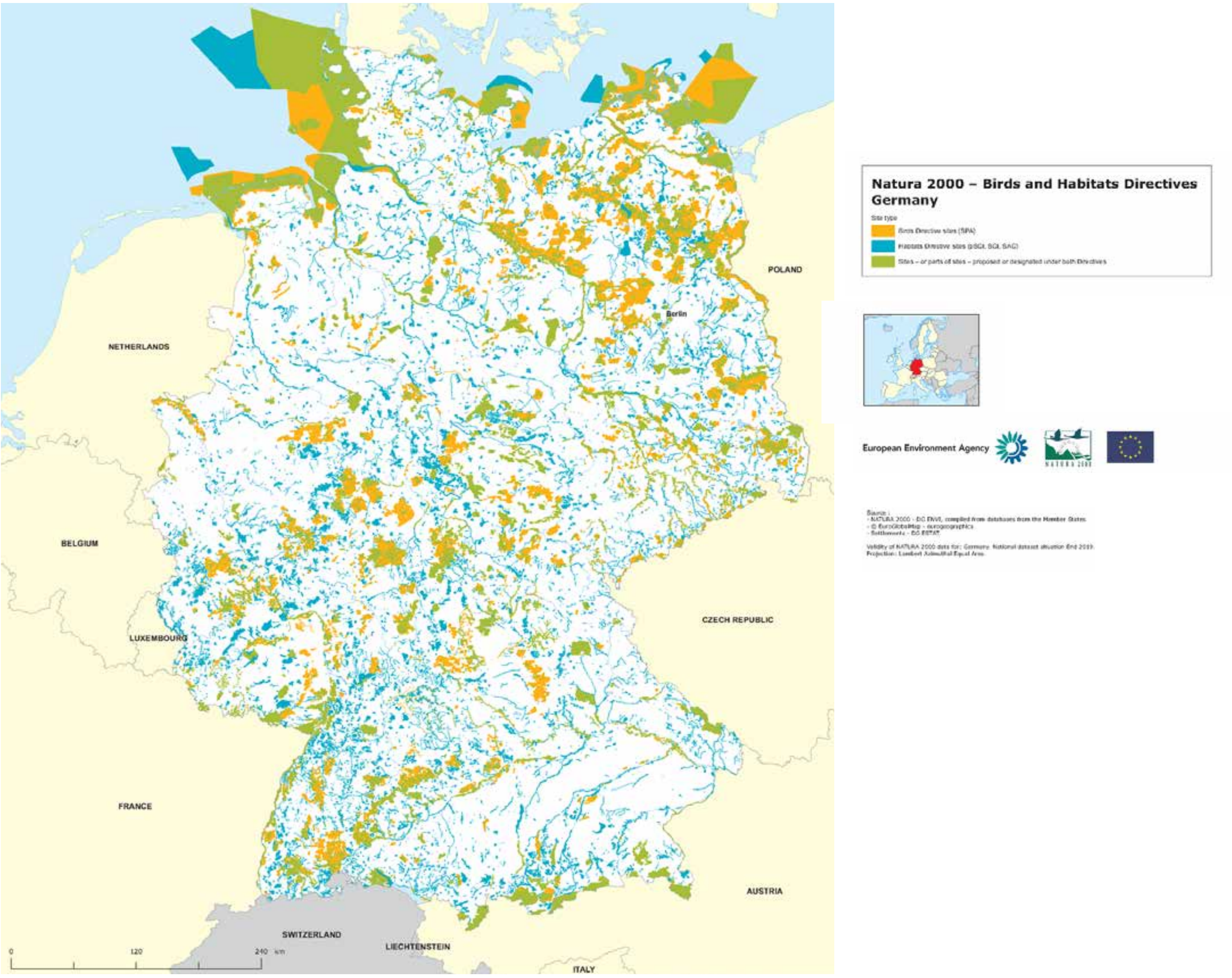
As of the end of 2018, Bavaria had 705 protected landscape areas, extending over 2,119,836 ha (30.04% of the land surface) (Bayerisches Landesamt für Umwelt 2018b).

EUROPEAN AND INTERNATIONAL DESIGNATIONS

Natura 2000

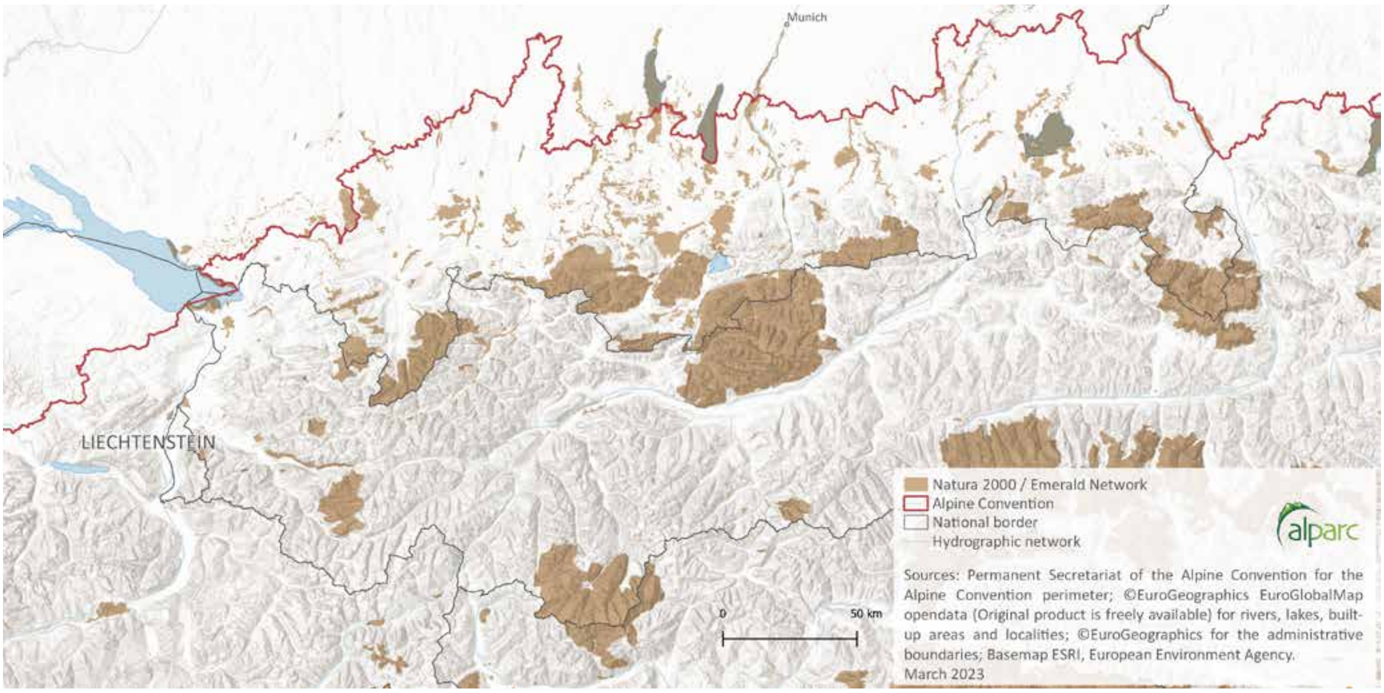
The coherent Natura 2000 network includes the areas registered under the Habitats and Birds Directive. These can spatially overlap. Together, the total of 5,200 areas covers 15.5% of Germany's terrestrial area and around 45% of the marine area (as of 2019). Germany submitted 4,544 FFH areas to the EU, which are spread over three biogeographical regions (Alpine, Atlantic, Continental). This corresponds to a share of 9.3% based on the land area. In addition, there are 2,123,789 hectares of Lake Constance as well as ocean, lagoon, and mud flats (as of December 2019).

Map 11: Natura 2000 Sites in Germany (2019)



Source: (EEA 2020b)

Map 12: Natura 2000 Sites in the German Alps



The Bavarian State Government selects Natura 2000 sites with the participation of those affected. Since April 2020, the Bavarian State Office for the Environment has published all completed management plans of the higher nature conservation authorities (governments) for the Bavarian Natura 2000 sites (Bayerisches Landesamt für Umwelt 2020).

As of December 2019, 45 Natura 2000 sites had been reported to the EU for the Alpine biogeographical region of Germany, amounting to a total land area of 9,462.08 ha.

UNESCO Biosphere Reserves

The Berchtesgadener Land Biosphere Reserve (83,894 ha, with a core area of 13,896 ha) is located in the northern limestone Alps. It is the only Alpine biosphere reserve in Germany. It covers Alpine landscapes as well as foothills with lower areas, with elevation ranges from 380 up to 2,700 metres. The reserve encompasses riparian, submontane, montane, and subalpine forests and Alpine as well as lowland meadows. It is characterised by small-scale agriculture. The core area and buffer zone are identical to the Berchtesgaden National Park with the famous lake Königssee. About 100,000 people live in the biosphere reserve, which relies heavily on tourism.

Bavaria does not have any UNESCO Global Geoparks or World Natural Heritage Sites.

Ramsar

Germany currently has 34 sites designated as Wetlands of International Importance (Ramsar Sites), with a surface area of 868,226 hectares (RSIS 2020c).

Several sites are located in the only Alpine state of Germany, Bavaria. Within Bavaria´s Alpine region, the Chiemsee is a protected 8,660 ha freshwater lake Ramsar site situated in a glaciated basin, with fringing reedbeds and areas of scrub. The mouth of the Tiroler Achen River is situated on the site and supports vast mudflats and moorland. It is an internationally important staging and wintering area for waterbirds, various breeding birds and several notable plant species.

Also notable is the 6,517 ha Ammersee site, a large, natural, freshwater lake with fluctuating water levels situated in a glaciated valley. It is important for breeding, wintering and staging waterbirds.

The Starnberger See is a 5,720 ha is a protected large freshwater lake subject to seasonal fluctuations. It is set in a glaciated valley and supports areas of reedbeds. It is important for breeding, staging and wintering waterbirds, and provides protected fish spawning areas, but it is subject to intensive recreational use and seasonal fishing (RSIS 2020c).

In addition, there are a few smaller Ramsar sites in Bavaria as well.

European Diploma

The Berchtesgaden National Park also has been awarded a European Diploma by the Council of Europe. It is noted for the exceptional quality of its landscapes, the richness of its flora and fauna and the diversity of its natural sites, ranging in altitude from 603 to 2,713 m (Council of Europe 2020b).

C.1.5.4

ITALY

Governance

Italy has a national framework law on protected areas (Legge quadro sulle aree protette, GU n.292 del 13-12-1991; last modified in 2017), which lays out the principles for the foundation and administration of such areas. In addition to this federal law, there are environmental protection laws at the level of regions and provinces, and especially the autonomous regions and provinces. Mountain areas are specially protected at a regional level.

The framework law on protected areas is no. 394 from 1991, which outlines the fundamental principles for the institution and management of protected areas. It outlines their mission, classification, and governance. It also sets out the legislation for national and regional protected natural areas.

In regions that have adapted to the National Framework Law, when regional protected areas are established, this happens jointly with provincial administrations and involved communities. Local administrations, also participate in the management of such areas. Regional laws have led to the establishment of a wide variety of protected areas, with separate classification systems and specific terminology in each region.

Additionally, there are land and marine potential park areas identified by Laws 394/91 and 979/82, which are areas of conservation importance earmarked as top priority for inclusion as protected areas (Federparchi 2020a).

Since 2015, the SAPA (Sistema di Aree Protette Alpine Italiane / System of the Italian Alpine Protected Areas) has aimed to harmonise the policies through monitoring and general management of Italian protected areas in the Alps. Its main activities are the creation of a database of their member protected areas and collaboration with the ecological network platform of the Alpine Convention.[1]

There are other protected natural areas belonging to environmental groups, suburban parks, etc. They can be divided into publicly-managed areas, which are set up by regional laws or equivalent legal provisions, and privately-run areas, which are established by formal public provisions or by contractual processes such as concessions or their equivalent (Federparchi 2020a).

National Parks fall under the legal jurisdiction of the Italian Ministry for the Environment and the Protection of Land and Sea, while regional parks are run by the various regional administrations. There are also reserves for which the Italian Ministry for Agricultural Policy is in charge, and others that are run by provincial or municipal administrations or even by private citizens. Once a park has been created, regardless of what entity is in charge of its designation, it is managed by an independent institution as a separate legal entity. The management body for a protected area may be an independent public organisation at a national or regional level, a consortium, a municipal administration, or an association. National Nature Reserves are still managed directly by the Forestry Corps under the aegis of the Agriculture Ministry, but the law requires them to be transferred at a future date to the Parks (Federparchi 2020a).

The following regions are part of the Alpine region of Italy: Friuli-Venezia Giulia, Lombardy, Piedmont, Trentino-Alto Adige, Valle d'Aosta, Venetia, and Liguria (Federparchi 2020a).

National strategies

In 2010, the Ministry of the Environment prepared the National Biodiversity Strategy, and, in 2016, an Intermediate Strategy Review until 2020 was created. The Structure of the Strategy is divided into three key themes:

1) Biodiversity and ecosystem services,
2) Biodiversity and climate change,
3) Biodiversity and economic policies.

The three respective strategic objectives are achieved with the contribution of the different sector policies identified in 15 work areas. These are:

Work Area 1	Species, habitats, landscape
Work Area 2	Protected areas
Work Area 3	Genetic resources
Work Area 4	Agriculture
Work Area 5	Forests
Work Area 6	Inland waters
Work Area 7	Marine environment
Work Area 8	Infrastructures and transportation
Work Area 9	Urban areas
Work Area 10	Health
Work Area 11	Energy
Work Area 12	Tourism
Work Area 13	Research and innovation
Work Area 14	Education, information, communication and participation
Work Area 15	Italy and global biodiversity

[1] The Ecological Network Platform ceased activities in 2019.

A preliminary set of indicators has been prepared for progress evaluation, 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 the actions in achieving the objectives of the Strategy (Ministero dell´Ambiente 2018).

Typology of Protected Areas

Table 6: Typology of Protected Areas - Italy

PA type	IUCN Category	Primary goal	Legal competence
National Parks	II/V		Ministry in charge of the environment
(State) Nature reserves	IV		Ministry in charge of the environment
(Inter-)regional nature parks	II/IV/V		(Ministry in charge of the environment)/ regional/provincial administration
Other areas with particular protections			
Wilderness areas/strictly protected reserves (in Italy the core zones of National Parks)	I (Ia/Ib)		Ministry in charge of the environment
Landscape protection areas	IV/V		Various, depending on type
Protected parts of a landscape	III		Various depending on type
Special conservation areas/Natura 2000 sites	IV or other		Various depending on type
Natural monuments/ natural areas	III/IV/V		Regional/provincial administration
Natural forest reserves/ strict protection forests	I/IV		Ministry in charge of agriculture and forestry
Wildlife protection area/ extraordinary protected area	I, II, III, V		Ministry in charge of agriculture (for wildlife)
Area of relevant environmental interest (only in Italy)	-		Various depending on type
Gardens and parks, municipal or intermunicipal parks	-		Municipalities
Natural recreation areas (only in Italy)	-		Various depending on type
Ensembles (new in 2020, Bolzano Province)	-		Autonomous Province of Alto Adige
International designations			
UNESCO Biosphere reserves	various	harmonised management of biological and cultural diversity	Ministry in charge of the environment
UNESCO Global Geopark reserves	various	protecting global geodiversity	Ministry in charge of the environment
UNESCO World Natural Heritage sites	various	conservation of natural sites of outstanding universal value	Ministry in charge of the environment
Ramsar sites		conservation and wise use of wetlands	Ministry in charge of the environment

The following types of protected areas are mentioned in the National Framework law (Federparchi 2020b).

National Parks

National Parks in Italy are defined as areas of international or national importance due to natural, scientific, aesthetic, cultural, educational, and recreational values, such that they require the intervention of the State in order to preserve them for present and future generations.

In the Italian Alps, there are four National Parks. These are Stelvio - Stilfserjoch, with an area of 130,728 ha, Gran Paradiso, with an area of 71,043 ha, Dolomiti Bellunesi, extending over 31,034 ha, and Val Grande, with an area of 15,000 ha (Federparchi 2020b). The first National Park to be established in Italy was Gran Paradiso National Park in 1922, which is located between elevations of 800 metres of the valley bottoms to the 4,061 metres at Gran Paradiso peak.

National Parks draw up a Park Plan, as do some regional parks. (Other regional parks draw up a Territorial Coordination Plan). These plans are approved by the management council and by the regional administration(s). In addition, National Parks draw up a Social and Financial Long-term Strategic Plan (Piano Pluriennale Economico e Sociale). Park regulations are approved by the management council and by the Italian Ministry for the Environment and the Protection of Land and Sea (Federparchi 2020a).

Zoning involves dividing the territory of the park into four different zones (Federparchi 2020a).

- Zone A: Strict Nature Reserve. No human activities allowed except for scientific research.
- Zone B: General Reserve. Only traditional occupations are permitted, and tourism is overseen by the park.
- Zone C: Planning of tourism and agrosilvopastoral systems authorised by the park.
- Zone D: Development. Includes built-up areas with potentially sustainable activities. Municipal Development Plans (Piani Regolatori).

The core zone (Zone A) is classified as an integral reserve (riserva integrale), where nature is protected in its entirety. No agriculture or other human impact, except for scientific research, is allowed in integral reserves.

Nature reserves

Nature reserves are created because they contain one or more animal or plant species of conservation importance, or have one or more ecosystems of importance either for biodiversity or for the conservation of genetic resources (Federparchi 2020a). Nature reserves are generally smaller and may be either state or regional according to the importance of the natural elements found within them.

There are 37 Regional Nature Reserves in the Alpine part of Italy. Within the different regions (*Regione*) there are different categories, not all of which are covered by the National Framework law, such as **"Recreation area"** (e.g., in Friuli-Veneto) or "**Biogenetic Reserve**" (only in Piemonte and Veneto). Among the different regions, there are differences in the levels of protection of protected areas that have the same name (e.g., in Veneto there are four categories of nature reserves: "**general nature reserve**", "**integral reserve**", "**directed nature reserve**", and "**regional nature reserve**"; in Lombardy there are three such categories: "integral reserve", "directed nature reserve", and "**partial nature reserve**". In nature reserves, no hunting is allowed, but there are exceptions.

Nature parks

In Italy, there are regional and interregional nature parks. These are areas of great natural and environmental value that form a single system that may cross the boundaries between two or more administrative regions. They may be valued for the natural assets of the area, the beauty of the landscape, and/or the artistic and cultural traditions of the inhabitants.

Regional Nature parks are zoned into areas of strict and less strict protection and are also subject to a multi-year management plan, which is established by an administrative body and approved by the Regione. Their aims are both to preserve and valorise biodiversity and to promote initiatives that foster economic, social, and cultural growth in the local communities. Every regional park has its own administrative entity. Hunting is not allowed.

In the Alps, there are 34 Regional Parks. What is also noteworthy is that, in several Italian Alpine Regions, the category "Regional Nature park" correlates with the type of protection found in National Parks elsewhere including zoning and management plans. These plans are subject to annual updates.

However, in the autonomous province of Bolzano (South Tyrol/Alto Adige), like in other Alpine countries such as Austria, Nature parks have a much less formal structure and no zoning.

Landscape protection areas

In most of Italy, there are equivalents of **landscape protection areas**. However, they are not designated as such. They might, for example, be designated as regional nature reserves (*riserva naturale regionale*), as provincial protected areas (*Area protetta di interesse provinciale*), or even as botanical gardens (EEA 2020a).

In South Tyrol/Alto Adige, landscape protection exists as a specific category. Different protection categories are defined in the Landscape Protection Act of July 25, 1970, No. 16 (Südtiroler Landesverwaltung 2020). While large-scale protected areas, such as National Parks and nature parks, are designated with their own decrees, landscape protections in other areas are defined using landscape plans.

The law defines protection categories for objects of particular landscape value (e.g., wide landscape areas, natural monuments, ecosystems [Biotope], gardens and parks) that can be placed under protection by resolution of the state government. Administratively speaking, "Wide areas" are divided into **ban zones**[1] and **landscape protection areas**. Landscape protection areas are areas of great natural beauty, most of which have emerged from a traditional cultural landscape. In addition to agricultural and forestry use, these areas are important for tourism and recreation. The protection goal is to preserve the existing landscape, nature and recreational potential and to harmonise the existing and the newly intended uses - usually for agriculture or tourism - with the protection goals in the best possible way.

The landscape plan also lays down the general protection provisions and community-specific regulations for particular areas. In South Tyrolean administrative practice, they are

[1] The ban zones are usually open areas near the settlement, which should be kept free from development.

not identified by individual decisions, but by summarising the areas and objects worth protecting in the landscape plan for each municipal area. Application for protection status via a landscape plan maybe initiated by the state administration or the municipality (amendments only). The initiative can also be taken by the state government, the district administrations as well as corporate bodies (Körperschaften), associations and organisations whose main objective is nature, landscape and environmental protection (Südtiroler Landesverwaltung 2020).

In addition to the previously existing categories, in Alto Adige, there are some new protection categories as of July 2020:

1. **Ensembles** are residential zones that give a characteristic picture of aesthetic and traditional value, including the historical town centres and building collections.
2. **Protected parts of the landscape,** these are parts of the landscape that contribute to biodiversity and landscape diversity as well as to ecological stability or permeability in the biotope network (e.g., chestnut groves, wetlands, etc.) (This category exists in other Alpine countries too but had not previously received special mention in Alto Adige.)
3. **Panoramic landscapes** and publicly accessible viewpoints or vistas from which one can admire the panorama.

In addition to National Parks, nature parks, nature reserves, and areas specifically designated as protected, in South Tyrol/Alto Adige, certain areas are automatically legally protected by law, i.e., without a specific protection act. These are listed in Art. 1 / bis of the Landscape Protection Act and include:

- areas adjacent to lakes with a width of 300 metres;
- rivers and streams including the banks and dams up to 150 metres wide;
- areas of mountains at above 1,600 metres ASL elevation;
- forests and forestry areas;
- wetlands;
- areas of archaeological importance.

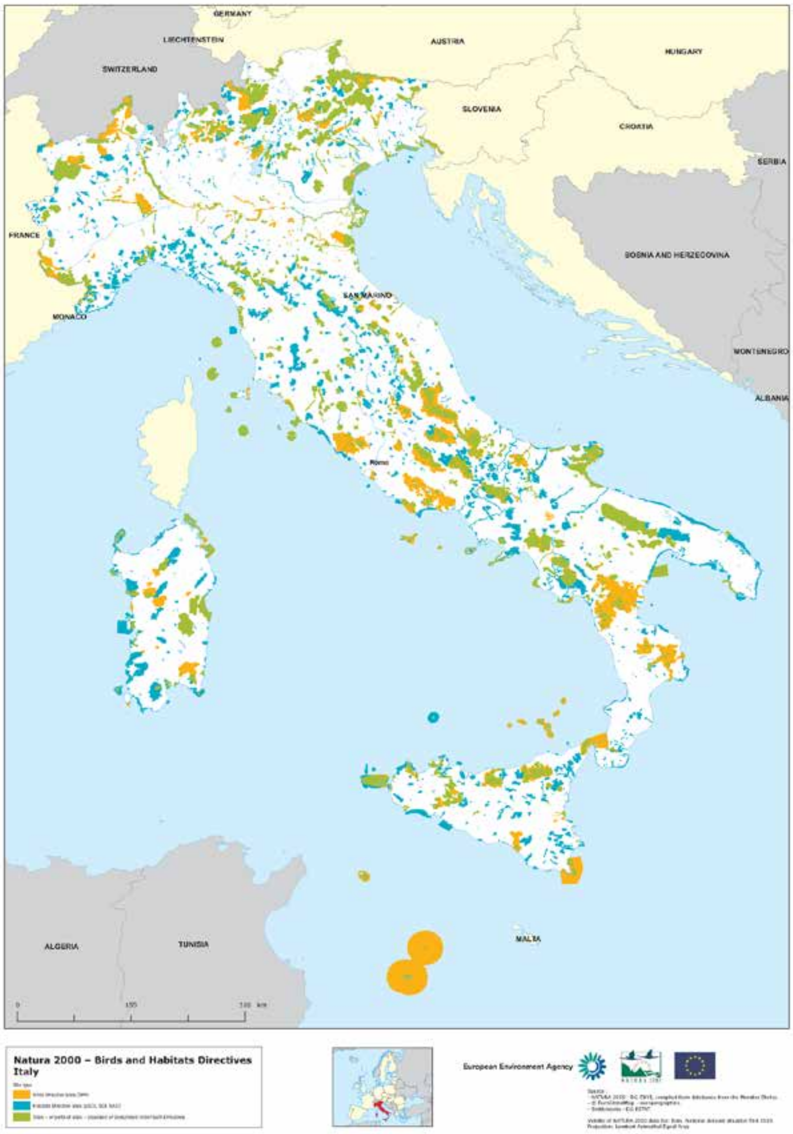
EUROPEAN AND INTERNATIONAL DESIGNATIONS

Natura 2000

In Italy, Sites of Community Importance (SIC), Special Conservation Areas (ZSC) and Special Protection Areas (ZPS) cover a total of about 19% of the national land and more than 7% of the marine land. To date (as of April 2020) , 2,347 SCI have been identified by the Italian Regions, 2,278 of which have been designated as Special Conservation Zones, and 630 Special Protection Zones (ZPS) (Ministero dell´Ambiente 2020).

There are 17 Natura 2000 sites in the Italian Alps. In the Friuli - Venezia Giulia region, as of April 2020, 66 sites totalling a land area of 153,037 ha have been designated. In Lombardy, there are 245 sites (373,534 ha), in Liguria

Map 13: Natura 2000 Sites in Italy (2019)



Source: (EEA 2020b)

there are 133 sites (139,959 ha). Piemonte includes 151 sites (404,001 ha), and in the Autonomous Province of Bolzano there are 44 sites (150,047 ha). In the Autonomous Province of Trento there are 143 sites (175,217 ha), in the Aosta Valley 30 sites (98,947 ha) and in the Veneto 130 sites (414,298 ha) (Ministero dell´Ambiente 2020).

UNESCO Biosphere Reserves

Of Italy´s 19 UNESCO Biosphere Reserves, six are located in or adjacent to the Alps, including two transnational Biosphere Reserves (UNESCO 2019a).

The transboundary Julian Alps Biosphere Reserve (71,451 ha, with a core area of 9,630 ha) in the Southern Limestone Alps, designated in 2019, includes Slovenian park land (see also the Slovenian Section below), which was already designated in 2003. The Biosphere Reserve constitutes an important Alpine corridor, notably for large carnivores as well as birds.

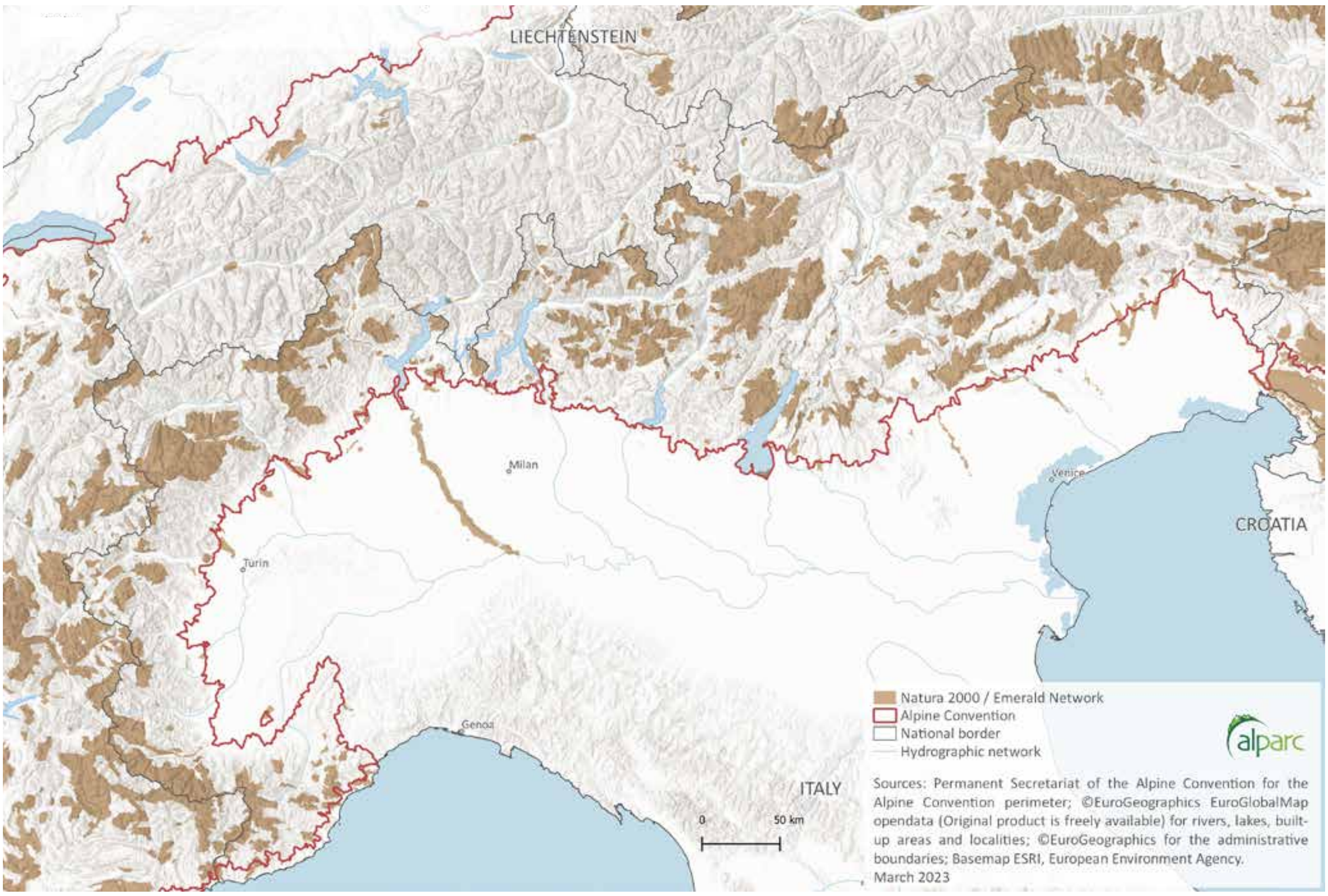
Italy shares with France the transboundary Mont-Viso Biosphere Reserve (427,080.7 ha: France: 133,164 ha; Italy: 293,916.7 ha), which is a glacial cirque situated between the Alpine mountains and the Mediterranean. It is surrounded by river valleys and high-altitude lakes and contains on 1,331 km^2 a mosaic of ecosystems ranging from the arid and rocky landscape found at high altitudes on the Monviso massif (at a maximum elevation of 3,841 m) to the unusual forest ecosystem, which hosts, among others, Pinus cembra.

The Ticino Val Grande Verbano Biosphere Reserve (151,596.9 ha, with a core zone of 13,393.37 ha) functions as an important ecological corridor within the urbanised and industrialised Po plain. The site encompasses a mosaic of ecosystems with large river habitats, wetlands, riparian woods, and patches of primary plain forest. It is also characterised by a traditional rural landscape with semi-natural ecosystems. These include rice paddies, cornfields, permanent grasslands and ‘marcita’ (water meadows). A population of 685,000 people living in the biosphere reserve works primarily in the services and industry sectors.

The Ledro Alps and Judicaria Biosphere Reserve (47,427 ha, with a core of 4,786 ha) is located in the Trento region of northern Italy, between the Dolomite World Heritage Site and Lake Garda. The site is representative of the southern slopes of the central-eastern Alps and comprises a variety of habitats including Alpine meadows, forest, grasslands and moorlands, alternating with traditional crops. It is a well visited tourist destination.

The very large Valle Camonica – Alto Sebino Biosphere Reserve (135,565 ha, core 34,160 ha) is located in the eastern part of Lombardy. The area is characterised by typical Alpine and pre-Alpine valleys, ranging from valley

Map 14: Natura 2000 Sites in the Italian Alps



floor landscapes to the highest peaks of Europe and the Adamello Glacier ending in the Iseo Lake, one of Italy's largest basins. The landscape features rivers and lakes, woods and forests, glaciers, meadows, and prairies. There is traditional farming and animal husbandry in the region.

Located just outside the Alpine Arc, the Collina Po Biosphere Reserve (171,234 ha, with a core area of 3,853 ha) is located in the northern Italian Piedmont Region and covers the Turin stretch of the River Po. The River Po is the main reservoir of biodiversity in the Turin plain, due in part to the numerous wetlands along its course. Its physical and geological characteristics have led to the formation of numerous gravelly shores, oxbow lakes and riparian woods that host a variety of species. These natural features are of particular value to the densely populated local environment, with 900,000 people living in the city of Turin.

UNESCO Global Geoparks

In total, Italy has ten UNESCO Global Geoparks. Of these, three are located in the Alps (UNESCO 2019b).

The very large (2,023 km^2) Sesia Val Grande UNESCO Global Geopark is located on the north-east of Piemonte Region and includes the Val Grande National Park, two regional parks (Alta Valsesia and Monte Fenera), and the Special Nature Reserves of S. Monte of Varallo, Sanctuary of Ghiffa and Domodossola. This Geopark is the highest and the steepest one in Europe.

The 1,188 km^2 Adamello-Brenta UNESCO Global Geopark, located in the Rhaetian Alps, the Italian sector of south-central Alps, represents a "key area" for understanding the geological history of the Alps. It is characterised by significant geodiversity due to the presence of two big mountainous massifs (Adamello and Brenta), which are very different geologically and geomorphologically.

Beigua UNESCO Global Geopark (392 km^2) is located in Liguria, in the north-western part of Italy, near the border with France. It includes the Beigua Regional Nature park and a broad zone linked to the nature park. Though, strictly speaking, it is not in the Alps, it is important for understanding the geological history of Italy, especially the evolution of the Alps and the Apennines.

UNESCO World Natural Heritage Sites

Italy has four Natural Heritage sites, of which two are located in the Alps.

The site of the Dolomites comprises a mountain range in the northern Italian Alps with 18 peaks that rise to above 3,000 metres and cover 141,903 ha. This contains nine areas that present a diversity of landscapes of international significance for geomorphology marked by steeples, pinnacles and rock walls. It also contains glacial landforms and karst systems. The site features dynamic processes with frequent landslides, floods and avalanches, and showcases one of the best examples of the preservation of Mesozoic carbonate platform systems with fossil records (UNESCO 2020). A portion of this area is further protected by other UNESCO designations: the Biosphere Reserves (Ledro Alps and Judicaria) and Geoparks (Adamello-Brenta UNESCO Global Geopark).

Together with Switzerland, Italy shares the UNESCO World Natural Heritage Site of Monte San Giorgio, beside Lake Lugano, which is regarded as the best fossil record of marine life from the Triassic Period (245–230 million years ago). Including the Swiss area, the Natural Heritage site stretches over 1,089.34 ha surrounded by a buffer zone of 3,207.45 ha.

Ramsar Sites

Italy currently has 56 sites designated as Wetlands of International Importance (Ramsar Sites), with a total surface area of 73,308 hectares (RSIS 2020d).

Two of the larger ones are in the Friuli-Venezia Giulia and Lombardy regions.

Laguna di Marano/Foci dello Stella is a 1,400 ha area lying within the vast lagoon complex formed by the deltas of the Tagliamento and Isonzo rivers. The site includes a fossil dune complex and tidal waters of varying salinity with extensive intertidal mud and sand flats. The lagoon environment is changing due to rising sea level.

In Lombardy, the Valli del Mincio is a 1,082 ha complex of artificial pools created from marshland in the floodplain of the Mincio River. Vegetation consists of emergent, floating and submergent species and includes species rare in Italy. The pools also support a rich fish population and are important for a diversity of breeding and wintering birds.

All the other Alpine region sites in Alto Adige, Friuli-Venezia Giulia, Lombardy and the Veneto region are much smaller.

European Diploma

The Alpi Marittime Nature park, which is twinned with the Mercantour National Park, has been awarded the European Diploma (Council of Europe 2020b). These two areas are on opposite sides of the same Alpine massif in the heart of the Alpes-Maritimes, considered to be the prime habitat for endemic species in the Alps. The two parks have taken successful joint action, particularly with regard to reintroduction operations (ibex, lammergeyer).

Grand Paradiso National Park has been awarded the European Diploma (see above), "twinned" with Vanoise National Park (France) (Council of Europe 2020b).

C.1.5.5

LIECHTENSTEIN

Governance

The Conservation Act of 1996 aims to conserve native species and their habitat and create natural habitat for these species where necessary. It also strives to conserve ecological functionality and near-natural landscapes. Areas and natural monuments that are particularly worthy of protection may be designated by the state in cooperation with communities. The state then determines the regulations and prohibitions for future use of such areas to prevent detrimental human activities.

Liechtenstein's biodiversity conservation goal is set out in the Law on the Protection of Nature and Landscape: "The entire area of habitats shall be protected and restored where necessary" (CBD 2020c). Other relevant laws are the Forestry Act, the Water Protection Act, the Fishery Act, and the Agriculture Act. To implement their provisions, numerous instruments are used in the biodiversity-relevant sectors. Various inventories aim to conserve natural values. Nature and forest protection areas are established to conserve flora and fauna as well as genetic diversity.

National strategies

Liechtenstein has developed a National Biodiversity Strategy and Action Plan (2010). Strategic goals that have been set in this regard include: conservation of habitats and the promotion and upgrading of current habitats; conservation of species; conservation of landscape, forest and soil; and the incorporation of more nature in the utilised landscape (CBD 2020c). The strategy is based on one overall target, four sub-targets and 12 strategy elements (CBD 2020b).

The Development Concept for Nature and Agriculture is being implemented as the framework for the development of natural values based on a legal obligation for a nature and landscape protection concept. The goal is to present the policy tasks, development intentions, and positions in the two specialised areas of "nature and landscape" and "agriculture" and to jointly establish a vision for development (CBD 2020c).

Typology of Protected Areas

Legally protected area types that exist in Liechtenstein include the following:

Table 7: Typology of Protected Areas - Liechtenstein

PA type	IUCN Category	Primary goal	Legal competence
Nature reserves	IV/Ia	biodiversity conservation	Amt für Umwelt, Natur und Landschaft
Other areas with particular protections			
Landscape protection areas	IV/V	landscape protection	
Forest reserves & special forest areas	IV/Ib	biodiversity conservation	
Plant protection areas & fungi reserves		biodiversity conservation	
Unfertilised meadows (Magerwiesen)	-	biodiversity conservation	
Quiet zones (for wildlife)		wildlife protection	
International designations			
Ramsar sites		conservation and wise use of wetlands	

Four categories of PA's within this system are legally binding: nature reserves, landscape protection areas, forest- and landscape protection areas, and plant protection areas. Nature and forest reserves are the two most strictly protected categories, with a focus on the conservation of habitats for threatened animal and plant species. They are protected by law or ordinance and include the goals of conservation and development. They cover an area of 1,988 ha, 12.3% of Liechtenstein's land area.

In addition, there is a scientifically compiled inventory of areas that are not yet legally protected, but that, in accordance with the "nature priority area inventory" (Naturvorrangflächeninventar), must be considered by the authorities and taken into account when intervening in nature and landscape. In addition, the inventory forms the most important basis for the determination of legal protected areas and objects.

Nature reserves

The eleven nature reserves are largely wetlands and are situated in the Rhine Valley. They serve to protect swamps and waters. The largest nature reserve, the Ruggeller Riet (93 ha), is the most significant bird breeding area in Liechtenstein and is a wetland of international importance (Ramsar site) (Braden and Müller 2014).

Forest protected areas

The 30 forest protection areas include forest reserves and special forest areas. They are mainly located at higher elevations and along the river Rhine. Around 27% of the country's total forest surface are declared protected nature reserves (Braden and Müller 2014).

Landscape protection areas

The Inventory of Nature Priority Areas includes 28 landscape protection areas. Only a portion of these areas, however, is protected by ordinance. Landscapes are inventoried because of exceptional natural scenery or cultural-historic value. The inventory must be taken into account by the state and the municipalities in land use planning (Braden and Müller 2014).

Other

The entire Liechtenstein Alpine area is a plant protection area. In the plant protection area, the pulling up, digging, and picking of plants is prohibited. The legal provisions and the perimeter of the plant protection area are defined in the Regulation for the Protection of Mountain Flora.

The Liechtenstein mountain area is a contiguous plant protection area intended to help preserve mountain flora and the appearance of the landscape. The protection provisions are less stringent than in the nature and forest protection areas.

There are no formally defined hunting ban areas (but, in some nature reserves and other areas, hunting is prohibited).

EUROPEAN AND INTERNATIONAL DESIGNATIONS

There are, as yet, no legally protected wilderness areas, National Parks, nature parks, or UNESCO biosphere reserves, nor Emerald Network areas in Liechtenstein.

Ramsar sites

Liechtenstein currently has one site designated as Ramsar Sites, with a surface area of 101 hectares: the Ruggeller Riet, a complex of lowland wet meadows underlain by up to nine metres of peat. It supports an exceptional floral diversity for its size and is home to many fungi, mosses, invertebrates and birds (RSIS 2020e).

C.1.5.6

SLOVENIA

Governance

In Slovenia, legal competence for all protected areas rests with the national government. Depending on the type of area it lies either with the Ministry of Environment or the Ministry of Agriculture.

The Slovenian National Assembly designates National Parks or protected areas of international importance. Management is undertaken by the National Park administration or by specialised institutions. Management plans must take into account the needs of the local communities, who participate in creating such plans. In the case of Triglav National Park, the protected area administrator is designated by Parliament. Management responsibility then rests with the Institute of the Republic of Slovenia for Nature Conservation and Protected Areas Management Authorities.

The state can independently set the conditions and criteria for regional and landscape parks and decide on their degree of protection. The law defines regional parks as well-preserved, natural environments, which can also include heavily populated areas, unlike in National Parks.

National strategies

The Biodiversity Conservation Strategy of Slovenia dates back to 2002 (CBD 2020b). Under its reporting obligations to the Convention on Biological Diversity, Slovenia produced thematic reports: a Report on Mountain Ecosystems and a Report on Protected Areas (both in 2003). These targets are still in draft form (CBD 2020a).

Overall National Target A (draft)	Improvement of conservation status of species and of their habitats.
Detailed National Target 1 (draft)	By 2025, the status of habitat types and species, including their genetic diversity will improve and/or will be maintained.
Detailed National Target 2 (draft)	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.
Detailed National Target 3 (draft)	By 2020 the invasive alien species and their pathways will be identified. By 2025, the invasive alien species and their pathways will be brought under control.
Overall National Target B (draft)	Knowledge, understanding and awareness on biodiversity and its importance will increase at all levels of society.
Detailed National Target 4 (draft)	By 2020, a national program on research and monitoring of biodiversity will be established.
Detailed National Target 5 (draft)	By 2025, biodiversity will be a part of compulsory education programmes.
Detailed National Target 6 (draft)	By 2025, the public will be adequately informed about the importance of biodiversity.
Detailed National Target 7 (draft)	By 2025, promotion of biodiversity will increase and good practices that support it will be rewarded.
Overall National Target C (draft)	For conservation of biodiversity, the interdisciplinary and cross-sectoral cooperation and application of comprehensive approach will improve.
Detailed National Target 8 (draft)	By no later than 2025, the biodiversity values will be integrated into relevant national and local strategies and decision-making processes.
Detailed National Target 9 (draft)	By 2020, the existing protected areas and Natura 2000 sites will be preserved through efficient management.
Detailed National Target 10 (draft)	By 2025, traditional knowledge, scientific research, innovations, and new technologies will be involved into conservation of biodiversity.
Overall National Target D (draft)	Stimulative financial incentives will be provided for biodiversity conservation.
Detailed National Target 11 (draft)	By no later than 2020, the subsidies and incentives harmful to biodiversity will be identified and removed.
Detailed National Target 12 (draft)	By 2025, sustainable financial resources for research activities, programmes and projects that support conservation of biodiversity will be provided.

Typology of Protected Areas

There are various categories of protected areas (according to the comprehensive Nature Conservation Act of 1999), summarised in the table below. In the Alpine region of Slovenia there is a National Park, a regional park, several landscape protection areas, nature conservation areas, and natural monuments. There are also international designations (see below).

National Park

The substantial Triglav National Park (TNP) is the only National Park in Slovenia. Extending along the Italian border and close to the Austrian border in the north-west of Slovenia (in the Eastern Julian Alps), the park covers 84,000 ha, or 4% of the territory of Slovenia.

Triglav National Park is divided into three zones, including a strictly protected core zone (1st and 2nd level) and a peripheral zone. Concerning the IUCN rule of 75%, the first (31,488 ha) and second (32,412 ha) protection zones present the TNP's core zone. In the first protection zone hunting is not allowed, but in the second and third (20,082 ha) protection zones hunting is allowed and regulated through wild game species management plans. Nevertheless, both first and second protection zones constitute the core zone.

Table 8: Typology of Protected Areas - Slovenia

PA type	IUCN Category	Primary goal	Legal competence
National Parks (narodni park)	II/V		Ministry in charge of the environment
Strict nature reserves (strogi naravni rezervat) (equivalent wilderness area)	I		Ministry in charge of the environment
Forest reserves (gozdni rezervat) (equivalent wilderness area)	I		MinAgri/Forest Service
Nature reserves (naravni rezervat)	IV		Ministry in charge of the environment
Regional nature parks (regijski park)	II//V		Ministry in charge of the environment
Other areas with particular protections			
Landscape parks (regijski park)	V		Ministry in charge of the environment
Special conservation areas/Natura 2000 sites (posebno varstveno območje)	IV or other		Ministry in charge of the environment
Natural monuments/ natural areas (naravni spomenik)	III/IV/V		Ministry in charge of the environment
Protection forests (varovalni gozd) and special purpose forest (gozd s posebnim namenom)	I/IV		MinAgri/Forest Service
Ecologically important area (ekološko pomembno območje)	-		Ministry in charge of the environment
Special purpose hunting area (lovišče s posebnim namenom)	-		MinAgri/Forest Service
Horticultural monument	-		MinAgri/Forest Service
Fishing reserve	-		MinAgri/Forest Service
International designations			
UNESCO Biosphere reserves	various	harmonised management of biological and cultural diversity	Ministry in charge of the environment
UNESCO Global Geopark reserves	various	protecting global geodiversity	Ministry in charge of the environment
UNESCO World Natural Heritage sites	various	conservation of natural sites of outstanding universal value	Ministry in charge of the environment
Ramsar sites	various	conservation and wise use of wetlands	Ministry in charge of the environment

The hunting issue is complex. There is a distinction between non-hunting areas and areas in which hunting is managed by the state/public authorities. In Triglav National Park, the TNP Management Authority is also responsible for the game species management in 65% of the National Park area. The so-called 'State Hunting Grounds Triglav' includes the entire first conservation zone, where hunting is not allowed. In the remaining part, hunting is managed and performed in accordance with game species management plans (10-years and annual), which are prepared by the Slovenia Forest Service and adopted by the Minister responsible for food, forestry and agriculture (Arih 2020).

Infrastructure is tightly regulated. All tourism that negatively affects natural and cultural heritage is prohibited or at least regulated, allowing nature conservation and cultural heritage protection to take precedence over other interests. Triglav National Park overlaps with a UNESCO Biosphere reserve and the Natura 2000 Network.

Triglav National Park meets most conditions for the IUCN category II. Only forestry practices (which includes also commercial logging) warrant further scrutiny. The park will need an expert evaluation of the second zone in the near future, as no additional zoning of the second zone currently exists (Arih 2020).

Within the park, quiet zones are prescribed by the TNP Management Plan (2016). Currently, there are 138 quiet zones defined by the Plan, covering around 9% of the park's area. Most measures of protection regimes of the quiet zones relate to mitigation of pressures from visitation, tourism and recreation. Exclusion of human activity could last for an entire year (e.g. in peat bogs) or be imposed temporarily (e.g. to protect capercaillie, black grouse, chamois, golden eagle, peregrine falcon) (Arih 2020).

The TNP Management Plan for the period 2016 – 2025 can be found online (in Slovenian). The Park is managed by the Triglav National Park Public Institution.

Nature reserves

Slovenia distinguishes between strictly protected nature reserves and regular nature reserves. According to definitions prescribed by the Nature Conservation Act (Art. 53, par. 5), nature reserves and natural monuments belong to small protected areas. Nature reserves may be part of a National Park zone. The Nature Conservation Act defines restrictions and prohibitions in Nature Reserves.

Anything that could damage biodiversity or the structure and function of ecosystems or endangered species is prohibited, except for research and education with Ministerial permit.

Strict nature reserves can be considered the equivalent of wilderness areas as defined by IUCN.

Forest reserves

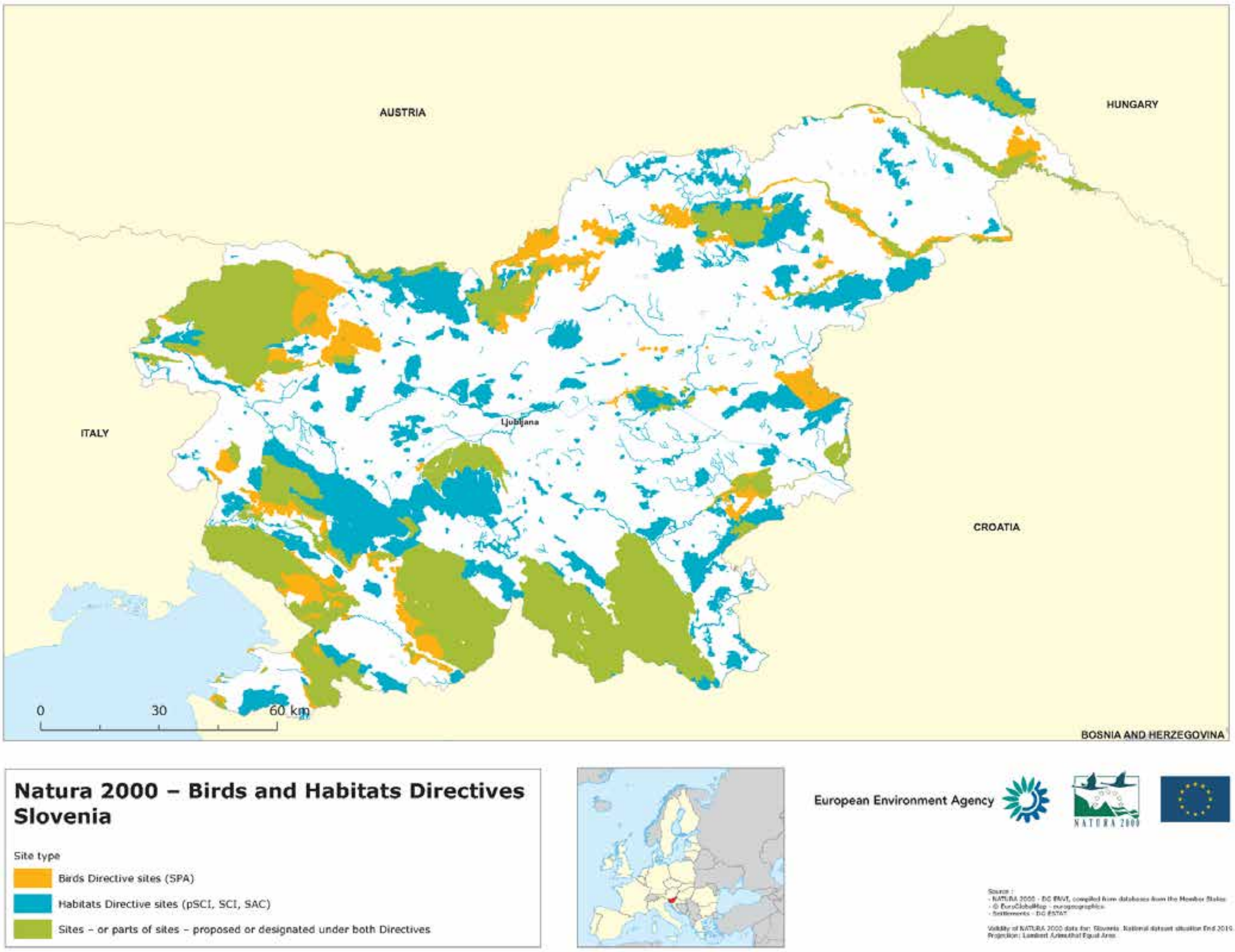
Forest reserves are designated by the Slovenian Government. A legal basis for their designation is the Forestry Act (1993). Currently, there are 170 forest reserves designated in Slovenia. Forest reserves are ecosystems left to natural development. A stricter regimen of management compared to protection forests is typical for this category. No measures that could hinder natural development of forest vegetation are permitted. There are two types of forest reserves: those with strict and those with less strict protection regimens. The area of strict forest reserves is quite small in Slovenia, amounting to around 1% of total forest area (Arih 2020).

Strict forest reserves can be considered the equivalent of wilderness areas as defined by IUCN.

Regional nature parks

These are also part of Natura 2000 and the Biosphere Reserve. They are more or less equivalent to a landscape protection area, but they have their own state management plan and management office. The main difference is in the obligatory zoning (at least two zones must be established) (Arih 2020). Regional parks are required to prepare management plans, and they have their own administration responsible for the area´s management.

Map 15: Natura 2000 Sites in Slovenia (2019)



Source: (EEA 2020b)

Landscape protection areas

The Nature Conservation Act (Art. 71) defines landscape parks as areas where human activities favour nature conservation, and these areas have a great ecological, biological and landscape value.

A management plan is not obligatory, but in some designated landscape parks they exist (e.g., Goričko Landscape Park, Ljubljansko barje Landscape Park) (Arih 2020).

Zoning is established by the acts of designation of landscape parks, such as Natura 2000 (e.g., Logar Valley Landscape Park), as well as natural monuments and assets of national and local importance.

Other

Apart from this, there are some other types of protected areas (some designated under the Birds Directive, others designated as Ecologically Important areas) in the Alpine region.

Protected parts of a landscape

In Slovenia, these are called “natural valuable areas”. They constitute one of the crucial elements of the nature conservation concept in Slovenia and include the country’s entire natural heritage. They are designated by ministerial ordinance based on the Nature Conservation Act.

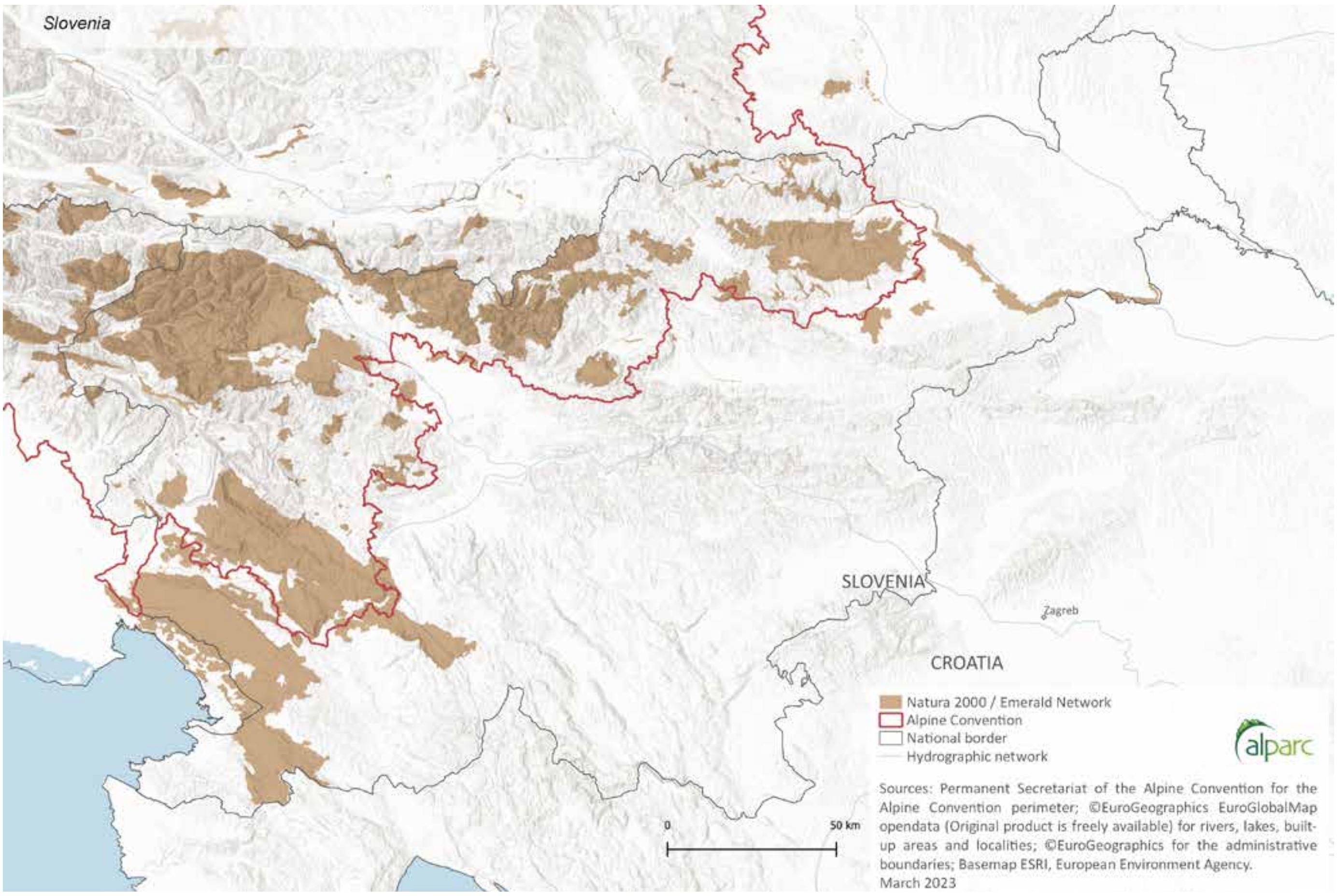
Currently, there are 17,431 such natural valuable area in Slovenia (Arih 2020).

Ecologically Important Areas

The Nature Conservation Act (Art. 32) defines the term “Ecologically Important Area”, which is one element (beside protected areas and Natura 2000 sites) of the ecological network in Slovenia. It is defined as an area of a habitat type that is part or of a larger ecosystem that is important for nature conservation. For example, the entire Triglav National Park lies within the Julian Alps Ecologically Important Area.

There are no protection regimes established for these areas (only guidelines and recommendations). They are designated by the Slovenian Government (Arih 2020).

Map 16: Natura 2000 Sites in the Slovenian Alps



EUROPEAN AND INTERNATIONAL DESIGNATIONS

Natura 2000

Natura 2000 sites cover more than 37% of the country's territory (Ministry of the Environment and Spatial Planning 2020). There are Natura 2000 sites in almost all Slovenian municipalities (in 204 municipalities out of 212 municipalities).

In most municipalities (83), Natura 2000 covers between 5% and 30% of the territory, and, in 23 municipalities, Natura 2000 covers 80% or more of the territory. 70% of Natura 2000 sites are covered by forest and just over 20% by agricultural land. Nature protection measures in Natura 2000 forest areas were largely implemented in state forests. Some measures were initially introduced in private forests with the help of project funds. Since 2017, funds within the Forest Fund have been earmarked for measures in private forests.

UNESCO Biosphere Reserves

Slovenia has four UNESCO Biosphere Reserves (UNESCO 2019a), three of them Alpine or near the Alps.

The Julian Alps Biosphere Reserve (195,723 ha, with a core zone of 63,900 ha, a peripheral zone of 20,082 ha, and a transitional zone of 111,741 ha) runs along the state border between Slovenia and Italy. It is an area of Alpine mountains and karst plateaux, with 66% natural forests. It is administered by the Triglav National Park. Human activities within this reserve include agriculture with pastoral economy, small enterprises, crafts, cottage industry, tourism, and forestry. The programme also includes transboundary cooperation with the Italian Nature park Prealpi Giulie (Triglav National Park 2020).

The Karst Biosphere Reserve (59,780 ha, with a core zone of 403 ha) encompasses the Skocjanske jame Regional Park including the Skocjan caves, designated both as a World Heritage site and a Ramsar Wetland of International Importance (UNESCO 2019a).

Kozjansko and Obsotelje Biosphere Reserve (94,814 ha) is marked by a closed chain of pre-Alpine hills, unconnected areas of tertiary lower hills and a chain of lowland fields.

UNESCO Global Geoparks

Slovenia has two UNESCO Global Geoparks (UNESCO 2019b).

Already mentioned above, the transboundary Karavanken Geopark (1,067 km^2) crosses over to Austria (see the Austria section for a description).

The Idrija UNESCO Global Geopark (294 km^2) in the western part of Slovenia is located at the junction of the Dinarides and Alps mountain ranges. This has resulted in exceptional geoheritage of deep gorges where a variety of rocks have been discovered in remarkable stratigraphic cross sections, tectonic phenomena, and mineral and fossil deposits. In addition, water contributes to the variety of the terrain with numerous features and water courses.

UNESCO World Natural Heritage Sites

Although strictly speaking located just outside the Alpine region, the Škocjan Caves, a protected area of 413 ha, are an exceptional system of limestone caves composed of collapsed dolines, some 6 km of underground passages with a total depth of more than 200 m, many waterfalls and one of the largest known underground chambers. The site, located in the Kras region (literally meaning Karst), is one of the most famous in the world for the study of karstic phenomena (UNESCO 2020). This area is also protected as Biosphere Reserve (The Karst) and has a Ramsar site (Skocjanske Jame).

Ramsar Sites

Slovenia currently has three sites designated as Ramsar Sites, with a surface area of 8,205 hectares but none in the Alpine region (RSIS 2020f).

European Diploma

The Triglav National Park has been awarded a European Diploma. The Council of Europe acknowledged the great value of the Triglav Park in terms of highly preserved breath-taking landscapes, entire series of karst phenomena, a great diversity of natural habitats, a rich flora and fauna and an important cultural heritage (Council of Europe 2020b).

Kozjansko Regional Park, Biosphere Reserve, and the Natura 2000 area

The Kozjansko Regional Park was founded in 1981 and is one of the oldest and largest protected areas in Slovenia, stretching over 206 km^2 (technically, it is not located within the Alpine Convention boundary, but it provides a good example for a park that combines various categories of protection). It is equivalent to IUCN protection category V (landscape protection area) and is professionally managed by the Javni zavod Kozjanski Park (Kozjansko Park Public Institute), which is part of the Ministry of Environment and Spatial Planning. Financing for the park comes from the Slovenian government, from the local community, sponsors and donor funds, and self-generated revenues and projects. The Park includes five municipalities and 17 local communities, the largest of which is Kozje with more than 700 inhabitants. It represents a mosaic of the pre-Alpine Posavje Mountain Range including hills, and plains along the River Sotla. In this region, environmentally friendly agriculture has resulted in a rich habitat of highland dry grasslands, which boasts very high biodiversity. In addition, there are traditional meadow orchards, which are also among the most endangered habitat types due to changes in the use of agricultural land, a decrease in agricultural production and consequent overgrowing, economic changes, as well as changes in the social structure of the owners. Meadow orchards belong to a group of important Natura 2000 European Nature Reserves, since they are home to some rare and endangered bird species.

More than 50% of the area is covered by forests, which include many native species of trees and shrubs. Two bird surveys have shown that the area is densely populated by middle spotted woodpecker (Dendrocopos medius), Ural owl (Strix uralensis), as well as collared flycatcher (Ficedula albicollis) and black stork (Ciconia nigra). Numerous protected species of beetles, such as the stag beetle (Lucanus cervus) and Rosalia longicorn (Rosalia alpina) are present. There are also some rare wet grasslands, which are home to several other important species.

The Travnik science educational trail, which starts from the Vetrnik peak (708 m) informs visitors about the region´s biodiversity. Kozjanski park is thus among the most important Nature Reserves in Slovenia and Europe, with the majority of the park belonging to the European Natura 2000 network. Since 2010, the Kozjansko and Obsotelje regions have also become a UNESCO biosphere reserve.

(Kozjanski park 2012)

C.1.5.7

SWITZERLAND

Governance

Nature and landscape protection is integrated at all administrative levels in Switzerland. A federal law on the protection of nature and homeland, the Nature and Cultural Heritage Protection Act (NHG), the National Parks Act, as well as the Ordinance on Parks of National Importance provide a foundation for the creation of protected areas. In addition, there are regulations on the protection of particular species that are anchored in the national hunting and wildlife protection law.

In addition, the legal framework for implementing the Biodiversity Convention includes national legislation incorporating the above-mentioned legislative instruments, plus the Federal Act on Hunting and Protection of Wild Mammals and Birds, the Federal Act on Fishery, the Federal Act on the Protection of the Environment, the Federal Act on Forests, and the Federal Act on Agriculture.

Also relevant are the various national action plans and programmes, including the Swiss Landscape Concept, Landscape 2020, the National Ecological Network, the Master Plan for Arable Land, the General Environmental Objectives for Agriculture (CBD 2020d). The Forest Policy 2020 replaces the previous Swiss forest program (2004-2015) ('Waldpolitik 2020. Visionen, Ziele und Maßnahmen für eine nachhaltige Bewirtschaftung des Schweizer Waldes' 2013). It includes the goal of safeguarding biodiversity in Swiss forests.

The federal government designates landscapes and habitats of national importance based on national inventories. A distinction is made between legally binding inventories (federal inventories) and legally non-binding inventories. The situation is complex because the federal laws have to be implemented by the Cantons, which are supported through federal funding. The only exception is the category of habitat and wetland protection: here the federal state has all-encompassing authority, whereas in the category of landscape protection, the federal government's authority is limited (Netzwerk Alpiner Schutzgebiete 2002).

The Cantons have a high degree of sovereignty regarding protected areas, although the federal government retains influence. Most Cantons have their own nature protection laws that encompass requiring inventories at the regional and local levels. The cantons are free to organise implementation actions as they see fit, while the municipalities are responsible for the actual implementation of the actions defined by the canton (CBD 2020d).

Inventories of nature are undertaken together with the communities, property owners, as well as nature conservation NGOs and associations. These localised processes have led to differing typologies according to different Cantons´ needs.

There is often an overlap of Cantonal protected area types with those designated based on national inventories. Under certain circumstances, the national government can exceptionally confiscate property to protect the area if it is needed to conserve or save an important natural habitat. More commonly such areas are designated by contract.

Furthermore, Switzerland has a federal Park Ordinance that was updated in 2007 (Verordnung über die Pärke von nationaler Bedeutung, or *Pärkeverordnung*, PäV). This details all the requirements an area must fulfil in order to be declared a National Park. Within the core zone, human activities are strictly regulated and restricted. The same law also regulates the requirements for other types of protected areas, such as regional Nature parks, and "nature experience" parks. In all cases, the communities situated in park areas must be represented in the park administration structure.

The Federal Office for the Environment (FOEN, or BAFU in German) is a federal expert institution for parks of national importance that is in charge of implementing the law. It works together with federal offices for agriculture, spatial planning, regional policy, infrastructure, defence, sports, homeland protection and monument protection, as well as with the Cantons.

There is also the Swiss Parks Network, an umbrella organisation (statutes approved in 2007) for parks and park projects in Switzerland. Their aim is to engage in dialogue, exchange, and knowledge transfer between parks. Their vision (spelled out in a strategy document) is to represent common concerns for all Swiss parks at the political level vis-à-vis the administration, partners from the non-profit sector, science, or business.

National strategies

The Federal Council adopted the Action Plan on the Biodiversity Strategy on September 6, 2017. The measures of the Biodiversity Action Plan directly promote biodiversity (creation of ecological infrastructure, species promotion), are supposed to build a bridge between federal biodiversity policy and other policy areas (e.g., agriculture, spatial planning, transport, economic development), and make decision-makers and the public aware of the importance of biodiversity as our basis of life.

The Biodiversity Action Plan concretises the goals of the Swiss Biodiversity Strategy of 2012 (BAFU 2019).

Switzerland´s national targets reported to the Biodiversity Convention are as follows (CBD 2020d).

Strategic 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.
Strategic Goal 2	By 2020, an ecological infrastructure consisting of protected and connected areas is developed. The state of threatened habitats is improved.
Strategic Goal 3	By 2020, the conservation status of the populations of national priority species is improved and their extinction prevented insofar as possible. The spread of invasive alien species with the potential to cause damage is contained.
Strategic Goal 4	By 2020, genetic impoverishment is decelerated and, if possible, halted. The conservation and sustainable use of genetic resources, including that of livestock and crops, is ensured.
Strategic Goal 5	By 2020, the negative impacts of existing financial incentives on biodiversity are identified and avoided, if possible. Where appropriate, new positive incentives are created.
Strategic Goal 6	By 2020, ecosystem services are recorded quantitatively. This enables their consideration in the measurement of welfare as complementary indicators to gross domestic product and in regulatory impact assessments.
Strategic Goal 7	By 2020, sufficient knowledge about biodiversity is available to society and provides the basis for the universal understanding of biodiversity as a central pillar of life, and for its consideration in relevant decision-making processes.
Strategic Goal 8	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.
Strategic Goal 9	By 2020, Switzerland's commitment to the conservation of global biodiversity at the international level is strengthened.
Strategic Goal 10	By 2020, the monitoring of changes in ecosystems and in species and genetic diversity is ensured.

Switzerland should have a functional ecological infrastructure by 2040 - both in rural and urban areas, including the Swiss plateau, the Jura and the Alps. Appropriate measures are described and staged in the Action Plan. On the one hand, specific additions and upgrades to the Swiss protected area system are identified. On the other hand, the addition and protection of a system of an ecological network throughout the entire Swiss landscape is prescribed. All sectors are expected to contribute to the ecological infrastructure (BAFU 2017c).

Also of great importance is the Swiss Landscape Concept (LKS), which is elaborated in accordance with Article 13 of the Spatial Planning Act (RPG). An update was approved by the Federal Council in May 2020. As a federal planning instrument, the LKS defines the framework for a coherent and quality-based development of Swiss landscapes (Arn et al. 2020).

In the strategic objectives and the spatial planning principles of the updated LKS, the overarching focus is on a coherent landscape policy of the federal government. The framework of the LKS consists of 14 landscape quality goals that support the landscape-relevant actors at federal, cantonal, and communal levels with the goal of achieving high landscape quality. The LKS objective is divided into 13 policy areas - such as federal buildings, energy, and transport - and concretises the landscape quality objectives. The LKS contains a plan of measures to support the implementation of the objective (Arn et al. 2020).

The concepts and sectoral plans, according to Art. 13 of the Spatial Planning Act 1979, represent the most important federal spatial planning instruments to support the government in increasingly complex spatial problems. The federal government thus sets guidelines, in close partnership between the federal agencies and the cantons, that are relevant for authorities at all levels. The focus is, however, not exclusively on nature protection. Rather it aims for development of the landscape as a “living, working, recreational, exercise, cultural and economic area as well as a spatial basis for biodiversity” (Arn et al. 2020, 18). It is based on a dynamic understanding of the landscape, which combines protection, accessibility, and use of the landscape (Arn et al. 2020).

Typology of Protected Areas

In Switzerland there are national, cantonal, regional, and local protected areas. Of the general table of protected area categories in the Alps, the following exist in Switzerland (BAFU 2017a).

Many habitats are only found in very small areas in Switzerland. The protected areas of national, regional, and local importance currently make up 9.9% of the country's area. Two thirds of them are protected at national and one third at cantonal level. The extent to which the various enforcement tasks (legal protection, ecological valuation) were implemented varies depending on the protected area. Another 3.7% of the country's area is devoted to biodiversity in a different form. Overall, around 13.5% of Switzerland's land area is designated as areas for the protection of biodiversity. According to the OECD Environmental Performance Review of Switzerland 2017, protective regulations in Switzerland are less stringent than in the other OECD countries (OECD 2017). In addition, the protected areas are often too small, poorly connected to one another or to other European networks and do not fully meet the protection goals (BAFU 2020).

The following area categories are specifically set up to safeguard or promote the protection of biodiversity:

Table 9: Typology of Protected Areas - Switzerland

PA type	IUCN Category	Primary goal	Legal competence
National Park (wilderness area)	Ia	biodiversity conservation	FOEN (designates)/Canton (implements)
Nature reserves/ecological areas of national importance (Biotope von nationaler Bedeutung)	Ia/IV	biodiversity conservation	FOEN (designates)/Canton (implements)
Regional nature parks	II/IV/V	cultural landscape protection	FOEN (designates)/Canton (implements)
Other areas with particular protections			
Landscape protection areas (bundesrechtlich geschützte Landschaften/ kantonale Landschaftsschutzgebiete)	IV/V	landscape protection	FOEN/Canton designate/Canton implements
Protected parts of a landscape (Bundesinventar, e.g., high moors)	III	ecosystem protection	FOEN (designates)/Canton (implements)
Special conservation areas/Emerald sites	IV or other	biodiversity conservation	FOEN (designates)/Canton (implements)
Natural monuments/ natural areas (Bundesinventar der Landschaften und Naturdenkmäler)	III/IV/V	protection of individual land-scape features	FOEN (designates)/Canton (implements)
Core zone of a “natural recreation park” (Naturerlebnispark)	IV (core)	biodiversity conservation (core)/urban recreation (buffer)	FOEN (designates)/Canton (implements)
Federal hunting ban areas (Eidgenössische Jagdbanngebiete)	IV	(huntable) wildlife protection	Federal government (designates)/Canton (implements)
Area of Cantonal or local importance (Biotope von regionaler und lokaler Bedeutung)	-	biodiversity conservation	Canton
Forest reserves (Kantonale Waldreservate)	IV	biodiversity conservation	Canton
International designations			
UNESCO Biosphere reserves	various	harmonised management of biological and cultural diversity	FOEN
UNESCO World Natural Heritage sites	various	conservation of natural sites of outstanding universal value	FOEN
Ramsar sites	IV	conservation and wise use of wetlands	FOEN

- Protected Areas of national importance. These include the Swiss National Park, the core zones of the nature parks, the biotopes of national importance (Floodplains, bogs, amphibian spawning areas and dry meadows and pastures are protected by national biotope inventories), the water and migratory bird reserves of international and national importance as well as the federal hunting ban areas;
- Cantonal and communal areas that are designated as Protected Areas by means of a sovereign act. These include biotopes of regional and local importance and cantonal forest reserves;
- Protected Areas of international importance such as Emerald areas (Bern Convention) and areas under the protection of the Ramsar Convention;
- Third party property designated by private organisations as "Protected Areas";
- Level II Biodiversity Promotion Areas (extensively used areas such as meadows and pastures, scattered areas, hedges, field trees or fallow land).

There are currently 19 Swiss Parks of National Importance (plus one candidate) which are classified into the following four types of protected areas of national importance: **National Park** (1), **National Park of the new generation** (currently, there are no parks in this category!), **Regional Nature park** (16) and **Nature Discovery Park** (2).

If a park meets all the requirements, it is awarded the "Park of National Importance" label by the Swiss Federation, valid for 10 years, after which the park management must apply for renewal. The label "Park of National Importance" certifies a park as guaranteeing the preservation and care of the natural and cultural landscapes in the park, its long-term financial and spatial viability, a basic, democratic (grass roots) legitimisation, and a professional park management (Netzwerk Schweizer Pärke 2020).

At a cantonal level, Switzerland has protected areas of regional or local importance, nature and forest reserves.

National Park

Switzerland only has one National Park, but it is distinguished by being the first such park in the Alps, and furthermore by its strict protection under **IUCN category Ia (wilderness area)**. It is the only National Park in the Alps that has this protection level. It is a high mountain nature reserve (altitude 1,380 to 3,173 m) situated mainly in the Lower Engadine Dolomites. It is fully protected against human intervention: hunting and fishing are prohibited, as are forestry and grazing.

It shares a border with the Italian Stelvio National Park Stilfser Joch.

Nature discovery parks

The so-called "**nature discovery parks**" are a category unique to Switzerland, the parks are located near urban centres whose primary purpose is recreation, but they also have a goal to protect - in the core zone - the free development of nature. These parks have zoning, a core zone of min. 400 ha and a buffer zone of min. 200 ha (Netzwerk Schweizer Pärke 2020).

Nature reserves

In Switzerland there are Cantonal Nature Reserves and Communal Nature Reserves. In each case the competent authority is the Canton administration. Swiss law does not explicitly define the term "nature reserve", except for "forest reserve". From the system of laws, however, it can be deduced that protected areas are formalised through a legal act for certain areas and ecosystems to be protected (this can also be done in the form of usage planning). It is crucial that they are described by a clearly defined perimeter and formulated protection goals. They are usually registered as ecosystems of national importance ("Biotope von nationaler Bedeutung"), or regional or local importance. They can also be privately owned and protected, e.g., by NGOs (BAFU 2017a).

Protected landscapes

Landscapes and natural monuments are considered as worthy of protection to preserve the beauty and diversity of Swiss landscapes (BAFU 2017d).

Forest reserves

As part of its "Forest Biodiversity" strategy, the Federal Government has been supporting the creation of natural forest reserves since 1991 (revision of the Forest Act). Forest reserves protect the forest as a natural ecosystem and serve to preserve biodiversity. Forestry operations are banned from natural forest reserves so that the forest can develop naturally again (BFW 2019).

It is hoped that these areas will become similar to primeval forests over decades. At the end of 2018, the natural forest reserves comprised of 46,199 ha, which corresponds to 3.5% of the forest area in Switzerland. In addition, there are forest reserves in which further nature conservation goals, such as the promotion of certain species, are pursued on so-called complex forest reserves (WSL 2020).

Other protected areas

There are other types of protected areas that are locally designated: Landscape- and Natural Monument, Waterbird Habitats, Hunting Ban Areas, Floodplain Areas, High Peatland Areas, Low Peatland Areas, and general Peatland Areas.

Wildlife sanctuaries (**hunting ban areas**) are government-designated areas with total (general wildlife sanctuaries) or partial (high-hunting sanctuaries, hare sanctuaries, etc.) hunting prohibitions. They are an important means of hunting planning. The Federal Hunting Ban areas and the Swiss National Park are game reserves in which hunting is restricted or completely forbidden.

Furthermore, Switzerland has protected **areas for particular habitat types** of particular species/ no-hunt areas. In addition to the national, regional, and local protected areas, there are areas designated for biodiversity conservation without a formal instrument issued, although these areas also have protection goals. As such, they also contribute to the "minimum 17%" Aichi target. They include areas designated due to obligations under international conventions, such as Ramsar, Bern Convention (e.g. Emerald sites, private protected areas, such as those belonging to BirdLife or Pro Natura, and time-limited biodiversity protection sites, as well as the buffer zones of habitats of national and regional importance (BAFU 2017b)).

Protected areas, especially Nature Reserves, may be managed by national or cantonal nature conservation organisations (e.g., Pro Natura, etc.). For contractual measures, the binding nature of biodiversity-friendly use of contractual protected areas is not considered the in long term and lasts for only six to eight years (BAFU 2017b).

EUROPEAN AND INTERNATIONAL DESIGNATIONS

UNESCO Biosphere Reserves

In Switzerland there are two UNESCO Biosphere Reserves (UNESCO 2019a).

The Val Müstair - Parc Naziunal Biosphere Reserve (Reservat da Biosfera Val Müstair-Parc Naziunal, 37,065 ha, of which the core is 17,200 ha) in the eastern most part of Switzerland on the right side of the Inn River includes mountains ranging from 1,400 to 3,173 metres above sea level, comprises of forests, Alpine grasslands and bare rocks or scree. It is administered by the Regionalverband Lungau/Biosphärenpark-Komitee. The whole area is strictly protected and not inhabited but receives recreational visitors and is used for research.

The Entlebuch Biosphere Reserve, with a surface of 39,659 ha and a core area of 3,301 ha, is located at the foot of the Alps in the central part of Switzerland. It includes peat bogs and raised bogs, alluvial and riverine forests, as well as complete cave systems. About 17,000 people inhabit this area.

UNESCO World Natural Heritage Sites

While there are no designated UNESCO Global Geoparks in Switzerland (UNESCO 2019b), there are three UNESCO World Natural Heritage Sites in Switzerland, including the first such Alpine site (UNESCO 2020).

The Swiss National Park and UNESCO Biosphere Reserve Engiadina Val Müstair

The SNP is one of the most strictly protected parks in the Alps and the largest wilderness area in Switzerland. This unique natural reserve covers 170 km^2 of natural landscape with 80 km of marked hiking trails. Founded in 1914, it is also the oldest National Park in the Alps and Central Europe. Legally, it is a public-law foundation. Its goals are nature conservation, research, and public information. The Federal National Park Commission (Eidgenössische Nationalparkkommission – ENPK) is the Foundation Council of the Swiss National Park foundation. It consists of nine members and is charged with all rights and obligations from the agreement with the park communities on behalf of the state. Membership is composed of representatives of Pro Natura, Swiss Confederation, Swiss Academy of Sciences, Canton of Grisons, and one representative from the park communities.

According to the International Union for Conservation of Nature (IUCN), the SNP is a category IA reserve (highest protection class, wilderness area). While hiking on designated paths is allowed, camping is prohibited in the park, dogs are prohibited even when on a leash, and skiing is also prohibited. Scientific research to better understand ecosystems and species is permitted.

Around the National Park, a UNESCO Biosphere Reserve was officially created in 2017: the Engiadina Val Müstair. The entire National Park itself is considered the buffer core zone of this Biosphere Reserve.

The Val Müstair borders on the National Park. In Val Müstair, the operation of the Val Müstair Regional Nature park was officially launched in 2011. This corresponds to the current care and development zone. Together, the Swiss National Park and the Val Müstair Regional Nature park form the UNESCO reserve da Biosfera Engiadina Val Müstair (UNESCO Biosphere Reserve).

Because the UNESCO Biosphere Reserve was not fully in line with the UNESCO Seville Strategy of 1995, UNESCO required a completion of the transition area and an integral management plan for the entire Biosphere Reserve. It also recommended continuing the enlargement process by involving the local communities of the Engadine in the transition zone. On the way to the establishment of the UNESCO Biosphere Reserve, the expansion of the buffer and transition zones in the area of the Engadin municipality Scuol stood in the foreground. A management plan was agreed in 2016. The enlargement in the Engadine is contractually regulated between the three partners. The three partners - the Swiss National Park, the Regional Nature park Val Müstair and the municipality of Scuol – together now form the UNESCO Biosphere Reserve. This over-arching goal of this alliance is the strategic coordination of the Reserve. Otherwise, the three partners remain largely independent due to their different responsibilities for the core and long-term buffer and transition zones, especially as they are also based on different legal foundations and financed through different channels.

(SNP, 2018)

The Jungfrau-Aletsch Region, with the rock massifs of the Eiger, Mönch and Jungfrau and the Aletsch Glacier, was chosen as the first Alpine UNESCO World Natural Heritage Site in 2001. The Aletsch Glacier is the longest glacier in the Alps, with a length of 23 km, and the World Heritage Site now extends over 82,400 ha. It has a diversity of ecosystems, including natural successional stages from glacier retreat and is of outstanding universal value both for its beauty and for scientific research about the formation of mountains and glaciers, as well as ongoing climate change (UNESCO 2020).

The Swiss Tectonic Arena Sardona (32,850 ha) is also significant, spanning the Cantons of Glarus, St. Gallen and Graubünden. Seven of its mountains rise above 3,000 m, and the site is distinguished by the clear three-dimensional exposure of the structures and processes that characterise the phenomenon of tectonic thrust. It has been a key site for the geological sciences since the 18th century. The major exposures of the geological features are within protected areas and remain substantially unthreatened (UNESCO 2020).

Monte San Giorgio beside Lake Lugano is regarded as the best fossil record of marine life from the Triassic Period (245–230 million years ago). The Natural Heritage site stretches over 1,089.34 ha surrounded by a buffer zone of 3,207.45 ha. Since 2010, following an extension, Switzerland has shared this area with neighbouring Italy, and the resulting extended property fully meets the integrity requirements for a fossil site (UNESCO 2020).

Ramsar Sites

Switzerland currently has 11 sites designated as Wetlands of International Importance (Ramsar Sites), with a surface area of 14,690 hectares (RSIS 2020g).

Le Rhône genevois - Vallons de l'Allondon et de la Laire is a 1,929.4 ha Ramsar site in the Canton de Genève. It includes the shores of Lake Geneva and riverbanks within the city, riverside areas of the Rhône and natural valleys of the Allondon and the Laire tributaries. The site forms a green corridor with a varied vegetation cover and habitats. It also includes some of the last remaining relatively unmodified stretches of the Rhône in Switzerland. It is of high educational and recreational value, but also under many pressures due to recreational and economic activities, such as hydropower generation and the presence of two chemical plants (RSIS 2020g).

Also, on the eastern part of Lake Geneva and the natural part of the Rhône River delta is the very large 6,342.2 ha Ramsar site Les Grangettes, which features open water, reedbeds, marshes, and riparian woodland. Despite the loss of its natural dynamics since the containment of the Rhône, the site remains an exceptional landscape, and a prime site for migrating, nesting and wintering birds (RSIS 2020g).

Among the larger Alpine sites is also the 1,376 ha Laubersmad-Salwidili in Central Switzerland on the northern slope of the Brienzer Rothorn mountain range. It is notable as the contiguous mire landscape with the highest number of bogs under protection in Switzerland and is home to 24 plant and 33 animal species listed on the Swiss red lists of endangered species. Three plant and 24 animal species are listed on the IUCN global red list. There are some human activities and cattle grazing affecting the site (RSIS 2020g).

There are also a few smaller Ramsar sites in the Alpine part of Switzerland.

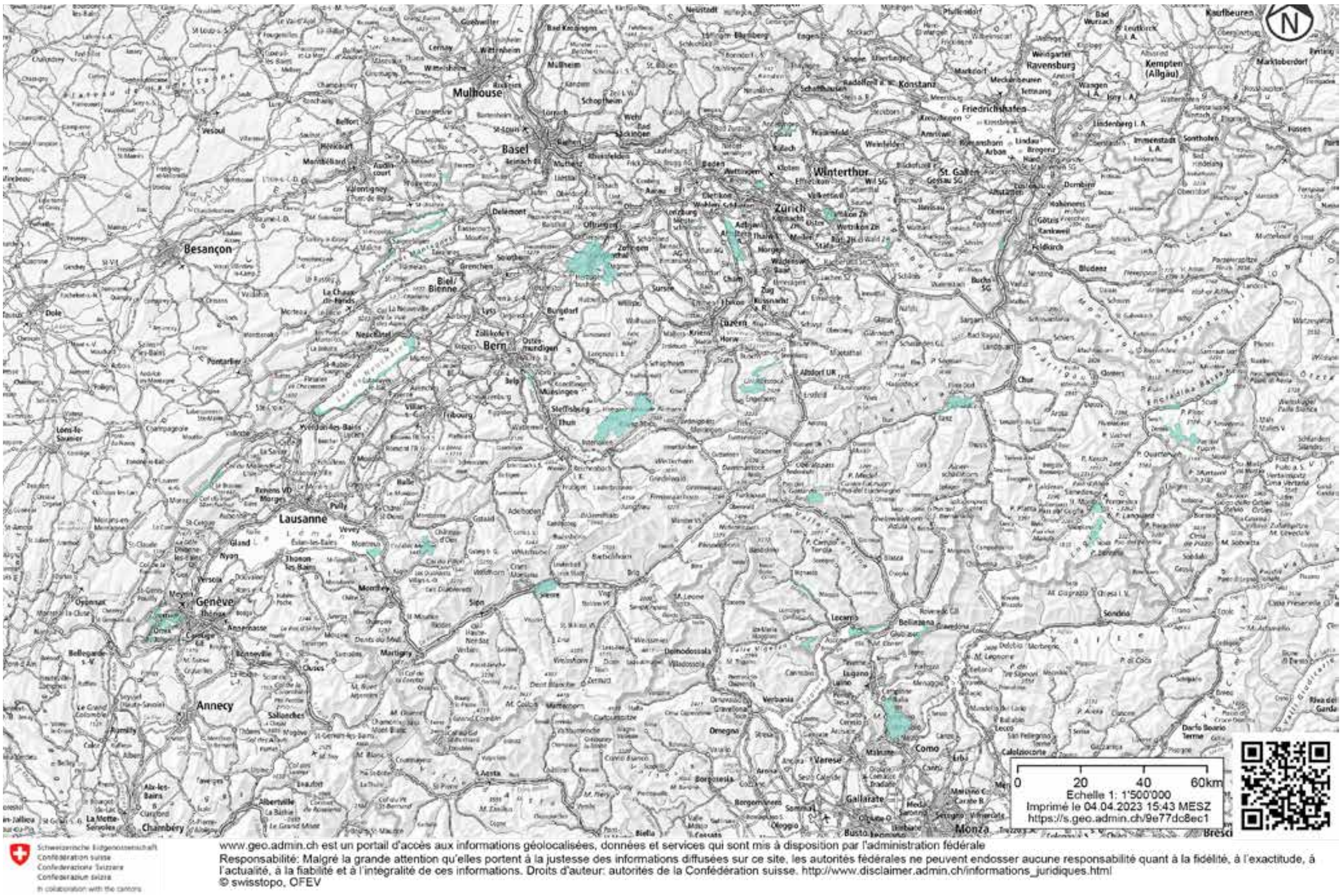
Emerald Network

As of December 2019, Switzerland has designated 37 Emerald sites (Council of Europe 2020a). The Emerald Network (see also Section 1.3 above) is made up of Areas of Special Conservation Interest. Its implementation was launched by the Council of Europe as part of its work under the Bern Convention, to which Switzerland is a party. For non-EU countries like Switzerland the Emerald Network is complementary to the EU Natura 2000 network.

European Diploma

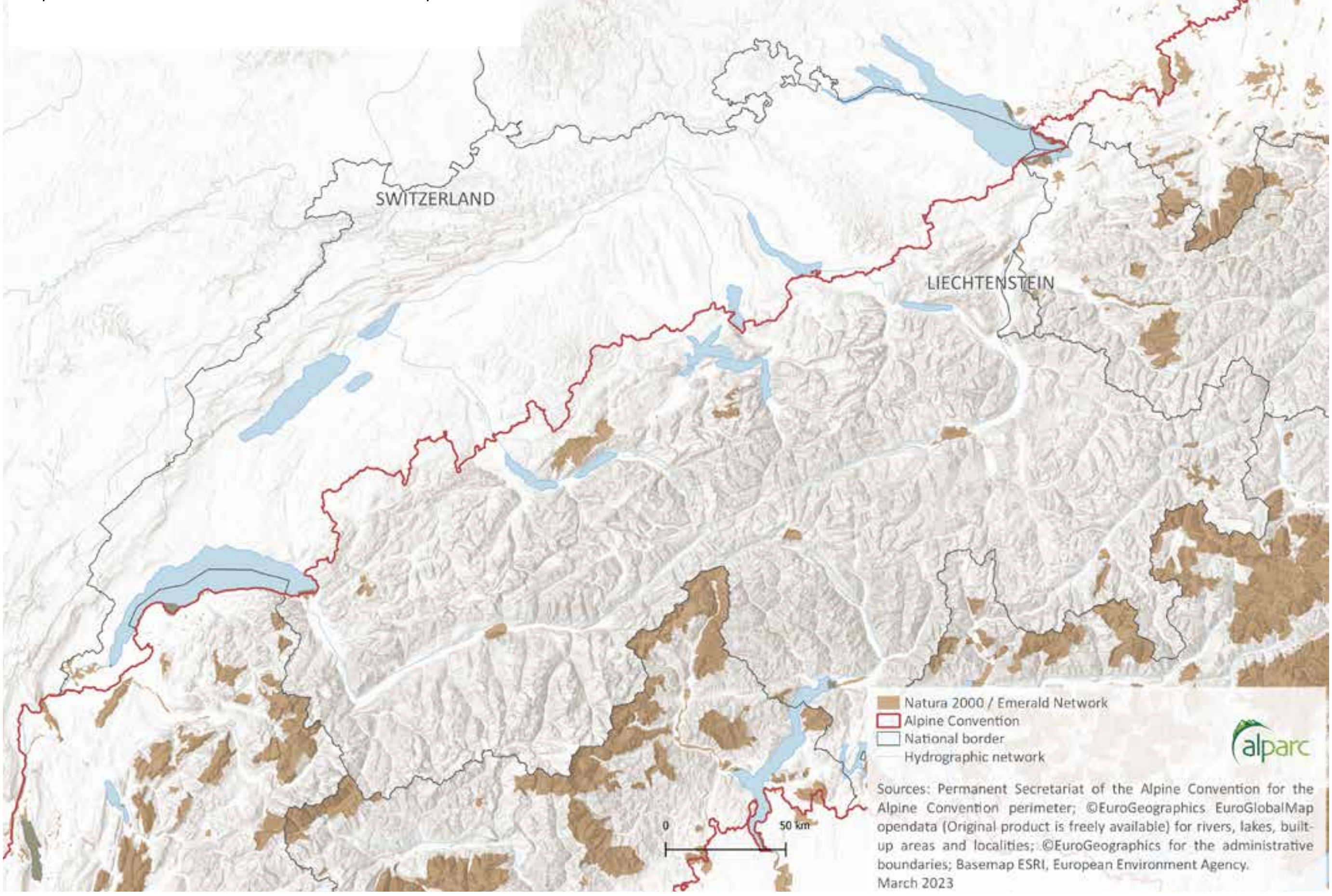
The Swiss National Park was also awarded a European Diploma by the Council of Europe. The Diploma was awarded to this first National Park of the Alps as it belongs to the IUCN-category Ia (wilderness area). That means it is fully protected against human disruption: from the day it was established, hunting and fishing have been prohibited and forest harvesting and grazing ceased. It shares a border with the Italian Stelvio National Park Stilfser Joch (Council of Europe 2020b).

Map 17: The Swiss Emerald Sites



Source: (BAFU 2023)

Map 18: Emerald Sites in the Swiss Alps



C.2

APPRECIATION OF THE EXISTING NETWORK OF ALPINE PROTECTED AREAS

C.2.1

IS THE EXTENT OF PROTECTION SUFFICIENT?

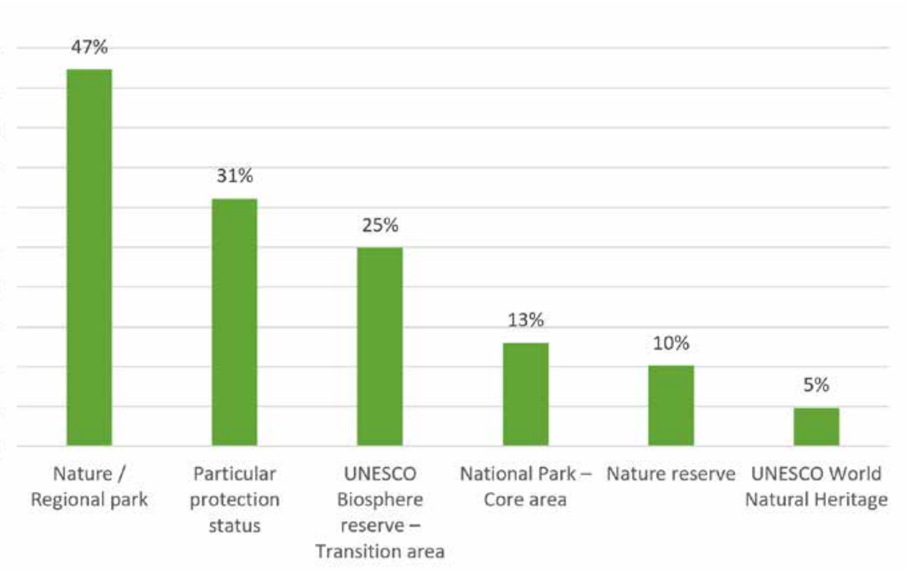
Apart from the overall percentage of land area protected, a general issue in the Alps concerns the size of the more strictly protected core zone of National Parks. According to IUCN, National Parks should have a core zone of at least 75%. This is not clearly defined in all the Alpine countries. For example, in Germany, the federal nature protection law does not specify how much of a National Park should be designated as a core zone, although it states that “the majority” of the area should be core. In practice, it seems that 50% is seen as the goal to be reached (Scherfose et al. 2013).

Annex H.3 is based on a survey undertaken by ALPARC in 2016 and shows the approximate distribution of different types of protected areas. The total surface area amounted to 54,472 km^2. As is evident, the most strictly protected areas constitute the smallest portion of the overall protected areas. It should be noted that there are overlaps between some categories (e.g., Biosphere reserves and other types of protected areas), amounting to some 15,337 km^2. Refer to the table of existing protected areas categories per country in the Annex H.3.

Although the Alps have a relatively large number and surface of protected areas (Figure 1), there are a number of issues with the way these are distributed across the landscape. The movement of species and the flow of ecological processes that are necessary for human well-being through the provision of a broad range of ecosystem services is hampered by a degree of isolation. For this reason, the Platform Ecological Networks of the Alpine Convention was initially established to promote and work towards improved ecological connectivity, or permeability of the landscape for wildlife and for the maintenance of such ecological processes. At the moment, large natural areas are relatively isolated within a matrix of human-dominated landscapes. However, connections through semi-natural and natural landscapes would be essential for effective function in many protected areas. There are many areas where it would still be possible to re-connect natural areas through various management measures and through purposeful creation of connectivity measures, such as wildlife corridors, if this were built into land-use planning.

Ensuring the ability of protected areas to fulfil their mandate of conserving biodiversity would require, on the one hand, the creation of a large, interconnected network for the protection of natural habitats and processes, and on the other hand management measures based on certain established quality criteria. This topic will be examined in the following chapters.

Figure 1: Approximate Distribution of Different Types of Protected Areas



The percentages in Figure 1 exceed 100% as some Protected Areas are simultaneously classified under two or more categories.

C.2.2

DIFFERING MANAGEMENT OBJECTIVES AND MEASURES

Depending on their category, protected areas often aim to preserve biodiversity in general, landscapes or specific ecosystem types, and/or habitat for particular species and populations. Protected areas are also often of social and economic value, for example by strengthening the identity and appreciation of nature and landscape, ensuring opportunities for recreation, maintaining ecosystem services that positively impact human (and animals) quality of life, contributing to regional development and promoting sustainable development.

The goals for different categories thus differ, and so do the legal frameworks and the types of management measures. Not only do the goals and regulations differ among different protected area types, but for what is nominally the same type of protected area (e.g., National Park), goals and regulation of human impact and activities vary widely among the Alpine countries. A National Park in the Italian or Swiss Alps is closer in nature to what is called a Wilderness Area in Austria. Austrian National Parks allow hunting (with restrictions) and tourism with infrastructure (with restrictions), whereas in the Swiss National Park all of that is prohibited or limited to the official hiking paths and without any artificial infrastructure. Nature Reserves in Slovenia have restrictions on construction activities, hunting and infrastructure tourism, while Nature Reserves in Bavaria prohibit human settlement, construction, and tourism infrastructure, but allow hunting. In Italian (Regional) Nature parks, there are regulations concerning construction and tourism, and hunting is prohibited, while in Austria the same category does not have strict protection and only regulates tourism infrastructure. The differences can be seen in the Annex overview table “Typology of Alpine protected areas” (annex H.3).

For more strictly protected areas, management plans are obligatory or customary, while other types of areas are merely subject to some restrictions or regulations but do not have formal management bodies. Where they exist (which is always the case in National Parks and Biosphere Reserves, but not necessarily in Nature Reserves or other protected area types), protected area management tasks usually include:

- Monitoring of compliance with the protection regulations
- Organisation of nature care and development measures
- Information and public relations
- Documentation of developments in the area (monitoring) as a basis for checking protected area effectiveness.

These goals require active communication with authorities, landowners, the local population, and all other stakeholders (e.g., conservation NGOs, tourism associations, Alpine hiking associations, local businesses, etc.) to promote the acceptance of a protected area and help to resolve conflicts. The participatory involvement of landowners and managers is important for successful territorial management. Nevertheless, this is not always prescribed in management activities and structures, nor is it always embraced.

Indeed, there are no uniform, universally accepted standards for protected area management, nor is there just one methodology for evaluating its effectiveness. In fact, at last count more than 40 different methodologies have been developed to evaluate the management effectiveness of protected areas, such as Rapid Assessment and Prioritisation of Protected Area Management (WWF), Enhancing our Heritage (UNESCO/IUCN/UNF), Management Effectiveness Tracking Tool (World Bank/WWF Alliance), etc. (UNEP-WCMC 2020).

In 2008, EUROPARC Germany elaborated quality criteria for all German National Parks with a set of indicators that should be used to evaluate the implementation of defined quality standards (Kemkes et al. 2008).

International conventions and agreements (Alpine Convention, Biodiversity Convention, EU habitat and birds’ directives, EU Biodiversity Strategy,) sometimes give indications about the need for effectiveness and indicators to measure it. Nevertheless, besides some specific publications regarding such indicators within the work of the Alpine Convention, no standard procedure seems to exist. Often, those indicators are limited to very general statements and are not, ultimately, pragmatic enough for a realistic comparison of effectiveness of PAs management.

C.2.3

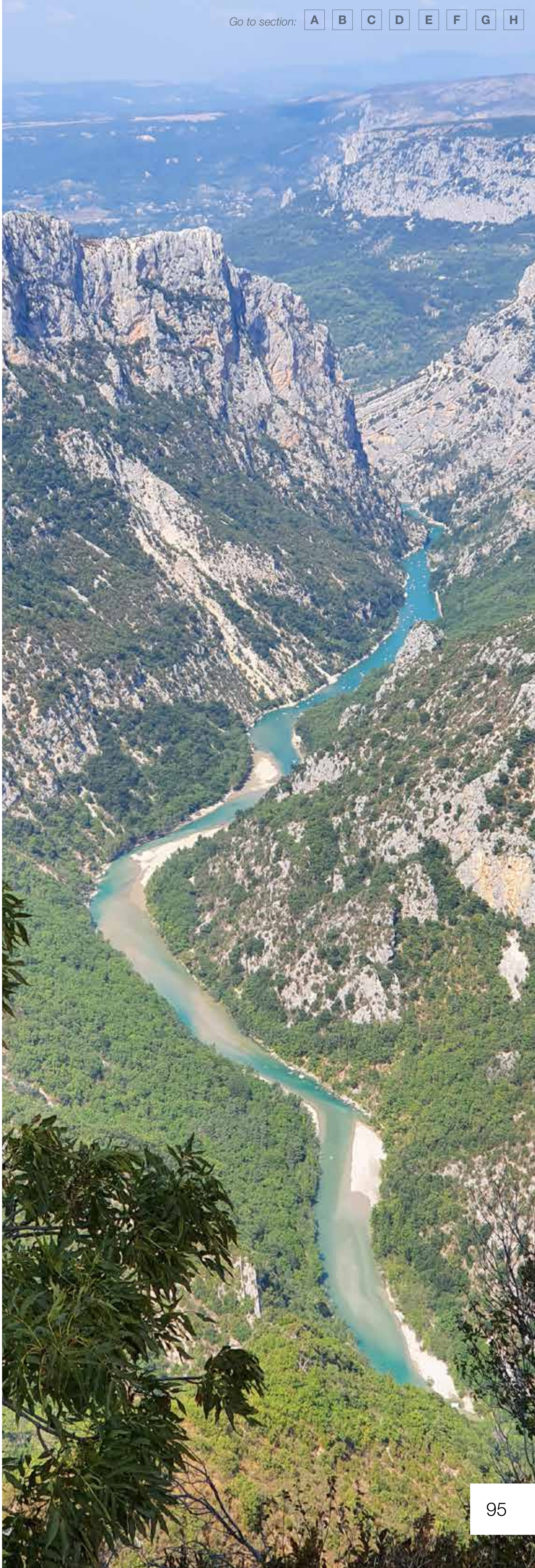
HARMONISATION OF MANAGEMENT

The degree of harmonisation of management varies between and within countries. Furthermore, the harmonisation processes are often linked to the type of protected area and can differ significantly between IUCN classifications I and II and classifications III-VI.

In Austria, there is an umbrella association, "Nationalparks Austria", which includes all six National Parks but not the other forms of protected areas, which makes harmonisation difficult for the latter sorts of protected areas. Under this brand, the Austrian National Park Strategy prioritises professional protected area management, cooperation among the different National Park administrations, nature experience and awareness raising, as well as research and the cooperation of all six National Parks (Zacherl-Draxler et al. 2018). A set of measures on the respective points provides a clear direction and serves to achieve the 12 set goals within the next five years. It also foresees an evaluation of the implementation of the strategy according to measurable criteria, such as a comparison of the extent of natural zones compared to 2016, the status and trend of particular habitat types and species, the degree of public awareness about National Parks, the level of acceptance of the parks by stakeholders and in the region, the number and quality of visitor programmes and of research and monitoring programmes, the number of joint activities (e.g., with other National Parks, including cross-border), the available budget, etc. One of the criteria refers to the extent to which regional development concepts respect ecological priority areas.

In general, the harmonisation of management within the same protected area category of a country or administrative territorial community is more the exception than the rule.

Cross-border coordination of management measures and participation in national or international programmes (e.g., Alpine Space, Interreg, ALPARC or other networks) has been attempted but is still limited to a few examples, e.g., Slovenia and Italy in the Triglav/Prealpi Giulie region, France and Italy in the Mercantour National Park and Alpi Marittime Natural Park region, or the Alpine-Carpathian corridor. There is certainly scope for a lot more coordination with a common goal among parks, regions, and countries.



C.3

CONCLUSIONS

In 2020, the IPBES issued its latest **Global Assessment Report on Biodiversity and Ecosystem Services** (IPBES 2019). However, the findings are not encouraging. "Except in scenarios that include transformative change, negative trends in nature, in ecosystem functions and in many of nature's contributions to people are projected to continue to 2050 and beyond, due to the projected impacts of increasing land and/or sea-use change, exploitation of organisms and climate change" (IPBES 2019, p. 16). Although there has been some progress in policy responses to conserve nature and manage societies more sustainably, it is far from sufficient and is not adequate to halt the current drivers of biodiversity loss and damage to ecosystems. In the current modus operandi, expanding economic activities has generally been favoured by incentives over the conservation or restoration of the natural environment. The multiple values of functioning ecosystems, including the contribution they make to people's wellbeing, including economic, health and mental benefits, have yet to be properly and fully incorporated into economic incentives. For better ecological, economic, and social outcomes truly transformative change is needed.

While the issues being discussed are global in scope, the situation is not much better in the Alpine countries. Although there are decidedly many political declarations to safeguard native biodiversity in the Alps and in areas surrounding them and to ensure ecological connectivity between protected areas, actual implementation on enlarging and connecting protected areas has been slow. Many conservation organisations, universities and civil society initiatives have contributed significantly to bringing the need to conserve nature to the attention of politicians. This is encouraging. However, policy development always lags behind, and even when well-formulated policies are in place, in any contest between short-term economic development goals (e.g., the expansion of ski areas into vulnerable wildlife habitats) and the protection of ecological areas and processes, short-term monetary gains often take precedence.

Land-use change in green areas outside protected areas is dramatic, and areas that are still considered natural are few and shrinking. For example, according to a 2018 landscape analysis study by the Institute of Social Ecology of the University of Natural Resources and Life Sciences in Vienna, in 2017, only 7% of the Austrian state area, around 5,900 km², remained largely in a "natural" state with little or no infrastructure use (Allianz für die Seele der Alpen 2017). Two thirds of such natural areas are located at high elevations, consisting of rocky and glacier terrain. At the time of the study, Austria was experiencing a "land consumption" (conversion of green land to other uses) of 14.7 ha per day, and several large infrastructure projects (ski resort projects, streets, power transmission lines, hydropower plants) were in the planning stages for some of those last natural areas. Only 40 percent of these last remaining natural areas are located inside protected areas. The current land consumption in Austria, and elsewhere, is ecologically and socially unsustainable and demands an ecologically sustainable spatial planning and a political rethinking on how to treat land areas and natural landscape as precious resources.

From this Austrian example, one can extrapolate to other Alpine countries. The pressures for development remain, and protected areas are refuges for the last existing natural areas of the Alps, which are important for human health and wellbeing at all levels. As has been shown above, only a few of the existing protected areas are currently relatively strictly protected or have biodiversity conservation as their primary focus. Furthermore, they are insufficiently connected geographically and often only on a planning basis. Networks such as ALPARC have an important role to play in connecting and leading a discussion on better coordination of activities among different Alpine parks.

However, in the end, it is national and often local politics and policies that determine how much power park managers have to intervene and to mediate when it comes to conflicts of interest between nature conservation and economic development. If, as has been argued and documented in reputable global reports, such as the Millennium Ecosystem Assessment, economic systems accounted properly for the costs of environmental destruction instead of focusing narrowly on GDP growth indicators, then the case for a much stronger role of protected areas in planning land uses outside the protected zones and bringing more areas under protection status would be quite evident to everyone. With our current national accounting systems, there is a false trade-off between conservation and economic "development", and National Parks and other protected areas remain politically relatively marginalised (with some exceptions).

The years after the Covid-19 pandemic are important years for biodiversity conservation, and especially the **CBD COP 15** which took place in December 2022 in Montreal, Canada after having been cancelled in Kunming, China. This COP adopted a new post-2020 global strategic framework including ambitious goals for biodiversity (see last chapter).

France hosted the IUCN World Conservation Congress in Marseille in September 2021. Although broad in scope, there have been discussions on the role and effectiveness of protected areas as the foundation of biodiversity conservation and sustainable development.

At European level, the EU has adopted a **European Green Deal** and the new **EU Biodiversity Strategy**.

Given the global Covid-19 pandemic on the one hand and the well-recognised (by most) climate change crisis on the other, as well as the much-publicised reports on dramatic species declines and extinctions over the past decades, there appears to be a growing recognition - even among politicians - of the connections between the destruction of natural ecosystems, the functions associated with them, and our human health and other needs. Whether this awareness will be sufficient to steer policies in the right direction remains to be seen. Looking at trends so far and how little has been accomplished overall to limit environmental damages and resource depletion, despite progress on some conservation goals, it is difficult to be overly optimistic. Nevertheless, with the decisive action and expression of concern by scientists, civil society actors (e.g., the Fridays for Future movement, the Extinction Rebellion movement) and conservation organisations, there is some hope that this groundswell has reached sufficient proportions to push for transformational change. This change must come at all levels of society and must affect how we live our lives.

While protected areas are not the panacea that can solve all our problems, they form part of any meaningful biodiversity conservation strategy. To succeed, they must grow, connect more, and obtain more political power. All Alpine countries have agreed to the Nature protection and Landscape Conservation Protocol and the Spatial Planning and Sustainable Development Protocol of the Alpine Convention, but setting targets, making recommendations, and issuing calls to action, important as such actions are, can serve only as tools and warning mechanisms. They cannot replace consequential participation in regional (spatial and infrastructure) planning processes. It is through such active participation that protected area managers have a chance to influence developments on the ground.

In Summary:

Protected areas in the Alps present a mosaic of different situations and types even within the same denomination. Mission and protection status differs from country to country and even sometimes from region to region (federal states and system of autonomous regions especially).

The harmonisation or a common standard of management measures and procedures within the same category of protected areas is not guaranteed. International coordination is inadequate and only exists in some cases of transboundary protected areas, such as Alpi Marittime (I) and Mercantour (F). Even these protected areas lack common legal framework and management. One exception is the international Nature park Nagelfluhkette (D/A). Even if the legal framework is different as well here, the cooperation between the both parts of the Park can be considered as excellent and is insured by a common directory.

Concerning the level of protection, quantity is not the same as quality – from the 28.5% of protected areas, only a small portion of their surface area is strongly protected compared to categories I, II and IV of the IUCN classification and to the ALPARC protected area system classification. Therefore, while those areas called ‘protected areas’ always have a special status and specific goals, such as sustainable development, they cannot be considered as core elements of a spatial nature protection system. In order to respond to the goal of strong nature protection, special wilderness and ecological process protection is crucial and must be developed further on.

The realisation of this goal would be facilitated if all protected areas received an attribution of one of the IUCN categories or a specific Alpine protected areas system to be elaborated. Unfortunately, this is currently not the case. A better comparability of the different categories and types of protected areas between Alpine countries and regions could improve international coordination and harmonisation of nature conservation efforts.

Finally, the importance, role and impact of human activities need to be evaluated by adapted indicators and compared on an Alps-wide scale.

C.4

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D

CHAPTER 2
GAPS IN THE EXISTING NETWORK OF ALPINE PROTECTED AREAS

WORKING HYPOTHESES[1]

1. A large percentage of strongly protected areas are in high elevation areas.
2. Low altitudes are underrepresented, requiring the establishment of new protected areas or areas with a more sustainable land use in general.
3. Threatened and valuable natural habitats and species are not sufficiently represented by the Alpine Protected Areas.
4. Wetlands, bogs, and aquatic systems are generally underrepresented within Alpine Protected Areas.
5. (Deciduous) Forest ecosystems are underrepresented.
6. Alpine Protected Areas are too small in surface to guarantee the maintenance of Alpine biodiversity for the next generations as they cannot sufficiently ensure ecological processes.
7. A very low percentage of protected areas in the Alps have the attribution and management of strict nature protection (IUCN Ia and Ib).
8. The establishment of new protected areas is often not in accordance with the expectations of the Alpine Convention, the Convention of Biodiversity or the recommendations of IUCN concerning the protection status and its management.
9. Wilderness areas (managed as such) are not large enough for certain species and populations.
10. A network of small, protected areas (“network of biotopes”) as stepping-stones for the ecological network of the Alps has not been sufficiently developed.
11. The contrast between managed protected areas and their surroundings is too extreme to ensure the continuity of biological processes – zoning for sustainable land use around protected areas is crucial.
12. The available resources (human and financial) for protected area management are insufficient to guarantee effective, lasting impact.

[1] Working Hypotheses in green have a strong territorial or spatial context. Those in orange are related to management issues.

D.1

INTRODUCTION

D.1.1

OBJECTIVES OF CHAPTER 2

Building on conclusions in the previous chapter, this chapter outlines the gaps in the protected area system regarding the lack of protection for important habitats and ecosystems in the Alps. The analysis highlights the lack of targeted and efficient management measures for individual protected area categories. The goal is to better understand the functioning of the network of protected areas and to identify existing gaps in order to develop concepts closing these gaps by adapting current protected area management approaches in covered in chapter 4.

The work refers both to the **spatial coverage** of certain protected area categories and to their **conservation objectives and means**. The objectives of protected areas for sustainable development (many regional parks have these objectives) are considered but not specifically evaluated for possible gaps. Sustainable regional development plays an important role in conservation success but is not the focus of this analysis as sustainable development is also possible outside of protected areas.

D.1.2

METHODOLOGY (APPROACH FOR THE ANALYSIS)

The methodology of this project can be described as a variation of a **gap analysis** for the network of protected areas in the Alps. Gap analysis is a tool perfectly suited to an Alpine wide evaluation since scale and context are the ideal scope for this type of analysis. Therefore, we have relied on the approach and principles of gap analysis while also appreciating that this analysis will be conducted on a very limited scale without addressing regionally specific situations.

> *"In an ideal situation, it [the gap analysis (editor's note)] would be applied across the whole of an ecologically defined region (such as an ecoregion) because this allows decisions about conservation to be made with the best available information and on the basis of ecological rather than political boundaries in order to ensure that the needs of biodiversity are met".*
>
> *(Dudley and Parrish 2006, p. 14)*

A protected area gap analysis follows six main steps, which build upon each other's outputs (see Figure 2). In the current chapter 2, steps one to four are fulfilled. Steps five and six will be completed in chapter 4.

> *"In a conservation context, gap analysis is a method to identify biodiversity (i.e., species, ecosystems and ecological processes) not adequately conserved within a protected area network or through other effective and long-term conservation measures".*
>
> *(Dudley and Parrish 2006)*

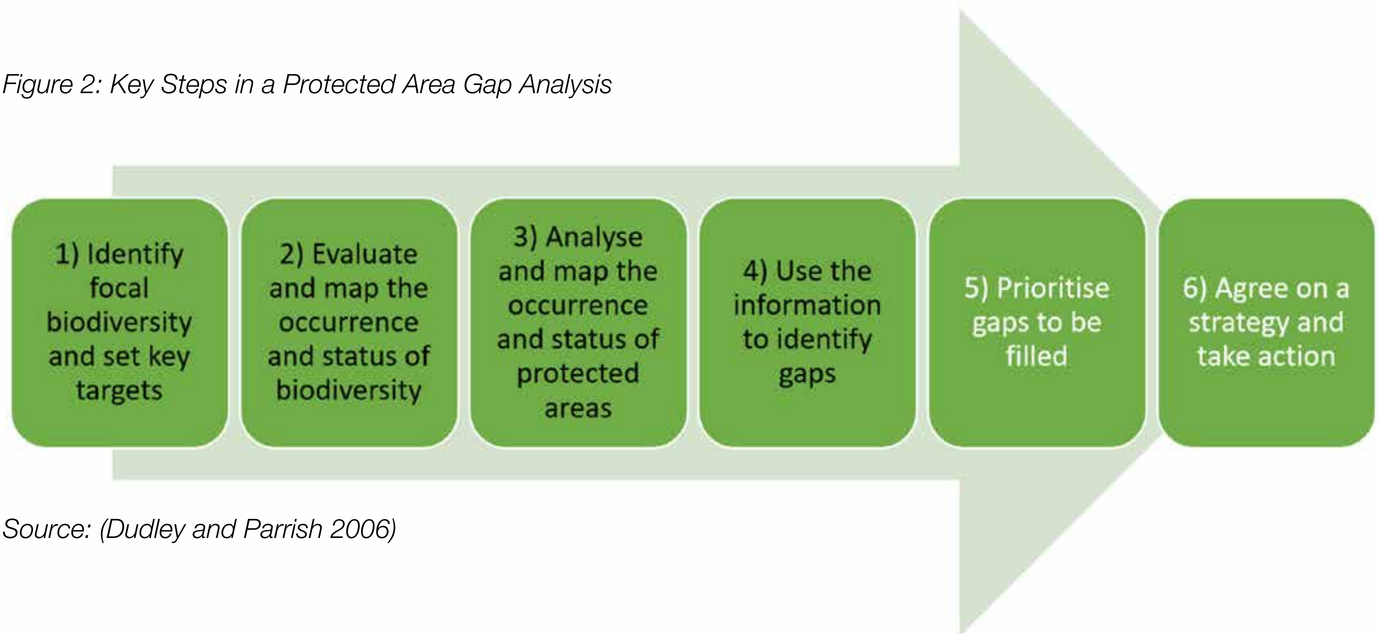
We would like to emphasise the fact that analysis on such a scale and across eight countries is more the exception than the rule. Furthermore, most analyses concerning the effectiveness of protected area management (as part of step 3 of the gap analysis) usually evaluate the performance of single protected areas (even if they fall within larger protected area systems) and do not address protected area categories. Our goal is to include the various protected area categories in our gap analysis.

This is a main difference and a new aspect that our synthesised analysis[1] brings up. The existing methodologies must, therefore, be adapted to these needs.

Throughout the stages, the six guiding principles listed by Dudley and Parrish (2006) are to be considered while carrying out the work.

Gaps can be defined in different ways and refer to different sets of attributes. In protected area networks, gaps can generally be subdivided into three categories, namely: representation gaps, ecological gaps and management gaps (see Figure 3).

Figure 2: Key Steps in a Protected Area Gap Analysis



Source: (Dudley and Parrish 2006)

[1] This signifies that we follow the principles of the gap analysis but need to summarise and concentrate on main features of the protected area system.

Figure 3: Range of Different 'Gaps' in a Protected Area Network

Gap analyses generally consider a range of different "gaps" in a protected area network:

Representation gaps: either no representations of particular species or ecosystems exists in any protected area, or not enough examples of the species or ecosystems is represented to ensure long-term protection.

Ecological gaps: while the species or ecosystem occurs in the protected area system, occurrence is either of inadequate ecological condition, or the protected area(s) fail to address species movements or specific ecological conditions needed for long-term survival or ecosystem functioning.

Management gaps: protected areas exist, but management regimes (management objectives, governance types, or management effectiveness) do not provide full security for particular species or ecosystems given local conditions.

Source: (Convention on Biological Diversity 2011)

In the following subchapters, we will describe the methodological steps we have taken to conduct the gap analysis within this project.

D.1.2.1

IDENTIFY REPRESENTATION AND ECOLOGICAL GAPS

In this analysis, we decided to identify the representation gaps and the ecological gaps in one methodological procedure. Ideally, a set of key target species would be chosen, and their distribution and population evolution would be examined. But, as it is impossible to aggregate data on all species of a given area, a representative and compelling subset of species was selected and analysed for the assessment of protected area coverage of habitats and biodiversity. This is an important step to identify representation gaps and ecological gaps, as outlined in Figure 3.

"Ideally, a conservation strategy takes into account all species, habitats and ecological processes. However, due to limited resources and data, a subset of representative species and habitats was considered".

(Lassen and Savoia 2005, p. 32)

One gap that we encountered that does not concern a gap in the sense of our analysis, and which can only be bridged in the long-term is the **data-deficiency gap**[1]. Data for species distribution across the Alpine arc is rare and only a few species are well-covered. We thus relied on existing data and expert advice to compile a set of species that aggregated a set of conservation targets that best fulfil these criteria and serve as one basis of the analysis. Ideally, these species should fulfil the criteria set for conservation targets:

- be representative - especially for protected areas,
- be varied enough to cover as many biodiversity aspects and habitats as possible,
- be sufficiently studied for Alpine-wide datasets to be available (adapted from The Nature Conservancy 2006).

"Mapping all species is impossible – most countries have only identified a small proportion of their plants and invertebrates for example. Gap analysis must, therefore, often rely on data (1) for well-known species (such as mammals, birds, amphibians and fish) (2) for a few key species from other groups that are representative of particular habitats and (3) for ecosystems".

(Dudley and Parrish 2006, p. 15)

As an analysis according to species from all taxa is not realistic, neither is an Alps-wide identification of their precise locations and presence within protected areas. Thus, we focussed on Alpine distribution patterns of some iconic Alpine species (black grouse, lynx, red deer, bearded vulture) as focal biodiversity representatives. We are aware that this only partially represents current ecological biodiversity. Therefore, this analysis must be considered a starting point rather than an exhaustive analysis for this field of the evaluation of the Alpine protected area system.

[1] Support on the global level to close this data-gap are on the way from rather unlikely actors.
The IT industry is trying to build global biodiversity databases in order to assess, monitor and manage natural ecosystems data.
https://www.greenbiz.com/article/microsoft-building-planetary-computer-protect-biodiversity.

"A systematic approach to conservation planning demands that we be explicit about what features of biodiversity we are trying to conserve (Groves 2003). With the goal of conserving the biodiversity of an ecoregion, we need to define a subset of features to work with that will adequately capture that representation and variety. We refer to these features as conservation targets (Redford et al. 2003). Conservation targets are the species, communities, ecological systems and surrogates that we focus our assessments on in order to capture the broad range of biodiversity as best we can. Targets are a subset of the biodiversity of an ecoregion, since it would be impossible to assess each component of biodiversity individually even if we knew what all of it was and where it resided".

(The Nature Conservancy 2006)

Furthermore, to complete the analysis, we decided to use aggregated data that is available and can be considered suitable for such an analysis. This data consists of grouped sets on a global level from reliable sources. The main weakness of these datasets is the coarseness that results from its global scale.

Also, the datasets were not all specifically designed to suit analysis on the Alpine level and thus are not very specific, nor do they explicitly consider Alpine specific species or habitats. Nevertheless, the data is deemed relevant and helpful for our analysis.

The datasets comprise the following sources and may serve as indicators for the analysis of representation and ecological gaps:

- Key Biodiversity Areas[1]
- Important Bird Areas[2]
- IUCN Red List of threatened species[3]
- Corine Landcover Data[4]

[1] http://www.keybiodiversityareas.org/home
[2] https://www.birdlife.org/worldwide/programme-additional-info/important-bird-and-biodiversity-areas-ibas
[3] https://www.iucnredlist.org/
[4] https://land.copernicus.eu/pan-european/corine-land-cover

D.1.2.2

IDENTIFY MANAGEMENT GAPS

To identify **the management gaps**, an analysis of management effectiveness of the different protected area categories will be conducted.

Figure 4: The Three Basic Approaches for Assessment Systems Based on the IUCN-WCPA Framework

"Since the development of WCPA framework in 2000, technical experience increased rapidly resulting in a range of assessment systems based upon the framework. There are now three basic approaches:

In-depth, evidence-based assessments
aimed at building monitoring systems and long-term understanding of management in an individual protected area, such as the Enhancing our Heritage system being developed for World Heritage sites.

System-wide peer–based assessment
developed specifically for use on a system-wide scale such as the WWF RAPPAM system and the systems developed in Finland, Catalonia (Spain) and New South Wales (Australia).

Scorecard expert–based assessments
There are four major steps in assessing protected area management effectiveness (i) getting started (ii) gathering data (iii) analysing results and (iv) integrating into capacity assessments".

Source: (Convention on Biological Diversity 2008)

None of these approaches are completely adapted to an Alp wide analysis of the effectiveness and completeness of the Alpine protected areas network. Nevertheless, during the analysis, we will consider individual aspects from each of these approaches.

> *"The term network is commonly applied in the conservation biology literature to refer to any collection of protected areas in a region or globally".*
>
> *(Gaston et al. 2008, p. 96)*

With the primary goal of analysing and evaluating the status of the management effectivity of the **network of Alpine protected** areas, we define the relevant thematic areas. These include the biodiversity governance aspects and stakeholder involvement, and, to a lesser extent, the aspect of sustainable regional development. There is a multitude of management effectiveness tools for protected areas being used for the assessment of the conservation work of the parks. In Europe alone around 40 different tools have been identified by Leverington et al. (2010, p. 3). These **tools are generally based on the IUCN-WCPA Management Effectiveness Evaluation Framework, a guide that, since its establishment in 1995**, helped to develop the standards of worldwide measuring of protected area effectiveness starting with its first publication in 2000 (Hockings et al. 2000).

> *IUCN-WCPA Management Effectiveness Evaluation Framework: a system for designing protected area management effectiveness evaluations based around six elements: context, planning, inputs, processes, outputs and outcomes. It is not a methodology but is a guide to developing assessment systems.*
>
> *(Hockings et al. 2006, p. xiii)*

Sharing this foundation, these instruments differ mostly in details and are typically adapted to regional specifics. One major difference, though, is the scale on which the assessments apply. Whereas some apply to single protected areas, others apply to protected area systems. Major differences between those approaches exist, and the goal of our analysis is that the tool should assess the functionality of protected areas or protected area systems based on the effectiveness of the single protected areas while also **evaluating protected area categories across several countries**. This is a difference that requires us to adapt existing methodologies.

We have, therefore, taken inspiration from a broad selection of approaches and chosen the appropriate aspects for integration into our analysis. Foundationally, we respected the six elements of management identified in the IUCN-WCPA framework but with varying emphasis as judged relevant to our purpose:

Figure 5: The Six Important Elements for Assessment of Protected Area Management Effectiveness, According to the IUCN-WCPA Framework

Management:

- *begins with understanding the* ***context*** *of the protected area, including its values, the threats that it faces and opportunities available, its stakeholders, and the management and political environment,*
- *progresses through* ***planning****: establishing vision, goals, objectives, and strategies to conserve values and reduce threats,*
- *allocates* ***inputs*** *(resources) of staff, money, and equipment to work towards the objectives,*
- *implements management actions according to accepted* ***processes****,*
- *and eventually produces* ***outputs*** *(goods and services, which should usually be outlined in management plans and work plans),*
- *that result in impacts or* ***outcomes****, hopefully achieving defined goals and objectives.*

Source: (Courrau et al. 2006, p. 11)

We adapt these six elements to our goal of an evaluation of the effectiveness and completeness of the Alpine protected area network. This means we consider the elements in a wider scale than a single protected area – in the scale of the Alps. This approach has its own limitations including lack of in-depth analysis.

Furthermore, we got inspiration from the three different basic approaches identified by the CBD that are based on the IUCN-WCPA framework and are shown in Figure 4.

Figure 6: IUCN Framework for the Evaluation of Protected Area Management Effectiveness (PAME)

Source: (Courrau et al. 2006, p. 12)

Table 10: Approaches to Assessing the Effectiveness of Protected Areas

	Approach	Key questions that underpin the approach
1	Assessment of extent and location of protected areas, including their coverage of biological and landscape diversity	How many protected areas are there in a country or region, and what is their total area? How effectively do the protected areas cover key ecoregions or habitats? How well do protected areas represent the diversity of ecoregions and habitats? How effectively do the protected areas represent other features such as landscape elements, wetland types and species?
2	Assessment of the effectiveness of protected areas as a conservation mechanism at larger scales, and the impact of protected areas on people	Have protected areas reduced deforestation and other habitat loss? How have protected areas affected local communities—have they increased or alleviated poverty?
3	Assessment of overall protected area management effectiveness (PAME)	How well designed is the protected area and the protected area system? Are adequate and appropriate planning, resources, and processes in place to enable management? Are protected areas achieving their objectives and conserving their values?
3a	Outcomes of protected areas in conserving their biodiversity values (a subset of approach 3 but focused just on outcomes)	Are protected areas protecting species and habitats? Are values such as endangered species being conserved or restored? What is the impact of protected areas on communities?

Source: (Worboys et al. 2015, p. 892)

Amongst the most widespread and commonly used assessments are RAPPAM (Rapid Assessment of Prioritisation and Protected Area Management) developed by WWF (Ervin 2003) and the METT (Management Effectiveness Tracking Tool) (Stolton et al. 2019).

A quite recent evaluation of the German National Parks helped to further refine our approach. It identifies ten fields of action for protected area management, each of which includes several criteria of quality (BfN 2013):

Table 11: Fields of Action for the Evaluation of Management Effectiveness in German National Parks

Fields of action:
• Framework conditions
• Protection of the biological diversity and dynamics
• Organisation
• Management
• Cooperation and partnership
• Communication
• Education
• Nature experience and recreation
• Monitoring and research
• Regional development
Protection of the biological diversity and dynamics
• Space for natural processes
• Adapted size of the area
• Grade of naturalness
• Living spaces of national and international importance
• Species management
• Ecological connectivity
Management
• Mission statement of the National Park
• Management plan
• Zoning
• Renaturation
• Concepts for use
• Visitor guidance and area control
• Integration of the National Park into the region
• Evaluation of the measures

Source: (BfN 2013)

This toolset identifies the most relevant fields of action and criteria to assess management effectiveness concerning the conservation of biodiversity, habitats, and natural processes by adapted management strategies in the Alpine protected area network. Referring to this evaluation concept of BfN, the criteria would be derived from within the fields of action 2 and 4. Not all criteria fit our purpose, but many do and will be used in this work. The extrapolation of the BfN concept from single protected areas to a system of protected areas seems appropriate for efficiency evaluations to improve modern nature protection strategies.

Against the background of the findings of chapter 1, the analysis in chapter 2 will take into consideration the complete system of Alpine protected areas integrating the different types of protected area categories by analysing the complementarity between these protected area classes. This will allow for an overview and establish the basis for a more detailed analysis focussing on ecological connectivity in chapter 3 and targeted development of future network strategies and management approaches within an Alpine protected areas system in chapter 4.

The definition of key targets for the efficiency of the Alpine protected area network (step 1 of the procedural structure – Figure 2) will be discussed again on the basis of this analysis of representation, ecological and management gaps in the beginning of chapter 4.

D.1.2.3

EVALUATE AND MAP THE OCCURRENCE AND STATUS OF BIODIVERSITY AND PROTECTED AREAS

In order to evaluate and map the occurrence and status of biodiversity, the distribution maps of KBAs and, if possible, identified target species or habitats will be compared with the maps of the existing protected area network. One methodological advantage of the Alpine region is the availability of reliable and relatively detailed GIS data on protected areas. The ALPARC database contains a set of around 1,000 protected areas larger than 100 ha and around 300 smaller than 100 ha classified according to their national designation. The number of small protected areas is probably higher but their number and surface area are harder to define as legal conditions are changing, and a subset of these areas are part of "private" (or volunteer) protected areas. After the analysis of existing protected areas (see chapter 1), we can attribute an IUCN category to most of these protected areas. This is helpful to determine the actual legal (or official) status of conservation.

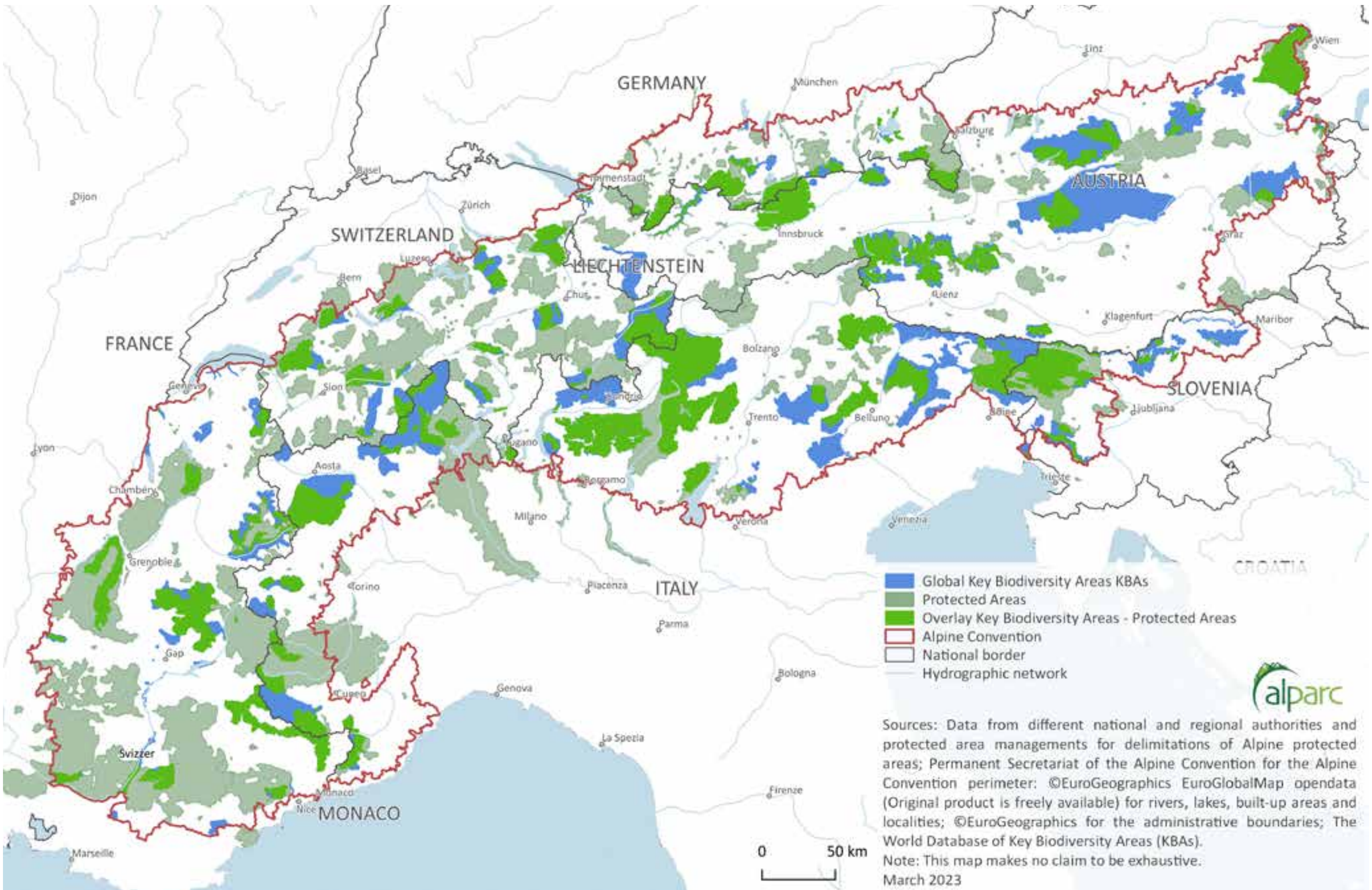
The following map show promising overlap between KBA and protected areas. Nevertheless, the protected areas represented cover 28.5% of the Alpine Convention surface, but only about 10% are areas of strong protection. For this reason, numerous Key biodiversity areas are not covered by any strong protection status.

To complete these data for a specific Alps-wide approach, we will consider data from the ALPARC data set (GIS) developed during the last 25 years:

- Protection status of Alpine protected areas
- Surface and zoning of Alpine protected area
- Altitudinal distribution of the surface of Alpine protected areas
- Connectivity potential of Alpine protected areas
- Management system and transboundary cooperation of Alpine protected areas

In a GIS model, areas that show inadequate protection status can thus be identified. Even if cartographic methods are not always available due to data lack, an interpretation of the current situation is possible.

Map 19: Key Biodiversity Areas and Protected Areas in the Alps



"An ideal gap analysis will consist of maps of biodiversity that can be overlaid over maps of protected areas to geographically and spatially locate and analyse thematic gaps. If this isn't possible some simpler methods are available, but wherever possible maps of biodiversity are particularly valuable".

(Dudley and Parrish 2006, p. 33)

D.1.2.4

USE AVAILABLE INFORMATION TO IDENTIFY GAPS

As described in the subchapter above, the spatial information gained in steps one and two of the gap analysis can be used to identify existing gaps through overlays of cartographic data.

To further detail the gaps, other aspects can be considered. In the Alpine environment, altitude is an important factor to consider, given that it determines many essential elements of the natural environment. Comparison between habitat needs and spatial coverage of the protected areas is another important aspect directly linked to this issue. The size and distribution in relation to seasonal migration patterns are two other essential factors.

Once the coverage of protected areas is identified, the surrounding zones and landscapes must be considered to identify areas which would need to be put under some form of sustainable conservation management. The utilisation pressure through settlements and other infrastructure must be considered to prepare the basis for the identification of ecological network needs discussed in further detail in chapter 3. A specific analysis concerning the potential of ecological connectivity for high value natural sites will be evaluated using a specific procedure (Geographical Information System – GIS - of ALPARC in cooperation with partners).

While the GIS analysis is an important tool, it is not a stand-alone methodology for the analysis. It is embedded in more classical research methods such as literature review as well as stakeholder and expert clarification in the form of interviews. Evidence from experts with a range of thematic competences is essential to assure a holistic approach and the consideration of all relevant information. With the aim of establishing an institutional framework, a steering group, composed of experts for the Alpine environment and protected areas, has been established representing the different Alpine countries.

Furthermore, the extended ALPARC network of contacts, including individuals as well as organisations and institutions, will be mobilised for this analysis.

D.2

ASPECTS OF ALPINE PROTECTED AREA MANAGEMENT OBJECTIVES IN INTERNATIONAL STANDARDS

In this chapter, the management objectives of the respective protected area categories will be placed in the context of international goals, such as those formulated in various international conventions including the Protocol "Nature Protection and Landscape Conservation" of the Alpine Convention, within the EUSALP action groups 6 and 7 or the IUCN strategies or the Convention on Biological Diversity as well as national and European strategies supporting the conservation of biodiversity. The relevant provisions and regulations of these treaties or strategies are an important element of this analysis.

It is important to note that the general objectives of these international Conventions and Strategies have obstacles to overcome within their proposed time frames: the year 2020 targets could not be achieved, neither do the 2030 targets seem realistic if no acceleration of biodiversity and ecosystem protection occurs. It appears likely that most 2030 objectives will not be met and will fall short by a large margin. This is especially true for the goals to slow, halt or even reverse biodiversity loss. The global extinction goes on, and all efforts being undertaken so far seem to be insufficient.

D.2.1

SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs) can be considered a global standard framework for sustainable development and conservation for the current decade. The global conservation community reflects the relevant parts of this framework in their planning and strategies. Overall, there are 17 SDGs, which form the backbone of the larger 2030 Agenda for Sustainable Development, which was adopted in 2015 by all UN Member States (UN 2015). While the SDGs cover all relevant topics in relation to sustainable development and poverty alleviation, it is mainly SDG 15, "Life on Land", that relates to biodiversity and habitat conservation through protected areas. A more detailed breakdown of the links between the SDGs and protected areas was published in 2017 (Dudley et al. 2017). The SDGs often refer to the Aichi Targets which will be presented in the following subchapter.

The SDGs must remain relatively non-specific given their global nature, but they, nevertheless, set a framework and provide general directives and guidelines. Target 15.4 is the one most clearly earmarked for mountain environments and the preservation of their ecosystems. The time frame set for this target is 2030. So, there is still almost a decade to fulfil its requirements. For other targets that had the year 2020 as timeline, fulfilment has been disappointing. Some targets can be considered fulfilled for the Alps, for example the (theoretical) coverage of protected areas in percent of the total land area[1]. But the target 15.5 'to halt biodiversity loss and the extinction of species' will certainly not be achieved. And, so far, no real solution has emerged to stop the extinction.

> *"At the Rio+20 Conference, Member States reaffirmed, through paragraphs 197- 204 of the outcome document, the Future We Want, that "intrinsic value of biological diversity, as well as the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its critical role in maintaining ecosystems that provide essential services, which are critical foundations for sustainable development and human well-being". Member States also recognised "the severity of global biodiversity loss and degradation of ecosystems" and stress the negative impact that this situation has on food security, nutrition, access to water, health of the rural poor and people worldwide".*
>
> *(UN 2015) See also (UN General Assembly 2012)*

[1] See further comments on that criterion in chapter D.2.2

The following table illustrates the relevant targets of the SDG 15 for the Alps:

Figure 7: Relevant Targets of the SDG for the Alps

Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Targets

15.1

By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains, and drylands, in line with obligations under international agreements.

15.4

By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, to enhance their capacity to provide benefits that are essential for sustainable development.

15.5

Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.

15.9

By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.

15.a

Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.

Indicators

15.4.1

Coverage by protected areas of important sites for mountain biodiversity

15.4.2

Mountain Green Cover Index

Source: (UN 2015)

D.2.2

CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

The strategic plan for biodiversity 2011-2020 from the Convention on Biological Diversity (CBD) has been the global framework for conservation policies for the last decade. One core element of this plan was the **20 Aichi biodiversity targets**, which were grouped into five strategic goals. Targets 11 to 13 refer directly to the subject of this report, and target 11 puts concrete numbers to what is expected from the global network of protected areas. The overall evaluation has yet to be realised, but it is already clear that the global efforts to stop or slow down the loss of biodiversity and habitats are largely insufficient. The most recent available figures remain alarmingly high, with an estimated one million species at risk of extinction within the next decades (Díaz et al. 2019b, p. 11).

Figure 8: Strategic Goal C of the Strategic Plan for Biodiversity 2011-2020 and its Three Targets.

Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species, and genetic diversity.

Target 11
By 2020, at least 17 per cent of terrestrial and inland water and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative, and well-connected systems of protected areas and other effective area-based conservation measures and integrated into the wider land-scapes and seascapes.

Target 12
By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 13
By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Source: (Convention on Biological Diversity 2020)

The new framework is currently being developed under the name of Post-2020 Global Biodiversity Framework[1] and will be the overarching reference for biodiversity conservation setting the objectives until 2050 (Vision of "Living in harmony with nature"), including stepping-stones in 2030 and 2040. It is conceived as the follow-up on the strategic plan for biodiversity 2011-2020 and the Aichi biodiversity targets.

Generally, the Convention on Biological Diversity sees the ecosystem approach as the theoretical backbone of its work as described in the following citation: *"As described by the Conference of the Parties, the ecosystem approach is the primary framework for action under the Convention. The Conference of the Parties, at its Fifth Meeting, endorsed the description of the ecosystem approach and operational guidance and recommended the application of the principles and other guidance on the Ecosystem Approach (decision V/6). The seventh meeting of the Conference of the Parties agreed that the priority at this time should be on facilitating implementation of the ecosystem approach and welcomed additional guidelines to this effect (decision VII/11)". (Convention on Biological Diversity 2021)*

The achievements of the Aichi targets in the Alps remains weak, with some differences between the respective objectives. On an Alpine level, target 11 is fulfilled and has almost achieved the strategy 2030 targets, with a spatial coverage of about 28% of the area of the Alpine Convention covered by protected areas larger than 100 hectares (ALPARC).

However, there are other questions about whether the Alpine protected area network fulfils target 11. Are these areas "**effectively and equitably managed, ecologically representative and well connected" … is their protection status truly sufficient?** And here lies the concern: most of these areas in the 28% are weakly protected or not protected at all - some even have a denomination as "park". A closer analysis of the Alpine situation will be given in the next chapters.

Indeed, this is the core question as a lot of so called "protected areas" don't have any real protection status but a mission more orientated towards "sustainable regional development" and often linked to an intensive work of awareness raising about environmental questions and education towards sustainable development. In our analysis, we distinguish between protected areas and areas with a strong (or stronger) legal protection status. Nevertheless, this approach can only offer approximate evaluation lacking details on an Alps-wide scale.

D.2.3

IUCN

IUCN is a globally recognised union of 1,300+ member organisations and 15,000+ individual experts working in the field of nature conservation. It is composed of a permanent secretariat and six Commissions, all working on conservation related issues. The most relevant for protected area issues is the World Commission on Protected Areas (WCPA).

This commission can also fall back onto a vast network of protected area specialists, covering all relevant aspects of protected area management. Its *"mission is to promote the establishment and effective management of a worldwide representative network of terrestrial and marine protected areas, as an integral contribution to the IUCN mission". (Worboys et al. 2016)*

The WCPA is specifically dedicated to improving biodiversity and habitat conservation through better protected area management and policies. IUCN and WCPA edit a series of Best Practice Protected Area Guidelines that provide guidance and support for protected area managers and practitioners, governmental and non-governmental organisations, researchers, and all other stakeholders involved in protected area management. The series claims to be the *"world's authoritative resource for protected area managers". (Mitchell et al. 2018)*

> *"The Commission develops knowledge-based policy, advice and guidance on the full suite of issues surrounding protected areas through the establishment of Specialist Groups and Task Forces. We bring together global experts to find solutions for programme priorities, including global protected area standards and Best Practice Guidelines".*
>
> *(IUCN)*

IUCN focusses on three key areas of work regarding protected areas, namely:

- Achieving quality for successful and valuable protected areas,
- Enhancing justice for fair, just and inclusive protected areas, and
- Contributing protected area solutions to development challenges.

[1] https://www.cbd.int/doc/c/d431/b38f/3d580bb73e7c2b5aaa286310/post2020-prep-01-01-en.pdf

This orientation is in full respect of the new approaches and international standards concerning protected area management and governance. Alpine protected areas should thus reflect this in their own orientation and daily work.

On a more concrete level, IUCN defines a larger framework for protected area management that should ideally be reflected in protected areas in all parts of the world. In chapter one we already cited the IUCN protected area categories that help to establish order and enhance comparability in the mingle-mangle of national protected area designations. Overall, these categories are rather general in nature to allow integration of the fascinating diversity of protected areas. Nevertheless, some rather clear indications are given to set a global basic standard and objectives in relation to these categories.

One very important suggestion, and probably the most relevant for our analysis, is known as the 75% rule which states that:

> *"In brief, the* ***primary management objective*** *must be* ***applicable to at least 75 per cent of the protected area*** *(and the remaining area must be compatible with the primary purpose of conservation). This provision aims to deal with the reality that many protected areas include small areas with quite different uses from the majority of the designated area—for example, areas, often on the periphery of the park, with management infrastructure (offices, vehicle maintenance depot, etc.) or areas, also often on the periphery of the park, with more intensive tourism infrastructure or some agriculture, etc".*
>
> *(Dudley 2013, p. 113)*

This rule applies to all IUCN protected area categories. It is not always achieved, and many protected areas lag behind in fulfilling this objective (e.g., Austria (Gehrlein et al. 2015, p. 24)). In most cases, studies refer to the 75% rule in the context of the analysis of National Parks.

Nevertheless, this analysis is more complex than it looks at the first glance: The history and the evolution of each national park are very different and depend on national and regional legislation, planning systems, and traditions. For this reason, almost all cases are specific. Category II of the IUCN is common to all Alpine National Parks. Only the Swiss National Park is a special case, the whole area is a core zone and part of the IUCN category Ia and Ib.

The evaluation of the 75% rule depends on the reference area. In recent years, this rule seems not to be so central anymore for IUCN evaluations. For the Alps, the situation is very complex, as zoning cannot be compared between Alpine national parks. Table 12 can only give a global overview according to the figures provided by the parks. Table 12 does not mention whether the 75% rule could be achieved or not by individual national parks, as concepts of zoning differ between each park.

The most important difficulty of this analysis consists in the fact, that the definition of buffer zones and the total park territory are different between the alpine countries. The French "optimal zone of participation" *(zone optimale d'adhésion)* is simply not comparable with other park territory definitions and doesn't allow a real conclusion on the overall Alpine situation as these territories are very large but are not coinciding with protected areas and are without protection status (e.g., very large ski areas within those perimeters).

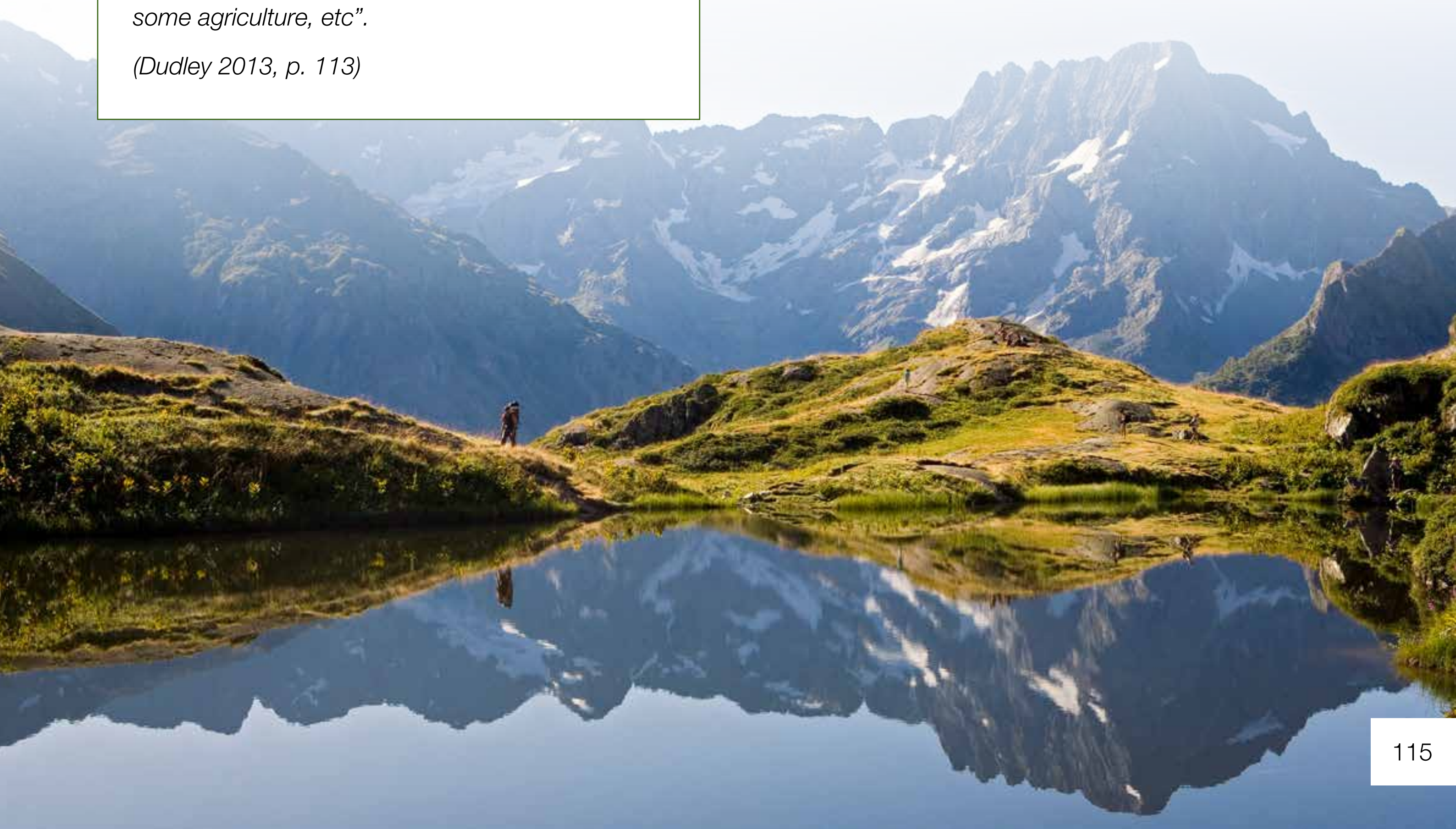


Table 12: 75% Rule in Alpine National Parks According to IUCN

National Park	Total Size (ha)[1]	Size core zone (ha)[2]	Size natural zones dedicated to the main (protection) objective of the park (ha)[3]	Percentages natural zones (or core zones) dedicated to the main (protection) objective[4] in relation to the core area and/or the total size
Berchtesgaden (D)	21,000	15,750	15,750	75%
Mercantour (FR)	180,100	67,900	67,900 including surfaces (27,433) reserved for natural spaces without human activities	up to 100% (reference: core zone) and 40 % for areas dedicated only to nature protection
Les Ecrins (FR)	252,600	93,000	93,000	up to 100% (reference: core zone)
La Vanoise (FR)	74,300	53,500	53,500	up to 100% (reference: core zone)
Gran Paradiso (IT)	71,044	34,431	34,431 reserved for natural spaces without human activities	up to 100% (reference: core zone) / 48% (reference: total size)
Val Grande (IT)	14,598	14,598	14,598 including approx. 1000 of an Integral Nature Reserve (7%)[5]	up to 100% (reference: total size) including 7% dedicated to an Integral Nature Reserve without human activities
Stelvio (IT)	130,604	tbc: approx. 48,240 (management plan in elaboration, see foot note)	tbc: approx. 48,240 (management plan in elaboration)	tbc: up to 100% (reference: core zone) / 37% (reference: total size)
South Tyrol/Alto Adige	53,383	10,995	10,995	up to 100% (reference: core zone) / 21% (reference: total size)
Trentino	17,553	7,245	7,245	up to 100% (reference: core zone) / 41% (reference: total size)
Lombardia	59,668	approx. 30,000[6] (tbc)	tbc: 30,000 (elaboration new management plan)	tbc: up to 100% (reference: core zone) / 50% (reference: total size)
Dolomiti Bellunesi (IT)	31,034	31,034	31,034	up to 100%
Hohe Tauern (A)	185,608	121,300	88,717	73% (reference: core zone) / 48% (reference: total size) or 65% (reference: core zone in relation to total size)
Carinthia	44,008	32,700 composed by: 29,100 core area and 3,600 special protected areas with a higher protection status than the core area	21,111	65% (reference: core zone) / 48% (reference: total size) or 74% (reference: core zone in relation to total size)
Salzburg	80,500	53,900	approx. 40 000	74% (reference: core zone) / 50% (reference: total size) or 67% (reference: core zone in relation to total size)
Tyrol	61,100	34,700	27,606	80% (reference: core zone) / 45% (reference: total size) or 57% (reference: core zone in relation to total size)
Kalkalpen (A)	20,850	18,550	14,866	80% (reference: core zone) / 71% (reference: total size) or 89% (reference: core zone in relation to total size)
Gesäuse (A)	12,382	9,665	9,523	99% (reference core zone) / 77% (reference: total size) or 78% (reference: core zone in relation to total size)
Triglav (SL)	83,982	63,900[7]	63,900	76% (reference zone A and B, see foot note)
Swiss (CH)[8]	17,030	17,030	17,030	100%
TOTAL	**802,532**[9]	**588,898**	**--**	**--**

[1] This table is only to take at an "indicative" level as the reference areas (total size of the area including the core area) of the parks are very differently defined. I.e. in France, the size for the core zone is given and the peripheral or adhesion areas (aire "optimale" d'adhésion) which is considered as buffer zone. However, the 75% rule can't be applied to French National Parks as the "adhesion area" is another concept that is not comparable with normal buffer zones. For this reason, the IUCN rule must be considered as fulfilled in French National Parks. The Hohe Tauern National Park has another system of zoning which also isn't harmonised between its three sectors. For the Stelvio National Park, new management plans currently are being elaborated. The reference for the calculation of the 75% is different from park to park because of the specific definition of the areas.

[2] The definition of core zones is different according to the parks, figures are for this reason not always comparable.

[3] As well the natural zones dedicated to the main (protection) objective of the park are defined in different manners and are presenting specific situations. We tried to harmonise as much as possible according to the information's delivered by the parks themselves.

[4] The references for the calculation are different for the national parks (core area / total size) according to the specific area definitions. This is linked to the definition of "core areas" and to "natural areas without human activities" by each single park.

[5] This concerns the "Integral Nature Reserve of the National Park" only.

[6] The surface of the core area for the Lombardian part of the park is currently not available due to the development of a new management plan. Estimations are around half of the surface according to existing documents (Atlas NP Stelvio: https://issuu.com/zeppelingroup/docs/atlas_nationalpark_stilfserjoch_sma)

[7] The Triglav National Park has the particularity that it is divided into 3 zones. Zones 1 and 2 combined are considered as core zone while zone 3 is considered as the buffer zone. The actual sizes of the respective areas are as follows: zone 1 is 31,488 ha; zone 2 is 32,412 ha and zone 3 is 20,082 ha. So far, zone 1 is to be considered the proper core zone, and zone 2 is being managed and used with the aim of bringing it to the same standards as zone 1. For the time being, activities including hunting, fishing, and commercial logging (rather in extensive usage through local communities) are allowed.

[8] The Swiss National Park is listed in this table even though it is not classified under IUCN category II but as Ia – strict nature reserve. On the entire surface, the management is dedicated to the free development of natural processes. Research and tourism are strictly limited to certain areas and activities.

[9] This total takes in account the core areas of the French national parks and not their total size including the so called "adhesion area" as this would be not comparable with any situation of the other alpine national parks.

D.2.4

EUROPEAN BIODIVERSITY STRATEGY AND THE NATURA 2000 NETWORK

Policy makers on an EU level are aware of the current ecological crisis that has persisted for decades and cannot be stopped with the tools developed so far. The strategy implementation was evaluated in 2015, and the results show that some positive effects can be seen, while the overall performance is still lagging far behind the objectives. The strategy comprises one headline target that is detailed by six targets that are "mutually supportive and inter-dependent" (European Commission 2011, p. 4). Each of the goals comes with several actions, described in detail, that are intended to achieve the overall objective of stopping biodiversity loss and fighting the loss of ecosystem services that go along with it. A special focus is laid upon the role of agriculture and forestry and the European contribution to global conservation measures.

An interesting point is that the term 'protected area' is not used in the Strategy. If there is a reference to protected areas the wording is "Natura 2000" sites or areas, without any cross reference to the existing protected area systems on a national level. It is, therefore, not possible to derive direct indications for protected area management from the Strategy. This is symptomatic of the fact that there is little coordination between these two sets of protected areas. Generally, in the literature, there is not much discussion of this topic.

The EU recognises the fact that **unsustainable land-use is one of the main driving forces of biodiversity loss.** Agriculture and forestry, which cover 76% of land in the EU, are the most important factors in this respect. The integration of biodiversity related aspects into all relevant sectoral policies is thus regarded as a basic requirement if any advances in slowing biodiversity loss are to be made[1].

According to the mid-term evaluation (European Commission 2015), the overall situation is disappointing. While there is some slight improvement or stabilisation for some species and habitats, it must be underlined that this does not constitute progress as it is often classified "unfavourable". Furthermore, there are many species and habitats that are still on a downward trend, putting many classes at risk, namely fish, molluscs, and amphibians. This is not surprising, given that the state of freshwater habitats remains critical in many parts of the EU. The analysis shows that the number of threatened species designated by the IUCN Red List remains alarmingly high: freshwater molluscs (55%), freshwater fish (43%), amphibians (22%), reptiles (21%) and birds (18%).

The situation for habitats is equally worrisome: **only 16% of all EU habitats** are in favourable conditions. **77% are in unfavourable** (the remaining 7% are of unknown status). Thus, the overall assessment concludes that the progress at mid-term for the overall target reflects *"No significant progress towards the target". (European Commission 2015; European Parliament 2016)*

The final evaluation describes some of the challenges faced regarding the implementation of the strategy related

[1] https://www.eea.europa.eu/ds_resolveuid/12345QWERT

to funding, the integration of the measures into policy and the lack of incorporation of data on the decision-making. Difficulties engaging stakeholders on the development of solutions have also been some of the main reasons for the limited the impact of the strategy.

As outlined on the evaluation report of the EU Biodiversity Strategy to 2020, the new framework proposed on the strategy to 2030 aims to tackle the weaknesses presented on the former strategy through the implementation of concrete measures and the involvement and commitment of all actors in order to accomplish the biodiversity targets.

Unfortunately, the EU has no specific datasets for the Alpine region. Still, it is important to consider this larger and more general biodiversity framework, as the Alps, no matter how particular its geography and therefore its habitats may be, remain embedded in and connected with the larger European environmental developments.

The Birds and Habitats Directives, also summarised as the Nature Directives, led to the establishment of the Natura 2000 network, which is the main tool to implement these Directives and the centrepiece for the implementation of the EU Biodiversity Strategy. It is a large network covering over one million km², representing about 18.3% of the EU territory, but rather inhomogeneous in size, protection, and management structure etc. This is due to the establishment process, which was bottom-up and gave a lot of freedom to single countries to design their respective Natura 2000 network. Approval criteria were not very clear and thus differ significantly between the member states. (Santini et al. 2016)

The general goal of the directives is to reach *"favourable conservation status of all habitats and species of European importance and adequate populations of naturally occurring wild bird species". (European Commission 2011, p. 5)*

> *"Article 6 (1) EU Habitats Directive: For special areas of conservation, Member States shall establish the necessary conservation measures involving, if need be,* **appropriate management plans specifically designed for the sites** *or integrated into other development plans, and appropriate statutory, administrative or contractual measures which correspond to the ecological requirements of the natural habitat types in Annex I and the species in Annex II present on the sites".*

Article 6 (and especially paragraph 1) of the Habitats Directive is essential in the establishment of the conservation regime within the Natura 2000 network. The European Commission therein "strongly encourages" all Natura 2000 sites to establish and implement a management plan or similar document. Nevertheless, this is a lengthy process that, to date, has not been fully achieved.

Conservation measures to protect the species and habitats covered by the Nature Directives and their Annexes are compulsory for the member states: "*The process of establishing the necessary conservation measures for each Natura 2000 site* **is not an optional provision; it is obligatory** *for all Member States. This means that, for each Natura 2000 site, those conservation measures, which are deemed to be necessary, must be established and implemented (ECJ case C-508/04)". (European Commission 2020)*

> *"To help ensure that sites are managed in a clear and transparent way, the European Commission strongly encourages Member States to elaborate Natura 2000 management plans, in close cooperation with local stakeholders".*
>
> *(European Commission 2020)*

As a requirement of both directives (Article 12 of the Birds Directive and Article 17 of the Habitats Directive), Member States report every six years on the progress of implementation and information provision regarding the current conservation status of habitats and species. Currently, from the 231 habitat types and more than 1,000 species included in the Annexes I, II, IV and V the Alpine countries Austria, France, Italy, Slovenia, and Germany jointly identify a total of 219 (non-priority) and 73 (priority) habitats for the Alpine biogeographical region and, respectively, 332 and 36 species for these areas, which can be considered as very important and requiring long term conservation measures.

European Union Biodiversity strategy for 2030:

Some key elements and statements of the EU biodiversity strategy 2030 stress the importance of the topic for all European countries and policies:

> *"For the good of our environment and our economy, and to support the EU's recovery from the COVID-19 crisis, we need to protect more nature. In this spirit, at least 30% of the land and 30% of the sea should be protected in the EU. This is a minimum of an extra 4% for land and 19% for sea areas as compared to today[1]. The target is fully in line with what is being proposed[2] as part of the post-2020 global biodiversity framework (see Section 4).*
>
> *Within this, there should be specific focus on areas of very high biodiversity value or potential. These are the most vulnerable to climate change and should be granted special care in the form of strict protection[3]. Today, only 3% of land and less than 1% of marine areas are strictly protected in the EU. We need to do better to protect these areas. In this spirit, at least one third of protected areas – representing 10% of EU land and 10% of EU sea – should be strictly protected. This is also in line with the proposed global ambition".*
>
> *(European Union Biodiversity strategy for 2030)*

This goal of the European Union concerning habitat and biodiversity protection is shared by the national strategies of some member states such as France ("30 – 10 deal").

D.2.5

EUSALP

EUSALP is the macroregional strategy of the EU for the Alpine region and was established in 2015. Such a strategy *"is an integrated framework endorsed by the European Council, which may be supported by the European Structural and Investment Funds among others, to address common challenges faced by a defined geographical area"*, such as the Alps. The strategy concerns all Alpine countries, including Switzerland and Liechtenstein, even though they are not members of the EU (EUSALP 2020). Nine Action Groups (AG) have been established to cover all relevant fields of intervention. For the protection of biodiversity (and thus our analysis) not all are equally relevant. Mainly, two AGs touch upon our topics, AG 6 "Resources - To preserve and valorise natural resources, including water and cultural resources" and AG 7 "Green Infrastructure - To develop ecological connectivity in the whole EUSALP territory". Both belong to the third thematic policy area "Environment and Energy".

The most relevant link between the EUSALP and our analysis lies in AG 7, as ecological connectivity is one of the outstanding challenges for future protected area management. The intersection between the EUSALP area and the Alpine Convention perimeter is a territory of highest interest for protected area strategy development as this direct periphery of the Alpine area is exposed to numerous impacts on biodiversity. EUSALP strategies and involvement should focus here; zoning with recommendations at a regional level could be one approach.

Figure 9: Mission Statement EUSALP

> *EUSALP is a European strategy for the Alpine territory joining human passions, natural resources, and economic assets, linking cities, plains, valleys and mountains to find solutions to challenges we can solve only together. We coordinate planning, integrate the best practices in the fields of economy, education, environment, accessibility, and mobility, and commit as institutions to create sustainable solutions for the benefits of the citizens. By bringing governing closer to the people, EUSALP is proving that the European culture of cooperation lives.*

Source: (EUSALP)

"The overarching challenge for the Alpine Region is to balance development and protection through innovative approaches which strengthen this area located in the centre of Europe as a living space for people and nature as well as a field for economic and social activities in a sustainable way".

The main objective above will be attained through the following 3 Thematic Policy Areas and priorities:

- **1st Thematic Policy Area:** Economic growth and innovation.Objective: Fair access to job opportunities, building on the high competitiveness of the Region.
- **2nd Thematic Policy Area:** Mobility and connectivity. Objective: Sustainable internal and external accessibility to all.
- **3rd Thematic Policy Area:** Environment and energy. Objective: "A more inclusive environmental framework for all and renewable and reliable energy solutions for the future" (EUSALP).

[1] Latest EU-27 statistics (European database of nationally designated protected areas) v. 2019, and Natura 2000 dataset 'end 2018'. Today, 26% of the EU's land area is already protected, with 18% as part of Natura 2000 and 8% under national schemes. Of EU seas, 11% are protected, with 8% in Natura 2000 and 3% under additional national protection. To note: offshore wind projects will be possible if in compliance with relevant environmental and nature protection legislation.

[2] First draft of the post-2020 global biodiversity framework (CBD 2021/WG2020/2/3), available at https://www.cbd.int/doc/c/abb5/591f/2e46096d3f0330b08ce87a45/wg2020-03-03-en.pdf.

[3] Strict protection does not necessarily mean the area is not accessible to humans but leaves natural processes essentially undisturbed to respect the areas' ecological requirements.

D.2.6

ALPINE CONVENTION

The year 2020 marked the 30th anniversary for the Alpine Convention, whose main objective is to foster sustainable development and the conservation of the natural and cultural heritage in the Alps. It is an international treaty and legally binding for the eight member states and the EU. Currently there are eight protocols in effect. The one with the greatest relevance for protected areas is "Nature Protection and Landscape Conservation". Within this protocol several articles (3 and 4, 11 to 14) directly refer to biodiversity conservation and protected areas. These articles are quoted in the tables below.

Unfortunately, the implementation of this legislation remains incomplete, and the regulations are often not sufficiently respected. The work of the compliance committee may play a stronger role in the future.

The Alpine Convention is the basis for the current analysis. In the nature protection protocol, the above-mentioned articles constitute a solid framework for improvement of the Alpine protected area network on a legal and international level. Nevertheless, central tools, such as the lists of threatened species in each country mentioned in article 14, are not available for all member states.

The concrete and consequent application of the convention would undoubtedly improve the situation of Alpine biodiversity conservation. Beside this issue of efficiency and a stronger political implementation of this international treaty, the Convention is an important force in the Alpine countries. International networks for nature protection, such as the network of protected areas (ALPARC) and representations of Alpine communities and cities (AIDA, Alpine town of the year) have been strengthened within the last 30 years of the Alpine Convention and are contributing with concrete actions to the Alpine environmental protection or actions for a sustainable development of the Alpine space on different levels.

Beside the nature protection protocol, articles in the other protocols, such as soil protection, sustainable tourism, or spatial planning, also address important aspects of greater protection for biodiversity within a holistic perspective.

The convention provides an approach involving all aspects relevant to or influencing ecological processes, environmental factors, and nature protection, including spatial planning crucial for zoning and ultimately protected areas.

Figure 10: Relevant Articles From the Protocol "Nature Protection and Landscape Conservation" of the Alpine Convention

Article 3 International cooperation

1. *The Contracting Parties undertake to cooperate particularly for: map surveying, drawing the boundaries and then managing and controlling protected areas and other natural and rural elements of the landscape worthy of protection, interconnecting a network of biotopes, defining landscape models, programmes and/or plans, preventing and rebalancing damage to nature and the landscape, systematically monitoring nature and landscape, scientific research, and any other measure for protecting wild animal and plant species, their diversity and their habitat, and for defining the relevant comparable criteria to the extent that this is necessary and functional.*
2. *They undertake to encourage cross-border cooperation relating to nature protection and landscape conservation, at a regional and local level, to the extent necessary for achieving the objectives of this Protocol.*
3. *They will aim to combine the framework conditions for adopting limitations to the uses for the purposes of this Protocol's objectives.*

Article 4 Taking account of the objectives in other policies

The Contracting Parties undertake to also consider the objectives of this Protocol in their other policies, particularly in the area of: territorial and urban planning, safeguarding the air quality, defence of the soil, protecting the water balance and the quality of the water, tourism, agricultural and forestry economy, transport and energy policies, industry and manufacturing, management of waste; and also in the area of training, education, research and information, as well as in the area of cross-border coordination of the measures.

Article 11 Protected areas

1. *The Contracting Parties undertake to preserve, manage and, where necessary, to extend the existing protected areas, in keeping with their protective function, and also to define, where possible, new protected areas. They shall take all appropriate measures to avoid impairing or destroying these areas.*
2. *They shall also promote the instituting and management of National Parks.*
3. *They shall set aside areas of respect and tranquillity that ensure giving priority to the wild animal and plant species over other interests. They shall ensure that, in these areas, there is the peace necessary for the ecological process typical of the species to take place undisturbed and shall reduce or prohibit any form of use incompatible with the ecological processes of these areas.*
4. *The Contracting Parties shall examine the compensation terms of the special services provided by the local population, in compliance with national law.*

Article 12 Ecological network

The Contracting Parties shall pursue the measures appropriate for creating a national and cross- border network of protected areas, biotopes and other environmental assets protected or acknowledge as worthy of protection. They shall undertake to harmonise the objectives and measures with the cross-border protected areas.

Article 13 Protection of types of biotopes

1. *The Contracting Parties undertake to adopt the measures necessary to ensure the lasting preservation of the natural or near-natural biotopes of a sufficient size and with territorial distribution according with their functions. They shall also promote the re-naturalisation of the impaired habitats.*
2. *For the purposes of preparing the valid lists for the entire Alpine territory, the Contracting Parties undertake to indicate, within two years of this Protocol coming into effect, the types of biotopes requiring the adopting of measures in accordance with paragraph 1.*

Article 14 Protection of the species

1. *The Contracting Parties undertake to pursue the measures appropriate for preserving the indigenous animal and plant species with their specific diversity and in sufficient populations, particularly ensuring that they have sufficiently large habitats.*
2. *For preparing the valid lists for the entire Alpine territory, the Contracting Parties shall indicate, within two years from this Protocol coming into effect, the species that require special protection measures since they are specifically threatened.*

Source: (Alpine Convention 1991)

D.3

CRITERIA FOR THE EVALUATION OF THE EFFECTIVE CONSERVATION OF ECOSYSTEMS AND HABITATS

This chapter will describe and define the relevant criteria for biodiversity conservation and ecological connectivity within the Alpine protected area system. Furthermore, the status quo regarding these criteria in the respective countries and protected area categories will be assessed, and the resulting gaps within the Alpine protected area network will be detailed. An analysis and conclusions will be provided in the following chapters.

Although nearly 30% of the area of the Alpine Convention is covered by some form of protected area, conversely, about 70% has no specific territorial status for any sort of development adapted to the Alpine environment. Furthermore, only few of the protected areas benefit from strong protection status according to our definition (National Parks, nature reserves, nature parks with important nature protection rules). While large amounts of the surface areas indicated as "protected areas" feature restrictions on development of infrastructure and economic, leisure or touristic activities, these regulatory measures are often inadequate to prevent habitat destruction and the decline of biodiversity.

Indeed, a significant proportion of protected areas don't have effective biodiversity conservation measures being implemented on the ground.

Employing methodology described in chapter D.1.2, we identified several criteria to inform the gap analysis for protected area categories in the Alps. These criteria are divided into two general categories, in line with the potential gaps: 1) representation and ecological gaps on one side and 2) management gaps on the other side, namely ecosystem/ecological criteria and protected area management criteria. The following subchapters will describe those in detail.

There is no general definition of the terms "strong" or "strict" protection status of protected areas.

In order to provide a working definition that is simultaneously time sensitive and meaningful, we propose the following.

Strictly protected areas in the Alps are considered:

- Wilderness zones
- Core zones of National Parks
- Nature reserves
- Nature parks if relevant regulations towards protection of biodiversity (e.g., in Italy)
- Core Zones of UNESCO Biosphere reserves

"A protected area under strong protection is defined as a natural space in which the main pressures generated by human activities on the ecological environment are significantly reduced, in a sustainable manner, thanks to the implementation of appropriate regulations and/or management, combined with effective control of the activities concerned".

French Strategy for protected areas (translated by the authors)

D.3.1

REPRESENTATION AND ECOLOGICAL CRITERIA THROUGH THE PRISM OF THEIR SPATIAL DISTRIBUTION

Several criteria responding to biological needs of species and habitats are of interest for our analysis of gaps in the protected area network in the Alps. We compiled a set that we consider essential for biodiversity and habitat protection in the long-term: **process protection, size of protected areas, elevation coverage, and habitat coverage**. We describe their importance and analyse the respective gaps in the following sub chapters. Certain aspects of the respective criteria overlap with others, as they all relate to the interconnected natural environment. We will therefore refer to these overlaps where necessary for the analysis, but still consider it important to single out each of these four criteria for clarity and methodological practicability.

Before doing so, we would like to underline the fact that the availability of data on spatial distribution of flora and fauna and their respective habitats for the Alpine arc, is, on the whole, insufficient. To conduct our analysis in the ideal manner those **data gaps** would need to be closed, but this is a long-term goal which would require an enormous effort by the Alpine countries and their respective research programs[1]. The problem is recognised and requires practitioners, decision-makers, scientists, and everybody else relying on such data to find alternatives and workarounds.

> *"Information on Alpine protected areas often does not meet the requirements of decision-makers, as large-scale, systematic surveys over longer periods of time with comparable results are only available in exceptional cases".*
>
> *(Gallaun et al. 2005, p. 5, translated from German)*

The fundamental problem that comes with this data gap, is that it is not generally possible to cut or overlay habitats and species distribution areas with protected area boundaries. There are only habitat mappings for a few species at different spatial levels that can in turn, be blended within GIS defined protected area boundaries. This lack of data concerns especially the analysis of habitat coverage in chapter D.3.1.4, as it relies most on such data. The other three analyses are far less affected, as other variables are at the base of their assessment.

Several systems of classification of areas with outstanding values in terms of biodiversity conservation exist and are considered in this analysis. Notwithstanding the aforementioned data gaps, we sourced as many relevant data sets as possible on species distribution and included those in our analyses as already mentioned on page 106.

D.3.1.1

PROCESS PROTECTION

Process protection is a very important part of the efforts towards habitat and biodiversity conservation. Process conservation can only occur in areas where human impact is (nearly) absent, and natural processes can develop without human interference. Those areas have a high value for biodiversity conservation and "can **significantly contribute to halting the loss of biodiversity**" (Kuiters et al. 2013, p. 7). According to Jedicke (1998), two prerequisites are necessary for the integration of conservation processes into conservation strategies: **sufficient size and prohibition of human impact**.

> *"Natural forest ecosystems are also home to significantly more endangered species, including jungle relics that rely heavily on a long habitat tradition and often require large amounts of high-quality deadwood. Some types, such as the pore fungus Antrodiella citrinella only occur in habitats with a dead wood volume of approx. 140 m³ per hectare. Such large amounts of deadwood can only develop in protected areas in which large-scale natural disturbances are permitted".*
>
> *(Braunisch 2015, translated from German)*

[1] A global approach is supported by several of the world's leading IT-companies to provide global data on biodiversity: https://www.greenbiz.com/article/microsoft-building-planetary-computer-protect-biodiversity.
This might be an interesting avenue to pursue in the future and could contribute to knowledge generation and management and thus finally to biodiversity conservation.

Generally, it can be stated that these conditions only exist in areas that are denominated as "strict nature reserves", "wilderness areas" (IUCN category Ia/b) or in core zones of National Parks (IUCN category II)[1]. Therefore, it is important to have a common understanding of what defines both: process protection and wilderness areas. On global and European levels there are several definitions, but, in general, they share a common basis of understanding. Below, we give a brief overview of several relevant and representative definitions.

Figure 11: Wild Europe Definition of Wilderness Areas

> *"A wilderness is an area governed by natural processes. It is composed of native habitats and species, and large enough for the effective ecological functioning of natural processes. It is unmodified or only slightly modified and without intrusive or extractive human activity, settlements, infrastructure, or visual disturbance".*

Source: (Wild Europe 2013, p. 10)

According to the 75% rule of IUCN (see chapter D.2.3), process conservation must be enabled on at least 75% of category II protected areas (usually National Parks). Within these areas, wilderness should be allowed in areas with the highest degree of naturalness (Nationalparks Austria 2018). Ideally, a time frame of 10 or, if necessary, 30 years is given to the National Parks in order to reach that goal.

This Wild Europe definition of wilderness *"builds on the existing IUCN Category Ib classification, adapting it to a European context".* It is widely accepted and used by government bodies and conservation organisation throughout Europe (e.g., Austrian National Parks Association, the German Federal government, the IUCN France National Committee, the European Wilderness Society).

In the quest to define a minimum size for wilderness areas that allows for natural processes to evolve, several factors have been integrated that go well beyond the simple and unique definition of the absolute size. The integrity of ecological processes differs between distinct habitats and ecosystem types. A forest ecosystem might need more surface than a wetland. Furthermore, zoning is an important factor to consider. If a buffer and/or transition zone is lacking, the actual size of the core zone of a wilderness area needs to be bigger than if these outer zones are appropriately sized, located and managed. Regarding the size, it is difficult to determine a standard minimum size as it really depends on the actual processes to be protected.

Nevertheless, there is a broad agreement that the absolute minimum size should be 1,000 ha Wilderness areas should *"be of sufficient size to protect biodiversity; to maintain ecological processes and ecosystem services; to maintain ecological refugia; to buffer against the impacts of climate change; and to maintain evolutionary processes". (Dudley 2013, p. 15)*

The general recommendations are, nevertheless, more ambitious and state that a wilderness zone with a buffer zone in place should have a minimum size of 3,000 ha, and one without a buffer zone should cover 8,000 ha. Ideally, the long-term goal should be a minimum size of 10,000 ha. (Wild Europe 2013)

In summary, a common delineation of a minimum size of wilderness zones does not exist. Instead, the definition depends on the ecosystems, and the EU states that *"Scale: Some Member States define the minimum size of strictly protected areas, …but most do not…Furthermore, the required size is relative, as the quality of the larger surrounding landscape must also be considered". (European Union 2013, p. 15-17)*

Table 13: Size Definition for Wilderness Area Zones

Core zone	Buffer zone	Transition zone
Minimum 3,000 ha is compulsory to gain a wilderness label, with an objective of 10,000 ha as an aspiration to be achieved wherever possible within a stated timescale. The area should be compact. Could have two or more cores if linked and with a plan for full amalgamation	Minimum size for total core plus buffer zones should aim to be not less than 8000 ha. If the core exceeds 8,000 hectares, the buffer is not needed. Ideally the combined core+ buffer zone area should be large enough to allow expansion of the core zone to an aspiration objective of at least 10,000 hectares	No minimum size but should aim to be at least a quarter of the total core/buffer/transition zone area. This zone is not 'compulsory', but highly recommended.

Source: (Wild Europe 2013, p. 8)

[1] For improved readability we will refer to these areas as wilderness areas in the following text.

Concerning the human activities taking place in wilderness areas, the Wilderness Society cites from the European Wilderness Quality Standard and Audit System and spells out the following activities that are banned from wilderness areas[1]:

- No Human extraction
- No hunting
- No logging
- No mineral collections
- No mining
- No deadwood collection
- No Human intervention
- No disease or alien species control
- No restoration measures
- Open ended undefined natural dynamic processes

The EU supports this definition and additionally gives some idea on the minimum size of wilderness areas in the following paragraph:

"Through certain management measures, wild areas can often be developed to wilderness, for instance by removing all forms of human interference and/or by interconnecting fragmented wild zones in an area by removal or bridging of ecological barriers. A minimum of 10,000 hectares for the core zone seems ecologically reasonable, allowing the effective ecological functioning of natural processes. The minimum size, however, will be dependent on ecosystem types involved and local geography". (Kuiters et al. 2013, p. 9)

Considering the described understanding of process protection and strict conservation measures, there are several general observations regarding the gaps in the Alpine protected area network. An observation that has already been made (Broggi et al. 1999) over the past 20 years is that most of the strictly protected areas are located at high elevations. The reasons for this are summed up most simply by saying the opportunity costs are lower an higher altitudes where competition for land-use is less (Broggi et al. 1999). On the other end of the altitude range, especially in low lying valleys, there are no large-scale protected areas with strict protection regulations throughout the Alps. At altitudes between 500m and 1,500m, there are very few protected areas covered by strict conservation measures.

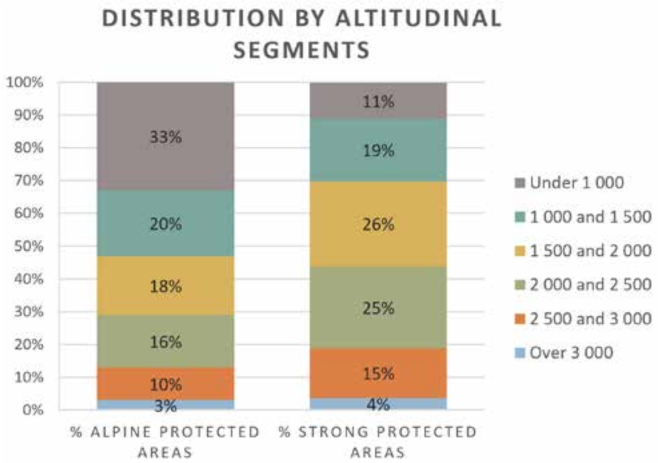
This means that only a subset of these natural processes is covered through the network of Alpine protected areas. The most striking example are the natural processes of rivers, which are in mostly absent in the Alps. Even 30 years ago, as little as 10% of the Alpine rivers were in a (near) natural state.

[1] https://wilderness-society.org/european-wilderness-definition/

Table 14: Surface km² by Altitudinal Segments Alpine Protected Areas and Strong Protected Areas

	Surface Km² Alpine Protected Areas	Surface Km² Strong protection
Under 1,000	17,916	2,082
1,000 and 1,500	11,093	3,435
1,500 and 2,000	9,550	4,776
2,000 and 2,500	8,778	4,582
2,500 and 3,000	5,535	2,851
Over 3,000	1,484	698
Total	**54,356**	**18,425**

Figure 12: Distribution of Alpine Protected Areas and Strong Protected Areas by Altitudinal Segments



Thus, the riverine biotic and abiotic natural processes are thus largely disturbed in the Alps. Since the Alpine valleys are not covered by strict conservation measures, the natural processes of riverine ecosystems, like meandering, can be classified as a **gap** in the Alpine protected area network. Furthermore, the natural processes in connection with wetlands, bogs and aquatic systems are all underrepresented within the network of Alpine protected areas.

Another ecosystem whose natural processes are inadequately conserved through protected areas are forests. Forest ecosystems need quite large areas for their inherent natural processes to develop freely. Whereas some of the coniferous forests are covered through strict, large-scale conservation measures, most deciduous forests are not. This is the **second main gap** in the Alpine protected area network regarding process protection. Generally speaking, natural processes that require large areas are not given the space they would need, and so large-scale ecological processes are thus often disturbed and cannot develop the necessary basis for efficient habitat and biodiversity protection.

Map 20: Forest Categories in the EUSALP Space

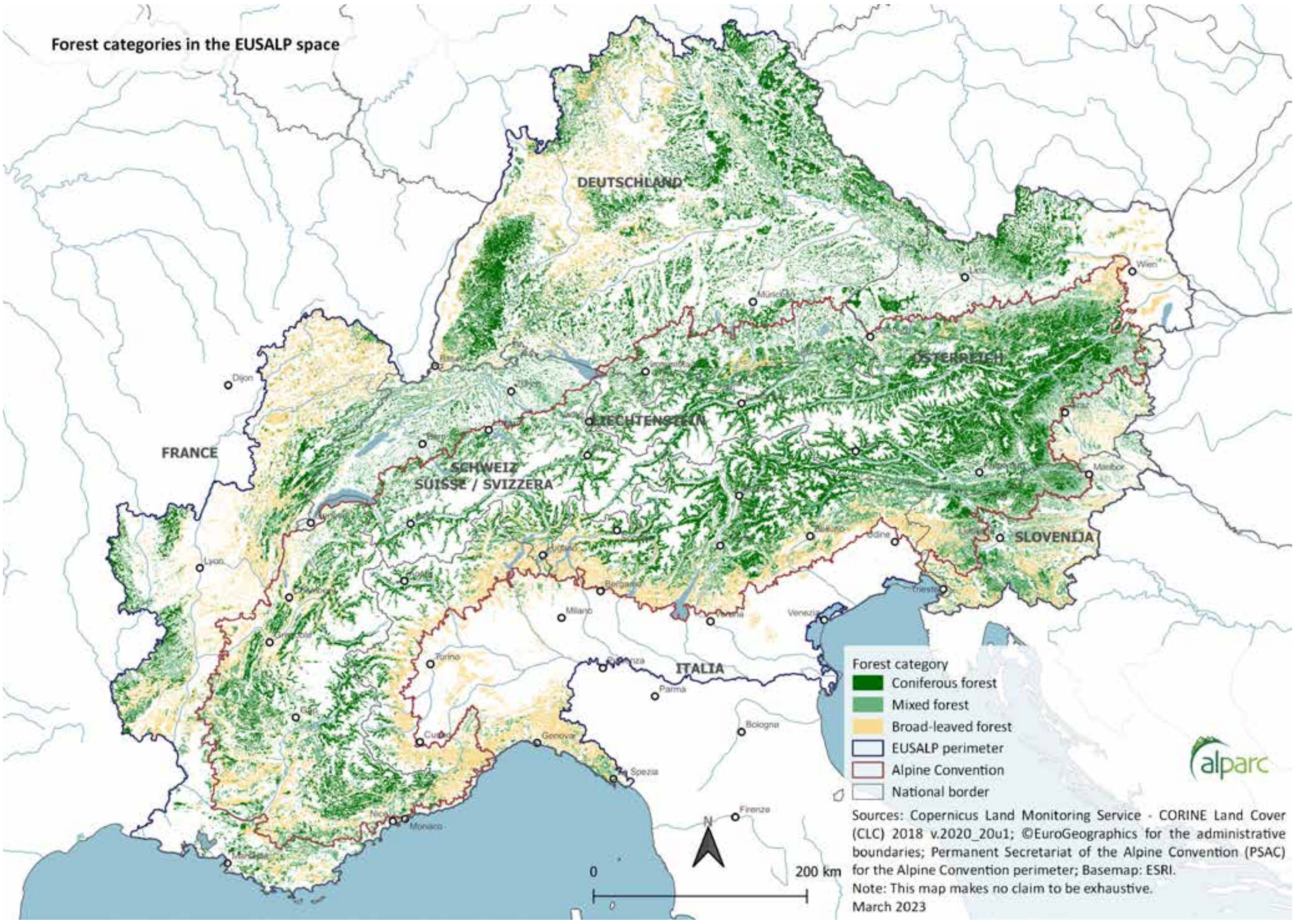


Table 15: Accumulated Forest Size Categories Within the EUSALP Perimeter

Forest category	Total area (km²)	Within protected area*	Protected (%)
Broad-leaved forest	51,043	14,243	27.9%
Coniferous forest	72,189	22,758	31.5%
Mixed forest	40,753	12,700	31.2%

**The forest surface inside a nationally designated area inside the EUSALP perimeter*

The size of wilderness areas across the Alpine arc are very small. The Map 21 gives an overview and shows the distribution of these areas concerning mainly the core zones of IUCN category II (National Parks) and category Ia/b protected areas. They demonstrate that current protection of natural processes is unsatisfactory, even though, compared to many other areas in Europe, the presence of wilderness areas in the Alps is relatively high.

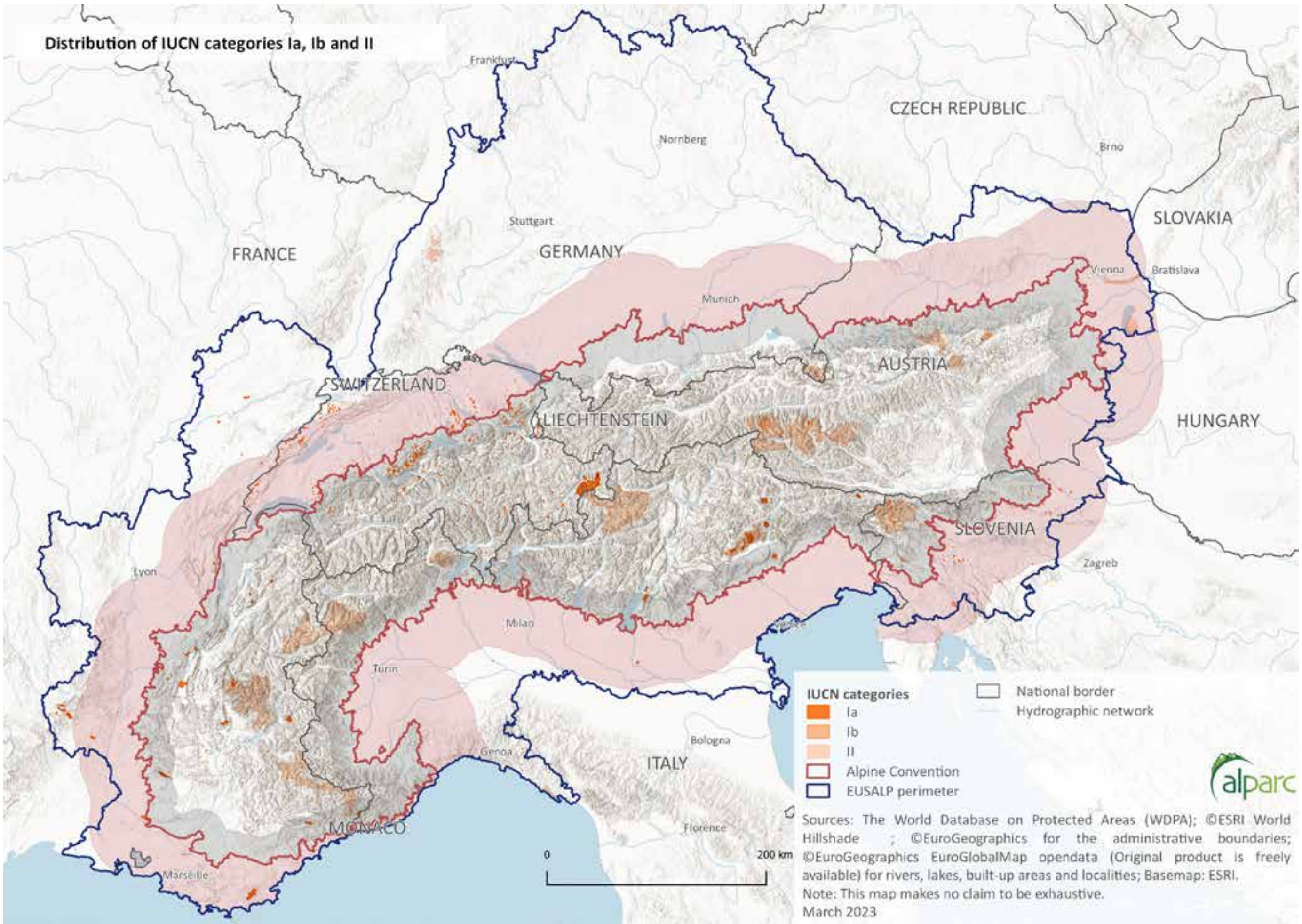
"A 'wilderness map' for Europe has been published by EEA (2010). This map was based on the work of the University of Leeds and used a set of criteria linked to remoteness and naturalness. The maps show that the ***highest values of wilderness index may be found in the Boreal and Alpine regions****, and to some extent in the Mediterranean region. Smaller and more isolated areas may also occur in other areas of Europe". (European Union 2013, p. 17)*

Table 16: Distribution of the IUCN Categories Ia, Ib and II Within the Perimeter of the Alpine Convention Based on the World Database on Protected Areas

IUCN Category	% Distribution of each category within the total surface covered by Ia, Ib and II
Ia	6.6%
Ib	2.1%
II	94.9%

**The result corresponds to the proportion between the surface of the category over the total surface covered by the three selected categories, as there is overlay between the categories, the aggregation of the three proportion will exceed 100%*

Map 21: Distribution of IUCN Categories Ia, Ib and II



The tables below show that the percentage of surface covered by strong protections measures within the Alpine Convention perimeter is rather small. The number of category Ia/b protected areas with a surface of over 3,000 ha[1] is particularly limited, as only six protected areas fall into this class, covering around 39,000 ha or **0.4%** of the Alpine Convention. If we consider the core zones of the existing IUCN category II areas, there are an additional 12 protected areas (Alpine National Parks) to include, which cover a significantly larger area. It is important to recognise that process protection is not guaranteed on all the surface of these areas. Nevertheless, if we consider the core areas of the alpine National Parks with the goal of 75% of their total territory which is currently not always achieved, we could conclude on an additional surface where natural processes can take place of around 820,000 hectares (if all National Parks will achieve this IUCN rule within the next decade). This would mean that between 4.2 and 4.3% of the alpine territory according to the Alpine Convention perimeter could be considered as strong protected areas.

Table 17: Accumulated Size of the IUCN Categories Ia, Ib, II, III, and a Selection of IV Within the Perimeter of the Alpine Convention Based on the World Database on Protected Areas

IUCN Category	Surface Km²	% Alpine Convention
Ia	514	0.3%
Ib	164	0.1%
II	7,526	3.9%
III	139	0.1%
IV	12,046	6.3%
Weighted surface according to over-laps (redundancies between PAs)*	**19,900**	**10.4%**

IUCN protected areas categories with the strongest protection

[1] Please see the descriptions and definitions given above and especially in Table 13 for the recommended minimum size of wild areas.

In a more detailed analysis of the surfaces covered by each category, the number of protected areas under the IUCN category IV is greater and much more variated on the subcategories (at least 26). Followed by the areas categorized as Ia and at least 1/3 of the surface covered by this category is explained by the presence of the Swiss National Park and as shown on Table 18, most of the areas under this category present a surface under 100 ha.

The areas under the IUCN category Ib have the lowest number and the smallest surface covered among the selected categories, these areas are located in Slovenia, Liechtenstein and Austria.

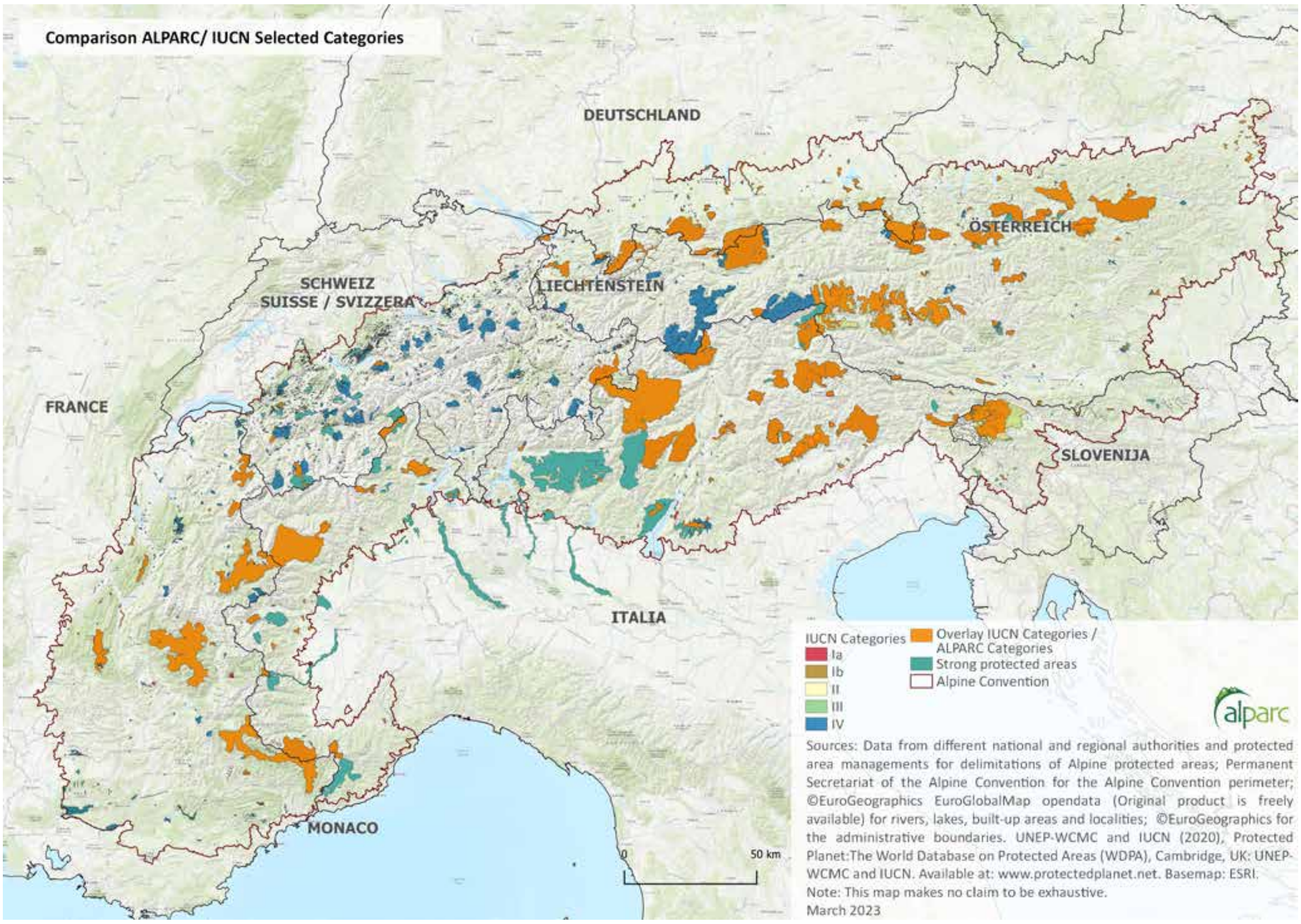
The National Parks under category II have the largest coverage among the selection, the representativity of core zones of National Parks compared with the surface of the perimeter of protection of the Alpine Convention allows to evidence the importance of the instauration of large protected areas that even being less numerous are essential for ecological continuity.

Table 18: Surface Partition of IUCN Categories Ia, Ib, II, III, and IV Protected Areas Within the Perimeter of the Alpine Convention Based on the World Database on Protected Areas

IUCN Category	All categories	Surface <= 100 Ha	Surface 100 - 10.000 Ha	Surface > 10.000 Ha
Ia	434	394	39	1
Ib	30	18	12	
II	12			12
III	260	234	26	
IV	4,564	4,128	412	24
Total Ia/ Ib, II, III and IV	**5,300**	**4,774**	**489**	**37**

A comparison between the coverage of the ALPARC strong protection selection (Italian Nature / Regional park, Nature reserves and National Parks) and the selection of the IUCN categories (Ia/Ib, II, III and IV) allow to evidence the similarities of both concepts in most of the categories, the differences are explained on one hand of the selection

Map 22: Comparison ALPARC/ IUCN Selected Categories



of the Italian Nature / Regional parks which includes some of the spaces classified under the category IV in Italy but excludes some spaces from this category located inside regional parks from other countries, on the other hand, the differentiation is related with some of the subcategories included on the IUCN – IV Habitat/Species Management Area, specifically the Hunting Reserves (National and Federal) and the Rest areas that are not compatible with the three categories included in the ALPARC concept.

Table 19: Comparison ALPARC/ IUCN Selected Categories

	IUCN		ALPARC
IUCN Category	**Surface Km² inside AC**	**Surface Km² inside AC**[1]	**Strong protected areas Km² inside AC**
Ia	514	514	
Ib	164	164	
II	7,526	7,526	
III	139	139	
IV	12,046	9,313	
Weighted surface according to over-laps (redundancies between PAs)*	**19,900**	**17,736**	**18,425**
Coverage over CA	**10.4%**	**9.3%**	**9.7%**

According to the definition in the German National Biodiversity Strategy - to take a concrete example of strategies of strong protected areas - wilderness zones should comprise at least 1,000 ha in mountain regions, preferably 3,000 ha. After 10 years, 30 years in exceptional cases, there should be no further human interference with natural processes. This time span is considered necessary to bring the ecosystems to a good starting point to allow for natural processes to develop appropriately. The definition is aligned with IUCN category Ib and the definition of the Wild Europe Initiative as described above. Most of Germany's wilderness areas are found within National Parks or other protected areas.

"Irrespective of this, all core zones of National Parks and large, contiguous core zones of biosphere reserves are classified as wilderness areas within the meaning of the NBS [National Biodiversity Strategy]. Particularly large wilderness areas in the sense of "wilderness areas" should not fall below the size of 3,000 ha recommended by the Wild Europe Initiative".

Translated by the author (BfN 2018)

"Wilderness areas in the sense of the NBS are sufficiently large, (predominantly) non-fragmented areas free of intrusive or extractive human activity. They serve to permanently provide for the ecological functioning of natural processes without human interference".

(Finck et al. 2013, p. 343)

Across the Alps, there are several national strategies for wilderness areas as listed below.

- Austria and Germany: 2% national target in their National Biodiversity Strategies. Germany also has a 5% forest wilderness target.
- France: in 2012 a specialist Wilderness Group was established, within the IUCN National Committee, to assess potential for a wilderness strategy. The national strategy for protected areas 2030 establishes a target of 10% of the territory under a strong protection category[2] *"(nature reserves, National Park core areas, biological reserves, areas under protection orders)" by 2022. (Ministère de la Transition écologique 2021)*

[1] The Hunting reserves (National and Federal) and the Rest areas are not comparable with the Strong Protected Areas categories of the ALPARC database and other protection designations included on the IUCN category IV. In order to ensure consistency with our concept of Strong Protection for the Alps, we will exclude the categories mentioned in the analyses elaborated in chapter 4 where the IUCN category IV is included.

[2] https://www.ecologie.gouv.fr/sites/default/files/DP_Biotope_Ministere_strat-aires-protegees_210111_5_GSA.pdf

D.3.1.2

SIZE OF THE PROTECTED AREAS

The size of protected areas plays an important role in the protection of habitats, ecosystems, ecological processes, and thus biodiversity. In general, the larger the area, the higher the number of species and individuals and of natural processes taking place. The smaller the area, the bigger the risk of impact from negative external influences, including insular phenomena that undermine genetic exchange. In the long run, species protection will be undermined by inadequate, unconnected protected areas for many animal and plant species (Broggi et al. 1999, p. 80-81). It is also important to establish buffer zones to reduce the boundary effects and to form bridgeheads for migration corridors and ecological connectivity.

Natural processes are particularly dependent on sufficient size of the PAs on order to function properly. If the size is too small, there is also the danger that settlements, infrastructure or other anthropogenic facilities will be damaged if the processes are allowed to run free (erosion, landslides, pest infestation, etc.). For existing internationally proposed standards and more detailed analysis of the relation between the size of protected areas and natural processes please refer to the previous chapter D.3.1.1.

The size of a given protected area should always be seen relative to the habitats, ecosystems, or species to be protected. Whereas there are no general standards for absolute size, the minimal territorial requirements for many species are known. For example, the lynx needs between 10,000 to 45,000 ha and a pair of golden eagles 2,000 to 10,000 ha (Haller 1991).

It is also important to underline the fact that the size of a protected area must always be seen in relation to its connections with other natural spaces. To a certain extent, it can be stated that no matter how large a protected area is, as an island it will not be able to meet all needs for all species or for genetic exchange. Therefore, connectivity and the state of the adjacent lands play an important role in relation to protected area size.

Large, protected areas can thus be considered the centrepieces for conservation, and, for those with strict conservation regulations, places where natural processes can freely develop and where many species can find a safe haven to live, breed and reproduce. Nevertheless, small and very small protected areas (as well as other effective area-based conservation measures and Green Infrastructure) play an important role in ecological connectivity. They can ensure stepping-stones to create a network that links the larger areas and thereby provides a significant contribution to the preservation of biodiversity and habitats. We will not go further into details here as the whole chapter 3 is dedicated to this topic.

In the Alps, it is important to understand that there is high pressure from competing land-uses on the protected area system. It is, therefore, difficult to establish or significantly extend large-scale protected areas. This results in gaps within the network of Alpine protected areas related to their size. On the whole, especially at lower altitudes and in the valleys, the protected areas size tend to be rather small. Additionally, the strictness of the conservation measures tends to be less in these areas. The reduced size is due to two main factors:

1. The presence of human infrastructure for housing, industrial use and transport reduces the available space for protected areas.
2. The same is true for agricultural lands, which are predominantly concentrated in the flat valleys. More details on the elevation distribution of protected areas will be given in the next subchapter.

Regarding the distribution of large protected areas with strict conservation regimes, the western Alps are better covered than the rest. The three French National Parks (together covering 2,137 km^2) and the Italian Gran Paradiso National Park (710 km^2) cover a large part of the western Alps. In the central Alps, the only large-scale area with strict conservation measures is the complex of Stelvio/Stilfersjoch National Park (the second largest National Park in the Alps with 1,301 km^2) and the Swiss National Park (171 km^2), which shares the north-western or south-eastern boundary. Triglav National Park (552 km^2) in Slovenia represents the largest of its kind in the eastern Alps with a compact shape. Hohe Tauern National Park is one of the largest in the Alps with nearly 1,856 km^2 (Nationalpark Hohe Tauern 2019), but its shape is rather segmented and, in some parts, fragmented. The northern Alps are particularly lacking in National Parks with only three small areas, Berchtesgaden National Park in Germany (210 km^2), Kalkalpen National Park (208 km^2) and Gesäuse National Park (110 km^2) in Austria. In conclusion, the protection of important habitats and processes that depend on sufficiently large areas is in jeopardy.

D.3.1.3

ELEVATION COVERAGE

One of the most critical points for the gap analysis is the protected area coverage of the different altitude levels in the Alps discussed in the two previous subchapters, because both process protection and the size of protected areas are strongly correlated to altitude levels. Some further description and analysis are, nonetheless, necessary. In general, the higher the altitude the higher the percentage of stricter conservation regulations. At lower altitudes, the coverage of protected areas is generally less, and these protected areas are subject to less stringent conservation regulations, such as (regional) nature parks (equivalent to IUCN category V)[1]. If we talk about higher altitudes, the reference in the literature is often set at 1,500 m a.s.l. The coverage of National Parks is significantly higher above 2,000 m. For most protected area categories, it has been shown that the altitudes above 1,500 m are well represented while the areas below are underrepresented. At this altitude, the habitats are already very limited and are composed mostly of Alpine meadows or rocky areas bare of significant vegetation cover.

The most obvious reason behind the described distribution of protected areas is the simple fact that most human activities, including living, transportation, agriculture and industry and the related infrastructure, are concentrated at the lower altitudes and especially in the Alpine valleys. The unequal distribution of protected areas and the fact that protected areas are more likely to be established in certain kind of areas than others is not specific to the Alps but is a phenomenon that can be observed on a global scale. *"Indeed, in general, terrestrial protected areas have tended historically to be biased toward higher elevations, steeper slopes, and lands of lower productivity, lower economic worth, and low human density e.g. (Armesto et al. 1998), (Cantú et al. 2004), and toward boundaries between geopolitical units (increasingly providing the basis for transboundary or transfrontier protected areas). Recent and proposed additions may often lessen such biases, but they nonetheless remain". (Gaston et al. 2008)*

The uneven distribution of the protected areas is problematic as the representation of the different altitude levels would be crucial for inclusion of the habit range of many species, especially regarding seasonal movement patterns. The altitude plays a special role for the habitats in the Alps as it has a fundamental influence on all ecological processes via the climatic gradient.

It is, nevertheless, important to note that, at the same altitude, mesoclimatic conditions and consequently floristic and faunistic habitats vary significantly throughout the Alps. There are important differences according to the different zones of the Alps: north, south, east, west, central, marginal, exposure, etc. An emblematic representation of these differences is the climatic timberline, which fluctuates between 1,800 m and 2,400 m a.s.l. Generally, one can distinguish three basic categories of the Alpine environment: the linear structures of the valleys, the forest belt and the insular structures of the high-Alpine ecosystems. Overall, one can distinguish six levels of vegetation: colline, montane, sub-alpine, alpine, sub-nival, and nival. These levels have clear definitions and can usually be easily recognised in the landscape by the presence or absence of certain tree species or trees in general (Broggi et al. 1999, p. 69-77; Bätzing 2005). These spatial differences must be considered when evaluating protected area coverage.

The coverage of lower altitudes with protected areas of less strict protection is generally more important. The fact that the protection status is less strict leads to reduced or ineffective protection of biodiversity. This is especially true for the regional parks and protected landscapes without a clear nature protection mission and without a specific regulation towards this objective.

[1] This phenomenon is also observed in other world regions (e.g., UNEP-WCMW 2005, p. 43-44).

D.3.1.4

HABITAT COVERAGE

Habitat coverage of protected areas is a fundamental prerequisite for species and ecosystem protection. It is important that the spatial habitat coverage of the protected area system be fairly extensive to assure long-term conservation goals.

One problem with the analysis of habitat coverage of protected areas is the availability of data as described at the beginning of this chapter. There is no Alpine-wide, comprehensive system of habitat mapping. The lists foreseen in the Alpine Convention, providing information on critical species and habitats, have not yet been submitted by the contracting parties[1] We did not address certain existing concepts, such as the target species concept, because there is too much inconsistency in the choice of the target species and the availability of relevant data (Laubhann et al. 2010).

Therefore, it was decided to base the analysis of habitats on land use and landcover data. This includes the major habitat classes in the Alps or, more generally, in mountainous regions. The table below shows the identified habitat types as well as their area coverage in general and in protected areas.

Table 20: Habitat Types and their Distribution in the Alpine Arc

Habitat type	Total area (km²)	Within protected area	Protected (%)
Snow, ice and rock	29,747	15,572	52%
Alpine and meadows	18,236	7,172	39%
Conifer forests	42,719	11,757	28%
Broadleaf forests	12,973	4,990	38%
Steppe and scrub	13,433	5,839	43%
Freshwater	1,140	407	36%
Wetlands	238	101	42%
Cultivated and artificial habitats (incl. agricultural land)	33,935	8,012	24%
Mixed forest*	20,440	6,444	32%

**The mixed forest category is an additional category to the referenced habitat types categories.*

Source: Habitat types have been taken from (Broggi et al. 1999, p. 69-77; Bätzing 2005), the calculation is based on Copernicus Landcover data.

Habitats rely in many ways on the factors discussed in the previous subchapters; they depend on functioning natural processes, which, in turn, depend on adequate undisturbed surface and the inclusion of all necessary altitude levels.

We used a range of datasets for habitat coverage for single species (conservation targets) and on an aggregated level. The former was identified through a scientifically sound selection process mainly ensured by the project ECONNECT[2] (2011). The latter comprise aggregated data from multiple sources, compiled by international organisations and institutions, identifying areas of elevated importance for biological conservation. Those include (as mentioned before):

- Key Biodiversity Areas
- Important Bird Areas
- IUCN Red List of threatened species
- Corine Landcover Data

The data from the IUCN Red List of threatened species for the Alps is far from exhaustive. We examined the species of vertebrates and amphibians. Only a few species are included that help to identify gaps in the coverage of their habitats.

It was, nevertheless, possible to identify several larger habitat types that are not sufficiently represented or protected through the existing network of Alpine protected areas. Here again, this stems from the combination of the geographical and altitudinal distribution of protected areas and the grade of conservation regulations defining the different protected area categories.

The habitat types less well covered by protected areas or any kind of management measures, which also lack scientific research and knowledge, are to be found in the lower altitudes of the Alpine arc. These include wetlands, bogs, and aquatic systems, but also certain types of forest ecosystems, mainly those dominated by deciduous tree species. The reasons probably relate to their proximity to settlements and infrastructure. For some of these "low land areas" of the Alps. there may be compelling reasons safeguard ecological and nature protection in the future in order to ensure ecological processes and a sufficiently diverse habitat mosaic of Alpine nature. Previously abandoned areas of the Alps that are no longer economically interesting for human activities may provide an opportunity in this regard.

[1] Article 14(2) of the Alpine Convention: "Within two years of the entry into force of this Protocol, the Contracting Parties shall designate for the establishment of Alpine lists those species for which special protective measures are necessary because of their specific risk".

[2] http://www.econnectproject.eu/cms/

D.3.2

PROTECTED AREA MANAGEMENT CRITERIA

Protected area objectives and the level of protected area management are fundamental factors for the conservation of functioning ecosystems. An adapted management of protected areas is crucial for biodiversity and ecological processes.

Having presented and analysed the biological criteria of the Alpine protected areas in the previous chapters, we now analyse the protected area management criteria of the network. This chapter will divide management into several sub-topics which will be then analysed as described in chapter D.1.2.2 on the methodology.

> *"The other set of information needed to carry out the gap analysis is the current extent and location of protected areas. Ideally, three pieces of information are helpful:*
>
> *Distribution: the existence of a protected area network (ideally maps of the location, area and boundaries of all protected areas, including federal, state, municipal and private protected areas).*
>
> *Protection status: the management objectives of these areas as indicated by the IUCN management categories.*
>
> *Management effectiveness status: the effectiveness of management of protected areas".*
>
> *(Dudley and Parrish 2006, p. 46)*
>
> *"Within point 2 (protection status), three key issues are crucial to evaluate:*
>
> - *Management objectives*
> - *Governance regimes*
> - *Management effectiveness and performance".*
>
> *(Dudley and Parrish 2006, p. 48)*

Of the three pieces of information considered helpful to analyse a gap analysis quoted in the table above, the first, distribution, has already been dealt with in the previous chapters on biological criteria. What interests us most in this chapter is the second point, the protection status linked to the management objectives. According to the work of Dudley and Parrish (2006), there are three key issues that need our attention to best capture existing gaps in the network of Alpine protected areas: **the management objectives, the government regimes and the management effectiveness and performance of the protected area categories**.

Therefore, our report uses these three key elements for our analysis. We will also discuss the integration of the different protected area categories into their surrounding landscapes in terms of natural environment but, more importantly, into the administrative and socio-economic environment.

D.3.2.1

MANAGEMENT OBJECTIVES

Management measures for a given area are usually directly linked to the protected area category and the respective management zones. Therefore, it is helpful to have clear definitions of both, categories, and management zones. Unfortunately, this is not always the case, and, even within one country and within one protected area category, the designation and management objectives for a given zone can differ significantly (Gehrlein et al. 2015).

Throughout the Alps there are several categories whose primary management objective is the conservation of biodiversity and habitats. These include all areas listed under IUCN categories Ia/b, II and III, and other areas, such as the core zones of the biosphere reserves or the Natura 2000 sites[1]. All these types of protected areas have a legal mandate and the related tools to enforce conservation measures. This is a significant difference to other types of protected areas. In protected areas of IUCN categories Ia/b, the main management objective is to allow for natural processes to take place over the entire area. Other objectives, such as research or recreation are complementary and subordinate objectives. This is coherent across the Alpine arc.

When it comes to IUCN category II, protected areas (e.g., all National Parks except for the Swiss National Park, which is part of IUCN category Ia) this objective

[1] Those areas are, in most cases, congruent with otherwise designated protected areas.

of natural processes remains the primary objective. But two major differences exist in comparison with the Ia/b protected areas. Firstly, the free development of natural processes is allowed only on a certain percentage of the area covered. Some of the National Parks have met the IUCN recommendation of 75% of their area while others are still on track to reach that minimal limit.

Secondly, other objectives are becoming increasingly important. These include education, recreation and often integration into the regional economy, mostly through tourism and the promotion of regional artisanal products, often linked to sustainable agriculture and extensive livestock husbandry. These objectives are shared by all National Parks even though their relative importance varies between the different parks. Generally, these objectives are becoming increasingly important to justify the existence of the parks ("alibi function"). Conscientious management of these activities is time-consuming, but it helps to increase awareness about the importance, the functioning, and the threats to biodiversity and initial acceptance by the local population.

These protected areas (category Ia, Ib and II) are thus the most important and interesting for the actual protection of biodiversity and habitats. And yet, the protected areas that fall into these categories cover only a small percentage of the Alpine territory. As shown in Table 17, no more than 4.2% of the surface of the Alpine Convention is covered with this kind of protected area. The most significant gap that we could identify is that IUCN category Ia/b protected areas are few and are seldom large enough to ensure the viability of natural processes. Only six protected areas of these categories are larger than 3,000 ha, and of these only the Swiss National Park is larger than 10,000 ha. This is partially made up by the figures on National Parks that help to provide space for the free development of natural processes.

In other protected areas, such as numerous regional parks in the Alps, conservation of biodiversity and habitats is only a secondary objective or at best on the same level than other management goals. Sustainable regional socio-economic development, often by means of touristic development, is usually the main intention of these areas. Thus, the parks are often seen and managed as an engine for regional development. It is, nevertheless, important that these areas are designated as protected areas and have a higher consideration for conservation measures than areas without any status. They must be seen as complementary to the protected areas described above. Their objectives do not include the protection of natural processes at large scale, but usually include the "preservation of the natural heritage" and cultural landscapes, which is a relatively vague expression.

D.3.2.2

GOVERNANCE REGIMES

Governance is a main factor influencing the efficiency and effectiveness of protected area management and thus the achievement of the set objectives. The choice of the right governance regime determines, to a certain extent, if biodiversity and habitats can be protected and if the stakeholders are on board or if they choose to oppose park management.

The governance types and thus the ownership of the protected areas can be classified into four categories as proposed by IUCN (see Figure 13 below).

Inclusive and participative governance structures are important because they incorporate local authorities and populations. This strengthens the acceptance of protected areas and includes local knowledge. Nevertheless, the design must be carefully chosen in order not to hinder management processes through ineffective approaches and tedious procedures (Simmen and Walter 2007).

While most of the protected areas considered in this analysis are administered by government (and hence belong to the first category in the table below), one major issue regarding the governance structures of the Alpine protected areas is the heterogeneity of protected area classification and management structures as well as the varied objectives. This makes it difficult to compare protection measures and effectiveness on the Alpine level and thus hinders the development of a coordinated conservation approach (Broggi et al. 2017).

Nonetheless, it is important to consider all four forms of governance to build a strong, representative, and resilient protected area system. The integration of other governance types can thus be considered a chance to improve the general conservation effects of Alpine protected areas.

Figure 13: Governance Types According to IUCN

- Governance by government (at various levels)
- Shared governance (i.e., governance by various rightsholders and stakeholders together)
- Governance by private individuals and organisations
- Governance by indigenous peoples and/or local communities

Source: (Borrini et al. 2013; Worboys et al. 2015, p. 180)

In some countries, other governance regimes do exist and include government owned land, private proprietorship, and associations. Some parks are co-owned while others are completely under one tenure. Shared ownership can lead to conflicting interests between the parties, which might turn into management problems and sub-ideal conservation (BfN 2013, p. 31).

The concept of PA governance is evolving steadily, but nevertheless lags behind the evolving social and ecological realities. Jungmeier developed the concept of parks of a third generation, parks 3.0 (Jungmeier 2014). For more details on the differences between the three generations of protected areas please refer to Table 31, p. 312.

"From the results, the author draws the conclusion that PAs, stringently put into the context of sustainable development, form a "third generation" of PAs. The most important and distinctive elements of this new generation are the new mechanisms of steering and governing, an increasing number of scientific disciplines and a new understanding of the socio-sphere in the eco-sphere. The management has increased in complexity and thus requires particular personal and technical competencies". (Jungmeier 2014)

The focus of protected area management appears to be diffusing. While the actual aim of protecting biodiversity still prevails, the socio-economic benefits and the positioning of the protected areas as touristic destinations is gaining ground and taking up evermore resources (money, time, people, etc.) of the park management (Scheurer 2019). While it is generally a positive development, park management must be careful not to overstretch the scarce resources available.

In order to strengthen local populations', share of governance in protected areas including UNESCO biosphere reserves, several procedures have been developed may dating back to the 1980's. While Alpine National Parks allow participation of locals via formal institutional bodies of the park, such as diverse "councils" (scientific, planning, landowner etc.), other protected areas, especially regional nature parks and sometimes biosphere reserves, aim for greater involvement of local populations. Sometimes this is accomplished by having them participate during the establishment of the protected area (France, Austria, Switzerland) and in some cases even by letting the local population decide whether the park should be created or not (Switzerland).

Increasingly, stronger governance of the common territory and its resources is considered as a fundamental in modern protected area management in the Alpine arch. Nevertheless, it still depends on different political systems (federal or central) in the Alpine states and the understanding of local democracy and its consequences in the management and conservation of biodiversity.

Figure 14: Reasons for the Importance of Governance

- **Governance is the variable with greatest potential to affect coverage**. In many cases, it is only by addressing issues of governance that countries will be able to expand the coverage of their protected areas and "other effective area-based conservation measures" to meet Aichi Biodiversity Target 11 of the CBD Strategic Plan 2011-2020.
- **Governance is a main factor in determining the effectiveness and efficiency of management.** Because of this, it is of great interest to governments, funding agencies, regulatory bodies and society in general.
- **Governance is a determinant of appropriateness and equity of decisions.** Improving governance can help to maximise the ecological, social, economic and cultural benefits of protected areas without incurring unnecessary costs or causing harm.
- **Governance can ensure that protected areas are better embedded in society.** Governance arrangements that fit their context nourish linkages to the wider landscape/seascape and help to make sure that protected areas are considered in broader decision-making.
- CBD Parties have agreed to **report about governance of protected areas as part of their obligations under the Convention on Biological Diversity** (CBD). Indeed, this very document was requested by the CBD Secretariat to help Parties monitor their own progress.
- **Governance can be improved and provide precious help in facing ongoing challenges and global change.** Far from being immutable, the institutions and rules governing protected areas must be dynamic and adaptive in response to existing challenges and global change. Processes of "adaptive governance" should be cautious and well-informed, but also visionary. This is what this document strives to promote.

Source: (Borrini et al. 2013)

D.3.2.2.1

LEGAL AND ADMINISTRATIVE FRAMEWORK

The legal and administrative frameworks for protected areas differ substantially between the Alpine countries and the respective protected area categories. As shown in chapter 1, it is an enormous challenge to try to compare them, and it is a daunting task to try to harmonise such a diverse legal environment. The questions that are the most relevant for our analysis are the legal provisions for protected area management, including governance regimes and its integration into other, more sectoral policies with impact on land-use as well as the integration of protected area management into administrative procedures and implementation.

We take here only the example of some of the Alpine National Parks. The situation of the legal and administrative framework for regional parks and other protected areas differ even more according to the Alpine countries. Please refer to chapter 1 for a more substantial description of the various situations.

One difference that impacts the legal provisions is the level of governmental responsibility. In Austria, there is no national legislation on protected area governance, but the Federal States are in charge of providing the legal framework. What exists on federal level is an umbrella organisation called "National Parks Austria". It provides concepts fixing general principles for National Park management on a national level: Austrian strategy for National Parks 2020+, guiding principles on research and hoofed game management, position papers on wilderness and process protection, bark beetle management and on National Parks and renewable energies.[1]

In France, there is a national law on protected areas, which was comprehensively revised in 2006 and includes regulations for National Parks and regional nature parks. There is also a new strategy on French protected areas 2020-2030[2] that is taken into account in this report but which touches more on the other topics of protected area management and less on the legal and administrative framework. An important element is that the park managers should be more involved in other sectoral policies with an impact on land-use.

In terms of management planning a large variety of approaches exists and these vary significantly between the different types of protected areas and between countries.

National Parks often come with a general management plan and/or with several more specific management plans, e.g., for wildlife, monitoring or tourism management. Nevertheless, not all Alpine National Parks have this kind of documentation, as do French National Parks, for example, which work on the basis of Chartas (Charte Ecrins NP). These documents function similarly to management plans and provide information on management activities and restrictions of use in the respective zones. These plans include the three zones of French National Parks: core zone (le cœur du parc), accession zone (zone d'adhésion) and wilderness areas (réserve intégrale) which may lay within the core zone). (Guillebon 2016)

The legislation within the core zone is legally binding for this sector, whereas the membership of the communes located within the buffer zone is voluntary. Once a community has officially signed the Charta, it automatically adheres to its values, principles, orientations and can chose to commit to contractual measures. The Charta is not legally binding though. In certain aspects, the Charta goes beyond the scope of management plans as it contains orientation for sustainable development of the buffer zone, and thus encourages sustainable forms of development beyond the core zone of the park.

The basic idea is to create a more participative approach to the management and governance of the National Parks through contractual inclusion of diverse stakeholders. For the communes, the agreement offers the advantages of access to financial and technical assistance from the park and to work on common projects between the park and the other participation communes. The Charta is valid for 15 years, and, after 12 years, a consultative process of revision is triggered the final three years.

"But the main part concerns the accession zone and consists of guidelines and contractual measures. It is a "field of possibilities" to which each municipality will be able to contribute actively by choosing its priorities and establishing a work programme with the Park. A sort of "à la carte" charter". (PN Vanoise)

One particularity of two of the Alpine National Parks, Hohe Tauern (AT) and Stelvio (IT) National Parks, is that they are spread over three provinces with separate management authorities. While it is good to have the parks spread across regional boundaries, it also entails challenges like transboundary management across national borders.

Finally, one strength of the Alpine protected areas is that they share a common framework that helps them to foster cooperation across political and administrative boundaries. (Vasilijević et al. 2015, p. 40)

[1] https://www.nationalparksaustria.at/de/pages/downloads-40.aspx#470

[2] Stratégie nationale pour les aires protégées 2030, January 2021 (https://www.ecologie.gouv.fr/sites/default/files/DP_Biotope_Ministere_strat-aires-protegees_210111_5_GSA.pdf).

Other forms of protected areas usually do not have management plans in the strict sense of the term but single legal arrangements or more general strategies.

D.3.2.2.2

FINANCIAL AND OTHER RESOURCES

Financial and other resources are at the base of all implementations of protected area management. These other resources include, firstly, human resources, the people working for the protected areas. This also includes their training and continuous management. Other resources encompass the material necessary for daily work in the offices and in the field, time and money for research activities, public relations, education, and touristic development.

Concerning human resources, it is important to have a motivated and well-trained staff. This is true for all jobs in the parks, in the offices and in the field. In order to maintain motivated staff, several aspects must be considered:

- Appropriate salaries
- Appreciation of their work
- Possibilities to evolve within the park
- Continuing training and capacity building
- Appropriate equipment
- Political support

> *"The capacity to manage is the product of willingness, competence, skills, capability, and adequate resources". Qualified, competent, and committed staff are central to the success of protected areas. It is therefore not surprising that strengthening the capacity of protected area agencies and the individuals working in them has become one of the priorities in the development of PA systems over the last decade.*
>
> *(Kopylova et al. 2011, p. 1)*

The features listed above are essential for the staff to feel motivated to fulfil their tasks. But even if not all items on that 'wish-list' can be always guaranteed to all staff members, it is important to strive for this ideal. We will not go into details for all the points as they are practically self-explanatory but will pick a few to comment on in more detail.

Providing staff with the possibilities to access continuing training and capacity building has become an essential part of protected area management. The specific needs for the respective protected area categories must be considered. The training should then be tailored to the identified and anticipated needs. In the Alpine context, such capacity building measures should be adapted to the specific natural and cultural framework. The need for ongoing training becomes ever more obvious with the growing spectrum of tasks being attributed to protected area managers, requiring interdisciplinary skills and knowledge not only in natural and social science but also in management, finance, tourism, etc. There is a direct correlation between trained staff and management effectiveness (Don Carlos et al. 2013).

It is also important that the protected areas have access to adequate resources to fulfil their responsibilities. This is relevant for both general categories of workplaces, in the office and in the field. In the office of the 21st century, IT-equipment probably holds highest prominence. This includes soft- and hardware that is up to date and adequate for management needs, especially regarding data management. Data in protected areas often have a spatial reference and are hence to be handled in GIS. It is important to provide the staff with suitable computing capacity to set up a functioning data management system, including back-up systems and interconnectivity with other protected areas on a national and potentially international level.

In the field, the staff needs to be well equipped to accomplish multiple tasks. Adapted clothing and gear are necessary in order to collect data that feeds into the above-mentioned databases. Infrastructure must be suitable for mobility, data collection, monitoring and law enforcement. Still, it must have the least intrusive impact possible on biodiversity.

Generally, and according to various authors and experts, underfunding and instability of financing are constant variables in the management of protected areas management. *"Funds do not evolve over time and thus do not consider rising costs, inflation etc. leaving the parks with considerable gaps in financial resources".*
(Gehrlein et al. 2015, p. 17–20)

The issue of quantity and competence of staff, as well of the length of employment and possible turnover rates are directly linked to the management goals and missions. Short term contracts do not lead to sustainable protected area management where a territorial knowledge and a social competence in the relation with local and regional stakeholder is crucial.

D.3.2.2.3

STAKEHOLDER INVOLVEMENT AND INTEGRATION INTO THE WIDER (INSTITUTIONAL) LANDSCAPE

Stakeholder involvement depends strongly on the type of PA in question. One very basic distinction is whether people live in a park or not. If there are people, they must be integrated into management and decision-making processes. The range of permitted activities within park boundaries determines the scope and aim of stakeholder involvement. But even if the people do not live in the park but rather in adjacent areas, it remains important to assure a certain level of participation to improve acceptance and strengthen management effectiveness.

Participation in protected area management has become a central part of modern approaches to conservation (Worboys et al. 2015, p. 413–440). The level and scope of the influence of the different stakeholders or the general public can vary greatly and has to be well balanced in order to obtain valuable input and to create ownership without slowing or blocking the planning and management processes. Participation often comes along with adaptive management and can help integrating local knowledge into the work of park managers. There is a wide range of different methods and options for participation, and park management must choose wisely in order to obtain the best outcomes for a given goal. The basic guiding questions while choosing an approach must be: who and why, how and when.

D.3.2.3

MANAGEMENT MEASURES AND EFFECTIVENESS

The management measures implemented aim to achieve defined objectives. In the case of wilderness areas, where natural processes run freely, this includes explicit non-management. These activities are usually laid out in some kind form of management document. Ideally, these documents address the different challenges and stakes of the park and the surrounding environments.

This includes participative approaches where the stakeholders concerned are integrated into the planning process and possibly even during implementation. Furthermore, the management measures should be based on sound science. There are multiple links and cooperation between protected areas and research bodies, such as universities or others. Besides the frequent regional cooperation, there are also a few research institutions that strive to cover the whole Alpine arc[1].

The management measures covering Alpine protected areas vary by the type of protected area. The fields of management can include: forestry, wildlife and hunting, water, education, sustainable socio-economic development, research and local development strategies and activities.

Several approaches for the evaluation of the effectiveness of single measures or single protected areas exist, and some have been mentioned in the beginning of this chapter. Nevertheless, it is not the objective of this work to provide exhaustive evaluations.

A central element is the cooperation of protected areas with their surroundings, other protected areas of the region or transboundary protected areas and the cooperation within national and international networks. This level of cooperation allows for better harmonisation of goals, management procedures and effectiveness for a whole region such as the Alps. This aspect is covered in the following chapters of this work.

D.3.2.4

SUSTAINABLE REGIONAL DEVELOPMENT / INTEGRATION OF PROTECTED AREAS INTO THE WIDER LANDSCAPE

As mentioned above, in this report, we cannot analyse gaps in the protected area management regarding sustainable regional development in detail. Yet it is important to analyse the integration of the different protected area categories into the wider landscape, landscape in the literal sense and in the sense of administrative and socio-economic landscape. Nowadays, all protected areas have relationships with their surrounding communities and stakeholders; this has become part of the standard modern management. Some protected area categories go much further and have regional incorporation deeply rooted in their management and their objectives. Nevertheless, the aspect of regional development and its contribution to a more sustainable lifestyle as well possible improvements for the protection of nature is not treated here.

[1] International Scientific Committee on Research in the Alps http://iscar-alpineresearch.org/, Mountain Research Initiative (sustainable development) https://mountainresearchinitiative.org/, Global Biodiver-sity Assessment (biodiversity) https://www.gmba.unibe.ch/

D.4

ASSESSMENT OF GAPS IN THE EXISTING NETWORK OF ALPINE PROTECTED AREAS

In this part we will point out several aspects presented in the previous chapters that are currently not sufficiently or systematically integrated within the Alpine protected area system or incorporated into the management of respective protected area categories.

Example Germany:

"Despite the high proportion of large protected areas in the area of Germany, the preservation of biological diversity continues to be poor. This is shown, among other things, by the Red Lists of Biotope Types, Plants and Vertebrates. The most important causes of this have been known for a long time and include above all too intensive agricultural and forestry use, drainage, excessive pollutant and nutrient inputs, fragmentation of valuable biotopes, soil sealing, raw material extraction, water maintenance, abandonment of extensive ecosystems, grassland upheaval, the immigration of non-native species as well as non-nature-friendly recreational and recreational use (e.g., Günther et al. 2005; Riecken et al. 2010)".

(BFN 2010)

This statement probably is valid for all Alpine countries and the Alps-wide situation of biodiversity too, related to the Alpine environment and situation. Data on an Alps-wide level are nevertheless difficult to obtain or are simply not available.

Example Bavaria (D):

"In the current Bavarian Red Lists, 6,480 (40%) of the assessed animal species (around 16,000 of the estimated 30 - 35,000 native species) are listed as extinct, lost or threatened (Voith 2003). A further 11% are about to be included in the Red Lists. A similar picture emerges with the plants. More than half of Bavaria's vascular plants are now part of the Red List. Only about a third are still considered unendangered. 915 animal and 78 plant species are now listed as extinct or lost (5.7% of all evaluated animal species and 3.5% of all plant species)".

(Bavarian State Government 2014, p. 36)

Notwithstanding all the efforts being made to stop or at least slow down the loss of biodiversity on a global level, it is widely accepted that we are currently experiencing the sixth wave of mass extinction in world history. What makes this phase different from the previous five is that it is the impact of human activities is at the very base of it (Ceballos et al. 2017). Global assessments assume that about one million species are threatened with extinction within the next decades if the current trends are not fundamentally altered. (IPBES 2019)

The Alps are not excluded from this evolution, and it is against this background that the gaps in the existing network of protected areas in the Alps need to be analysed.

The elements covered by the assessment of gaps of the Alpine protected area network in this work are comparable with international standards and requests of current intergovernmental cooperation structures and scientists as underlined in the documents of IPBES[1].

Indeed, one of the outputs from a workshop of 50 of the world's leading biodiversity and climate experts of IPBES and IPCC – the first ever collaboration between these two intergovernmental bodies – concerns the contribution of protected areas to limit the loss of biodiversity in the light of climate change (see the box below).

According to the IUCN Red List, more than 30,000 of the approximately 112,000 assessed species are threatened with extinction, that is 41% of amphibians, 25% of mammals, 34% of conifers and 14% of birds.

There is a mismatch between the species listed in the Annexes of the EU Directives and the IUCN Red List. A relatively weak representation of globally endangered species in the Annexes could result in an unfavourable conservation status of these species and thus for the achievement of the targets of the EU Biodiversity Strategy 2030. (Hermoso et al. 2019, p. 2)

[1] https://ipbes.net/sites/default/files/2021-06/20210606%20Media%20Release%20EMBARGO%203pm%20CEST%2010%20June.pdf.

"Enhancing and better targeting conservation actions, coordinated with and supported by strong climate adaptation and innovation. Protected areas currently represent about 15% of land and 7.5% of the ocean. Positive outcomes are expected from substantially increasing intact and effectively protected areas. Global estimates of exact requirements for effectively protected and conserved areas to ensure a habitable climate, self-sustaining biodiversity and a good quality of life are not yet well established but range from 30 to 50 percent of all ocean and land surface areas. Options to improve the positive impacts of protected areas include greater resourcing, better management and enforcement, and improved distribution with increased inter-connectivity between these areas. Conservation measures beyond protected areas are also spotlighted – including migration corridors and planning for shifting climates, as well as better integration of people with nature to assure equity of access and use of nature's contributions to people".

Workshop report "Tackling Biodiversity & Climate Crises Together and Their Combined Social Impacts". (IPBES 2021)

Figure 15: Overview on Current Global Extinction Risk

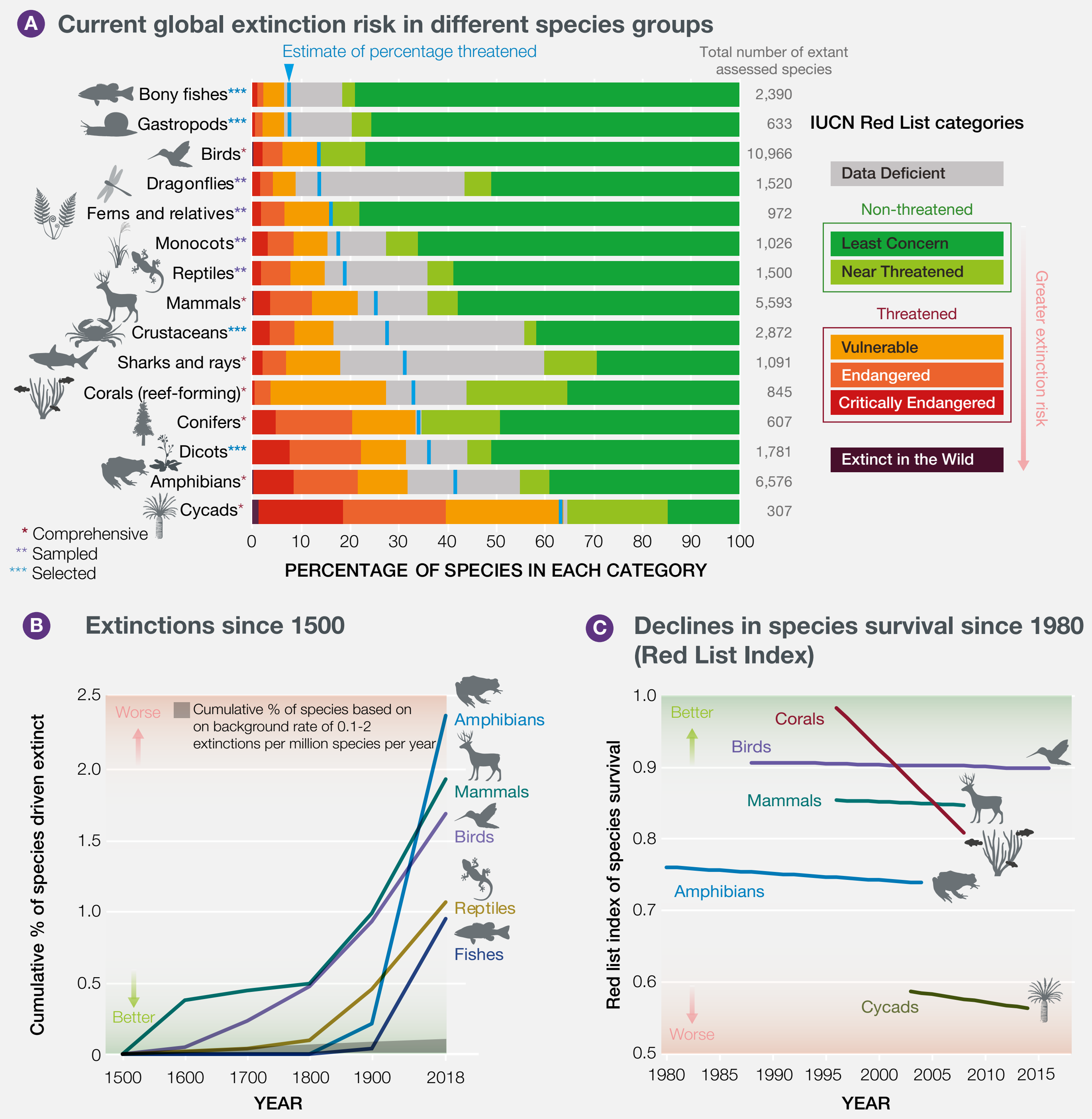


Figure SPM 3 **A substantial proportion of assessed species are threatened with extinction and overall trends are deteriorating, with extinction rates increasing sharply in the past century.**

A Percentage of species threatened with extinction in taxonomic groups that have been assessed comprehensively, or through a 'sampled' approach, or for which selected subsets have been assessed, by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. Groups are ordered according to the best estimate for the percentage of extant species considered threatened (shown by the vertical blue lines), assuming that data deficient species are as threatened as non-data deficient species. B Extinctions since 1500 for vertebrate groups. Rates for reptiles and fishes have not been assessed for all species. C Red List Index of species survival for taxonomic groups that have been assessed for the IUCN Red List at least twice. A value of 1 is equivalent to all species being categorized as Least Concern; a value of zero is equivalent to all species being classified as Extinct. Data for all panels derive from www.iucnredlist.org (see Chapter 3 Figure 3.4 and Chapter 2 Figure 2.7).

(Díaz et al. 2019)

ASSESSMENT OF THE ALPINE PROTECTED AREA NETWORK

The procedure for the assessment of the functionality and efficiency of the Alpine protected areas network as a whole is based on the metrics for Alpine Protected Area Management Objectives in International Standards and realised with the help of the criteria for the Evaluation of the effective conservation of ecosystems and habitats as discussed previously.

The assessment of gaps relies on criteria including a differentiation of protected area categories before coming to a more holistic conclusion.

Based on the analysis of existing approaches and international standards, we defined the following main criteria describing the situation of protected areas within the Alps. The analysis of the previous chapters led us to select these eight main criteria for the gap analysis of the current situation to evaluate current efficiency of the Alpine protected areas system:

1. General distribution of protected areas in the Alps
2. Protection status (categories) of Alpine protected areas
3. Process protection within protected areas
4. Size (extension) of Alpine protected area
5. Elevation distribution of the surface of Alpine protected areas
6. Representativity of protected areas for biodiversity
7. Connectivity potential of Alpine protected areas (Alpine ecological network)
8. Management and cooperation of protected areas (individual area and international cooperation)

To proceed with a concrete tool for the evaluation of these main criteria in the Alpine situation, a set of general indicators has been defined within each of the main criteria categories.

To demonstrate the Alpine situation and to illustrate those criteria for the Alps, we refer to the following available data and apply them to the ALPARC GIS system and other former project and research outcomes of the last years. So far, mainly so-called “large protected areas” have been considered within evaluations of the effectiveness of protected areas systems because only large protected areas present an active management with its own staff. The ALPARC definition of large protected areas has been defined as 100 hectares. This is also the minimum size where one can consider that ecological processes are possible on a small scale. Nevertheless, smaller protected areas have an important role (e.g., as stepping-stones) to link larger natural spaces as we will present it in chapter E.

To provide results that are applicable to all protected area categories in the study area and with the intention of making the results accessible to the wider conservation community well beyond the Alps, we have chosen to use the IUCN protected area categories as a global reference.

A stronger integration of Natura 2000 sites into the management approaches and biodiversity strategies would allow for enhanced efficiency. There is a high probability that more efficiency of biodiversity protection would be possible if more emphasis were put on the integration of the two systems (Protected Area Network and Natura 2000 Network). Currently, these systems work more in parallel rather than jointly toward a stronger common strategy of nature protection in the Alps.

The working hypothesis presented in the beginning of this chapter will be a guideline of the gap analysis that follows.

D.4.1

DISTRIBUTION, PRESENCE, AND ZONING OF ALPINE PROTECTED AREAS

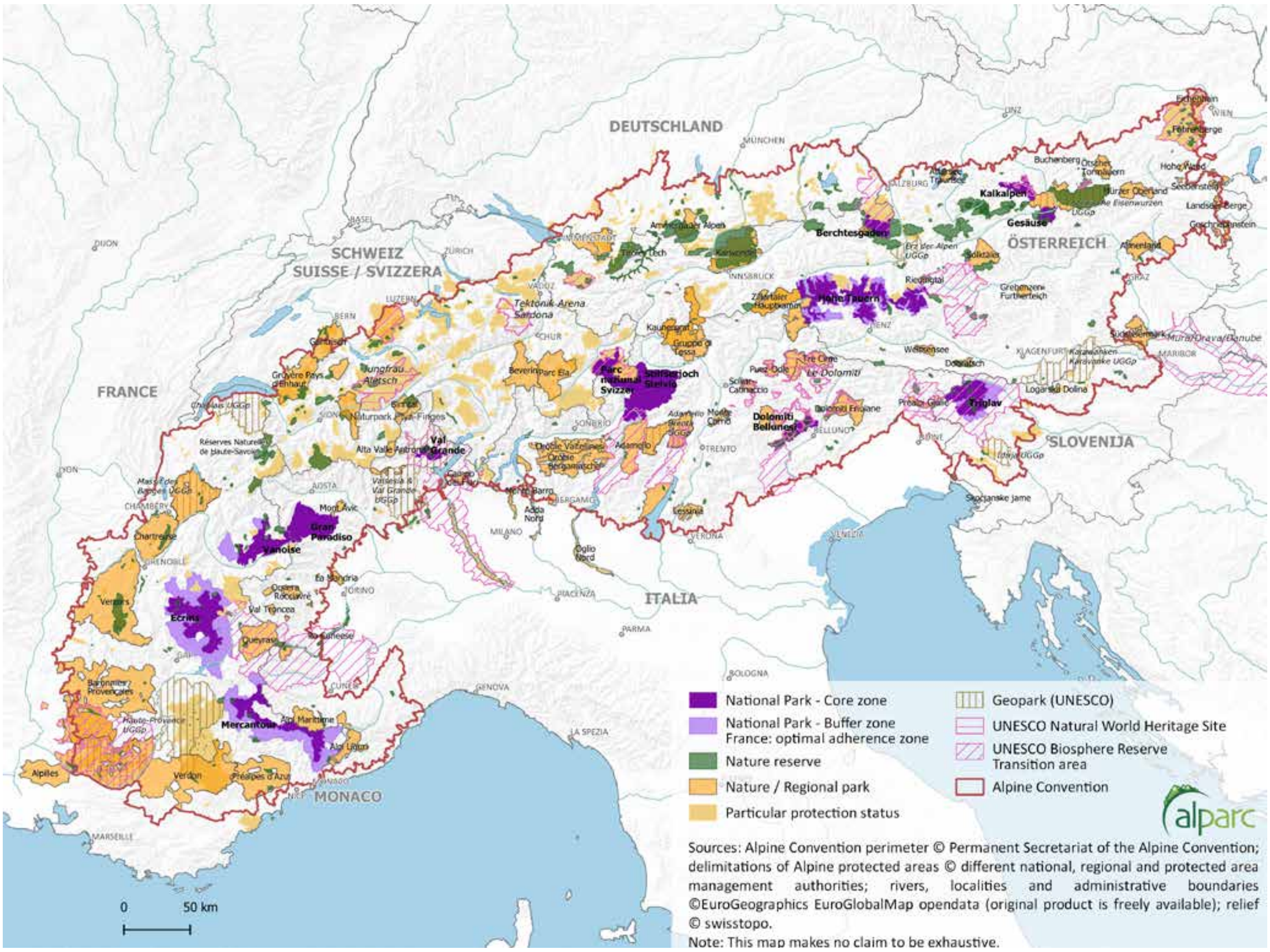
Indicators:

- Geographical scope,
- Concentration
- Zoning
- Distribution in the Alps
- National legislation and strategies
- Development and industrialisation (Alpine valleys)

This subchapter concerning the distribution of Alpine protected areas illustrates how much the current situation of the localisation of protected areas relies upon criteria that are not always linked to the main objective of nature or landscape protection.

In this first rough overview, we analyse the general distribution of protected areas in the Alps according to their geographical position.

Map 23: Protected Areas in the Alpine Convention Area



Alpine protected areas don't follow any pan Alpine distribution logic but are, instead, based only on national strategies. Their localisation may be based on opportunities and/or biological and ecological aspects – usually a combination of both. All Alpine countries have National Parks apart from the Principalities of Liechtenstein and Monaco due to their geographical situation and their very limited area. Furthermore, all the large Alpine countries (A, F, I, CH, D, SI) have different forms and types of regional or nature parks, often with a strong orientation towards a mission of sustainable development, and all of them have nature reserves as the strongest form of nature protection.

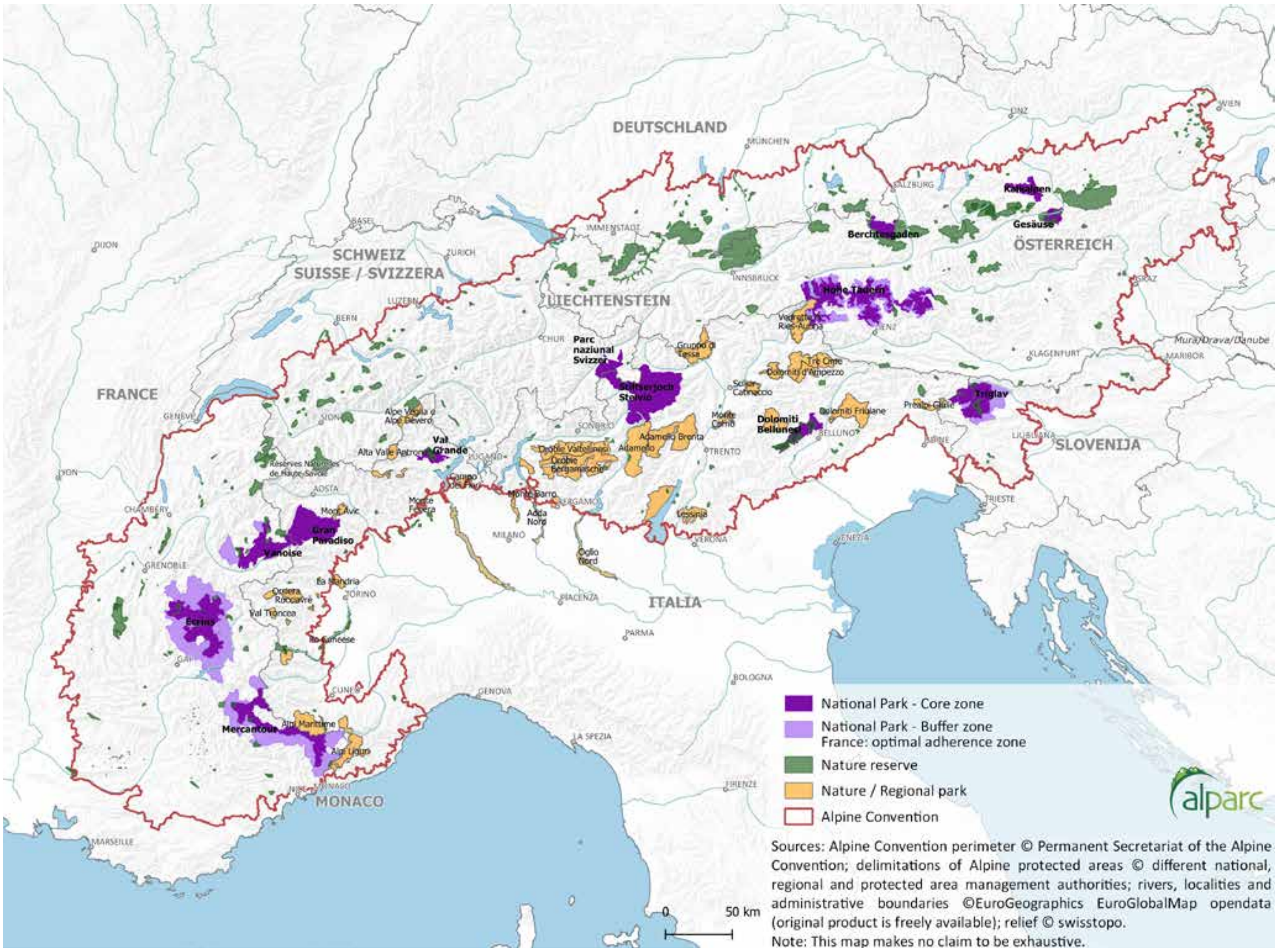
Generally speaking, the geographical distribution over the Alps initially appears quite balanced with some exceptions in the central Swiss Alps and in the Eastern Alps. It is important to appreciate, however, that most of the surface of the large Alpine protected areas with an important protection status is located in the central Alpine range and primarily in the high mountains.

Furthermore, no international coordination exists in the Alps for the creation of protected areas with a strong protection status and the goal of the conservation of biodiversity. The individual national considerations regarding nature protection, limit an efficient Alps-wide nature protection system of biodiversity. Even international instruments, such as the Alpine Convention, are not sufficiently implemented in this specific field,

International coordination for the establishment of protected areas with a strong protection status, especially for those in border areas, would make sense. A common basis of criteria exists with the IUCN categorisation and could be further defined with the work and expertise of the Alpine Convention.

The zoning in different sectors of protected areas (e.g., for some National Parks and biosphere reserves) is an important factor for both their spatial extent and the level of protection within a protected area. The peripheral zones of protected areas cannot always be considered as sectors contributing directly to biodiversity and protection goals, but they can play an important role for ecological connectivity and sustainable land use (see next subchapter).

Map 24: Alpine National Parks, Italian Nature / Regional Parks and Nature Reserves



Zoning is an important tool that helps in targeting management objectives and activities. To use that tool most effectively on the Alpine level, it would be best if the zoning would use the same or at least comparable categories and designations with similar management purposes all over the Alpine arc. So far this is not the case within all countries.

This makes the evaluation of management effectiveness more difficult and less comparable between the different zoning categories as stated by (Gehrlein et al. 2015) for the Austrian National Parks.

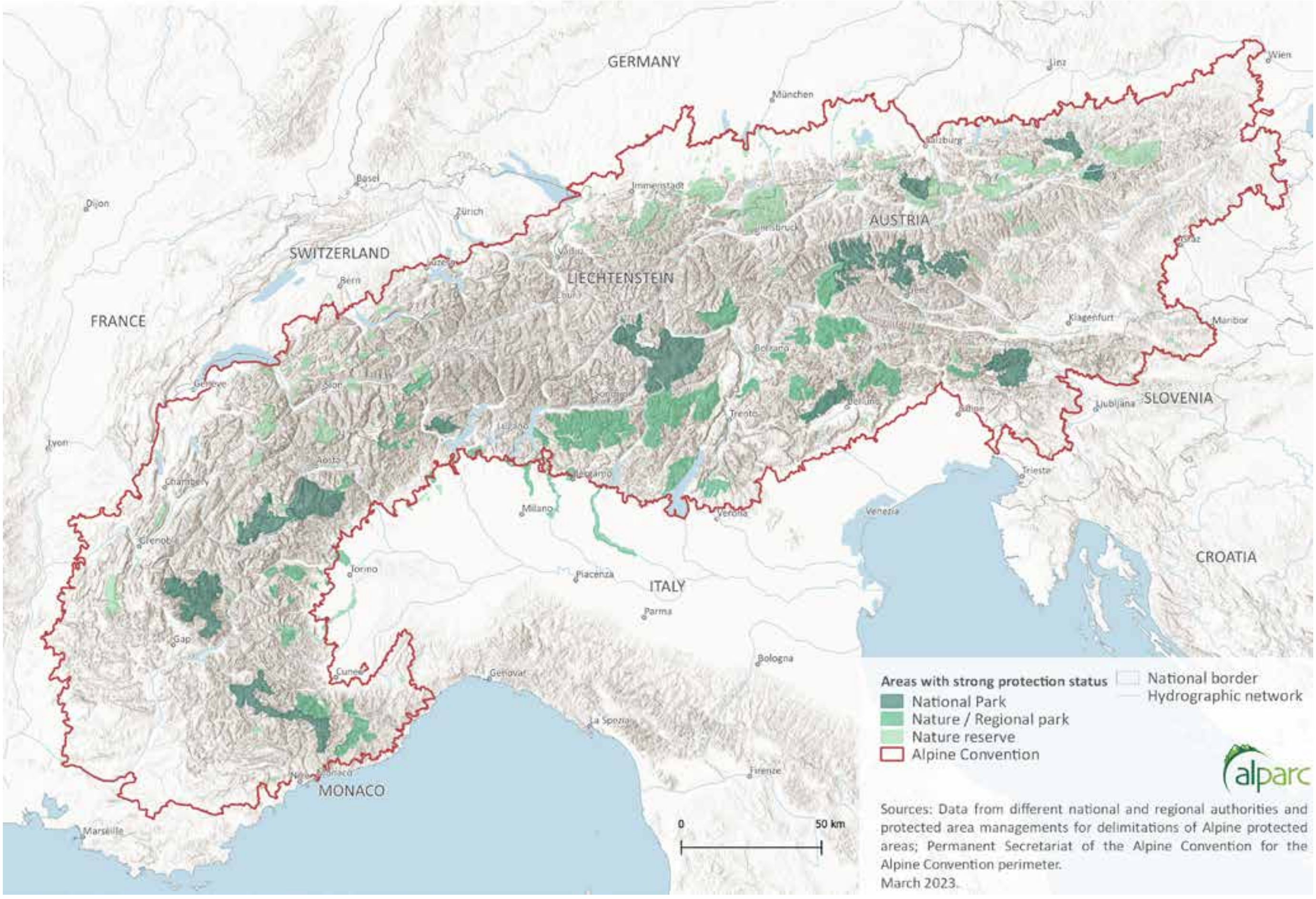
> *"At present, there is a variety of terms in the zoning of Austrian National Parks. The lack of definition of the management permitted in the respective zone makes it even more difficult to assess the actual level of development of the National Parks".*
>
> *(Gehrlein et al. 2015, p. 25)*

Generally, large strong protected areas are concentrated in the central parts of the Alps and strong protection of large areas in the margins and lower Alpine regions is lacking. This is, of course, directly linked to the conflicts of land use concerning the most industrialised, settled or intensively used parts of the land for agricultural purposes. All this is understandable and logical, but it does not sufficiently support a positive conservation status of Alpine eco-systems in the long term.

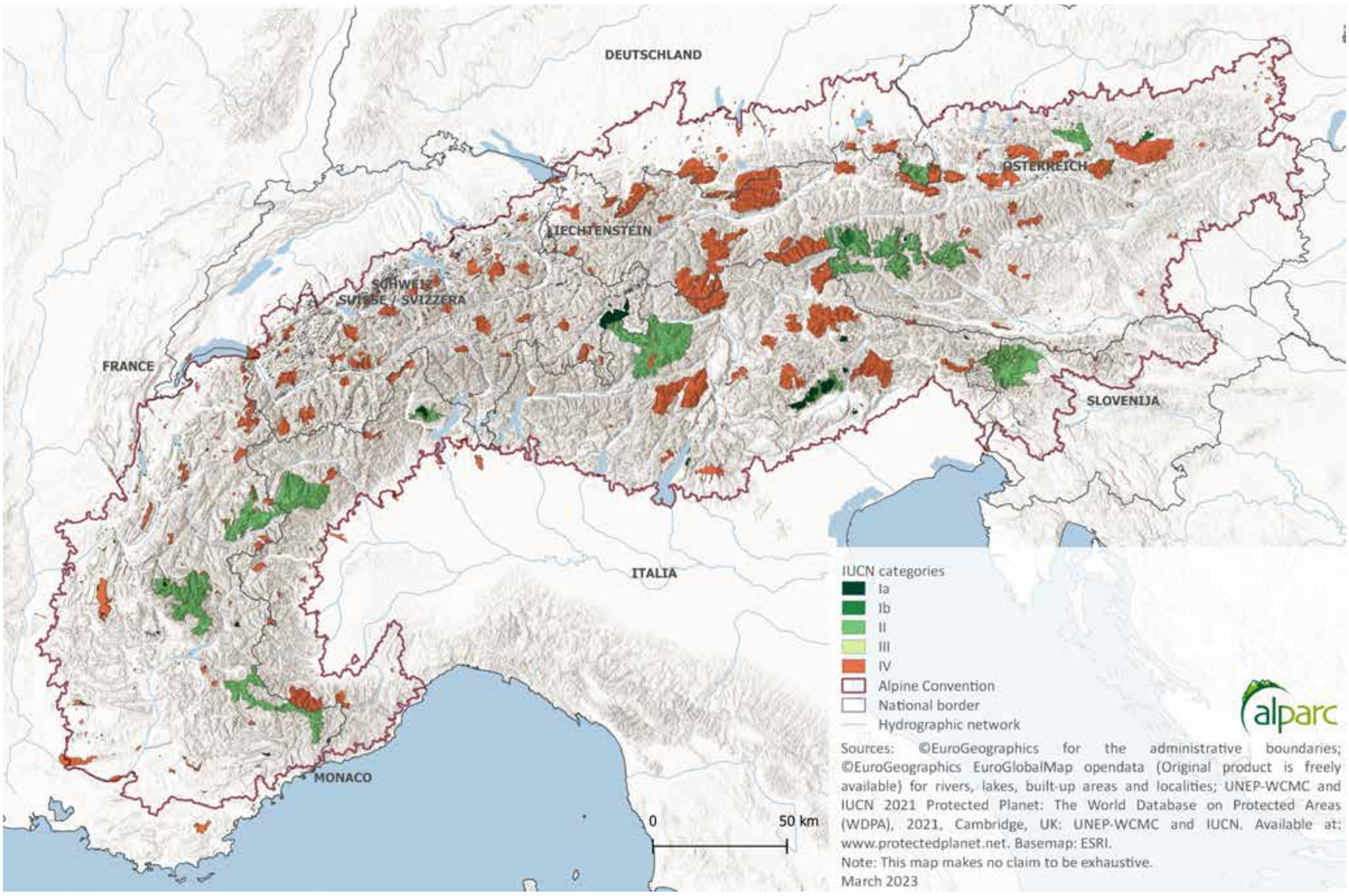
The following two maps illustrate strongly protected areas according to an ALPARC definition (Nature reserves, National Parks, Italian Nature parks). This assessment is submitted to internal evaluations of the protection status and may offer a partially subjective impression. The same is true for the other map, covering the categories I, II, III and IV of the IUCN categories.

The maps reflect the concentration of stronger protected areas mainly in the centre of the Alps, with some exceptions: mainly some larger nature reserves and nature parks of Italy.

Map 25: Strong Protected Areas – Alpine Context



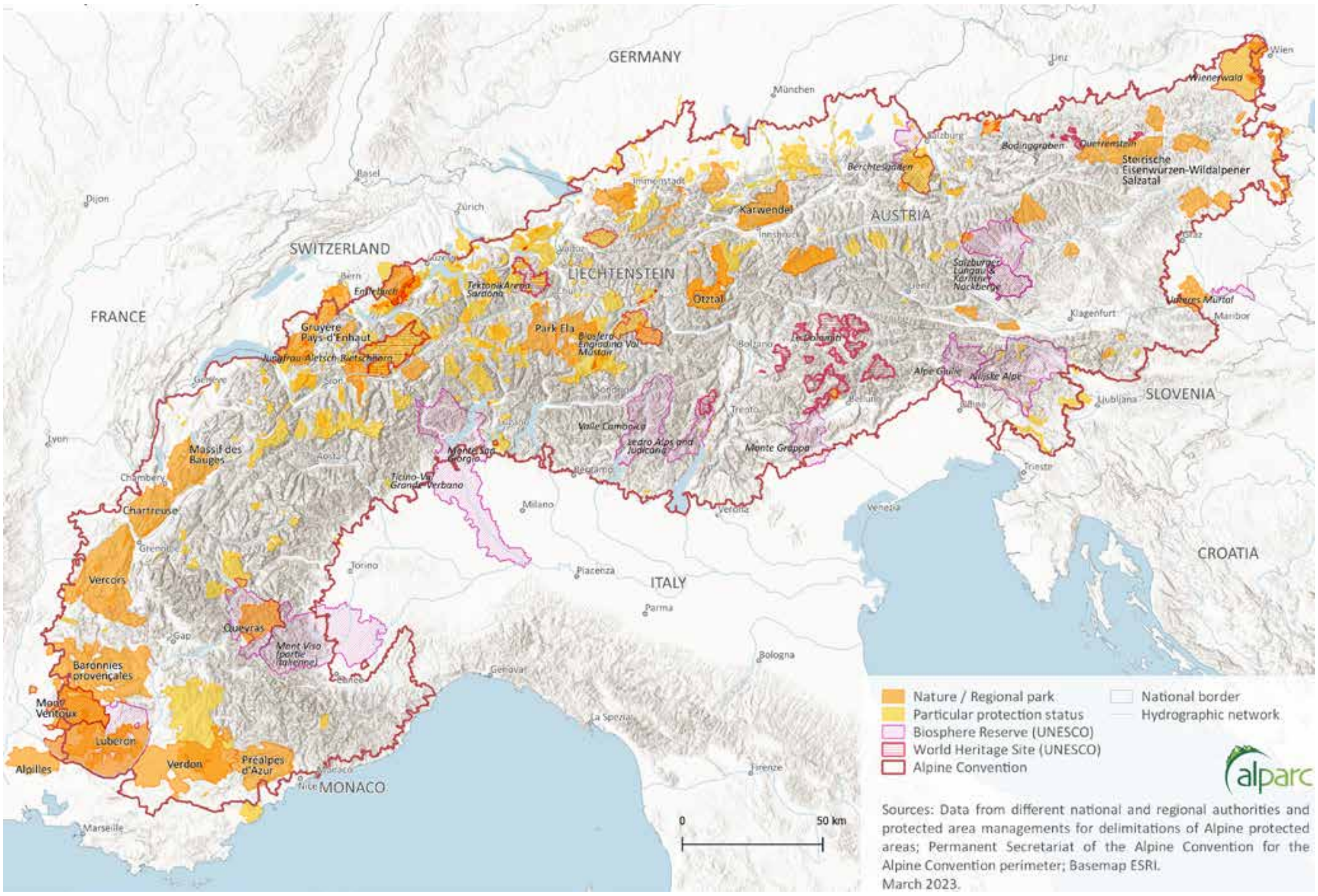
Map 26: IUCN Categories Ia, Ib, II, III and IV



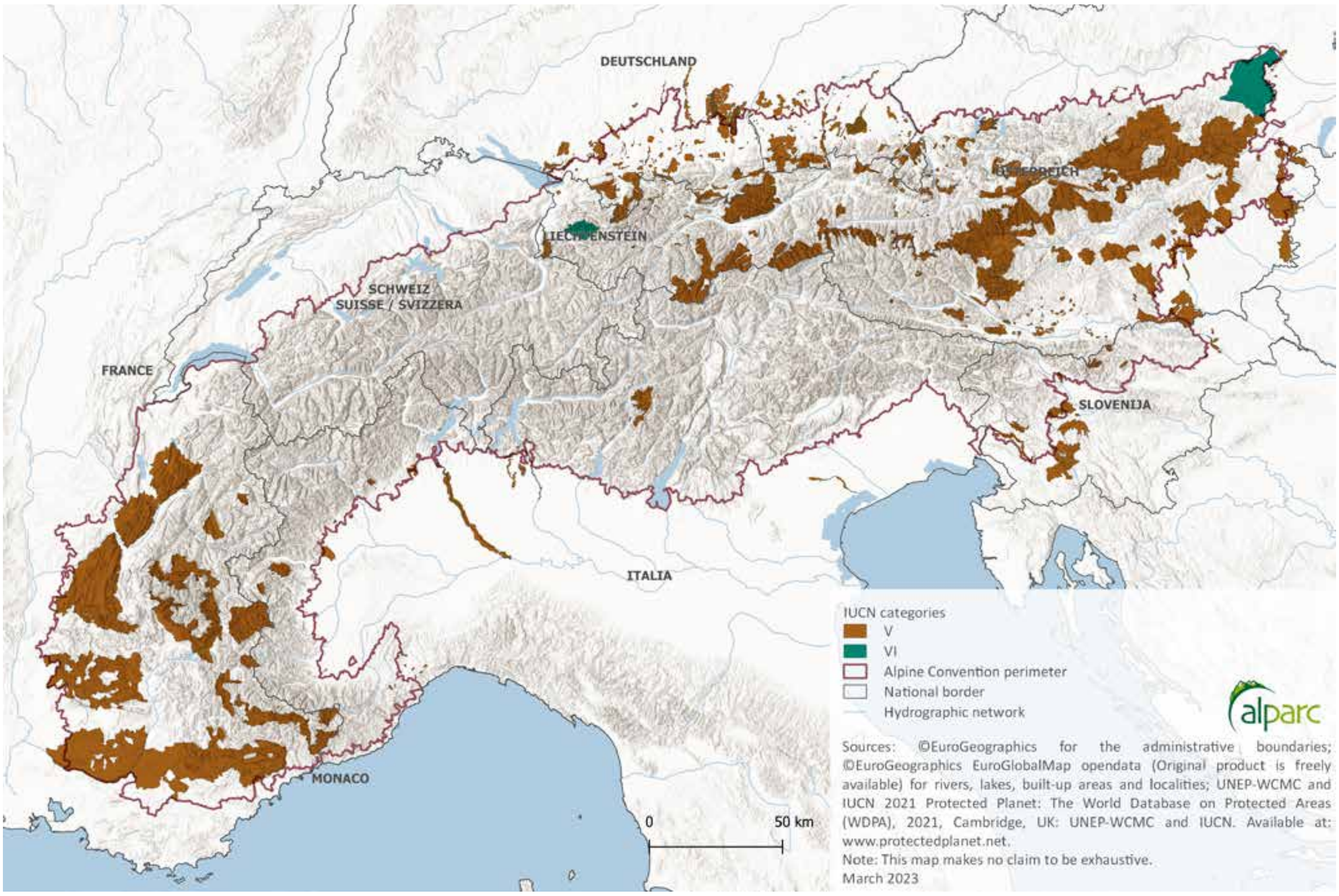
The next two maps show the distribution of weaker protected areas, first according to the ALPARC definition and again the IUCN definition of the categories V and VI (as far as possible as not all protected areas have an IUCN category definition).

The fact that weaker protection is often to be found around the pre-Alpine valleys and the Alpine periphery relates to the fact that those areas often serve as local recreation areas for the populations around or at the margin of the Alps. Often, the pressure of development, settlement, infrastructure, and traffic is very high in those regions and not adapted to large and strong protected areas.

Map 27: Weak Protected Areas – Alpine Context



Map 28: IUCN Categories V and VI



The distribution of less and strongly protected areas demonstrates a better protected core area of the Alps with the more highly protected areas in higher altitudes and less protected areas in lower Alpine regions and the borders of the Alps, which often create transition zones in the Alpine periphery.

In conclusion, Alpine nature protection through protected areas relies too heavily on national or regional legislation and avoidance of land-use conflict rather than landscape features. These areas do not always represent the highest level of biodiversity. Comparative studies of the richness of biodiversity in and outside of Alpine protected areas have not sufficiently examined the Alpine space to allow final conclusions. For this reason, it is crucial to consider the gaps described in the following subchapter. Following an analysis of the status of Alpine ecological connectivity (chapter E), these gaps will highlight the crucial element of linking hotspots of biodiversity and inform recommendations in chapter E concerning the vision of a protected area landscape by 2030.

D.4.2

CATEGORIES OF PROTECTED AREAS AND THEIR PROTECTION STATUS

Indicators:

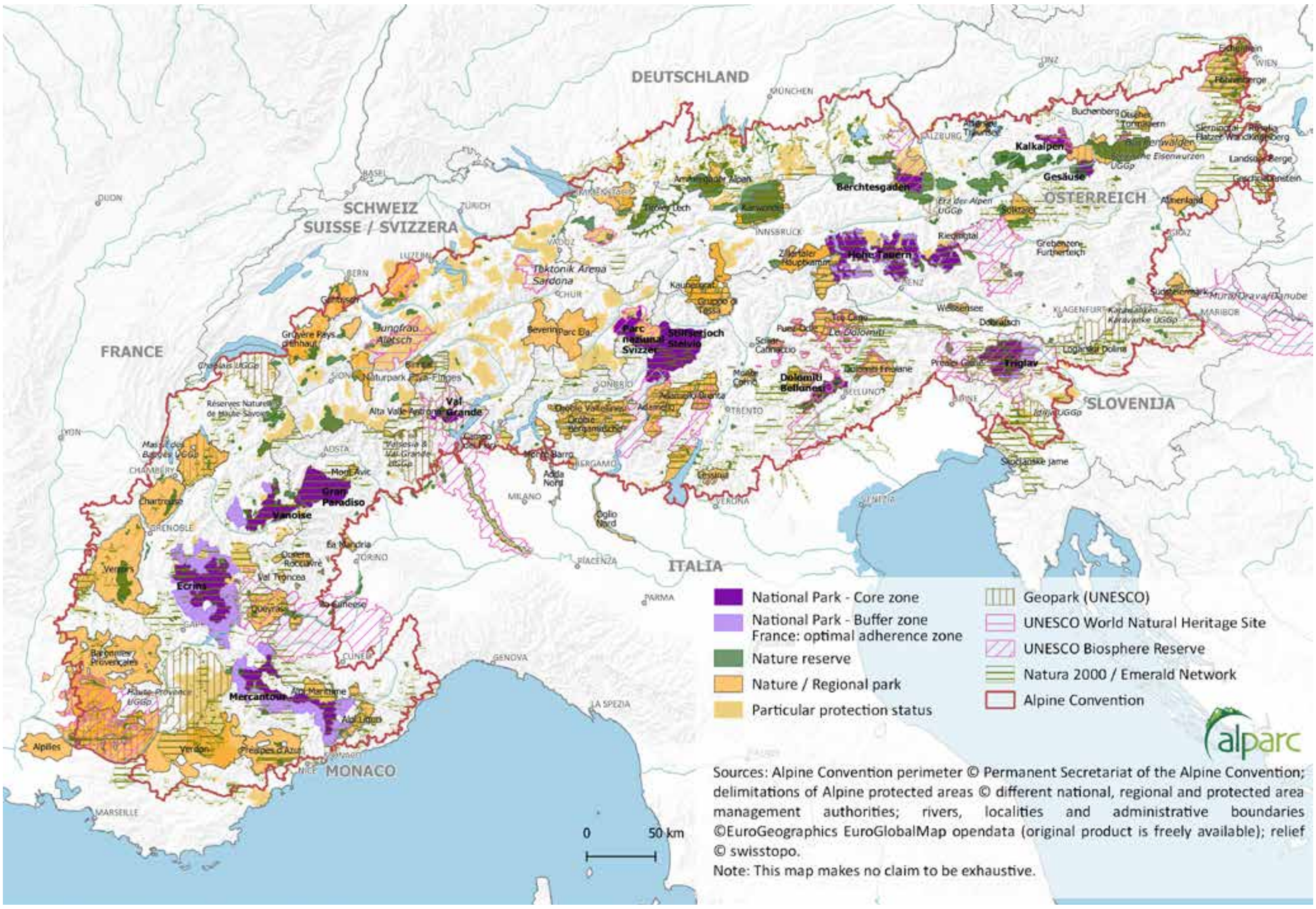
- Protection status
- National legislation
- Mission

The Alps contain a wide variety of protected areas that depend on national or regional legal status as well on private or public law according to their ownership. Please refer to the chapter 1 of this work (B). To make our analysis and overview of the Alpine situation more comprehensive, we identified the following main categories:

- National Park
- Regional or Nature park or Regional Nature park
- Nature reserves
- Special protection forms according to the national status
- Global UNESCO Geoparks
- UNESCO World heritage
- UNESCO Biosphere reserves or parks
- Special protections (all other forms like protected landscapes, etc.)

Most of these broad categories have sub-categories with special objectives and missions. Nature reserves may have a clear goal and protection mission for specific habitats or species. Regional and nature parks may have different orientations if they are in a structural weak region as opposed to an overcrowded touristic destination of the Alps. Protected areas' missions are defined in a general way by their category (e.g., nature and process protection by National Parks or nature reserves) or regional and nature parks by their management goal (e.g., local sustainable touristic development or management of overly used areas). For these reasons, protected areas, beside their consideration within an ecological environment, should always be considered within their integration in the social-economical context and the anthropogenic use they are exposed to.

Map 29: Alpine Protected Areas Larger than 1 km²



The different Alpine countries have created and developed category definitions and established areas according to criteria which are often very specific and not always comparable.

The protection status is generally strong for the National Parks and the nature reserves, but the details depend on the national or federal systems of regional legislation (Bavaria, Austrian Länder). The area is essentially subdivided into a core area and a peripheral zone. Some peripheral areas are very large. The IUCN criteria for the category II require that at least 75% of the area must be within the core area and strongly protected (the main conservation purpose must be applicable on at least 75% of the area – this generally means on the core zone). The protection also includes some minor differences between the Alpine National Parks, habitat, species, and process protection.

D.4.3

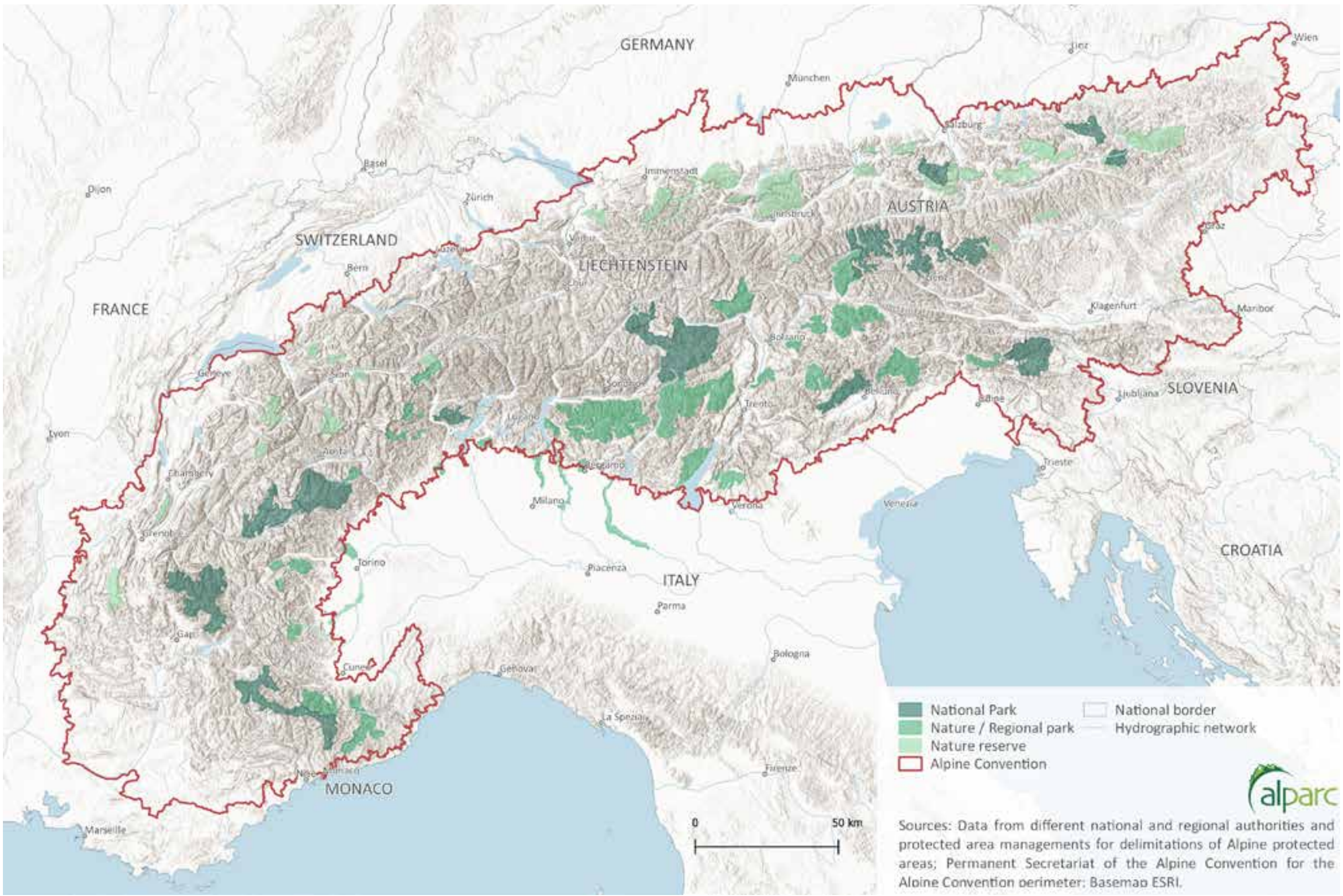
PROCESS PROTECTION WITHIN PROTECTED AREAS

Indicators:

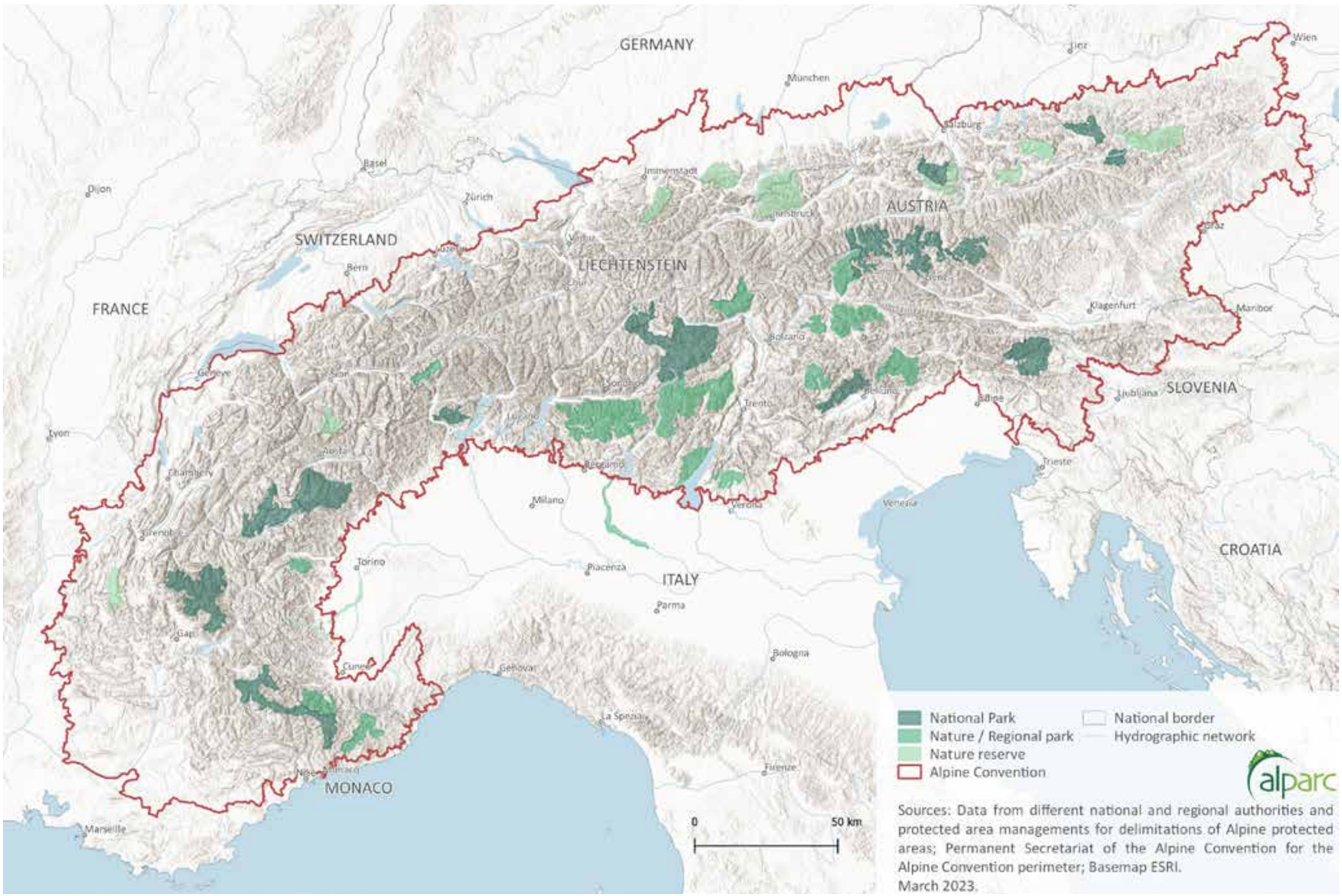
- Size (min. 1,000 ha up to 10,000 ha) depending on ecosystems
- No human intervention
- Open ended nature dynamic
- Protection status

Ecological processes need space. So, process protection is directly linked to a sufficient surface of the protected area. Experts suggest at least 3,000 ha – better a minimum of 10,000 ha- as the area for efficient ecological process protection. This surface depends, of course, on the ecosystems concerned. The most important feature is that no human intervention takes place or that only limited traditional activities that respect the natural cycles, and a sustainable resource management are the basis of any anthropogenic presence in the area.

Map 30: Large Protected Areas – Strong Protection > 3,000 ha



Map 31: Large Protected Areas – Strong Protection > 10,000 ha



These features depend on a certain protection status of the areas devoted to free ecological process development. Currently, in the Alps, there are no areas specifically nominated "protected areas of ecological processes". Indeed, our vison of protection is still a static one, characterised by a high number of species considered as "protectable" and of habitats considered as spectacular landscapes or "visually" attractive habitats.

In the end, what process protection of ecosystems really means is wilderness, a term that, until recently, included certain management possibilities in those areas. But wilderness means no management and no possibility of intervention for long periods – longer than several human generations – so un-touchable in one individual's lifetime.

The map clearly shows, on an Alps-wide scale, the disappointing number of protected areas large enough and protected enough to ensure ecological processes protection at a large scale. Only a few areas can provide the system of a large area surrounded by a buffer area avoiding direct impacts of human presence or activities to the core area that would allow such processes as described in chapter D.3.1.1.

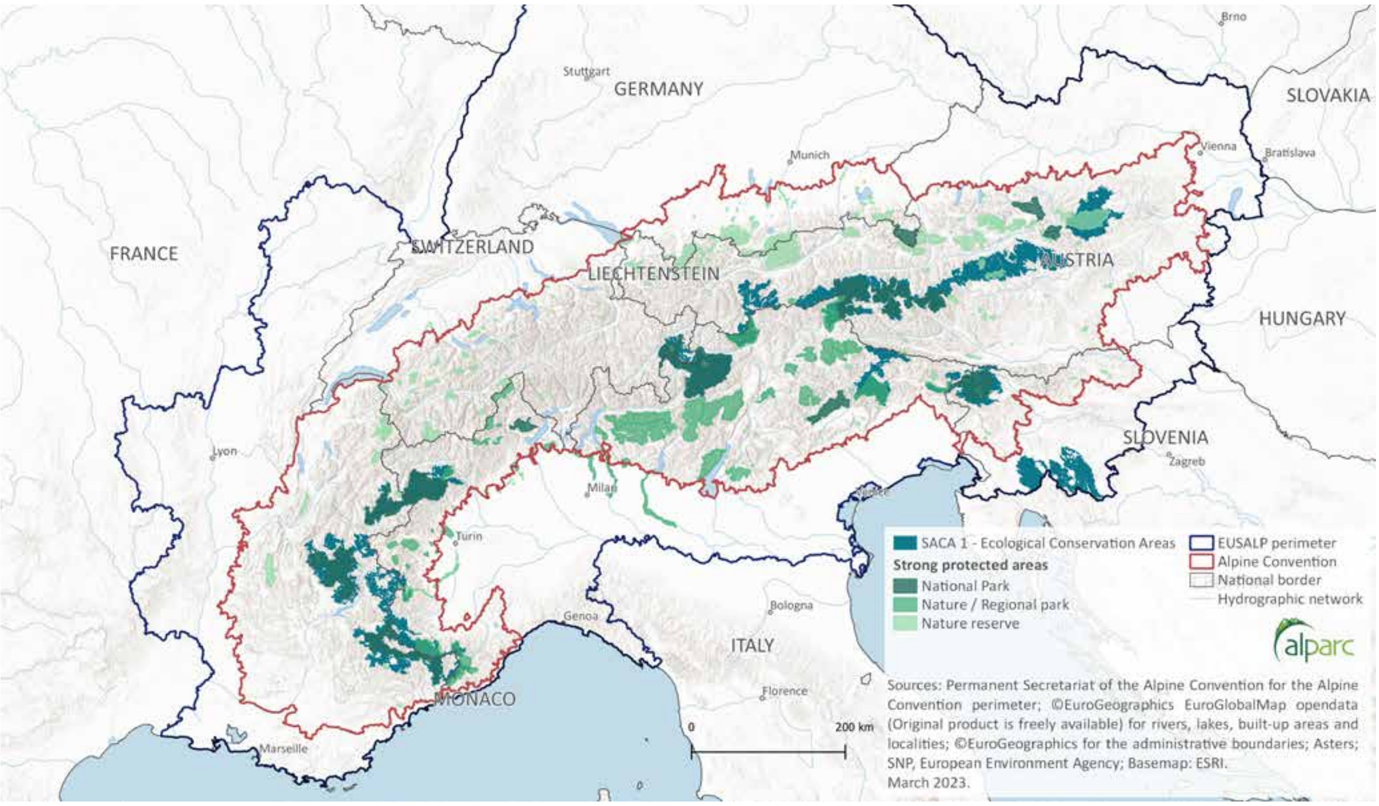
This situation could be improved by creating large scale areas as ecological links between well selected protected areas with a sufficient surface area. Currently, the overall situation in the Alps is poor in this sense because it is rare to find the combination of large-scale areas with an important protection status that ensure both vertical and horizontal coverage and also fulfil the criteria of ecological representativity and buffer zones to prevent human impacts.

The following maps illustrate the main large scale protected areas meeting the criteria of a high protection status, altitudinal representativity and important surface with buffer zones possibilities:

The long-term assurance of protection and provision of "open end" ecological processes is crucial. Only after long years of non-intervention, can ecological processes occur within intact biotopes and within healthy systems of biocenosis.

Such systems are more resilient against parasites and diseases. In fact, we have a vested interest, for human health reasons, in maintaining areas that are the most resilient against proliferation of virus and bacteria. The best way to do so, is the protection of large-scale natural spaces, healthy ecosystems that limit the development of pests. The less naturally resilient areas humankind conserves, the more vulnerable human health becomes. This is certainly a worldwide truth, and the contribution of nature conservation concerns all continents including mountain ecosystems.

Map 32: Large-Scale Ecological Conservation Areas and Strongly Protected Areas



D.4.4

EXTENSION OF ALPINE PROTECTED AREAS (SIZE)

Indicators:

- Absolute Size and minimal size
- Combination size and protection status
- Zoning
- Number per country and category

As mentioned in the chapter above, size matters! Healthy coexistence of the earth's species can only be safe guarded by protecting appropriate surface areas through efficient long-term protection of biotopes as a basis for healthy biocenosis. The minimum size of protected areas depends on the home range of local species and on the ecological processes and their time scales.

Generally, the stronger the protection status is, the smaller the surface of the concerned area. There are some exceptions in the large Alpine National Parks, especially in France (Les Ecrins, Vanoise) and both largest protected areas of the Alps – the parks of the Hohe Tauern (if taken all three parts or the park together: Tyrol, Carinthia, and Salzburg / A) and the Stelvio National Park (also comprised of three parts: Alto Adige, Trentino and Lombardia / I). Nevertheless, these last examples confirm the rule stated at the beginning of the paragraph since they have long been categorised only in category V of the IUCN before being re-evaluated after changes in the management goals and protection measures including a new zoning in category II.

It has been and is still difficult to establish political and social acceptance for large and strong protected areas. The largest Alpine parks are generally regional parks (e.g., France, Switzerland) and UNESCO Biosphere reserves that generally have a weaker protections status, very often under the IUCN V category.

Nevertheless, there are exceptions, like large scale nature reserves having a strong protection status, such as the Austrian "Wildalpener Salza" Valley, which is located at low altitude or the high plateaux of the Vercors and Chartreuse Regional Parks, which, in contrast, are situated in higher altitude.

Another important feature is the zoning of protected areas. Generally, zoning distinguishes the rules and protection levels according to different parts of the protected area. The core area is mostly afforded a stronger protection level than the surrounding zones. Such zonings are often present in National Parks and in Biosphere reserves. For the latter, zoning is mandatory according to the UNESCO Biosphere concept. For this reason, an evaluation of the surface of strong protection areas by only category is misleading.

Table 21: Extension of Alpine Protected Areas

Category	Surface km² inside AC
UNESCO Biosphere reserve – Transition area	13,560
Nature / Regional park	25,708
Particular protection status	16,912
National Park – Core area	7,073
Nature reserve	5,512
UNESCO World heritage	2,650
Weighted surface according to overlaps (redundancies between Pas) – all categories*	54,356

The weighted surface of the selection of the Alpine protected areas in the EUSALP macro-region perimeter with a surface over 100 hectares is climbing to 61,259 km^2, within the Alpine Convention to 54,356 km^2.

The surface of all strong protected areas (National Parks, Nature reserves and Italian nature parks) encompasses 18,425 km^2. Considering only the Alpine space according to the Alpine Convention perimeter, this makes little difference. Again, this shows the importance of the Alps and the Alpine Convention to central areas as a legally binding tool for nature protection in the heart of Europe.

The map 33 illustrates the surface of the Alpine Protected Areas, most of the PA's are smaller than 1,000 km^2; this includes almost all the National Parks and some Nature parks; the smallest PA in brown colour, are mostly distributed among Nature parks and Nature reserves. The biggest PA's identified on the map have different particularities, on the one hand, there is no strong protection category among the largest PA's, on the other, most of the largest PA's belong to some UNESCO categories (Biosphere reserves and Geoparks); in the case of the Geoparks it is a perimeter built around the geological sites and landscapes, and for the Biosphere reserves, the perimeter is in fact the transition area; in both cases the perimeters allow the development of economic activities which is incompatible with the criteria of strong protection.

Map 33: Alpine Protected Areas Surface

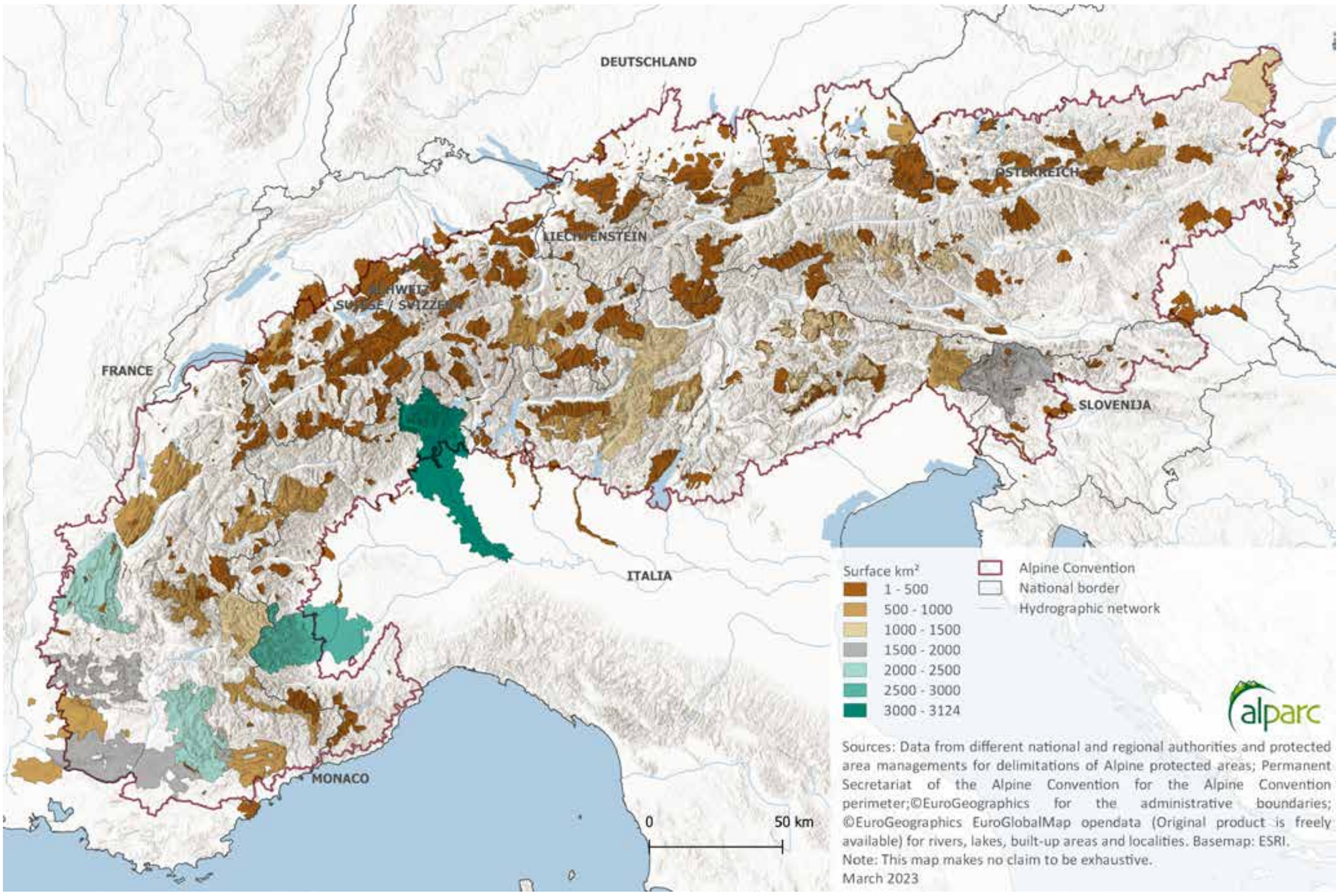


Table 22: Extension of Strong Protected Areas

Category	Surface km²	Surface km² AC
National Park	7,703	7,073
Nature / Regional Park	6,826	6,116
Nature reserve	5,646	5,512
Total*	19,226	18,425
Percentage over AC		9.7%

**The total surface calculation avoids double counting of the surface that overlap between each of the categories.*

Even if currently the overall surface within the perimeter of the Alpine Convention is covered by approximately 28.5%, the total surface of strong protected areas according to our (ALPARC) definition is rather low (9.7%) and unequally distributed among the Alpine countries (without taking in account the regional parks). Nevertheless, the following would be achieved according to the 30/10 strategy of the EU biodiversity strategy 2030:

Target 1 – Legally protect a minimum of 30% of the EU's land area and a minimum of 30% of the EU's Sea area, and integrate ecological corridors, as part of a true Trans-European Nature Network.

Target 2 – Strictly protect at least a third of the EU's protected areas, including all remaining EU primary and old-growth forests.

(According to EU Biodiversity strategy 2030)

For the French and the Swiss Alps, the percentage is even higher: 44% (18,121 km²) and 39% (9,944 km²) according to the total surface area of all categories mixed for the Alps within the Alpine Convention. The Slovenian Alps occupy an average value of 17% as almost the whole Julian Alps are covered by the Triglav NP, while Germany occupies a value of 28%, and Italy and Austria represent below average values with 21% and 20% respectively. These figures must be put in context as both countries occupy the largest territories of the Alps for single countries.

The following table shows the number of PAs and different categories in the Alpine countries as well as their total surface. The last feature is important as it illustrates the cover of protected areas per country and Alpine region. This is more significant than the surface of single areas considering the interconnectedness of those protected areas (see as well Annex H.3).

Table 23: Number of Alpine Protected Areas

Number of Alpine Protected Areas								
	Country							
Type	**AT**	**CH**	**DE**	**FR**	**IT**	**LI**	**SI**	**Total**
Nature reserve	128	53	37	36	83	1	15	353
National Park	3	1	1	3	4		1	13
Regional Park	33	9	2	10	45		2	101
Particular protection	57	453	76	54	12		20	672
Biosphere Reserve (UNESCO)	4	2	1	3	4		1	15
World Heritage Site (UNESCO)	5	3			1			9
Geopark UNESCO	3			4	2		1	10
Total	233	521	117	110	151	1	40	1,173

The distribution and the total surface of protected areas of a same category varies widely among the Alpine countries, and the number of protected areas depends, to some extent, on extension of the national part of the Alpine territory. France and Italy have an important and historical tradition of creating large National Parks, while Switzerland still has only one – even if it is the first one (established in 1914) as two projects have been refused by referendum on a cantonal level in 2016 and 2018. The federal structure seems to be an obstacle for the implementation of new strong protected areas. Germany and Slovenia have one National Park each, which is very much dedicated to the limited Alpine territory and, for this intensive land-use, conflicts with mainly touristic and agricultural activities. The Austrian situation is an interesting one: only three of the six National Parks are situated in the Alps. Two of them are rather small compared to the largest Alpine National Park – the Hohe Tauern- and are significantly younger. The largest parks of the Alps were created before 1980. Since this time, the establishment of large and strong protected areas in the Alps has stalled during a period of highest biodiversity lost and habitat destruction due to more and more intensive human activities (especially touristic) and landscape fragmentation.

The importance of nature parks in the Alps differs from country to country– France and Italy have a long-standing tradition of large nature or regional parks. The main difference consists in the protection status of those nature parks. While the Italian parks can be considered as tools contributing to biodiversity and habitat protection, the French ones are more clearly orientated to a sustainable development strategy of their region with no legal possibilities for nature protection. The recent Swiss creation of nature parks follows the French model, and in Austria, the majority of the regional parks lack legal protection measures. In Germany, the Naturpark Nagelfluhkette is the first bilateral nature park between Austria and Germany. In spite of important activity in nature protection strategies and measure, it has no legal tools to protect biodiversity or habitats. The overall strategy here is the involvement of the population for sustainable management of the areas and common activities in favour of nature and species. In the case of the Naturpark Ammergauer Alpen, the management of visitor flow and adapted offers seem to be an important priority without a legal toolset for nature protection.

An important indicator is the number and surface of nature reserves as these are forms of strong nature protection. The situation differs widely between the Alpine countries as does the surface they occupy within the Convention perimeter. The most important number and surface of nature reserves is held by Austria (128) with a total surface of almost 2,700 km^2, Germany with only 37 but a surface of 1,042 km^2, Switzerland with 53 (645 km^2); followed by France with 36 (586 km^2); Italy 83 (507 km^2) and Slovenia with 15 nature reserves covering 69 km^2.

Despite the number and the extent of those nature reserves, it is crucial to analyse the elevation distribution as well especially with regard to strongly protected areas in the Alps.

D.4.5

ELEVATION DISTRIBUTION OF ALPINE PROTECTED AREAS

Indicators:

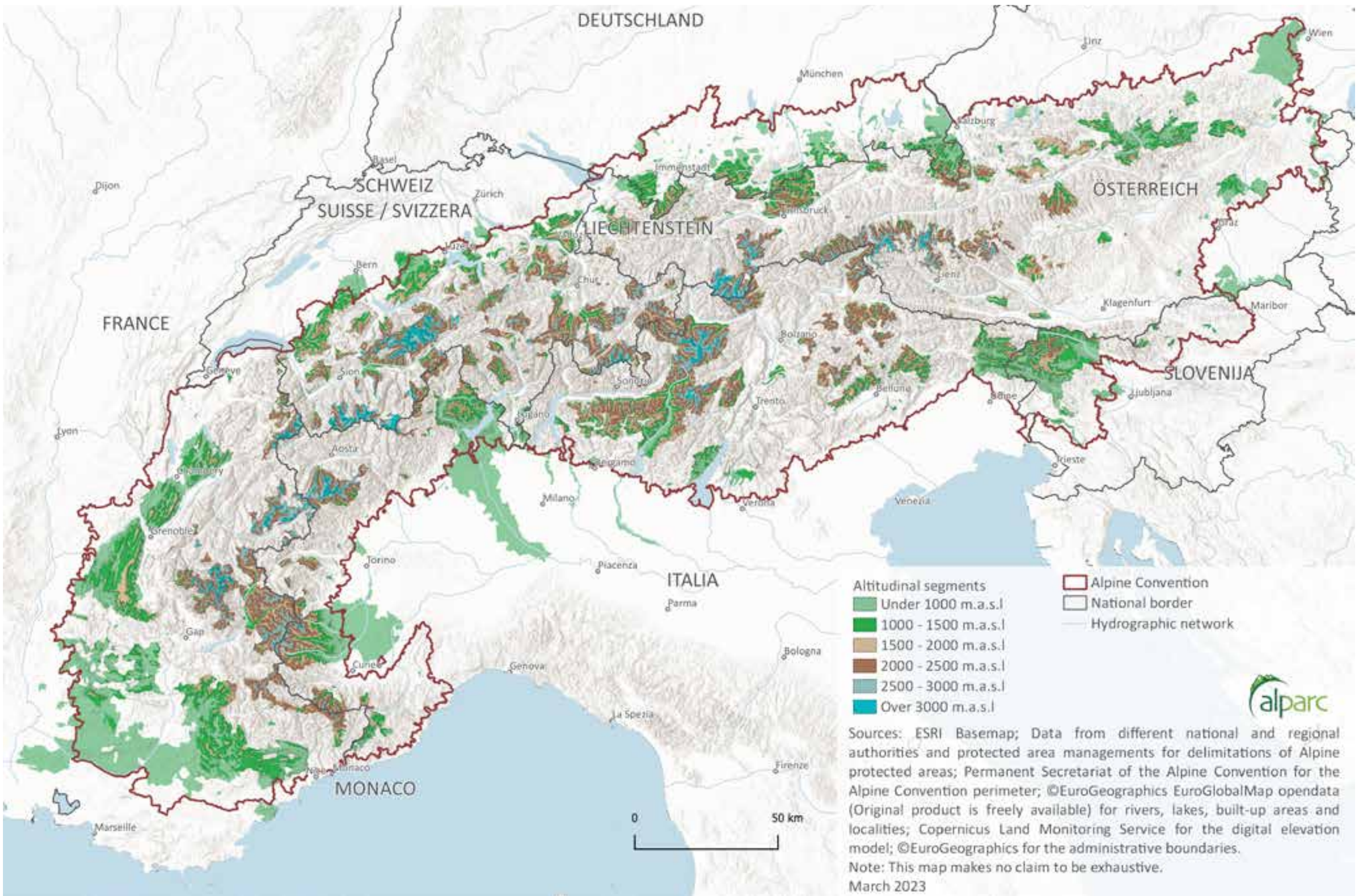
- Altitudinal categories linked to protection status

The general rule for the Alpine range concerning protected areas is the following one: the stronger the protection status of a single park or reserve the higher in elevation it is situated. This is because of the issue of land-use conflicts. Generally, land use conflicts are fewer at high elevation areas than in lowlands or mid altitudinal ranges of the Alps. Nevertheless, there is the exception of tourism (ski resorts or excursion with cable cars e.g.), energy production (hydropower production and high-tension lines e.g.) and sometimes pastures. In those cases, these areas are excluded from the strong protection status by zoning or exceptional permissions.

The representation of strongly protected areas in the lowlands is underdeveloped. We take as an example some figures:

- Two-thirds of the total surface of all 13 National Parks of the Alps are located over 2,000 m a.s.l.
- > half of the total surface of all nature reserves of the Alps are located over 1,500 m a.s.l.

Map 34: Elevation Segments Alpine Protected Areas



For some of the protected areas with a strong conservation status, we made the following analysis:

Table 24: Elevation Segments by Category of Protection

Elevation segments	% over total category surface					
	National Parks – core	Nature reserves	Regional parks	Particular protection	World heritage UNESCO	Biosphere reserve UNESCO
Under 1,000	5%	19%	47%	35%	3%	61%
1,000 and 1,500	11%	27%	20%	19%	8%	15%
1,500 and 2,000	18%	33%	13%	15%	25%	11%
2,000 and 2,500	30%	14%	11%	15%	36%	8%
2,500 and 3,000	28%	5%	8%	12%	18%	4%
Over 3,000	7%	2%	1%	5%	9%	0%

Table 25: Elevation Segments National Parks – Nature – Regional Parks Selection

National Park / Nature – Regional park	< 2,000		2,000 – 3,000		> 3,000		
	Ha	%	Ha	%	Ha	%	Total surface (Ha)
Hohe Tauern (AT)	37,406	20%	139,803	75%	8,522	5%	185,600
Les Ecrins (FR)	118,176	47%	121,098	48%	13,496	5%	252,608
Triglav (SL)	7,7432	92%	6,663	8%			83,982
Berchtesgaden (DE)	17,700	85%	3,220	15%			20,800
Swiss National Park (CH)	3,432	20%	13,668	80%	89	1%	17,030
Prealpe Giulie (IT)	8,882	94%	520	6%			9,402
Gran Paradiso (IT)	17,143	24%	44,815	63%	9,093	13%	71,051
Gesäuse (AT)	11,686	96%	429	4%			12,118
Naturpark Schlern (IT)	4,380	61%	2,850	39%			7,230
Total	**296,237**	**45%**	**333,066**	**50%**	**31,200**	**5%**	**659,821**

Concerning the nature reserves we made an analysis of the 10 largest nature reserves of the Alps. The result is as follows:

Table 26: Elevation Segments – 10 Largest Nature Reserves of the Alps

Nature reserves	< 2,000		2,000-3,000		> 3,000		Total surface (Ha)
	Ha	%	Ha	%	Ha	%	
Karwendel (AT)	43,678	81%	10,186	19%			53,863
Widalpener Salzatal (AT)	50,767	99%	268	1%			51,034
Ammergebirge (DE)	28,785	100%	54	0%			28,839
Kalkhochalpen (AT)	14,199	59%	9,735	41%			23,935
Allgäuer Hochalpen (DE)	18,469	89%	2,192	11%			20,662
Karwendel und Karwendelvorgebirge (DE)	18,618	97%	497	3%			19,115
Hauts Plateaux du Vercors (FR)	16,807	99%	208	1%			17,015
Val de Bagnes (CH)	790	5%	8,902	54%	6,915	42%	16,607
Totes Gebirge-West (AT)	14,836	93%	1,040	7%			15,876
Dachstein (AT)	9,506	70%	4,169	30%			13,675
Total	**216,455**	**83%**	**36,315**	**14%**	**6,915**	**3%**	**260,621**

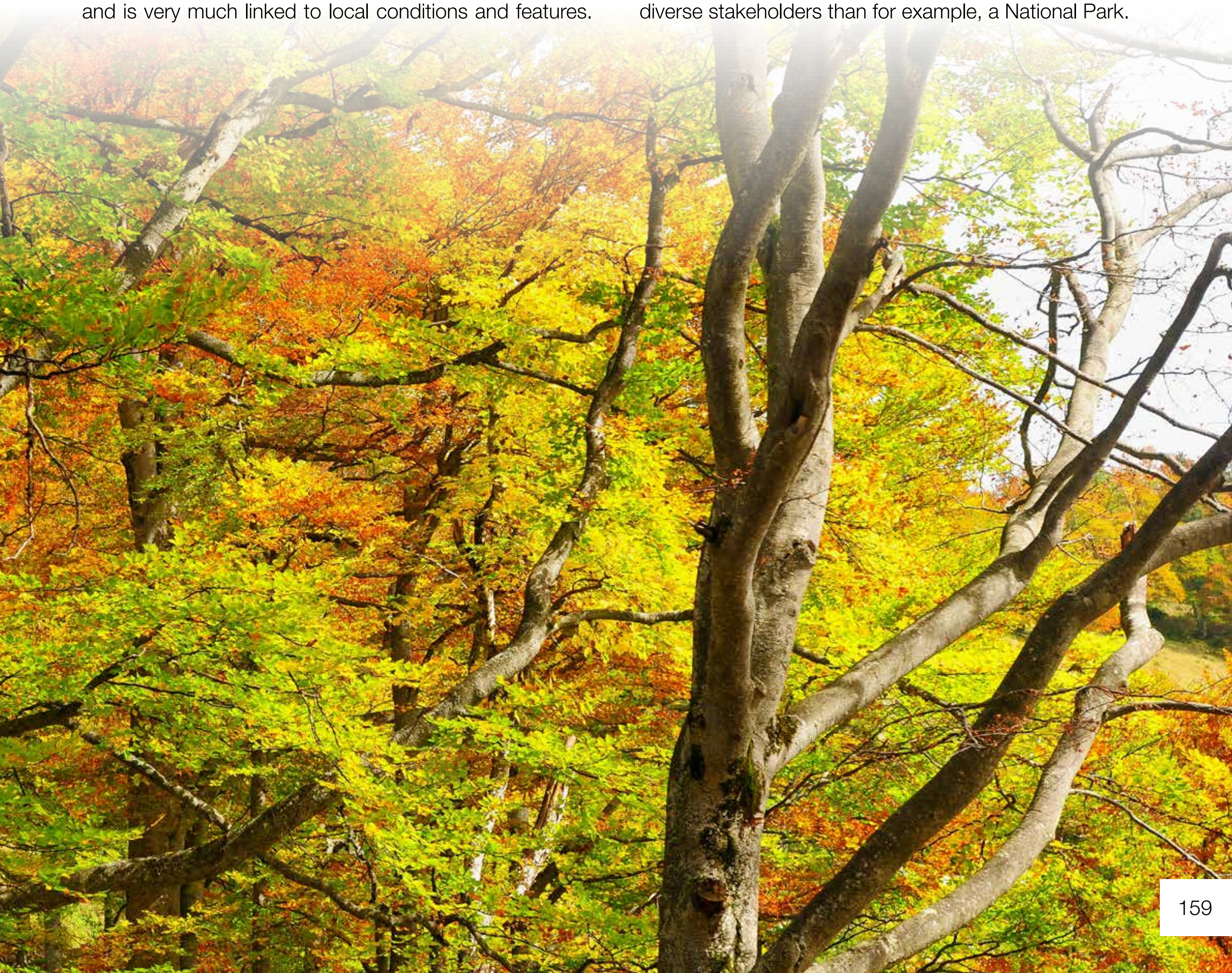
We proceeded as well to the following analysis in the case of some protected areas with a lower protection status (slightly different analysis concerning the altitudinal distribution)

Table 27: Elevation Segments Selected Alpine Protected Areas

Protected Areas	< 1,500		1,500-2,500		> 2,500		Total surface (Ha)
	Ha	%	Ha	%	Ha	%	
Jungfrau-Aletsch (CH)	2,380	3%	28,296	34%	51,604	63%	82,280
Vercors (FR)	178,275	87%	27,345	13%			205,621
Nagelfluhkette (AT)	37,079	93%	2,812	7%			39,891
Pfyn-Finges (CH)	8,070	29%	12,132	44%	7,294	27%	27,495
Karwendel (AT)	32,205	44%	39,830	55%	466	1%	72,501
Mürzer Oberland (AT)	19,001	85%	3,259	15%			22,260
Total	**277,010**	**62%**	**113,674**	**25%**	**59,364**	**13%**	**450,048**

The tables clearly show the correlation between altitude and protection status, with the exception of nature reserves as they are present at all altitudinal levels and protected areas generally lower than 2,000 metres a.s.l. Nature reserves are, in many cases, quite small. For this reason, they are easier to establish. In the case of the 10 largest nature reserves, every reserve has its own history and is very much linked to local conditions and features.

In general, there is a lower staffing with rangers etc. and lower costs because the main characteristics of nature reserves consists in the rules they provide for all activities. For all these reasons, nature reserves are often based on state ground or are backboned by very clearly defined protection subjects, such as a single species or habitats. Therefore, they often need to be "less negotiated" with diverse stakeholders than for example, a National Park.



D.4.6

REPRESENTATIVITY OF PROTECTED AREAS FOR BIODIVERSITY

Indicators:

- Data from former ALPARC projects
- Key Biodiversity Areas
- Special Protection Areas

The question of representativity or ecological gaps in an Alps-wide perspective is difficult to answer. On a regional or local scale, a more in-depth analysis can be realised covering many groups of species. For the whole Alpine range, however, data is just missing, and interpretations can be uncertain.

When considering ecological gaps, it is important to note that numerous threatened species are, of course, present outside of protected areas or within areas with a low protection status. In such cases, ecological gaps need to be recognised and, in the case of single species extinction risk, adapted measures need to be taken.

We selected different species, because of their symbolic value, as a (very) limited indicator for ecological representativity of protected areas with different protection status. Among these species are the black grouse, the bearded vulture, the red deer and as a group of large carnivores the brown bear, wolf and lynx.

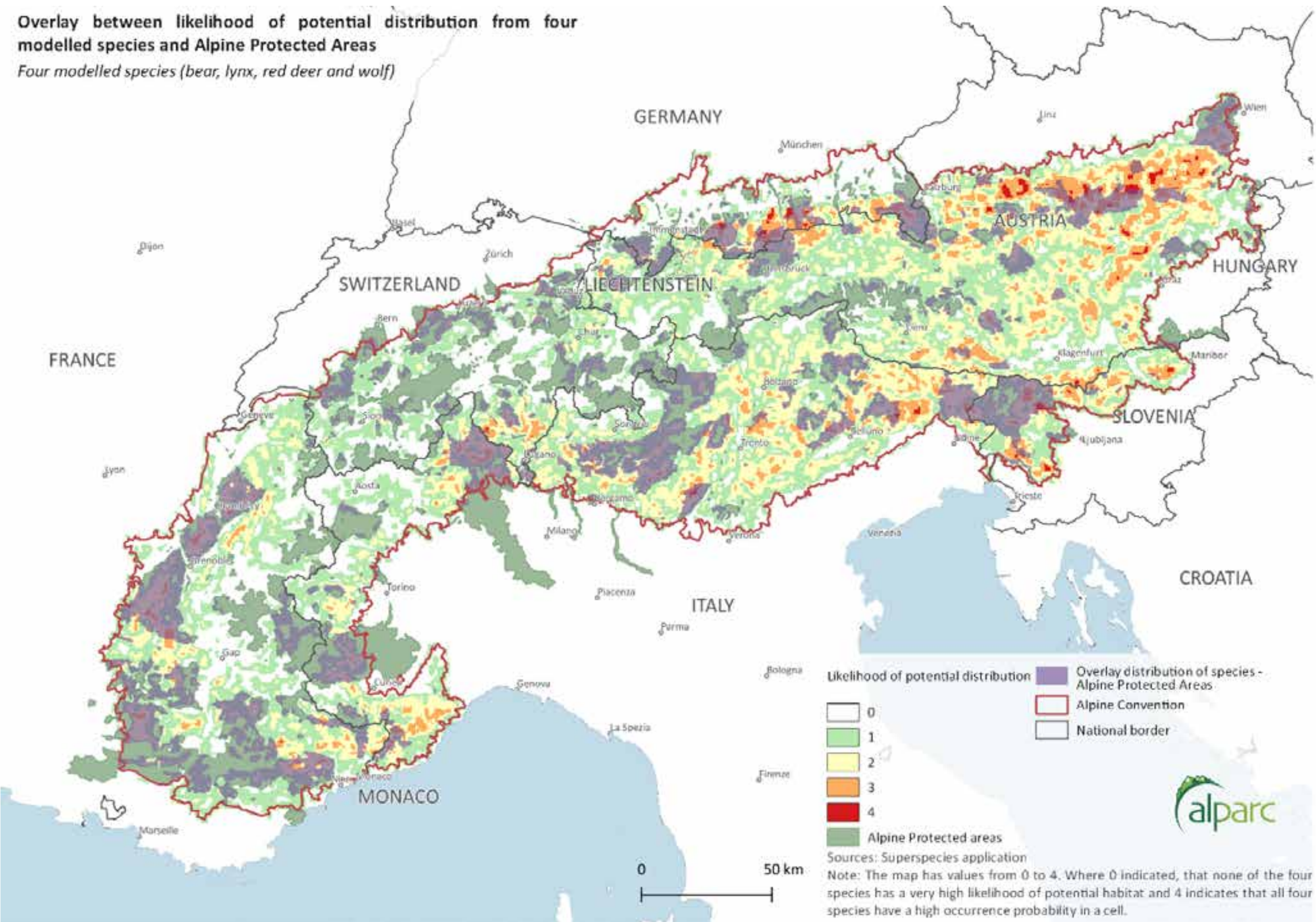
The distribution data concerning these species has been obtained from a former Interreg project[1] on which ALPARC was collaborating. The following map illustrates the distribution of four of these species over the protected areas of all categories.

It shows that the distribution of those species is quite opportunistic and not directly linked to the presence or to the level of protection of the PA; the most important (potential) concentration of the selected species, according to adapted habitats, is often located near the protected areas, which justifies action to preserve the species and manage those as yet unprotected spaces with an important presence of biodiversity[2].

[1] ECONNECT.

[2] We believe that this analysis based on potential species distribution according to adapted habitats is very limited for the interpretation of the representativity of PAs concerning biodiversity.

Map 35: Likelihood of Potential Distribution for Modelled Species (Lynx Lynx / Cervus Elaphus / Ursus Arctos / Canis Lupus) and Alpine Protected Areas



Indicators:

- Main data from official sources and international organisations

Another general approach employs the following data sets from international organisations. They can be considered as (limited) "habitat criteria for biodiversity potential":

- Key Biodiversity Areas[1] - overlay with protected areas of strong protection status:

In the case of the strongly protected areas, there seems to be a quite tight correlation between the protected areas and the KBAs. More than the half of the KBA surface area (56%) overlaps with the Alpine Protected Area; most of this coverage (68%) corresponds to the strong protection categories, which demonstrates the importance of these areas for the preservation of biodiversity.

Nevertheless, large parts of the KBAs are not covered by a strong protection status. While it may not always be necessary to provide protection if biodiversity is already present, it is still important to avoid gaps where there are areas with high protection status in order to ensure robust biodiversity.

- Important Bird Areas[2] - overlay with strong protected area

The redundancy between special protection areas and Alpine protected areas is relevant since two-thirds of the SPA surface area overlaps with the Alpine Protected Areas. Here again, often the recovery is better matching with the strong protection areas, nearly 76% of the total surface belongs to these categories.

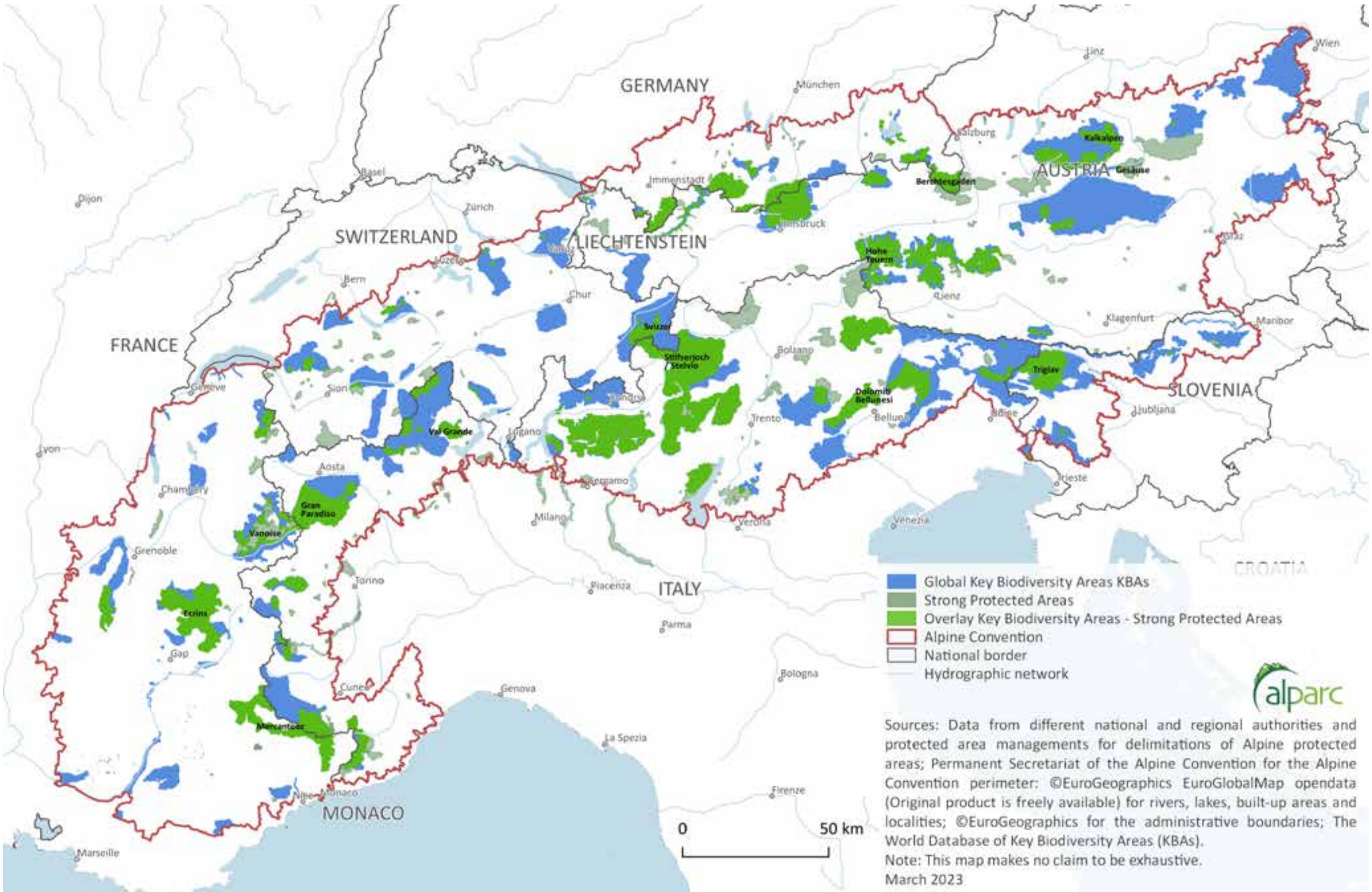
The maps indicate that there is no systematic correlation between the data provided by international organisations with that of the PA's. Nevertheless, the PA's with a strong protection status are mostly concerned by KBAs and probably host the most relevant species as is visible on the overlap between the KBA and PA layers. This is likely linked to the fact that, in the case of the KBA, data is already aggregated.

We found that direct evaluation of the biodiversity representativity of the Alpine protected areas is very limited. The analysis needs to be realised for single protected areas or Alpine regions. At an Alps-wide scale and with the available data, this goal is not achieveable.

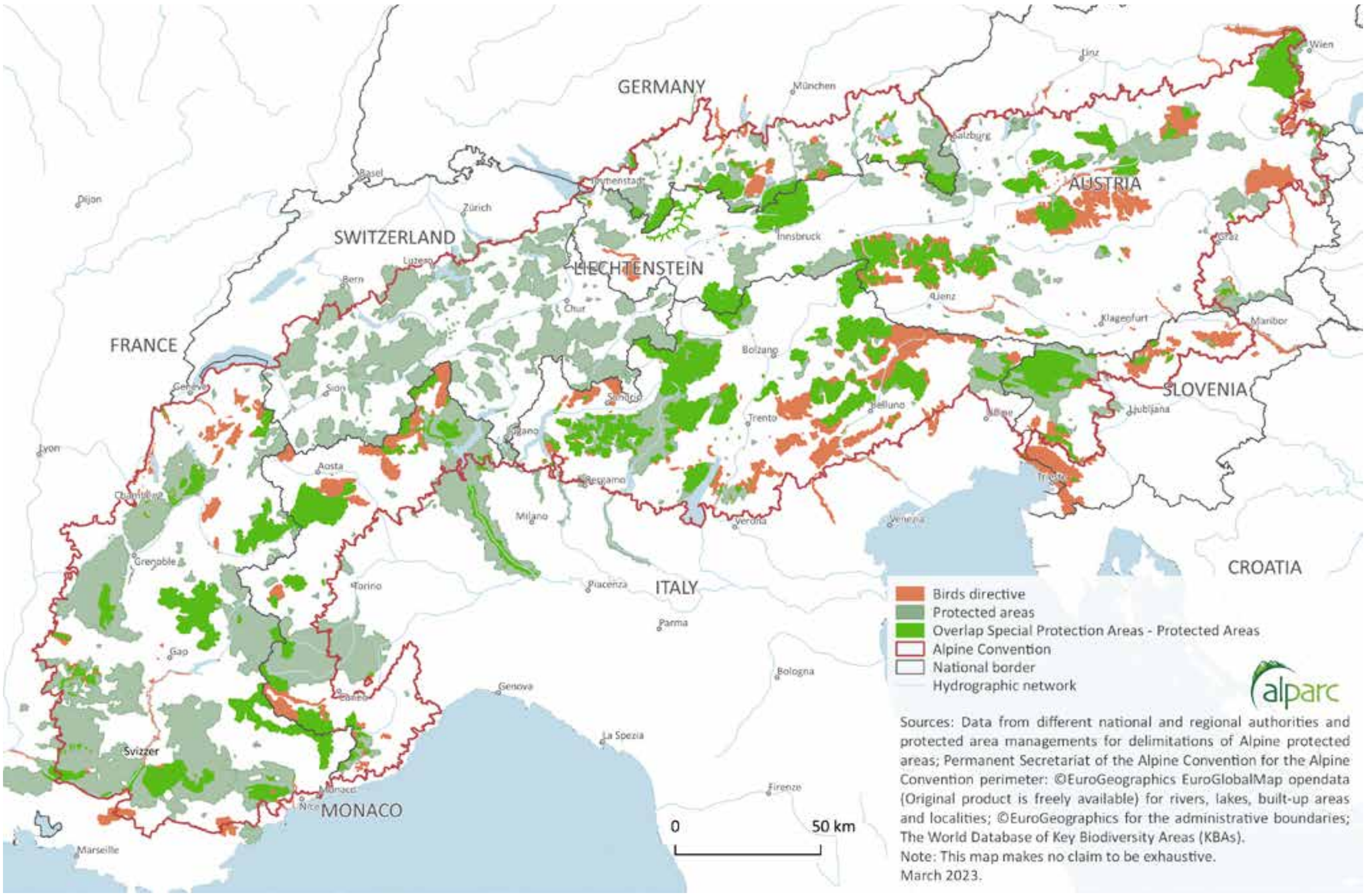
[1] http://www.keybiodiversityareas.org/home.

[2] https://www.birdlife.org/worldwide/programme-additional-info/important-bird-and-biodiversity-areas-ibas

Map 36: Key Biodiversity Areas and Strong Protected Areas



Map 37: Special Protection Areas and Alpine Protected Areas



D.4.7

CONNECTIVITY POTENTIAL OF ALPINE PROTECTED AREAS

Indicators:

- SACA categories
- Wildlife corridors

The issue of Alps-wide ecological connectivity where Alpine protected areas play a prominent role will be treated in the next chapter. Nevertheless, we would like to briefly highlight some aspects of the ecological connectivity concerning single protected areas and the necessary features of parks and nature reserves to guarantee a potential for ecological connectivity.

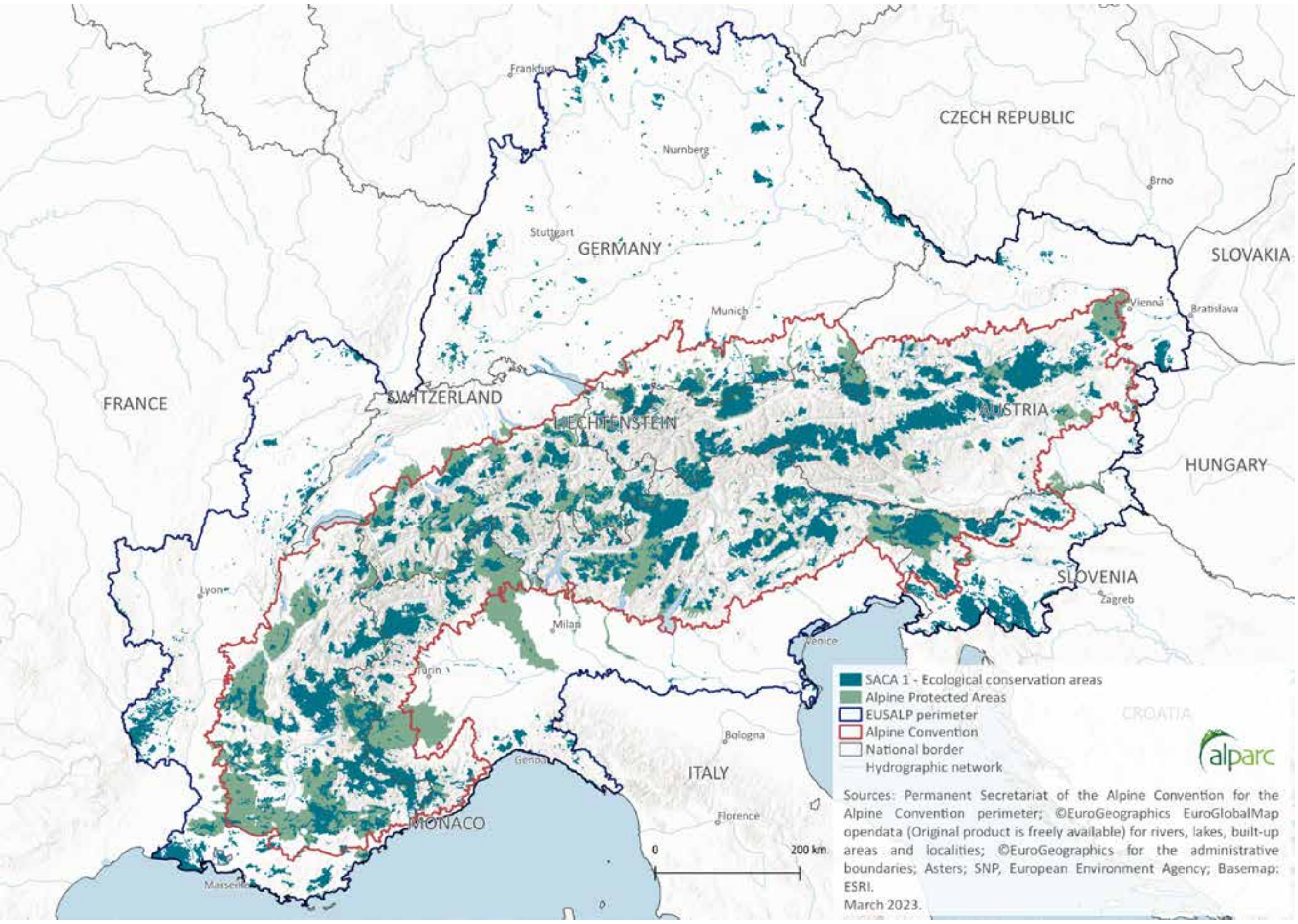
Starting from the results of the project ALPBIONET2030 which will be partially presented in the next chapter, we think that protected areas need to belong to the category SACA 1 (Ecological Conservation area) or in some parts and for some exceptions at least to the category SACA 2 (Ecological intervention areas). Protected areas too isolated by the category SACA 3 (Connectivity restoration areas) are not likely to be connected with other protected areas. The factor of “isolation” is crucial in this context.

The SACA 2 areas are the classical areas used as corridors and links for SACA 1 regions, but this requires that the SACA 1 areas are not too far from each other. Protected areas should not be too isolated from other protected areas or should at least have nearby ecological stepping-stones to be able to be part of an ecological network.

The connectivity potential of protected areas furthermore depends on the altitudinal development of protected areas as the links are situated in mid-altitudinal or low levels.

Finally, the definition of wildlife corridors also depends on the presence of well-structured protected areas because these corridors must link core areas essential for certain species and allow for their free and safe movement. If this cannot be ensured, their function is limited or inefficient.

Map 38: Ecological Conservation Areas (ECA) and Alpine Protected Areas



D.4.8

MANAGEMENT AND COOPERATION OF PROTECTED AREAS

Indicators:

- Criteria for the management of protected areas
- Criteria and framework for the international cooperation of protected areas

A distinction needs to be made between the management of single protected areas and their individual management approach and that of networks of protected areas as a system of regional or international cooperation. For single protected areas, we would recommend the following indicators be used for an evaluation of the effectiveness of the protected area. This is not the stated objective of this work, but the methodology and basic evaluation criteria are interesting beyond single protected area considerations.

Criteria for the management of protected areas:

- Mission statement of the protected area
- Management plan
- Zoning
- Renaturation
- Visitor guidance and area control
- Integration of the protected area into the region
- Evaluation of the measures

The indicators listed above define the role, the function and the conceptualisation of the protected area. The mission statement defines the objectives and the protection status of the park or reserve. It is the basis for any management in concert with the planning instrument of the park – the management plan. Defined by clear zoning with areas of different levels of active intervention or non-intervention (both are management principles), the protected area is equipped with its central management tools.

In the Alps, not all protected areas have these tools yet. Management plans do not even exist for all the National Parks at the moment, and they are rare for other forms of protected areas where zoning according to management measures is not systematically implemented. It is important that these basic tools be made available to allow more systematic work and goal-oriented interventions by the park or protected area staff.

One of the key roles of the protected area, not always systematically communicated, is to preserve landscapes and natural resources. This is, to our mind, a minimal condition for a park to be called a park. The management may plan to achieve this goal through measures of renaturation of the areas or parts of the area. This active management needs to be planned, and communication and adapted measures including compensation measures must be adopted.

In the last 10 years, the issue of visitor management in the Alps, especially in the Alpine protected areas (particularly the most famous among them), became a central topic and is today a main issue for the protected area management in all large parks. The issue can be conflictual as it may hurt local economic interests. A well-structured common strategy for visitor management with biodiversity protection adapted to local situations is currently lacking within the Alps and demands more international cooperation as visitors are not limited by national borders.

Furthermore, management incorporates local governance that facilitates integration of local and regional structures, which finally determine acceptance of the area by the local population. Governance models exist for numerous large protected areas with individual administrations – primarily for national but also regional parks. Nevertheless, a systematic approach for all the protected areas – even within a single state is lacking; and in the case of transboundary management of neighbour parks with a common border on both sides of a national territory it is rare (e.g., Alpi Marittime – Mercantour) or very specific and unique in the case of a transboundary park – the Nagelfluhkette. Such models need to be further developed and implemented.

For several years now, resources, financial support, and further development of protected areas stagnated or declined for numerous protected areas. Sometimes budget reductions undercut important conservation measures. In other cases, budgets may have increased (as in some of the Alpine National Parks), but often these increases relate to specific projects that are not based on mid- or long-term perspectives necessary for biodiversity management and conservation.

A complete and active management of single protected areas necessitates evaluation of management measures. Here, many methodologies have been developed by specialised agencies or NGO's, but no international harmonisation exists– making an international benchmark impossible. National systems exist but don't permit comparison of experiences and effectiveness of different approaches on an Alps-wide level. The latter would be of highest interest as most of the Alpine regions face comparable conservation and management difficulties and could learn more about the effectiveness of measures from each other.

For exactly this reason, the Alpine Convention initiated in 1995 the international cooperation of protected areas throughout the Alpine network of protected areas (ALPARC).

To better understand this cooperative network the following criteria are being discussed:

- Criteria and framework for the international cooperation of protected areas
- Planning and objectives
- Governance regimes
- Stakeholder involvement
- Resources

Within this framework of Alpine protected areas, park managers exchange and realise common projects in the fields of biodiversity protection and ecological connectivity, regional innovative and sustainable development, and environmental education. The main objective is to contribute to the implementation of the Alpine Convention and especially its nature protection protocol. Other protocols of the Convention concerning the missions and the work of protected areas such as "Spatial planning and sustainable development", "Mountain agriculture", "Tourism" and "Soil protection" are also considered central.

Today, **the network of Alpine protected areas constitutes the largest and most extensive specialist federation for territorial nature conservation under the Alpine Convention**. It was founded to implement parts of the Alpine Convention through networking of all protected area managers of the Alps. The Alpine protected areas are of particular interest to visitors and residents alike. They conserve an age-old, natural and cultural heritage and are role models for modern nature conservation.

The protected areas are also a communication tool, notably through the visitor centres, their information policy, and the welcome and provision for tourists and outdoor enthusiasts. Without being political activists, they perform an important role within the local and regional stakeholders via their expertise in nature protection.

The Alpine Network of Protected Areas has been considered as a model for creating the Carpathian

Convention's network of protected areas. Another network, established in 2000, based itself on the Alpine Network under the heading of mountain partnerships.

This international cooperation contributes to the management of the Alpine biological diversity, species protection and habitat conservation mainly through an intensive exchange of management experiences and measures and the testing of new approaches as well as the realisation of common actions for biodiversity protection.

The governance of the network is ensured by an international council representing all Alpine countries and protected area categories. An operational board of five members from different Alpine countries represents the core along with the coordination team to create a network for all decision-making and long-term strategy development.

A yearly general assembly and regular council meetings ensure the permanent contact between the Alpine territory and the protected areas. The team spends a large part of its working time on the ground, which means close to the park's territories and in contact with the competent authorities for environmental issues and nature protection (ministries of the Alpine states, regional agency, European institutions, and park administrations). Some activities and projects, namely those within the framework of the Alpine Convention and the European macro-regional strategy for the Alpine region (EUSALP), as well as the realisation of several EU projects involve numerous stakeholders within the protected area regions. Direct, continuous, and international coordination of activities in favour of the biodiversity and local, regional, and national stakeholders of all the Alpine countries is thus assured.

The main resources of this cooperation model consist of the coordination and expert team of the Alpine protected areas. Resources for the functioning of the network are provided by several Alpine states, and activities are generally supported by common means and in the frame of European projects, mainly the cooperation programme – Interreg Alpine Space.

The Alpine network ALPARC developed from an expert exchange and cooperation network to an increasingly spatial network by providing the planning basis for ecological connectivity between the Alpine protected areas. It now depends on political decision processes at the national, regional and the concrete local scale and the logistic and financial support available to realise this spatial ecological network in the framework of the Alpine Convention. This would constitute significant, concrete progress for biodiversity protection in the Alpine Space for generations to come. A strong involvement of spatial planning systems and experts as well as an important public acceptance and involvement are other prerequisites of a transnational ecological network – the main instrument against landscape and habitat fragmentation and, therefore, the most important for biodiversity protection in the long term.

D.5

CONCLUSIONS

We chose to be thorough in our description of the general approach and framework for the evaluation of gaps in the Alpine network of protected areas because we consider the current protected areas essential to supra-regional and international processes and standards that can ensure efficient biodiversity protection. We want to safeguard liveable conditions for generations to come. Discussion of the criteria for evaluation is an essential methodological part to better explain the approach. The assessment section of the chapter, based on the description of the frameworks and the main criteria, highlights maps illustrating the Alpine situation of biodiversity protection and, as far as possible, the effectiveness. Most of the working hypotheses especially those based on quantitative indicators have been confirmed mainly through maps based on geodata and figures. We tried to develop the more management orientated working hypotheses throughout the chapters concerning the representativity of protected areas for biodiversity, their connectivity potential, and the management aspects. Nevertheless, those criteria have been an unavoidable part of subjectivity and personal evaluation based on experiences. We will revisit some of these issues in the following two conclusion points of this chapter.

D.5.1

AN INSUFFICIENT SURFACE AREA IN THE NETWORK OF PROTECTED AREAS

The Alpine protected areas fairly accurately reflect the natural and cultural diversity found in the Alps. However, most of the large protected areas – particularly National Parks – are at high altitude. This raises questions about their actual contribution as a habitat and refuge for certain highly endangered species that live at lower altitudes.

We could state that, generally, low altitudes are underrepresented amongst large and strong protected areas due to land-use conflicts. Exceptions include a few large natural reserves- mainly in less intensively used parts of the Alpine territory and National Parks in the Eastern part of the Alps mainly constituted by large forests (Kalkalpen, Gesäuse). The representation of wetlands is generally poor in the Alps; only a few RAMSAR sites are present; wetland biotopes such as bogs and other aquatic systems are usually very limited in surface area and seldom managed by specific structures ensuring a strict protection and long-term valorisation for such areas within an ecological aquatic network. This is one of the most urgent issues for Alpine biodiversity especially in lower Alpine altitudes and in the Alpine valleys.

Ecological process protection seems to suffer because protected areas are too small in surface and are not interconnected adequately. The history of Alpine forestry leads to a situation where deciduous forest ecosystems are underrepresented and threatened, and natural habitats and species are not always sufficiently represented by the Alpine protected areas (see Annex H.11).

The overlay with the KBA indicates that the redundancy between protected areas and the KBA is not very high. The Key Biodiversity Areas cover 9,041 km^2 and around 56% of the total surface of the KBA overlays with the Alpine Protected Areas (see Annex H.11).

This situation is even worse for the overlay with strongly protected areas as the map and the calculation of the redundancy index shows. Around 38% of the total KBA surface overlays with the strongly protected areas (National Parks, Nature Reserves and Nature / Regional Parks from Italy).

This demonstrates that important biodiversity also exists outside of protected areas, which is not surprising and has to be considered as a positive fact. But it also shows that this biodiversity, essential for the Alps, is not protected by a system of spatial measures, which clearly indicates a gap in the network system of Alpine protected areas.

The number and surface of protected areas under a strict protection system is relatively low.

Table 28: Alpine Strong Protection Coverage

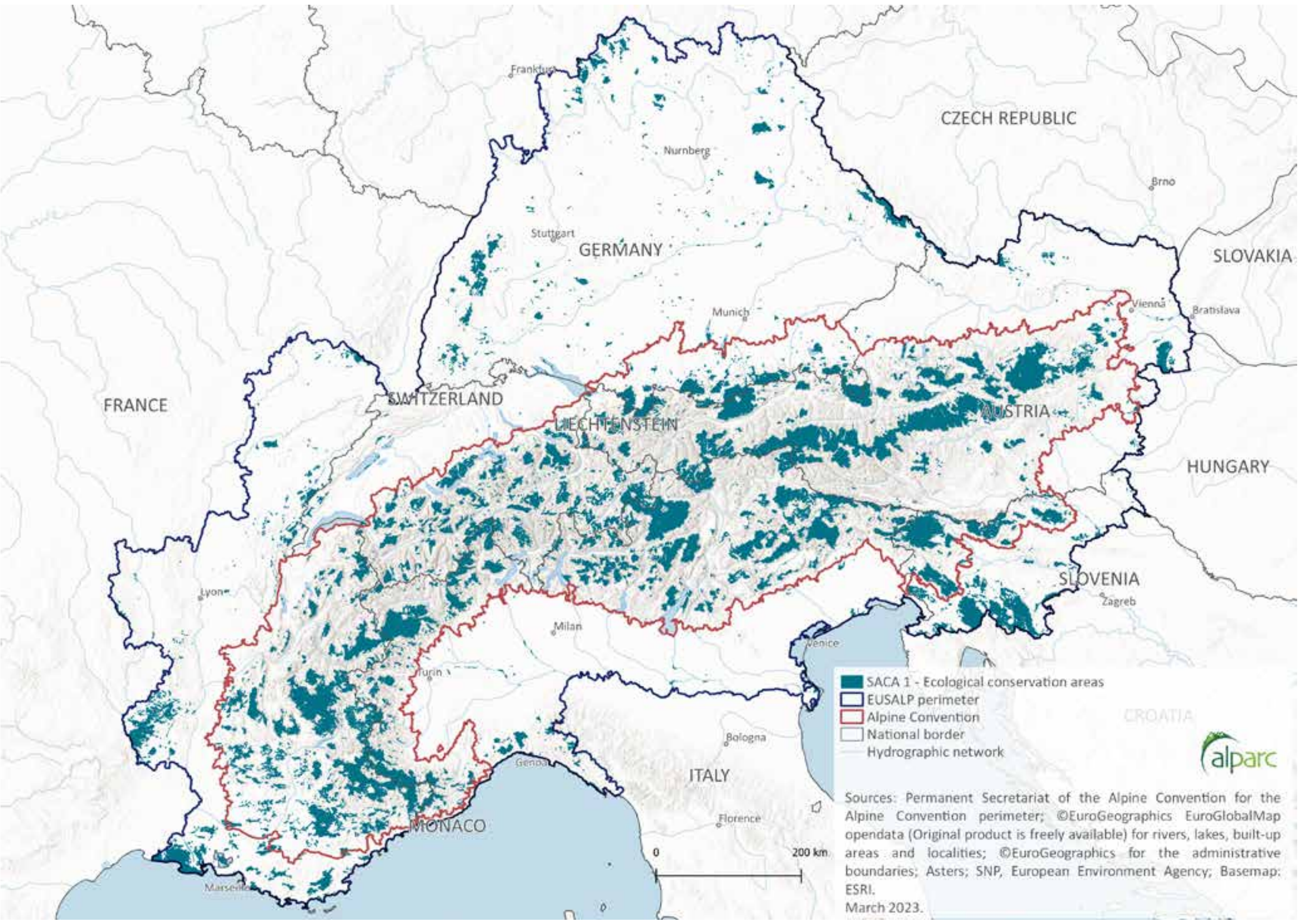
Criteria	Surface within AC km²	Surface within EUSALP km²	"% Strong protection within AC over total strong protection surface"	Alpine Convention surface km²	"% Strong protection within AC over AC surface"	EUSALP surface km²	"% Strong protection within AC over EUSALP surface"
Strong protection	18,425	19,226	95.8%	190,700	9.7%	450,000	4.1%

This table gathers the territories of all Alpine National Parks, nature reserves and Italian nature park territories. Evaluating only National Parks and nature reserves territories – generally the strictest protection the index would fall under 6.5% (which means approximately 12,360 km² without considering the Italian nature parks) for the Alpine Convention perimeter.

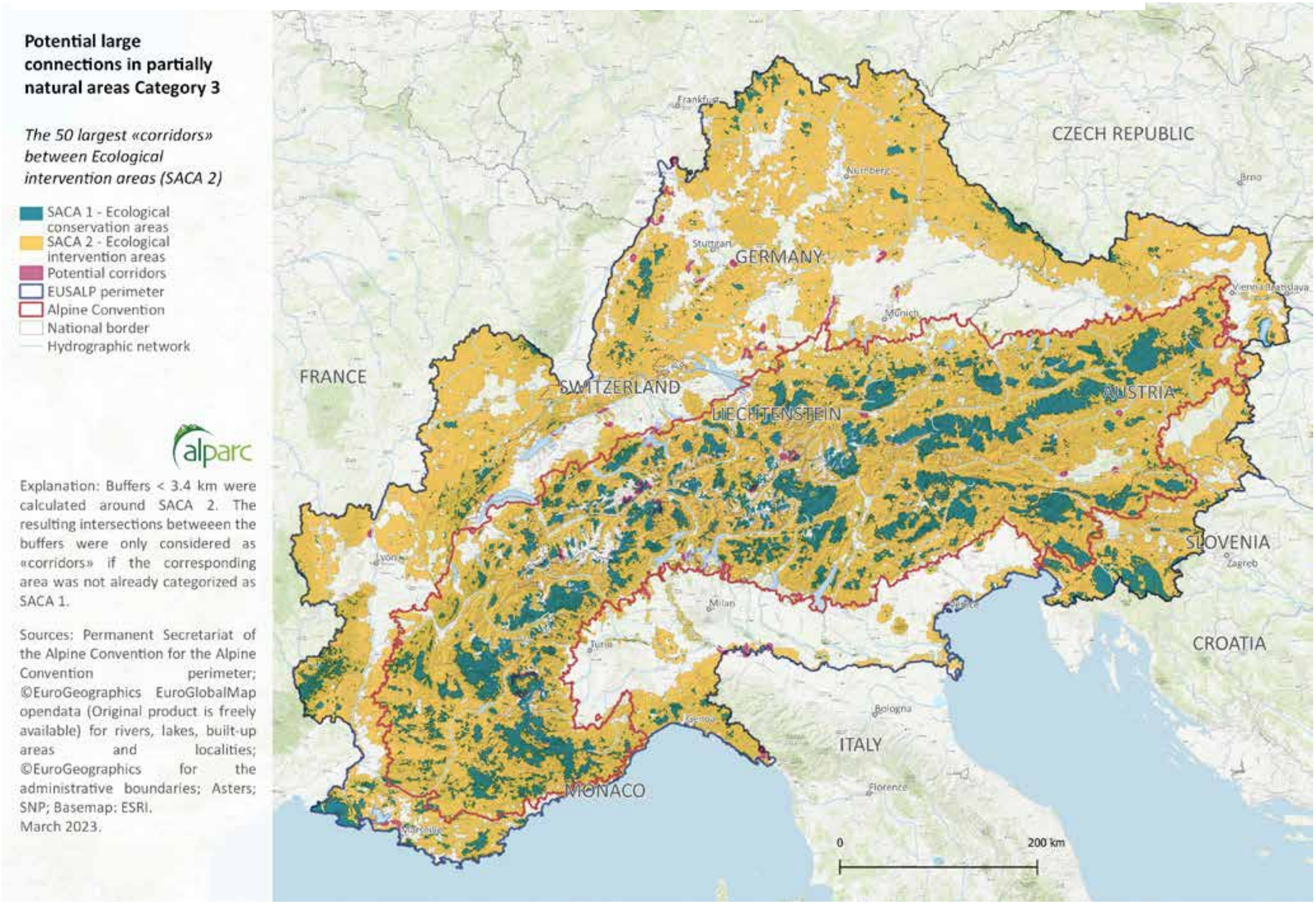
During the last 20 years, not one National Park nor large nature reserve has been created in the Alps. There have been some extensions of protected areas and a few other forms of protection systems like stronger forest protections. (Wilderness areas, network forest in Austria). This means that no new significant protected areas have been created to meet the expectations of the Alpine Convention and the Convention of Biodiversity in the Alps set out in 2002, the date of the creation of the youngest National Park – the Gesäuse (Styria / Austria). The few existing wilderness areas are too small to ensure the survival of major species populations within a sufficient perimeter even if they are scientifically useful for a limited number of plant species, insects, and birds.

To further develop the ecological network (see next chapter), a stronger network of protected areas and biotopes would be efficient as stepping-stones. Large parts of the Alps lack such stepping-stones which makes the realisation of the ecological network in some regions of the Alps difficult.

Map 39: Non-Fragmented Areas and Potential Ecological Stepping-Stones



Map 40: Potential Large Connections in Partially Natural Areas, Category 3



The SACA Analysis of the entire EUSALP area confirms the situation by highlighting “white areas” in some parts of the territory. These reflect the absence of SACA 1 areas (Ecological conservation areas) as well as insurmountable distances between the SACA 1 areas. This means it is impossible to create a connectivity system by SACA 2 areas, which can’t exist without stepping-stones. The main reason for this situation seems to be intensive land use and often agricultural monocultures.

Finally, with regard to ecological processes protection, it is important not to have harsh borders between strongly protected areas and intensive land use, as is currently the case. Indeed, zoning could help to buffer negative effects from intensive agriculture or other land-use (settlement, tourism) on the protected area territory being in a fragile ecological balance.

Support and resources for protected areas, including human resources and financial investments, are crucial to ensure long-term stability and consolidation of protected areas. Too often, this issue depends on changing political mandates. The protection of the Alpine biodiversity still relies too heavily on political ideologies and short-term considerations. The only valid indicator here is to keep biodiversity alive for generations to come!

D.5.2

A LONG-TERM PERSPECTIVE THROUGH INTERNATIONAL COOPERATION

The Alpine Convention and its protocols (e.g., Nature protection protocol) provide an important and future orientated framework for nature and biodiversity protection in the Alps.

Article 12 of its Nature Protection Protocol creates a cross-border network of protected areas:

> Article 12 Ecological network
>
> *“The Contracting Parties shall pursue the measures appropriate for creating a national and **cross border network of protected areas**, biotopes and other environmental assets protected or acknowledge as worthy of protection. They shall undertake to harmonise the objectives and measures with the cross-border protected areas”.*
>
> *(Alpine Convention)*

Besides expert exchange and the necessary harmonisation of management objectives and measures, this network provides the most important opportunity for protection of Alpine biodiversity in the long run. The creation of new, large, strongly protected areas in the Alps seems, as demonstrated in the preceding chapters, unlikely. Linking existing areas to make them more "dynamic" and more "vital" for species migrations has a higher chance of success.

Ecological corridors will be one element of the ecological continuum, accompanied by local sustainable land management measures and specific provisions for the various local stakeholders (contractual protection, agro-environmental measures, etc).

Creating small but strictly regulated protected areas at lower altitudes would be another way to link a range of habitats and to compensate for the lack of large protected areas at low altitude. It is vital to link existing natural areas in low level zones (small, well-preserved biotopes, large natural reserves, greenbelt areas) for different species to develop migratory patterns between existing large protected areas in the longer term.

In terms of the ecological continuum, this movement could be boosted through zoning and by establishing buffer zones around protected areas as mentioned in the previous chapter. This would reduce the impact of neighbouring towns and villages. Protected landscapes and transition zones in Biosphere reserves could be used to achieve this goal.

Creating Alpine ecological corridors is one of the greatest challenges facing the protected areas and Alpine Convention policy in the coming years if biodiversity protection is considered as a crucial objective by the Alpine states.

Its realisation will only be possible through close international cooperation with and between all the Alpine countries and including the European Union. Conditions have been created within the Alpine Convention and the Alpine network of protected areas to support this evolution.

The protected areas are part of the regional structure in the Alps: they are spread throughout the Alps, playing a role in conserving endangered species but also in preserving social and cultural life in the Alps, which is being threatened by economic globalisation and land management policies. Certain species that have returned after being eradicated by humans in the early twentieth century now use the protected areas as places of sanctuary and in their migrations.

The protected areas attract millions of tourists each year and also make an active contribution to the economy and culture in many Alpine regions through their services and activities to educate visitors about the natural and cultural heritage, through their efforts to protect the Alpine landscape and traditional activities, and through their image as places of outstanding beauty. All these efforts and engagements cannot be considered individually, they must all come together to achieve an overall goal – the preservation of biodiversity and more generally "Alpine life" for the next generations.

D.6

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E

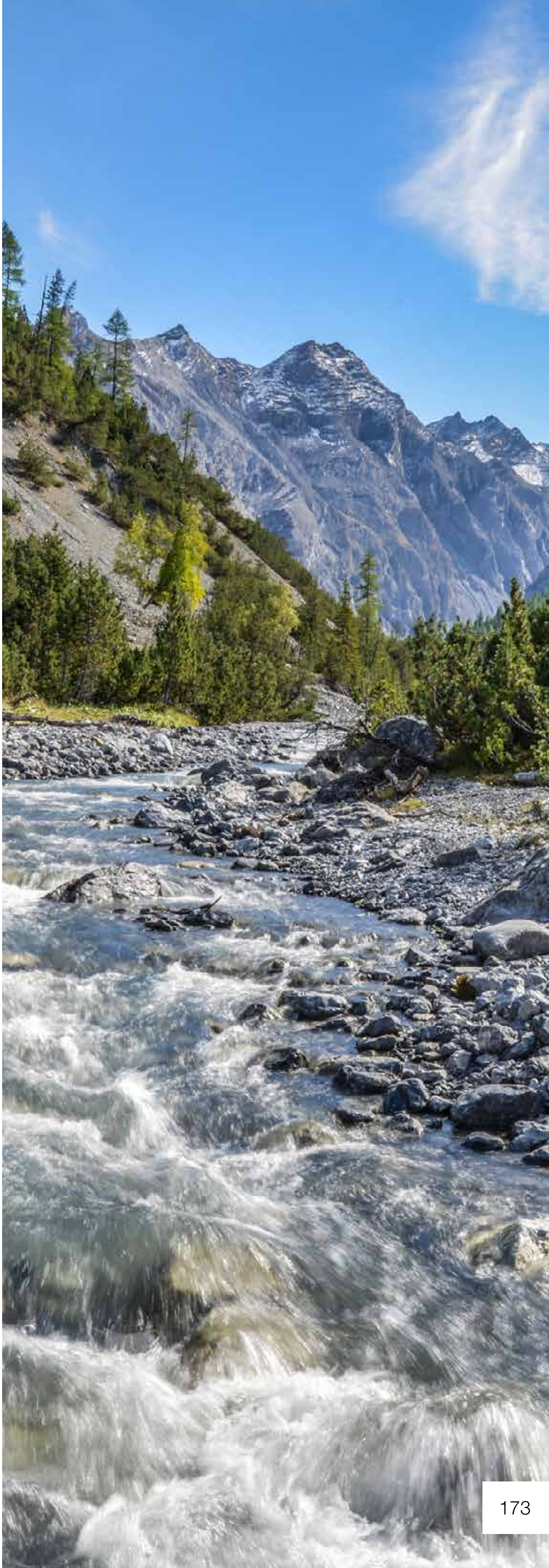
CHAPTER 3
PROTECTED AREAS AS CENTRAL ELEMENTS OF AN ECOLOGICAL ALPINE NETWORK

WORKING HYPOTHESES[1]

Protected areas need to be more strongly connected through spatial and management measures

1. Small protected areas and Natura 2000 sites may partially complete the Alpine protected area network
2. The 10 inner Alpine valleys most impacted by fragmentation should be revitalised for species migration via wildlife corridors
3. Special attention needs to be paid to transboundary networks of Alpine protected areas
4. Special focus should be put on the periphery of the Alps at the interface between the Alpine Convention perimeter and the EUSALP territory as an area with significant challenges for Alpine ecological connectivity
5. Cooperation between protected areas and their surroundings is crucial in order for connectivity to function properly
6. A special Alpine policy and strategy should be applied according to the SACA categorisation developed by the INTERREG project ALPBIONET2030
7. Spatial planning is a key issue for ecological connectivity. To ensure long term ecological connectivity, planning in other key sectors (agriculture) must also be included in larger “environment plans”
8. Cooperation between urban, peri-urban and rural areas concerning ecological connectivity needs to be reinforced
9. The transport protocol of the Alpine Convention should be a basis and implementation tool for the connectivity policy of the Alpine space.
10. JECAMI must be defined as the simulation tool of Alpine connectivity

[1] Working Hypotheses in green have a strong territorial or spatial context; those in orange they are linked to management issues



E.1

INTRODUCTION

Ecological connectivity – why it is important in addition to protected areas?

A massive global decline of species richness has been documented (Böhm et al. 2013, Estes et al. 2011, Schipper et al. 2008) highlighting a worldwide biodiversity loss far exceeding the background extinction rate (e.g., Pimm et al. 2014). There is mounting evidence that biodiversity loss alters the functioning of ecosystems (e.g., Risch et al. 2018) and thereby impacts human beings by compromising critical ecosystem services, such as the pollination of food crops or the provision of fresh and clean air. In order to combat the extinction crisis, the United Nations (UN) Sustainable Development Goals aim to conserve 17% of the terrestrial and 10% of the marine areas (AICHI Target n°11), while representatives of the 'Half Earth approach' (Dinerstein et al. 2012, Noss et al. 2012, Wilson 2016) claim that 50% of the earth needs to be conserved to sustain human livelihood.

While large, functional, and well-managed protected areas are extremely important for conserving biodiversity, it is essential to recognise that vast amounts of biodiversity and ecosystem attributes exist in and depend on landscapes outside of the present-day protected area domain.

The simple size of a protected area is, more often than not, a poor criterion when evaluating its value in conserving biodiversity, protecting intact ecosystems and conserving species.

In the Alps, as elsewhere in Europe in the past, conservation efforts focused on maximising biodiversity in protected areas (Brudvig et al. 2009), and these areas were chosen to include most of the territories' biodiversity, their natural and cultural heritage. Considering the resource needs of the world's growing population and given the particular Alpine geographic context, it is unlikely that enough land can be directly protected to meet the needs of all species and communities. (Mawdley et al. 2009)

Given that the number of threatened species is steadily rising, and protecting land only represents a static approach, the concept of protected areas is insufficient.

In the Alps, one of the first international projects that worked on linkages between protected areas, the ECONNECT project (2008-2012), made the following statement about the patchwork of Alpine Protected Areas:

"The project envisions an enduringly restored and maintained ecological continuum, consisting of interconnected landscapes, across the Alpine Arc region, where biodiversity will be conserved for future generations and the resilience of ecological processes will be enhanced". (Walzer et al. 2011)

No protected area is, in itself, large enough to fulfil essential conservation goals. In order to achieve these goals, protection will necessarily have to extend into the complex, patchy multi-use matrix that stretches between the protected area islands (e.g., Boscolo and Metzger 2011, Shanahan et al. 2011).

> *"Ecological connectivity refers to the ability of plants or animals to move freely through a landscape, seascape, or freshwater environment. The main goal of connectivity is to facilitate movement of individuals, through both dispersal and migration, so that gene flow is maintained between local populations. By linking populations throughout the landscape, there is a lower chance for extinction and greater support for species richness. More connectivity means fewer barriers to dispersal or migration and less fragmentation".*
>
> *(Boscolo and Metzger 2011)*

Mountain ranges, like the European Alps, are unique habitats exhibiting high species richness. This makes them important to global biodiversity conservation (Kohler et al. 2009, Körner and Spehn 2002). Nature conservation in the European Alps tends to take place mainly where there are few conflicts of interest and not necessarily at the most favourable locations from a conservational perspective.

E.1.1

METHODOLOGY

The content of this chapter is based on the results of previous work carried out by ALPARC and numerous project partner in various projects and initiatives. In the framework of the Alpine approach to ecological connectivity, protected areas, landscape permeability and a sound GIS based approach of mapping suitable areas for ecological connectivity in the Alpine Arc (Plassmann et al. 2016) have always represented key elements. The work described in this chapter will refer, in particular, to the results of the ALPBIONET2030 project developed on the basis of the Strategic Alpine Connectivity Areas (SACA) approach that will be described in detail in the following sections. The results produced by the ALPBIONET2030 project were further analysed and combined with different data sets linked to the situation of Alpine protected areas in order to refine hypotheses and needs linked to ecological connectivity, the role of protected areas and recommendations to the policy level in the Alpine context. Notably, a large mapping analysis took place during this project to underline the hypotheses and project results from former work on Alpine ecological connectivity.

The working hypotheses expressed at the beginning of this chapter are considered throughout this chapter.

E.1.2

THE CONTINUUM SUITABILITY INDICES

The continuum suitability indices (CSI) were developed to a) support the decision-making process for policy development and implementation of landscape planning; and b) provide an overview of ecological space and obstacles in the EUSALP macro region.

The indices are the most central basis of all analyses that have been conducted within this and former projects to illustrate the current situation of Alpine ecological connectivity and to consider scenarios for the future.

The CSI are defined as a set of spatially explicit indicators that determine ecological connectivity.

They are:

Environmental protection (ENV)

In all ecoregions across the world, environmentally Protected Areas (PA) are key strategic elements for nature conservation (Laurance et al. 2012, Ostermann 1998, Saunders et al. 2002) because of the vast amount of biodiversity which exists in them. The effectiveness of the PAs is determined by the effectiveness of their management (Jones et al. 2018), their spatial distribution (Le Saout et al. 2013, Schoville et al. 2018) and the surrounding matrix (Häkkilä et al. 2017). Although the PAs total area has roughly doubled since the Earth Summit in Rio in 1992, the human pressure on PAs has also increased.

Nowadays, some 30% of PA land is affected by intense human pressure (Jones et al. 2018). Furthermore, PAs in the European Alps may come under increasing pressure if they are not sufficiently legally secured. Threats arise from a variety of competing interests, such as the infrastructure construction for renewable energy production and touristic projects. New PA projects are often opposed by particular interest groups, and, at lower elevations, the establishment of large PAs is almost never discussed.

Fragmentation by transportation infrastructure (FRA)

Landscape is increasingly fragmented by a variety of anthropogenic structures, such as industrial areas, settlements, and transportation infrastructure. These constructions result in habitat loss in terms of space (each fragmenting feature uses space) as well as disruption and isolation of areas by linear structures, such as roads or railways. Based on island biogeography (Simberloff and Abele 1976), areas rich in biodiversity need to be of a minimum size in order to maintain their species richness. Small, disconnected areas that do not allow for movement lose their biodiversity within a short time. The degree of degradation depends on the isolation of the individual areas and their size (Saunders et al. 1991). Small areas are particularly affected over time by decreasing key ecosystem functions (Haddad et al. 2015).

While the loss of space is implicitly included in the land use indicator, the fragmentation indicator accounts for the isolation and disruption of areas by transportation infrastructure. For this purpose, the effective mesh density (Jaeger 2000) - a widely used measure for fragmentation - was applied using the cross-boundary concept proposed by Moser et al. (2007) and assigning a higher importance to motor- and highways. The effective mesh densities were then valued from zero, which means highly fragmented, to 10, which means very low fragmentation and therefore good conditions for an ecological continuum.

Land use (LAN)

Altering natural landscapes for human needs or transforming the use of landscapes directly influences biodiversity and consequentially the functioning of ecosystems (de Baan et al. 2013, Foley et al. 2005, Metzger et al. 2006, Teixeira et al. 2016). In contrast to other ecoregions in the world, the EUSALP macro-region contains almost no area which has not either been used or transformed in the Anthropocene. However, the degree of transformation and the naturalness of the specific landscapes varies considerably. Globally, urbanisation is one of the major threats to native species, reducing biodiversity and altering ecosystems (McKinney 2002). In the EUSALP region, land is still being transformed into settlements or sealed for other purposes. In Switzerland, for example, approximately 0.75 square metres are sealed per second (based on the evaluation of the spatial statistics).

Ecological connectivity and biodiversity in agricultural and forested landscapes depend on land use intensity and on the type of management practices (Young et al. 2005). Intensive agriculture reduces biodiversity (Tsiafouli et al. 2015, Tuck et al. 2014), while unproductive or extensive agriculture may have the opposite effect. In forested areas, plantations of monocultures reduce the abundance of native species and the type of forest management methods affects biodiversity (e.g., Bernes et al. 2015). Reduction in or abandonment of intervention or management that is closer to the natural life cycle of forests could have positive effects (Mölder et al. 2019, Paillet et al. 2010), while clear-cutting has mainly negative effects.

The aim of the land use indicator is to represent the sum-effect of these interactions on the ecosystem. Based on collation of the results of a literature review combined with the results of expert workshops, a classification scheme for land use and land cover data was elaborated and applied.

Population pressure (POP)

Humans are seen by the Millennium Ecosystem Assessment (2005) as the main drivers of change in the state of ecological systems, and the threat to biodiversity increases as human population density increases (Luck 2007). In addition to permanent inhabitants, tourism demand plays an important role in human pressure on ecosystems– especially in the Alps, where approximately 226 million overnight stays are registered annually (based on the evaluation of the Eurostat data [Eurostat 2019] for the alpine perimeter). With the population indicator, human pressure on ecological connectivity is represented. It is expressed as a classification of population density.

Altitude and topography (TOP)

High Alpine areas act as a barrier for many species occurring at lower elevations, and steep rock walls may be insurmountable obstacles. In addition, biomass decreases with altitude in the European Alps. Similarly, species richness decreases with altitude (e.g., Meyer and Thaler 1995). The topography indicator accounts for these sum-effects by the combined evaluation of altitude and slope.

The CSI were defined based on the collation of scientific literature and the results of expert workshops. The individual indicators complement each other by not including different influencing factors more than once. Each indicator is described in a spatially explicit manner using a GIS. The spatial analysis results are then valued from zero to 10 depending on the suitability as an ecological continuum. In the valuation process, zero means poor suitability as an ecological continuum and 10 indicates high suitability. The individual indicators provide the basis for the SACA approach.

E.1.3

STRATEGIC ALPINE CONNECTIVITY AREAS (SACA) – A EUSALP WIDE CONCEPT FOR ECOLOGICAL CONNECTIVITY

The Strategic Alpine Connectivity Areas (SACA) approach offers a useful lens through which to view the questions of ecological connectivity and protected areas. All Alpine and EUSALP areas have been analysed with regard to their potential for ecological connectivity and assigned to one of three categories according to the status of their ecological connectivity and to the type of action required. For the EUSALP area it can now be illustrated, at a pan-Alpine level, where to prioritise conservation action, restoration activities or planning for more important ad-hoc measures.

Based on expert knowledge, the main barriers to ecological connectivity in and around the Alps have been defined based on the Strategic Alpine Connectivity Areas (SACA) analysis. These barriers represent significant obstacles to the movement of flora and fauna. One can observe a concentration of barriers in the border zone between the Alpine Convention area and the EUSALP area. The isolation of the mountainous region of the Alps from the surroundings is therefore a fact that needs to be considered when discussing ecological connectivity in the European Alpine context.

In addition, main connectivity areas have been identified by the experts. These areas are of particular importance for ecological connectivity at an international level and, when managed appropriately, allow bridging of interruptions caused by the barriers. They often also represent linkages to neighbouring mountain ranges, such as the Apennines or the Jura. The connectivity areas will certainly play a central role in the context of climate change induced migrations in the area.

E.1.3.1

ECOLOGICAL CONSERVATION AREAS (ECAS)

Ecological Conservation Areas (ECAs) are the first of the three categories of the Strategic Alpine Connectivity Areas (SACAs). They are areas that still have considerable space for connectivity with non-fragmented surfaces and where connectivity should be conserved.

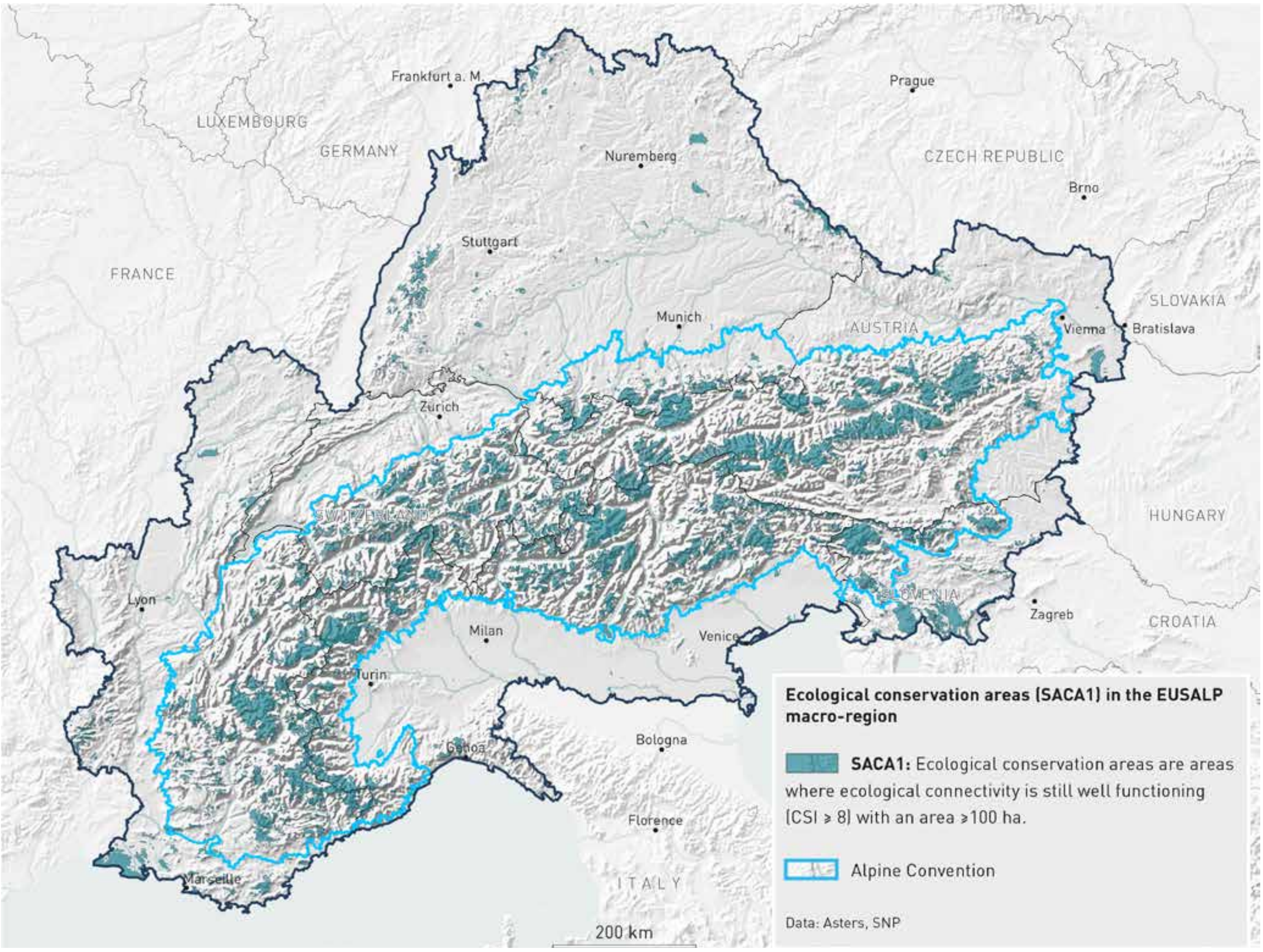
Due to their characteristics, they can be considered as connectivity nodes or central elements in an Alpine ecological network system. They ensure larger continuous natural areas and therefore represent nature hotspots in the Alps. Compared to other regions, the Alps are still rich in fairly intact landscapes with 11% of the surface included in the EUSALP perimeter considered as Ecological Conservation Areas.

From an ecological connectivity perspective, the main objective for the Alps is to conserve these areas in their current state by preventing degradation that would have a negative impact on the ecological functioning of the area, such as fragmentation, intensification of land use or further anthropogenic pressure. This means that these areas need a well targeted, large-scale conservation policy to prevent such degradation (passive approach) combined with a spatial planning policy recognising their role as a biodiversity heart for ecological connectivity. Currently, 61% of the Ecological Conservation Areas are located in existing protected areas (within the perimeter of the Alpine Convention, which means in mountainous regions), and 48% of the existing protected areas are totally or partly located in an Ecological Conservation Area.

This highlights the importance of protected areas as non-fragmented areas in the Alps and as important areas for nature conservation, particularly for ecological connectivity. But it also shows that efforts must be undertaken to raise the profile of Ecological Conservation Areas that are not located in protected areas. Within the EUSALP perimeter (excluding the Alpine Convention contribution), the portion of Ecological Conservation Areas located in protected areas is much lower (27%). Also, the number of protected areas addressing ECA is lower (10%). Directly comparing the proportion of ECAs within the perimeter of the Alpine Convention (15%) to that within the EUSALP perimeter (2%), it is clear that the situation of ecological networks in the Alps is completely different. As the human pressure on land and the effects of human land use are much higher in the lowlands than in the mountainous areas, this is not very surprising. But it shows the need to consider these aspects in the lowlands surrounding the Alps and the importance of a close analysis of the situation especially in the frontier areas between the Alps and the EUSALP area.

Therefore, Ecological Conservation Areas should be safeguarded by intelligent nature conservation and spatial planning polices, and, where possible, their area should be increased. Connections should be established in between them by adequately addressing the zones located between ECA. Ecological Conservation Areas protection measures should be reinforced.

Map 41: Ecological Conservation Areas (SACA 1)



E.1.3.2

ECOLOGICAL INTERVENTION AREAS (EIAS)

Ecological Intervention Areas (EIAs) are the second of the three categories of the Strategic Alpine Connectivity Areas (SACAs). They are areas with a high potential for connectivity in which larger, more or less natural, non-fragmented zones could be created, especially by connecting protected areas, Natura 2000 sites or other precious biotopes. Ecological connectivity is currently working to some extent in these areas but would benefit from enhancements.

The Ecological Intervention Areas have been designed as important links between the Ecological Conservation Areas. They have been defined based on the assumption of the electric circuit theory (McRae et al. 2008), stating that landscape composition and pattern can be linked to functional connectivity by translating landscapes and an animal's potential to move within them into current, voltage, and resistance values. In this way, the circuit theory approach simulates dispersal and gene flow in wildlife populations at landscape spatial scales by analysing how current disperses in a given landscape in which resistance values have been attributed to different landscape patterns. ECAs are defined as power sources from which electric power is released into the landscape. A resistance matrix based on the Continuum Suitability Index (CSI) defines the resistance of a single landscape to the power flow. Only areas connecting two or more ECAs and located below 2,500 m were selected as EIA.

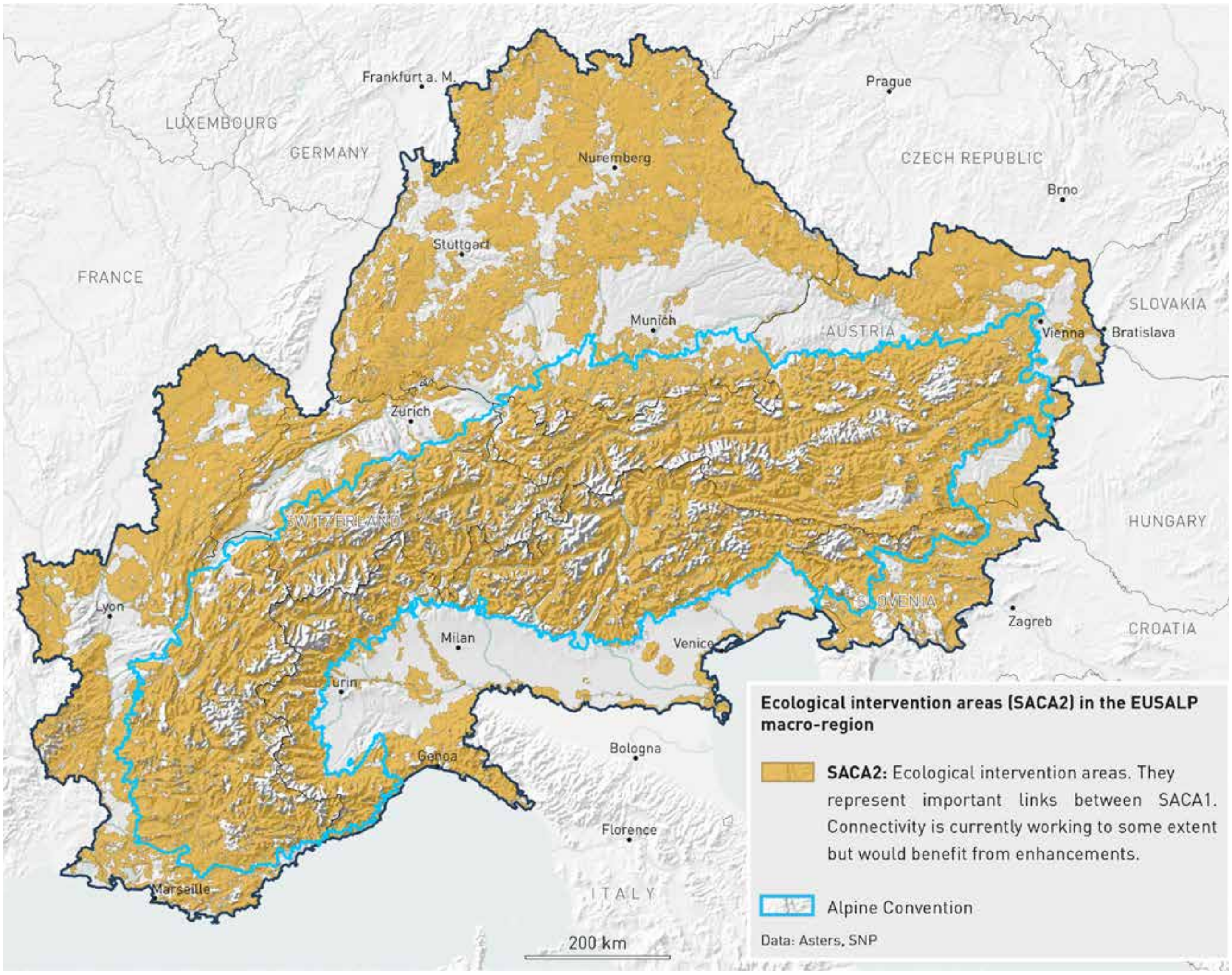
The map shows that 59% of the total EUSALP territory and 65% of the Alpine Convention territory are covered by EIAs. As the number of Ecological Conservation Areas is higher in the Alpine Convention Perimeter, the percentage of EIA is also higher here. Ecological Intervention Areas connect Ecological Conservation Areas with one another and represent the dynamic areas of an ecological network facilitating connections between larger core areas. For these areas a careful institution of measures improving ecological connectivity should be planned.

Table 29: Elevation Segments ECA - EIA

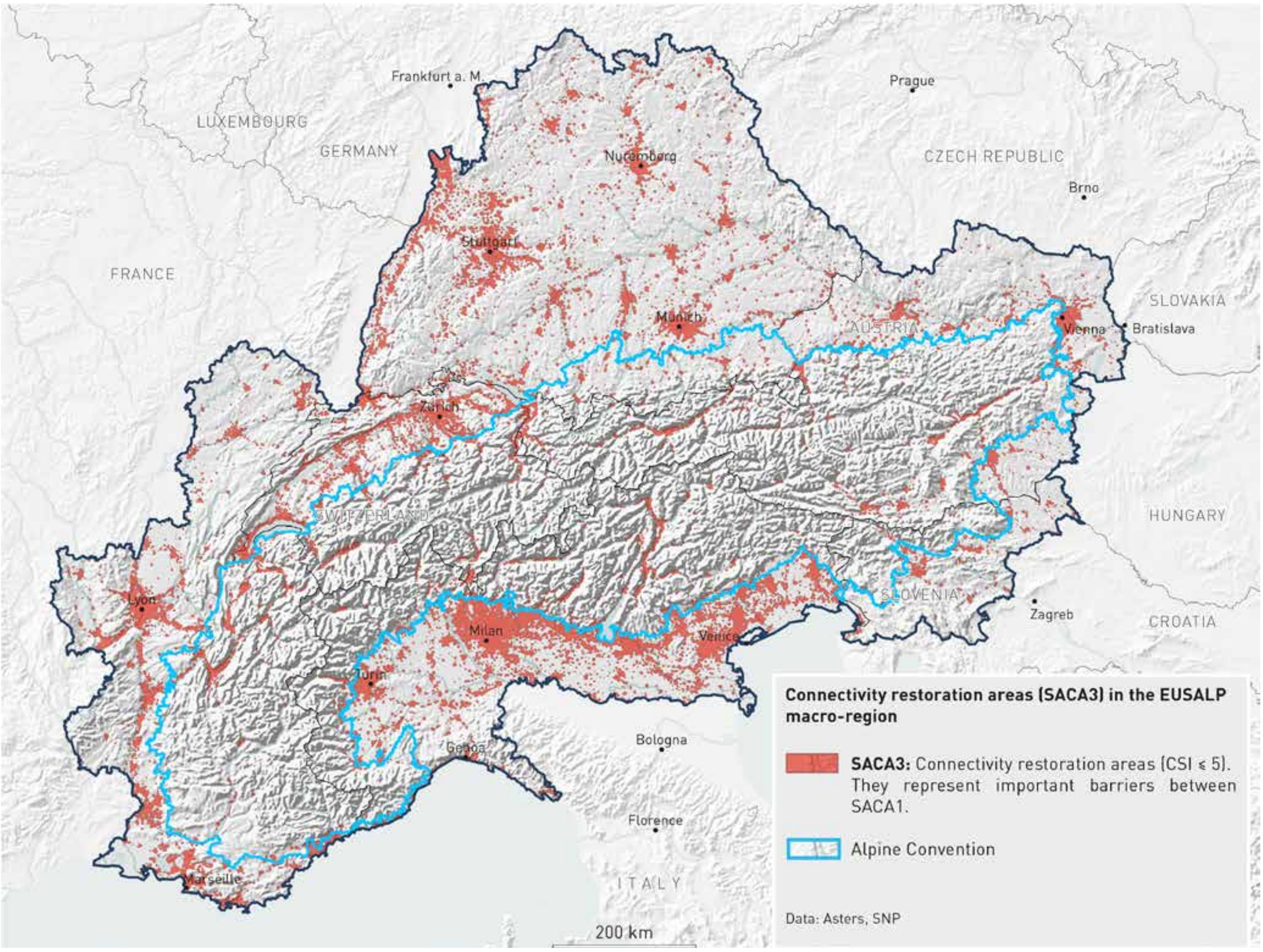
	ECA	EIA
Altitude (m asl)	**%**	**%**
0 – 500	7	38
500 – 1000	13	35
1000 – 1500	20	15
1500 – 2000	25	8
2000 – 2500	23	5
2500 – 3000	10	0
3000 – 3500	2	0
3500 – 5000	0	0

The situation of ecological connectivity can be slightly improved through adapted measures, which means that action in these areas is still feasible with a relatively low investment. Comparing the altitudinal situation of the EIAs with the altitudinal situation of the ECAs (see Table 29), it is obvious and unsurprising that EIAs are located at lower altitudes, altitudes where human pressure on land is higher. The EIAs represent the largest share of the three categories of the Strategic Alpine Connectivity Areas (77%).

Map 42: Ecological Intervention Areas (SACA 2)



Map 43: Connectivity Restoration Areas (SACA 3)



E.1.3.3

CONNECTIVITY RESTORATION AREAS (CRAS)

Connectivity Restoration Areas (CRAs) are the third of the three categories of the Strategic Alpine Connectivity Areas (SACAs). They are areas where fragmentation has already progressed so far that interlinked habitats and a transparent landscape matrix are no longer a realistic option using reasonable, viable interventions, and solutions would entail extreme financial and political effort. They represent important barriers between Ecological Conservation Areas.

The Connectivity Restoration Areas represent 14% of the EUSALP territory and 4% of the Alpine Convention territory. They are mostly located at lower altitudes (see Table 29) with very high human pressure on the land.

In the Alpine area, they are mainly concentrated in the densely populated and intensively used valley floor areas. In the territories around the Alps, they are mostly located in the areas of larger agglomerations and cities. Two big belts can be identified in the southern (Po plain) and northern border areas between the Alpine and the EUSALP territory as well as in the lower Rhône valley in the west. They are characterised by landscape fragmentation due to urban sprawl and transport infrastructure as well as river engineering generating important barrier effects and causing loss of natural connectivity between individual populations.

Recommendations for these areas are the implementation of ad hoc measures to improve ecological connectivity (punctuated approach) at very targeted locations in order to mitigate negative barrier impacts.

E.2

THE CURRENT SITUATION OF ECOLOGICAL CONNECTIVITY IN THE ALPS

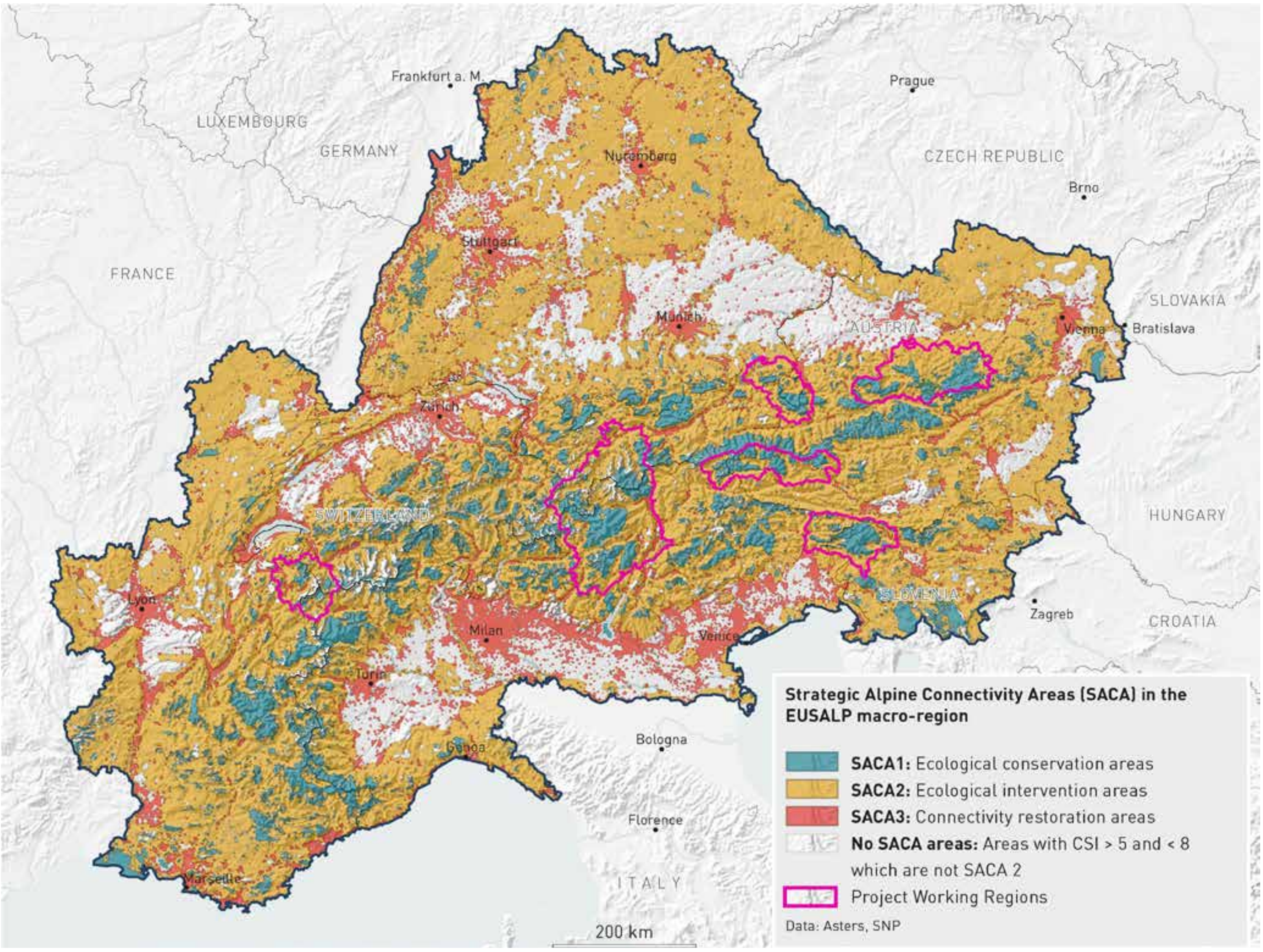
E.2.1

STRATEGIC ALPINE CONNECTIVITY AREAS – THE ALPINE OVERVIEW

The following map displays all three of the different types of Strategic Alpine Connectivity Areas at once. The map clearly illustrates that the Ecological Intervention Areas (EIA) constitute the largest percentage of the Strategic Alpine Connectivity Areas. The EIA act as linkages between Ecological Conservation Areas (ECA) as well as buffer zones.

Looking at the Alpine and EUSALP picture, it appears that the ECAs, mostly located in the higher Alpine areas, are, to a large extent, already benefiting from an existing protection measure (some category of protected area) and therefore need commitment to long-term preservation of this status without any degradation of ecological functioning.

Map 44: Strategic Alpine Connectivity Areas



Connectivity Restoration Areas (CRA), located at lower altitudes, are concentrated at the border area between the mountain zone and the lower lands surrounding the Alps. Here, interventions to improve ecological connectivity require participation of a larger number of stakeholders as well as significant financial investment. As these areas are often located in densely urbanised areas or areas with intensive land use, actions must also be closely coordinated with the spatial planning sector.

Since the EIAs represent the greatest surface area and are geographically distributed over the different altitudes and areas of the Alps and the EUSALP, they are the focus of this approach. Their relative abundance also illustrates the high potential both in and around the Alps for ecological connectivity improvement by implementing the corresponding actions. Large parts of the landscape would benefit from a coherent initiative of ecological network building.

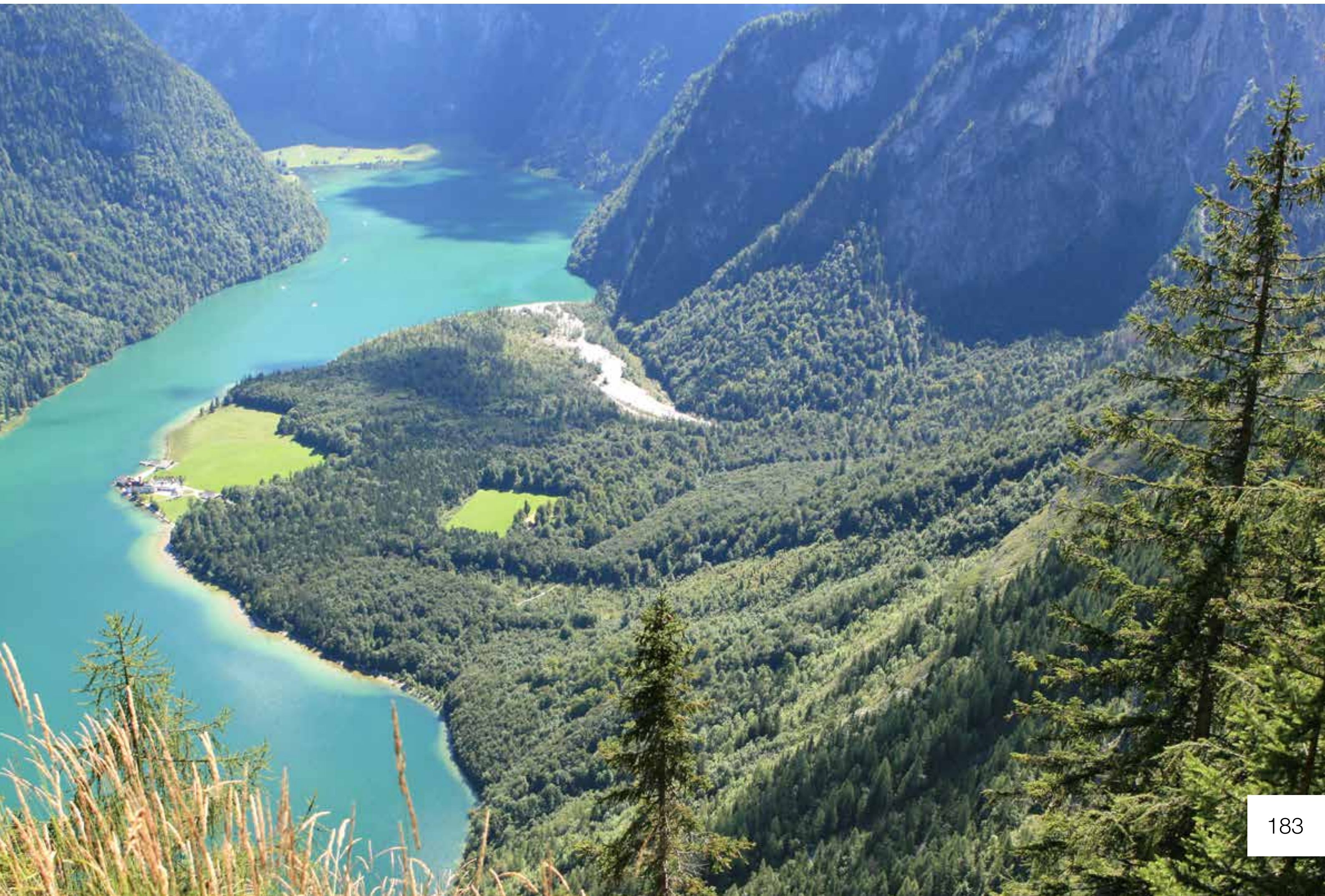
White Areas

An unexpected result of the analysis of connectivity was that the three categories of Strategic Alpine Connectivity Areas, combined, cover 77% of the EUSALP territory (84% of the territory of the Alpine Convention). Therefore, 23% of the area is not covered by any of the three SACA categories.

Areas with CSI values between five and eight would normally fall into the category of the Ecological Intervention Areas (SACA 2). Based on their individual geographic context, they have, nevertheless, been excluded from this category because of their location in areas where interventions concerning improvement of ecological connectivity would not make much sense according to the criteria defined by the project (lakes, high altitudes above 2,500 m asl). They have also been excluded from this category if they do not act as connecting elements between two Ecological Conservation Areas. This is the case if distances between two ECAs are too great to ensure connectivity between them.

It is noticeable that the areas not considered in the Strategic Alpine Connectivity Areas categories are mostly located on the border between the EUSALP territory and the territory of the Alpine Convention. The intensive land use observed in this zone explains the absence of protected areas and, according to our findings, therefore, also the absence of Ecological Conservation Areas that could be connected. The main land use type leading to these results is agriculture, which is practiced in an intensive way in the concerned zones.

Improvement of the permeability of the landscape matrix and creation of larger protected areas in these zones could certainly improve the situation and would lead to a classification in the Ecological Intervention Areas category.



E.2.2

NON-FRAGMENTED AREAS AND POTENTIAL ECOLOGICAL STEPPING-STONES

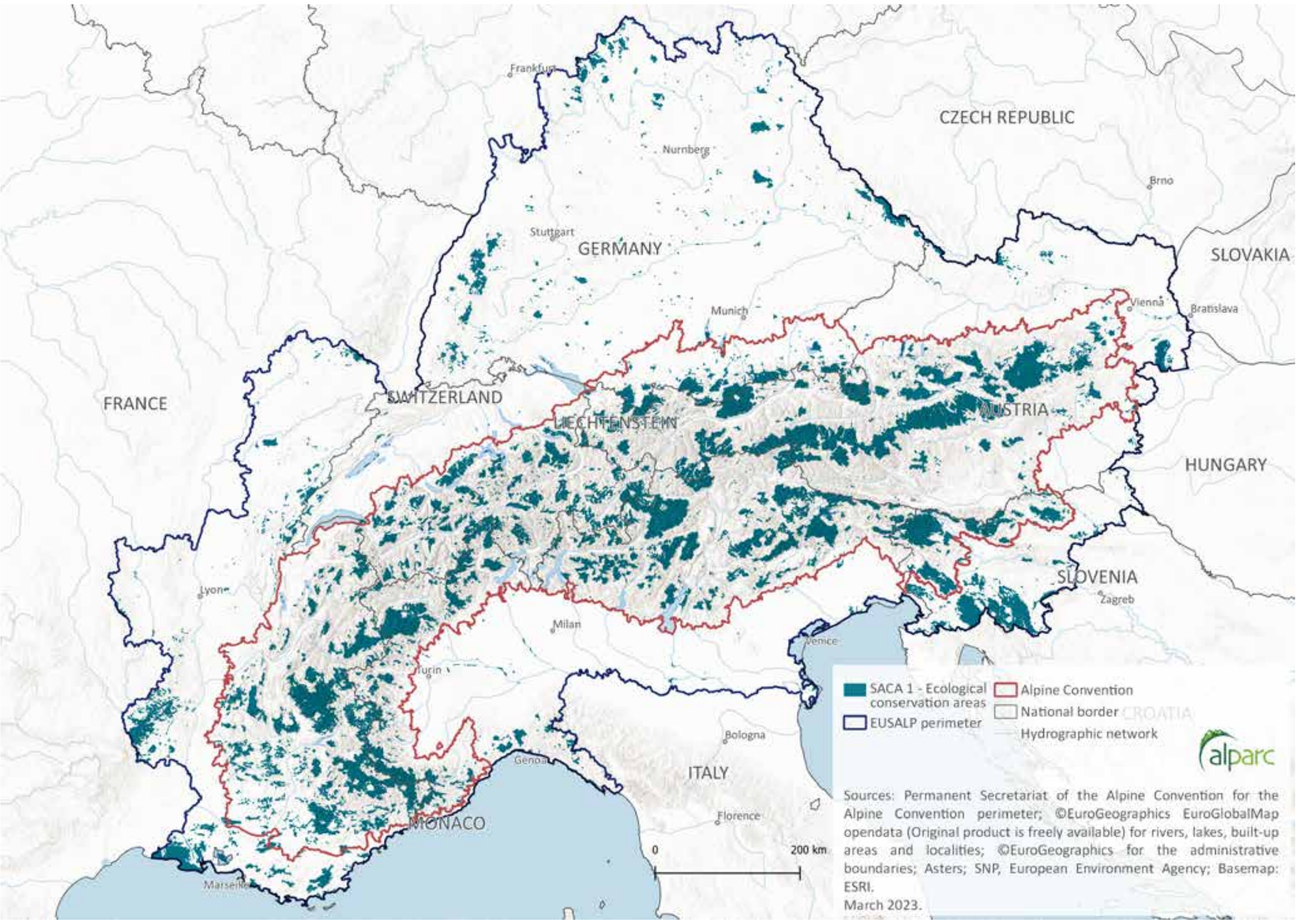
The map below shows all Ecological Conservation Areas (ECAs) larger than 1 km². A large majority of these are located, as expected, within the Alpine Convention perimeter and geographically distributed along the higher mountain ranges of the Alps, corresponding mainly to the areas of the largest Alpine protected areas.

The total number of ECAs larger than 1 km² is 2,660 with a total surface of 48,420 km². This corresponds to almost 98.9% of all ECAs that have been identified within the EUSALP perimeter and to 20% of the surface area of the Alpine Convention perimeter (Map 45).

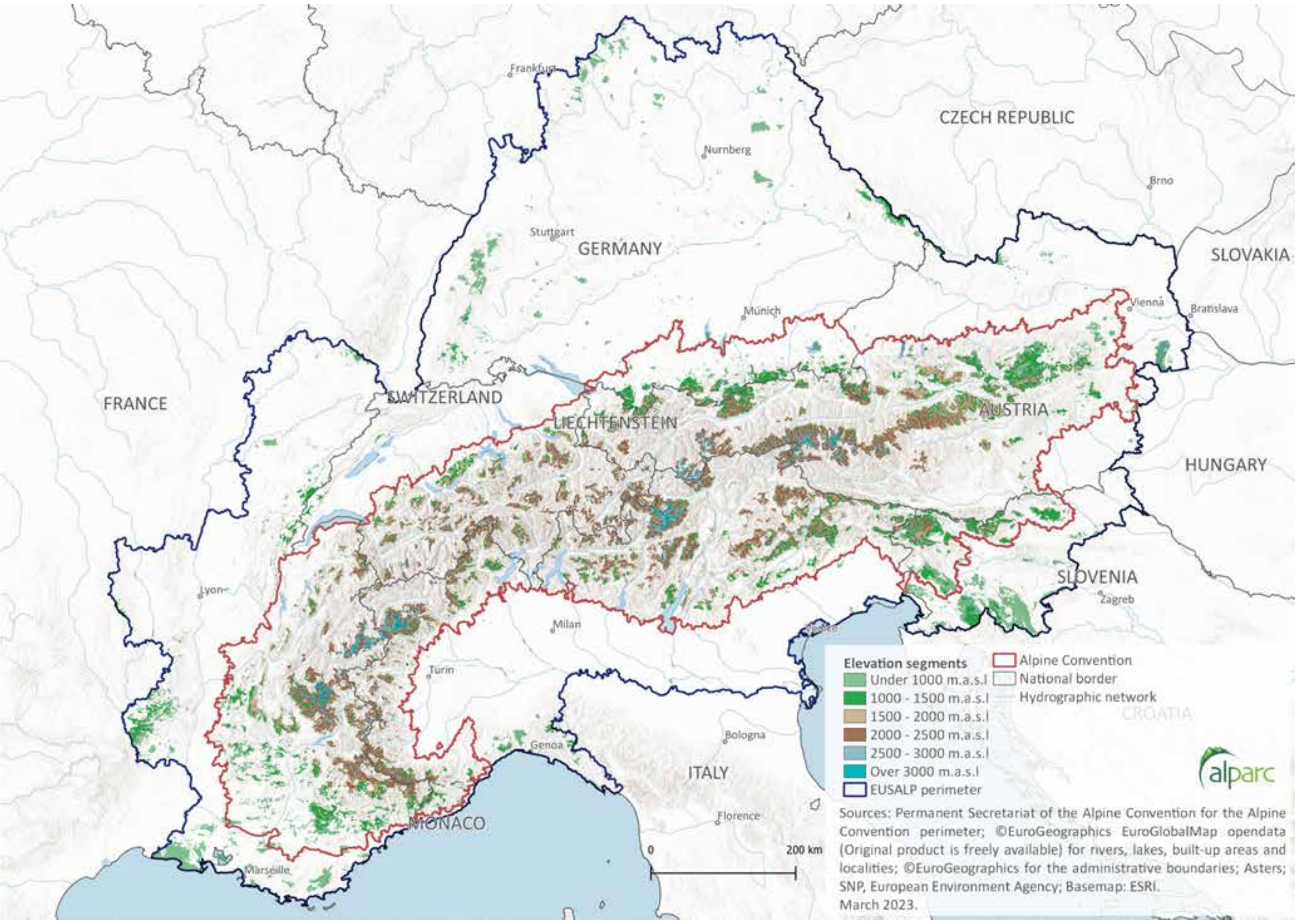
When analysing the altitudinal distribution, one can see that large parts of the ECAs are also located below 1,500 m, an important finding since these areas are very important for ecological connectivity but are quite underrepresented amongst the stronger protected areas (Map 46).

Such ECAs have great potential for ecological connectivity and can be designated for this reason as well as ecological potential areas for the future and for ecological corridors if certain conditions (connected habitats, species migration) are fulfilled (Map 47).

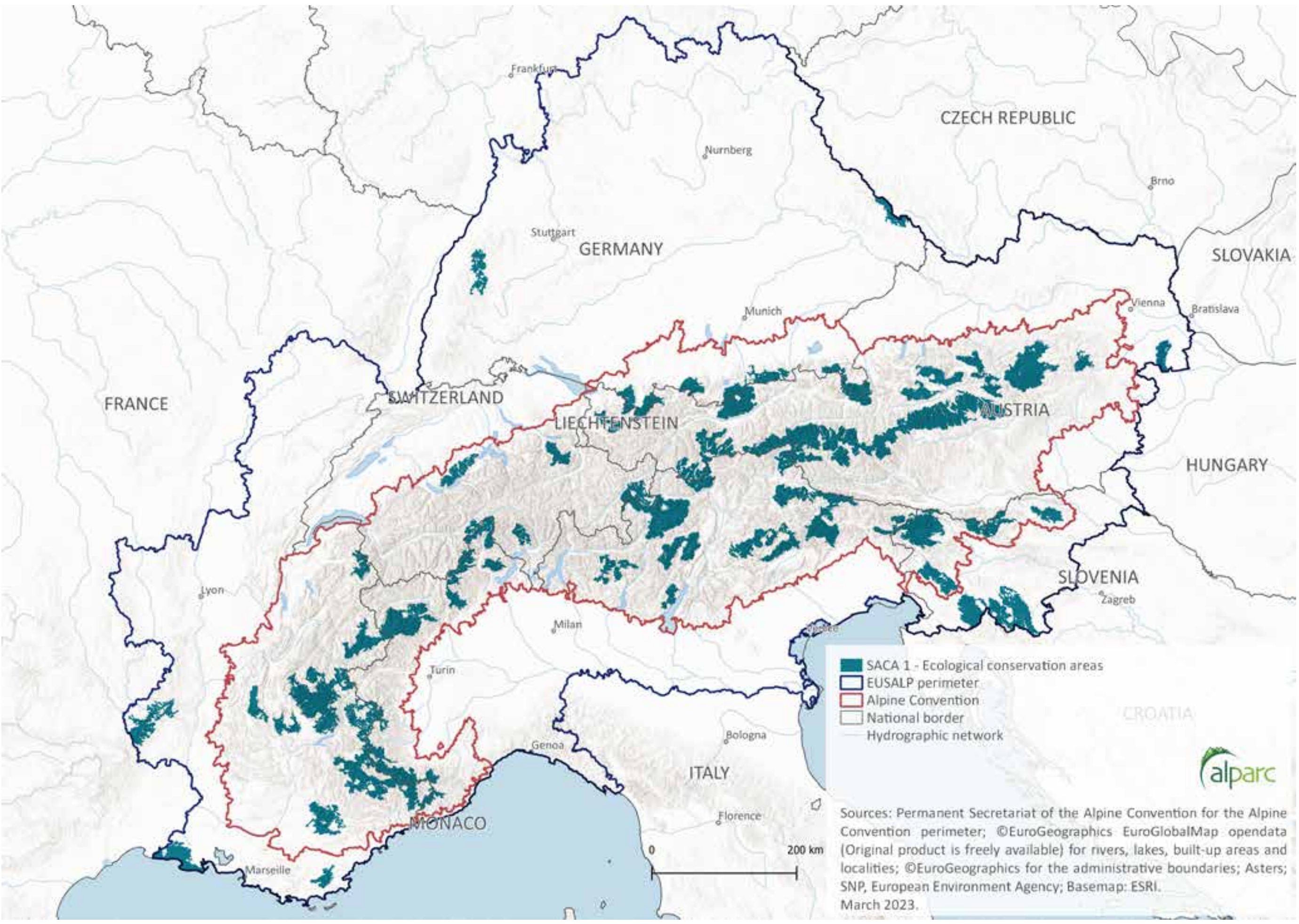
Map 45: Non-Fragmented Areas and Potential Ecological Stepping-Stones



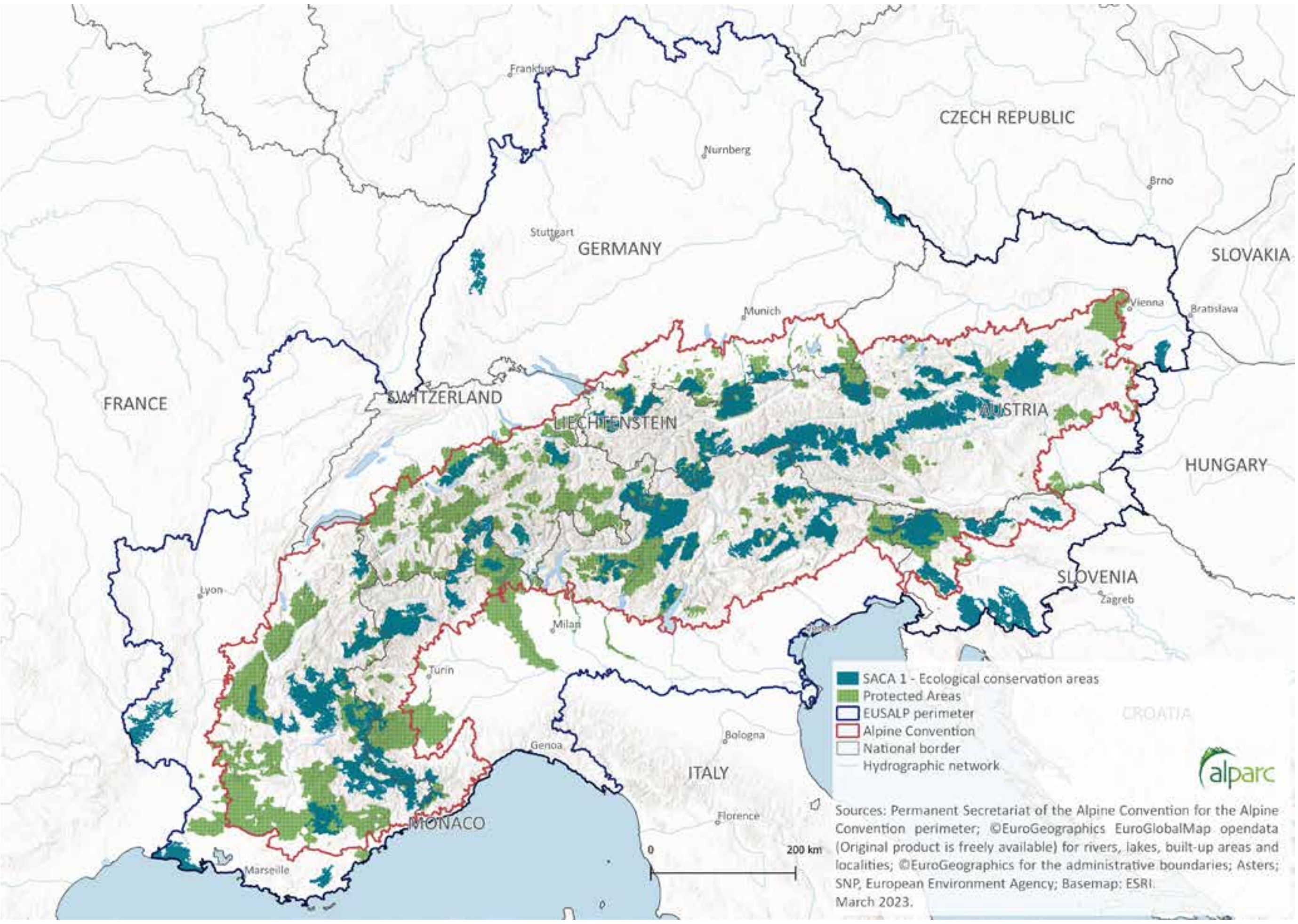
Map 46: Non-Fragmented Areas and Altitudinal Distribution



Map 47: Areas with High Ecological Connectivity Potential



Map 48: High Ecological Connectivity Potential and Protected Areas



Going deeper in this analysis, we identified the 50 largest cohesive Ecological Conservation Areas within the EUSALP territory. These 50 areas cover a total surface of 30,575 km², which represents 63% of the total surface of the ECA.

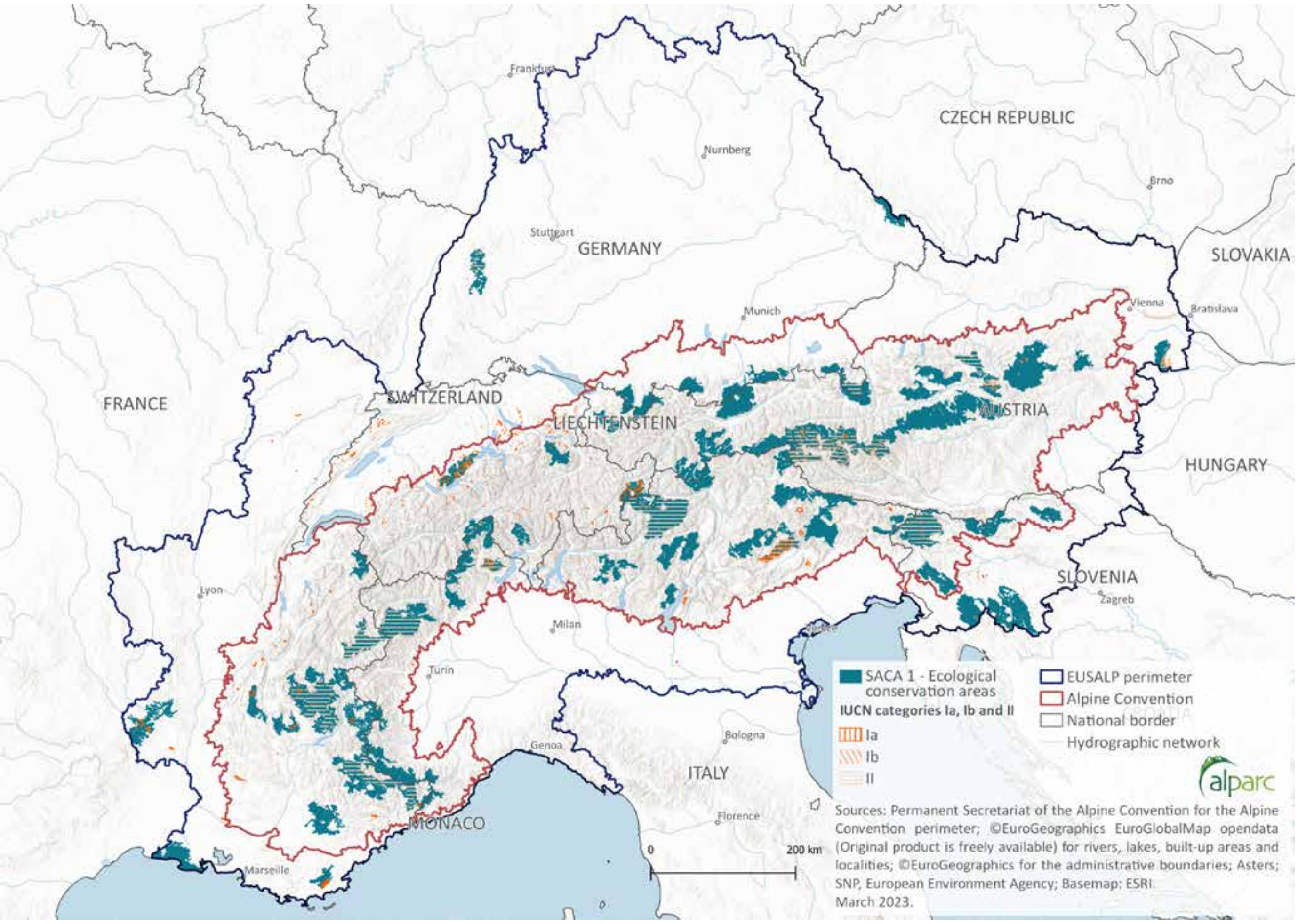
The overlap with existing protected areas is again quite high as shown by the following map 48, especially covering the large Alpine National Parks. This finding underlines the importance of these National Parks as key elements – biodiversity reservoirs and shelter – in an Alpine ecological network.

The maps showing the overlap with IUCN protection categories Ia, Ib and II (Map 49) underlines the low number and therefore also the low surface area within the Alps covered by these categories. The potential of ecological connectivity is still important in surface and altitudinal distribution and including the important low altitudes for biodiversity than the current realisation of areas well connected and protected.

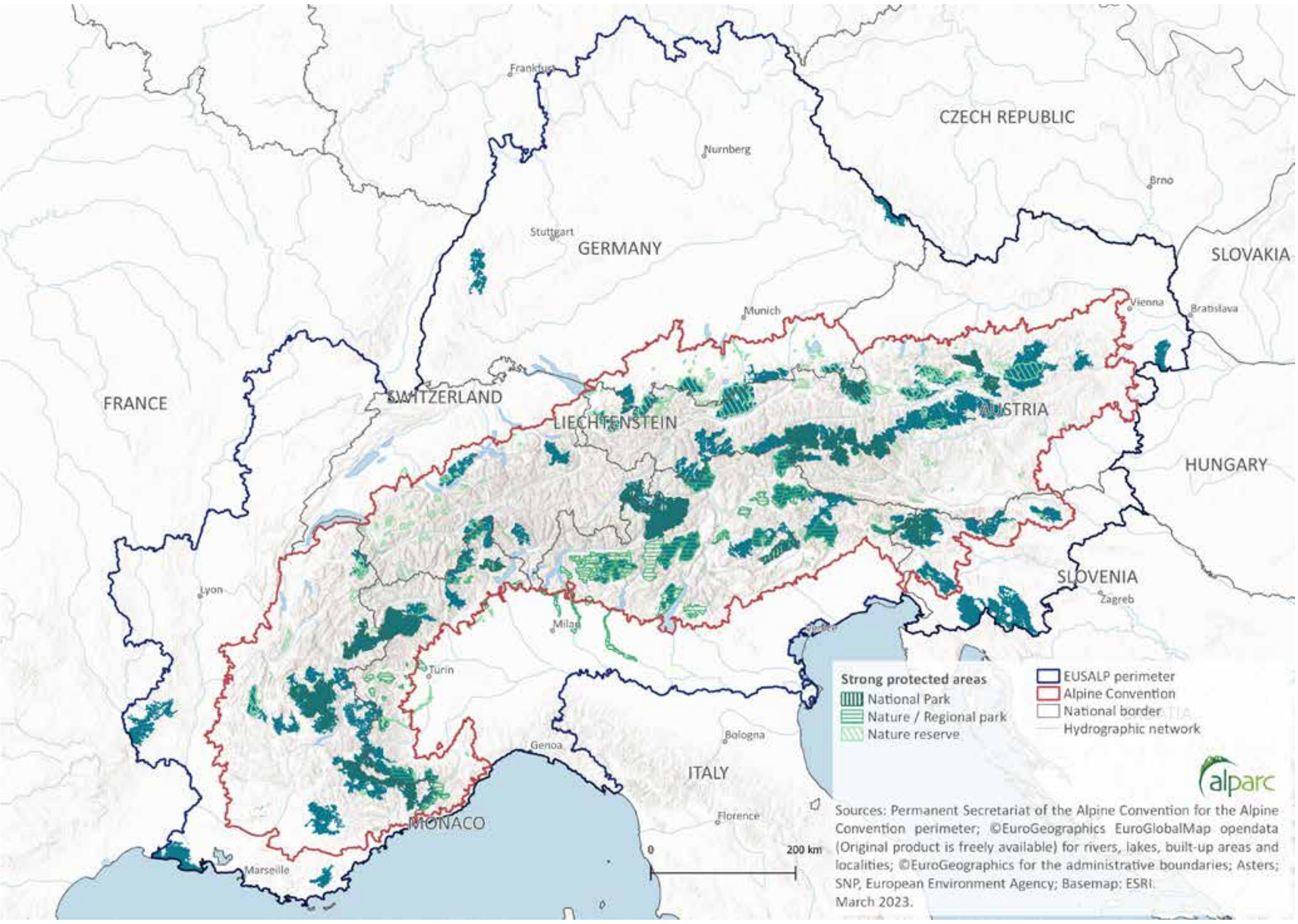
This point is significant because a strong protection status has an important effect on nature conservation in this area and, of course, also on the degree of naturalness of the territory. As wilderness in central Europe is rare, such areas play a particular role and are a significant element in an ecological network. Besides the ECA areas that should be conserved in their current status with regard to ecological connectivity, the areas receiving strong protections that support free natural development need to be conserved as they are, and, where possible, their scope should be expanded.

Map 50 shows the protected areas of the Alps with a relatively strong protection status in combination with the 50 largest ecological conservation areas. Those areas, together with some Natura 2000 sites, which can be found at all altitudinal levels, constitute the heart of the current Alpine ecological network.

Map 49: High Ecological Connectivity Potential and Selected Protected Areas (IUCN Selection)



Map 50: High Ecological Potential and Strong Protected Areas in the Alpine Context



E.2.3

POTENTIAL FOR LARGE-SCALE CONNECTIVITY IN THE ALPS

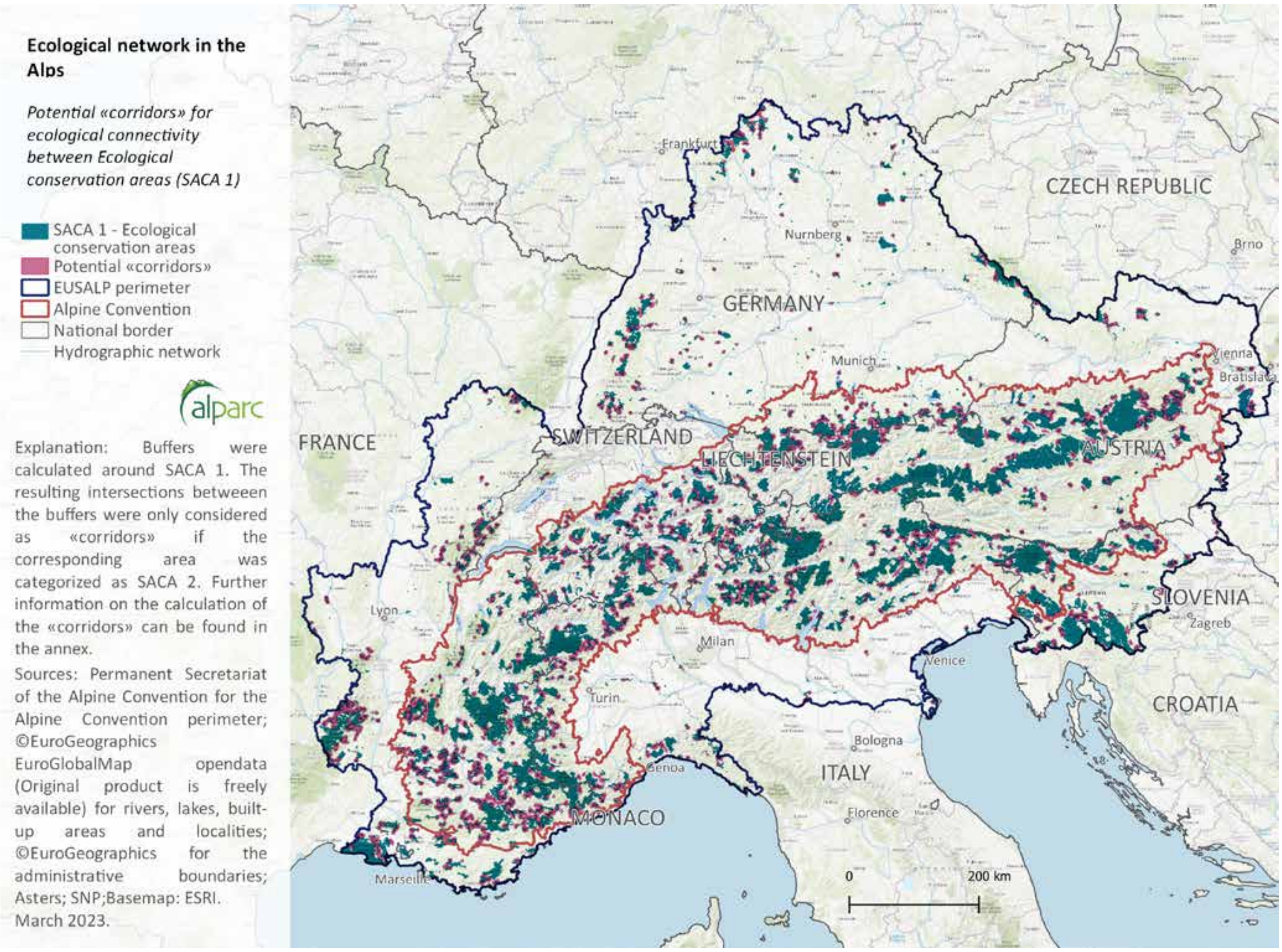
According to the classical ecological network concept, such a network is composed of core zones (areas of high biodiversity) linked to each other by corridors or other stepping-stones. Based on our Alpine approach described above, the Ecological Conservation Areas (ECA) would represent these core zones.

The following maps show the results of a GIS analysis of the ECAs that are located close to each other (2.5 km around the ECA). The violet areas are areas connecting two ECAs according to the parameters detailed above-representing potential corridors between two ECAs. The landscape matrix of these potential corridors corresponds to Ecological Intervention Area (EIA) criteria, which means that, in these areas, ecological connectivity can be improved with a realistic effort in order to guarantee adapted exchange between the ECA areas.

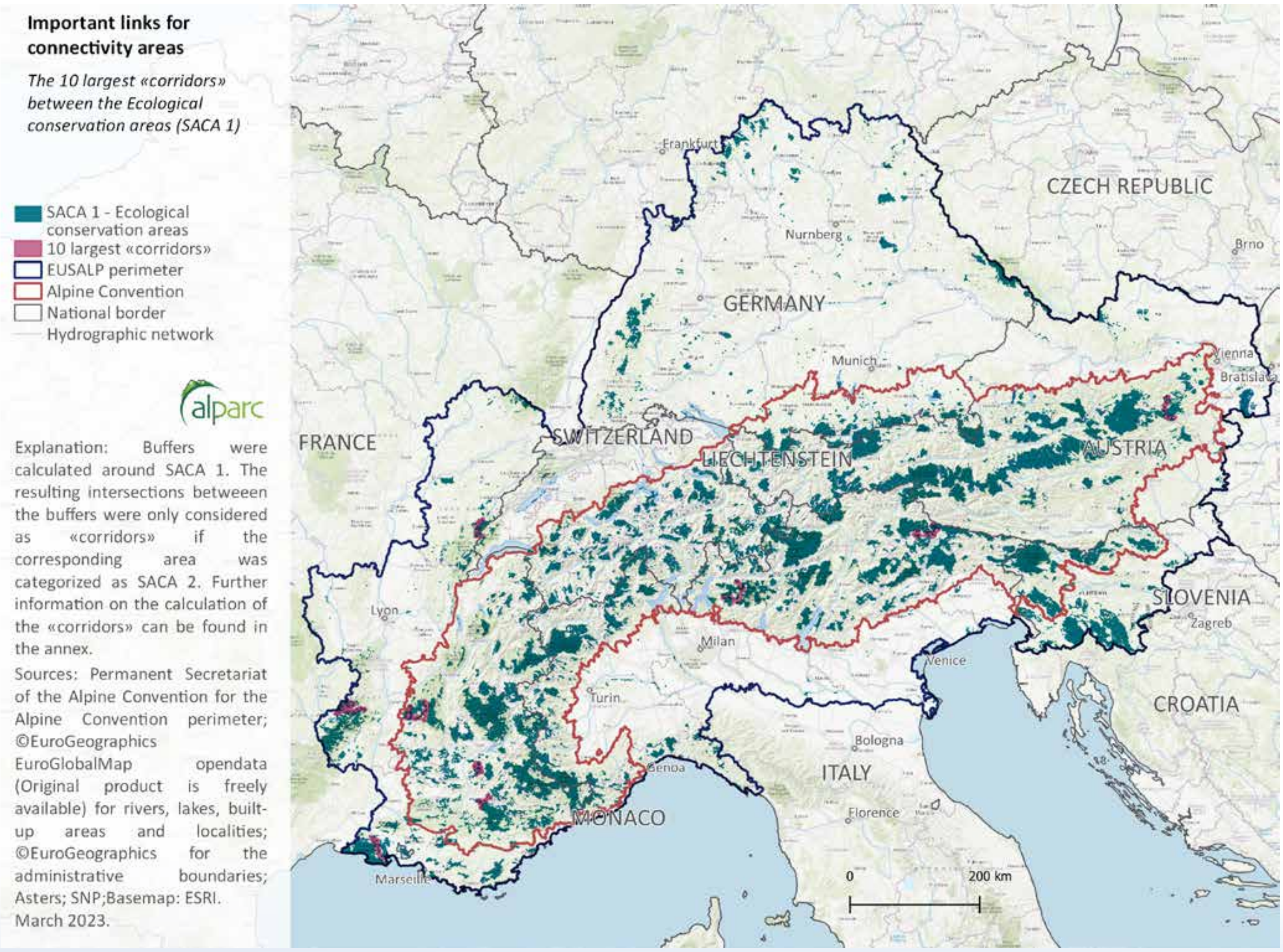
When looking at the Alpine arc, keeping in mind the aim of this report to identify adapted strategies for the situation of protected areas in the Alps for the next decade, the potential corridors identified could be good starting points on which to focus actions for ecological connectivity restoration. Because the ECAs overlap appreciably with the existing protected areas, they represent ideal starting points for the implementation of measures.

Ten of these potential corridors with the largest surface are shown in the map 52. Six of them are located within the perimeter of the Alpine Convention and four outside. All are located within a range of protected areas. Taking actions within these areas would significantly increase not only the total unfragmented or minimally fragmented surface area with regard to ecological connectivity but also create larger well-connected patches of ECAs, areas that are currently quite rare in the Alps and therefore of specific value.

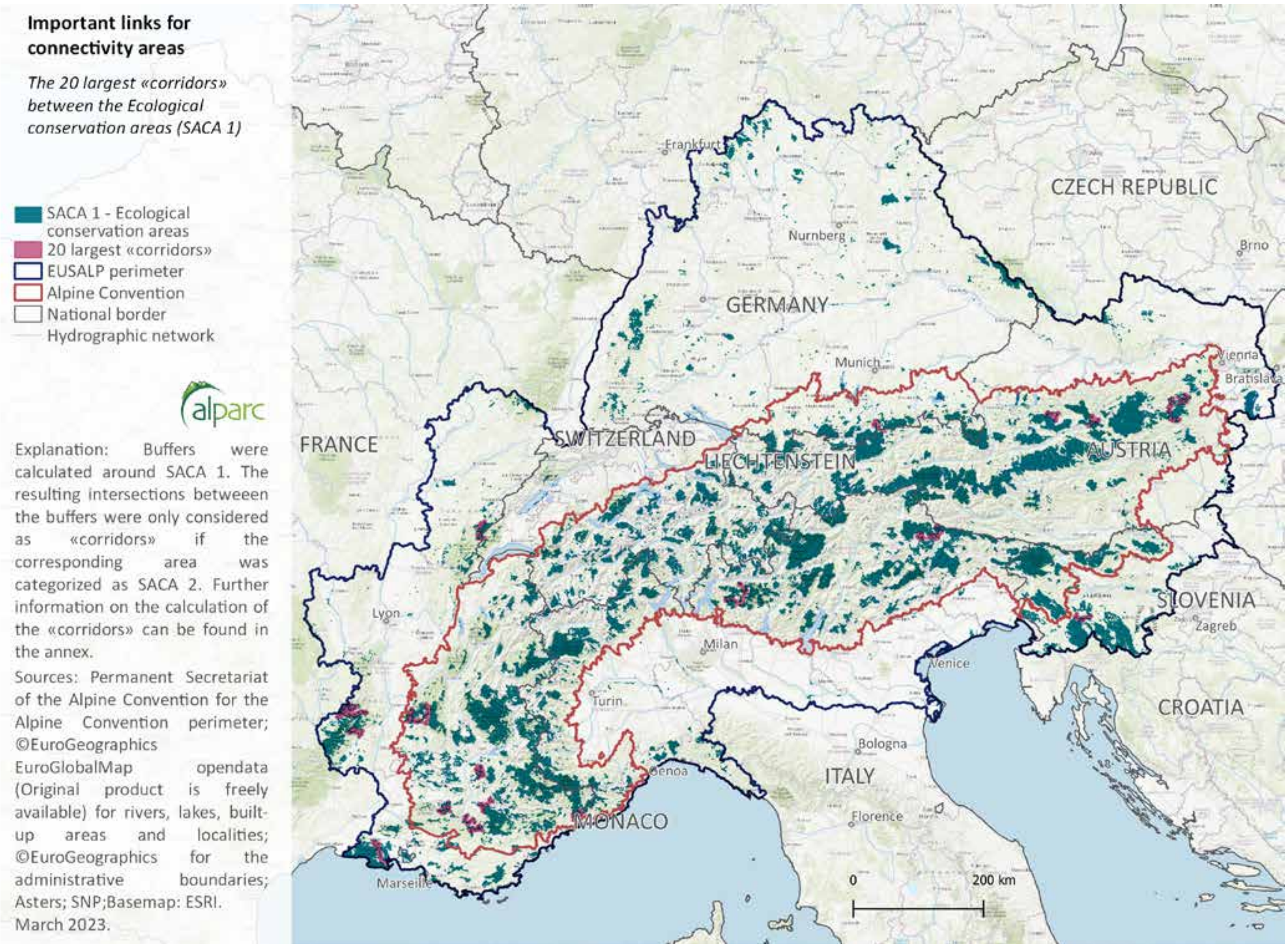
Map 51: Ecological Network in the Alps



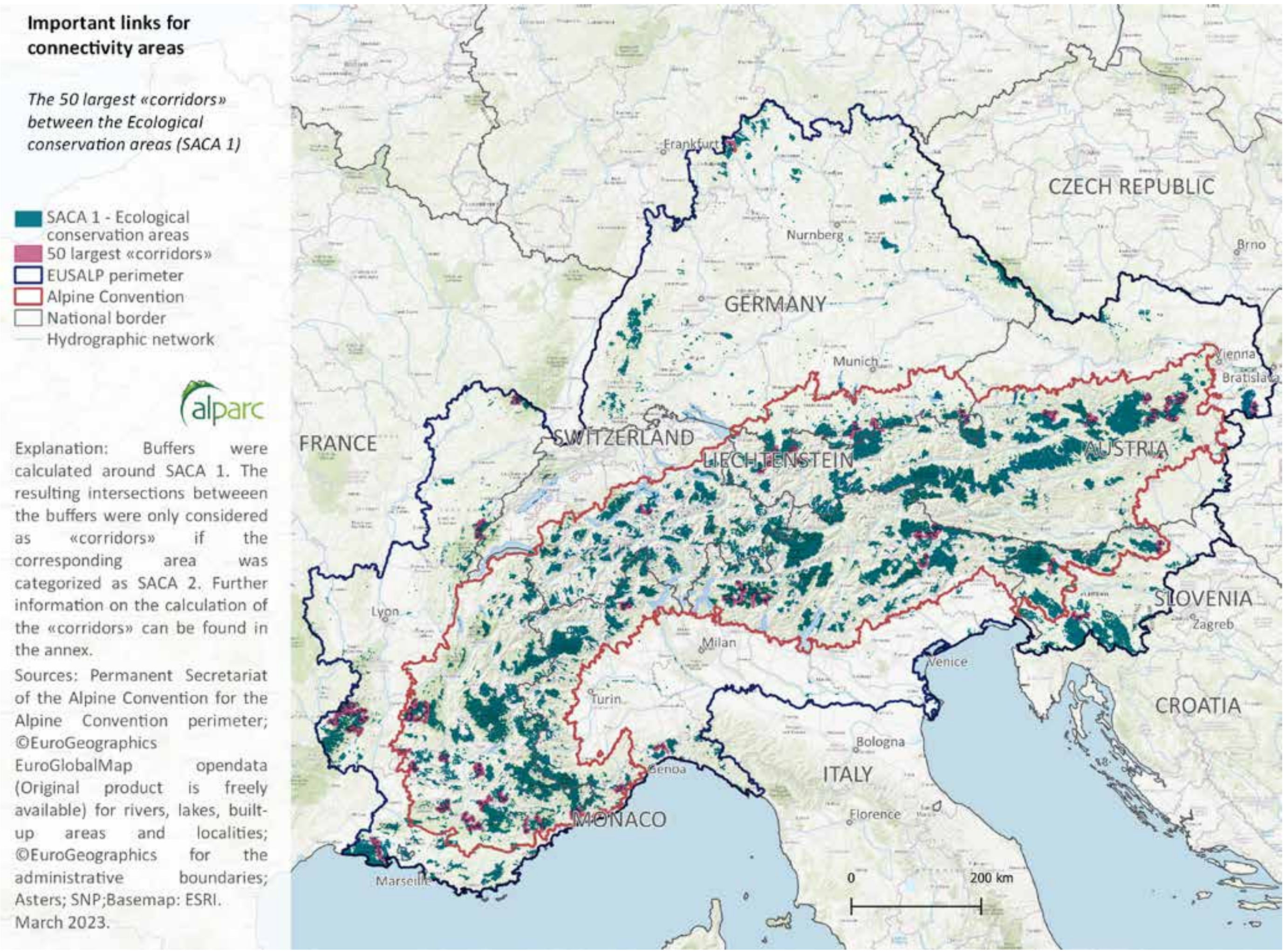
Map 52: Connectivity Areas Priority 1



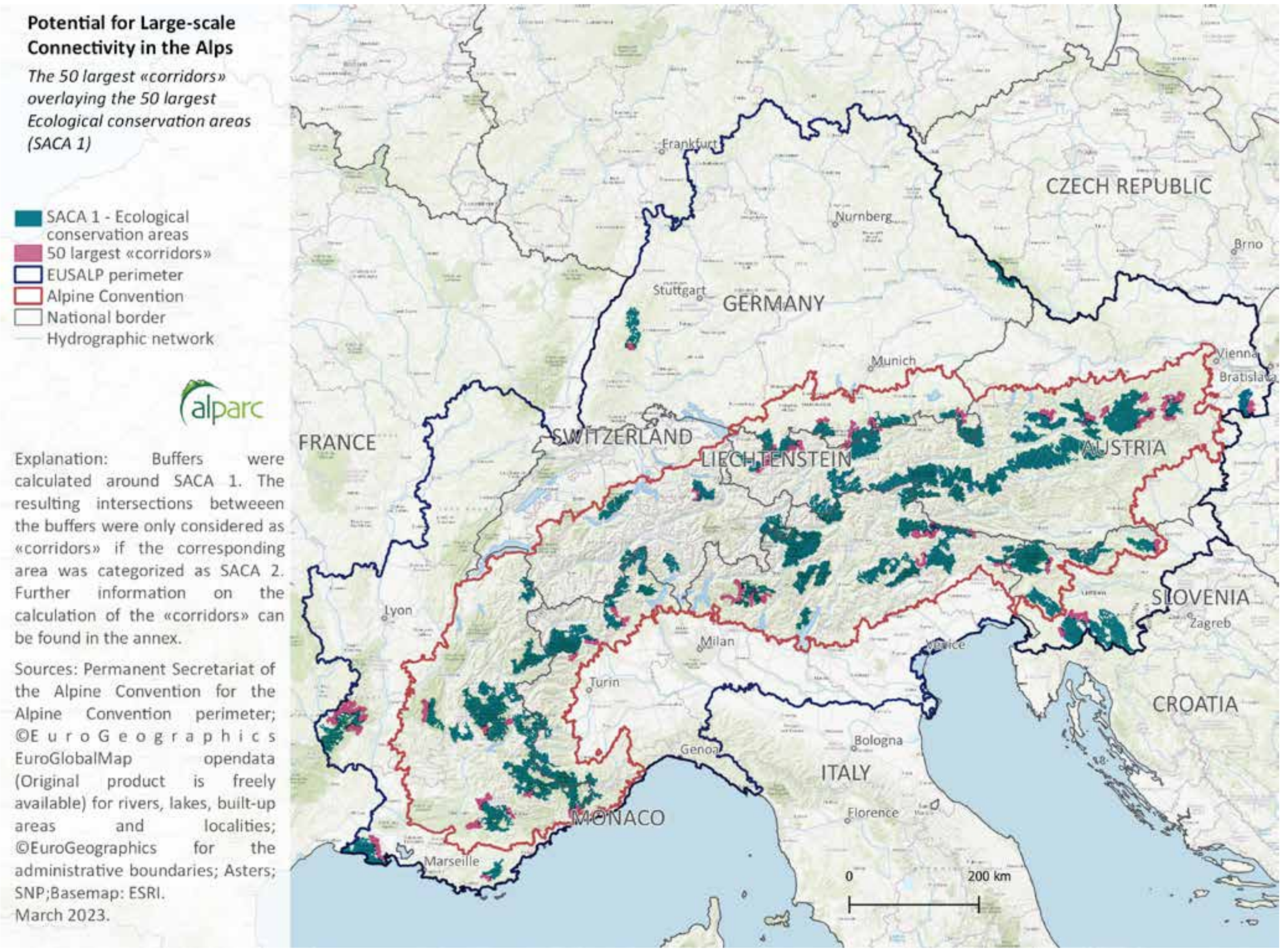
Map 53: Connectivity Areas Priority 2



Map 54: Connectivity Areas Priority 3



Map 55: Potential for Large-Scale Connectivity in the Alps



The maps 53 and 54 show respectively the 20 and 50 potential corridors with the largest surface area according to the previous map. The majority of these areas are located in the peripheral areas of the Alps and are therefore interesting in the context of creating larger well-connected patches in zones at lower altitudes where ecological connectivity is of particular importance in the Alps as many human land use claims are concentrated here.

The map 55 drills deeper by identifying priorities as it shows the 50 largest ECAs together with the 50 largest potential corridor areas overlaying the ECAs. With the aim of creating the largest interconnected areas possible, the maps provide some clear indications of specific areas to concentrate on to reach this goal.

The identified corridors correspond to a selection of surface areas neighbouring the 50 largest ECAs. A second selection among this first group was made according to their surface area. This selection was required to visualise the enlargement of key zones that could improve the coverage and connectivity of the largest ECAs and, thus, the general ecological connectivity of the Alpine space.

The majority of these areas are located inside the Alpine Convention perimeter. The selection of large corridors contiguous to the ecological conservation areas presents an overview of the areas where ecological connectivity could be improved by expanding the coverage of areas where connectivity works well and on a large scale.

E.2.4

ZOOM ON ALPINE PILOT REGIONS FOR ECOLOGICAL CONNECTIVITY

One of the main strengths of the Alpine approach to ecological connectivity (see Plassmann et al. 2016) was the work with designated Alpine Pilot Regions for ecological connectivity, regions where in-depth, regional analyses were carried out in cooperation with the regional partners and where implementation actions took place in the field.

This section will show some examples of the GIS analysis results described in the former section for the cases of the Alpine Pilot Regions. More details on the different Alpine Pilot Regions can be found in documents of the Platform Ecological Network of the Alpine Convention as well as in the final results publications of the projects ECONNECT, greenAlps, ALPBIONET2030 and Life BeltAlps and, of course, in Plassmann et al. 2016.

The maps illustrate the approach in this context and will not be discussed in detail for each example. They all, nevertheless, highlight how the approach can be used to focus specific activities in areas where they can contribute to reinforcing the positive effects of the local ECA. Of course, the results need to be cross-checked with the local partners and their specific knowledge of the area, but, like the results of the JECAMI mapping approach and the CSI, they can offer a good basis to start discussion at a local level and serve as a trigger for a coherent and concerted action bundle.

MONT BLANC

The Pilot Region Mont Blanc is, to date, the latest Pilot Region to be nominated by the Alpine Convention as an official site for its efforts in favour of ecological connectivity. It comprises several municipalities on the French side of the Mont Blanc massif and a series of nature reserves. The area in the triangle between France, Italy and Switzerland is of particular interest as it is a highly symbolic place in the Alps around the highest Alpine Peak, and it is an important node between the north-south and east-west axes of the Alpine Arc.

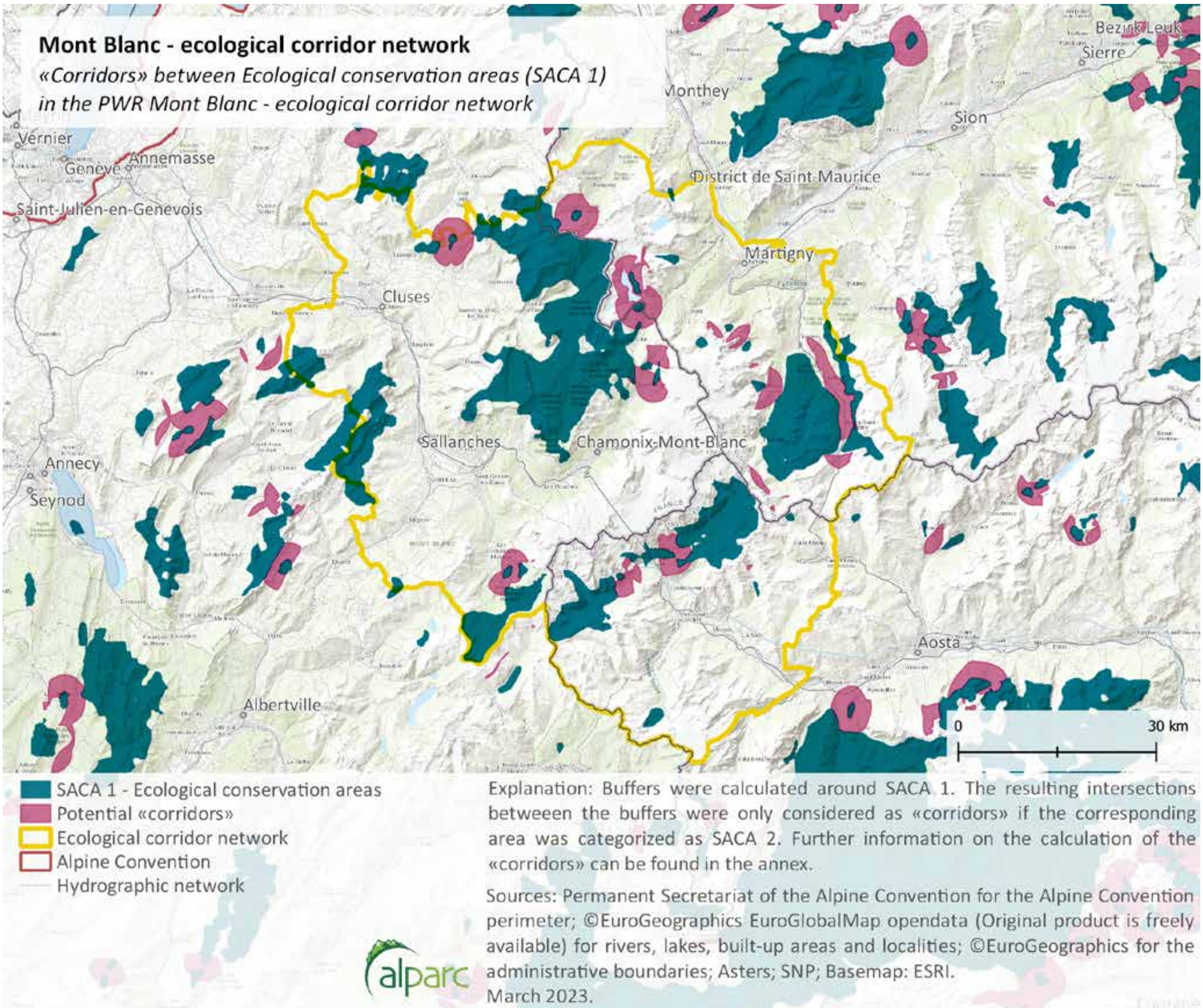
With the Espace Mont-Blanc initiative, bringing together Savoie, Haute-Savoie, the Aosta Valley, and Valais, close transboundary cooperation has existed for many years. Its aim is the protection and enhancement of an emblematic territory, where exceptional natural and environmental heritage coexists with economic and touristic interests. The Strategy for the Future of Mont Blanc, developed in 2014, already recommended the identification and restoration of ecological corridors within the area. This challenge will now be addressed by the Pilot Region.

In France, the Regional Scheme of Ecological Coherence, the regional implementation of the national blue and green infrastructure policy, identifies sectors of the Pilot Region as regional priority areas for action on ecological connectivity improvement. Several activities concerning habitat and species conservation, environmental education and spatial and landscape planning have already been implemented.

Two recent studies have highlighted the natural and social context of the Pilot Regions: a sociologic analysis that offers an overview of the main regional stakeholders and their interactions, including a detailed cartography of existing protected areas and zones with specific interest for ecological connectivity in all three countries of the mountain massif.

In addition to its trilateral territory, the Mont Blanc has tremendous symbolic value for Alpine nature and ecological connectivity. It is an area many conflicts of use (tourism, traffic, constructions), and an international coordination for the further development and protection of the site is crucial. For this reason, it is a very important pilot region for the work of ecological connectivity that ALPARC started almost 20 years ago within the Alpine Convention.

Map 56: Mont Blanc - Ecological Corridor Network



RAETHIAN TRIANGLE

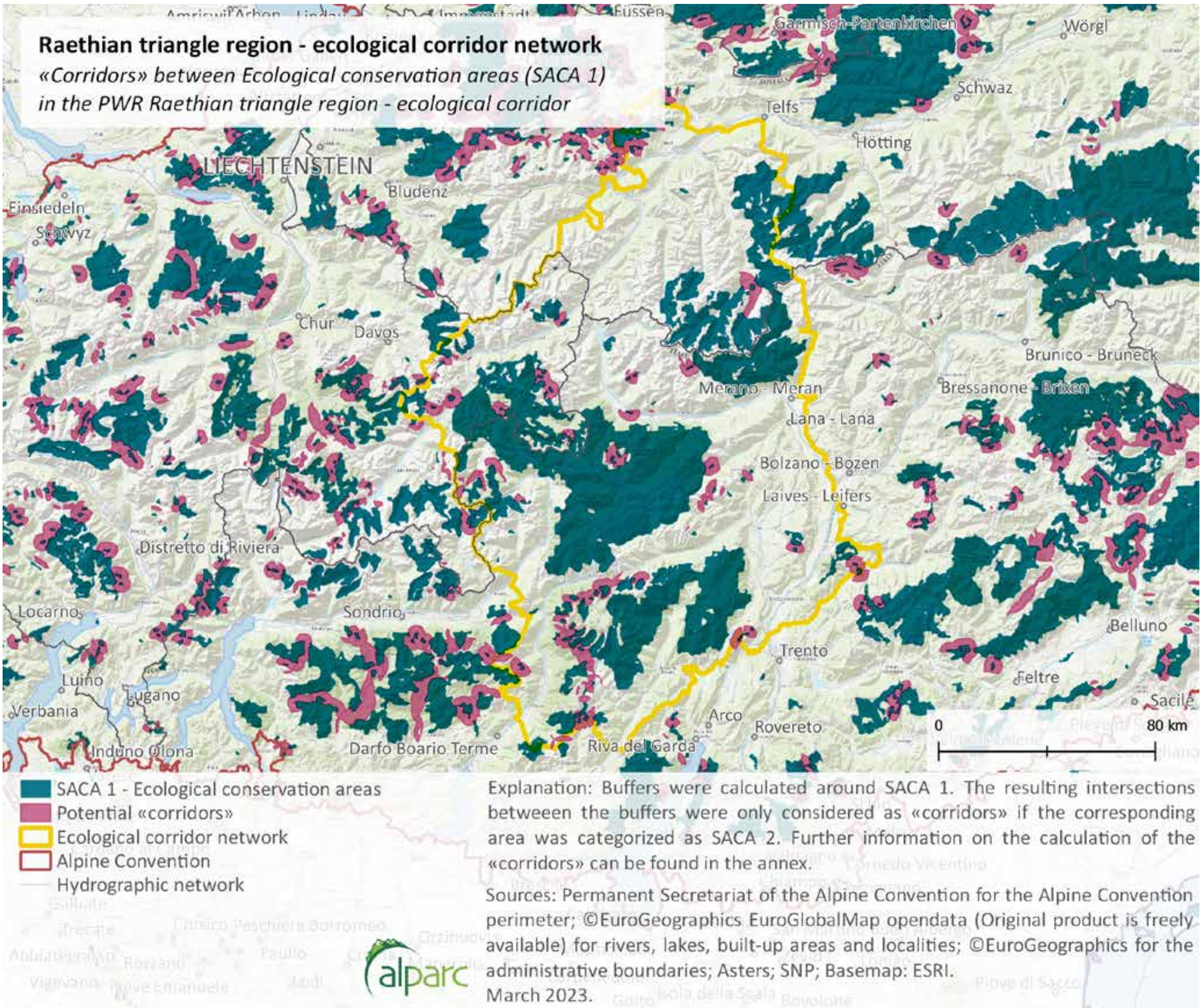
The Pilot Region Raethian Triangle is located in the Austrian-Italian-Swiss borderland and encompasses various protected areas of different categories, such as National Parks, nature parks and Biosphere reserves.

The origin of the name Raethian Triangle goes back to the time of the ancient Romans when it described the cultural alliance of several populations in the central Alps. Today, the term has been revived to refer to international collaboration between the areas of Grisons in Switzerland, Tyrol in Austria and South-Tyrol in Italy which is named 'TERRA RAETICA'.

At an international level, the main activities are concentrated around the topic of ecological connectivity for transboundary riverine systems. One example is implementation of restoration activities in Rom-Rambach in the Biosphere Val Müstair. Regarding the Inn, an integrated River Basin Management project is ongoing within an Interreg – Alpine Space Project (SPARE) in collaboration with six other Alpine states. Furthermore, public information events and monitoring activities that are carried out yearly for the International Day of Biodiversity have promoted the topic of ecological connectivity in the region.

A large number of activities were realised in the Lower Engadin, led by the Foundation Pro Terra Engiadina, such as "active nature days" for enterprises and schools. These activities help to remove trees from open grasslands to protect the species-rich, traditional agricultural landscape.

Map 57: Raethian Triangle Region - Ecological Corridor Network



TRANSBOUNDARY REGION BERCHTESGADEN-SALZBURG

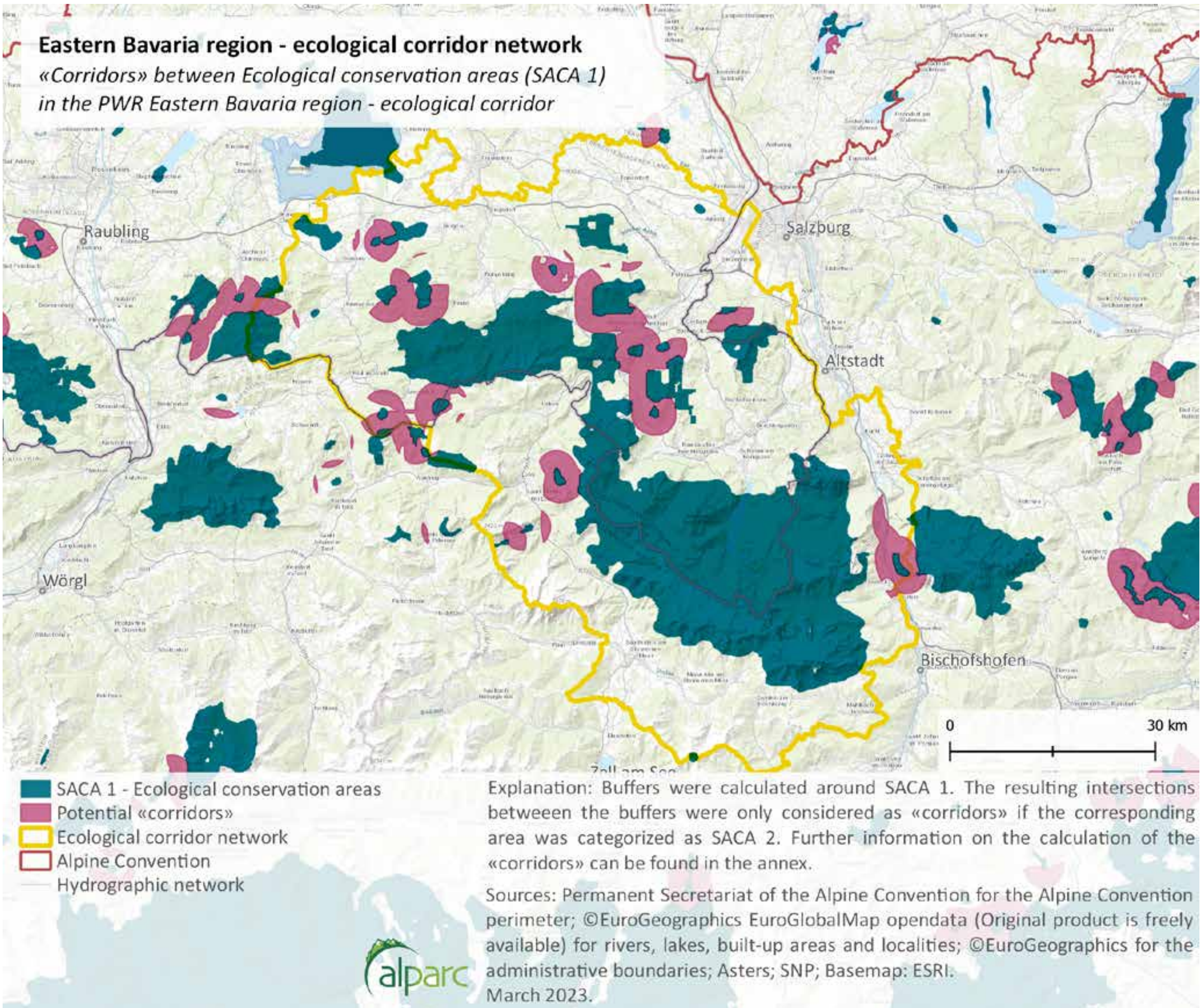
The transboundary region Berchtesgaden - Salzburg is characterised by a mosaic of pristine Alpine habitats and cultural landscapes showing a broad spectrum of rare plant and animal species as well as typical Alpine dynamics.

Several protected areas are located in the region. They are particularly suited as initial points for developing integrated approaches to biodiversity conservation. As the region is of high ecological significance and part of one bio-geographical area, cooperation towards establishing an ecological network is essential.

River restoration activities and the improvement of continuity between grassland patches are among the initiatives in the region. Important efforts have also been made to include ecological connectivity aspects in local spatial planning tools. A broad transboundary GIS analysis has been realised for the entire border area between Austria and the Free State of Bavaria that should lead to common transboundary projects on connectivity in the coming years.

What has been conceived by sound cross-border scientific work is now being implemented: recently, the regional landscape plan with the ecological connectivity measures has been enacted.

Map 58: Eastern Bavaria Region - Ecological Corridor Network



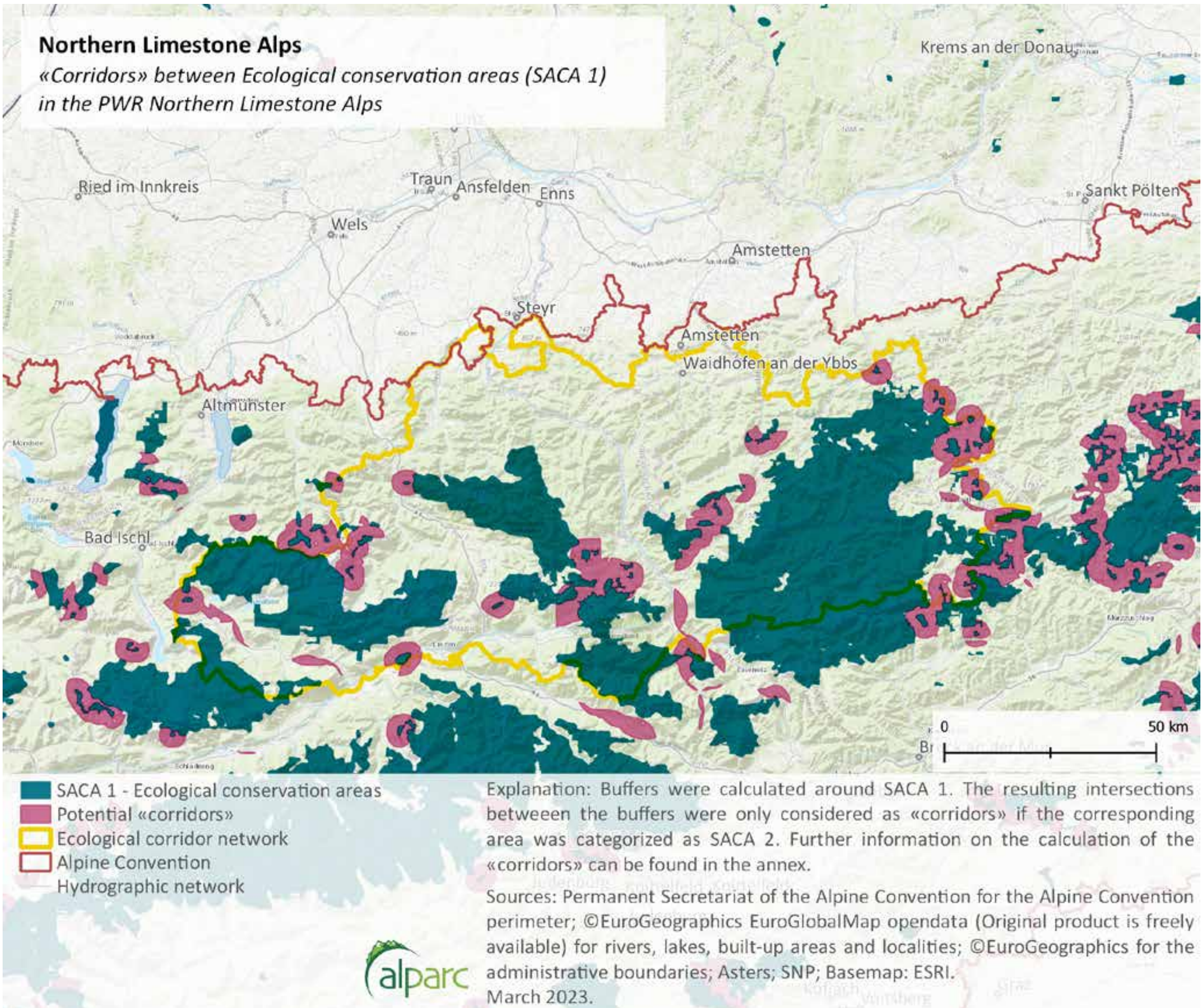
NORTHERN LIMESTONE ALPS

The area is shaped by its history as the “Eisenwurzen” cultural area and has been in use for over 800 years. Even today, the region combines cultural and economic heritage. It includes three Austrian provinces and more than 25 protected areas covering more than 200,000 ha. The region is characterised by vast areas with low settlement density and a low degree of fragmentation, a large share of forest (>80%), a densely structured cultural landscape and rich biodiversity. This region is also important as a connection with other Alpine areas as well as with the neighbouring massifs of the Carpathian Mountains.

Old natural beech forests are one of the singularities of the region. The Netzwerk Naturwald project aims to safeguard islands of natural forest patches in otherwise intensively used forest areas to offer forest-dwelling species habitats and migration possibilities. By connecting the remaining habitats and creating new stepping-stone habitats that facilitate migration, there is a possibility to create an outstanding compound of biotopes for Central Europe. This also offers interesting opportunities for the sustainable (economic) development of the entire region. The Netzwerk Naturwald Hiking trail is a wonderful illustration of how to valorise unique natural capital.

The region possesses natural splendour and a cultural heritage at the level of a World Heritage site as nominated in 2017. The prospect of creating a trans-regional UNESCO Biosphere Reserve in the region would also offer an interesting governance model to support the Pilot Region activities and coordinate the implementation of the ecological network of forest habitats.

Map 59: Northern Limestone Alps - Ecological Corridor Network



TRANSBOUNDARY ECOREGION JULIAN ALPS

The transboundary Ecoregion Julian Alps was initially limited to the Italian area around the Prealpi Giulie Nature park but was extended across the border to include the territory of the Triglav National Park in Slovenia in 2014. It occupies a large proportion of the Eastern Julian Alps with a landscape characterised by glacier-shaped valleys, mountain plateaus and steep mountain ridges above the tree line. It is a sparsely populated area with a unique complex of unspoiled pristine Alpine habitats and cultural landscapes.

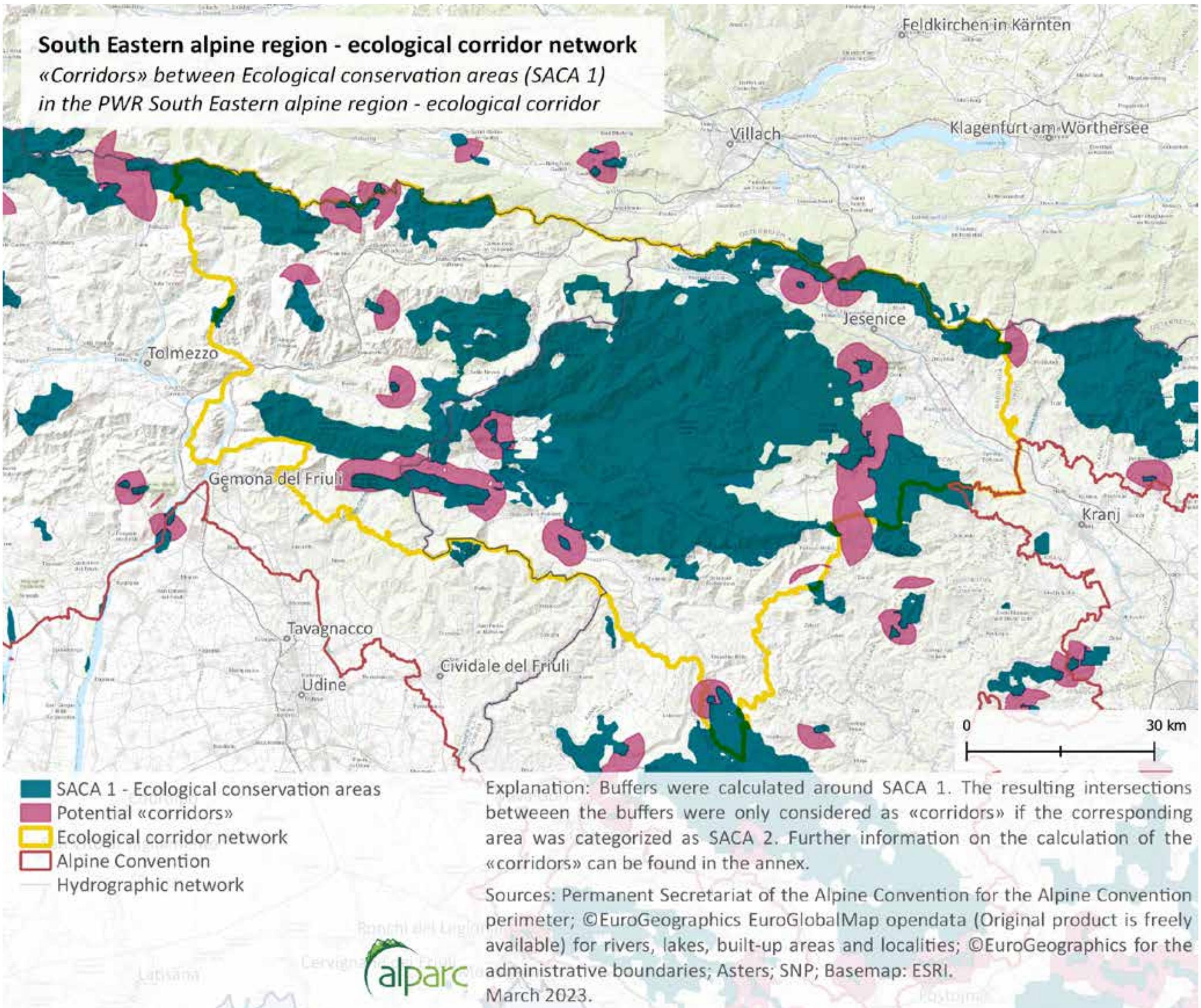
The official nomination of the transboundary Pilot Region has strengthened pre-existing, close, and fruitful ties between the protected areas sharing control of the Pilot Region. This collaboration provides an opportunity to overcome political and administrative barriers when taking concrete conservation activities and offers support for sustainable development.

The current transboundary activities directly linked to ecological connectivity conservation include shared monitoring of chamois and Alpine ibex populations in Canin Massif area and the information and data exchange about most significant species crossing the border.

The long-term vision for the area foresees enhanced facilitation of cross-border cooperation by creating a Transboundary Biosphere Reserve Julian Alps that will join the existing Slovenian Biosphere Reserve of the Triglav area with a planned Biosphere reserve on the Italian side. This would not only offer new and interesting development opportunities but also a real opportunity for transboundary ecological connectivity planning.

From its inception, the involvement of private and public stakeholders as well as the public was an important concern in the region. Various Alpine projects supported this exchange and offered insights on the conciliation of biodiversity conservation and the production of renewable energies, territorial management plans and sustainable tourism practices.

Map 60: South-Eastern Alpine Region - Ecological Corridor Network

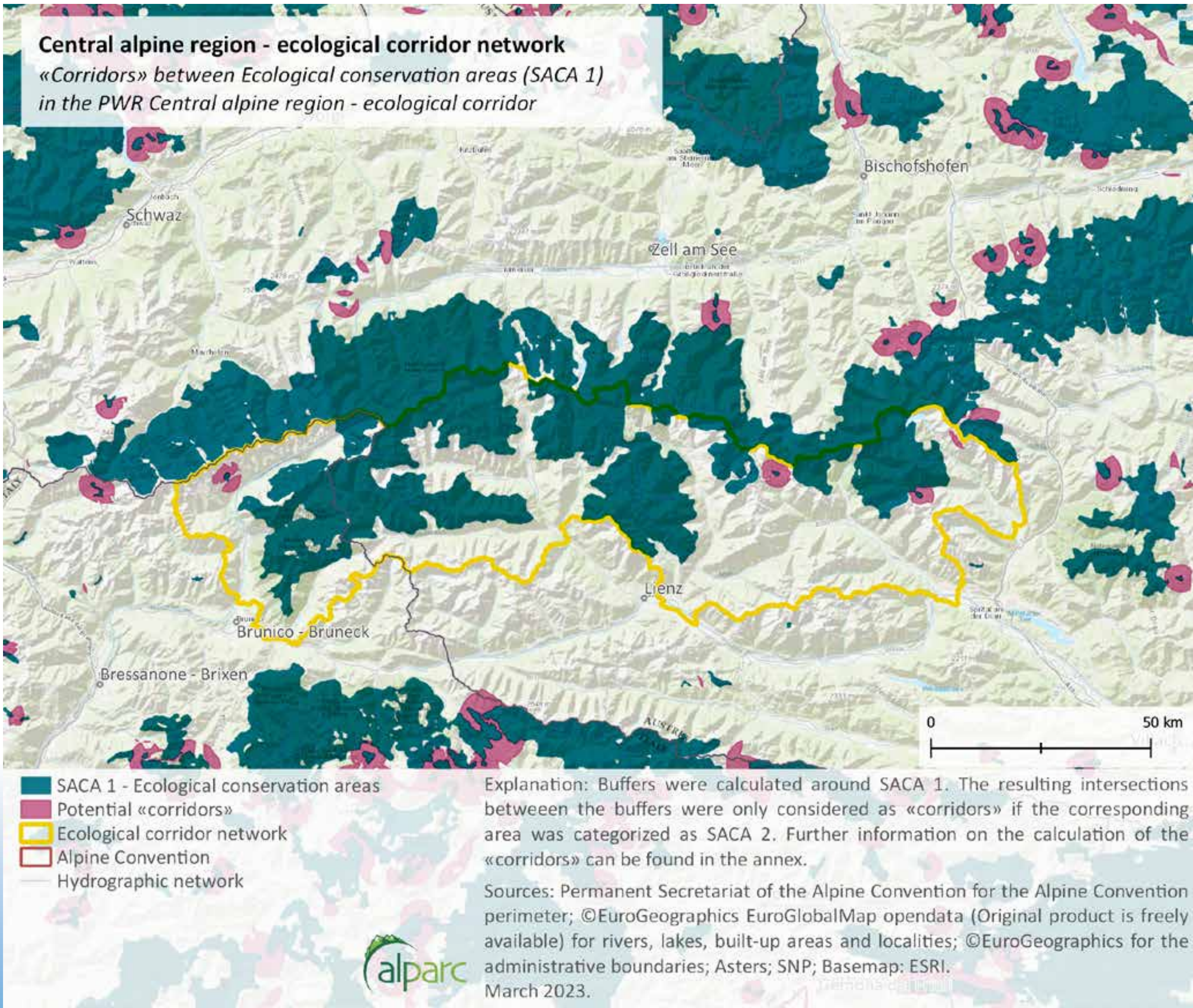


THE CENTRAL ALPINE REGION

The central Alpine region, with one of the two largest Alpine National Parks, the Hohe Tauern encompassing three administrative units (Tyrol, Salzburg, Carinthia), constitutes the heart and centre of the Central-Eastern Alps. It is a foundational element for ecological connectivity from south to north and from west to east.

This region is very important for connectivity as it covers large zones of the main Alpine backbone linking central Alpine valleys with high biodiversity and species migration.

Map 61: Central Alpine Region - Ecological Corridor Network

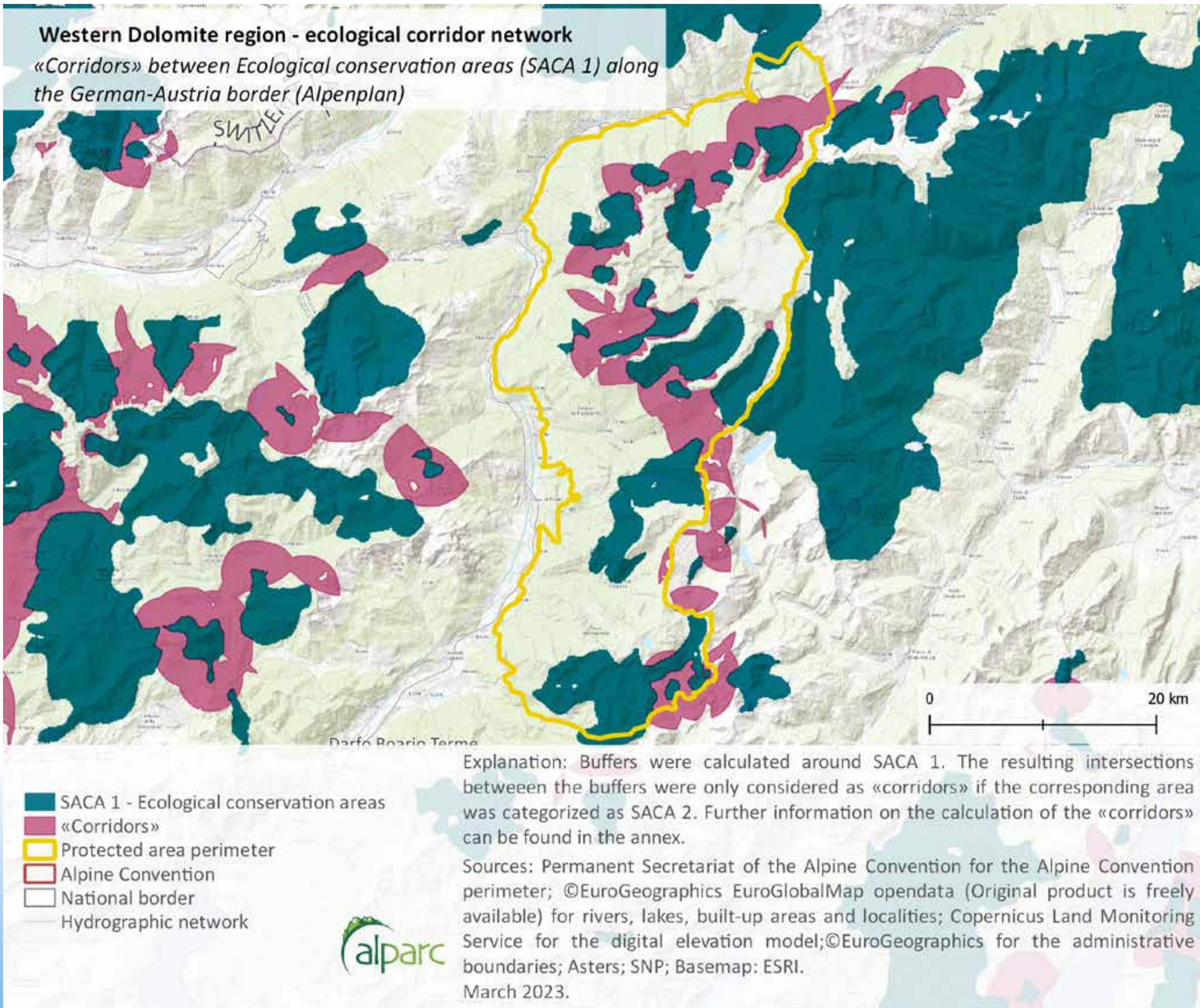


THE WESTERN DOLOMITE REGION

The area between the Stelvio National Park (incorporating the Hohe Tauern, the largest park of the Alps), the Swiss National Park and several Italian nature parks with a high protection status offers many opportunities for an ecological network. Using GIS analysis, the maps illustrate the potential for buffering those protected areas.

In the past, projects for the creation of a large international protected areas have been based on pre-existing protected areas. The projects have never been realised, and even planning process was subject to significant roadblocks. Nevertheless, extraordinary potential exists for an interesting ecological network in this area, and there is an important opportunity for the Alpine areas to create a large area of interconnected hot spots of biodiversity ensuring a high level of connectivity.

Map 62: Western Dolomite Region - Ecological Corridor Network



WESTERN BAVARIA REGION

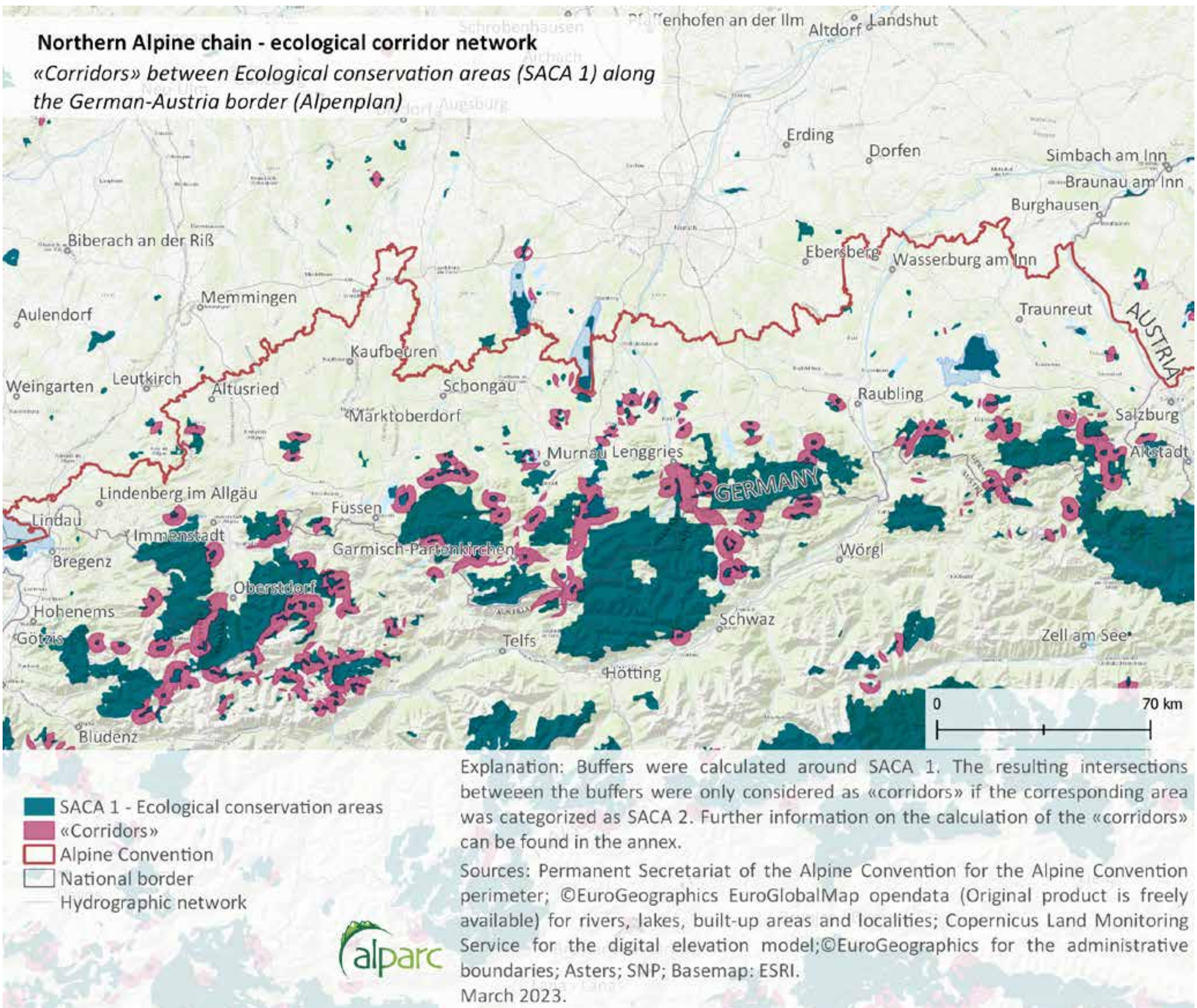
The region is interesting for many reasons as it incorporates a transboundary regional nature park, various regional parks on the Austrian side and large nature reserves and Natura 2000 sites. By opening a platform of ALPARC (ALPARC CENTR'ALPS) in this region, efforts to improve connectivity have intensified, and an ongoing project analyses further possibilities of ecological connectivity development in this region.

The transboundary regional Nagelfluhkette Nature Park (Bavaria – DE and Vorarlberg – Austria) was founded in 2008. This Region is the case study region of the present project. For details on this region refer to the case study description.

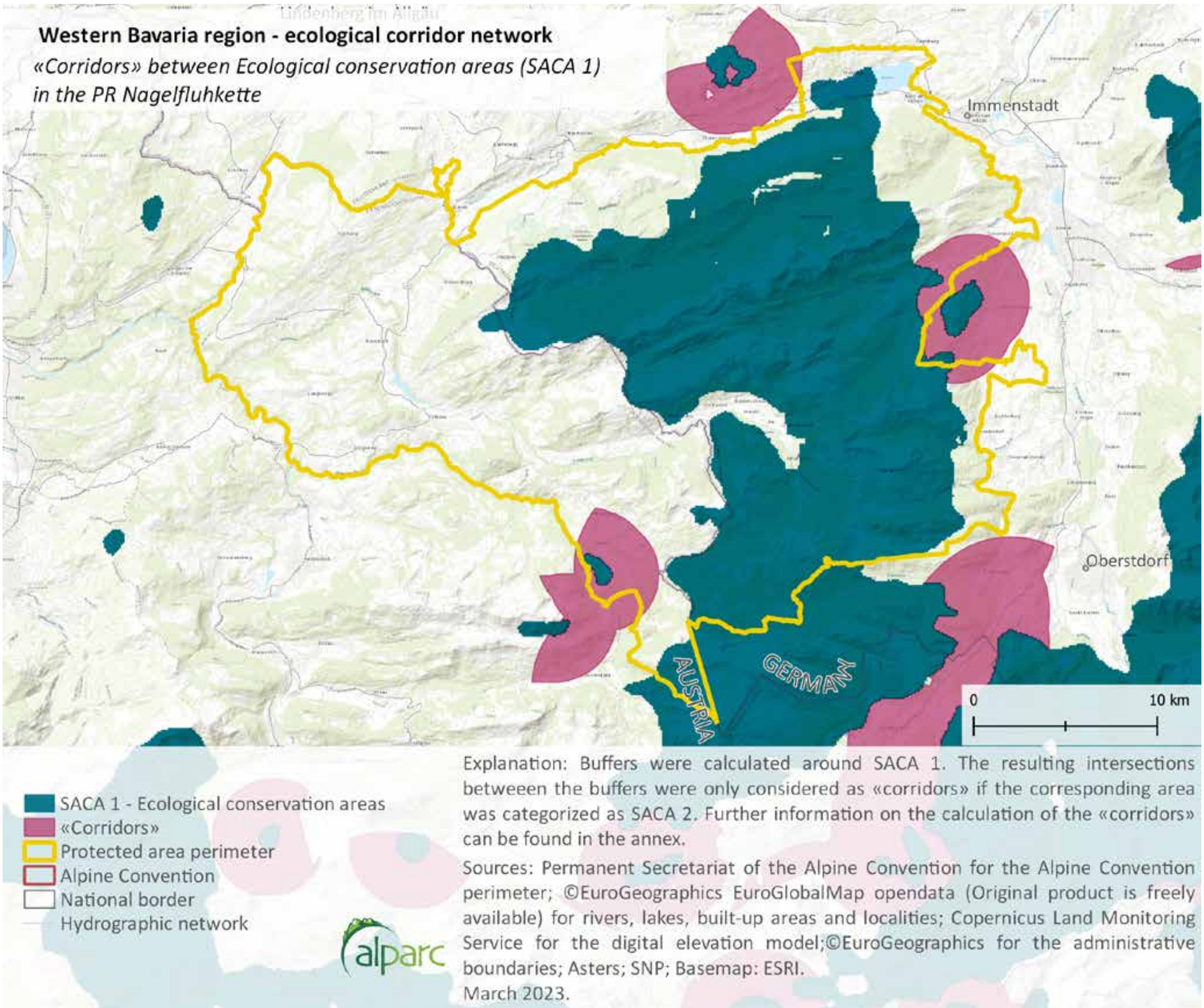
In the Bavarian district of Oberallgäu is located one of the largest nature reserves in Germany, the "Allgäuer Hochalpen". It is also a Natura 2000 site, with long-standing site management. Through the SACAs and a potential corridor southwest of the municipality of Oberstdorf (in the Austrian Kleinwalsertal), there is potential to establish better connectivity between the Nagelfluhkette Regional Nature park and the Allgäuer Hochalpen Nature Reserve.

To the east of the aforementioned nature reserve, there are potential corridors towards the Tiroler Lech Nature park (Austria). This connection would be interesting as it would cover the different levels of elevation, from the peaks down to the riverbed of the Lech, whose headwaters are among the last wild riverine landscapes in the northern Alpine region. Around the regional nature parks of Ammergauer Alpen and Karwendel, the potential corridors offer

Map 63: Northern Alpine Chain - Ecological Corridor Network



Map 64: Western Bavaria Region - Ecological Corridor Network



interesting connections towards some smaller SACAs in the pre-Alpine regions. Through the work of ALPARC CENTR'ALPS, initial contacts have been made to the site managements in those areas as well.

Although there is less staff capacity than in National Parks, some monitoring activities take place in the Nagelfluhkette Regional Nature park, e.g., apollo butterfly (*Parnassius apollo*) and black grouse (*Lyrurus tetrix*). In a common project, four regional nature parks along the Austrian-Bavarian border have been working on "transboundary species and biotope protection as a basis for future nature conservation management" and published a report on that topic (Oberwalder and Längert 2021). Those activities are a good basis for further cooperation in the future and to illustrate the importance of ecological connectivity.

Open spaces play an important role in improving ecological connectivity. They are areas free of buildings or infrastructures, and they can occur within and outside protected areas. In the (western) Bavarian-Austrian border region there are already two established instruments for the preservation of open spaces: The quiet areas in Tyrol (Austria) and the Alpine Plan in Bavaria (Germany).

The Alpine Plan exists since 1972 and is a key element of the Bavarian State Development Programme, regulating infrastructure development in the Bavarian Alps from a spatial planning perspective (Job et al. 2022). A few years ago, it received a lot of attention due to a highly controversial discussion about a planned ski infrastructure project in the pilot region. In the recently finalised Interreg-funded project "OpenSpaceAlps", recommendations concerning the open spaces have been developed. The challenge will now be to disseminate the results in such a way that the recommendations can be put into practice.

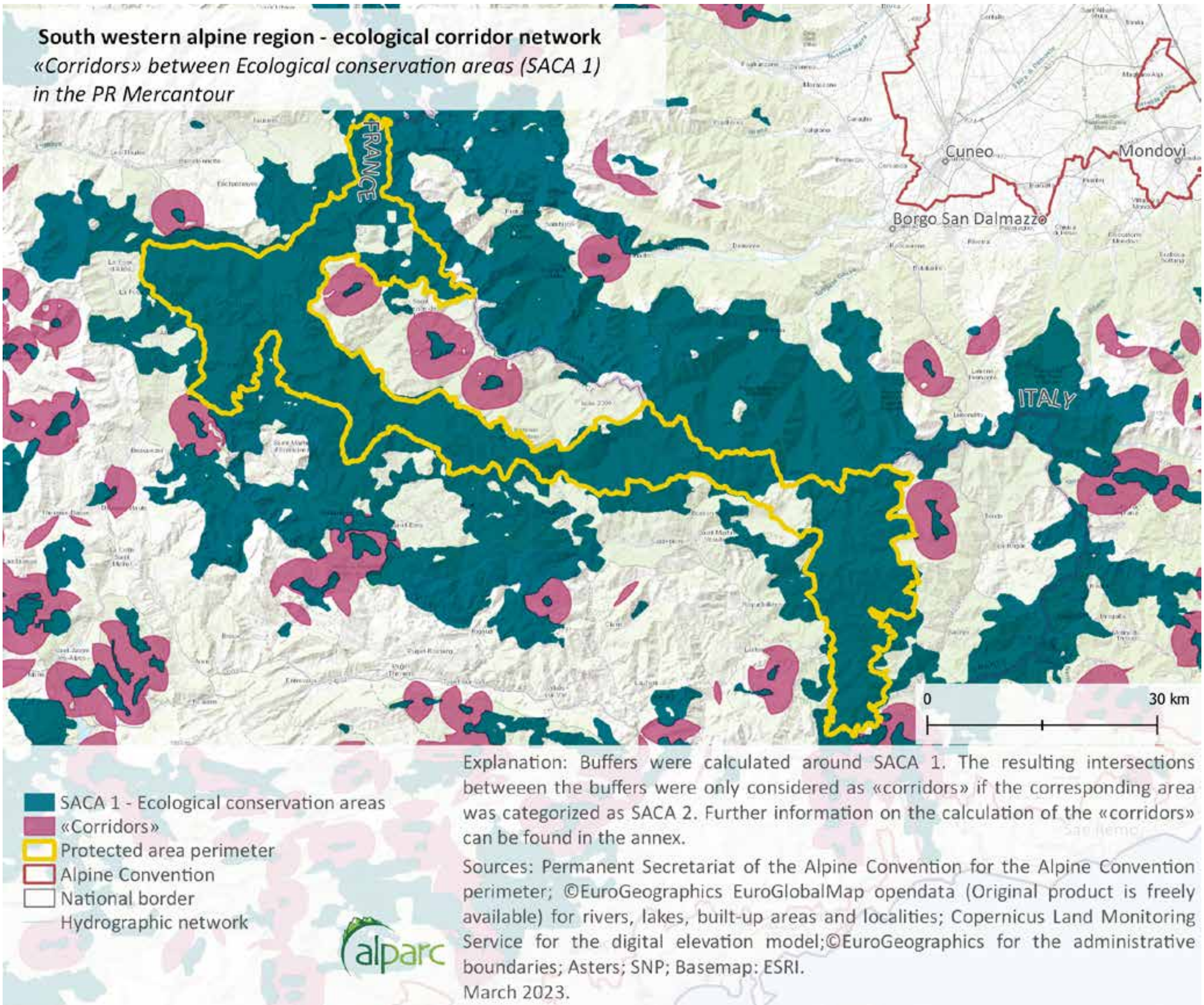
TRANSBOUNDARY SOUTH-WESTERN ALPS ECOREGION

The South-Western Alps region is located at the southwest tip of the Alpine range in the French region of Provence-Alpes-Côte-d'Azur. The region includes the Mercantour National Park and the Italian regions of Liguria and Piedmont where the Alpi-Maritime Natural Park is located. Relations between the regions include close cultural exchanges, trans-boundary cooperation, well-established forms of collaboration and a common vision for a "European National Park". The Pilot Region is an important connection between the mountain ranges of the Apennines and the Alps and is home to many species of animals and plants. The Maritime Alps are world-renowned for their botanic richness (2600 species).

Ski resorts, with their numerous cable cars and other infrastructure, represent a permanent danger for several species, especially birds (raptors, galliformes and others). To ensure better coexistence between these animals and human winter sport activities, the Pilot Region of the Alpi Marittime and Mercantour Parks equipped two ski resorts with experimental devices that make the cables visible: Limone Piemonte (I) and Isola (F) 2000. Furthermore, several ski slopes are sowed for the summer season with native seed mixtures of wild- and meadow flowers, contributing to plant diversity and preventing the dispersal of invasive species.

Continuity and connectivity exist at all levels: the dense sequence of diverse habitats starting from marine habitats below the sea level, the valleys and river plains up to high altitude habitats on the mountain tops at 3,000 m all within a range of 25 km is exceptional.

Map 65: South-Western Alpine Region - Ecological Corridor Network



E.2.5

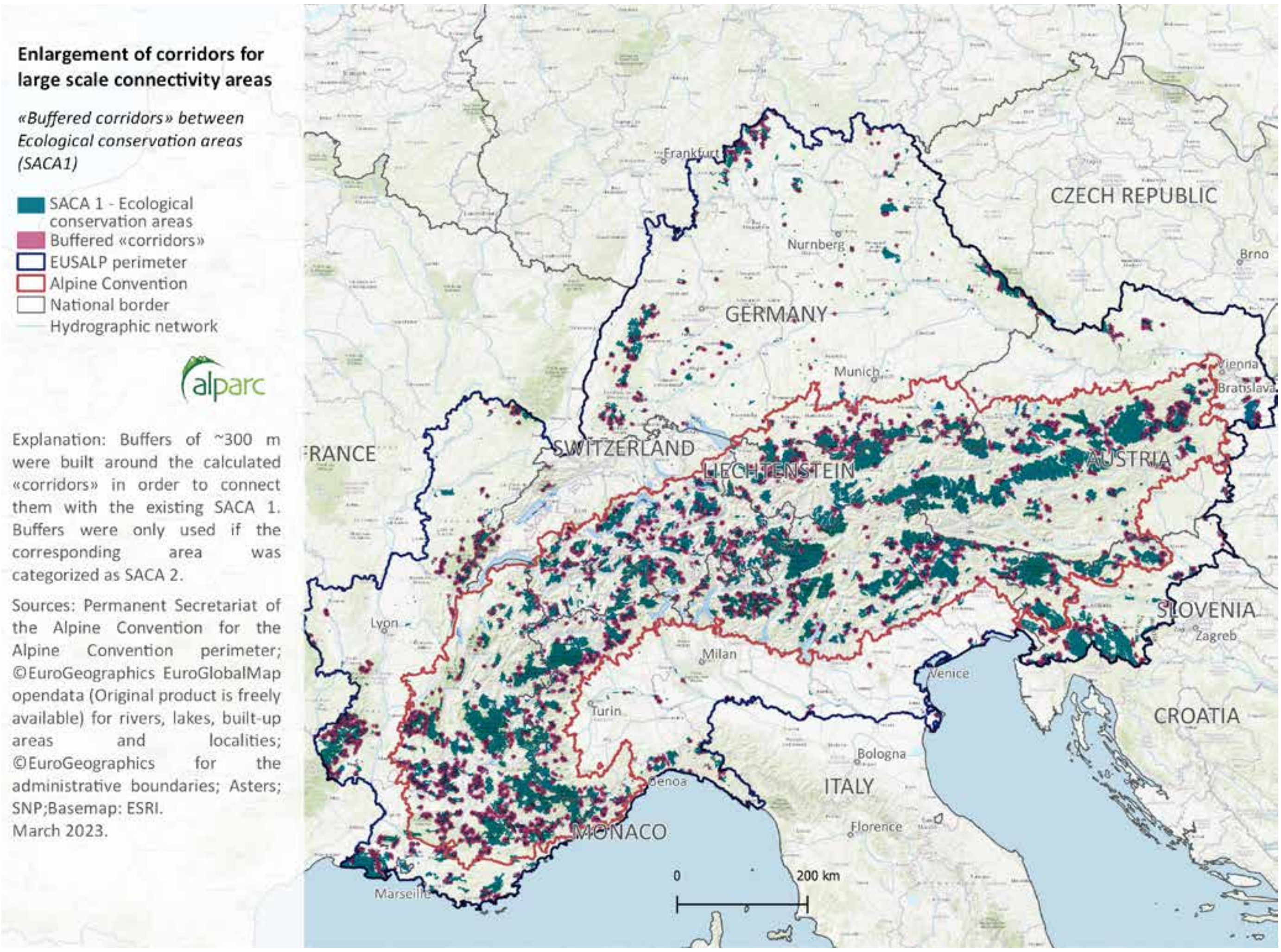
CONNECTED AREAS BASED ON THE ECOLOGICAL CONSERVATION AREA APPROACH

This section presents the results of a further application of the Strategic Alpine Connectivity Areas to identify additional key spaces in which to concentrate ecological connectivity measures. The analysis is based on the work described in the previous section identifying the potential large-scale connecting corridors between ECAs. In this exercise we go one step further and add an additional 300 m buffer to the identified corridors. Areas buffered in this way were only included in the model and showed on the map when they corresponded to EIA criteria. Areas corresponding to CRA were excluded from the model. The results show possibilities of creating larger patches of not only interlinked ECA areas but also patches with a more coherent surface area and less border effects due to a fuzzy form.

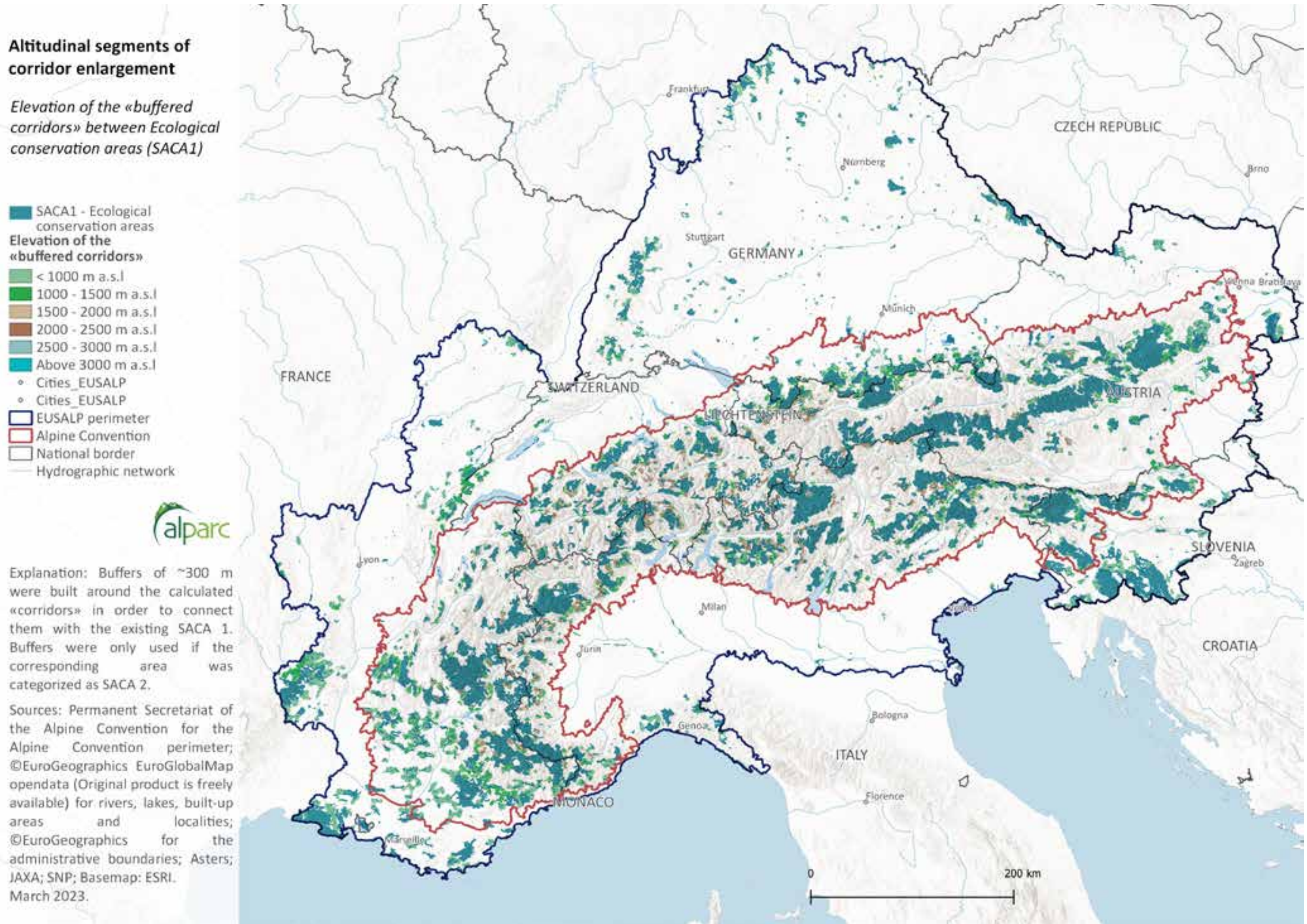
The map 66 shows the results for the whole EUSALP territory.

As previously stated, the altitudinal distribution of the identified surfaces is quite important, since there is currently an over representation of areas benefiting from protection at higher altitudes and a concentration of land use pressure in the lower areas.

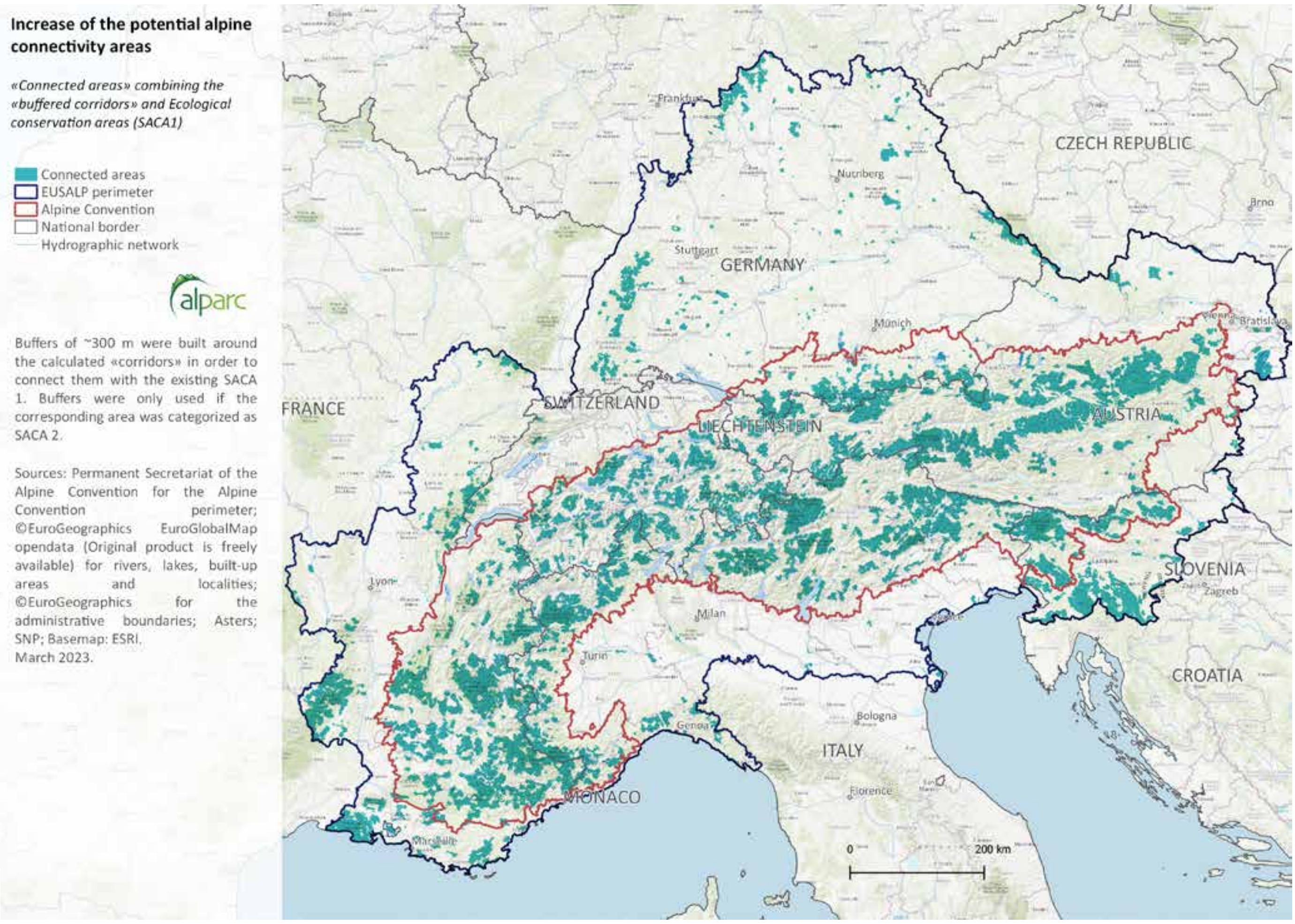
Map 66: Enlargement of Corridors for Large-Scale Connectivity Areas



Map 67: Altitudinal Segments of Corridor Enlargement



Map 68: Increase of the Potential Alpine Connectivity Areas



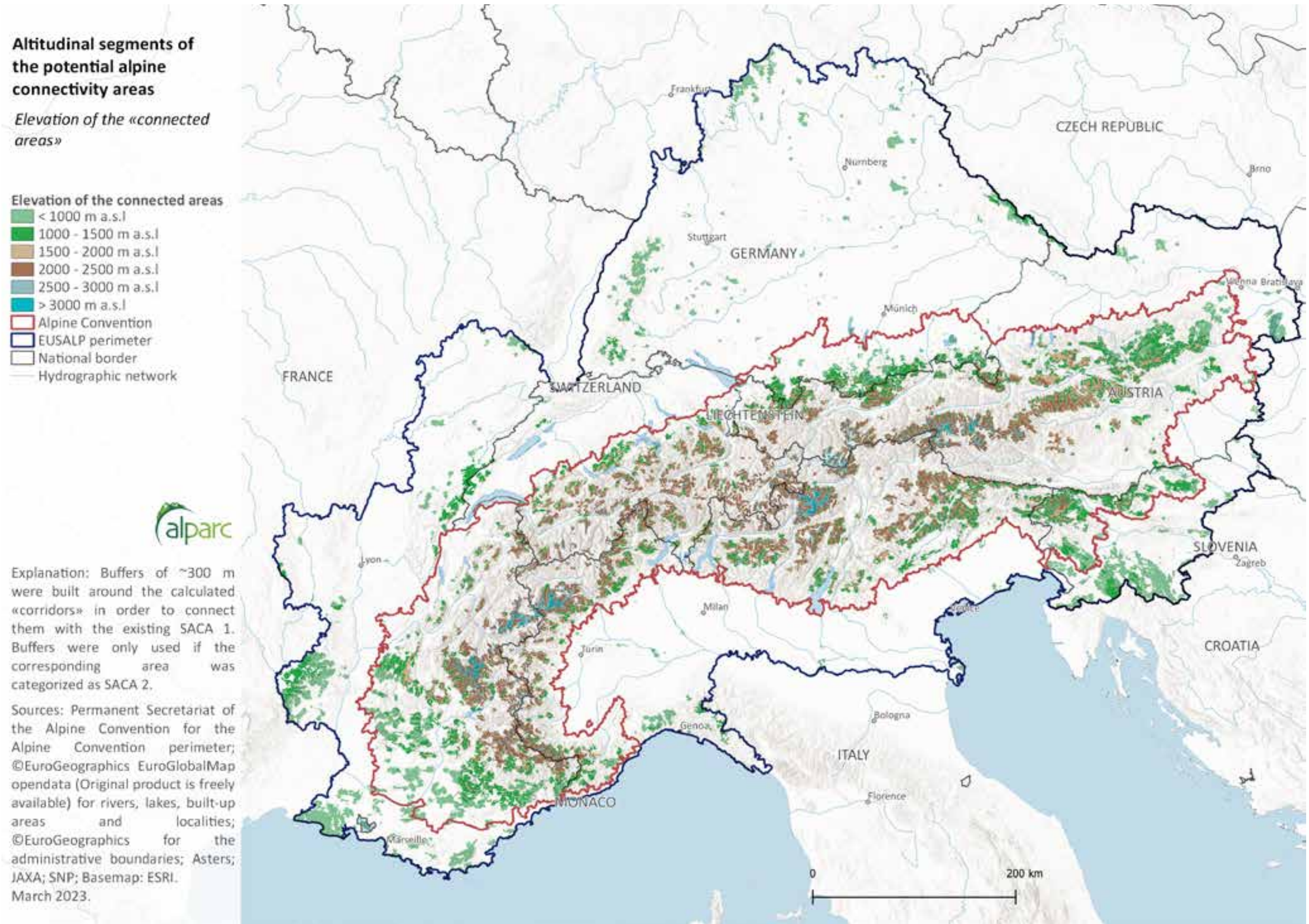
The map 67 shows the distribution in altitude of the newly identified surfaces and highlights the fact that these are mainly located in the lower altitudinal segments.

The result of this modelling as illustrated in the map 68 gives an overview of the potential of this approach. Focusing actions in a coherent and coordinated manner on the identified surfaces can effect real change in the Alpine connectivity landscape.

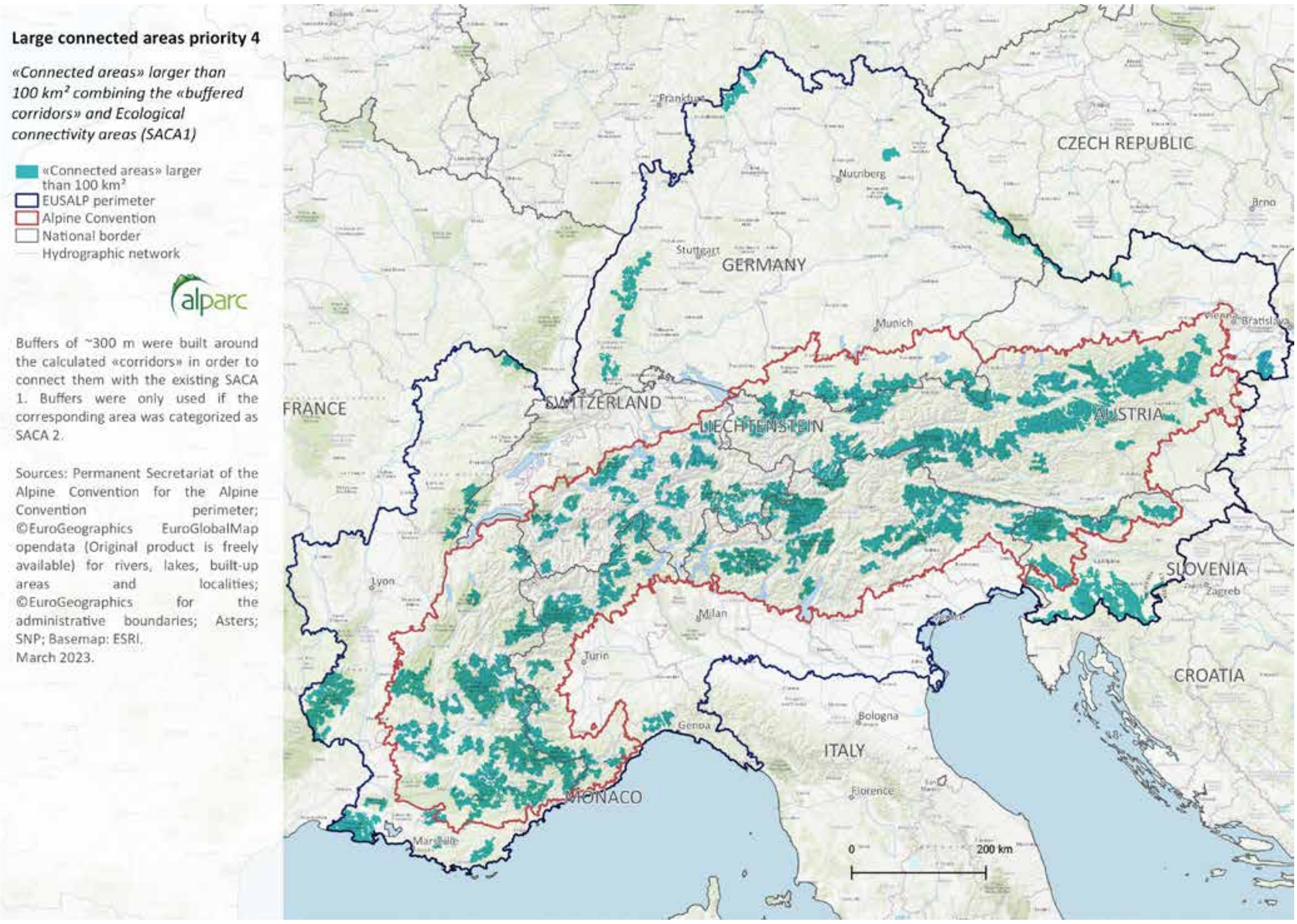
The map was produced by connecting the "buffered corridors" with the ECA where they share common borders. It is important to mention that the connected areas are a result that combines ECA and corridors established on the cover of EIA as these are the zones that could benefit from restoration measures and that offer the greatest impact in terms of territorial coverage linking the different identified ECA.

The results show large patches of well-connected landscape distributed all over the Alpine arc and covering all types of altitudinal levels and different habitats (see Map 69).

Map 69: Altitudinal Segments of the Potential Alpine Connectivity Areas



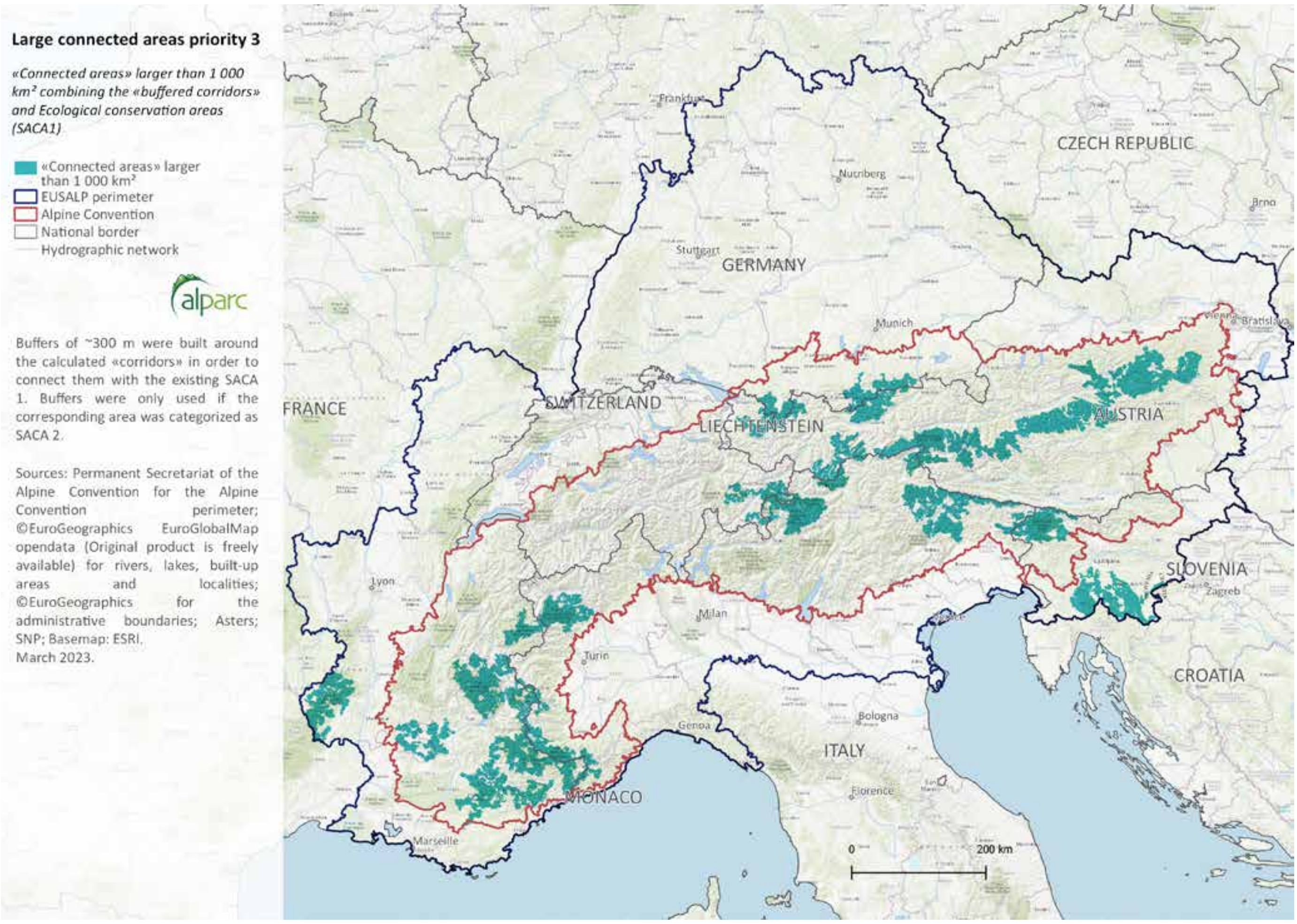
Map 70: Large Connected Areas Priority 4



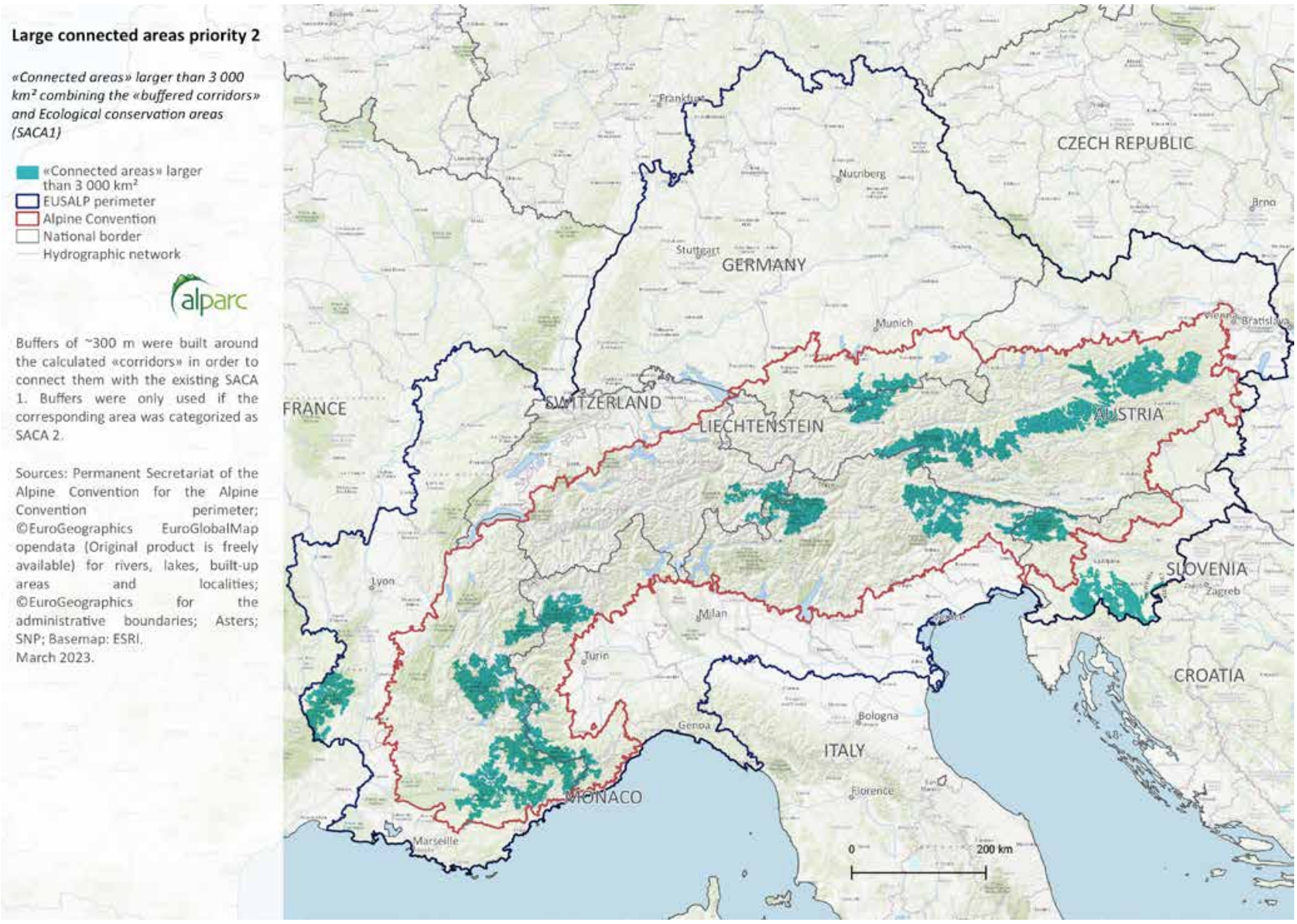
The following maps give an overview of these large patches that could be realised by concentrating on the proposed areas. The first example (Map 70) shows the areas larger than 100 km² classified according to their surface area (the larger they are, the higher their priority for ecological connectivity and potential of biodiversity protection).

The other maps (71-72) illustrate areas larger than 1,000 km² and 3,000 km².

Map 71: Large Connected Areas Priority 3



Map 72: Large Connected Areas Priority 2



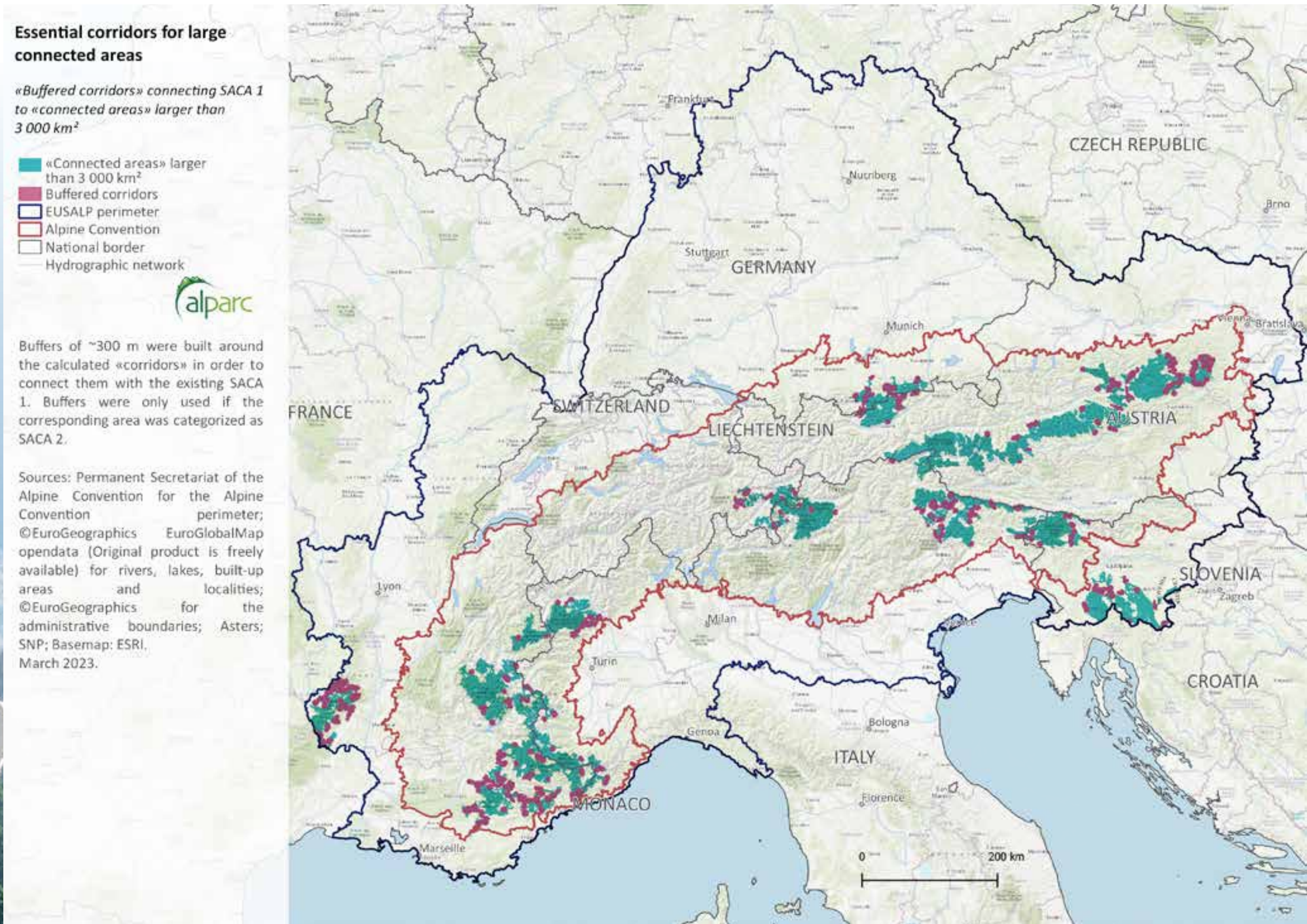
As large-scale connected landscapes are a key to biodiversity conservation and are currently lacking in the Alps compared to other large mountain ranges in the world, the creation of such large-scale connected areas would be a concrete and important step forward for ecological connectivity in the Alps. The few patches of really large size are located in the eastern and western parts of the Alps, with a dearth of such large-scale areas in the central Alps. Nevertheless, these areas would offer connectivity along the main high Alpine chain with the possibility of connection between high altitudes and lowlands while also guaranteeing connection to the neighbouring mountain ranges in the southwest and east.

This is a very important result – The centre of the Alps lacks large scale connectivity areas including highly protected large core zones.

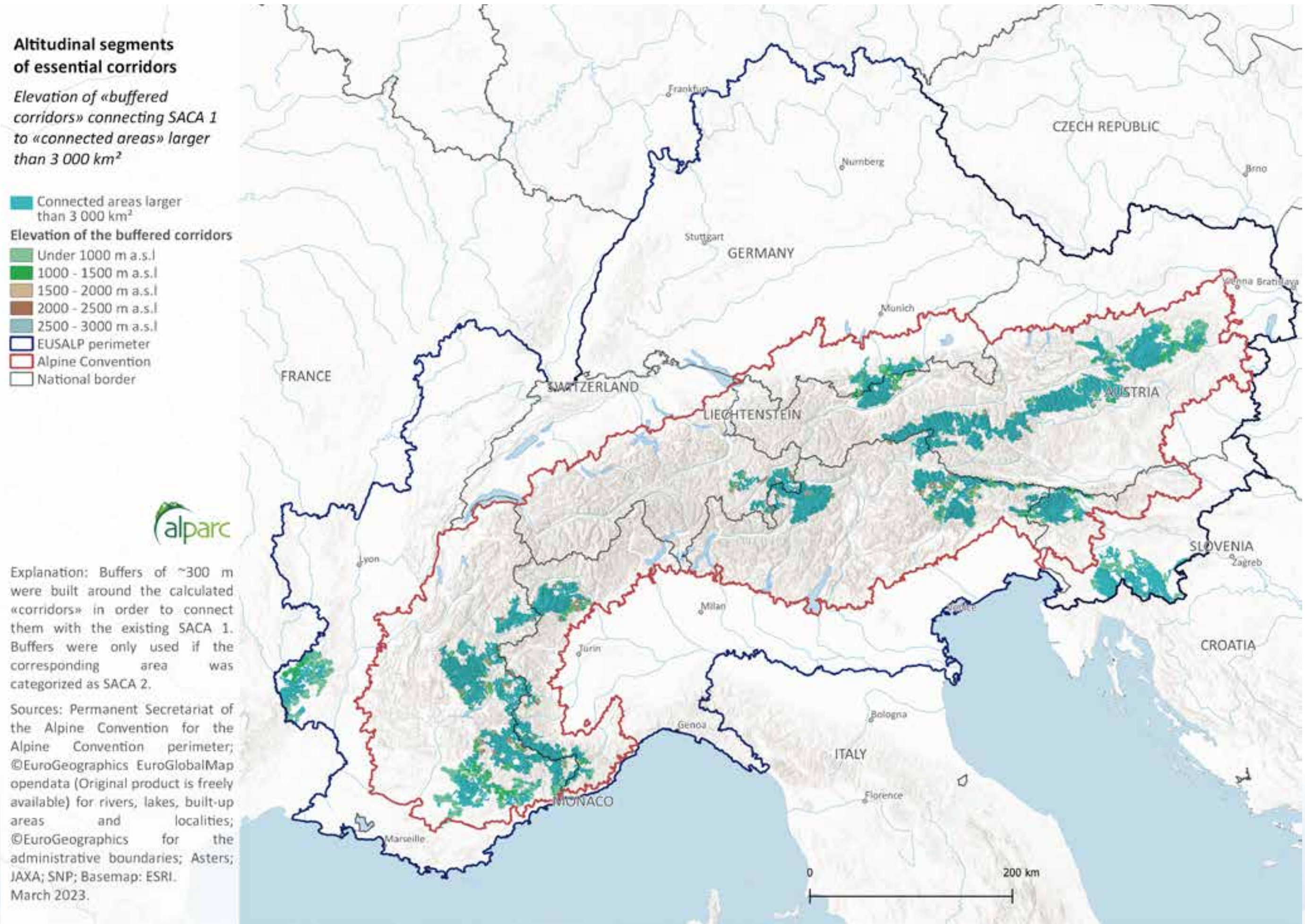
This map (73) demonstrates one of the most important features of the Alpine spatial nature protection and ecological connectivity situation. It illustrates the reality on the ground from an Alps-wide (and only Alps-wide) perspective. This is a strategic approach. It is also true that at local and regional scales the situation may be more positive. Nevertheless, in order to safeguard high biodiversity for generations to come, a large-scale approach will be crucial.

Adding the buffered corridors to the analysis would further increase effectiveness and size of the identified areas. The analysis includes the largest connected areas. The buffered corridors were only selected if they were inside an EIA and were located next to a large connected area. This selection was made to illustrate the extent to which ecological connectivity could be improved by extending existing protection in specific areas considering as well their altitudinal distribution (Map 74).

Map 73: Essential Corridors for Large Connected Areas

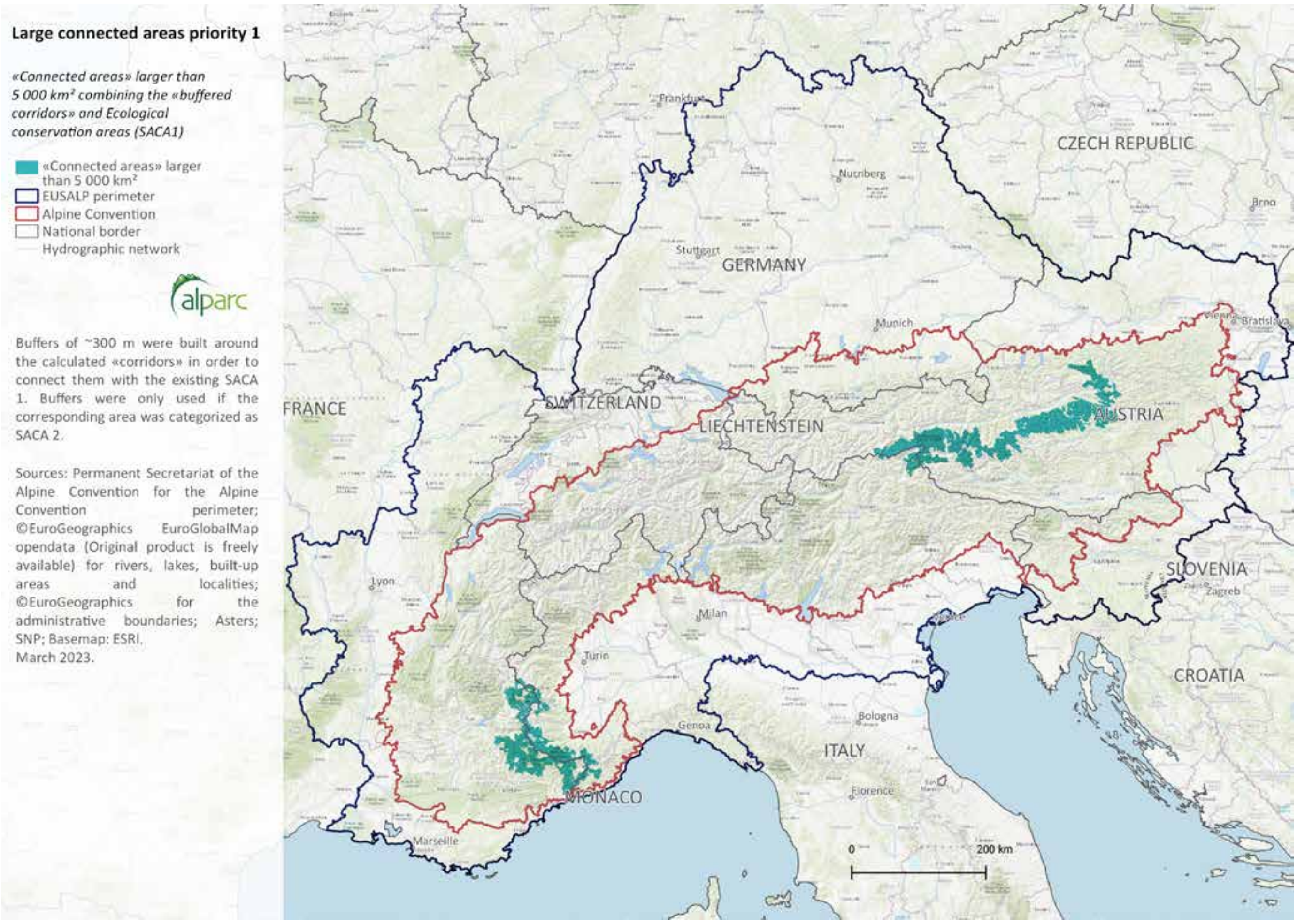


Map 74: Altitudinal Segments of Essential Corridors for Large Connected Areas



This approach identifies only two areas with a surface area greater than 5,000 km², but they are of particular interest (Map 75). These are areas where action in favour of ecological connectivity has already been taken in partnership with different protected areas because they are located within the range of the southwestern transboundary ecoregion with the National Park Mercantour, Ecrins and Vanoise and Italian protected areas like the Parco Naturale Alpi Marittime and in the area of the National Park Hohe Tauern and other Austrian protected areas.

Map 75: Large Connected Areas Priority 1



The areas identified as Priority 1 are the largest segments that could be created by establishing ecological corridors. The selected areas benefit from a well-distributed surface area in terms of altitude and are also partially covered by a strong nature protection category.

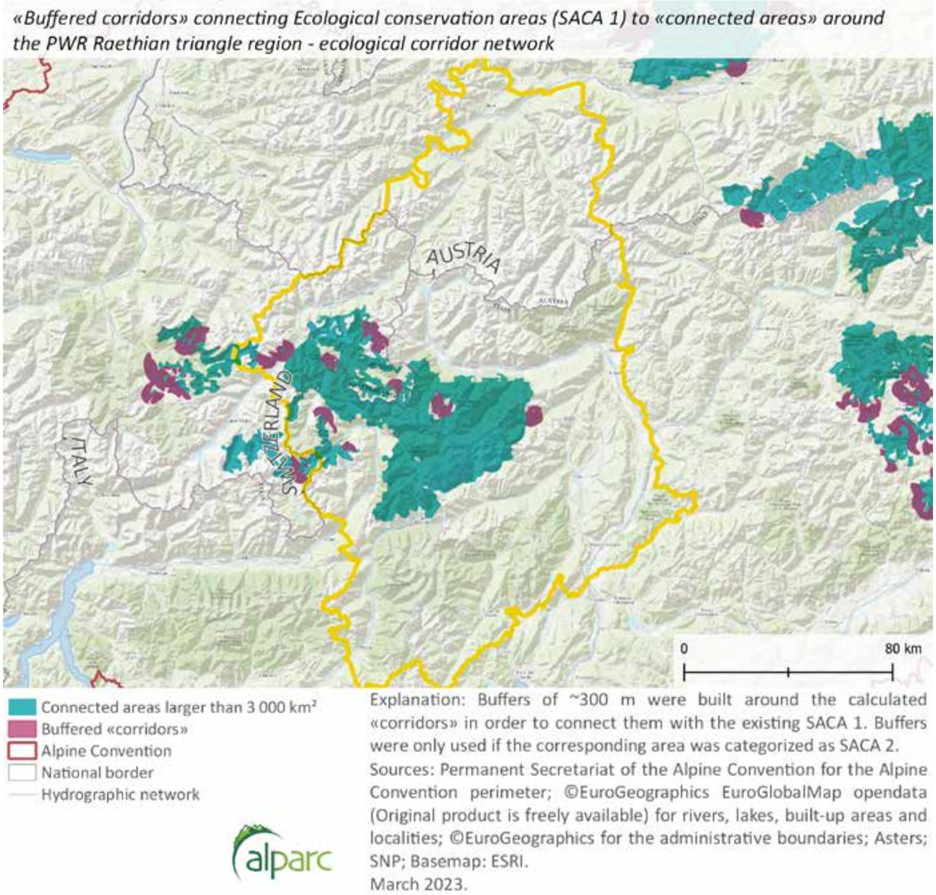
The following maps offer a zoomed view of the analysis results for different Alpine areas of particular interest for ecological connectivity. In addition, a supplementary map shows the altitudinal distribution indicating the elevation of the buffered corridors.

RAETHIAN TRIANGLE

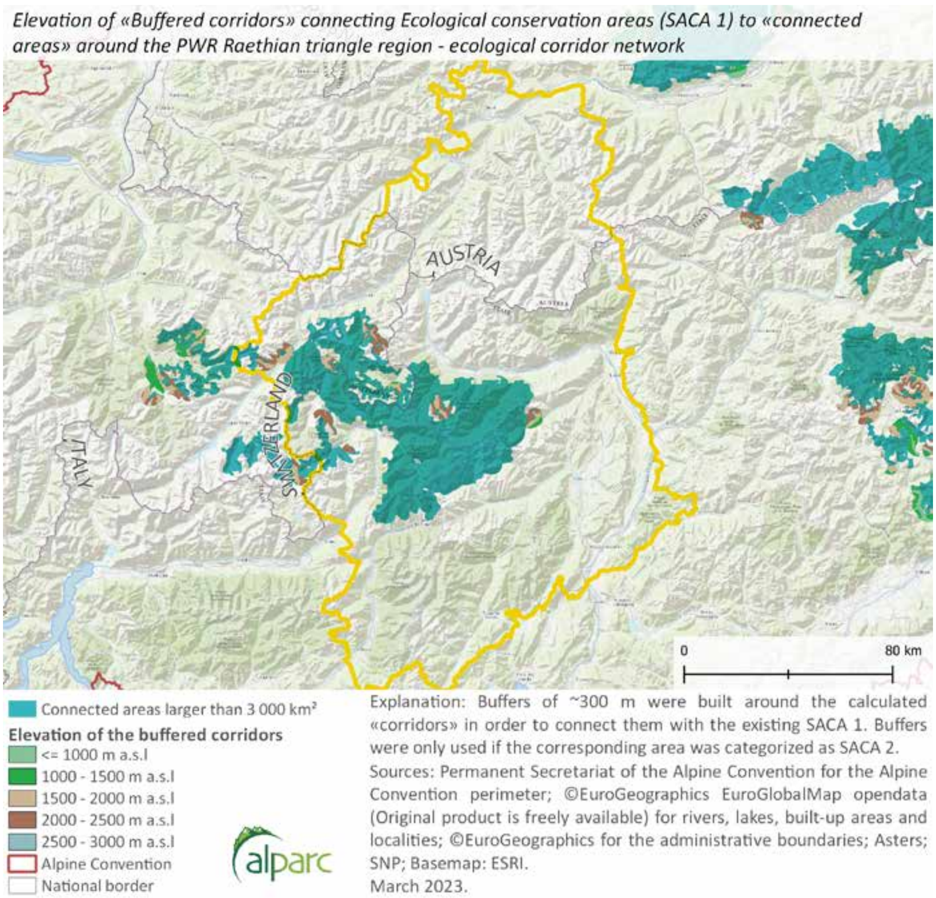
The Raethian Triangle is a key zone for enhancing nature protection and therefore the ecological connectivity. As mentioned previously, different strong protection categories are present, which could facilitate the extension of the protection measures to become large connected areas (Map 76).

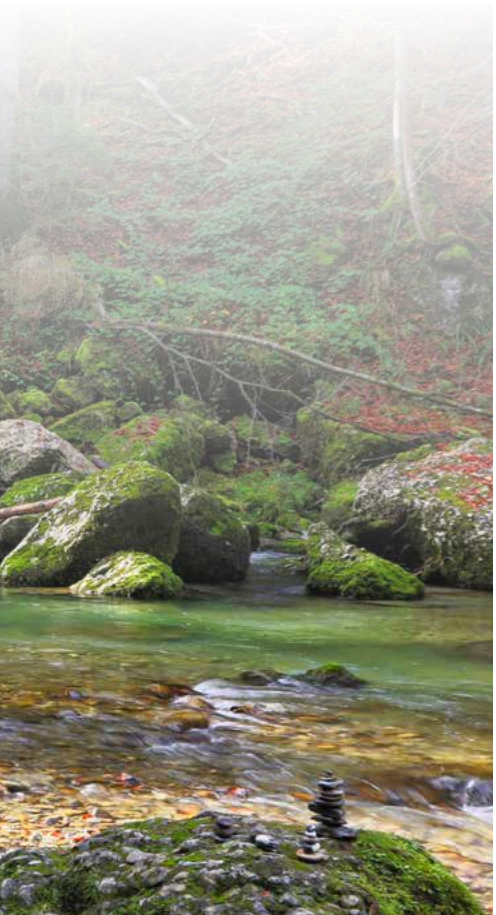
The results show that, in order to consolidate the connected areas on this region, action would mostly be required in the neighbouring zones adjacent to the National Parks and on high altitude surfaces (above 1,500 m a.s.l) (Map 77).

Map 76: Raethian Triangle Region - Connected Areas



Map 77: Raethian Triangle Region - Connected Areas Altitudinal Distribution



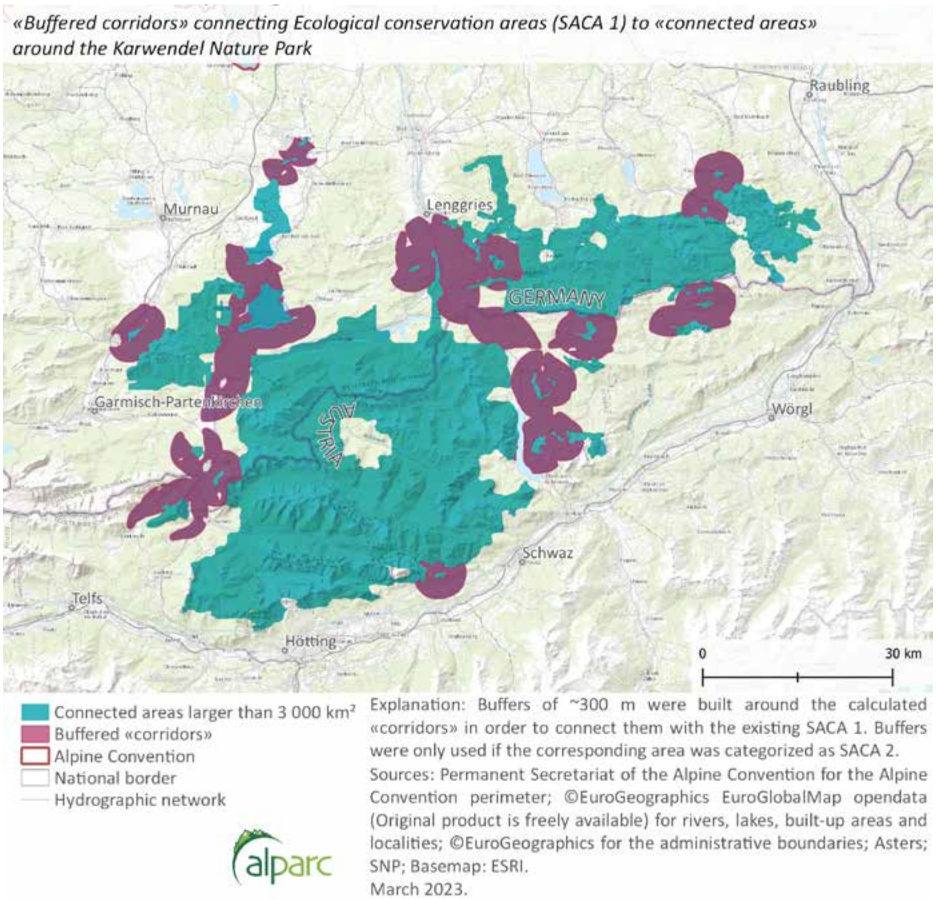


NORTHERN CENTRAL ALPINE REGION

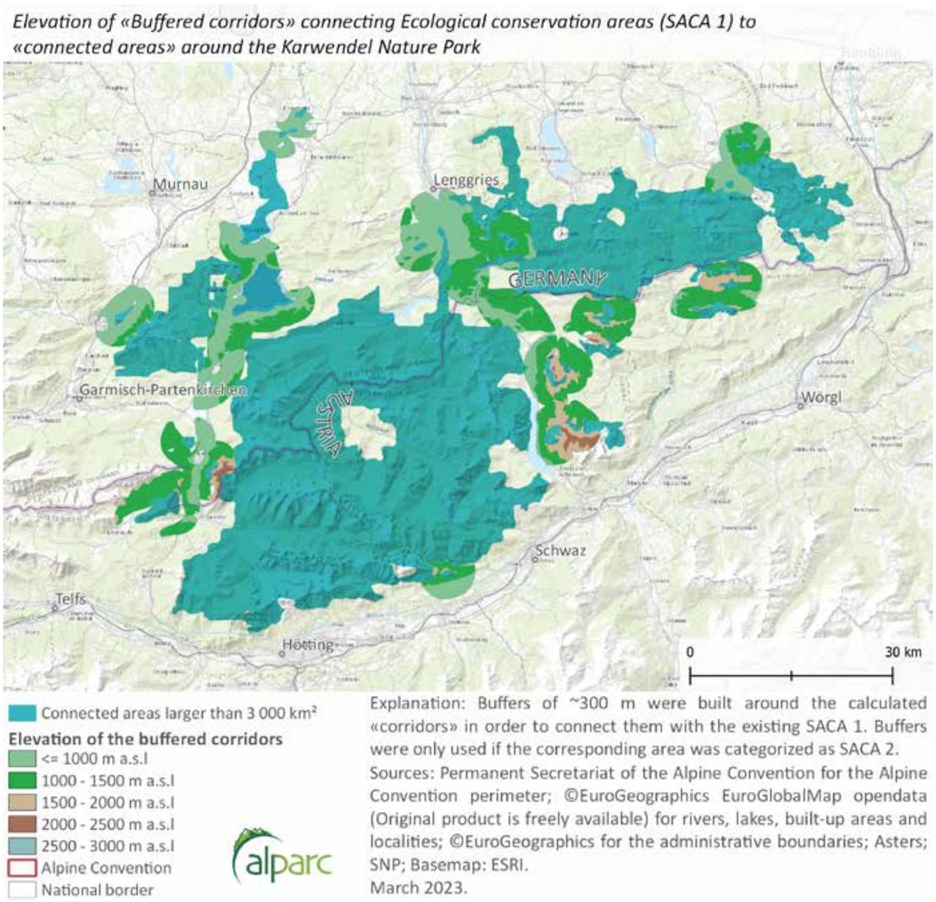
The Karwendel Nature park was selected to illustrate the potential connected areas in the Northern Central Alpine region. This zone is covered by different nature protection categories (Nature park, Nature reserve, among others) (Map 78).

As illustrated on the map, to consolidate the connected areas in this region, action would be needed mostly in the neighbouring zones adjacent to the Nature park, which are not currently included on the protection surface. Another important challenge is that most of the corridors are located on the valley, mostly at elevation levels below 1,500 m a.s.l. (Map 79).

Map 78: Northern Central Alpine Region - Connected Areas



Map 79: Northern Central Alpine Region - Connected Areas Altitudinal Distribution

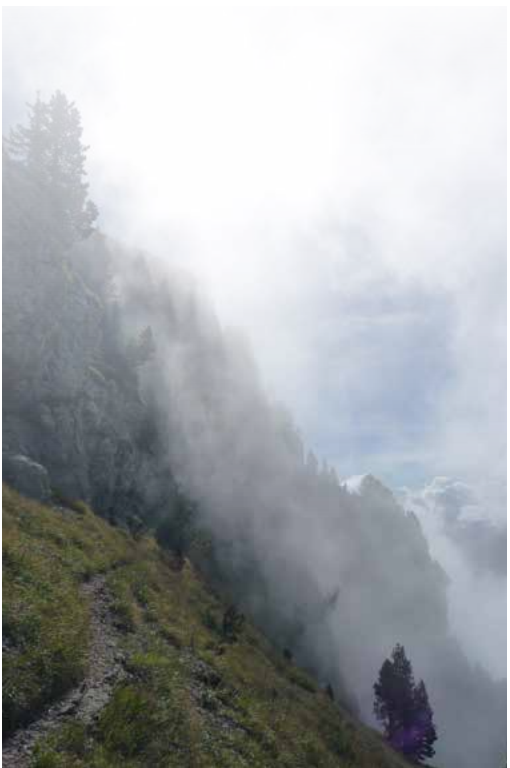


SOUTH-WESTERN ALPINE REGION

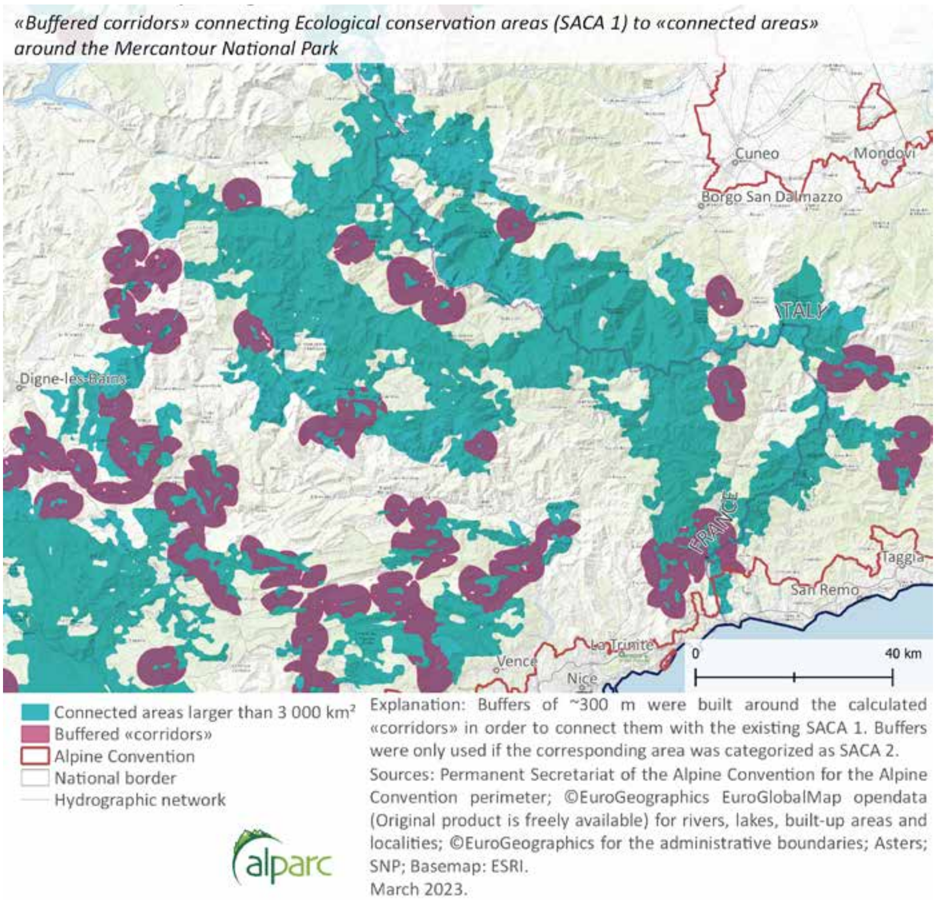
The South-Western Alpine region is a key zone for enhancing ecological connectivity. High biodiversity value zones, such as the Mercantour National Park, the Prealpes d'Azur Nature Regional Park, the Alpi Marittime Nature park and different nature reserves, are located in the area.

As illustrated on the map 80, in order to consolidate the connected areas in this region, action would mainly be required in two locations. These include some surfaces of the buffer zone of the National Park which are currently part of the protection perimeter but that still present some challenges to accomplishing a high level of ecological connectivity. The identified zones are mostly at elevation levels above 1,500 m a.s.l.

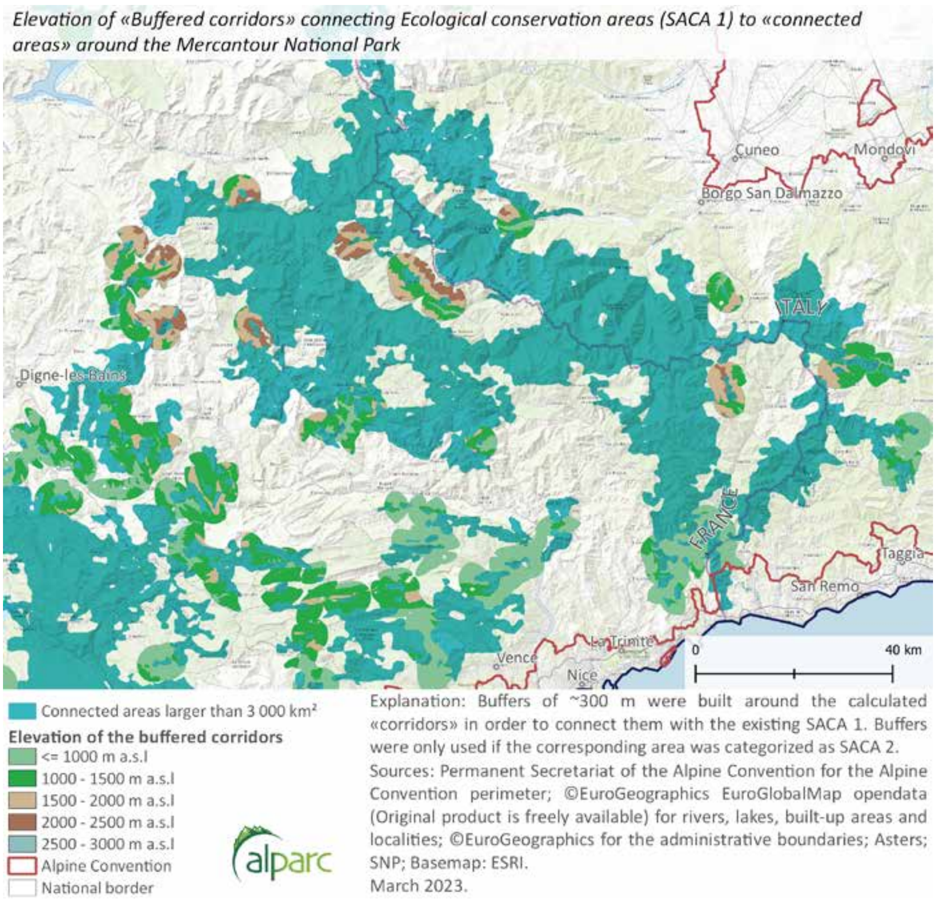
Some areas inside of the protection perimeter of the Prealpes d'Azur Nature Regional Park would also need more actions to improve the connectivity. These areas are located on lower altitudes below 1,500 m a.s.l. (Map 80)



Map 80: South-Western Alpine Region - Connected Areas



Map 81: South-Western Alpine Region - Connected Areas Altitudinal Distribution

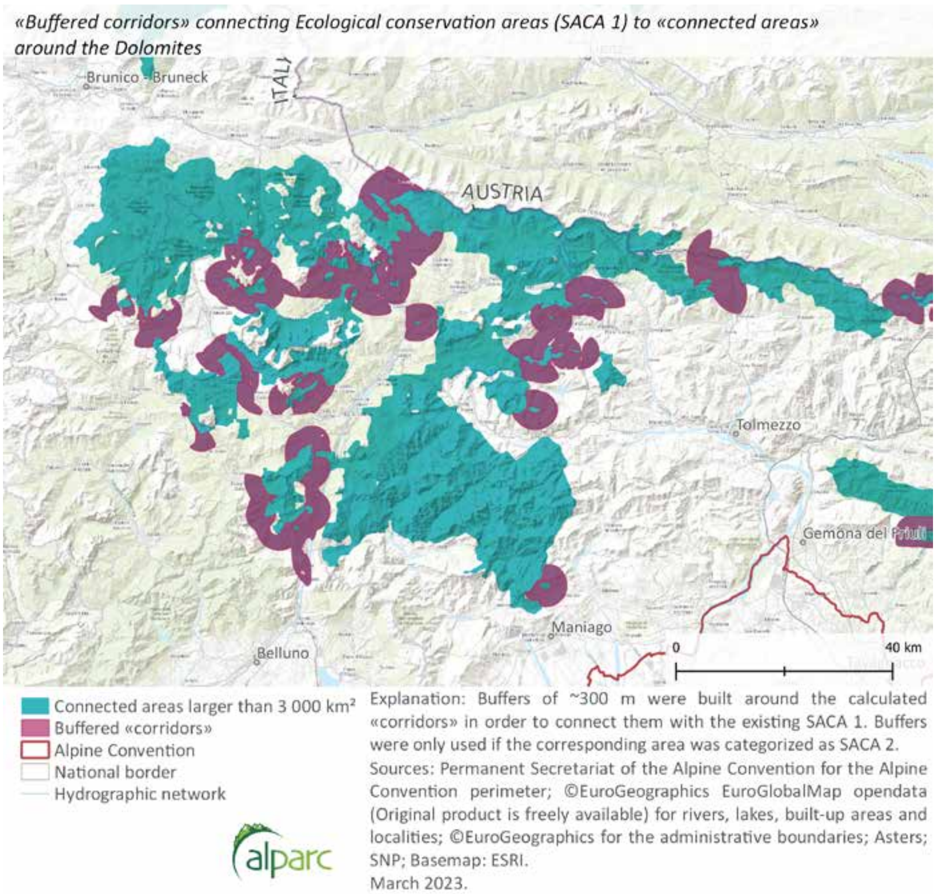


DOLOMITES

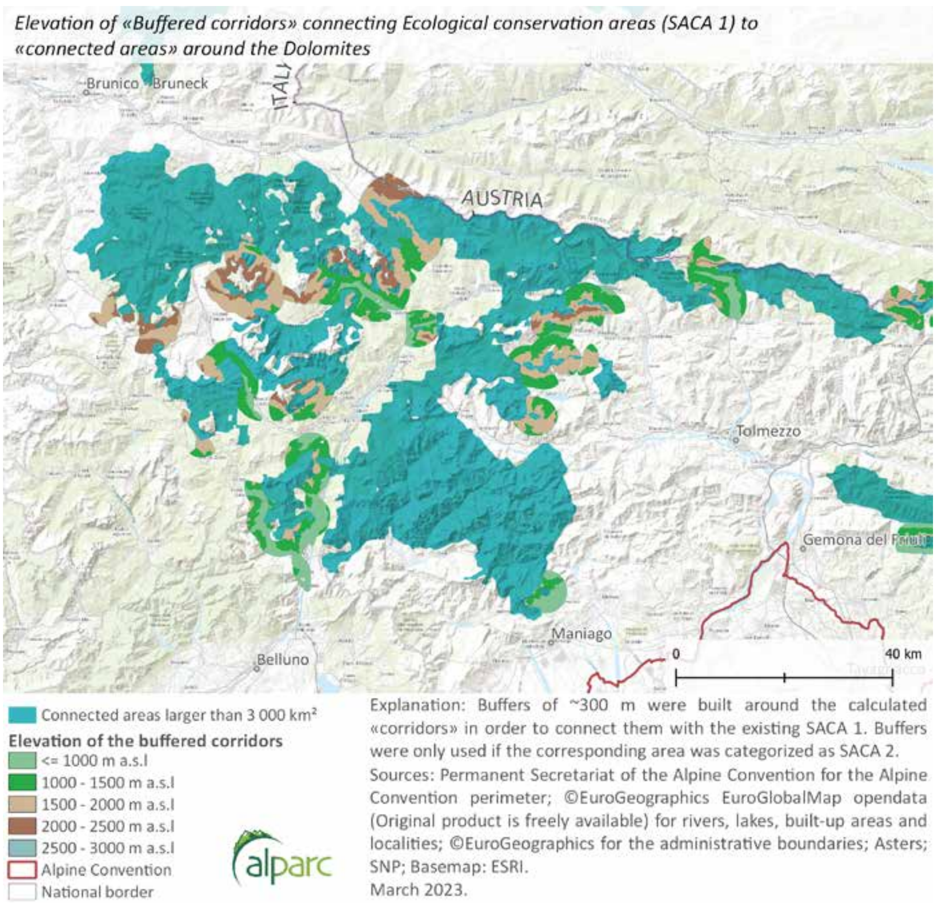
The Dolomites have a natural and cultural significance recognised on an international level through the designation of the UNESCO World heritage sites. Different protection categories have been established to regulate human intervention within the zone and to preserve the natural landscape.

As illustrated on the map 82, in order to consolidate the connected areas in this region, action would be needed in the inner links of the World heritage site. The identified zones are mostly at elevations above 1,500 m a.s.l. with some smaller surfaces located in the valley (Map 83).

Map 82: Dolomites - Connected Areas



Map 83: Dolomites - Connected Areas Altitudinal Distribution

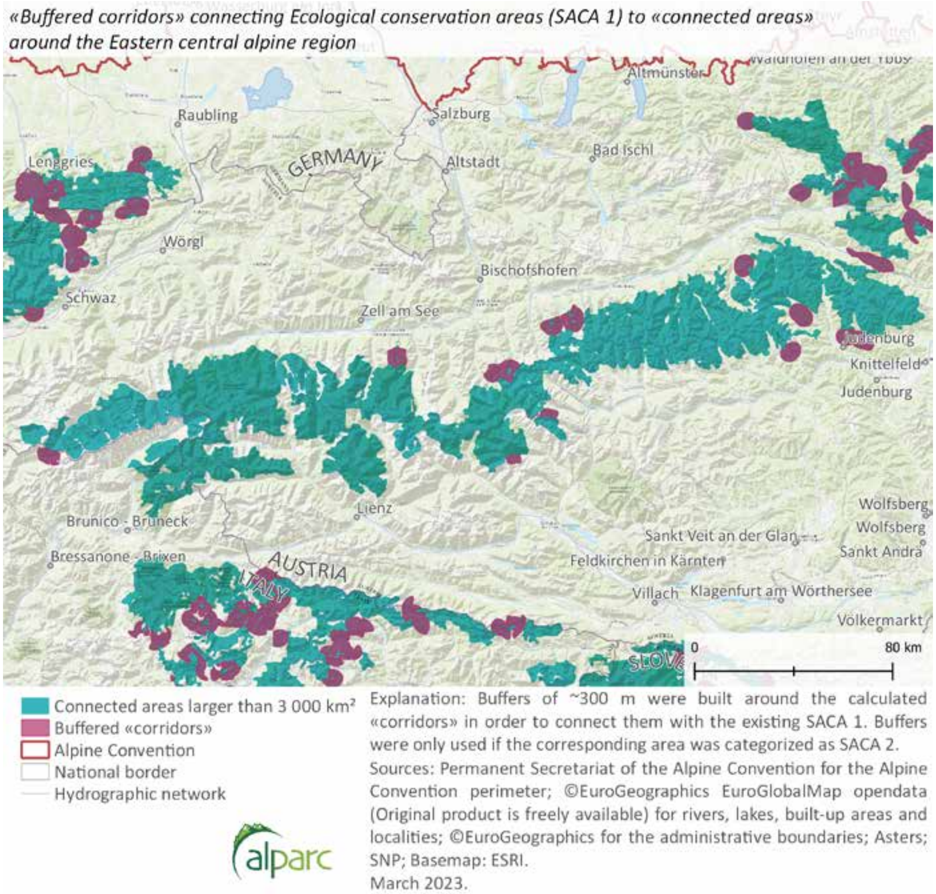


EASTERN CENTRAL ALPINE REGION

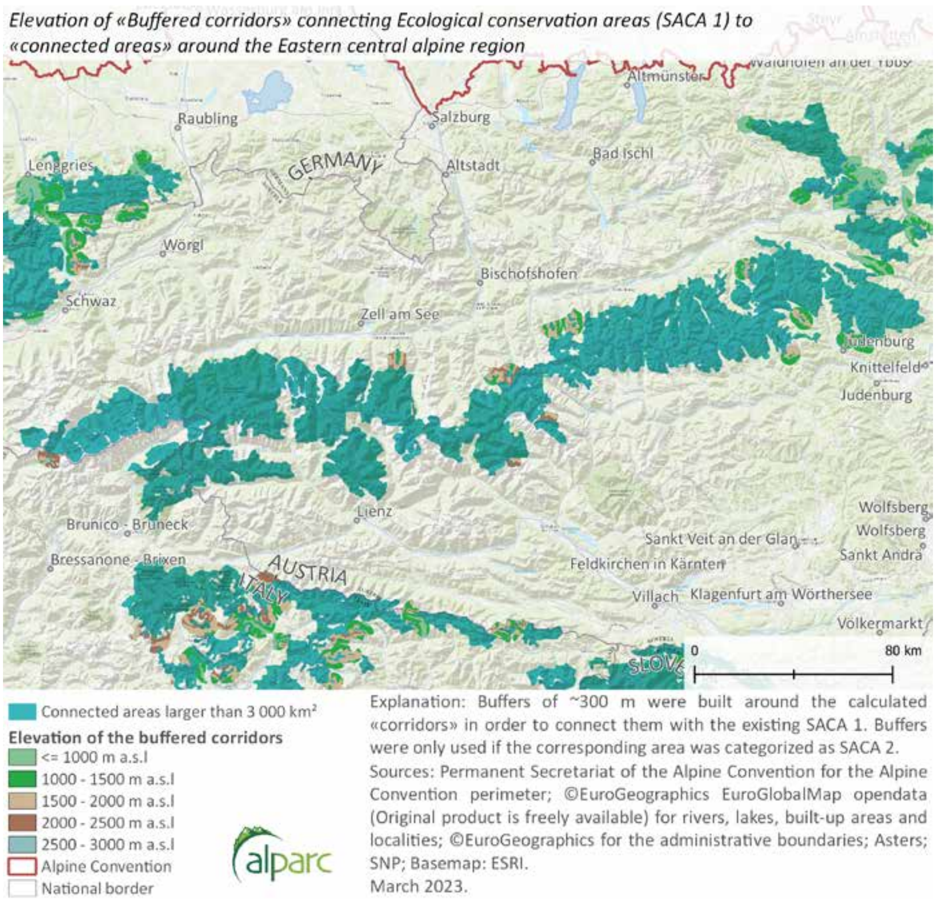
The Eastern central alpine region is a key zone for enhancing ecological connectivity. Different categories of protection coexist in this area which is characterised by the heterogeneity of topography and territorial challenges.

As expected, the connected areas are located around the more strongly protected surfaces, the National Parks (Map 84). The results show that, in order to consolidate larger connected areas in this region, action would be needed mostly at the lower altitudes (below 1,500 m a.s.l) (Map 85).

Map 84: Eastern Central Alps - Connected Areas



Map 85: Eastern Central Alps - Connected Areas Altitudinal Distribution

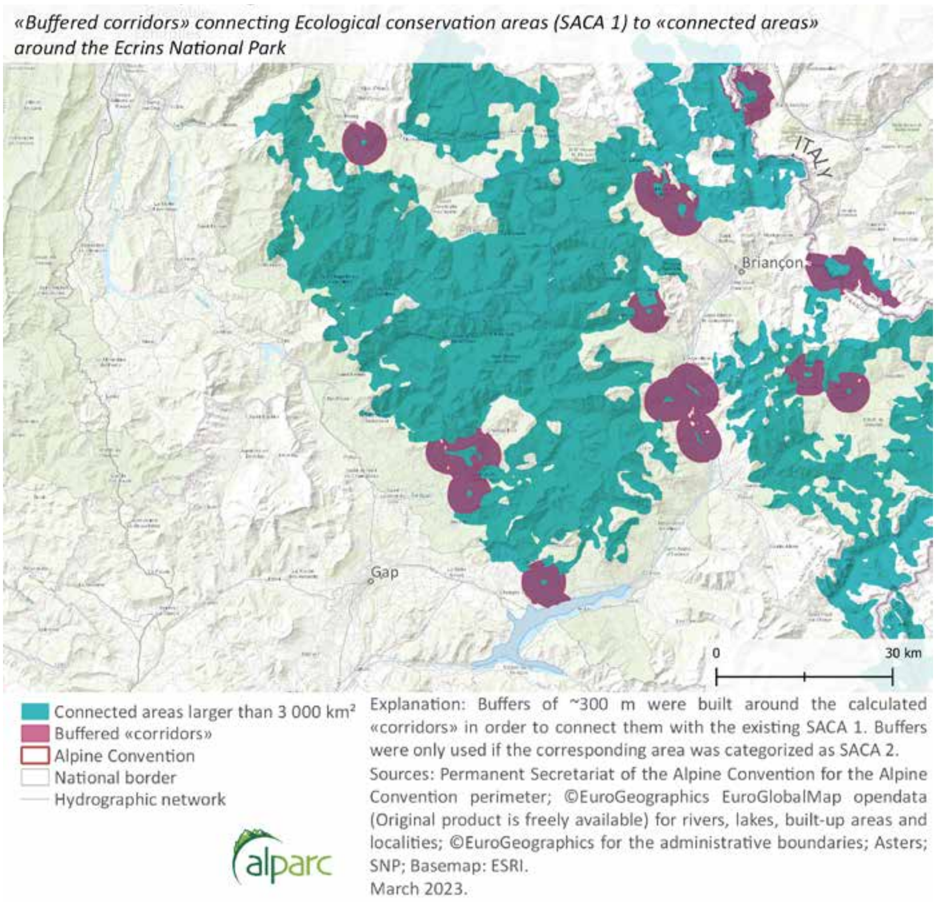


WESTERN CENTRAL ALPS

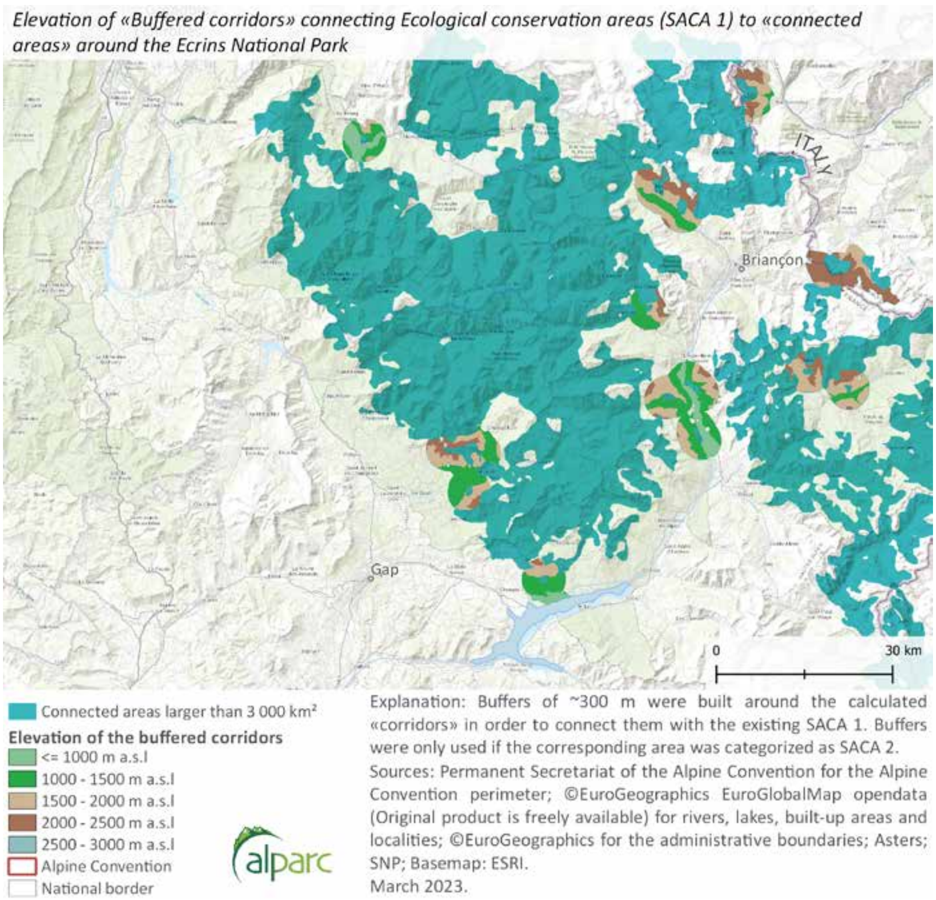
The Western Central Alps region is a zone with different levels of nature protection. The Ecrins National Park provides strong measures to preserve nature inside its perimeter and is the zone where the implementation of more actions to enhance ecological connectivity would have a greater impact on the region (Map 86).

The results show that in order to consolidate larger connected areas on this region, action would be needed mostly at altitudes below 2,500 m a.s.l. (Map 87).

Map 86: Western Central Alps - Connected Areas



Map 87: Western Central Alps - Connected Areas Altitudinal Distribution



E.2.6

PRESERVING AND RESTORING ECOLOGICAL INTERVENTION AREAS

This section offers an approach similar to the one described before. However, here it is aimed not at the core elements of the ecological network (ECA) but rather at the linking elements, in this case the Ecological Intervention Areas (EIA).

Just as was done for the ECAs, buffers were created around EIA areas. The idea behind this approach is to show which EIAs would be of priority to preserve or connect to create a specific EIA rescue plan of some sort.

As the total surface area of EIAs is significantly larger than that of ECAs, and their interconnection is already quite intense due to the ways of modelling them, the number of connections (here in violet) is quite a bit lower than was the case for the approach described previously. Nevertheless, it is clear that a series of the connections exist and that they can, as before, be an interesting starting point for prioritising action.

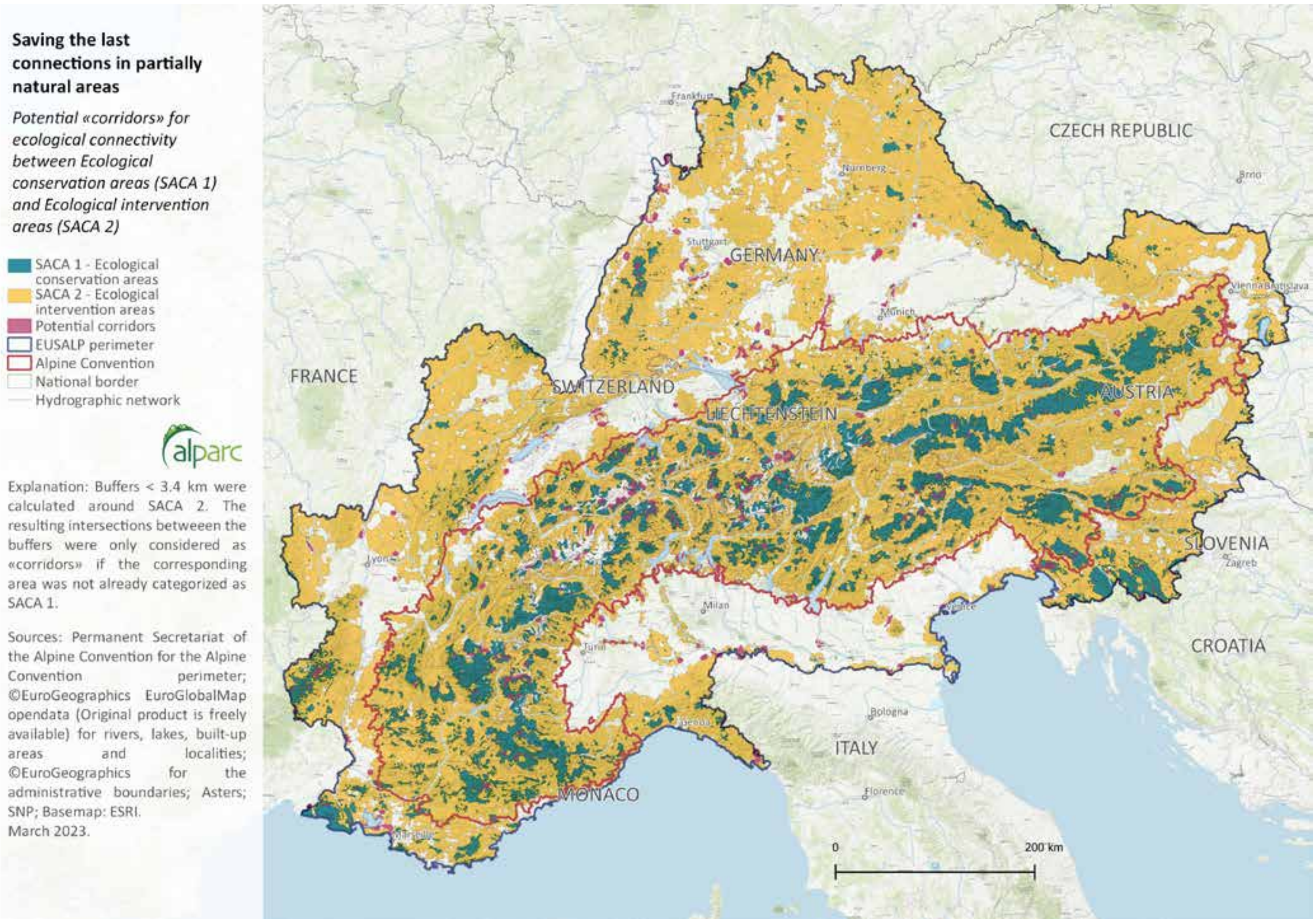
In some cases, focusing on the connections related to the "white areas" on the map 88 could be valuable as they contribute to filling and overcoming these white areas, where the connectivity is uncertain using our modelling approach.

For the examples below, a specific identification of the 10, 20 and 50 largest of these connection areas was carried out.

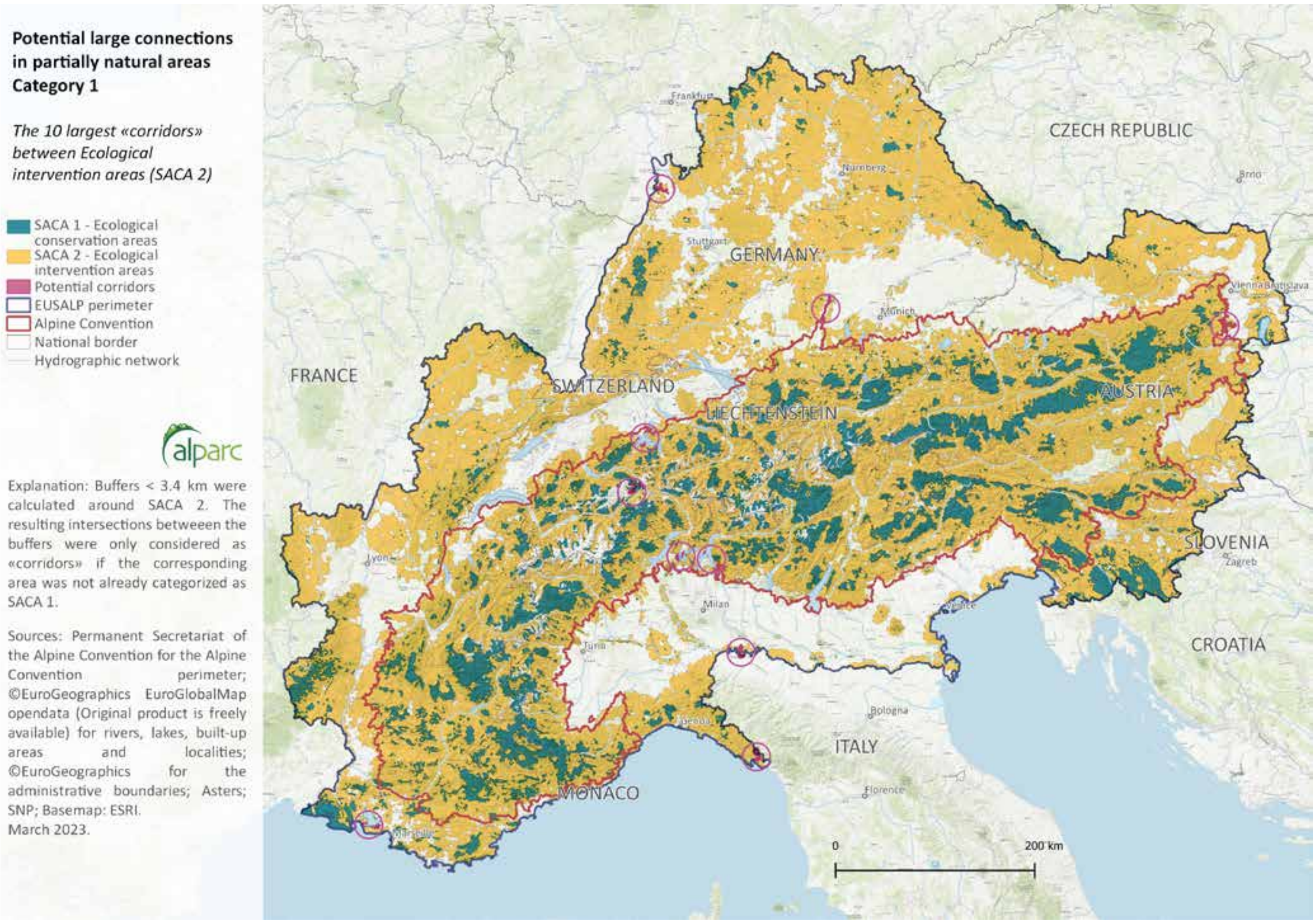
There are fewer potential corridors identified through this analysis than for the process elaborated with the ECAs, the morphology and distribution of the EIAs complicates the identification of clear zones that allow for improvement of ecological connectivity based on the definition of buffer zones around EIAs.

Our analysis reveals that the largest EIA connected elements are located in the centre of the Alps. In combination with the models presented previously, this result offers an opportunity to really focus on effective actions prioritised according to geographical location: in the eastern and western parts, focus should be placed on large connected areas (based on ECA) with their buffers; in the central part of the Alps, where large connected areas are lacking, the focus should be put on the EIAs and their main connecting elements as shown in the map maps 89 - 91 below.

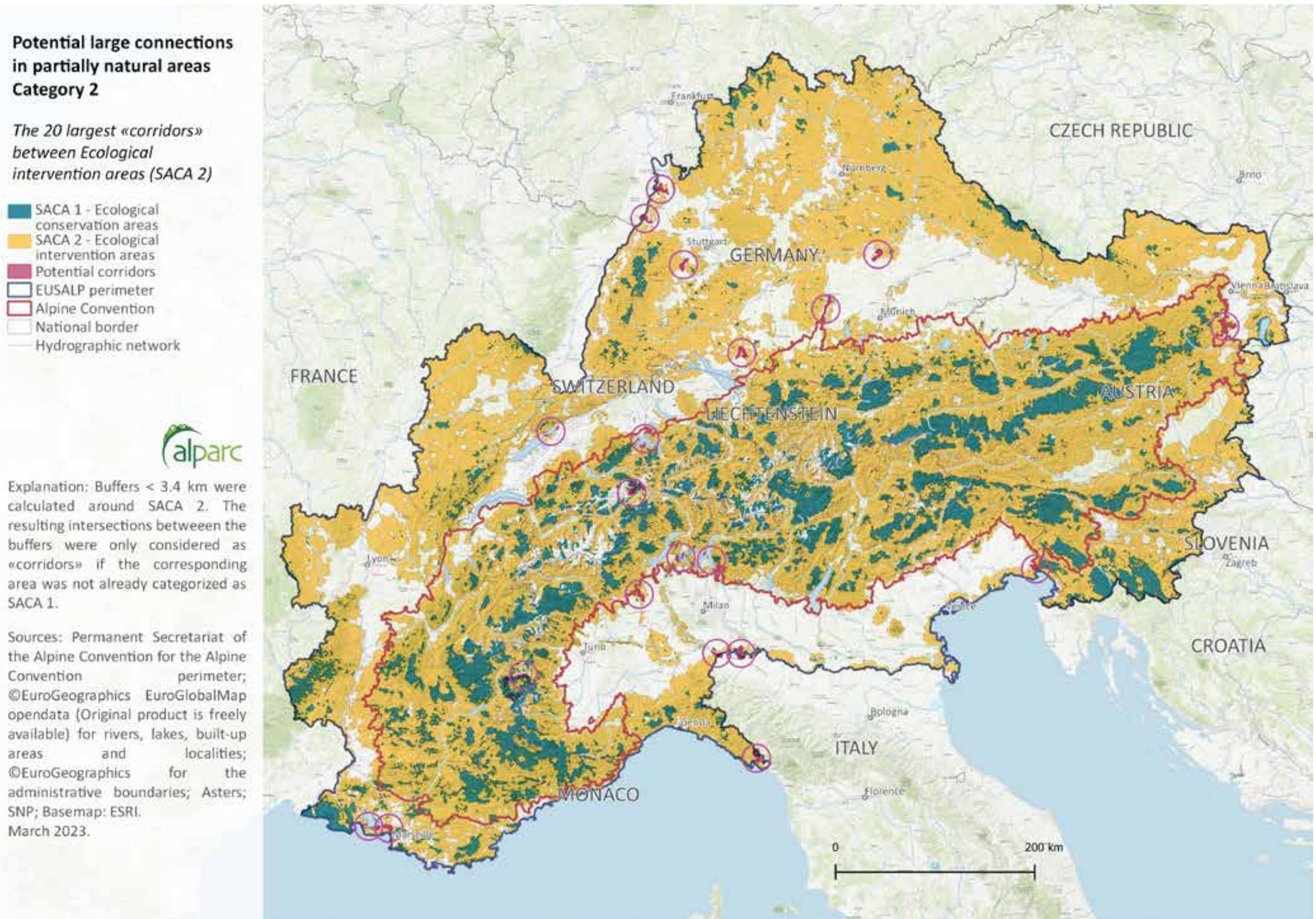
Map 88: Saving the Last Connections in Partially Natural Areas



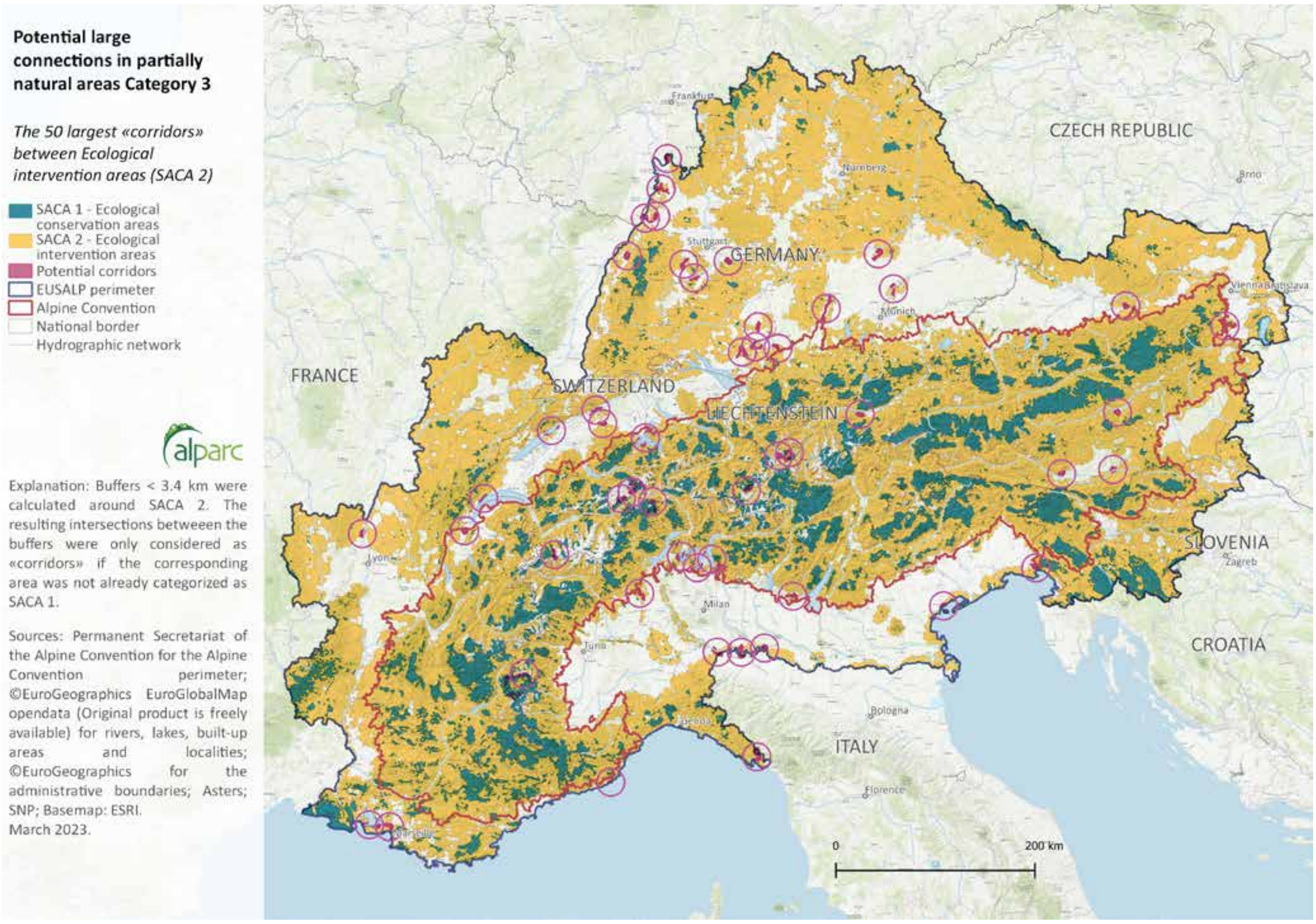
Map 89: Potential Large Connections in Partially Natural Areas Category 1



Map 90: Potential Large Connections in Partially Natural Areas Category 2



Map 91: Potential Large Connections in Partially Natural Areas Category 3



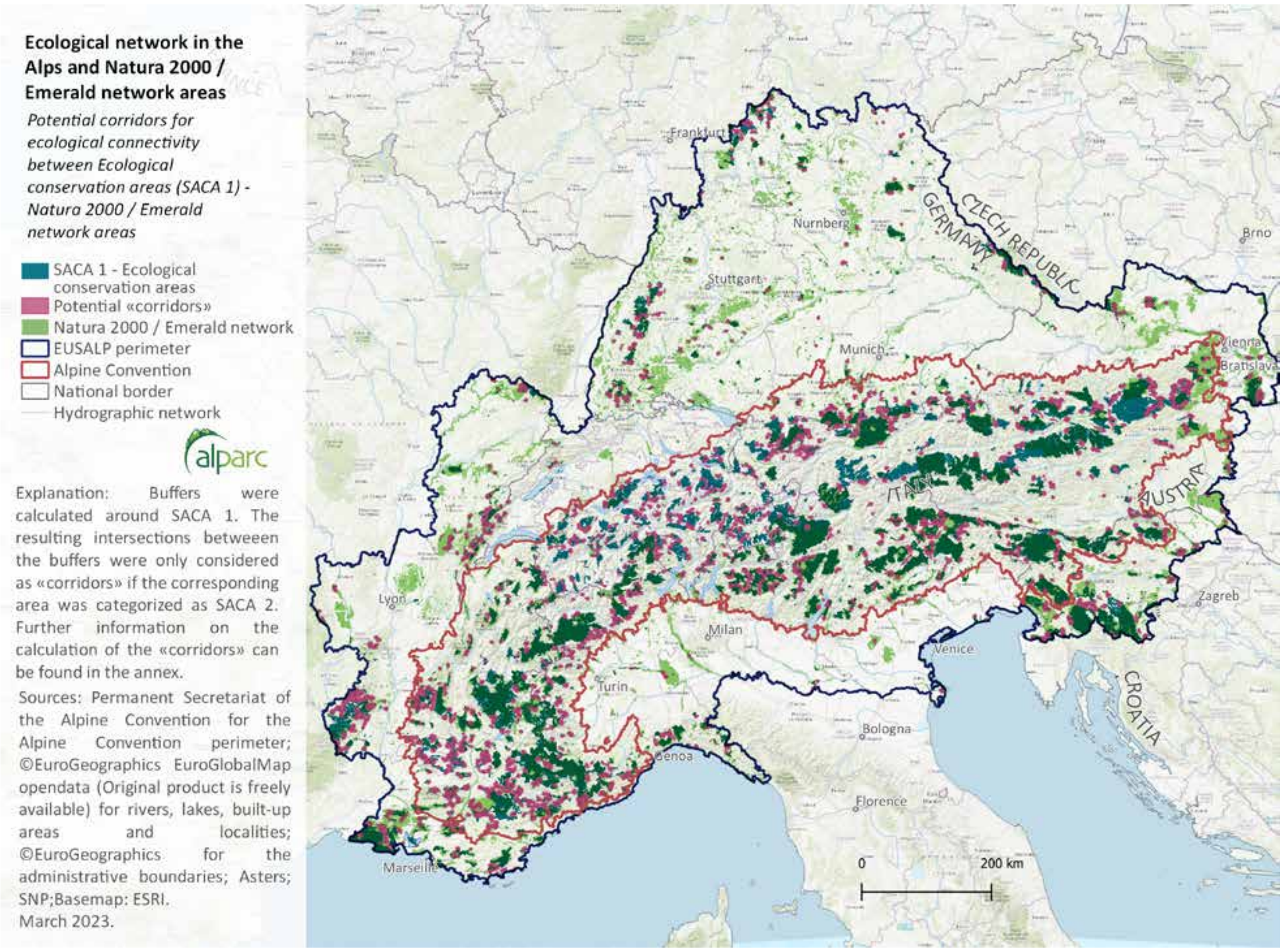
E.2.7

NATURA 2000

In 1992, the European Natura 2000 Network, designed in the late 1980s and early 1990s, found its way into the EU's key biodiversity instrument, the Habitats Directive. The word "network" indicates that protected areas are linked to each other and, thus, establish connectivity. It was only in the decade after the adoption of the Habitats Directive that the term "connectivity" was coined, mainly in connection with climate change. Nevertheless, the current state of the Natura 2000 sites in the Alps represents only a very limited interconnected network.

The map 92 shows the distribution of the ECAs and the potential corridors combined with the Natura 2000 and Emerald Network spaces, which illustrates the overlap between some of the designated natural sites and the ECAs. The potential corridors are also partially covered by some of these spaces in the western central Alps region and the south-eastern Alpine region among others, which illustrates the importance of the corridors for the preservation of nature protection areas.

Map 92: Ecological Network in the Alps and Natura 2000 / Emerald Network Areas



E.3

NATIONAL POLICIES IN FAVOUR OF ECOLOGICAL CONNECTIVITY

The Habitats Directive requires Member States to monitor and protect species and habitats within and outside protected areas. A voluntary goal is the cohesion of the Natura 2000 network, which, if implemented, would have a direct positive impact on ecological connectivity.

In addition to Natura 2000, there is also the “Emerald Network of Areas of Special Conservation Interest”, based on the same principles as Natura 2000 but extending these principles to non-EU countries. 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 2020 (EU and Council of Europe 2015). In the Alpine context, this includes the non-EU member country Switzerland, which, as of November 2017, had nominated 40 Emerald sites (CE 2016).

Guided inter alia by the Alpine Convention´s Ecological Network Platform (Alpine Convention 2015) and Action Group 7 of EUSALP (Badura and Palenberg 2016), the various Alpine countries have made different degrees of progress towards creating the framework conditions for ecological connectivity measures and towards practical implementation.

Within the context of prior and ongoing Alpine Space projects, and also instituted by individual countries, some cross-border connectivity measures have been implemented in project pilot regions and in some countries. One such example is the approval of an integrated spatial and thematic planning strategy for transboundary cooperation between Italy and France as part of the Interreg ALCOTRA programme. Under a project called BIODIVALP, cooperation has been organised by ASTERS (Manager of the Mont Blanc and Upper Savoy nature reserves) and other partners from Haute-Savoie, the PACA and Auvergne Rhône-Alpes, and the administration of the Autonomous Region of the Aosta Valley, Liguria and Piedmont as well as the Gran Paradiso National Park and the Ligurian Regional Environment Agency. The purpose of this transboundary collaboration has been the protection and valorisation of biodiversity and Alpine ecosystems by creating a transboundary ecological network.

Austria

There is no uniform Austrian environmental law. Instead, there is a legal framework of environmental protection that is composed of a variety of laws. Many legal areas have a direct or indirect impact on biodiversity, both at the national and provincial levels. These comprise nature and forestry legislation, as well as laws from areas such as land use planning, hunting laws, air quality regulations, etc.

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+) (BMLFUW 2014). Target 10: “Species and habitats are conserved” and Target 11: “Biodiversity and ecosystem services are taken into account in spatial planning and transport/ mobility” both require ecological connectivity. The Strategy foresees numerous measures to achieve these targets, such as 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 a need for green infrastructure; harmonised ecosystem services mapping across Europe; consideration of functional connectivity and the habitat network when establishing compensation areas; and the development of nationwide strategies for habitat connectivity.

Implementation responsibility rests with the BMLFUW alongside provincial governments, city governments, and communities (Gemeinden). Further stakeholders are also listed in the Strategy document.

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 and reports. Several regional projects are either in the planning stage or under implementation and are documented on this website as well as in an accompanying report (Leitner et al. 2016).

In addition, there are provincial and institutional strategies, such as the Austrian National Park Strategy, or the Austrian Forest Strategy 2020+ that make reference to the need to establish ecological networks (BMLFUW 2016, 2010). The level of implementation of measures intended to achieve biodiversity conservation goals differs from province to province.

France

In France the protection of habitats essential to the survival of some animal and plant species is provided by prefectural decrees and codified in the Environment Code. France has legally protected ecosystems and ecological connectivity in a series of national laws and decrees on the creation of the "green and blue networks" and 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.

France published the first part of the National Biodiversity Strategy for 2022 - 2030 (*La Stratégie nationale pour la biodiversité 2030*) in 2022 (French Ministry of the Environment). It encourages, in particular, the development of measures to reduce the pressure on biodiversity. The strategy describes principles, fields of action and specific targets that allow for protection and restoration of ecosystems.

Most important in this context is the Field 1: "Protected, restored and resilient ecosystems" and Target 1 "Strengthen policies for the protection and restoration of biodiversity" 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. At the same time, Target 2 "Ensure protection and restoration ecological continuities" 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.

In terms of the implementation of connectivity measures, France has developed a "Regional Scheme of Ecological Coherence" - *Schéma Régional de Cohérence Ecologique – SRCE (Région Rhône-Alpes n.d.)*, 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. The Alpine regions have also prepared their own biodiversity strategies and plans for the implementation of the regional scheme of ecological coherence, including the identification of priority areas (PACA 2015; Région Rhône-Alpes n.d.). In the PACA region, a map with major issues and pressures on ecological connectivity in the region was prepared in 2013 (BdCarto 2013).

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, the Federal Nature Conservation Act (Bundesnaturschutzgesetz - BNatSchG) of 2010. This law clearly requires ecological connectivity protection and enhancement measures, together with a series of other pertinent laws. As in Austria, in addition to federal laws, there are state laws and regulations. However, the new German Federal Nature Conservation Act of 2010 created a direct and federally applicable law for conservation that overrides the nature conservation laws of Germany´s federal states in many areas 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 and in the protection of species.

Bavaria has its own nature conservation act, (*Bayerisches Naturschutzgesetz – BayNatSchG)*, which refers to an ecological network as well as species and ecosystem (biotope) protection programmes (*Bayerisches Landesamt für Umwelt 2015a*). However, national laws governing species protection and the general principles of nature conservation cannot be overridden. This means that, in all federal states, national law and state law must both be considered simultaneously. The Bavarian State Ministry for Environment and Consumer Protection (StMUV), the highest nature conservation authority, is responsible for the implementation of the Habitats and Birds Directives. Municipalities steer 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 areas up to a size of 10 ha. In larger areas, the higher nature conservation authority has jurisdiction.

In addition, since the 1970s, there has been a Bavarian "*Alpenplan*" (Alpine Plan – officially "partial plan of the recreational landscape Alps of the Bavarian Landscape Development Program"), which prevents excessive development of new ski areas. Unfortunately, this long-established Alpine Plan was recently weakened by a political decision.

Bavaria has also produced an Alpine Ecosystem map (LfU Bayern 2022) because the increasing number of interventions in the landscape required a high level of technical and detailed knowledge for assessments of sensitive ecosystem types. The Alpine ecosystem map distinguishes between protected and unprotected areas and 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 – NatSchG Landesrecht BW Bürgerservice 2015*). Concerning landscape planning, the law 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 addition to the framework laws, there are Land Stewardship Directives (LPR) *(Bayerisches Staatsministerium der Finanzen, für Landesentwicklung und Heimat 2015*; *Ministerium für Ländlichen Raum und Verbraucherschutz Baden Württemberg n.d.)* in both federal states, which are implemented whenever special requirements for the preservation of the cultural landscape and nature conservation need to be considered.

The German National Strategy on biological diversity (BMUB 2007) was first published in November 2007 and this report considered the fourth print edition (2015). 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 Federal States (*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 action field C9, settlements and traffic, there is an acknowledgement that ecological connectivity must be considered when planning federal and state 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 federal states, Baden Württemberg, and Bavaria, have prepared their own biodiversity strategies and some wildlife corridor plans, as well as, in the case of Bavaria, the Bavarian Nature Network map (*FVA 2010; Ministerium für Ländlichen Raum und Verbraucherschutz Baden-Württemberg n.d.; Ministerium für Umwelt, Naturschutz und Verkehr Baden-Württemberg 2014; StMUG 2009; StMUV 2014, n.d.).*

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 federalism (Randier 2009). The Italian constitution assigns exclusive legislative power for environmental protection to the State (Article 117, para. II, letters of the Constitution), but specific management competence is transferred to the Regions and other local bodies (Minambiente n.d.). Note that the term "province" is used differently in Italy than in Austria or Germany. In Italy a province is an administrative division between a municipality 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 areas (Randier 2009).

There are also regional laws. For example, the autonomous province of South Tyrol (Alto Adige) has its own Law on Nature Protection. Habitat protection provisions, which are relevant for ecological connectivity, include, for example, a requirement to retain vegetation along riverbanks and to keep hedges and corridor woods intact.

Regions must follow the principles outlined in the Legislative Decree on landscape planning (*Codice dei beni culturali e del paesaggio*), which mandates the preservation of the character of protected natural elements and the restoration of damaged natural elements.

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*) (Martins 2014), 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). 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 species (Boitani et al. 2003). 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 in integrating the concept of an ecological network into the regional planning process. Several regions of Italy have included designs for ecological networks in their territorial planning. At the provincial level, the so called "Provincial Coordination Territorial Plan (P.C.T.P.) is used by local administrations.

In 2010, Italy prepared its National Biodiversity Strategy through a participatory process that included various institutional, social and economic stakeholders (Minambiente 2015). 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" (Minambiente n.d.). 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 also by assigning "ecological meaning" to other areas within the conceptual framework of ecological networks.

Liechtenstein

Liechtenstein has a Law for the Protection of Nature and Landscape (*Naturschutzgesetz; NSchG*) dating to 1996 and amended in March 2017 (Landtag Liechtenstein 2017). The law contains provisions for ecological connectivity requiring the protection of biodiversity populations and sufficiently large, ecologically connected natural ecosystems that can ensure the long-term survival of species. Landscape structures and connectivity elements that ensure ecological connectivity are to be preserved. The law requires that the nature and landscape protection concept be taken into account for all spatially significant activities. If a project interferes with nature and landscape, the competent authority may make the granting of the permit conditional on the submission of an accompanying landscape management plan, depending on the scope of the project.

Liechtenstein developed a National Biodiversity Strategy until 2020, based on an overall target (biodiversity conservation and sustainable use), four sub-targets and 12 strategy elements. Strategy element 6 aims to conserve biodiversity beyond nature protection areas by specific means of support. For all strategy elements, concrete measures to be taken were identified. According to the latest report, some have already been implemented (Braden and Müller 2014). Based on this Biodiversity Strategy, a National Action Plan on Biodiversity 2020 was also developed in 2010 linking measures of implementation (actions) to respective elements of the Strategy (Government of the Principality of Liechtenstein 2014). Some of these actions concern the designation of specific protected areas. Those related to Strategy element 6 also mention renaturisation of streams, the implementation of network links, and raising the protection status of the commons as park area.

However, as the fifth national report to the Convention on Biological Diversity also concludes, the topic of spatial planning is a difficult one, and given the limited space available in Liechtenstein, in the future, there will have to be prioritisation that takes into consideration the trade-offs between the goals of settlement, traffic, agriculture, protection of water bodies and nature conservation (Braden and Müller 2014).

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*) as well as the Cave Protection Act, a decree on ecologically important areas, and decrees determining special protection areas (Natura 2000 sites). The Nature Conservation Act defines natural components of an ecological network inside protected areas and outside them, in so-called ecologically important areas and valuable natural features (Arih 2015). 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 58 percent of its land area has forest cover, forestry regulations are also important. Seventy-one percent of Slovenia´s Natura 2000 network is covered by forest, according to official figures delivered by the Slovenian forest services (Rantaša and Veenvliet 2018). Slovenia does not have the decentralised administration system of other Alpine countries, and nature conservation is administered centrally. The professional national Institute of the Republic of Slovenia for Nature Conservation (IRSNC), with its regional units, is responsible for conservation activities under the Nature Conservation Act. The Triglav National Park administration, the Slovenian Forest Service and local communities also have a role to play in the implementation of conservation activities.

The Slovenian Environment Agency has produced an online environmental atlas (Slovenian Environment Agency n.d.) that enables users to select different layers to overlay on the map. It demonstrates 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 management (Arih 2015). 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 areas (Slovenian Institute for Nature Conservation 2013).

The Slovenian Biodiversity Conservation Strategy (Slovenian Ministry of the Environment and Spatial Planning 2002) dates 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.

The proposed targets of the updated Strategy (Bolješić and Groznik Zeiler 2015) for Biodiversity Conservation in Slovenia will likely include at least some concrete measures that contribute to ecological connectivity. 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 recognised 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, which also mentions habitat fragmentation as an ongoing problem, this new Strategy was to be adopted in 2016 – however, currently, it has not yet been submitted to the Secretariat of the Convention on Biological Diversity (Bolješić and Groznik Zeiler 2015).

Switzerland

Integrative Alpine wildlife and habitat management for the next generation in Switzerland, which is not an EU Member State but a Council of Europe Member State, is also a subject to the Bern Convention, in particular Resolutions No. 4 (1996) and No. 6 (1998), and to the Convention on Biological Diversity (ratified in 1995 (CBD ND)), 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, including but not limited to the Federal act on natural and national heritage protection (*Bundesgesetz über den Natur und Heimatschutz*) are relevant for the conservation of ecological connectivity. They mirror those of other Alpine countries and are equivalent to similar EU regulations.

The extent to which national laws are translated into on-the-ground actions varies by canton. The national ecological network (REN) has to be taken into account according to the Spatial Planning Law. 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. In the framework of the Swiss Forest programme (FOEN 2004), the importance of connectivity for forests is highlighted. Within the framework of the Swiss National Forest Programme (2004), the importance of connectivity for forests is highlighted (SAEFL 2004). 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 goals (FOEN 2013).

Ecological compensation in agriculture is another area where connectivity is promoted: based on the ECO-Quality-Regulation, 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 important tools 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 2011, FOEN developed a landscape strategy (Landschaftsstrategie BAFU/FOEN) that illustrates the strategic goals of an integrated national landscape policy (FOEN 2011). The purpose was to update the strategic agenda of the Swiss Landscape Concept and the Landscape Vision 2020 (BUWAL 2003).

The Swiss Biodiversity Strategy of 2012 (FOEN 2012) 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"). 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 concretise 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.

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 October 2016, Switzerland listed 40 Emerald sites (up from 37 in 2014) (CE 2016).

Switzerland has started a major project on "ecological infrastructure" together with the Swiss Protected Areas. According to this, Switzerland should have a functioning ecological infrastructure by 2040 - both in rural and urban areas, in the Mittelland, in the Jura and in the Alps. The Action Plan Strategy Biodiversity Switzerland describes and plans appropriate measures. On the one hand, specific additions and upgrades to the Swiss protected area system are necessary, on the other hand it requires the expansion of a system of networked areas in the overall landscape. All sectors are expected to contribute to the ecological infrastructure (BAFU/FOEN 2017). Currently, less than a third of wildlife corridors designated at such in Switzerland are estimated to be intact (BAFU/FOEN 2022). New projects have been launched during the last years to improve the connectivity situation, especially with the help of the protected areas of Switzerland.

E.4

ECOLOGICAL CONNECTIVITY IN PROTECTED AREAS MANAGEMENT

Protected areas are key players when it comes to creating ecological networks.

The traditional concept of an ecological network represents a system composed of core areas or zones – in general, protected areas – that guarantee the resources necessary for the survival of the species that it supports. In an ideal situation, these core areas are surrounded by buffer zones, creating a transitional area that limits the influence of neighbouring zones and minimises negative marginal effects. These different zones are connected with one another by linking elements, such as ecological corridors or stepping-stones, that allow the movement of individual animals as well as genetic mixing within the network (Illustration of classic ecological network).

Since each species has different requirements with regard to the types of links it uses, it is not possible to define a single corridor as being a definitive migration path between different biotopes. Instead, the needs of priority species and specific problems related to the local situation must be evaluated and addressed in an appropriate manner. This explains the dynamic character of these connecting structures, which implies a certain reversibility of spatial planning[1]. It is not a question of creating other static conservation elements, like the core areas of the network (classic protection areas such as parks or reserves), but more of providing solutions adapted to local problems (Bennet 1999). This is even more important since the major drivers of biodiversity decline are, in fact, situated outside protected areas.

In the context of ecological networks, this means that it is important not to simply concentrate environmental measures along the borders of fields or hedges, or on fallow land, but rather to encourage working practices that are sustainable and respectful of the environment over the area as a whole. To ensure that ecological interconnections function correctly, the concept of ecological networks thus provides for the conservation of core areas of substantial size, stepping-stones with similar characteristics to the core areas, and corridors, combined with a more thoughtful use of the area. Discussions and measures undertaken around the theme of ecological connectivity give rise to a completely new appreciation of practices to protect the natural environment: the place and role of protected areas within their region are being redefined, placing them in a wider territorial context.

Based on these findings, the role of protected areas has been defined in an Alpine context placing them in the heart of Pilot Regions. In concert, these areas should bolster the Alpine Ecological Network. These Pilot Regions are composed of several protected areas and other zones situated between and around these areas. This constellation represents a major challenge for these protected areas because they find themselves confronted with unknown situations, forcing them to “take an interest in” areas situated beyond their administrative boundaries and to work together with new partners, in other words to change from a static approach to one based on dynamic exchanges.

Among these new partners are the different actors of the region concerned, such as farmers, hunters, planners, and developers, to name a few. The implementation of habitat improvement measures for the Capercaillie (Tetrao urogallus) in the Hohe Tauern National Park demonstrates the possibilities of inter-disciplinary cooperation between forestry, agriculture, hunting and nature conservation.

Protected areas thus take on a new role within their region: they are no longer seen as and no longer act as “nature islands” but are, instead, integrated into a more global approach. The 2006 law concerning national, regional, and marine parks in France is evidence of this, in that it introduces the notion of “ecological solidarity” between the heart of the parks and their surrounding areas. Until now, the effects of protected areas on their neighbouring region have been perceived primarily in economic terms, with the emphasis on financial spinoffs and the added value generated by the presence of a protected area in the region (for example Jungmeier et al. 2006; Job 2003). The “Alpine Pilot Region approach” provides these areas with a new constructive role in a programme for planning and organising the region.

This approach also endows the protected areas with a new role at an Alps-wide scale based on the vision of an Alpine ecological network. The role of protected areas is,

[1] The issue of spatial planning is further developed in the following chapter E5.

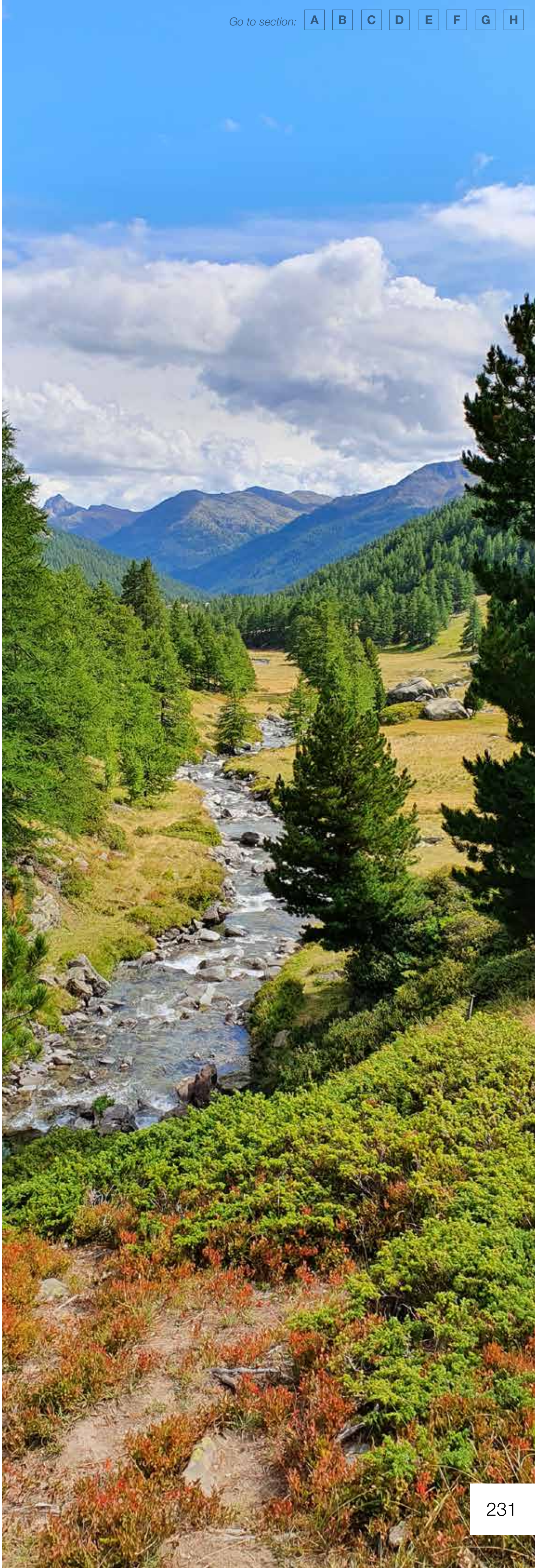
therefore, twofold: firstly, the extensive protected areas form indispensable core areas within the ecological networks (Kohler and Plassmann 2004), and, secondly, these areas provide possibilities for "testing" and acquiring experience on setting up ecological networks in the Alps. Among the personnel of protected areas are geographers, biologists and other experienced naturalists with very good knowledge of the terrain, the species and the special issues in the area.

These individuals also possess important communication skills. In addition, the protected areas administrations are partners known to and recognised by the local actors and, therefore, provide the ideal link in transmitting, discussing, and developing such projects in their region. Finally, according to several international and European agreements and guidelines, they are obliged to ensure the spatial and functional integration of the protected area into its surroundings (for example Natura 2000).

Nevertheless, these roles have limits, and it is often very difficult for protected area managers to initiate and support a planning and implementation process in territories beyond the protected area itself. It is evident that protected area managers have no direct decision competence for areas outside the protected areas' official boundaries, even though, as core zones, protected areas constitute a fundamental element of the ecological network of a certain region. The park manager needs political support and official legitimisation to participate actively and as an initiating organisation within the process. Such legitimisation is particularly important for protected areas featuring a Pilot Region for connectivity in the Alps. Legitimisation must be conferred by the competent administrative organ in accordance with the political systems of the individual Alpine countries (federal or centralised systems).

Currently, legal competence for the landscape between protected areas is situated mainly within local, regional, or national agencies and not with the protected area management authorities. Financial and human resources should be strengthened within these authorities to ensure the realisation of an ecological continuum over the long term. Park borders are generally too constrained to allow for fully functional ecosystems at a scale large enough to conserve biodiversity.

The importance of protected areas in discussions on these questions is undeniable. This can be seen in France, for example, where regional natural parks (PNR) were at the heart of a working group on the implementation of the national Green and Blue Infrastructure from its inception. The objective of the group is not only to reflect on the



notions of ecological connectivity and their importance in a park area, but also to set up scientific pilot projects.

To do this, the *"Parks define, together with other administrative levels, structured and coherent territorial strategies to protect the natural environment. They then try out these notions in landscape and spatial management protection and planning tools". (Translation by authors / Fédération des Parcs Naturels Régionaux de France 2007)*

The study and commitment in favour of ecological connectivity were thus written into the objectives of the charters of certain regional natural parks (the PNR Chartreuse, for example). This has also been done by Queyras Regional Nature park, which has placed this question at the centre of the discussion for the newly created transnational UNESCO biosphere reserve around Mount Viso consisting of several parks and neighbouring protected areas also in Italy. It is not only the natural parks, however, that are concerned by these questions based on their objectives and special missions.

Discussions on connectivity aspects are also ongoing in other types of protected areas, such as the Berchtesgaden National Park in Germany (in the framework of the ETC projects ECONNECT, greenAlps or Recharge Green), the Swiss National Park (closely involved in local initiatives of ecological connectivity improvement with the foundation Pro Terra Engadina) and the Kalkalpen National Park (local Project on Connectivity of forest areas Netzwerk Naturwald) to name just a few. Beyond borders, transboundary protected areas play an important role as dynamic elements in the landscape of protected areas. The examples of cooperation in all types of thematic fields (knowledge exchange, communication, and more) are numerous but also concern the direct, day-to-day work including common monitoring procedures, shared databases, joint management plans and other activities (staff exchange or research projects). The international cooperation receives an additional significance when it is, as is the case for the French National Park Mercantour and the Italian Nature park Alpi Marittime, formalised in an official cooperation convention. Through their transboundary activities, the protected areas contribute to the emergence and consolidation of a transboundary region.

Besides enhancing the exchange specific to the protected areas themselves, these spots offer the possibility to study synergies between the different national, regional and local approaches for ecological connectivity conservation. Sometimes this can be the starting point for large transboundary initiatives, as in the transboundary region Berchtesgaden-Salzburg, where the local analysis of transboundary connectivity has been extended to the entire border region between Austria and Germany in cooperation with the regional administrations (Rapp and Haller 2015). National borders are a challenge for cooperation, but regional and even municipality borders can also represent important political barriers with as much potential impact as the physical barriers. The project Netzwerk Naturwald in the Northern Limestone Alps region has taken a first step in overcoming such internal barriers by offering a platform for cooperation around a nature protection topic moderated by protected areas (National Park Kalkalpen as project leader), which is progressing successfully (Nitsch 2015).

The map of the protected areas offers a good representation of protected sites all over the Alpine arch, many of them with their own administrations. This illustrates the high potential for partners on the ground. Even considering their unequal altitudinal distribution (see chapter 1), protected areas play an important role in biodiversity conservation, as illustrated by the fact that the priority conservation areas identified in 2002 (WWF 2006) match nearly exactly with existing protected areas. In some areas of the Alps, several protected areas are located close to one another forming larger patches of protected lands, as is the case in the eastern Alps with the Hohe Tauern National Park and the neighbouring Nature parks in Tyrol and South Tyrol as well as the Nockberge Biosphere Park. Actions led by them in unison as a consortium, as is the fundamental spirit of the Pilot Region approach, have an impact on a large part of the Alps.

The protected areas of the Alps, especially the inhabited areas, such as the regional nature parks or biosphere reserves, are often considered as test and/or model areas (Laslaz 2010) for new approaches to stakeholder cooperation in the field of biodiversity protection. Recognising all positive examples, some of which are covered in this report, it is important to note that the cooperation among different sectors in this field is still the exception rather than the rule. Furthermore, although the number of actors and groups involved in the initiatives is constantly growing, most cooperative efforts still originate from the "green" sector. Nonetheless, improvement of this situation is at the heart of all Alpine nature conservation efforts.

E.5

TOWARDS MORE CONNECTIVITY

E.5.1

SPATIAL PLANNING AND ECOLOGICAL CONNECTIVITY

There is consensus on the fact that the field of spatial planning is a major means for organising and optimising spatial functions (Jongman 2004; Fortier 2009). Among other things, *"[a]s a policy goal, modern land-use planning legislation should require land-use plans to be consistent with the provisions of conservation plans." (Lausche et al. 2013)*

Thus, spatial planning promises much in supporting the implementation of ecological networks and ecological connectivity (Gurrutxaga et al. 2015). Three aspects of the interaction between spatial planning and connectivity issues stand out (Bennett 2010): balancing biodiversity conservation with other objectives, organising arrangements as far as the operational scope of spatial planning (broad scales) and ecological networks (specific areas), and developing methods of achieving objectives. These various aspects make it clear that planning has a key role in restoring and maintaining ecological connectivity (Jongman 2002; Crooks and Sanjayan 2002).

The planning of ecological networks largely involves considering biodiversity outside of protected areas. This can be seen as a major added value of the concept, but this also illustrates that biodiversity considerations outside of protected areas face multiple and divergent interests – (e.g., agricultural, recreational, natural hazard prevention, etc.) that may compete for space and time; as emphasised by Jongman (2007): *"[t]he planning of ecological networks includes not only the ecological modelling, but also the societal debate on implementation and societal benefits and costs".* Establishing ecological networks, thus, requires efforts in terms of spatial coordination and landscape coherence as they deal with (and achieve) different visions and needs related to human societies, natural ecosystems and ecological functionalities. As a result, ecological network implementation requires a comprehensive approach (Jongman 1995, 2008; Clergeau and Désiré 1999) to encourage and develop a multisectoral (economic, social, cultural and environmental) and multiscalar (national, regional, local) dynamic.

The idea of connecting nature areas, at least in its structural dimension, is not new in planning policies. The greenway concept was conceived at the end of the 19th century in the American Policy for Nature Conservation by landscape architects and planners as linear elements linking urban parks between other parks or to rural areas (Jongman 1995; Mougenot and Melin, 2000; Fábos 2004; Vanpeene-Bruhier 2008). The greenway concept has thus been defined as multifunctional and planned infrastructures, considering soft mobility (pedestrians, cyclists, etc.), recreational, cultural, environmental, or aesthetical functions. During the 1960s, small-scale wildlife passageways that assisted species in moving across local barriers, such as roads and railway lines, were implemented to restore impacted natural connections (Vanpeene-Bruhier 2008).

Although spatial planning is not always welcomed by the European Union, its potential for implementing ecological networks has been pointed out in different EU communications and policy documents on nature conservation. The following are examples: the European Community Biodiversity Strategy (1998) highlighting the influence of spatial planning on the conservation and sustainable management of ecosystems (Bennett 2010); the communication output "Options for an EU vision and target for biodiversity beyond 2010" (2010) underlining that the EU contribution to biodiversity should expand conservation measures to maintain ecosystems functions and services, in particular by supporting a "better coordination, in accordance with the subsidiarity principle, with the development of and investment in 'green infrastructure' that concerns 83% of EU territory falling outside the Natura 2000 network"; and finally, the communication support "Our life insurance, our natural capital: an EU biodiversity strategy to 2020" (2011) focusing its second target on "maintaining and enhancing ecosystem services and restoring degraded ecosystems by incorporating green infrastructure in spatial planning".

Simultaneously, ecological networks have been largely developed in the context of national, regional and local spatial planning processes. However, concerns have been raised about the real degree of functional connectivity pursued and achieved; questioning whether the spatial planning processes have concretely influenced the capacity of populations and individuals to move and spread through the landscape and the ecological networks. In practice, considerable latitude exists in the way networks are implemented at national or regional levels, as PLACE (Part 3) reports. The way ecological networks are understood and implemented through planning may differ from one country to another. Consequently, this variety of practices brings into play, in some cases, the ability of these networks to maintain functional connectivity for the benefit of biodiversity conservation (Boitani et al. 2007).

In this context, guidance documents have been formulated, containing recommendations or guidelines highlighting, among other things, the importance of adequate spatial planning policies and regulations for the maintenance of landscape connectivity features of major importance for wild flora and fauna (Kettunen et al. 2007, p. 64-68; Ullrich et al. 2009; Kohler and Heinrichs 2011; Walzer et al. 2013). However, these documents are not focused exclusively on spatial planning but treat it as one of many elements for improving ecological connectivity. Consequently, the recommendations and guidelines are fairly general and do not aim to identify specific tools or obstacles for better consideration of ecological connectivity in spatial planning processes.

E.5.2

ECOLOGICAL CONNECTIVITY IN THE ALPINE SPATIAL PLANNING

The Alpine arc is recognised as an outstanding area for the richness of its biodiversity, with over 30,000 animal species and 13,000 plant species, including 388 endemic ones (ALPARC 2004). Moreover, ALPARC (Kohler et al. 2009) underlined the high density of conservation areas in the Alps. About 26% of the Alpine Convention area is covered by approximately 1,000 protected areas. National Parks and nature reserves dedicated to biodiversity conservation represent around 9% of the Alpine Convention area (Kohler et al. 2009). Despite this remarkable network of nature conservation areas, Alpine biodiversity has been steadily declining, as is the case throughout Europe, particularly as a result of anthropogenic pressures outside protected areas. Mountainous areas are especially vulnerable to these pressures and ecological connectivity has been jeopardised by landscape fragmentation, especially in the valleys impacted by strong land-use competition (in particular for the development of urban areas and economic activities) and the concentration of linear infrastructures (such as roads, railways and electric lines) that constitute the main barriers to species movement between habitats and protected natural areas (Vanpeene-Bruhier 2008).

Major efforts have been undertaken in the past two decades, at national, regional, and local levels in the Alps, to maintain and foster biodiversity. In a first phase, different projects were launched with the aim of mapping ecological networks to describe the current situation in terms of connectivity features and habitat fragmentation, and, in some cases, a vision of the potential connectivity in a given landscape. For example, Italy has undertaken the definition of its national ecological network (Rete Ecologica Nazionale) on the basis of a study focused on vertebrates published by Boitani et al. in 2003; the Swiss Confederation has drawn up a comprehensive ecological network for its whole territory in 2004 with the publication of the REN (Réseau Ecologique National) (Berthoud et al. 2004); and France has adopted the Programming Acts for the implementation of the Grenelle Environnement Agreements (Act I and II, 2009 and 2010), introducing the concepts of ecological continuum (continuités écologiques) and the green and blue framework (trame verte et bleue) into French law.

In Germany, the Bavarian Ministry of the Environment established a biotope network (BayernNetzNatur Project) at the state scale as early as 1986. At the local level, some early initiatives have been launched as well. For example, in 1999, the Isère County (France) launched the ecological network for the county (Réseau Ecologique Départemental de l'Isère - REDI), which aimed to identify the ecological continuum, corridors and conflict hotspots for wildlife movements over its whole area. These initiatives remained mainly conceptual, offering the first opportunities to establish ecological networks on the basis of scientific and/or expert methods and knowledge. However, little was done to maintain or restore ecological connectivity on the ground. This situation clearly calls for better consideration of the issue in spatial planning practices and instruments.

However, numerous projects have emerged, and a concentration of various Alpine initiatives has worked towards transnational consideration for planning connectivity. The protocol "Nature conservation and landscape planning" of the Alpine Convention was ratified in 1994 by the eight Alpine countries and the European Union, and under its Article 12, *"[t]he contracting parties [to] take adequate measures to establish a network of existing national and transboundary protected areas, of biotopes and other protected elements or those to be protected. They commit themselves to harmonise the objectives and applicable measures in transboundary protected areas". (Alpine Convention 1994, p. 87)*

Other initiatives and programmes have also contributed to building a common view on ecological connectivity.

The Ecological Network Platform of the Alpine Convention was set up by ministers during the 2006 Alpine Conference as an expert forum to develop common strategies to contribute to the preservation of Alpine biodiversity and to support measures ensuring connectivity between natural habitats. Moreover, the initiative "Ecological Continuum: Catalysing and Multiplying Alpine Connectivity" 10 was launched in 2007 by three Alpine organisations (ISCAR, CIPRA international, ALPARC) (Scheurer et al. 2009) to improve ecological connectivity in the Alps (Kohler et al. 2009).

It laid the foundation for a common Alpine-wide framework (know-how, databank, methodologies) to raise awareness on protecting and restoring corridors between habitats (Walzer et al. 2013). Different generations of Alpine space programmes have also contributed. For example, the Alpine space project "ECONNECT - Restoring the web of life" (2008-2011), intended to protect, maintain, and restore a pan-Alpine ecological network in the Alps (Kohler et al. 2005). Its aim was to set up a think-tank for future strategies establishing continuity between areas of ecological importance in the Alps that have already taken the first steps in implementing biotope connectivity in their respective regions. A number of pilot regions were selected with the goal of developing a methodology applicable to the entire Alpine region. It contributed to the further development of a more dynamic approach to nature protection that can be effective beyond the limits of the protected areas as they are defined today.

Lastly, the German Presidency of the Alpine Convention and ALPARC (Alpine Nature 2030, 2016) provided a guide for improving ecological connectivity in the Alps by giving keys and scenarios to understanding and mitigating the threats to Alpine biodiversity and ecological connectivity. It underlined the key role of an integrated spatial planning process to guarantee biodiversity conservation and ecological connectivity. These various European initiatives sought to maintain or restore ecological connectivity in the Alps and stressed the importance of spatial planning given the current erosion of Alpine biodiversity due to anthropogenic pressures. However, the degree of acceptance of spatial planning as a tool for biodiversity conservation varies amongst the Alpine countries. This is true both within their legislative framework and the implementation of ecological connectivity at regional and local levels.

The recently concluded project OpenSpaceAlps, in which ALPARC was one of the central partners and responsible for the Alps wide mapping of open spaces for spatial planning, shows interesting and promising results for future development of adapted strategies in spatial planning. The results will be presented and interpreted in the next chapter as they are essential key stones for a future scenario of spatial nature protection concepts in the Alps.

E.6

THE IMPORTANCE OF THE PERI-ALPINE REGION (EUSALP) FOR ECOLOGICAL CONNECTIVITY IN THE ALPS

The EU's strategy for the Alpine region (EUSALP) was the fourth macro-regional strategy to be developed in Europe. The discussion on the establishment of a macro-regional strategy for the Alpine region was launched by the Mittenwalder Declaration of 12 March 2010, which was signed by the regions of Bavaria, Bolzano-South Tyrol, Salzburg, Tyrol, Trento, and Vorarlberg. On that basis, various processes concerned with the added value of such a macro-regional strategy were initiated. The European Council, at its meeting on 19/20 December 2013, gave the European Commission the mandate to develop the strategy by June 2015, in cooperation with the Member States. On 28 July 2015, the EUSALP was published by the European Commission (EC). After confirmation by the General Affairs Council in November 2015, the EUSALP was adopted by the European Council on 28 June 2016. The implementation has been running since the first half of 2016.

The EUSALP covers seven states (France, Germany, Slovenia, Italy, Austria, and the non-EU Member States of Switzerland and Liechtenstein) and 48 regions of these states in the Alpine region. While the perimeter of the Alpine Convention area covers 190,000 km^2 and houses 14 million people, the macroregion has a much larger surface area of 490,000 km^2 with some 80 million inhabitants living beyond the Alpine arc itself (Job et al. 2017).

Within the EUSALP, thematic policy area "Environment and Energy" Action Group 7 focuses on developing ecological connectivity to strengthen, improve and restore biodiversity, as well as ecosystem services. The goal is to increase the degree of connection between natural and semi-natural landscapes in the entire EUSALP territory. It aims to establish a comprehensive macro-regional scheme by applying the EU Strategy for Green Infrastructure (GI) to regional scales to develop a strategically planned and functionally interconnected network of natural and semi-natural areas in rural and urban areas.

It is within this context that ALPBIONET2030 sought to contribute to improving the conditions for ecological connectivity from within the Alps towards the bordering regions and beyond. Macro-regional ecological networks will provide many advantages for nature as well as social and economic benefits for humans. This is because functionally connected natural ecosystems provide valuable ecosystem services, such as fresh air provision, water retention, climate regulation, and providing a biologically important genetic exchange for a host of species – including those species perceived as useful to humans - as well as recreational space.

Because of habitat fragmentation and deterioration due to traffic, other infrastructure, and human activities, many landscapes have become degraded across the European Union, and about 30 percent of the entire surface area is heavily fragmented (EEA 2011). In the Alpine area, there is still a lot less fragmentation, but, in many Alpine valleys and around urban centres and their extended agglomeration, barriers to connectivity are already serious or increasing due to high human densities with their associated infrastructure and economic and recreational activities.

There are many pressures on Alpine ecosystems. Global climate change has already had a concrete impact on the environment, biodiversity and living conditions of the inhabitants of the Alpine area. In addition, socio-economic drivers of landscape fragmentation, i.e., the way land is used and managed, significantly affect the permeability of the landscape for species and the functioning of natural processes. Demographic developments - especially in Alpine and peri-Alpine cities – such as traffic and energy infrastructure trends, agricultural land management, tourism and leisure behaviour, the way spatial planning is implemented, and generally all policies that affect these factors, have an impact.

E.7

CONCLUSIONS AND OUTLOOK

The fact that ecological connectivity is a key element in the strategy for long-term biodiversity conservation is not only commonly accepted among the global expert community but has also been deeply discussed in this chapter.

As the task of this report is to address perspectives and visions for the development of the existing and potential future protected areas in the Alps, the conclusion of this chapter will focus on these aspects.

The present chapter has highlighted a series of ways and given specific geographic indications as to where efforts could be concentrated to maximise the restoration of effective ecological connectivity. Possible measures that can be realised in these areas with good effect on the landscape permeability are described in Heinrichs and Kohler (2009).

E.7.1

THE ALPS AS A UNIQUE EUROPEAN BIODIVERSITY HOTSPOT NEED ALL THE CONSERVATION EFFORTS THEY CAN OBTAIN

The Alps are central for European for biodiversity conservation. The protected areas play an essential role for conserving this biodiversity and need to be developed in order to meet this objective. In addition to protected areas, the Alpine landscape includes important surfaces with the potential to play a significant role within the Alpine ecological network (see sections about strategic Alpine connectivity areas), and efforts must be made to enable these areas to best perform this function, including implementation of adequate measures in the appropriate areas.

The potential key zones to constitute large connected areas ("Potential corridors") incorporate some natural and semi-natural landscapes included in Natura 2000 and Emerald Network areas, which justifies the need to develop strategies in order to preserve nature beyond the Alpine protected areas perimeters.

E.7.2

TRANSBOUNDARY NETWORKS OF ALPINE PROTECTED AREAS

The transboundary protected areas were analysed according to different criteria, and this highlighted the different challenges faced by each territory in order to improve their ecological connectivity. The creation of potential corridors can contribute to consolidated connected areas based primarily on the priority areas previously illustrated.

The selected transboundary examples have a high biodiversity value and are the territories where different levels of nature protection co-exist. This allows for the development of different measures to preserve them, increase their influence zone and consequently enhance their connectivity.

Some of these measures have already been successfully implemented in the Alpine Pilot Regions. You may find some good practice examples described in this chapter and in detailed reports on the implementation of measures and actions in the different project result reports of the large Alpine connectivity projects ECONNECT, greenAlps and ALPBIONET2030.

E.7.3

INTERFACE BETWEEN THE ALPINE CONVENTION PERIMETER AND THE EUSALP TERRITORY FOR ALPINE ECOLOGICAL CONNECTIVITY

The ECAs only cover 10% the surface of the EUSALP territory, almost 80% of these areas are located inside the Alpine Convention perimeter, which illustrates the important challenges that exists to developing ecological connectivity on the interface between these two territories.

The presence of heavily developed zones around the Alpine Convention area threatens the preservation of natural ecosystems. The methodological approach in the zones likely to be restored include the EIAs, which are distributed all along the EUSALP perimeter having the potential to create links for nature protection.

E.7.4

INTEGRATIVE SPATIAL PLANNING IS ESSENTIAL FOR GOOD ECOLOGICAL CONNECTIVITY

On a local level, municipalities of a community have proven to be the best level to successfully implement ecological connectivity projects and to develop landscape visions integrating landscape permeability aspect. Co-construction and cooperation for connectivity are common in the Alps and often include partnership with the networks of the protected areas.

A good regional concept is based on an integrative approach including all the different kinds of land use types and the various expectations of the region's citizens. Just as the needs of the population must be met, the needs of nature, specifically concerning ecological connectivity aspects, must be equally valued.

Bringing together agricultural, forestry and other nature resources using planning with the classic spatial planning aspects is a challenge. Going into details of this planning process to identify exact uses of space and time is even more challenging. But it is only with this degree of detail at this level that a high-functioning, coherent landscape approach for ecological connectivity can be realised.

E.7.5

THE LOCAL LEVEL – THE LEVEL FOR ACTION

Strong spatial planning concepts, using a non-sectorial approach but integrating and overall strategy for a given territory combined with a strong local commitment and action plan, are the most promising ways to sustainably guarantee the constitution of a liveable and healthy landscape, both for nature and humans.

This, of course, requires good information and understanding of the natural needs and the value of healthy nature by decision makers, inhabitants as well as key economic actors. Furthermore, the adapted financial resources are necessary to allow translation of the existing vision into action.

Conserving or restoring a well-functioning local ecosystem tailor made to the specific local situation will not be cost-free and needs strong financial commitment. Finally, in order to realise the objectives, nature conservation and ecological connectivity must be considered top priorities when it comes to final decision making.

Local actions are the best way to actively involve citizens and key stakeholders and are, therefore, the important way of educating these target groups regarding the need for connectivity. Local actions also have a direct impact on individual animals and on the populations – therefore: in order to improve, restore or conserve connectivity: PLAN GLOBAL, ACT LOCAL.

E.8

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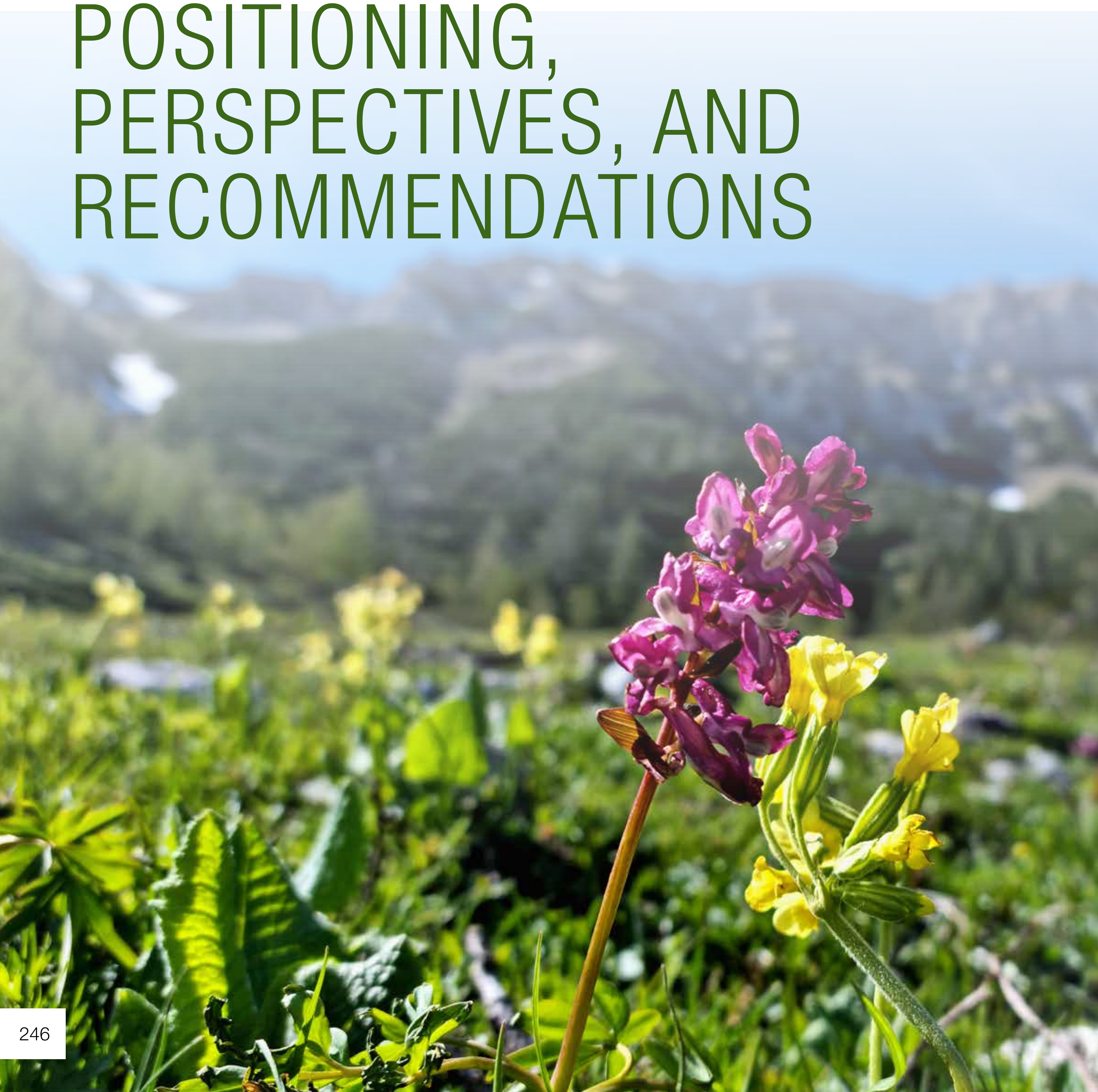
F

CHAPTER 4

PARKS OF THE NEXT GENERATION - POSITIONING, PERSPECTIVES, AND RECOMMENDATIONS



WORKING HYPOTHESES[1]

1. Formulate recommendations for the localisation of future protected areas in the Alps
2. Enlarge existing protected areas wherever possible to strengthen ecological processes
3. Create more protected areas including wilderness zones at lower altitudinal levels
4. Realise protected "Wildlife territories" for threatened species
5. Connect more ecologically well-represented protected areas
6. Increase the proportion of areas with an ecological forest management across the Alpine arc
7. Use inhabited protected areas as model regions for a participative governance of nature protection measures, environmental awareness raising and sustainable development
8. Consider zoning of protected areas as important tool for the integration/reconciliation of nature conservation and socio-economic development/well-being
9. Integrate protected areas, ecological connectivity, and wilderness within an adaptation strategy addressing climate change
10. Implement the nature protection obligations of the Alpine Convention

[1] Working Hypotheses in green have a strong territorial or spatial context; those in orange they are linked to management issues

F.1

INTRODUCTION

Achieving a well-functioning system of protected areas for the protection of Alpine biodiversity will require a broad recognition of the essential functions of protected areas, a well-designed system that enables the various ecosystem services to be delivered and an appropriate system of payments for those ecosystem services. These payments may be part of the public budget, recognising the high value of the public benefits being provided by these protected areas (e.g., conservation of biological diversity, watershed protection, national security, carbon sequestration, conservation of genetic resources) (Doody 2015, according to J. McNeely).

The development of Alpine parks must be seen in the broader context of the evolution of protected areas in Europe or even on a global scale. Concepts must be analysed and adapted to specifics in the Alps and further down on national, regional, and local levels.

The improved integration of scientific research and its orientation are important to consider when addressing the above-mentioned lack of information/data gap for species and habitat distribution (see chapter D.3.1.).

Planning an Alpine protected areas scenario 2030 raises many questions, such as:

- What could next generation protected areas look like?
- How can they function as laboratories for new challenges and especially in the context of the biodiversity and climate crises?
- How can the cornerstones for new or existing protected areas (sustainability, good governance, and benefit sharing), be implemented?
- How to make the protection benefit of protected areas for biodiversity more efficient?
- How can species-specific connectivity needs be considered in new biodiversity strategies for the Alps?
- What could be a long-term, biodiversity-based monitoring system for the Alps? Which umbrella or indicator species would be pertinent to this scientific approach?
- How much wilderness is necessary and possible in the Alps?
- How could an internationally accepted, minimum standard of protection criteria be achieved for protected areas?
- How to improve the protection of the last semi-natural forests of the Alps?
- How to protect the "Water tower" Alps and the linked riverine systems of the massif?
- How to integrate stronger protected areas, such as Geoparks, into a global concept of biodiversity protection?
- How to establish ecological networks of small and very small protected areas, including wetlands, bogs and old growth forests, and to integrate them into the overall biodiversity protection strategy of the Alps?

Those questions will guide this chapter's discussion about the new protected area scenario 2030 and help to evaluate the 10 recommendation hypotheses made in the beginning of this text.

Protected areas initially created for landscape and biodiversity protection have evolved into far more complex systems with categories of protected areas referring to more global concepts such as sustainable development and environmental education principles and missions. Today, in the Alps, only around 10% of PAs have a strong protection status and are dedicated fully to biodiversity and habitat protection.

Formerly, the management of protected areas concerned mostly the expertise of biologists, botanists, geologists and physical geographers. Today, these experts are joined by sociologists, anthropologists and human geographers, political scientists, to name just a few.

Borrini-Feyerabend (2004) established a table that illustrates the differences between the old model and the new paradigm of protected area management. Even though it is nineteen years old, it captures the significant points that have changed.

Table 30: Paradigm Change in Protected Area Management

The conventional understanding of protected areas	The emerging understanding of protected areas
Established as separate units	Planned as part of national, regional and international systems
Managed as "islands"	Managed as elements of networks (protected areas connected by "corridors", "stepping-stones" and biodiversity-friendly land uses)
Managed reactively, within a short timescale, with little regard to lessons from experience	Managed adaptively, on a long-time perspective, taking advantage of ongoing learning
About protection of existing natural and landscape assets –not about the restoration of lost values	About protection but also restoration and rehabilitation, so that lost or eroded values can be recovered
Set up and run for conservation (not for productive use) and scenic protection (not ecosystem functioning)	Set up and run for conservation but also for scientific, socio-economic (including the maintenance of ecosystem services) and cultural objectives
Established in a technocratic way	Established as a political act, requiring sensitivity, consultations and astute judgment
Managed by natural scientists and natural resource experts	Managed by multi-skilled individuals, including some with social skills
Established and managed as a means to control the activities of local people, without regard to their needs and without their involvement	Established and run with, for, and in some cases by local people; sensitive to the concerns of local communities (who are empowered as participants in decision making)
Run by central government	Run by many partners, including different tiers of government, local communities, indigenous groups, the private sector, NGOs and others
Paid for by taxpayers	Paid for from many sources and, as much as possible, self-sustaining
Benefits of conservation assumed as self-evident	Benefits of conservation evaluated and quantified
Benefiting primarily visitors and tourists	Benefiting primarily the local communities who assume the opportunity costs of conservation
Viewed as an asset for which national considerations prevail over local ones	Viewed as a community heritage as well as a national asset

Source: (Borrini-Feyerabend 2004, p. 3)

More recently, Jungmeier (2014) established the concept of parks of a third generation (see table 31). It shows the growing complexity of protected area management and the expansion of their objectives. Protected areas are increasingly integrated in other fields of policies, land use, socio-economic development, etc.

Table 31: Constituting Elements of Generation of Protected Areas

	1st generation	2nd generation	3rd generation
Approach	static	dynamic	integrated
Concept	segregation	balance	integration
Motivation	ethic, romantic	emotional, ethic-political	rational, evidence-based
Steering	public administration top down regulating	management top down and bottom up mediating	governance network stimulating
Aim	species, habitats, sceneries	land use and ecosystems	socio-sphere in eco-sphere
Disciplines	natural science	natural science economics (human and social sciences)	natural science economics human and social sciences planning sciences technics philosophy and cultural sciences
Principles	long-term perspective internationality global perspective ethically based approach	sustainable development internationality global perspective benefit sharing participation, governance long-term perspective knowledge management	sustainable development internationality, global perspective inter- and transdisciplinary ecological, economic effectiveness benefit sharing participation, governance long-term perspective innovation, change management ethically based approach knowledge management
Process	constant	cyclic	?
Complexity	low	high	very high
Staff	sectoral expert	multisectoral expert / manager	interdisciplinary manager
Education	sectoral	(autodidact)	specific education / training

Source: (Jungmeier 2014)

Three major terms have become central for modern protected area management, reflected in the usage of these terms in publications and in conferences: sustainability, good governance, and benefit sharing.

Protected areas can be models for sustainable development. The shift away from the exclusive focus on biodiversity conservation toward an integrated model of conservation and socio-economic development has been part of the evolution of the protected areas environment over the last four decades. The explicit integration of regional development into the objectives of protected areas found its way into the IUCN categories (Hammer et al. 2016, p. 17), especially with the IUCN category V.

Benefits are both tangible and intangible, including direct financial benefits from the PAs, the ability to use the natural resources in the PA, and ecosystem services resulting from the conservation within the PA. Many of these benefits are difficult to measure and often even more challenging to communicate to those living around the PA. Research has shown that even the communication and measurement of tangible, financial benefits from, for example, tourism within PAs, is on an *ad hoc* basis with many governments being unaware of the total contribution to their economies (Rylance, Snyman and Spencley 2017).

The benefits arise from tourism and ecosystem services. The first are shared among the local population and the protected area financing. The second are more indirect and complex and require financial compensation from the users of those services. This is especially true for the urban population using the natural space for various leisure activities - often heavily impacting the nature of the area and sometimes the well-being of the local population. A compensation system by tax redistribution between urban and rural communities could be one way ("inter-community solidarity") to create more equality in benefit and impact sharing. It could also contribute more meaningfully to the protected area management ensuring the protection of biodiversity – a common good for current and future generations.

The issue of benefit sharing is very much linked with the governance of protected areas. The participation of the local population and representatives of diverse stakeholders of the region is a must for the long-term success of the protected area management, but, often, it is not easy to implement.

The new global framework for the development of protected areas addressing those topics was prepared in the form of the Post-2020 Global Biodiversity Framework former to the UN Biodiversity Conference on Biodiversity (CBD COP 15) in December 2022 in Canada. Numerous decisions have been taken with the most relevant decision to protect 30% of terrestrial and aquatic surfaces by 2030. The issues of governance and involvement of indigenous populations have been included in the decision paper. The 30% goal nevertheless is not binding, neither the level of protection is defined.

“The Post-2020 Global Biodiversity Framework will define a mission for 2030 and a long-term vision for 2050, together with goals and targets, in order to stimulate and coordinate global efforts for conserving the planet’s biodiversity. It is seen as a crucial landmark for environment-related policymaking, largely contributing to 2020 being coined as a “super year” for nature conservation”. (IUCN)

Unfortunately, the Covid-19 crisis interrupted plans, and the process has been delayed. The Covid-19 crisis is, nevertheless, one of the strongest indicators of the last decades demonstrating that the destruction of habitats and biodiversity will create a critical threat to the long-term survival of humankind. The 2050 vision considers this: long-term survival of humankind:

Figure 16: The Vision of the Framework for the Post-2020 Global Biodiversity Framework

2050 Vision

__9.__ The vision of the framework is a world of living in harmony with nature where: “By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people”.

__10.__ The mission of the framework for the period up to 2030, towards the 2050 vision is: “To take urgent action across society to conserve and sustainably use biodiversity and ensure the fair and equitable sharing of benefits from the use of genetics resources, to put biodiversity on a path to recovery by 2030 for the benefit of planet and people”.

2050 Goals and 2030 Milestones

__11.__ The framework has four long-term goals for 2050 related to the 2050 Vision for biodiversity. Each 2050 goal has a number of corresponding milestones to assess, in 2030, progress towards the 2050 goals.

Goal A

The integrity of all ecosystems is enhanced, with an increase of at least 15 per cent in the area, connectivity and integrity of natural ecosystems, supporting healthy and resilient populations of all species, the rate of extinctions has been reduced at least tenfold, and the risk of species extinctions across all taxonomic and functional groups, is halved, and genetic diversity of wild and domesticated species is safeguarded, with at least 90 per cent of genetic diversity within all species maintained.

Milestone A.1

Net gain in the area, connectivity, and integrity of natural systems of at least 5 per cent.

Milestone A.2

The increase in the extinction rate is halted or reversed, and the extinction risk is reduced by at least 10 per cent, with a decrease in the proportion of species that are threatened, and the abundance and distribution of populations of species is enhanced or at least maintained.

Milestone A.3

Genetic diversity of wild and domesticated species is safeguarded, with an increase in the proportion of spe-cies that have at least 90 per cent of their genetic diversity maintained.

Goal B

Nature’s contributions to people are valued, maintained or enhanced through conservation and sustainable use sup-porting the global development agenda for the benefit of all;

Milestone B.1

Nature and its contributions to people are fully accounted and inform all relevant public and private deci-sions.

Milestone B.2

The long-term sustainability of all categories of nature’s contributions to people is ensured, with those cur-rently in decline restored, contributing to each of the relevant Sustainable Development Goals.

Goal C

Milestone C.1

The benefits from the utilization of genetic resources are shared fairly and equitably, with a substantial in-crease in both monetary and non-monetary benefits shared, including for the conservation and sustainable use of biodiversity. Milestone C.1 The share of monetary benefits received by providers, including holders of traditional knowledge, has increased.

Milestone C.2

Non-monetary benefits, such as the participation of providers, including holders of traditional knowledge, in research and development, has increased.

Source: (CBD 2021, first draft of the Post 2020 Global Biodiversity Framework)

F.1.1

METHODOLOGY

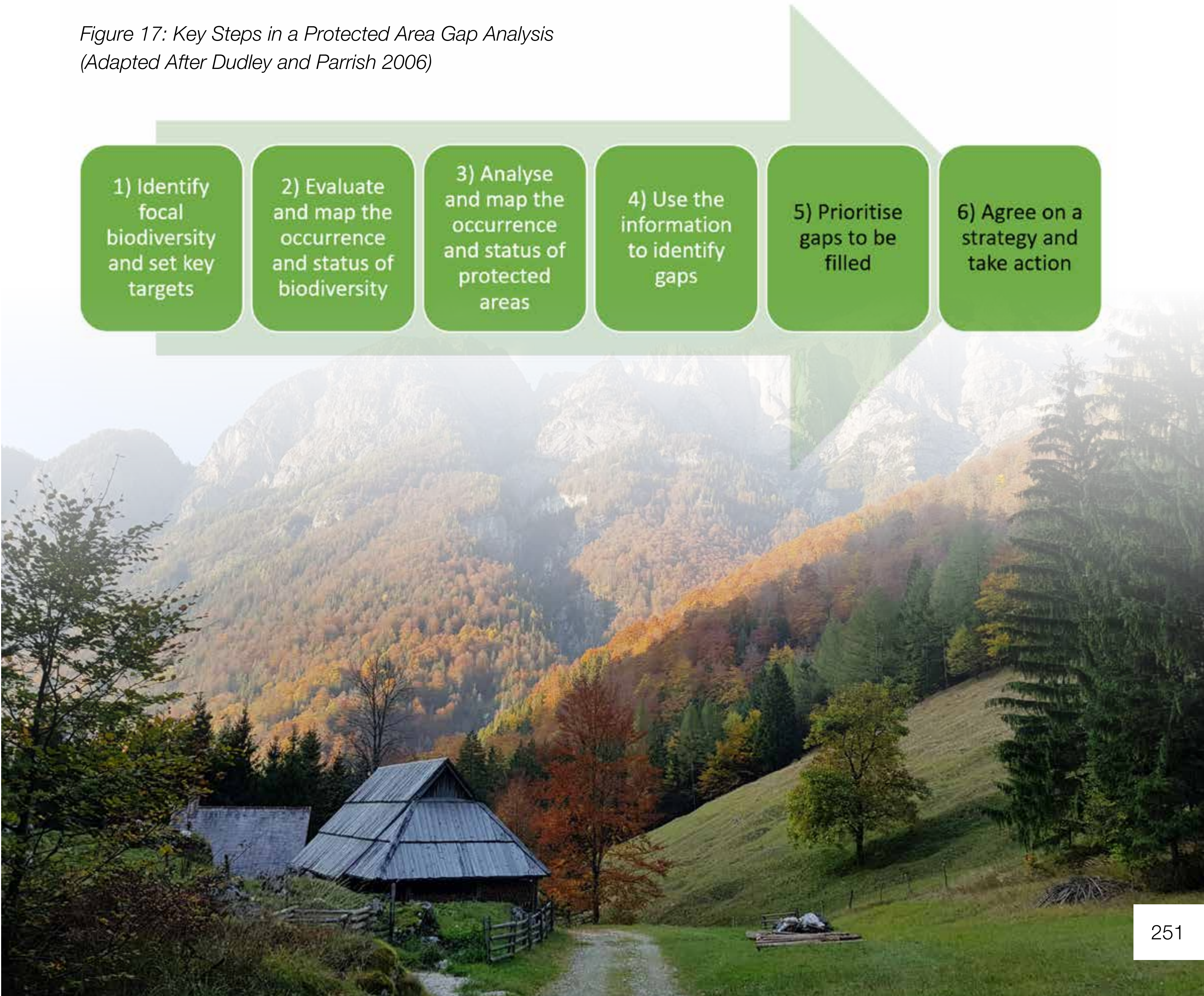
The Methodology of this chapter is the continuation of the previous chapters and finalises the gap analysis.

Steps one to four of the gap analysis were completed in chapter 2. Chapter 4 will realise the remaining two stages five and six.

The identified gaps will be discussed regarding their impact on biodiversity conservation and habitat protection. Against the background of current developments in Alpine protected area management, we will develop our vision and strategy for the upcoming decade and beyond. As in the previous chapters, we will consider international developments that merge in the post-2020 framework. In the end, we will propose adapted approaches for improving the Alpine protected area system. The elaboration of maps proposing a "zoning" based on the main findings of the assessment of the protected areas system to strengthen the current network are part of it.

We base our discussion on the situation description (assessment of the Alpine protected area system and the results of the mapping presented in chapter 2 and 3). The discussion will address the questions formulated within the introduction of this chapter and the recommendation hypothesis. Results and maps from the recently finalised Alpine Space project OpenSpaceAlps will inform the future vision of the protected area landscape of the Alps expanding to larger criteria than only parks and nature reserves. Indeed, we suggest that "Open Spaces" will play a key role in connecting natural areas and ensuring the migration of species and will allow adaptation strategies for biodiversity and wildlife.

Figure 17: Key Steps in a Protected Area Gap Analysis (Adapted After Dudley and Parrish 2006)



F.2

CRITERIA FOR THE ESTABLISHMENT OF NEW ALPINE PROTECTED AREAS

F.2.1

BIOLOGICAL AND ECOLOGICAL CRITERIA

Biological and ecological criteria have been discussed already in the preceding chapters. It is difficult or impossible to give a precise picture of ecological and representativity gaps within the different protected areas of the Alps. Species with a high "communication value" are better understood than others, their distribution is often monitored, and the PA staff knows about their representation within the large protected areas of the Alps. Nonetheless, we suggest that the exclusive consideration of so-called flagship species creates neither more species protection nor a more coherent protected areas system in the Alps.

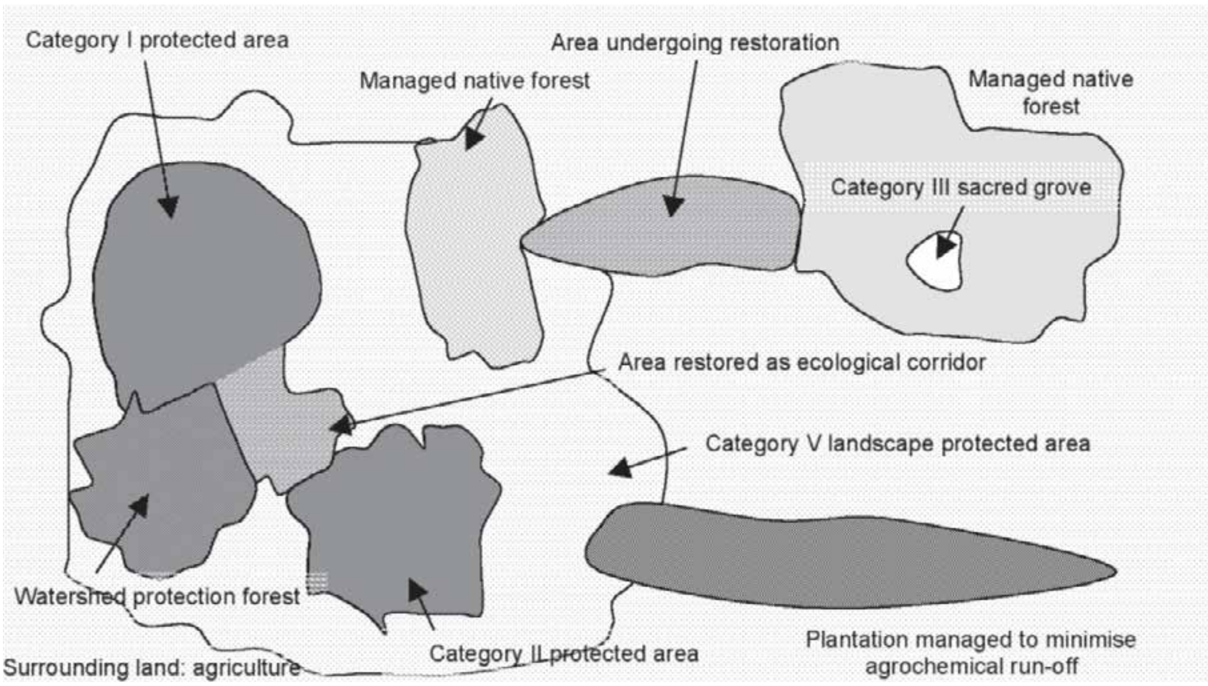
"All in all, conservation is moving beyond the issue of individual species or individual places to larger landscapes,"
says Cristián Samper, president and CEO of the Wildlife Conservation Society.

"This will be absolutely crucial as we go forward".[1]

On the one hand, it will be relevant to consider the existing network of protected areas and to better interlink its elements by using zoning of the Alpine territory based on spatial planning including nature protection aspects. Different forms of spatial protection including buffer zones need to be taken in account. On the other hand, the establishment, as an ad-hoc measure, of protected areas with a clear target of biodiversity and habitat protection in priority areas ("to act") guarantees reaction to current changes and demands.

[1] *https://ensia.com/features/is-conservation-extinct*

Figure 18: A Landscape Approach to Biodiversity Protection



Source: (Dudley and Parrish 2006, p. 12)

The trend of the last decades to create more and more protected areas with only the goal of sustainable development needs to be reevaluated. Parks and protected areas must include clear nature protection goals, and there is no doubt that parks of the next generations will have to fulfil various functions.

In the publication of Michael Jungmeier, the authors of the present publication mentioned:

Parks of the next generation might be compromises between environmental protection and economic development, facing the pending danger that their conservation function is neglected in favour of their development function. (Parks 3.0 Protected areas for the Next society, p. 16)

To effect biodiversity and habitat protection, a variety of protected areas with an ecological conservation function needs to be integrated in a common spatial network, and special criteria for the protection of species need to be considered in biodiversity hotspots.

Specific criteria may come from the red lists of the European Union, national and regional biodiversity inventories and habitats with a rich Alpine specific fauna and flora.

The Annexes (lists) of the nature protection protocol of threatened habitats and species may be an important reference for the implementation of a veritable ecological network of protected areas:

Article 13 Protection of types of biotopes

1. The Contracting Parties undertake to adopt the measures necessary to ensure the lasting preservation of the natural or near-natural biotopes of a sufficient size and with territorial distribution according with their functions. They shall also promote the re-naturalisation of the impaired habitats.

2. For the purposes of preparing the valid lists for the entire Alpine territory, the Contracting Parties undertake to indicate, within two years of this Protocol coming into effect, the types of biotopes requiring the adopting of measures in accordance with paragraph 1.

(Alpine Convention)

Article 14 Protection of the species

1. The Contracting Parties undertake to pursue the measures appropriate for preserving the indigenous animal and plant species with their specific diversity and in sufficient populations, particularly ensuring that they have sufficiently large habitats

2. For preparing the valid lists for the entire Alpine territory, the Contracting Parties shall indicate, within two years from this Protocol coming into effect, the species that require special protection measures since they are specifically threatened.

(Alpine Convention)

As the convention is an internationally binding treaty ratified by the Alpine states including the protocols, the later constitutes a legal basis for the establishment of further protected areas in all the Alpine countries.

Article 11 calls for a possible creation of new protected areas:

Article 11 Protected areas

1. The Contracting Parties undertake to preserve, manage and, where necessary, to extend the existing protected areas, in keeping with their protective function, and also to define, where possible, new protected areas. They shall take all appropriate measures to avoid impairing or destroying these areas.

2. They shall also promote the instituting and management of National Parks.

3. They shall set aside areas of respect and tranquillity that ensure giving priority to the wild animal and plant species over other interests. They shall ensure that, in these areas, there is the peace necessary for the ecological process typical of the species to take place undisturbed and shall reduce or prohibit any form of use incompatible with the ecological processes of these areas.

4. The Contracting Parties shall examine the compensation terms of the special services provided by the local population, in compliance with national law.

(Alpine Convention)

Biological and ecological criteria are available through these different instruments and species lists. Together with local knowledge about hotspots of biodiversity completed by regional and national inventories and scientific research, those criteria can be geo-localised, and targeted protected areas can be established.

F.2.2

CULTURAL AND SOCIAL CRITERIA

What is true for protected areas all around the globe also applies to the Alpine arc: the consideration of cultural and social aspects is essential for protected area management. The Alpine landscape has been under human influence for millennia, and many of the traditional land use practices have helped to create the Alpine space as we know it today. Ecosystems and biodiversity have evolved and often created symbiotic arrangements with these anthropogenic factors. The most important cultural aspects influencing the landscape are agriculture, husbandry, and forestry[1].

The parks of tomorrow will have new functions and roles to play. New concepts will probably be developed in compliance with the subjects of protection mentioned in the hypothesis. Nevertheless, space is limited, and controversies regarding land use are to be expected *(in* Jungmeier, *Parks 3.0 Protected areas for the Next society).*

Traditional practices do not constitute the main threat to protected areas. In fact, these two approaches can be complementary. The main threat is rather the intensive, industrial style agriculture and husbandry with heavy machinery, enormous chemical inputs, and intense resource needs.

During the planning process of new protected areas, the integration of the above-mentioned activities must be considered. It is a balancing act that must consider the needs for both, conservation, and socio-cultural activities. The categories and the management objectives of the respective new protected areas are pivotal in the decision-making process. According to those, the priorities will lean one way or the other.

Protected areas can even be of significant support to cultural and social heritage. By their nature, protected areas are more favourable toward sustainable agricultural practices than toward industrial style approaches. In that sense, they are allies. Nevertheless, there are challenges that come along with spatial proximity or overlap between protected areas and agricultural use. The most important issues are human-wildlife conflicts. They manifest mainly in two ways, namely, damages caused by large carnivores to domestic animals and damages to crops by the wild fauna.

Protected area management can play a significant role in the prevention and handling of such conflicts. They can accompany farmers and herders through adaptation and recompensating measures.

Furthermore, protected areas can build alliances with local and regional farmers in a way that the latter are included in promotion strategies and campaigns. The products originating from local, sustainable production from agriculture and other natural resources[2] can create an added value for traditions and social structures of a given region.

The highly controversial issue of large carnivores in the Alpine countries remains a significant and persistent challenge. Hesitation on the part of various governments, at the national and the regional level, to take a clear position concerning the goals of biodiversity and species protection creates ambiguity and leads to heated debate and persistent doubts among Alpine communities. Species protected by international conventions are endangered because numerous political and economic stakeholders are unwilling to adapt parts of the Alpine pastoral practices to more nature-friendly ways of coexistence between people and wildlife. Tools exist and adaptation strategies are needed if the commitment to biodiversity protection is to be taken seriously.

The role of protected areas is limited concerning this issue – as, in central Europe, there are no protected areas large enough to be considered as realistic “reserves” of wildlife. Those “refuges of wildlife” can’t be limited to our Alpine parks and reserves, but the latter can constitute the core areas of larger areas. Once a vigorous population of large carnivores is established, controlled hunting to balance human activities and wildlife in the Alpine area becomes possible.

Here, biodiversity protection is a more social and cultural issue than an ecological or economical one. It is the way in which we consider the value of wildlife that guides political decisions toward more or less protection and acceptance. The establishment of larger natural aeras interlinked with adapted wildlife corridors in some central parts of the Alps may support the concept of the protection of specific species with an important home range.

[1] To facilitate easier reading, we will use the term agriculture to refer to those three components of land-use in the text.

[2] Again, to enhance the reading fluency of the text we will refer to agricultural products and inherently include products from animal husbandry and also from forestry and non-timber forest products. If we talk about farmers, we include all professions dealing with the preceding products.

F.2.3

ECONOMIC CRITERIA

The aforementioned inclusion of socio-cultural activities in protected area management can have significant economic impacts for a region. Tourism and agriculture are the main economic pillars in many rural areas. Protected areas can strengthen the performance of those two industries significantly if a cooperation, based on mutually agreed upon standards, is established in the long-term vision. The criteria to be developed for such a standard must take economic, social, ecologic, and cultural aspects into consideration. It must be clear that the integration of these factors is the basis for a lasting and successful integration of protected areas into the wider landscape and society. It is in the DNA of modern protected areas that any development must be respectful of nature and people. Any economic development supported by protected areas must, therefore, be in line with this belief.

Protected areas can support farmers through the promotion of their products under their own park label[1]. This adds visibility and value to the labelled products and creates new ways of direct marketing to the end consumer, thus cutting out middlemen. In this way, the position of sustainable farming can be strengthened against intensive agricultural practices.

Tourism is the second component that can be strengthened through protected area management. The parks are often attractive touristic destinations, which deliver important economic impact in a region, especially in rural areas with little other income opportunities. Tourism can also bring direct benefits to local farms, through the development of on-farm touristic opportunities. However, similar to the agricultural sector, tourism needs to be developed with care and good integration into a wider planning and management approaches in order to guarantee the aforementioned sustainability standards.

During the Covid-19 crisis, the trend of outdoor sport activities and visitation of the Alpine Mountain areas increased significantly, especially in Alpine regions near to the important peri-Alpine agglomerations (Vienna, Munich, Milano, Torino, Venezia, Zurich, Lyon, Ljubljana). This trend toward increased visitor presence in fragile Alpine sites is ongoing. Social media and digital outdoor platforms promote the most spectacular and attractive natural sites – and, unfortunately, the most fragile ones- often giving the illusion of discovering secluded sites or experiencing outdoor activities in perfect harmony with nature. The reality is generally the opposite.

The difficult balance between an adapted touristic development of Alpine areas and the need for biodiversity and habitat protection became a central task of the protected areas as they are integrated into larger regions with economic activities and needs. During the last decades, protected areas contributed substantially balanced development and even created special offers for visitors. Now, the situation is far more dramatic and time-consuming, and more active management of visitors (including those pursuing outdoor sport activities) is required in most of the protected areas.

There is an urgent need to accommodate visitor flows by offering outdoor activities and areas to practise them within the Alpine parks and sensitive natural sites. Protected areas in the 21st century increasingly not only manage the protected area but also facilitate a certain kind of economic development in and beyond the protected area regions.

F.3

NECESSARY EVOLUTIONS OF ALPINE PROTECTED AREAS

Every period has its challenges. For at least 30 years, the challenges have been climate and biodiversity crises. Both are connected in many ways but not all. The global context makes the situation more complex - complicated by current demographic shifts, resource exploitation and a devastating energy crisis.

[1] These kinds of labels exist in all Alpine countries, often on national and regional level and / or on park level.

F.3.1

PROTECTED AREAS WITH NEW GOALS AND DYNAMICS

Ongoing climate change and the biodiversity crisis call for modified protection goals in the form of larger protected areas, networks of biotopes and strengthening natural dynamics and ecological processes. The era of sanctuary protection for spectacular landscapes and species inventories is over. If protection is underpinned with a political and social willingness, it must be efficient and effective for the Alps. For this new model - or at least a modified approach- and its legal measures to be implemented, more innovation is needed in nature protection models and areas as M. Broggi confirms (see below).

We believe that those considerations target the heart of a new protection strategy for protected areas. Biodiversity protection must become more universal within the Alps and not only be the responsibility of protected areas. We can no longer afford to distinguish between areas of strong

"I believe that we should not be contemplating a softening of the conservation status, but rather its further development in content, without inflationary appellations of category.

…It appears that – for all too long and in a manner that has been too one sided – those of us working in nature conservation have been concerned with the conservation of rare species, and thus, have unintentionally allowed the segregation into protected areas and unprotected "waste areas". Both are necessary: the separation of priority zones for biodiversity as well as an adequate quality of life across the entire area…

…Working meticulously, we have created inventories for many species and habitats, which are only partially supported by acceptance…There was little discussion about which nature actually needs to be protected…

…Our regionally diverse cultural landscapes are of great inherent value. They reflect the long history of human land use in Europe. Much would be lost, if we allowed the entire Alpine region to "return to wilderness". The cultural landscape itself carries a value that is not yet receiving adequate attention from the market of competing interests. We are going to have to conceive of significantly more innovations, for example in order to give small-scale "high nature value agriculture" a chance with its biodiversity hotspots…

…On the other hand, areas that are growing wild are seen as a viable alternative due to economic considerations with real cost-benefit analyses. It would be necessary to dispense with many new developments or with expensive redevelopments. The potential for free dynamics can be established relatively quickly with the determination of areas that have remained more or less undisturbed so far…

…Allowing wilderness is consequently also a form of reinsurance in nature conservation. However, allowing wilderness also requires broad mental acceptance by society. This rethinking does not yet have majority appeal and in terms of spatial planning we are only aligned for growth, not for shrinkage. Here too, we are lacking the necessary innovation to turn the "weakness" of retreat into a "strength". This could, for example, take the shape of a compensation for public services. It appears that the CO2-binding forest is crucial for reaching climate goals. Why, therefore, don't we compensate this reduction effect as a service for climate protection, rather than redeeming it through trading indulgences somewhere in the Third World?...

Finally, I submit a plea in favour of not holding on tight to images that no longer depict reality, but rather reflect distorted notions of what form sustainability should take in the context of land use. The cementing of structures is not sustainable. Too often, the countryside is "staged", and harmony is faked. It is not necessary to maintain cultivation efforts right into the furthest corner. In the long term, it is also not affordable. Nature will seek a path of variation and of the unforeseen. We must allow this, and thus, we must increasingly anticipate what has, so far, been unthinkable. In other words, in Central Europe, we must accept the coexistence of nature and history. It is therefore pointless to play off the traditional cultural landscape against the wilderness. Areas growing wild are also part of the cultural landscape…

(Mario Broggi in "Parks for the next generation", 2014, p. 56 ff.)

protection and areas with with regional development as the sole goal. Cultural landscapes support a specific form of biodiversity conservation if they are sustainably managed, and returning cultural landscape to a certain degree of wilderness is not problematic if economic and social evolutions lead to this stage. It is crucial that these areas are not further fragmentated by infrastructure, that they are not submitted to new land-uses that do not support biodiversity, and that they are kept free from pollution. We need open spaces for future generations, and they should be as "natural" as possible.

To summarise, future goals of protected areas are to: allow wilderness evolution and ecological process development; integrate cultural landscapes into the protection system and recognise their value for biodiversity; establish protected areas around deciduous forests and consider more wetland protection. Furthermore, protected areas must raise public awareness and encourage acceptance of these issues in order to explain and implement current and new targets.

Protected areas with a clear objective of sustainable rural or regional development need to incorporate protection missions and functions. It is now unacceptable to call large parts of the Alpine territory "parks" if they do not promote the conservation of biodiversity and raise awareness regarding climate change. In a time of climate and biodiversity crisis, we cannot afford to award etiquettes to territories that do not fulfil the function of their denomination. Doing so risks losing the confidence of the visiting public in protected areas. Instead, we must actively participate and support the general goal of better nature and climate protection. Parks play a key role, and they need to be recognised in this regard.

F.3.2

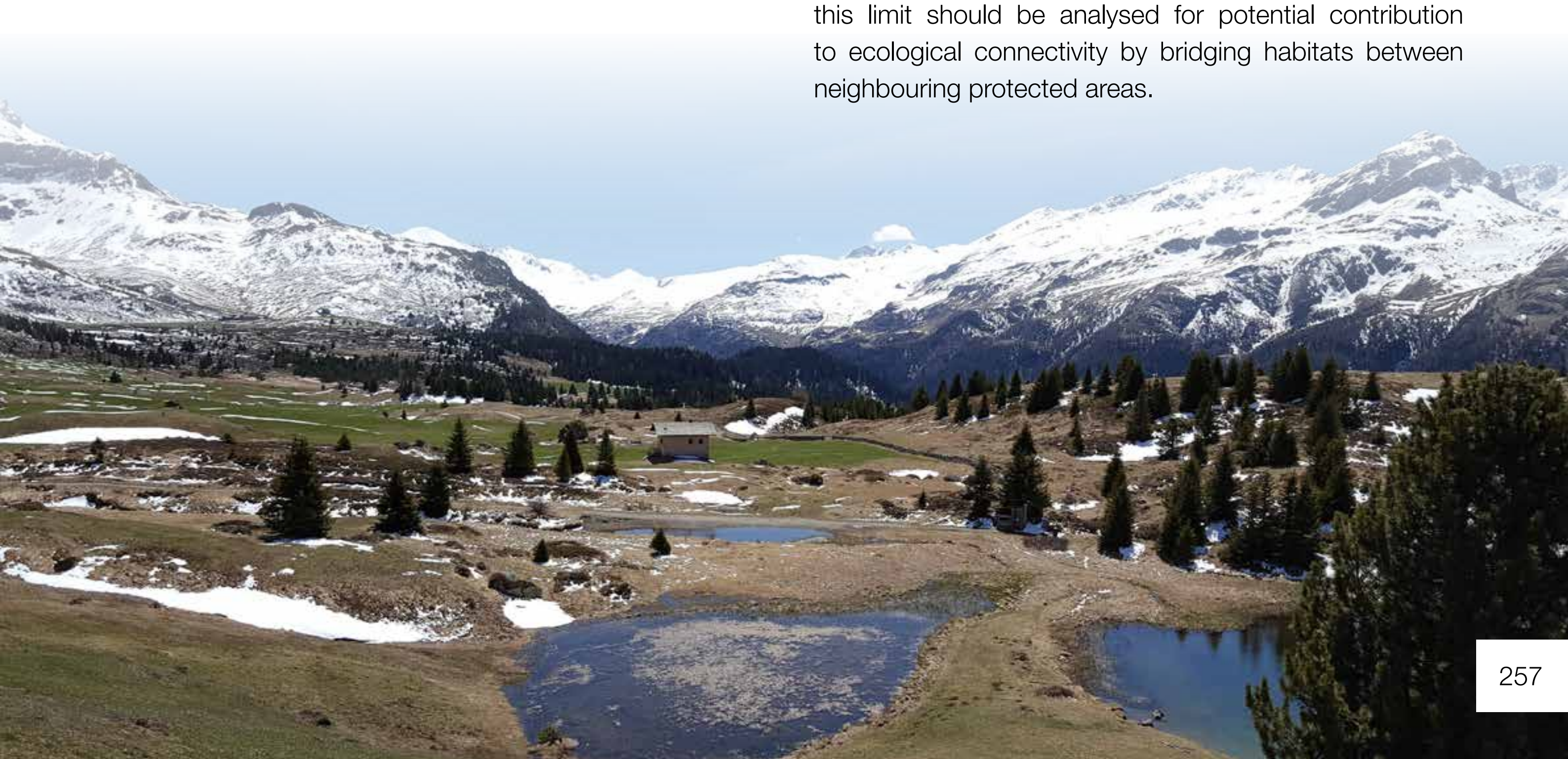
PROTECTED AREAS WITH STRONG CONSERVATION REGULATIONS

In chapter D and in the Glossary, we provided a definition of strong conservation measures. In the Alps, only a small percentage (around 10) of protected surface area warrants such a status. Generally, this is the case for the core areas of National Parks, nature reserves, some core areas of nature parks in Italy and biosphere reserves (often having a complementary status of another strong protected area category). Additionally, some so-called "integral reserves" exist in the Alps. Currently, they occupy a very limited surface area.

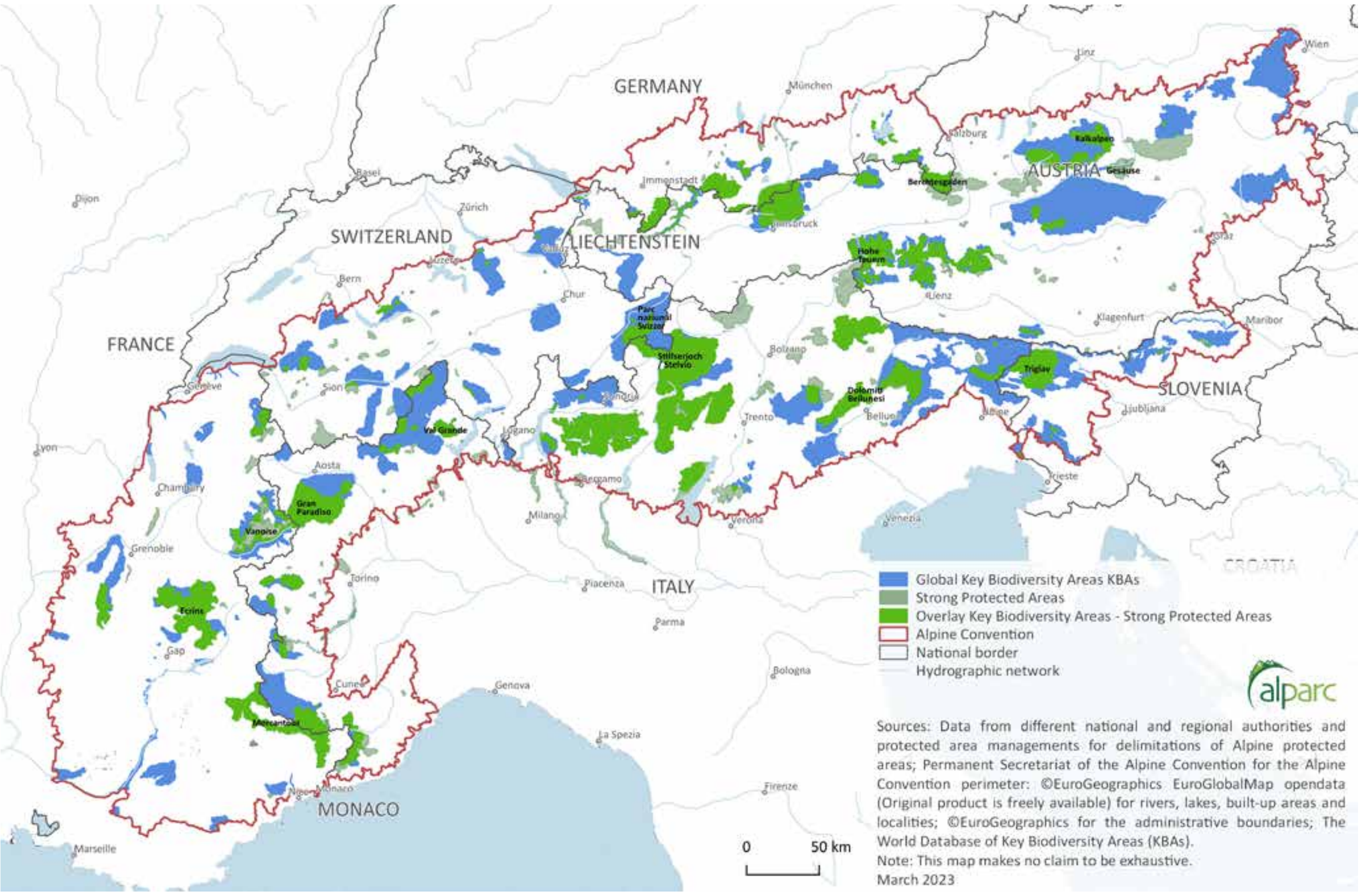
In the light of this weak amount of strong protection, the need for more and larger surfaces of a strong protection is evident.

This is one of our most urgent recommendations: create strong protected areas of at least 1,000 ha at all altitudinal levels, especially in the mid-altitudes of the Alps between 1,000 and 2,500 metres, to sustainably protect biodiversity. The most adapted category of protected areas may be the nature reserves. They don't need a large staff (compared to a National Park), they don't attract as many visitors as areas with more prestigious status (e.g., National Park), but they can be equipped with strong regulation and protection perimeters.

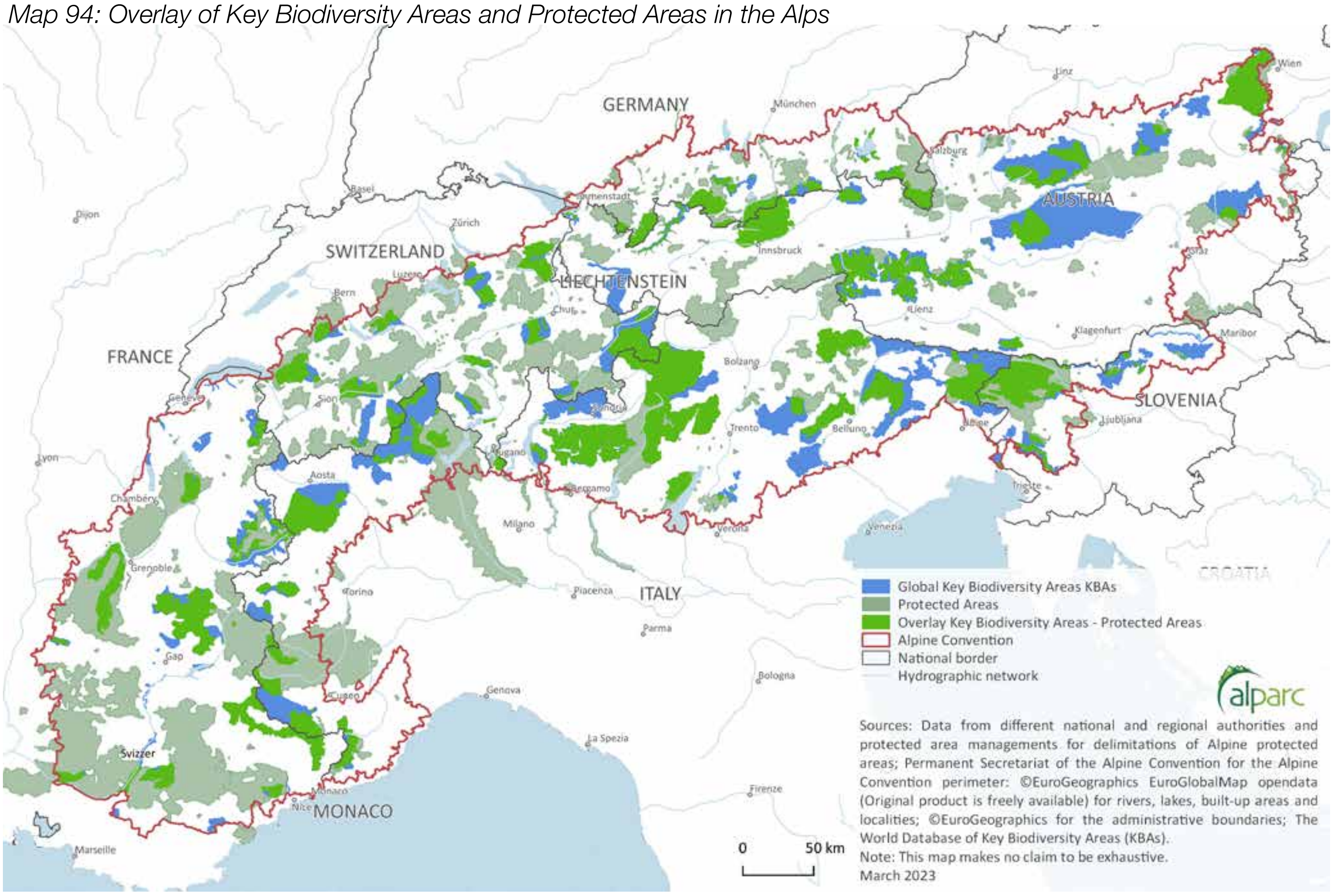
It is these areas that can substantially protect Alpine biodiversity in the long term. According to many experts, even areas under 10,000 ha are often insufficient for protection of many species. For this reason, areas under this limit should be analysed for potential contribution to ecological connectivity by bridging habitats between neighbouring protected areas.



Map 93: Overlay of Key Biodiversity Areas and Strong Protected Areas in the Alps



Map 94: Overlay of Key Biodiversity Areas and Protected Areas in the Alps



The map 93 illustrates the weak overlap between biodiversity hotspots and strong protected areas. Key biodiversity areas are compared with strong protected areas according to our definition. Large parts of the KBAs are not covered by a strong protection status and even not at all by any kind of protection or management as shows the map 94.

Future protected areas must have a stronger mission regarding biodiversity protection. Existing protected areas need to be evaluated for their legal possibilities to protect nature, species and habitats. If these are considered insufficient, procedures should be undertaken to extend the competences of those protected areas in this field.

F.3.3

INHABITED PROTECTED AREAS

Protected areas cover 28.5% of the Alpine surface area and inhabited protected areas (mostly category IUCN V) account for a large proportion of this coverage. Nevertheless, they often have only a very limited or indirect protection function. The Alpine network of protected areas needs those protected areas as a system for more sustainable development and awareness raising to transition towards improved quality of life. Taking the responsibility for one's own territory needs to be fostered among the Alpine population.

Protected areas contribute to the local economies of the territory. The presence of a management team of a natural or regional park often improves touristic activity, infrastructure, and services. Specific offers, such as those with an environmental education orientation, are proposed. Local products and services (overnight facilities e.g.) are often labelled as such, which increases their quality and value.

Nature and regional parks also strive to make the park territory more attractive as numerous visitors and tourists are looking for a "nature destination".

Agriculture and tourism are probably the economic sectors that benefit most from inhabited protected areas since the technical knowledge of a "park team" often facilitates acquisition of more subsidies through European projects or other subsidies for the territory and its activities as long as they are included as part of a "sustainable development" approach.

In the context of biodiversity protection, it is not only important to strengthen the regional economy (hopefully, in a nature-compatible fashion), but also to make local stakeholders aware of the fragility of their territory, and that specific measures can be taken to protect more biodiversity relevant sites and habitats. Those measures can range from simple recommendations or restrictions of certain activities (economic, leisure, infrastructure) to concrete protection or restoration measures of habitats or wetlands, riverine systems, or natural monuments.

A central issue for inhabited protected areas is that spatial planning activities and procedures include more nature protection elements. In territorial planning, it is essential to pay attention to protection of "open spaces" on the one hand and fragile nature sites on the other. If there is no recognisable difference in spatial planning or management between a so-called protected area (park, landscape area or other) and an area without any protection status, the denomination as "park" will become increasingly problematic.

In a time of biodiversity and climate crisis, is not enough to promote a general approach of a sustainable "way of life" or some complementary nature-compatible activities in tourism and agriculture, concrete and credible measures must also be taken.

As an example, the inclusion of compulsory measures in a responsible, integrated approach to sustainable economy and energy supply for an inhabited park territory would constitute a meaningful contribution to the protection of the natural environment. The point is to differentiate between territorial management in protected and non-protected areas. This delineation is currently absent or insufficient in all the Alpine countries.

Inhabited protected areas need a clear protection strategy for the natural environment of their territory. The strategy can be governed by rules or laws or agreed in concrete application protocols or conventions, but there must be a difference relative to non-protected areas, or otherwise expressed:

> *"If it says park on the outside, it should contain park on the inside".*
>
> *(Guido Plassmann, ALPARC, 2022)*

All protected areas require zones with a strict protection status or areas with targeted species and habitat protection that must not be watered down. This applies especially to regional nature parks and similar categories that focus mainly on regional development (ALPARC 2016).

F.3.4

THEMATIC PROTECTED AREAS

The idea of specific thematically orientated protected areas is not new but could be better integrated in the Alpine spatial protection strategies. These thematic protected areas could have different goals according the local or regional situation and future needs.

In the case of valuable ecological sites with important habitat and species, the classical forms of existing park categories or nature reserves are the most common tool. However, local, and regional initiatives also warrant promotion on the basis of their footprints and in spite of political discussions and financial uncertainties. The installation of local parks or regional nature parks with very specific objectives and measures defined in a "Charta" and action plan could be an interesting tool for the future. They would be built on a local governance and decided by one or several communities sharing the same approach and objectives.

Nevertheless, protection measures and a long-term biodiversity strategy should be part of such a protected site/area or nature park. New forms of "protected areas" or parks should be prohibited if clear rules for nature protection are diluted or excluded.

Protected areas can also be orientated more towards a sustainable development goal if they are clearly linked to a protection status. They deliver vital environmental, social and economic benefits to the Alpine and local societies. Thus, they should be recognised as an integral part of our economies, territorial development, and human well-being. Here, a key requirement is the acknowledgement and compensation of the protected areas' "ecosystem services" from which certain economic sectors benefit. Taxation of tourist service providers, who are reliant on intact landscapes and nature areas, is one viable model.

Finally, another clear orientation for the future would be the conservation of the last wilderness areas we have in the Alps. Cooperation between national, regional, and local stakeholders, forest and landowners would be necessary, and a binding agreement to avoid any hunting in those areas would be a goal. It is clear that such a protection form would be difficult to achieve, and, for now, we should probably concentrate on state properties or the federal system of properties of the regions, cantons, Länder or provinces. The forest authorities could offer a key to such an approach for areas that are difficult to access.

We are not promoting the proliferation of more protected area categories – rather the simplification and harmonisation of their goals. Nevertheless, these three approaches of a) more local initiatives of protected areas recognised by the authorities under certain conditions, b) protected areas with a clear sustainable development goal but including compulsory protection measures and c) installation of wilderness areas with specific goals for biodiversity and species protection, especially in the case of threatened species, seem to be three thematic approaches worthy of discussion at an Alps-wide level. They can be utilised within the Alpine Convention to fulfil several of its obligations of diverse protocols.

A central goal of all these thematic approaches should be to include not just "highland parks" but also "lowland parks" for biodiversity protection.

F.3.5

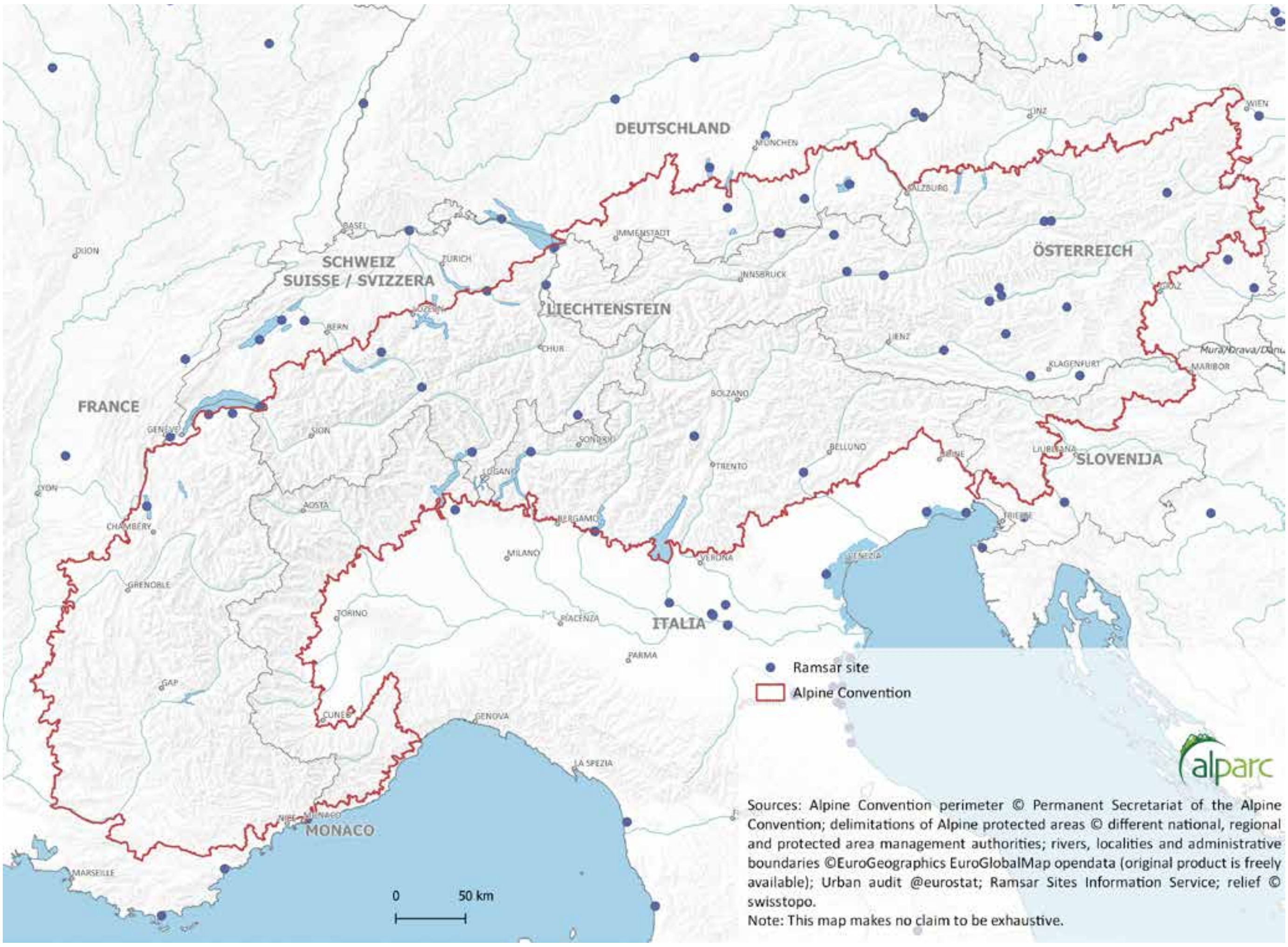
PROTECTED WETLAND AREAS

Wetland protection in the Alps is uncommon in national or regional strategies - with international sites, such as RAMSAR, being very rare and specific protected areas for wetlands, bogs or riverine systems seldom noted. Switzerland is the exception with numerous wetlands in the inventory of biotopes of national interest and a clear policy regarding them.

Besides their significance for biodiversity, mire habitats have important ecosystem functions. Peat accumulation sequesters carbon from the atmosphere and mires also act as water reservoirs and buffer discharge from catchments into lakes and rivers. In a natural catchment they function as sponges which prevent lower parts of the catchment from flooding in periods of heavy rain, and still support water for a long time in periods of drought. Mires also often have a distinct wilderness character, representing remnant natural habitats in landscapes otherwise altered by humans. (EU Commission 2016, European Red list of habitats, Part 2, Terrestrial and Freshwater habitats, p 13)

It is evident that, for a coherent network of protected areas with the goal of biodiversity protection, the Alpine states need to do more for the protection of wetlands of all kinds (bogs, swamps, peatlands, mountain lakes and rivers, glaciers, and karst water). Here, a specific Alpine strategy is missing and would complement the work of protected areas. Given the importance of water from the Alps for the Alpine periphery and water supply, a coordinated approach of all the Alpine countries is indicated.

Map 95: Alpine Map of Ramsar Sites



The Alps are very underrepresented within the RAMSAR convention. Large parts of the Alps, notably the South-Western Alps, don't have any RAMSAR sites. Nevertheless, water is one of the main assets of the Alps – both for its quality and its quantity.

Specific protected areas with the special goal of wetland protection could be a solution if they follow an international standard defined within the Alpine Convention and declared by the Alpine Conference. This would be a concrete implementation measure of the Convention, creating a basis for more wetland protection in the Alps.

F.4

PRESENT AND FUTURE MISSIONS AND MANAGEMENT OF ALPINE PROTECTED AREAS

Alpine protected areas have numerous missions as discussed in the preceding chapters. What they all have in common is integrating the topics of climate change, species protection, ecological process protection, green economy, and participatory processes ever further in their current and future strategies and activities.

There is a shared responsibility of the Alpine protected areas to ensure biodiversity, healthy environment, intact habitats, and a liveable Alpine space for generations to come.

For this reason, we would like to present some perspectives in the following chapters of these missions and the associated management needs.

F.4.1

THE ROLE OF PROTECTED AREAS FOR CLIMATE CHANGE MITIGATION AND ADAPTATION

"Ongoing climate change calls for modified protection goals in the form of larger protected areas, networks of biotopes and the strengthening of natural dynamics". (Mario Broggi, 2020)

Protected areas should lobby for official recognition as tools to fight climate change and to mitigate its impacts. This includes the provision of ecosystem services and protection against natural calamities. This role needs to be part of the official management plans of protected areas and must have consequences in their territories.

The biodiversity crisis is linked in many aspects to the climate crisis, and ecological connectivity is one answer to some of the problems that both crises share – mitigation and adaptation. Nevertheless, numerous aspects of the climate crisis are not connected to the biodiversity crisis, such as specific human activities may produce on ecosystems. Here, we discuss aspects of the climate crisis and the role protected areas may have in this context without special consideration for the links with biodiversity.

In the face of climate change, it is important to anticipate future developments and needs of ecosystems and species. In this regard, it might be of interest to designate protected areas in zones where future habitats could develop. This anticipation would give conservation efforts a head start instead of relegating them to a reactionary role.

Protected areas are recognised by the IUCN WCPA Climate Change Specialist Group as decisive tools for sustainable development and the fight against climate change. Beyond conserving species and ecosystems, protected areas provide essential ecological, social, and economic services – such as clean water, carbon storage, genetic reservoirs, disaster mitigation, and soil stabilisation – and preserve our cultural heritage. Protected areas are important tools for adapting to climate change. If well-managed, protected area networks can provide resilience to catastrophic events and connections across landscapes that allow plants and animals to move.

The need for change in the role of protected areas when addressing this topic was highlighted at the sixth World Parks Congress in Sydney, Australia, which made clear the importance of moving from a passive-isolated management of protected areas to an active-inclusive and collaborative approach working across many sectors. Three broad goals were identified in this context[1]:

[1] IUCN WCPA Climate Change Specialist Group, Strategic Framework 2016-2020.

1- Enhance Awareness of Climate Change and its Impacts on Protected Areas and Biodiversity in Surrounding Landscapes.

Communities in and around PAs should understand how climate change is affecting these landscapes and seascapes, biodiversity, and sustainable livelihoods.

This issue mainly concerns the question of monitoring. Biodiversity monitoring is one of the key tasks in most of the Alpine protected areas. Various methods and approaches exist in the different Alpine regions, countries and, sometimes, in an international context. Despite numerous efforts to harmonise monitoring activities in Alpine protected areas, monitoring protocols remain disparate.

Nevertheless, climate change is considered in most Alpine protected areas' monitoring and observations protocols (83%[1]). Many protected areas contribute to scientifically-lead research projects and actively cooperate with research institutions and universities in monitoring phenomena that can be directly linked to climate change impacts on the Alpine environment in the protected areas, such as temperature records, glacier monitoring, and phenology. As an example, the Alpine protected areas manage meteorological stations that record data about temperature, precipitation, snow height, etc. Also, observatories of different types are installed in protected areas (pastures, lakes, etc.) and managed by the protected areas staff or in cooperation with external researchers.

The monitoring of glaciers and permafrost is an activity with a long history in Alpine protected areas (for example the observation of the Pasterze glacier in the Hohe Tauern National Park). This is also particularly important from a symbolic standpoint as the melting of glaciers is a striking and effective illustration of climate change impact on the Alpine environment.

2- Promote the Capacity of Protected Area Managers to Respond to Climate Change.

This includes development and dissemination of best practice guidelines that enable PA managers to effectively access and apply current knowledge and tools that strengthen planning and management of PAs under a changing climate, enabling protection and connection of key features and processes as landscapes transform and adapt to climate change.

Concrete actions cited by Alpine protected areas to measure the effects of climate change (67% of the protected areas mentioned that they take such measures) include the monitoring of (emblematic) species according to predefined protocols, studies of climate impact on mountain species, and the monitoring of water courses, glaciers, mudflows, soil, and vegetation. One very important aspect of the projects led in the field of climate change is an interdisciplinary approach to research; in this regard, the projects act as catalysts for cooperation with various other fields.

The results from monitoring and Alps-wide research on this topic are integrated into management strategies and the actualisation of management plans. These plans are elaborated according to specific procedures and regional or national regulations and to the type of protected area. Management plans are the main and most important tool for natural areas as they set biodiversity and conservation targets along with indicators and evaluation criteria. At a global level, other drivers of climate change (like changes in land use, invasive species, or pollution) are well identified and targeted in management plans. Unfortunately, climate change usually receives still not enough attention.

In the Alps, almost 60% of the protected areas surveyed mentioned climate change and measures on how to mitigate and/or adapt to its effects in their management plans.

This trend will continue to increase as the topic is now recognised as essential. The number of tools and guidelines on how to best address this issue in the planning document is also increasing rapidly. What is needed is a thorough system and criteria to guide actions for better climate change adaption. This will require enhanced mechanisms for collaboration between scientists and managers of protected areas. Adaptation to climate change in protected areas should be based on an ecosystem approach, aiming for the protection of the natural resources and ecosystem services provided to society.

3- Mainstream Natural Solutions and Especially Protected Areas into Sectorial Strategies, Plans and Programmes for Mitigation and Adaptation to Climate Change.

All sectors of society should adopt protected areas as natural solutions in their climate change responses, and new coalitions should be formed to work together across protected areas, business, climate science, cultural boundaries, and geographies to integrate Protected Areas into mitigation and adaptation strategies at all levels.

[1] ALPARC Survey 2019.

Mitigation measures:

Protected area systems provide powerful tools to combat climate change; with commitment and planning, they could do even more in the future. Protected areas participate in strategies to mitigate climate change by sequestering carbon in organic matter and reducing impacts of climate change through maintenance of ecosystem function and the services upon which millions of people depend. They also provide space for natural processes to buffer natural disasters due to climate change phenomena.

So far, according to our results from the 2019 survey[1], only 17% of the Alpine protected areas report having taken any recent actions specifically related to climate change mitigation. Surprisingly, the actions cited in this context are not linked to habitat restoration activities but rather to measures taken in the administration infrastructure (like the change of heating system, installation of photovoltaic and geothermic in park administration), changes of mobility habits of park employees and the local population as well as actions for education of the general public (e.g., specific exhibitions).

[1] Source: (ALPARC 2019).

Adaptation measures:

When asked about the most effective actions for long-term adaptation to climate change, protected area managers expressed (ALPARC survey and report, 2019) their need for more cooperation between protected areas by developing a harmonised approach, common measures, and the elaboration of a shared action plan for Alpine protected areas to address the challenges of climate change. This clearly shows that the topic of climate change is seen as a global topic needing responses at an international level, specifically in the Alpine context.

The protected areas see a need for an evolution of their work, which must now include missions linked to climate change mitigation and adaptation aspects. A majority appreciate the need for better integration of these aspects into the management plan.

For the protected areas, it is also clear that this will entail changes in their management habits. For example, it may sometimes be necessary to intervene to displace certain populations (capture and release of individuals, or spots) to contribute to their mission of biodiversity conservation in the context of climate change.

In some cases, climatic changes would also require changes to the boundaries of the protected areas to adapt the territory to the changing environment and allow the protected areas to fulfil their conservation missions. Cooperation with the surroundings of protected areas is also important in the context of ecological connectivity. The need for movement patterns for species (individuals as well as entire populations) will require the protected areas to work even harder on ecological connectivity concepts that consider ecological corridors linking the protected areas to each other and to other specific territories and habitats.

Climate change will have favourable effects on several species that are often considered invasive. Management in protected areas will, therefore, need to apply specific actions to control invasive species.

Protected areas themselves face important new pressures due to climate change, with a risk that the solutions they offer will be less efficient if they decline in quality. Managers need to develop additional conservation strategies, such as building connectivity, providing routes for species to move as climate shifts, addressing extreme weather events and maintaining ecological integrity. A big challenge will be management in the face of increased uncertainties, for example to deal with changing rates of invasion by alien species or increased frequency of fires. Many management responses require new skills and new tools. On a crowded planet, any expansion of protection needs careful social safeguards and more stakeholders involved in decision-making than in the past. Protected area systems that recognise and involve local communities, indigenous peoples, the private sector and other conservation stewards in a mosaic of conservation actions are more likely to increase the resilience of ecosystems and people in a changing world.

In general, it will be necessary to re-evaluate the efficiency of species and habitat protection in the protected area territories in the context of the Alpine climate change and its consequences – and especially in light of their altitudinal distribution. As a result of species migration from lower areas or valleys, adapted protection may be needed with measures specifically tailored for mid-Alpine altitudes. The risk of invasive species needs to be considered and appropriate solutions need to be found.

F.4.2

THE ROLE OF PROTECTED AREAS FOR THE PROTECTION OF THREATENED SPECIES

In the light of the biodiversity crisis, partially linked to the climate crisis, it is clear that specific protection measures within protected areas will be essential for the survival of many species in the Alps.

The current Covid-19 crisis also impacted biodiversity worldwide, and the reasons are comparable with those identified in the Alpine Space:

> *"…Land use change is a key driver of emerging zoonotic diseases. Deforestation, habitat fragmentation and an expanding agricultural frontier increase the contacts between humans and other animals, potentially increasing the chances of zoonoses emerging and spreading. This is why protected areas and environmental law must be part of our global strategy to reduce or prevent future disease episodes. In understanding the consequences of human activities that lead to the spread of zoonotic diseases we can ensure we rebuild thoughtfully, and clearly communicate effective long-term remedies to actors ranging from policy makers to local communities…".*
>
> *(IUCN statement on the COVID-19 pandemic, Wed, 08 Apr 2020)*

More than ever, it is crucial to strengthen species and habitat protection. Numerous species, globally and in the Alps, are threatened with extirpation or extinction. The natural reestablishment of some species, like the large carnivores, is not ensured even if they are highly protected. Although it is not the objective of protected areas to be the only territories hosting those species, protected areas will play an ever-increasing role as core areas of biodiversity protection - especially with the climate change and linked species migrations. The protected areas need to be prepared for these new challenges.

The protection status, the extension and improved distribution, as well the zoning and buffer areas around the park with different protection levels will need to be reconsidered in order to effectively address species protection.

Beside the current legislation of strong protected areas concerning the protection of species, it will probably be necessary to create more "integral reserves" within existing protected areas with access limited to research and the protected area manager. In areas where threatened species are still present, they must be better protected. A total reserve corresponding to IUCN Ia or b would be the most effective measure because this area is large enough to provide an adequate home range for the concerned species.

This will be not possible for several species that need large areas, such as the lynx (*Lynx lynx*) whose home ranges may be 20,000 ha or more. Nevertheless, integral reserves can, at least, offer refuge zones for those species.

Other species are tightly linked to specific habitats, such as the ones presented in a simulation with the three large carnivores and the red dear based on a so called "super species approach" realised during the Interreg project ECONNECT. Indeed, the map shows the importance of forest for such species on an Alps-wide scale.

To succeed in Alpine species protection, we need more habitat-orientated, strong protection measures in existing protected areas – this requires a species-orientated zoning of protection degrees and more international coordination. Using the example of large carnivores and red deer, the map shows clearly that the highest chances for the survival of such species is in the areas of the Alps with the largest forest habitats. We need international cooperation of habitat protection where the species have the best conditions to reproduce and thrive.

Species protection goes hand in hand with social acceptance. A lot of work needs to be done here, and education, directed at the general public, regional stakeholders and local decision makers, is the second priority of protected areas.

Species protection need to be presented in a more prominent way in the political discourse, and specific protection measures must be increased. Management plans of the large Alpine protected areas need to be revised to accommodate an increasing number of targeted measures for specific species protection. Furthermore, new zonings may be needed within and between the Alpine protected areas with specific protection status to ensure that, in the Alpine range, no species will disappear or be exterminated through irresponsible land-use, sport and tourism activities or illegal or irresponsible hunting as still occurs in many Alpine regions.

All these points are directly linked to an acceptance process. The Alpine protected areas can improve acceptance through targeted information and facts.

Europe's Brown Bear, Ursus arctos

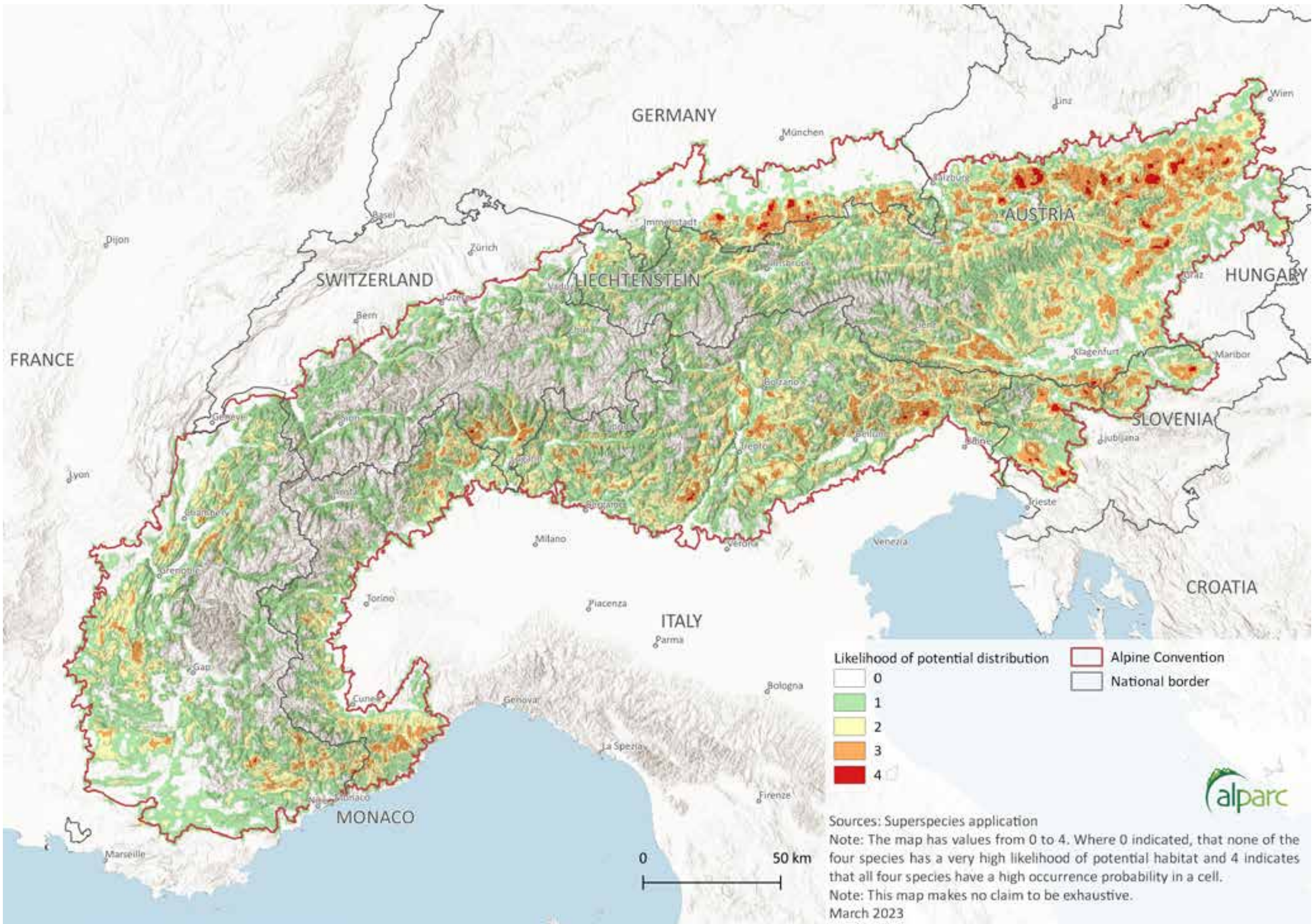
Large carnivores are often used as flagship species for nature conservation. To some, they symbolise wild nature, to others they are seen as a major threat to lives and livelihoods. This, combined with the fact that they require large territories, makes their conservation particularly challenging.

The species is now confined, within the EU, to 10 distinct populations, the largest of which is to be found in the Carpathian Mountains (7,000 bears). At the other end of the scale are the Alpine (45–50 bears) and Pyrenean populations (22–27 bears). In 1992, the Brown Bear was listed as a strictly protected species under the Habitats Directive, and some 750 Natura 2000 sites have since been designated for its conservation across the EU. Thanks to these concerted actions, the species is now showing signs of recovery over much of its range, and its overall population has increased to some 17,000 individuals.

However, the low social acceptance of their presence remains a major issue, not just because of the potential damage they cause but also because of people's innate fear of such large animals. In 2012, the European Commission launched a new Large Carnivore Initiative to encourage an active dialogue with all relevant stakeholders and to explore ways to promote the continued co-existence of humans and large carnivores in the EU.[1]

[1] https://ec.europa.eu/environment/nature/conservation/species/carnivores/conservation_status.htm

Map 96: Likelihood of Potential Distribution for Modelled Species (Lynx Lynx / Cervus Elaphus / Ursus Arctos / Canis Lupus)



F.4.3

THE ROLE OF PROTECTED AREAS IN ALLOWING ECOLOGICAL PROCESSES

In the light of the preceding chapters, it appears logical that more Alpine areas need to be dedicated to unhindered, natural ecological processes. The best way to reach this goal is to foster wilderness.

Wilderness Protection

The Alps need wilderness areas to achieve more efficient biodiversity protection and to ensure this diversity for generations to come. Alpine wilderness is very much limited to some strong protected areas of the IUCN category I, which means less than 1% of the Alpine surface area! … and perhaps a few "forgotten" valleys that are rarely frequented. Large parts of the Alps are certainly considered a cultural space, one of the most populated mountain ranges of the world with enormous economic added value in tourism and a major transit area for Europe. The Alps are also a nature paradise – and protecting this heritage need not necessarily mean conflict with social and cultural interests. In fact, it is important to maintain those activities appreciated by visitors and locals and provide a living base for some millions of Alpine inhabitants. The only way to do this and also preserve Alpine life and typical species and biocenosis is to create space which will be not touched by human activities – to allow "wilderness".

The following article[1] from Mario Broggi illustrates this urgent need using the example of Liechtenstein and Vorarlberg - but also suggests the possibility to create wilderness areas even in very densely populated regions in the heart of the Alps:

High time for wilderness areas in Central Europe (M. Broggi)

Less and less natural dynamics

Dynamic processes in nature have been prevented by humans since the Neolithic Revolution with the beginning of agriculture in our latitudes. This is particularly true in the case of watercourses, where free development is hardly permitted anymore. Forests are also no longer subject to natural dynamics; they are characterised by fixed rotation times in their use and a preferred choice of species by forestry (keyword advocacy). The transition from peasant to large-scale industrial agriculture with over-fertilisation and pesticide use causes the rest across the board.

More space for little influenced nature

We are used to thinking in terms of functions and services and draw our metaphors from physics or economics. The acceptance of an intrinsic value of nature, which eludes our useful thinking, on the other hand, has a hard time. The meaning of our lives could also include giving value to nature. Then an untamed stream is not only beautiful because it has its experience value, but simply because it is there.

Anthropocentric and biophilic views should not be played off against each other. Only anthropocentric views entail considerable risks for nature that is not shaped by man, and to the end, man himself is the victim. If you want to give more space to a nature that is little influenced by man, you have to take the human influence out of the system. The well-known American evolutionary researcher E.O. Wilson demands that half of the earth remain or become wilderness again to enable natural development and thus also to preserve our lives. This requires a human effort commensurate with the size of the problem.

The steps taken here are still tentative. While implementing the Convention on Biological Diversity, the German Federal Government adopted a scale for free development in its national strategy in 2007. By 2020, 2% of Germany's state territory is to develop again in accordance with its own laws, which corresponds to 714,000 hectares. It is foreseeable that the 2% target for 2020 has been massively missed, as has been the one to stop the loss of species. Most of the 16 German National Parks are still fighting for the international standards of 75% core zone with free development (see http://wildnisindeutschland.de).

The reasons for the continuous decline of natural diversity are not difficult to describe. Nature is a public good without price and there are no incentives not to harm it.

Biodiversity targets are not limited to species

The previous biodiversity objectives are often linked to the protection of certain species and neglect the other objectives for the conservation of ecological diversity. Wilderness with free development symbolises to a certain extent the counter-world of an order made by man. It is true that the longing for emotional closeness to a "paradisiac primordial state" remains in us, which has been described with the keyword "Arcadian" in the course of cultural history. Without wilderness, the sacred and the healing, the incomprehensible and mysterious, self-organised and organic, disappears…

[1] The article has been translated into English and slightly shortened by the authors of this publication.

"Target wilderness" potentials for Central Europe

As primary wilderness almost disappeared in Europe, *the idea of a secondary or "target wilderness" was also developed …- larger areas can be developed into target wilderness areas in the course of land use changes. This potential is estimated at 20 – 30 million ha. In Central Europe, the greatest potential lies in the mountain area as well as in the area of the forest. In the Federal Republic of Germany, this potential is cautiously estimated at around 3.5% of the federal area, which corresponds to 1,270,000 ha. In Austria, free development is already given on 2% of the national territory, which is the order of magnitude that Germany was aiming for by 2020. The potential of the WWF-Austria with certain dismantling measures with 8.3% of the national territory (= approx. 700,000 ha). In Switzerland, according to a study by Mountain Wilderness, the wilderness potential is estimated at 720,000 ha, which corresponds to 17% of the land area. This reflects the fact that the proportion of mountains in Switzerland is even higher than in Austria.*

In Central European latitudes, orders of magnitude for a wilderness area between 500 and 10,000 ha are under discussion. The German Federal Agency for Nature Conservation proposes minimum sizes of 500 to 1,000 ha, while in an expert survey in Austria the range of minimum sizes ranged between 1,000 and 2,500 ha. In mountain areas, a minimum of 1,000 ha should not be undercut to allow a closed landscape aspect.

Declare 2,500 hectares in the border area Liechtenstein-Austria as Wilderness

Hard to believe, but in the 16,000-hectare micro-state of the Principality of Liechtenstein there are still undeveloped locations. They lie behind the Alpine Rhine Valley towering dolomite mountains of the Three Sisters (Kuhgrat 2,123 m above sea level). The inner-Alpine main valley drains with the Saminabach in the direction of the Austrian Ill near Feldkirch. Only above the former Maiensäss settlement Steg (1,300 m above sea level) the valley is accessible by an Alpine road. Below Steg, the naturally left Samina eats its way through the rock flanks in the direction of Walgau. Here, a marked hiking trail accompanies the watercourse. The hike from the jetty to the Frastanz hamlet of Amerlügen takes about four hours with a difference of around 600 metres in altitude and is very popular, especially in autumn with the beginning of leaf discoloration. On a Samina Valley hike, we experience the forces of the little tamed nature of the wild river and its feeder roads, which in turn are equipped with mighty torrent debris cones. The Grauerlenau along the Samina is also subject to the dynamics of the forces of nature.…

Early protection efforts

In the European Year of Protection, 1970, a large Alpine protected area was proposed for Liechtenstein and the statement was repeated in the nature conservation inventories of 1977 and 1992. In 2000, the forests were eliminated as a natural forest reserve. In the past, a planned Alpine and forest road development along the Saminabach was not carried out. The Samina Valley and the neighbouring Galina Valley to the east were also eliminated as a "large-scale biotope" in the Vorarlberg Biotope Inventory in 1988. The upright Spirken forests were designated as Natura 2000 sites in 2002. This part of Vorarlberg has been recorded in a GIS modelling of the WWF Austria of the year 2010 for the discovery of potential wilderness areas, because it is without settlements, main roads, and infrastructure structures, but with near-natural vegetation. There is talk of "one of the most important natural rest areas in the Eastern Alps". This area was also recorded as a "white zone" in a study by the Vorarlberg state government in 2016. They represent untapped buildings which are to be protected from further intervention. The mostly affected municipality of Frastanz has spoken out positively about this zoning.

The cross-border investigation area covers approximately 2,500 ha on both sides of the country's borders. It is therefore sufficiently large to enable free development. Despite its closeness to nature and undeveloped nature, this area, which is hardly to be expected otherwise in Central Europe, has also experienced certain impairments. In the hydrological catchment area above the project area, for example, there is a small plant with a storage basin, and below the Liechtenstein border there is a drinking water collection site for the city of Feldkirch, to which a development leads to the lower Samina Valley. Access is blocked by a barrier.

A natural monograph has been prepared for this area, the history of use has been determined and proposals for further action have been formulated. It is proposed to strive for the "Category Ib Wilderness Areas" with recognition by the International Union for Nature Conservation (IUCN) in a cross-border natural space management. The IUCN defines: "Wilderness areas are usually extensive or only slightly modified areas which have retained their natural character, in which there are no permanent or significant facilities". That is entirely true in this case. With the explicit designation of a wilderness area, the wilderness idea is to be given wider recognition.

The wilderness debate in central Europe is difficult and still based on clichés. The Alps are, even being highly cultivated and economically developed, one of the last mountainous regions, together with the Carpathian range and the Scandinavian mountains, where "wilderness" is still possible to a certain degree. It is essential to preserve this situation for the coming generations.

F.4.4

THE ROLE OF PROTECTED AREAS AS MODEL REGIONS FOR A GREEN ECONOMY

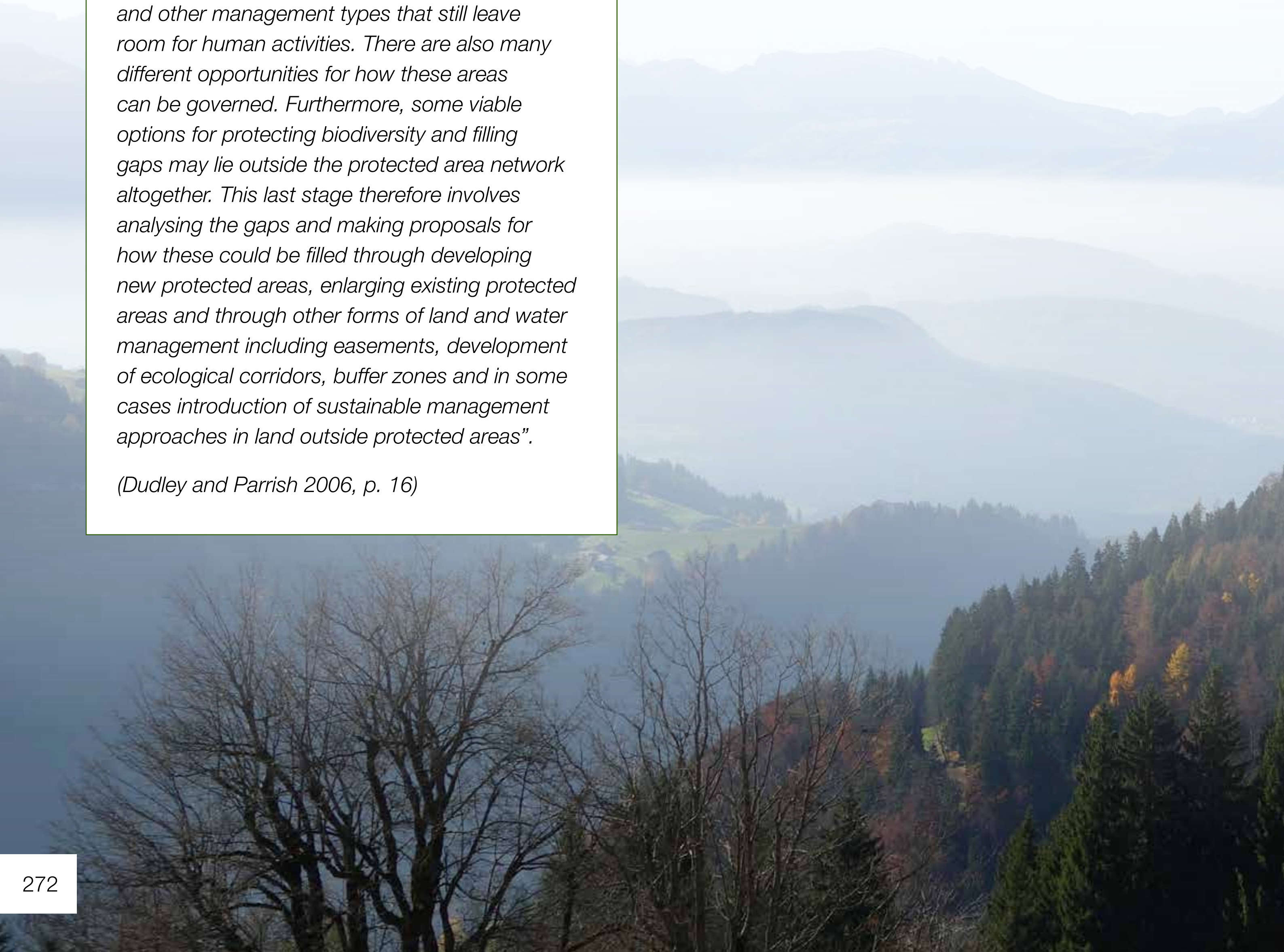
The Alpine protected area system is composed by many inhabited and, therefore, economical regions. People live there, work there, and move around and through. The question is whether all these areas are much like one another, or are there difference in the way their inhabitants live and work that promote goods and services?

This is the issue of many regional parks and development zones of biosphere reserves. Here, the protected area has the mission to develop an alternative form of economical function. The goal of working for a living is still the same, of course, but the "how to get there" may be different.

> *"Agree on a strategy and take action (chapter 11): there are many different ways of filling the gaps in a protected area network. There is a range of different management objectives within protected areas, varying from strict protection and other management types that still leave room for human activities. There are also many different opportunities for how these areas can be governed. Furthermore, some viable options for protecting biodiversity and filling gaps may lie outside the protected area network altogether. This last stage therefore involves analysing the gaps and making proposals for how these could be filled through developing new protected areas, enlarging existing protected areas and through other forms of land and water management including easements, development of ecological corridors, buffer zones and in some cases introduction of sustainable management approaches in land outside protected areas".*
>
> *(Dudley and Parrish 2006, p. 16)*

> *"The missing piece in the jigsaw puzzle is the wider countryside around the protected areas. As well as delivering ecosystem services in its own right, this land needs to be managed to provide an ecological framework within which protected areas remain viable for maintaining populations of species, habitats, and ecosystem goods and services. To get there we will need a new way of thinking about the management of our rural and peri-urban landscapes that integrates sectors such as agriculture, energy, transport, and water management to provide sustainable decision-making".*
>
> *(Doody 2015; Lawrence 2015)*

There are various examples illustrating the role of protected areas within a green economy approach: Integrate conservation objectives into land/sea use and regional and sectoral planning at all levels and integrate protected areas planning and management into the wider land and seascape (IUCN 2005, p. 140).



One key element could be seen in protected areas from IUCN categories V and VI (regional nature parks, development zones of Biosphere reserves, etc.). They can function as essential transmitters and multipliers for land-use patterns that combine biodiversity conservation and regional development.

- As it is unlikely that a significant number of stricter protected areas will be established in the Alps within the next decade, it seems important as well to "deal with what we have" and to possibly extend the network of less strict protected areas. Sustainable forms of land use can be promoted, and the staff of category V/VI protected areas can be more involved as active actors[1]. Assigning them a more important role could be a pivotal change. Therefore, consequent improvements in staff and general resource availability need to be envisaged.
- The approach of regional nature parks appears highly promising when it comes to reconciling conservation and sustainable development. In Austria, the federal umbrella organisation explicitly has this as their objective *"Today, the strategy of NaPs [Nature parks] is to simultaneously protect natural and cultural landscapes and to become model regions for sustainable development". (Braun 2020)*

[1] One example can be "prairies fleuries" where French parcs and small livestock keepers work together for enhanced biodiversity on the pastures https://prodinra.inra.fr/ft?id=%7B2783D7E3-B84F-4C9E-B7C7-C9E5163D2404%7D&original=true.

> *"This implies, for example, valuing the benefits of protected areas, which are often the basis of new territorial dynamics. Preservation of natural resources and ecosystem services, scientific research or training programs, mobilisation of funds, creation of "green" jobs, support for social integration, attractiveness of territories, recreational activities, enhancement of local products, maintenance of spiritual and cultural functions attached to these spaces, environmental education and local partnerships are all levers for development and enhancement of local products, territories and their actors".*
>
> *(CBD 2012)*

We believe this approach is a very pragmatic one. We have those territories, and we need to employ them for a more sustainable development of our Alpine regions where the issue of economic growth does not take precedence, but where quality and a long-term vision of local economy, social inclusion, and the quality of life in attractive landscapes and healthy nature should be the priorities. Protected areas can contribute to more balanced local development; parks can support the local economy and people through their management approach, with a chance to create some kind of buffers and transition areas in the Alpine protected area system. Here again, an approach based on a zoning with different protection levels seems to be relevant.

F.4.5

THE ROLE OF PROTECTED AREAS AS A PARTICIPATORY GOVERNANCE APPROACH

For a stronger local governance participation by protected areas, including UNESCO biosphere reserves, procedures have been developed since the 1980's. While Alpine National Parks allowing participation of locals by formal institutional bodies of the park, such as diverse "councils" (scientific, planning, landowner etc.), others, especially regional nature parks and sometimes biosphere reserves, have attempted to increase involvement of local populations by including them in the establishment procedure of the protected area (France, Austria, Switzerland). In some cases, they have even deferred the decision to the population as to whether the park should be created or not (Switzerland).

A stronger governance of the common territory and its resources is increasingly considered as fundamental in modern protected area management in the Alpine arch depending directly on different political systems (federal or central) in the Alpine states and the understanding of local democracy.

Parks can play a role in reconnecting people with nature and participation is a crucial element for the success and efficiency of biodiversity conservation and the basis of the future of protected areas in the Alps. Support from the local population is not just one of, but rather "the" factor for success of sustainable management of those areas.

But, in the last decades, communication from protected areas regarding their objectives and rationale have not always been successful. In spite of growing awareness about environmental problems and the need for more nature conservation, and in spite of significant efforts, many protected areas still face significant opposition from the local population and key stakeholders. So far, we, the conservation community, have not managed to create the biodiversity equivalent to the what is tagged as the "Greta-effect" in the climate change discussion. We have identified several aspects that might help to improve the communication and strengthen participation thereby improving acceptance and management effectiveness of protected areas.

One key aspect is the need for more people on the ground. People talking to people. People who listen and take the time to engage in relevant discussions that allow for the common development of solutions. Open dialogue accomplishes several objectives: to disseminate information about the park and its activities etc. and to build a relationship and trust, thus enabling the collection of information regarding the questions, needs, and expectations of stakeholders in and around the parks. The staff dedicated to such outreach measures need not be conservation experts but might be recruited from several other sectors, such as technical experts with knowledge of water, agriculture, tourism, etc. One advantage might be that they are not perceived and pre-judged in the way that conservation experts often are.

Furthermore, tapping into the rich knowledge of the fields of sociology, psychology or even public relations might help us to better understand why we so often fail to bring our message across and also to bring people round to our side.

Open discussion about the future of home regions, home valleys and mountains with the local inhabitants might generate solutions that support a liveable future for not only those inhabitants but also for the conservation of nature. The gap and the polarity between socio-economic well-being and environmental preservation could thus be bridged on a local scale.

This may not always work, and sometimes decisions must be taken that inevitably create tension or conflict because priorities must be set. Nevertheless, we consider such an approach to have great potential in mitigating lines of conflict and raising awareness and thus understanding for the respective positions.

> *"Current management structures for protected areas were designed under different conditions and are not necessarily able to adapt to these new pressures. Conservation will only succeed if we can build learning institutions, organisations, and networks and enable conservation practitioners to identify and solve their own problems and take advantage of opportunities. In particular, we need to empower all stakeholders to fulfil their role in protected area management".*
>
> *(IUCN 2005, p. 141)*

Specific conflicts, mainly related land use and socio-economic activities, arise and can only be solved by participatory processes and involvement at least within the protected area categories such as regional parks not based on strict rules. The human-wildlife conflict, symbolised by the return of the wolf, is such a conflict. Beyond official protection rules for the species, demanding and long-term education and compromises are required. Perceptions between the rural population and urban citizens are usually divergent. This is also reflected in political positions on the topic between different in different public arenas. Park management plays a critical role in the mediation and consensus building in these cases.

Different forms of governance of protected areas can be considered including privately or co-managed protected areas in some cases.

Local participation:

As it is already best practice in many parts of the world to include what is often referred to as “indigenous or traditional knowledge” as essential for the success of biodiversity and habitat conservation. Even if this concept might often be perceived something for more traditional societies in the global south, its core messages apply equally across the globe. It is often stressed that the traditional use of natural resources throughout the Alpine arc is an essential part of the Alpine tradition. This knowledge should be better incorporated into protected area management and the land-use in adjacent areas. Together, traditional knowledge and protected area management must unite against other land-use forms, especially industrialised agriculture.

Traditional knowledge and land-use practices can be integrated into government-run protected areas, but the possibility to establish community-run protected areas should also be considered in order to engage these actors in biodiversity conservation. This would not only be beneficial for the conservation efforts but would equally strengthen the democratic legitimation of nature conservation through the empowerment and ownership by citizens and communities. Plenty of methods for improved community involvement in protected area management are available online.[1]

As the topic of participatory management seems to us as very important for the success of the future system of protected areas - especially in a mountain range that is intensively used by many stakeholders, locals and visitors, sportsmen and nature lover- we analysed the question more closely with the help of a Pilot region.

[1] http://communityconservation.org/the-9-stages-of-a-community-conservation-project

A concrete example of a participatory approach: Pilot Region Approach – Nagelfluhkette Nature Park

Anja Worschech / Rolf Eberhardt Nagelfluhkette Nature Park

The integration of a pilot park in our analysis aims to show how the governance and the management of a protected area does concretely impact biodiversity conservation.

We chose an inhabited, transboundary nature park as this covers many important aspects for the analysis and helps shaping our draft proposal for the future of Alpine protected areas. Our focus is based on the evaluation of the governance regime in the Bavarian-Austrian Nature Park “Nagelfluhkette” especially regarding its participatory approach and the inclusion of stakeholders in management planning and decisions. Furthermore, we explore what impact the four fields of action (see below) have on biodiversity conservation on the ground.

In order to analyse the governance structures and the participation of the population in the management, the following aspects are relevant:

The relation between the protected area and…

… the authority bodies and institutions
… the communities and its structures such as local associations
… the population
… the wider institutional environment.

The park regularly reviews its guiding principles and published them as recently as 2019 (Naturpark Nagelfluhkette 2019). In this document, the park management emphasises its participatory and integrative approach.

The management quality has been considered in this report as well as the success of communication between the stakeholders and decisions makers of the protected area. Furthermore, the common definition of the main goals and measures of the park and their realisation have been taken into account.

The role of nature in the protected area and its mission in the frame of climate change were analysed to give space to new forms of land use such as open spaces, inclusion of human activities in ecological processes by adaptation of such activities, active participation of the population in nature protection measures… and more.

(The whole report is available in German language on demand)

Management of Protected Areas for the Future – an Analysis of the Nagelfluhkette Nature Park as a Model Region

Nature parks can act as important pillars in the management of protected areas. They contribute to maintaining biodiversity, strengthening rural development, offering an attractive recreational outlet, and supporting nature-oriented tourism. They also provide education in sustainable development. In view of the national and international biodiversity and climate protection programmes, their importance is greater than ever. Today, there are more than 100 nature parks in Germany, representing some 25 percent of the country's total area. In Austria, there are 47 nature parks, covering almost 6 percent of the country's area: one is the Nagelfluhkette Nature Park, a 405 km^2 protected area characterised by its cross-border structures between Germany (Bavaria) and Austria (Vorarlberg) and its cooperative approach.

What will the protected areas of the future look like, and to what degree must a nature park intervene in order to ensure effective protection of nature? These questions are repeatedly discussed within the nature park family: the Alpine Network of Protected Areas (ALPARC) has now selected the Nagelfluhkette Nature Park to get to the bottom of such questions.

The Nagelfluhkette Nature Park covers 15 municipalities and is, thus far, the only nature park shared between Germany and Austria. Walter Grath, former mayor of the German municipality of Oberstaufen in Allgäu, provided the decisive impetus for the project in 2008. His idea was also well received in neighbouring areas. The international protected area was therefore created at the request of local citizens, and its acceptance in the region is correspondingly high. On this basis, it has grown to its current size in just fifteen years and employs ten people. Other municipalities have also now shown great interest in becoming part of the nature park.

The methodology used contributed significantly to the establishment of the Nagelfluhkette Nature Park, with high priority given to the "four Cs": Cooperation, Communication, Competence, and Continuity. These are a constant in every one of the park's activities, such as education for cooperative nature conservation, sustainable regional development, nature conservation and landscape management, as well as nature-oriented tourism. A cooperative approach is a characteristic of all fields: this means involving all actors with an influence on the natural diversity and conservation goals of the nature park.

Cross-border cooperation means increased communication and workloads, but, on the other hand, provides a valuable wealth of experience. The nature park benefits greatly from ideas and actual implementation on both sides of the border, bringing decision-makers into the exchange process and thus permitting model projects to be initiated. Such cooperation is based upon trust, appreciation, and credibility.

According to our survey filled out by 44 key people, more than 85 percent see considerable added value in the cross-border cooperation between the Austrian Vorarlberg and German Allgäu regions. Most of those asked, state that it is not so much the national border that is decisive, but rather the topics covered and the homogenous natural area. In the opinion of many respondents, "tourists and nature know no borders".

Figure 19: Associations with the Nagelfluhkette Nature Park

In addition, specialist exchanges between countries are very productive, while another major advantage is the generation of funds. Nevertheless, survey participants also pointed out that the challenges of cross-border cooperation lie mostly in divergent laws, interests and principles. The survey also showed which topics respondents would associate with the Nature park itself. These were, alongside rangers, primarily environmental education, and visitor guidance: the latter, in particular, played a major role during pandemic times in 2020/2021.

The Nature Park relies on highly qualified employees to oversee this wide range of topics. To establish a diverse, cross-sectional team when filling vacancies, it is vital (as in a business) to make independent decisions based upon qualifications and social skills. Team spirit and the working atmosphere are essential for the effectiveness of an organisation based upon cooperation that is responsible for a protected area: this includes the network and the partners contributing their knowledge to projects.

The following success factors have emerged from the project work:

- Partnership-based conception and implementation with all interest groups will help to break down existing communication barriers. People talk to, rather than about, each other and thus build trust.
- Working together and learning from one another helps to change perspectives and fosters new ideas.
- The Nature park is a neutral and accepted mediator and thus takes on a chairmanship role.
- The Nature park always works to ensure that solutions are developed in the sense of preserving biodiversity and sustainable regional development.
- A collaborative approach is the key to robust networks.

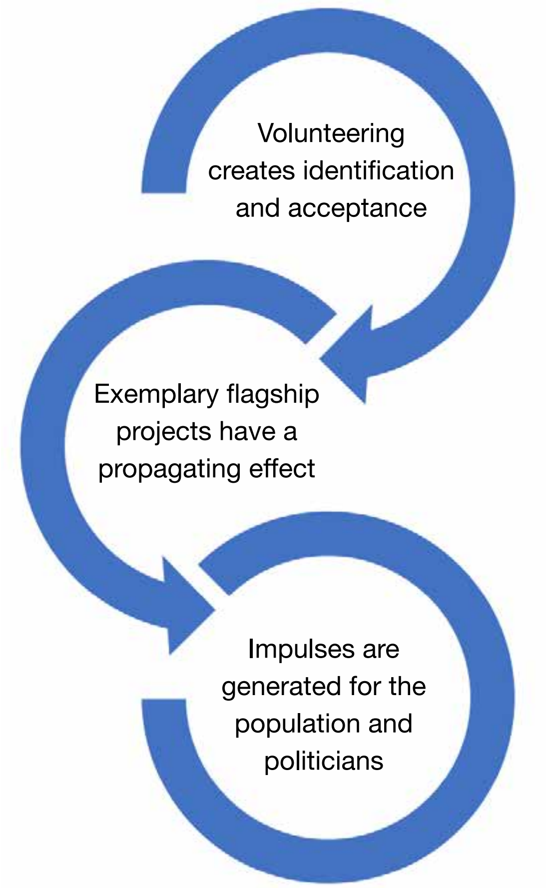
It is also interesting to look at the legal basis for a nature park. The legal framework for nature park work is provided by the Bavarian and Vorarlberg Nature Conservation Law, the nature park regulations, and the strategy papers of the German and Austrian nature park associations. This framework defines the main pillars for nature park work but leaves sufficient leeway in their realisation for local people to become the main orchestrators on the ground, thus engendering acceptance and appreciation. A direct connection between population and project team is especially important for all those involved in nature park work. A majority of those surveyed said that decision-making powers should continue to rest with the executive association and thus with municipalities, as this would guarantee a direct link with the region.

In addition to legal requirements, the voluntary principle is still a valuable asset in a nature park context. This raises the question of whether more regulation is needed to ensure effective nature conservation in protected areas. From the nature park's point of view, the question of regulation and voluntary action is not an "either/or", but rather one of balancing the two poles. Legal requirements are necessary to provide a clear framework; the additional voluntary measures that nature parks can initiate represent an important complement.

The efficacy of a nature park stems from a population's degree of acceptance and its desire to take effective action. For this to be the case, it must identify with the nature park. More than 95 percent of the key people surveyed see the Nagelfluhkette Nature park as a model for other regions.

Excessive regulation at local level can achieve the very opposite producing a lower degree of acceptance, even in cases where stricter regulation with regard to protection of nature and sustainability would be entirely reasonable in political terms.

Figure 20: Possible Effects of the Nagelfluhkette Nature Park



Exemplary flagship projects are the greatest contribution a nature park can make in respect to politicians, population, and nature. Awareness-raising work by a protected area also helps to create understanding for legal requirements among the local population.

The EU's Biodiversity Strategy for 2030 requires that at least 10 percent of the land area come under the protection of natural processes so as to preserve and restore valuable ecosystems. It would be desirable for protected areas to lead by example and meet this target. However, like most other protected areas, the Nagelfluhkette Nature Park is restricted insofar as it has no areas of its own. It is estimated that around 3-5 percent of the Alpine area of the nature park is equivalent to process protection areas, where the natural conditions, such as steep rocky slopes, do not permit any form of pasture farming and are therefore free from human influence.

These areas can be seen as valuable ecological stepping-stones. Any intensification of strictly defined nature reserves seems challenging. At this point, however, account must be taken of the ecological value of extensively managed areas, e.g., Alpine areas or protective forests that create important habitats for many species. There is no alternative to increasing focus on nature conservation in the future. Species loss is considerable, while healthy habitats are becoming more and more important as they represent a kind of "life insurance" for human population. It should here be noted that protected areas also make a major contribution to biodiversity protection through their environmental education work.

One possible future approach would be for territorial entities to be more strongly committed to purchase areas of high ecological importance then hand them over to an organisation oriented towards the common good (e.g., a landscape conservation association or a nature park) for their upkeep. The Nagelfluhkette Nature Park sees, as a future model, a so-called spatial concept whereby protected assets, such as rare animal and plant species, are analysed and appropriate conservation measures are agreed.

However, the basis of a nature park's work still lies in informing people and raising their awareness. Society must recognise and appreciate the value of landscapes and habitats. The future lies with the "adults of tomorrow" – the children.

In order to develop their enormous benefits, nature parks will have to gain greater importance in the eyes of politicians and administrators. Nature parks should also possess sufficient financial and personnel resources to be able to oversee flagship projects. In this way, impulses that have a propagating effect become possible, and nature parks will be effective pillars in the management of protected areas.

F.5

PROTECTED AREAS 2030

"At least, it is sure that we have failed so far".
Roger Croft, IUCN WCPA Emeritus

According to him, there are still too many "paper parks" in Europe and elsewhere. Besides, parks are often subject to political manipulation and reductions in resource allocation, and are targets of mining companies, agriculturalists, or foresters. Furthermore, they will never be able to achieve their conservation goals if they remain "islands of protection" in a "sea of devastation". Consequently, the quality of protected areas management must be improved **not only in terms of the management efficiency of the designated site, but also in terms of integrating adjoining areas, ecological corridors, and the unprotected areas in between into the conservation efforts**. The focus on quality is essential as nowadays several protected areas are mainly designated as potential growth engines for regional economies or peripheral tourist destinations". according to Roger Croft, In Parks 3.0, Jungmeier 2014.

This analysis, made by one of the most experienced and recognised personalities in spatial protection worldwide, is sobering, but the statement remains pertinent today. Even if efforts have been made, we are probably far away from a protected area system that is sufficient for the protection of our Alpine biodiversity because of exactly the reasons identified, which align with the analysis in chapters 2 and 3 of this report.

But how should a modernised network of protected areas in the Alps look for the 2030 horizon?

F.5.1

THE DISTRIBUTION OF ALPINE PROTECTED AREAS IN THE FUTURE

Where should new protected areas be located or which existing protected areas should be extended to improve biodiversity protection? Where could zoning be a better solution and how can we integrate the areas in between protected areas in a coherent system of sustainable development and living space and the protection of life and habitats for the future?

Efficient spatial protection measures and the distribution of protected and natural spaces require concrete tools and criteria for the development of first simulations and to guide decision making for constructive planning of the Alpine space.

An interesting approach has been proposed by Locke et al. (2019) to adapt the management of protected areas according to the current land use (pressure) and further framework conditions in a worldwide scale - The 3Cs framework approach:

*"The concentration of people, food production, and threatened vertebrates in highly productive C1; the abundance of KBAs and PAs that could be interconnected compatibly with natural resource extraction in C2; and the prevalence of carbon-rich soils and forests, small human populations and indigenous management in C3 exemplify **why it is useful to sort conservation strategies by varied societal and natural conditions**". (Locke et al. 2019: Three global conditions for biodiversity conservation and sustainable use: an implementation framework in National Science Revue)*[1]

[1] *https://academic.oup.com/nsr/article/6/6/1080/5567446*

The 3Cs framework evaluates land-use drivers and human pressures to establish a baseline state of three broad terrestrial conditions: Cities and Farms cover 18% of land (C1), shared lands 56% (C2), and large wild areas 26% (C3). It maps all but Antarctica (Map) and enables development of suites of conservation responses and production practices appropriate for each condition that are clustered on a continuum from those appropriate to the most heavily impacted areas to those best suited to the wildest areas remaining on Earth. These include:

- *C1: Increase conservation efforts to secure endangered species and protect all remaining primary ecosystem fragments. Mainstream sustainable practices such as protecting good farmland, practicing productive regenerative agriculture, and keeping nitrogen out of freshwater. Maintain pollinators and increase ecological restoration. 'Green' cities to reduce carbon emissions, prevent urban sprawl, and provide access to nature for urban dwellers' health and well-being.*

- *C2: Establish 'ecologically representative and well-connected systems of protected areas (PAs)' while increasing coverage of key biodiversity areas (KBAs); restore and maintain ecological processes and viable populations of native species (ensure area protected is in the range of 25%–75% per ecoregion). Across landscapes integrate sustainable natural resource extraction and activities such as tourism, grazing, and use of wildlife (where appropriate and sustainable) with indigenous knowledge and well-managed, equitable, and properly funded PA networks.*

- *C3: Retain overall ecological integrity and associated global processes such as carbon storage and rainfall generation, fluvial flows, and large migrations; prevent further fragmentation allowing only rare nodes of intense industrial development enveloped in a largely wild matrix. Remove and restore anomalies. Establish large PAs and indigenous and community conserved areas. Secure indigenous knowledge and livelihoods.*

Table 32 The Three Global Conditions, Summary Statistics

	Cities and farms	Shared landscapes	Large wild areas	Whole world
Distribution of land	17.7%	55.7%	26.5%	100.0%
Distribution of human population (2015)	75.2%	24.7%	0.1%	100.0%
Percent of area protected	5.8%	14.4%	24.4%	15.5%
Distribution of key biodiversity areas	10.5%	64.9%	24.6%	100.0%
Food calories produced by farming and ranching	72.0%	27.8%	0.3%	100.0%
Percent global area under indigenous management or tenure	7.8%	48.6%	43.6%	100.0%
Average number of vertebrate species per 100 km^2 area	228.9	193.3	102.3	175.0
Average number of threatened vertebrate species per 100 km^2 area	6.9	5.6	3.3	5.2
Median forest aboveground biomass carbon density, tonnes/ha	13.2	40.1	36.8	33.5
Median soil organic carbon density, tonnes/ha	45.8	42.7	53.0	45.8

This model is quite similar to the SACA model presented in the previous chapter and incorporates the idea of spatial ecological planning. The ALPARC map of the SACA distribution within the EUSALP area is based on the potential for ecological connectivity, revealing where this potential is limited by human activities and presence. In this sense, it consistent with the model of Locke at an Alps-wide level. C1 corresponds to SACA 3; C2 to SACA 2 and C3 to SACA 1.

The SACA simulation gives an indication of the distribution of the Alpine natural sites with a high ecological connectivity potential. The Locke model confirms the SACA approach. Thus, the SACA simulation can be considered as a main tool for further spatial and ecological planning in the Alpine area.

The planning of a spatial protection system of the Alps depends on several criteria: ecological representativity to protect the real existing biodiversity; extension and surface of possible areas to ensure the minimal required home ranges of species; altitudinal distribution to consider the biological habitat needs of the species; connectivity potential to guarantee the migration of species for their gene exchange. … and, last but not least, the feasibility – with the presence of open spaces as a potential for a zoning allowing establishment of areas with different functions and protection conditions.

(ALPARC 2022)

The importance of dealing not only with the territories of the protected areas PAs themselves but also with their surroundings delivers another important indication stressed by several authors, such as William Laurence in *"Avoiding a Fatal Future". (Envision 2050: The future of protected areas | Ensia)*

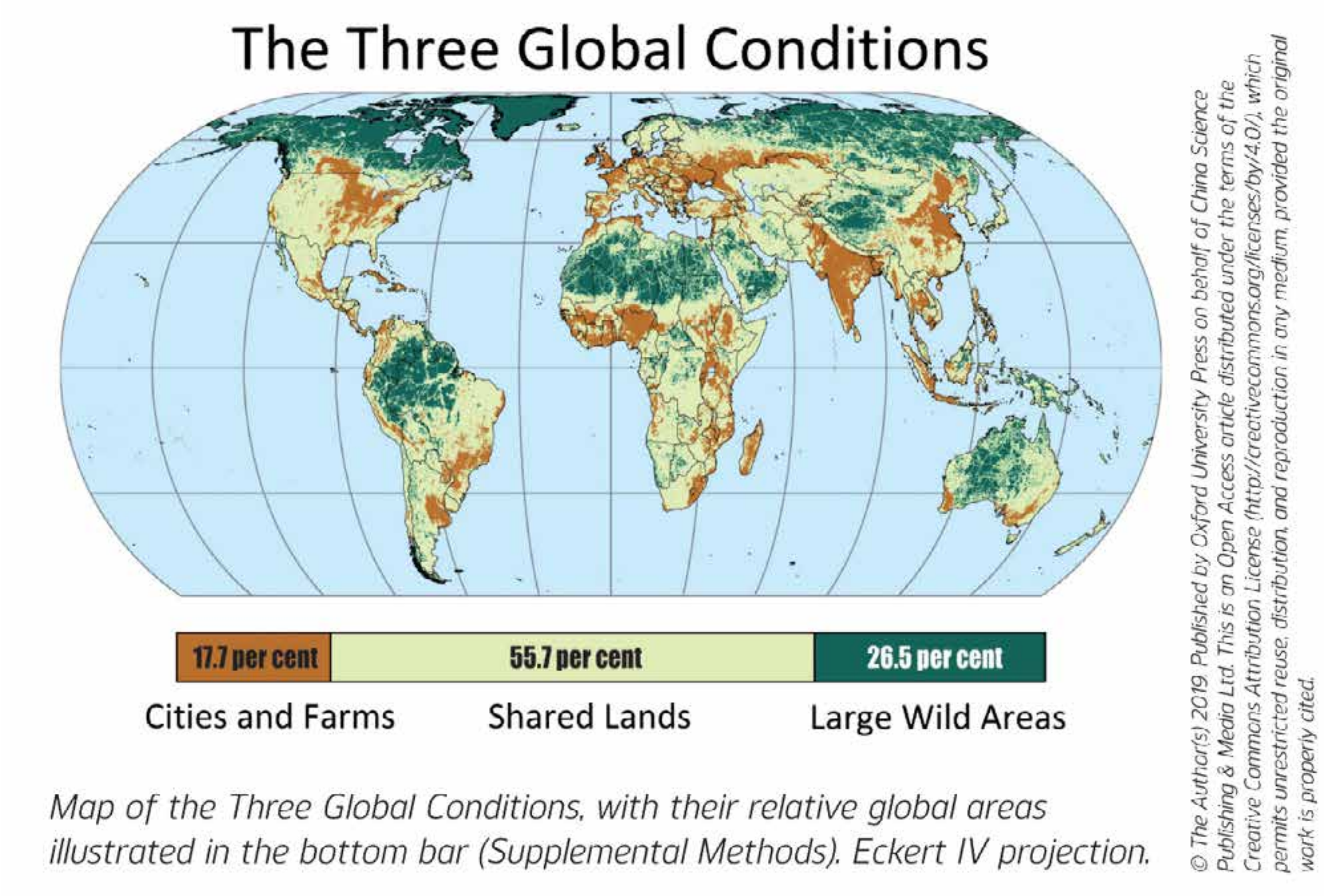
He claims that "protected areas and their biodiversity are intimately connected to their surrounding landscapes. If the habitats surrounding a reserve are trashed — as often happens — then the perils of isolation take over. Species are cut off from life-giving immigration and gene flow or are persecuted when they stray beyond the margins of reserves. Local extinction is a frequent result. …Hence, we can't simply set aside nature reserves and forget about their surroundings.… We need protected areas to be as big as possible, because bigger reserves are more resistant to outside threats. We should also establish buffer zones around reserves to help shield them from hostile surrounding land uses; and we must stop reserves from becoming isolated wherever possible, by maintaining substantial reserve connectivity to other forested areas…".

As in the Alps, it will be unlikely that many strong protected areas will be created. So, it is crucial that the aspects of **zoning** (buffers), efficient **emplacement within hotspots of biodiversity** and having a **strong potential of connectivity** are considered when thinking about spatial ecological planning and the establishment of new protected areas.

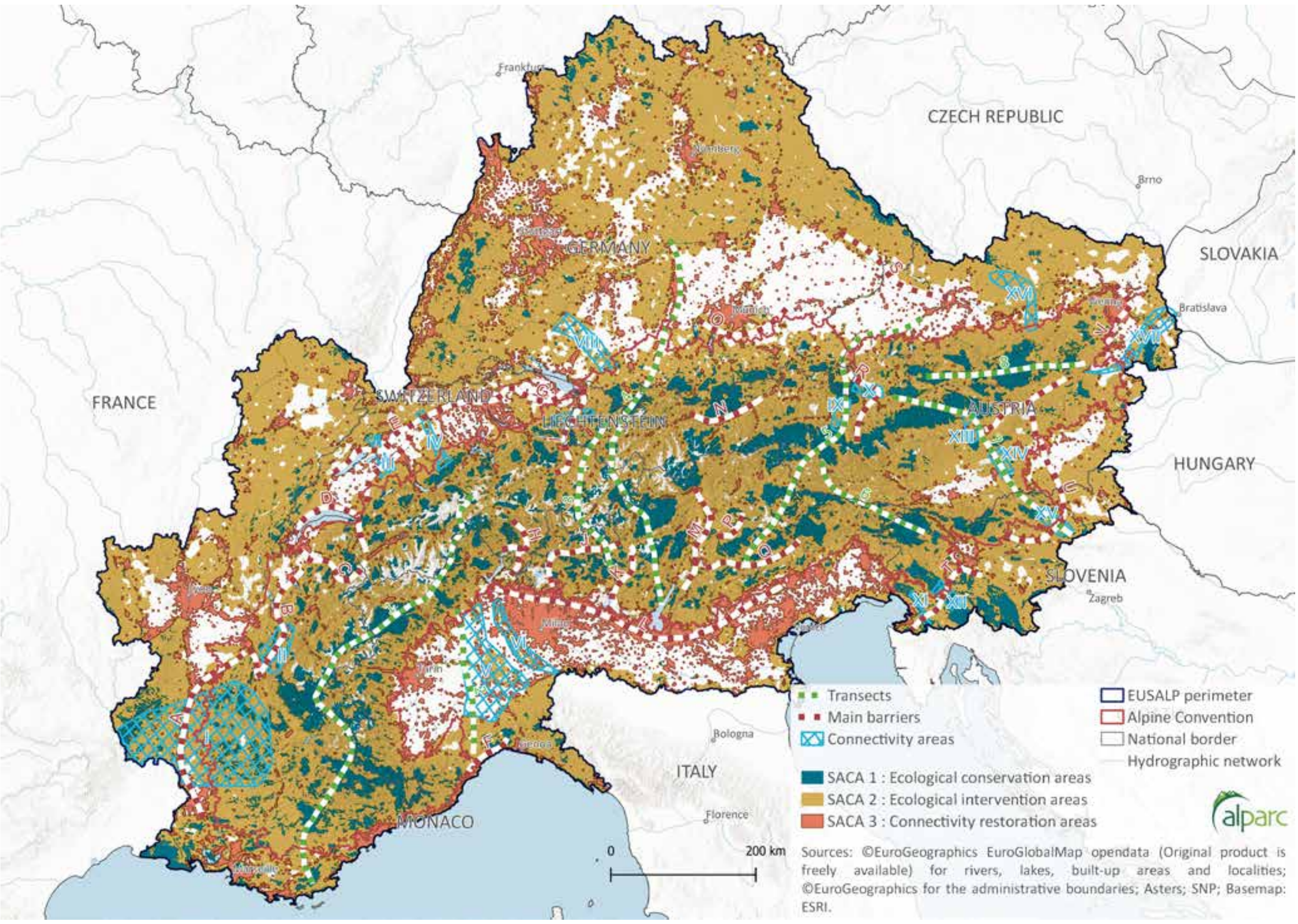
If Alpine biodiversity is to be conserved for future generations, we must broaden our scope beyond the default of focusing mainly on isolated area and spaces with low land use conflict.

This means that a more strategic distribution of protected areas with different functions should be considered. An Alps-wide planning of zones dedicated to different land-uses including the potential for a modern protected area system could be the key to more biodiversity protection and a higher quality of life for Alpine inhabitants.

Map 97: Protected Area Management and Framework Conditions



Map 98: Super SACAs in the EUSALP Macro-Region



F.5.2

TOWARDS A NEW CATEGORY OF PROTECTED AREAS?

"Our Park" Concept

In the light of the new governance and participation models, local or regional initiatives can lead to creation of protected areas. Even if they are not officially recognised in the early stages, the sometimes be accepted and consolidated at a later stage. This is what happened in at least two Alpine examples – the Slovenian Landscape Park Logarska Dolina and the German/Austrian Nature park Nagelfluhkette. Parks created by locals and local municipalities can elicit a very strong local sense of identification with the region and conservation values if important stakeholders and parts of the population are involved at the outset.

The task is difficult and will not always lead to success with the eventual creation of a more or less protected territory nor to official recognition by the competent national or regional authorities. Nevertheless, it is a very interesting option for local participation, responsibility and governance in the Alpine territories and should be further developed by all Alpine countries as a voluntary and local form of the management- especially in areas that are facing the simultaneous need for well-organised touristic development and the limitation of impacts of different tourist and sporting activities.

Regional or national recognition has often been successful after a period of demonstrating the sustainability of the initiative.

Local stakeholders see the regional protected areas as an asset that helps the region and its development. The main drivers should be the conservation of intact landscapes that attract tourism and the (re)establishment of a local identity.

Success factors important for the acceptance of such regional protected areas or parks are very closely linked to the identification of the local population with a formal or informal structure that helps to build a local or regional landscape or other protected area. This requires a cooperative management style, local integration of the protected area, joint projects and initiative, diverse and flexible forms of cooperation, and permanent information exchange in formalised and informal ways.

Investments in such parks should be perceived as investments in the region by local, regional and national authorities. They can also contribute as research sites to identify new and sustainable ways for rural regional development especially in times of multiple, escalating crises (climate, biodiversity, health crisis…).

A new park model, under the working title "Our Park", could be an innovative approach for the Alps to strengthen the involvement of local populations and stakeholders in a common and collaborative territorial project. Taking responsibility for one's own living place and region is a milestone towards a more respectful attitude towards nature and its resources.

F.5.3

COOPERATION BETWEEN PROTECTED AREAS

Protected areas have been cooperating since 1995 with the creation, by France, of the Alpine network of Protected Areas (ALPARC) in the framework of the Alpine Convention. Since more than 25 years, this network has fostered exchange of knowledge, development of common management procedures and projects as well as concrete activities on the ground.

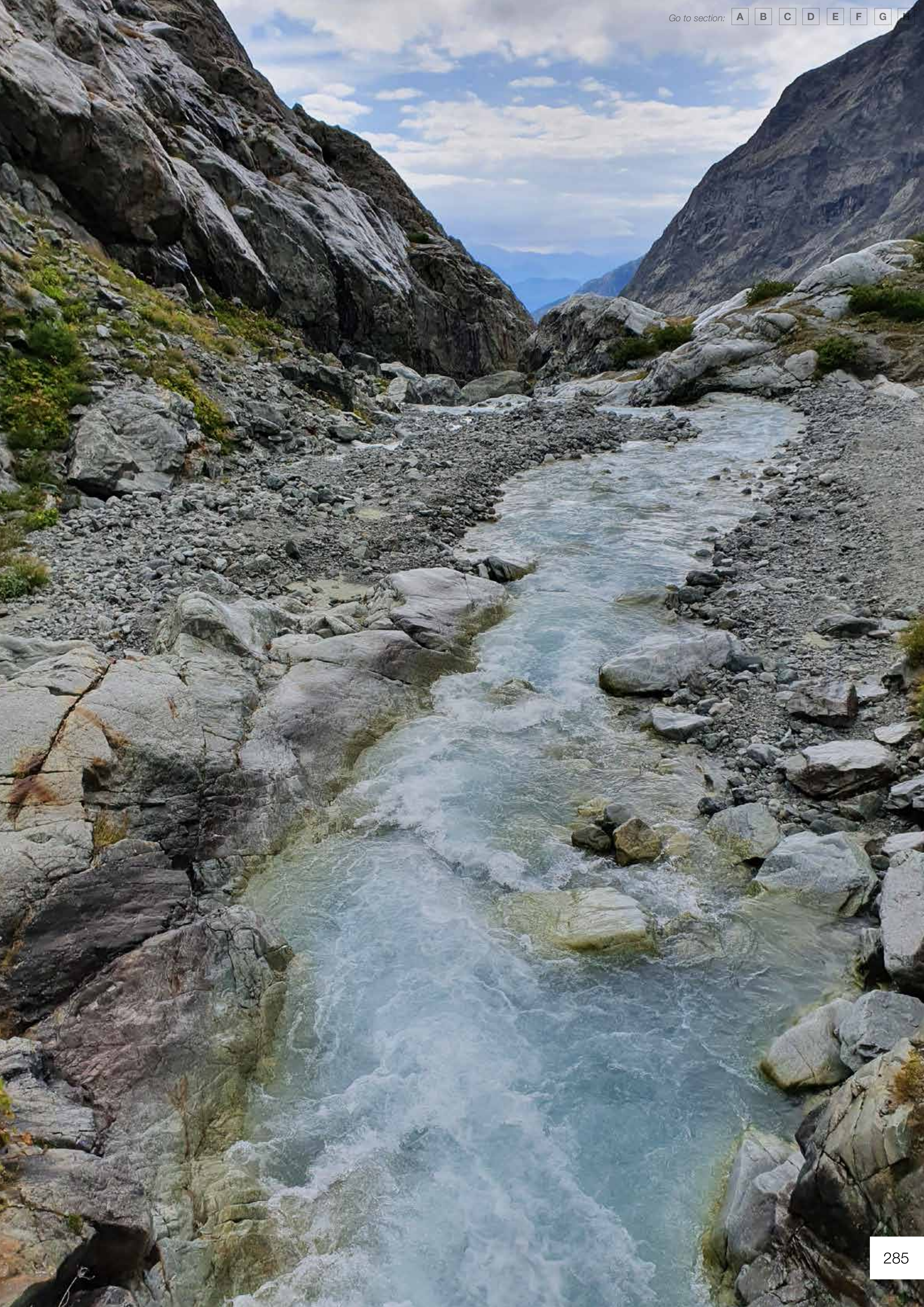
Remaining challenges include greater harmonisation of management goals between Alpine protected areas to be more efficient in biodiversity and habitat protection and the realisation of the spatial network with the establishment of a real ecological connectivity between protected areas of the Alps.

F.5.3.1

HARMONISATION OF MANAGEMENT GOALS

The harmonisation of Management goals, as described in the preceding chapters, remains a major challenge for the coming years. It could be facilitated by the Alpine Convention competent bodies, such as the Alpine Biodiversity board, to implement the convention in a more concrete manner.

Some internationally ratified conventions, like the Bern Convention, give another framework for this objective. Indeed, one of its aims is to harmonise national legislation for conservation.



One general problem is the multitude of differing categories of protected areas. Often these areas are overlapping, and it should be investigated if zoning within one category could provide a better solution. This might also help to reduce the number of different levels of responsibility and institutions involved.

A clear definition of zones and the attribution of IUCN categories and, as a complementary step, the attribution of Alp-wide categories agreed upon by all Alpine states, would be a significant step toward allowing a more targeted policy and more concrete measures to preserve biodiversity and to protect habitats from destruction, fragmentation and pollution of any kind.

The stronger integration of Natura 2000 sites and all the other protected areas within the Alpine network would create more "stepping-stones" between core habitats of the Alpine ecological network. This could also include smaller protected areas, such as forest reserves, which are often established in France and Austria.

So far, the Natura 2000 network and the Alpine protected areas represent two parallel worlds that do not follow an integrated approach, with the exception of Natura 2000 sites included in existing protected areas. This probably leads to a loss in efficiency of resource allocation and finally biodiversity conservation.

A minimum harmonisation of protection and management goals and procedures could be achieved between protected areas within the Alpine Network of Protected Areas by creating a specific work group with thematic sub-groups. The process should be followed up by the Alpine biodiversity board of the Alpine Convention. A pre-condition is the validation of such a process by all the Environmental Ministries of the Alpine States and, if possible, a specific mandate to proceed with the technical support of ALPARC.

F.5.3.2

COMMON BORDERS/ TRANSBOUNDARY PROTECTED AREAS

A stronger cooperation between transboundary protected areas has been proposed and claimed for many years. In some situations, it actually exists officially, as in the case of the French Mercantour National Park and the Italian Alpi Marittime Nature park. A common management structure has even been created (EGTC).

In case of a common border of the protected area, an intensive cooperation and common management in monitoring the existing species populations, common rules for visitors and harmonised objectives of the conservation's goals should be a standard. If no common border exists, but the distance between two protected areas is close, the definition of wildlife corridors and a general improvement of ecological connectivity should be established.

To strengthen this cooperation and plan common actions, a compulsory common management board is helpful in at least some aspects of both (or more) protected areas and allows a better coordination of activities and appropriated measures to reach the parks' objectives.

A common management plan approved by the official bodies of both protected areas on either side of a national border should be a goal of all protected Alpine areas in this geographical situation. It would also represent a strong sign of European cooperation in the field of biodiversity and a concrete implementation step for the Alpine Convention.

F.5.3.3

COMMON MANAGEMENT

A common management would be the ultimate step for a complete international cooperation. This doesn't require a common management of all the territories of the protected areas but rather the management of common projects, activities, and measures to achieve a higher degree of biodiversity protection in the Alps.

We believe this would be the logical "last" step to complete the harmonisation of management goals and objectives and a strengthen common coordination of transboundary protected areas as described in the two previous chapters.

Protected areas play an outstanding role in the conservation of Alpine natural and cultural heritage – on the one hand regarding protection and management strategies (nature, know-how, natural and cultural heritage, cultures) and on the other hand regarding economic development strategies that deal with tourism, mountain agriculture and forestry.

For the protection and management strategies of biodiversity, a closer cooperation would be ideal to develop strategies for a permanent exchange of experiences and for the success of specific measures.

Many Alpine protected areas not only have **a common territorial identity, but they also share joint values.** That is why a great number of them have already been working together for more than two decades in the ALPARC Alpine Network of Protected Areas in order to coordinate their efforts and share their experiences and know-how.

ALPARC is committed to protecting Alpine living spaces. Through the exchange of knowledge, experience and methods, the Alpine Network of Protected Areas contributes to ensuring that future generations can enjoy and appreciate the beauty and diversity of the Alps - for humankind and nature, today and in the future.

In order to further strengthen the international cooperation leading to a common management of central questions and measures for biodiversity protection, the National Parks, nature parks, protected nature areas, biosphere reserves, UNESCO World Natural Heritage sites, geological reserves and administrative bodies in charge of protected areas represented in the ALPARC Alpine Network of Protected Areas must be considered as an integral part of future-oriented nature conservation. Their significance for the conservation of the Alpine natural and cultural heritage must be acknowledged on all political levels.

After a general harmonisation of management goals and procedures and a stronger cooperation of transboundary protected areas, a specific Alps-wide board, within the ALPARC network and politically framed by competent instances of the Alpine Convention, could regularly give recommendations and launch activities for a common protection of biodiversity and habitats for the Alpine population and visitors of tomorrow.

But… nature protection cannot be delegated only to protected areas, and nature conservation must not stop at the protected area borders. Nature protection goals can only be achieved if adequate protection is guaranteed all over the Alps, including beyond protected areas. The significance of networking between protected areas and with concerned local and regional stakeholder must thus be acknowledged on all political levels, and the protected areas administrations must extend their activities beyond the protected area borders in an intermediary and networking manner and must receive the necessary political support to do so. This also includes means for the operability of common management in the field of biodiversity and nature protection.

F.6

THE MAP OF THE ALPINE PROTECTED AREAS NETWORK 2030

Based on the analysis covered in the previous chapters, we want to develop in this last part of the report an exhaustive vision of what the protected area network 2030 could and should be and what role it will have in the Alps. This vision will be based on the data and information gathered in this report and will be illustrated by maps.

We will construct this future vision using results from other projects we have been involved in, such as OpenSpaceAlps, ALPBIONET2030 and data and experiences collected during the more than 25 years of Alps-wide cooperation between the Alpine protected areas within the ALPARC network.

Several maps will show priorities and locations where more spatial protection should take place based on the spatial distribution of protected areas and their connectivity potential. These maps can also be used for further planning by environmental protection institutions all over the Alps. A zoning approach will be proposed as a guide for discussion at an Alps-wide scale. It is evident that this is only a first step for a new spatial protection policy in the Alps, and local situations must be verified, adapted and planned in detail.

F.6.1

THE ROLE OF THE ALPINE NETWORK OF PROTECTED AREAS 2030

In addition to the recognised missions and functions of protected areas, the future will require that protected areas embrace broader functionalities and ecosystem services than we are currently accustomed to (e.g., the health mission of protected areas will be crucial in the future). This recognises concerns about human health and the hypothesis that healthy ecosystems seem more resistant to parasites and pests. With the protection of large areas for species diversity, the potential for zoonotic virus impact is reduced. Protection of biodiversity and its habitats can prevent disease events affecting humans. Health for nature and health for humans - This is the **One Health** approach and a primary ecosystem service

Ongoing climate change calls for modified protection goals in the form of larger protected areas, networks of biotopes, and strengthening of natural dynamics and processes. Implementation of adaptation strategies, such as the development of ecological corridors that better address species migration patterns affected by increasing temperatures, must also be facilitated.

The recreational function of protected areas will play an important role in the coming years and will place further pressure on sensitive ecosystems. Better zoning and sufficient staff on the ground will be increasingly important.

Economic and cultural functions will also play a role in the future for the protected areas and their inhabitants. **New forms of governance** and activities compatible with the area and the needs of locals will have to be developed or adapted. However, the protection of nature and conservation of species will remain the protected areas' primary function.

In a world that is increasingly threatened by destruction of nature and loss of biodiversity, awareness that nature is the basis of human and planetary well-being dictates that the need for protection will only grow. Protected areas, especially those with a **clear protection mission** equipped with rules and regulations and means to implement and apply them, must be a central element of Alpine environmental and nature protection strategies and political decisions.

Alpine protected areas and Natura 2000 sites will play a progressively more vital role as core areas for threatened species' habitats if fragmentation and intensive land use in lower and mid-altitudinal Alpine regions continues. With climate change, mountain lakes, rivers, wetlands, and peats as well as their habitats are threatened and increasingly vulnerable to any form of pollution by human activities. Protected areas, including wetlands or areas having the function of wetland protection, will carry more weight in the Alpine protected areas system in the coming decades.

F.6.2

SCENARIOS OF A FUTURE PROTECTED AREA NETWORK

The cornerstones for the development of these scenarios are the elements that have been identified in this report as essential for protected areas to function effectively in defence of biodiversity and habitat protection.

We identified these elements for the Alpine protected areas:

1. Physical features of protected areas: surface, altitudinal distribution of the protected surface, connectivity potential
2. Status and management relevant features: protection status, staff, resources for the management
3. Representativity of the protected areas regarding biodiversity

While features 1 and 2 are measurable, the evaluation of the representativity of protected areas for biodiversity was limited within this report for an Alps-wide approach. As a main data base, the key biodiversity areas have been integrated in the analysis. We are, nevertheless, aware that their significance within the Alpine context is limited. This illustrates why more coordinated monitoring of Alpine biodiversity is needed to achieve an overall picture of the situation and its evolution. ALPARC is currently working on a specific proposal for an Alps-wide monitoring approach to address this gap in the future.

In order to establish a vision for the protected areas landscape 2030, the data concerning the above-mentioned characteristics have been analysed statistically (multifactorial analysis).

The procedure and methodology will be explained in the following pages.

PROCEDURE

We have employed the following criteria and data sources concerning the different features of the protected areas:

1 - Protected Areas Surface

Protected areas from the ALPARC database of Alpine protected areas, the World Database of Protected Areas – WDPA, the Natura 2000 and Emerald Network areas.

2 - Topography

Indicator obtained from the combination of altitudinal segments and slope. The values were classified as follows:

TOPO=0.5 * value altitude + 0.5 * value slope

Value altitude

Altitude	Value
< 1,000	100
1,000 – 1,500	80
1,500 – 2,000	60
2,000 – 2,500	40
> 2,500	20

Value slope

Slope	Value
< 30º	100
30 - 40º	80
40 - 45º	60
> 45º	40

3 - Connectivity Potential

The connectivity potential was measured according to the classification of the Strategic Alpine Connectivity Areas – SACA from the ALPBIONET2030 project.

4 - Protection Status

The protection status has the same data sources as the surface criteria. However, the feature measured in this criterion is the category of protection, the values assigned for each category are described in the following table:

Category	Value
IUCN I	100
IUCN II	80
Strong protection without IUCN I and II[1]	60
IUCN V and other protected areas	40
No protection status	0

[1] This signifies IUCN III and IV as well as other protected areas considered in the APA system of ALPARC as strong protected areas, such as numerous Italian nature parks.

5 - Open Spaces

The level of spatial development indicator obtained from the OpenSpaceAlps allows the identification of the remaining natural and semi-natural spaces. The following table illustrates the values assigned for the calculation:

Level of spatial development	Value
0 - 10	100
10 - 20	80
20 - 30	60
30 - 50	40
> 50	20

6 - Key Biodiversity Areas

Key biodiversity areas database: this indicator was not classified into different categories but was only measured in terms of presence or absence.

7 - Management and Staff

The management is a key criterion in the analysis of protected areas. However, there is no dedicated and available data about this subject. The management was, therefore, measured in terms of presence or absence. The presence of a managed protected area was made by a selection of categories (National Parks, Natural / Regional parks, Biosphere reserves UNESCO, World heritage UNESCO and some Nature reserves, which have a management structure established).

These criteria have been adapted to the given data situation and have been iteratively aggregated and synthesised to make the analysis technically feasible and as logical as possible with the available information. The goal was to aggregate and use these criteria to give an image of the current situation of the Alpine protected areas system **and of Alpine regions worthy of protection, including landscapes presenting the necessary potential features for successful biodiversity conservation.**

The approach and data aggregation processes are described in the following methodological explanation. It is evident that other approaches and other weight given to the different criteria would generate different results. Nevertheless, we are convinced that the overall trend and relevance of the results is reflected in this analysis.

The analysis takes place in three steps: **the first one identifying and explaining the current situation of the main features of the protection system of the Alps**, with all categories, and levels of protection combined and a **second step,** defining a simulation with "improved" indicators of the same criteria used as in the first step to present **possible changes in an Alpine protected areas strategy 2030 for a future scenario of the Alpine protected areas landscape**. The second step is a projected scenario that is more or less realistic depending on the political will and the evolution of trends in the society, economy and the environment including the evolution of climate change that will influence Alpine biodiversity and its distribution within the Alpine area.

Finally, as an important decision was taken in December 2022 by the COP 15 Biodiversity in Montreal, we developed **a third step to specifically analyse the potential of strong protected areas in the Alps to achieve the 30% goal of "effectively conserved and managed areas"**.

METHODOLOGY

STEP 1

The first step of the mapping process entails five phases. The first of these phases consists of the identification of criteria (see pages above) and subsequently the linked indicators to better analyse the current general situation of the Alpine protected area system.

The final map from the first step is the result from different trials elaborated to obtain a visualisation that aggregates the performance regarding the defined criteria inside the surface covered by the EUSALP space. Each stage is explained in detail to illustrate the limitations in terms of data availability, measurability, and relevance. The results have then been defined for the Alpine Space to be more pertinent for the analysis of the Alpine protected area system.

One of the main limitations of the chosen data sources was the redundancy among the different layers that were being combined to obtain the first simulation. This issue led us to build a second simulation. Instead of using the result of the calculation of two different indicators (Alpine protected areas – Natura 2000), the second simulation uses a combination of both indicators giving more weight to the surface values of the Alpine PA than to the Natura 2000 sites.

However, the problems of redundancy persisted as the layer Management, which was built through a selection of protection categories, was relatively similar to the protection status criteria and did not contribute meaningfully to the calculation process.

Another issue was related to the use of the KBA layer: as identified on the third phase of the analysis, when removing the KBA layer and the Management layer (but mainly due to the removal of the KBA layer), the number of potential areas of high biodiversity increased. This is probably because the KBA layers are not complete and are based on insufficient data for all Alpine regions. To better take this circumstance in account, we conducted a two-phase analysis: 1) Calculating with the criteria of surface, topography, connectivity, development level (expressed by the remaining open spaces) and the protection status, 2) Joining the data for the KBA and the management aspects to the output of phase 1 to be more precise concerning the interpretation of the results.

Finally, analysing the results from these intermediary simulation phases, a new modification was required concerning the surface criteria: although both criteria of surface and level of protection were included in the analysis, it became evident that it is also important to define the surface not only in terms of quantity but also in terms of quality (level of protection). For this reason, both criteria have been integrated into one single indicator expressing both the extent of the protection area and its protection level according to the IUCN and ALPARC criteria.

However, the layer open space is often redundant in protected areas with a high protection status. This is not always the case with less protected areas since, especially in inhabited protected areas, infrastructure and settlements mean that they do not meet the criteria of open space with a spatial development under 10%. For this reason, we integrated this layer in the analysis and particularly considered the criterion "spatial development" under 10% as a complementary aspect for areas with a high potential for biodiversity protection. Nevertheless, we only assigned a low weight to this criterion so as not to amplify the significance of the protection status compared to other criteria.

The evolution over four test phases of improvements of the indicator system leads to a final system of indicators (phase 5) of four central and well-balanced criteria for the analysis (see Annex H.5 for the intermediary simulations).

Phase 5 – Final model integrating the Protection scope

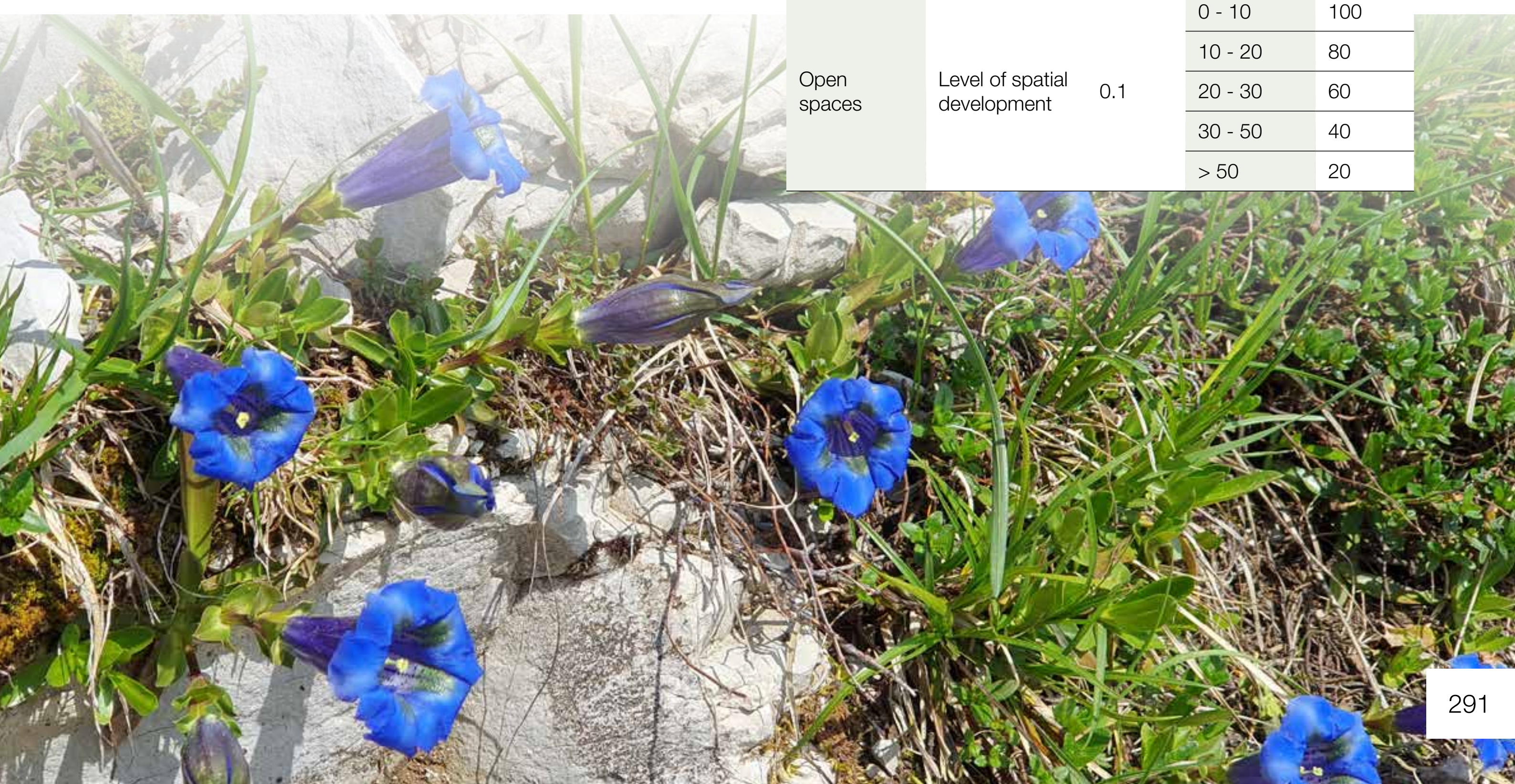
The previous maps of the different test phases (see Annex H.5) have shown a lack of interpretation, mainly for the large protected areas, as the protection level has been evaluated independently from the surface. However, it is crucial to directly link the level of protection to the surface of a protected area as the Alps contain very large protected areas with a very low protection level. To consider both criteria independently throughout the Alpine space does not produce the same result as merging both criteria into one with the same weight for the indicator (50% of the criteria surface value and 50% for the criteria protection level).

The combination of the surface and protection status creates a common indicator called the "protection scope" - this indicator overcomes the limitation of the surface indicator as a relatively large surface covered by a protection status should be differentiated by its level of protection.

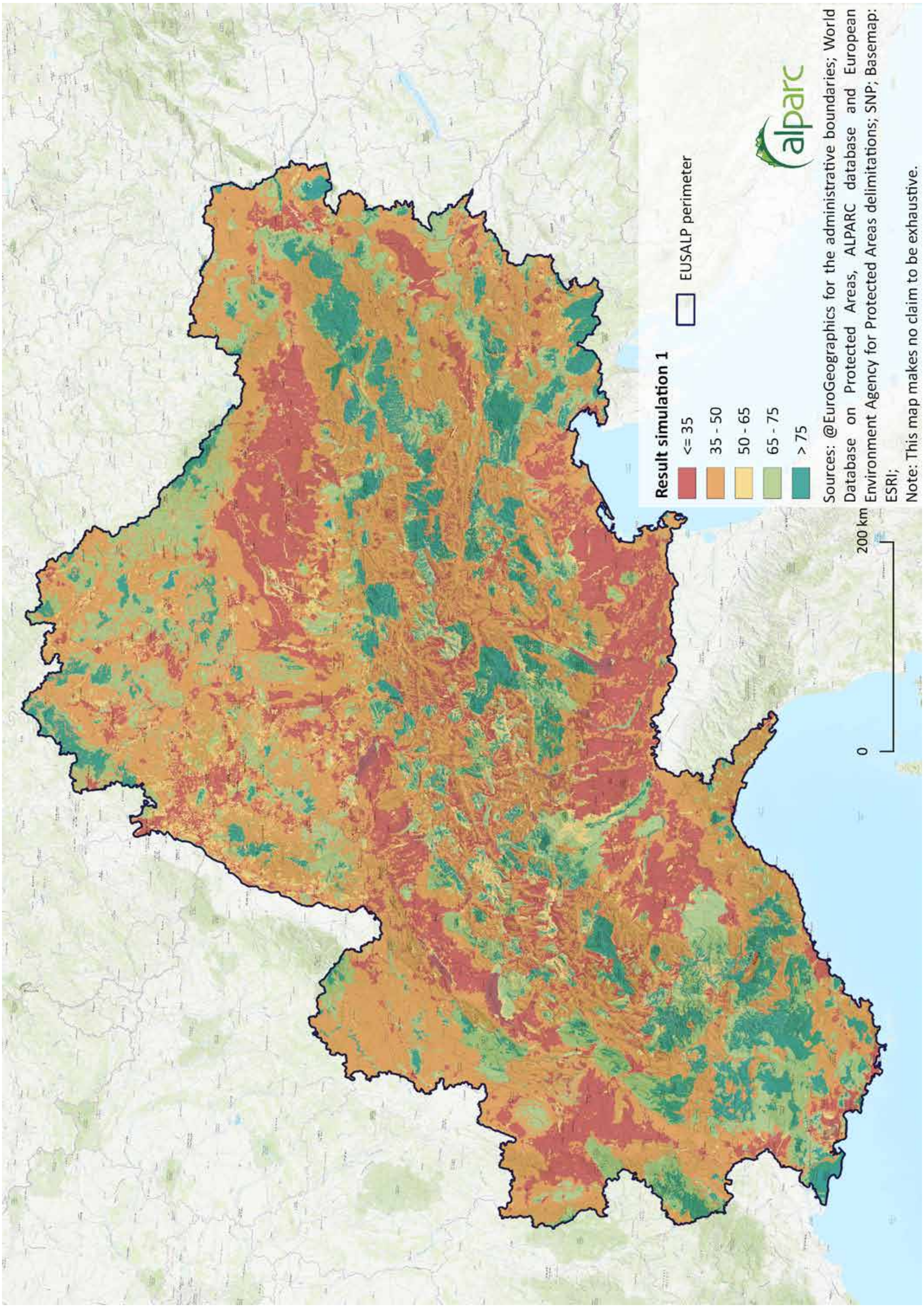
The integration of this indicator allowed us to build a **new model** for the calculation. This model is now built according to four final criteria summarised in the table below.

Table 33: Classification Scheme of Simulation 4

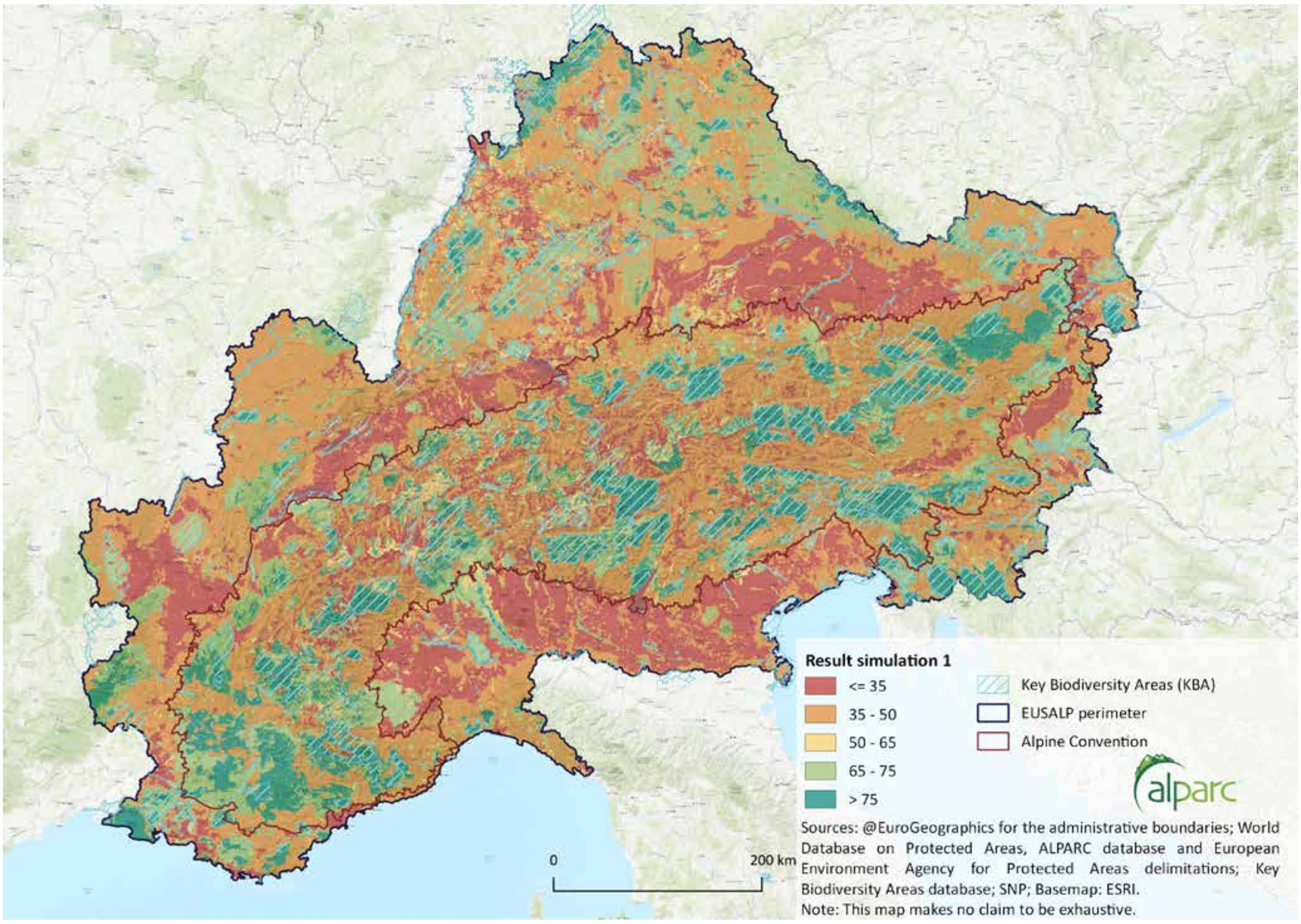
Criteria	Indicator	Weight	Class indicator	Class value
Protection scope	(Value protection status * 0.5) + (Value surface*0.5) [1]	0.45	Max	100
			Min	0
Topography	TOP= 0.5* value altitude + 0.5 value slope	0.3	Max	100
			Min	30
Connectivity	SACA	0.15	SACA 1	100
			SACA 2	50
			SACA 3	40
			Not classified	0
Open spaces	Level of spatial development	0.1	0 - 10	100
			10 - 20	80
			20 - 30	60
			30 - 50	40
			> 50	20



Map 99: Final Results of Step 1



Map 100: Comparative Analysis of Step 1 - Results and Key Biodiversity Areas



To better illustrate the results and to be more precise in the differentiation of the analysed features of the Alpine areas, five classes have been created for these final results of the first step.

The results show a distribution of more than 28% of well adapted (cat. 65-75% + cat. >75%) sites for nature protection in the EUSALP area – either already protected or having a high potential for protection.

Table 34: Value Distribution EUSALP

EFA[1]	EFA surface km²	% Distribution of EFA within the EUSALP surface
<=35	87,653	19.8%
35-50	203,626	46.0%
50-65	24,457	5.5%
65-75	75,243	17.0%
>75	51,642	11.7%

For the Alpine Convention perimeter, this rate climbs up to more than 38% (cat. 65-75% + cat. >75%), 10 points more than for the whole EUSALP area. This is not surprising knowing that the main biodiversity potential and natural spaces are located within the Convention area.

The inner Alpine area contains almost all the large National Parks of the EUSALP. The exceptions are the National Parks outside the Alps: German Bavarian Forest and the Black Forest National Park, the Austrian Taya Tal, Donau Auen and Neusiedler See (Seewinkel) National Parks. The National Park Cinque Terre, Italy can be considered as more of a coastal, cultural park not of crucial signification for the EUSALP territory with respect to biodiversity.

Table 35: Value Distribution Alpine Convention

EFA	EFA surface km²	% Distribution of EFA within the Alpine Convention surface
<=35	21,617	11.3%
35-50	85,316	44.7%
50-65	10,830	5.7%
65-75	35,551	18.6%
>75	37,675	19.7%

Concerning the presence of the KBA, more than half of these areas are situated in the ecologically favourable areas (EFA) or potentially intact zones of the EUSALP (64.6%). However, 23.8% are in less favourable areas with insufficient protection for their biodiversity.

[1] Ecological Favourable Area.

Table 36: Value Distribution KBA (EUSALP territory)

EFA	KBA surface km²	% Distribution of KBA's surface within the EFA (EUSALP)
<=35	2,780	4.1%
35-50	15,966	23.8%
50-65	4,996	7.5%
65-75	18,972	28.3%
>75	24,341	36.3%

For the Alps, the situation for the KBAs is even more favourable, and the rate of redundancy with the ecologically most favourable (EFA) areas of the Alps is considerably higher- reaching more than 50% for the highest (>75%) value and 22% for the next value (65-75%). And it is significantly lower for the less favourable areas, which is statistically logical as the most favourable areas are located within the Alpine Convention perimeter.

Table 37: Value Distribution KBA (Alps and Periphery)[1]

EFA	KBA surface km²	% Distribution of KBA's surface within the EFA (Alps)
<=35	1,065	3.0%
35-50	6,393	18.3%
50-65	1,905	5.5%
65-75	7,675	22.0%
>75	17,906	51.2%

Comparison of the overlay between protected areas and KBA:

Table 38: All Categories Compared to Weak and Strong Protected Areas (Alps)

Alpine Protected Areas	APA[2] surface Km²	Overlay KBA	% Coverage
Alpine protected areas	54,356	19,700	36%
Strong protected areas	18,425	13,361	73%
Weak protection	35,932	6,963	19%

The presence of KBA within strong protected areas is especially significant- representing 73% of their territory. There is a clear difference relative to the weaker protection spaces, which seem to be less representative for biodiversity. However, because the knowledge about biodiversity is better in strong protected areas, such as National Parks, it is likely that this fact contributed to their designation as KBAs and, therefore, to a higher concentration of KBAs in strong protected areas relative to weaker ones.

[1] As some protected areas are at the interface between the Alpine Convention perimeter and the EUSALP area, here we consider the Alps and its "immediate" periphery.

[2] Alpine Protected Areas.

What is the distribution of different protected area types and levels within the categories of the "Ecological Favourable Areas" (EFA)?

The following analyses show how many percent of the existing **protected areas** are situated in the ecologically best situated areas:

1 - All categories:

Table 39: Value Distribution Alpine Protected Areas (Alps and Periphery)[1]

EFA	APA surface km²	% Distribution APA surface within the EFA (Alps)
<=35	149	0.2%
35-50	843	1.4%
50-65	6,993	11.4%
65-75	25,849	42.2%
>75	27,406	44.8%

For this analysis, we used the database of ALPARC including the protected areas of the Alps and its periphery as they have a direct influence on Alpine biodiversity either as protected zones at the interface between the Alps and the EUSALP area or in a role of "stepping-stones" towards the Alpine periphery. The overall distribution of protected areas resulting from Step 1 is very high in the ecologically positive areas as would be expected (87%).

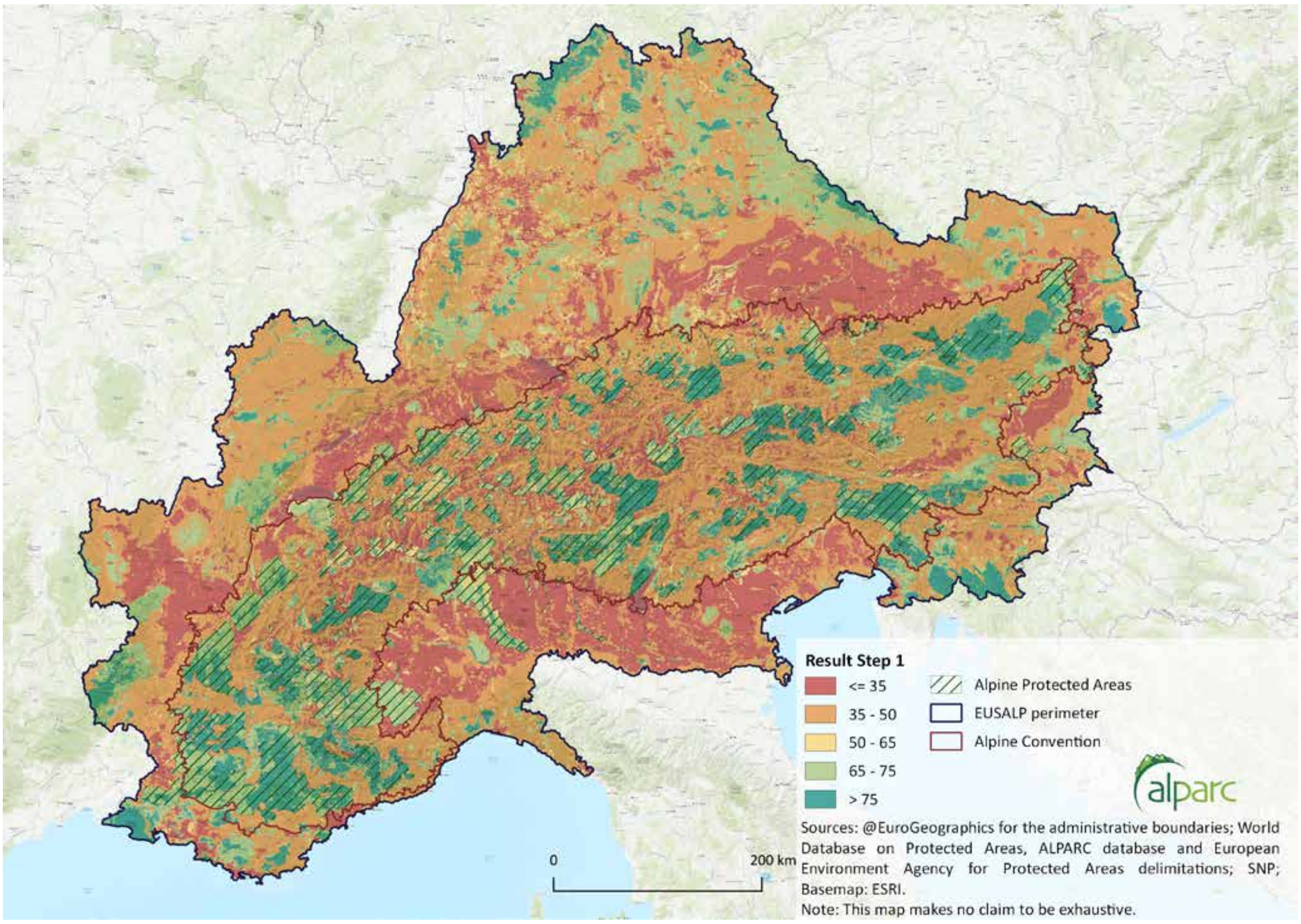
2 - Strong protected areas:

Table 40: Value Distribution for Strong Protected Areas (Alps and Periphery)

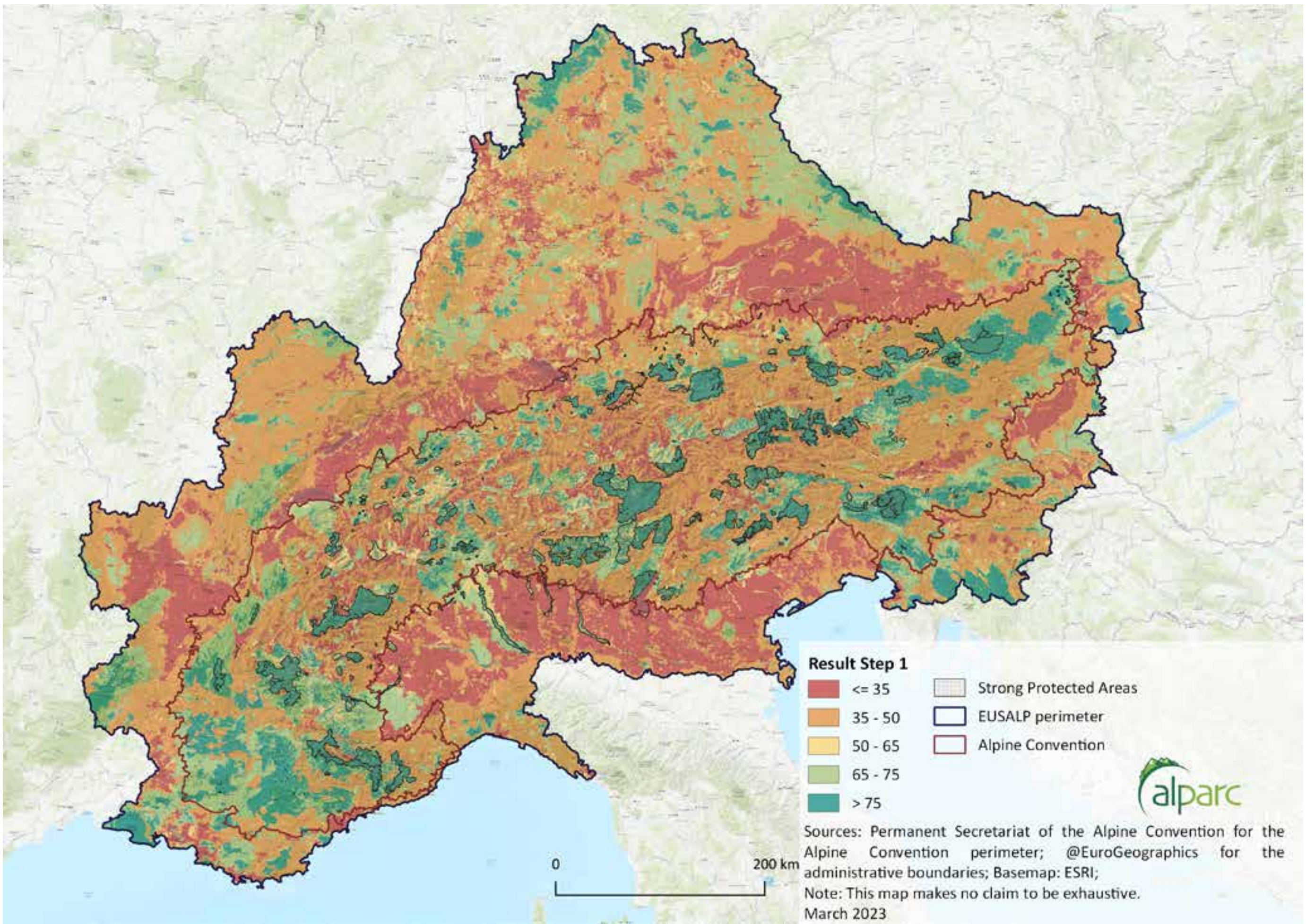
EFA	Strong APA surface km²	% Distribution of strong APA within the EFA (Alps)
<=35	31	0.2%
35-50	119	0.6%
50-65	1,119	5.8%
65-75	3,035	15.8%
>75	14,922	77.6%

For the strong protected areas, this value climbs to 93.4% and demonstrates the relevance of the criteria chosen for this analysis. Strong protected areas are almost absent in the ecologically less favourable Alpine areas, and they are minimally represented in the middle class of 50-65% of "ecologically adapted areas" (5.8%). Probably, these low rates reflect peripheral areas of strong protected areas, infrastructures or other land use forms crossing or being situated in those strong protected areas.

Map 101: Comparative Analysis of Step 1 - Results and Alpine Protected Areas



Map 102: Comparative Analysis of Step 1 - Results and Strong Protected Areas



3 -National Parks:

Table 41: Value Distribution for National Parks (Alps and Periphery)

EFA	National Parks surface km²	% Distribution of NP within the EFA (Alps)
<=35	1	0.0%
35-50	4	0.1%
50-65	60	0.8%
65-75	342	4.8%
>75	6,667	94.2%

The distribution of the National Park territories over the different classes shows the strongest value (more than 90%) for the ecologically best class, which is to be expected since the criteria value of protection and surface are high for this protection category in our analysis, and the open space and connectivity criteria reach very good values for this protection category. Only the topography criteria may be a limiting factor as two-thirds of the National Park surfaces in the Alps are located, as previously discussed, above 2,000 m a.s.l. This element may account for the 4.8% and the remaining almost 1% in the classes 65-75% and 50-65% respectively.

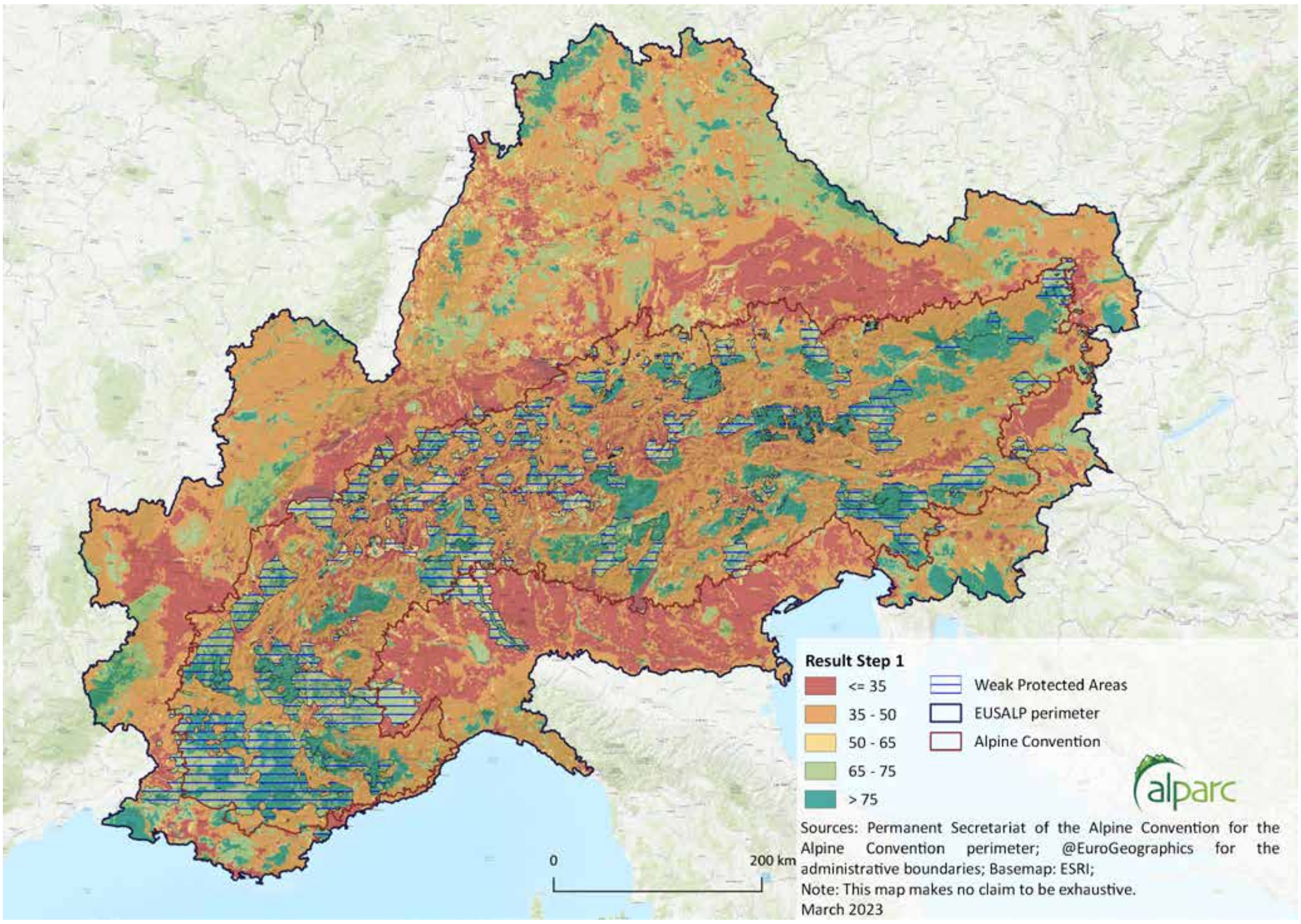
4 - Weak protected areas:

Table 42: Value Distribution for Weak Protected Areas (Alps and Periphery)

EFA	Weak APA surface km²	% Distribution of weak APA within the EFA (Alps)
<=35	118	0.3%
35-50	723	1.7%
50-65	5,874	14.0%
65-75	22,814	54.3%
>75	12,484	29.7%

These values of the preceding three tables can be confirmed by considering the results of the weak protected area distribution. Here, we still have very positive values of the highest classes (84% together) as those areas mostly still have a certain protection status and are often very large in surface, which means that the protection scope reaches a good value. In general, they also have a more equilibrated distribution over all the different altitudinal levels. Nevertheless, due to the lower protection status and lower values for the criterion open space - as many of those areas are inhabited – their distribution over the different classes is, ecologically speaking, less favourable, and the highest value (> 75%) is only represented by less than a third of the results.

Map 103: Comparative Analysis of Step 1 - Results and Weak Protected Areas



5 - Natura 2000 sites

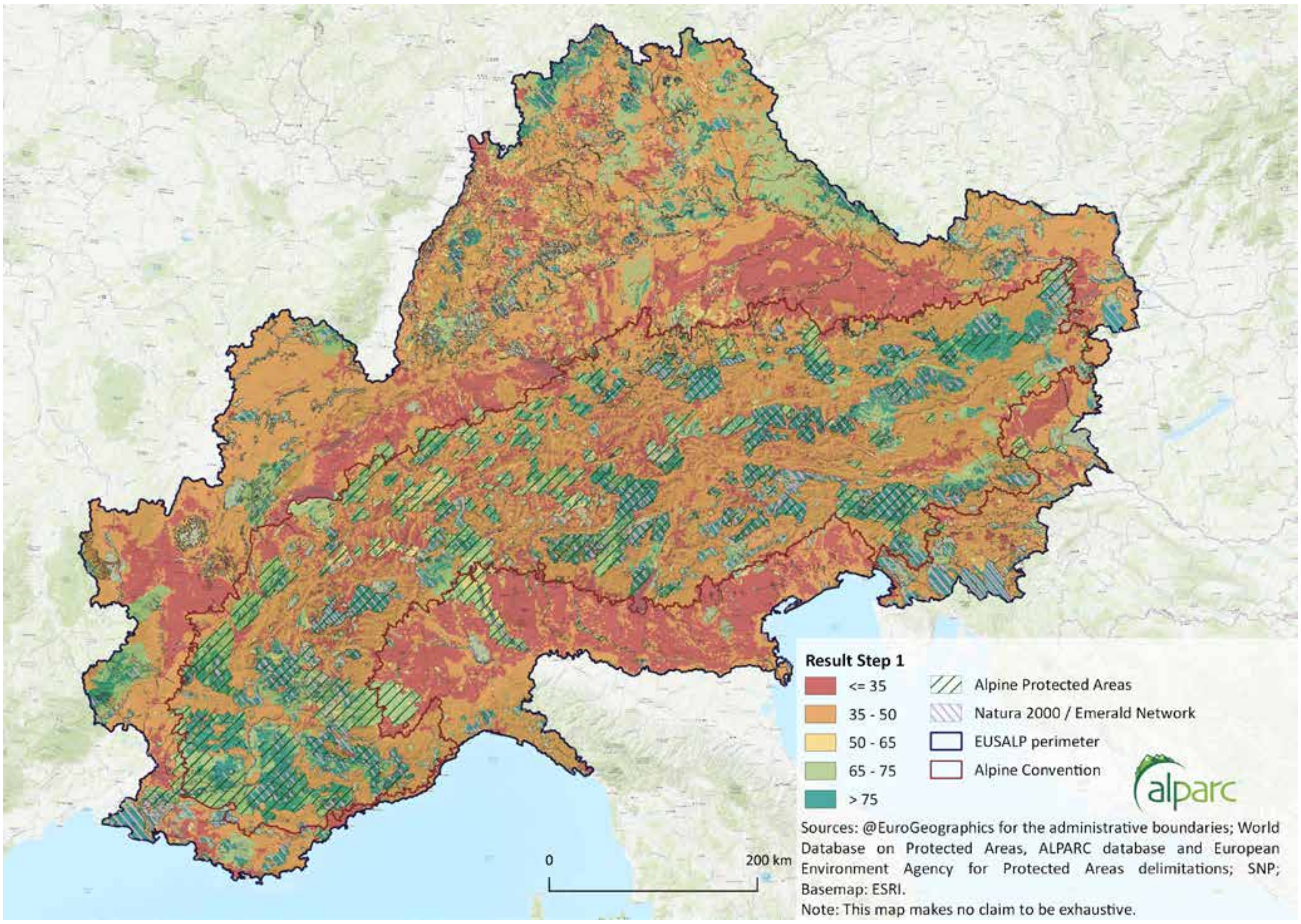
Natura 2000 sites have a very special role in this analysis. They are not, technically speaking, protected areas but are managed areas, and their protection can be a management measure as well a sustainable form of land use. They also reflect a certain ecological interest in biodiversity[1]. In the Alps, they overlap significantly with existing protected areas. Their distribution across the EUSALP territory is steadily increasing within ecologically valuable spaces. The highest representation is reached for the value >75%. This is not surprising considering the redundancy with the protected areas and good distribution at different altitudinal levels with relatively low fragmentation impact (open space, connectivity). We considered the distribution here for the EUSALP area because Natura 2000 sites are often important as ecological stepping-stones between both perimeters, especially at the regional interface between the Alps and the EUSALP territory where strong protected areas are generally lacking.

[1] Refer as well to Step 3 of this analysis.

Table 43: Natura 2000 and Emerald Network Distribution (EUSALP)

EFA	Natura 2000 surface km²	% Distribution of Natura 2000/Emerald within the EFA (EUSALP)
<=35	195	0.3%
35-50	1,517	2.1%
50-65	10,300	14.3%
65-75	27,733	38.5%
>75	32,247	44.8%

Map 104: Comparative Analysis of Step 1 - Results, Natura 2000 - Emerald Network and Alpine Protected Areas



WHICH TYPE OF PROTECTED AREAS COMPOSE EACH CATEGORY?

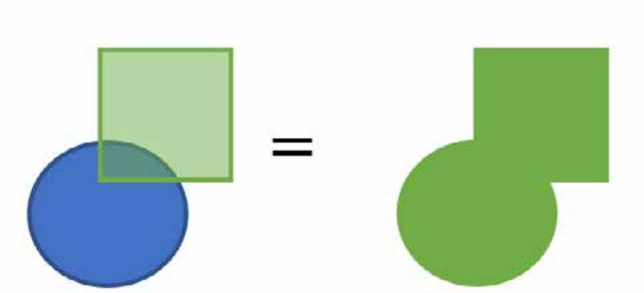
The following analysis shows how the different categories and protection levels (results of Step 1) are composed by the existing protected areas and indicates their surface (and %) of the corresponding category located exclusively inside the Alpine Convention perimeter:

The analysis includes different nature protection categories, the Tables (44 – 46) summarise the distribution between the different range of values at first separately, by each categorisation (Natura 2000, Emerald Network, Alpine Protected Areas[1] by ALPARC and IUCN) and in a further table summarising the distribution of all categories without distinction. This step was made to demonstrate the high redundancy between the categorisation and how a wider perspective combining them all together can enhance identification of more potential zones for biodiversity.

Natura 2000 sites play a key role in the composition of the ecologically favourable classes of the Step 1 analysis. Nevertheless, the very high redundancy with the protected areas must be considered– at least in the surface dimension of their impact within the Alpine protected areas system.

As there is high redundancy between the Tables 44 and 45 (many protected areas are also Natura 2000 sites), we devised another approach considering the overall surface of all protected areas and Natura 2000 sites. Using several available databases, we excluded this redundancy by combining all the surfaces regardless of the protection status to avoid double counting the surface of areas covered by different categories:

Scheme of dissolving redundancies of polygons (QGIS)



The consideration of all protected areas categories including Natura 2000 without redundancies lead to the following figures:

The table 46 indicates that the highest value (>75%) is almost completely composed of protected areas of all categories as we can see in Table 45 (71.4% without Natura 2000 and further protected areas from the WDPA database including areas <100 ha). This result is expected as the criterion "protection scope" used in the multifactorial analysis is rated with 45%. Nevertheless, the other three criteria together are weighted for 55% (topography, connectivity, and open space), and this may explain the important results for the categories 50-65 and 65-75 (see table 33).

[1] APA data bank of ALPARC.

Table 44: Natura 2000 – Emerald Network – Surface Inside the Alpine Convention Perimeter

		Natura 2000 - Emerald Network			
EFA	**Total AC surface km²**	**Distribution by category km²**	**% (Natura 2000 per EFA category)**	**Area not covered by Natura 2000**	**% (Natura 2000 per EFA category)**
<=35	21,617	38	0%	21,579	100%
35-50	85,316	538	1%	84,778	99%
50-65	10,830	3,914	36%	6,916	64%
65-75	35,551	11,027	31%	24,524	69%
>75	37,675	23,167	61%	14,508	39%

Table 45: Alpine Protected Areas – Surface Inside Alpine Convention

		Alpine protected areas (ALPARC Database)							
EFA	**Total surface in the AC km²**	**Alpine protected areas in km² (APA)**	**% (APA per EFA category)**	**Strong protected APA in km²**	**% (strong APA per EFA category)**	**Weak protected APA in km²**	**% (weak APA per EFA category)**	**Not covered by APA**	**% (of not covered EFA categories by any APA)**
<=35	21,617	85	0.4%	19	0.1%	66	0.3%	21,532	99.6%
35-50	85,316	598	0.7%	111	0.1%	487	0.6%	84,718	99.3%
50-65	10,830	5,469	50.5%	952	8.8%	4,517	41.7%	5,361	49.5%
65-75	35,551	21,305	59.9%	2,634	7.4%	18,671	52.5%	14,246	40.1%
>75	37,675	26,898	71.4%	14,708	39.0%	12,190	32.4%	10,777	28.6%

High redundancy between protected areas and Natura 2000 sites

Table 46: Protected Areas - ALPARC Database, WDPA Database, Natura 2000 and Emerald Network - Surface Inside the Alpine Convention Perimeter

		Protected areas of all categories and different data bases*			
EFA	**Total AC surface km²**	**Distribution protected areas in km² by EFA category**	**% (APA + Natura 2000 + Emerald per EFA category)**	**Not covered by any protected areas**	**% (of not covered EFA categories by any PA's)**
<=35	21,617	171	1%	21,446	99%
35-50	85,316	1,306	2%	84,010	98%
50-65	10,830	10,204	94%	626	6%
65-75	35,551	32,343	91%	3,208	9%
>75	37,675	36,246	96%	1,429	4%

** The protected areas included on the calculation concern different databases and protection categories that do not necessarily imply the application of strict and effective nature protection measures. A non-exhaustive list of the categories is available in Annex H.10.*

*** This situation of a coverage of 96% of the highest category should not mask the fact that only 39% of areas with the very best ecological potential for biodiversity (refer Table 45) receive strong protection – there is room for significantly more engagement and protection of biodiversity!*

Interpretation of the Current Situation

The multifactorial analysis and its geographical representation (Maps) show the areas presenting the most favorable combination of the following indicators: degree and surface of protection, over a maximum range of altitudinal levels and with a high degree of non-fragmented areas (SACA 1) that are relatively free from human activities (open space).

The importance of strong protected areas related to significant overlap with the KBAs in the highest category (KBA 50% and 73% of the strong protected areas - see Tables 37 and 38) is confirmation of the gap analysis of chapter II. The ecologically most valuable and best protected spaces are a combination of surface, protection status, altitudinal distribution, and connectivity criteria with a very low presence of infrastructure or settlements (open space).

It was not possible in this analysis to identify precisely and individually the weight of each of these criteria in different Alpine situations and areas. Neither has it been possible to attribute concrete biodiversity and ecological values to the analysis and Alpine regions. For this reason, the KBA have been used as an aggregated and recognised data set.

The analysis shows that there is still potential, especially in the category 65-75%, for a 9% improvement of the protection situation (all categories combined) and 4% in the highest category (Table 46). There is also potential to better protect biodiversity as shown in Tables 36 and 37. The KBA surface for the Alps (37) shows that only 51% (51,2) are in the highest category, and more than one fifth (21,2) are in the two lowest categories. This represents a great opportunity to improve the protected area system.

The overall distribution of the different EFA categories shows that, for the Alps, 38.3% achieve the highest value (Table 35) – but the overall surface of officially protected areas in the Alps is 10 points less at 28.5% (Table 57). Here, potential exists to provide protection status for zones that seem interesting for the future of Alpine ecosystems and biodiversity.

Other interesting figures include the 78% (77,6) of strong protected areas situated in the highest category (Table 40), which seems logical considering the weight of surface and protection status ("protection scope") that has been given to the analysis, but only 39% of this category is composed of strong protected areas (Table 45). The rest is composed of other forms of protected areas. This is also a topic with potential.

Finally, although the management criterion could not be integrated in the statistical analysis due to an inadequate data situation, we consider it important since managed protected areas have a larger impact through various measures as described in Chapter 2, and this feature of protected areas should be considered. In the Alps, 15% or less of all protected areas over 100 ha have their own management structure. Here lies another valuable opportunity for improvement.

We will proceed in Step 2 with simulations integrating the results and conclusions made during the analysis of Step 1.

STEP 2

To elaborate proposals to improve the situation, we proceed by changing some of the parameters of the different criteria to situations that should be more favourable for the protection of biodiversity. In the first step, we try to improve the situation with the following changes:

Simulating new situations with the same criteria but by optimising them for nature/biodiversity protection:

1 - Changing parameters that can be affected by political or management decisions

Protection scope

- Covering all KBAs with a protection status (IUCN without cat. I and II = Value 60)
- Extending the surface of the three strongest protection categories by 10% (I, II and Strong protection status)[1]
- Creating or extending wilderness sites inside all National Parks and nature reserves with a surface above 50 km² up to areas with a 10 km diameter

Topography

- Not modified

Connectivity

- Simulating a change of SACA 1 in Connected areas (the SACA 1 areas are connected in this simulation by SACA 2)

Open Space

- Not modified

[1] This indicator can be summarized as follows: Extending surface of all strong protected areas (IUCN cat I/II – Italian Nature parks and Nature reserves) by 10%.

2 - The Management situation of protected areas

Any change in management will not modify the overall result as no indicators concerning this aspect have been included – This criterion will be discussed based on the results of the simulation of Step 2.

RESULTS

Three tests were conducted to visualise which improvements could create a major impact on the current situation of the Protected Area Network. The following maps and tables concern the results from the first simulation, which implies more investment in the Protection scope and the connectivity, and that served as the basis for the elaboration of the scenarios. The results obtained for the other simulations are available in the Annex H.6.

Testing different improvements – Simulation 1

Table 47: Modified Simulation - Increasing Overall Protection Scope and Connectivity

Criteria	Indicator	Modifications	Weight
Protection scope	Protection status	KBA with a protection status (Value=60)	0.45
		Increasing the surface by 10% of the three strongest protection categories (I, II and Strong protection status)	
	Surface	Extending all cat. I / II and Nature reserves in 10% of size	
		Extending wilderness sites inside all National Parks and Nature reserves with a surface above 50 km² by 10% in size	
Topography	Elevation and slope	Not modified	0.3
Connectivity	SACA	Replacing SACA 1 by Connected areas	0.15
Open spaces	Level of spatial de-velopment	Not modified	0.1

Map 105: Increasing Overall Protection Scope and Connectivity – Simulation 1

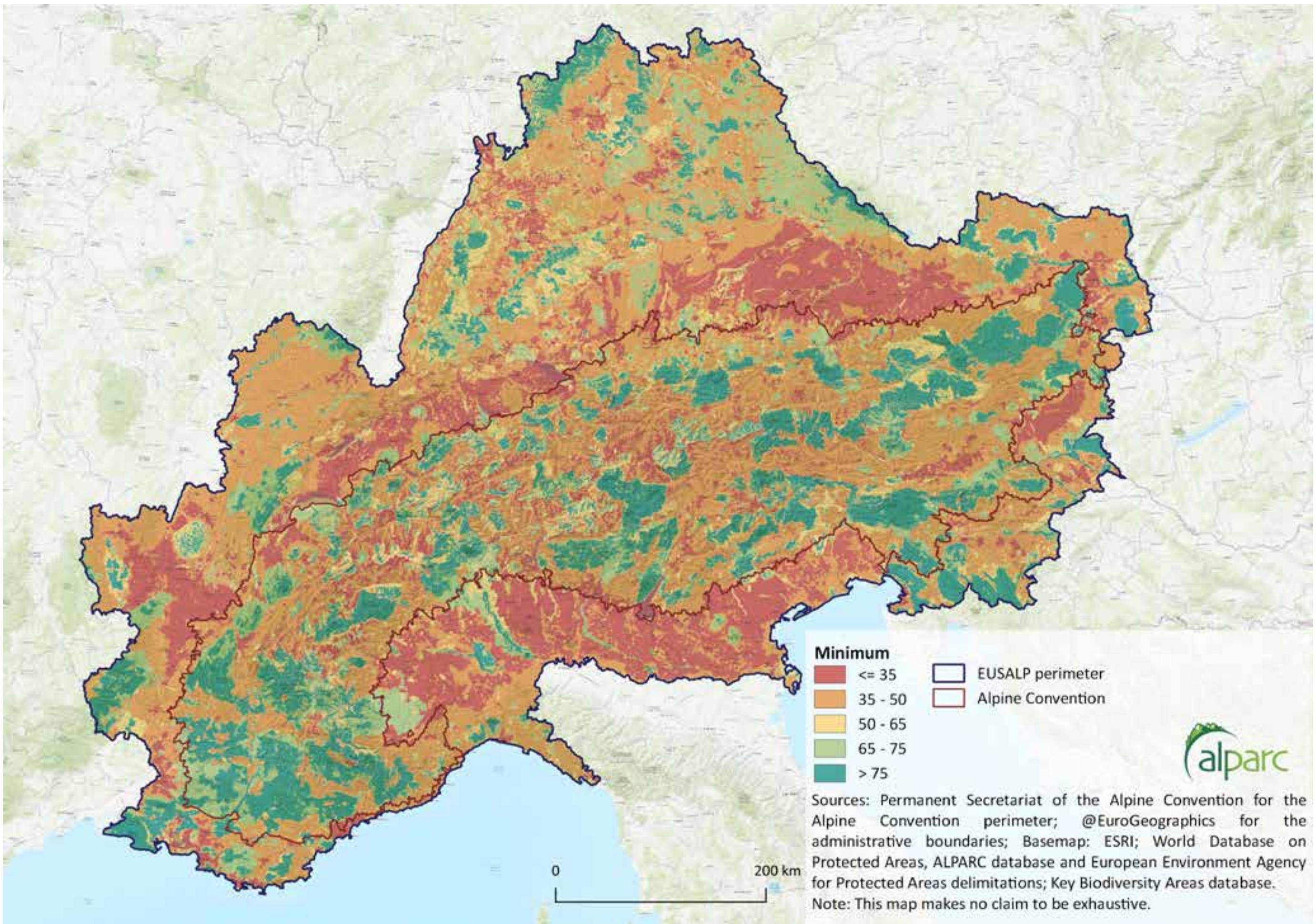


Table 48: Value Distribution Among EUSALP – Step 2 Simulation 1

EFA	EFA Surface km²	% Distribution of EFA within the EUSALP surface
<=35	81,490	18.4%
35-50	186,685	42.2%
50-65	43,595	9.9%
65-75	59,792	13.5%
>75	70,749	16.0%

Table 49: Value Distribution Among Alpine Convention – Step 2 Simulation 1

EFA	EFA Surface km²	% Distribution of EFA within the Alpine Convention surface
<=35	19,110	10.0%
35-50	77,539	40.6%
50-65	18,377	9.6%
65-75	28,830	15.1%
>75	47,133	24.7%

The improvement of all these indicators of the chosen criteria creates a better outlook for the Alpine biodiversity protection especially for the highest category. Nevertheless, the overall change is not that significant.

Two more simulations with modified values were conducted: one (simulation n°2) by taking only one indicator from both of "protection scope" criteria – the one promising stronger effect in change of the protection situation of the areas considered ecologically valuable: (KBAs with a protection status: Value = 60) / (Extending all cat. I / II and Nature reserves in 10% of size) and a second simulation (simulation n°3) by taking each of the estimated weaker indicators of the criterion "protection scope": (Increasing the surface by 10% of the three strongest protection categories: I, II and Strong protection status) / (Extending wilderness sites inside all National Parks and Nature reserves with a surface above 50 km² in 10% of size) (see Annex H.6).

The results of both these simulations - striving to improve the situation with less investment in measures - are positive for the simulation n°2 and n°3 (almost no changes in the highest categories 65-75% and > 75% of the Alpine Space) .

Generally speaking, the results are not different enough from each other to be meaningful and do not show an important change, with the exception of simulation 1, which shows an improvement of 5% for the category >75 relative to the current situation (Step 1). For the category 65-75%, the value decreased from 18.6% in the current situation (Step 1) to 15.1% in the most optimistic simulation of a future scenario (Step 2).

This can be explained by the fact that most measures have been taken based on already well protected and ecologically favourable areas. The increase of four points for the highest category within the Alpine space supports this interpretation.

These results suggest that, with conservative measures, an appreciable improvement is not achievable. To really change the biodiversity conservation situation of the Alps we need bold and courageous measures:

If a real improvement of the current situation is the goal for 2030 and beyond, it is necessary to act on larger spaces. A significant extension of the surfaces of existing strong protected areas must be considered, and it is very important to provide meaningful protection status for currently weak protected areas.

This protection status may not always need to be a very strong protection, like that for a national park or a nature reserve. **But providing no protection is not an option if we want to improve the state and the future of Alpine biodiversity**. For all those regions currently covered by a protection status yet not being effectively protected (so called weak protection, which is mostly no protection), special measures should be considered (special regime).

The following series of simulations for 2030 is mainly based on both criteria (extent and protection level of protected areas).

After these considerations and evaluations of the results of the first simulation for 2030 above, we will now proceed to a stronger proposal for improvement of Alpine biodiversity protection for the next 10 years in order to make biodiversity conservation for generations to come an Alpine reality:

1. The increase of the 10% rule is a minimum option.
2. We suggest an increase of respectively 20% and 25% of the strong protected surfaces for effective long-term protection of biodiversity to better address the goal of the 30% of protected areas (Montreal 2022) with a reasonable protection status.
3. Using the term "protection" only for what is effectively protected will be a fundamental change of paradigm in Alpine conservation policies.

The concrete scenarios of this final simulation for improving the protection of biodiversity in the Alps 2030 are the following ones:

1 - Minimum scenario

- Increase of **10%** of all protected area categories considered as strong protection (IUCN I, II, nature reserves, Italian nature parks) according to IUCN and ALPARC definitions
- Providing a protection status to all KBAs (simulation value 60)
- Changing the SACA 1 (ecological connectivity) areas in connected areas

2 - Medium scenario

- Increase of **20%** of all protected area categories considered as strong protection (IUCN I, II, nature reserves, Italian nature parks) according to IUCN and ALPARC definitions
- Providing a protection status to all KBAs (simulation value 60)
- Changing the SACA 1 (ecological connectivity) areas in connected areas

3 - Optimum scenario

- Increase of **25%** of all protected area categories considered as strong protection (IUCN I, II, nature reserves, Italian nature parks) according to IUCN and ALPARC definitions
- Providing a protection status to all KBAs (simulation value 60)
- Changing the SACA 1 (ecological connectivity) areas in connected areas
- Providing a **protection status to all weak protection** areas including protected areas smaller than 100 ha from the WDPA Database (simulation value 60)

To really differentiate between the results of the three scenarios, we have opted for a very strong "optimum" scenario including all protected areas – as well those sites smaller than 100 ha from the WDPA.

In these simulations, we no longer included the creation or extension of Wilderness sites in all National Parks and nature reserves more than 50 km^2 with a diameter of 10 km.

While this last measure is certainly a very interesting point for the biodiversity effect, it is not visible on the maps since it is almost always found in the highest category of >75%. Another difficulty of this measure for the simulation is that it is not possible to geolocate. All the other indicators of the different categories in the simulations are geolocated on the maps.

Nevertheless, we consider this measure as very important for the protection of biodiversity as it increases the category Ia and b of the IUCN in the Alpine space and would constitute important refuges for threatened species in an increasingly stressful environment (climate change, human pressure).

THE NEW SCENARIOS SIMULATION SHOWS THE FOLLOWING RESULTS:

1 - Minimum scenario

Table 50: Value Distribution Among EUSALP - Minimum

EFA	EFA surface km²	% Distribution of EFA within the EUSALP surface
<=35	81,490	18.4%
35-50	186,685	42.2%
50-65	43,595	9.9%
65-75	59,792	13.5%
>75	70,749	16.0%

Table 51: Value Distribution Among Alpine Convention - Minimum

EFA	EFA surface km²	% Distribution of EFA within the Alpine Convention surface
<=35	19,110	10.0%
35-50	77,539	40.6%
50-65	18,377	9.6%
65-75	28,830	15.1%
>75	47,133	24.7%

2 - Medium scenario

Table 52: Value Distribution Among EUSALP - Medium

EFA	EFA surface km²	% Distribution of EFA within the EUSALP surface
<=35	81,367	18.4%
35-50	183,416	41.5%
50-65	26,841	6.1%
65-75	62,468	14.1%
>75	87,958	19.9%

Table 53: Value Distribution Among Alpine Convention - Medium

EFA	EFA surface km²	% Distribution of EFA within the Alpine Convention surface
<=35	19,113	10.0%
35-50	76,240	39.9%
50-65	12,116	6.3%
65-75	30,087	15.8%
>75	53,435	28.0%

3 - Optimum scenario

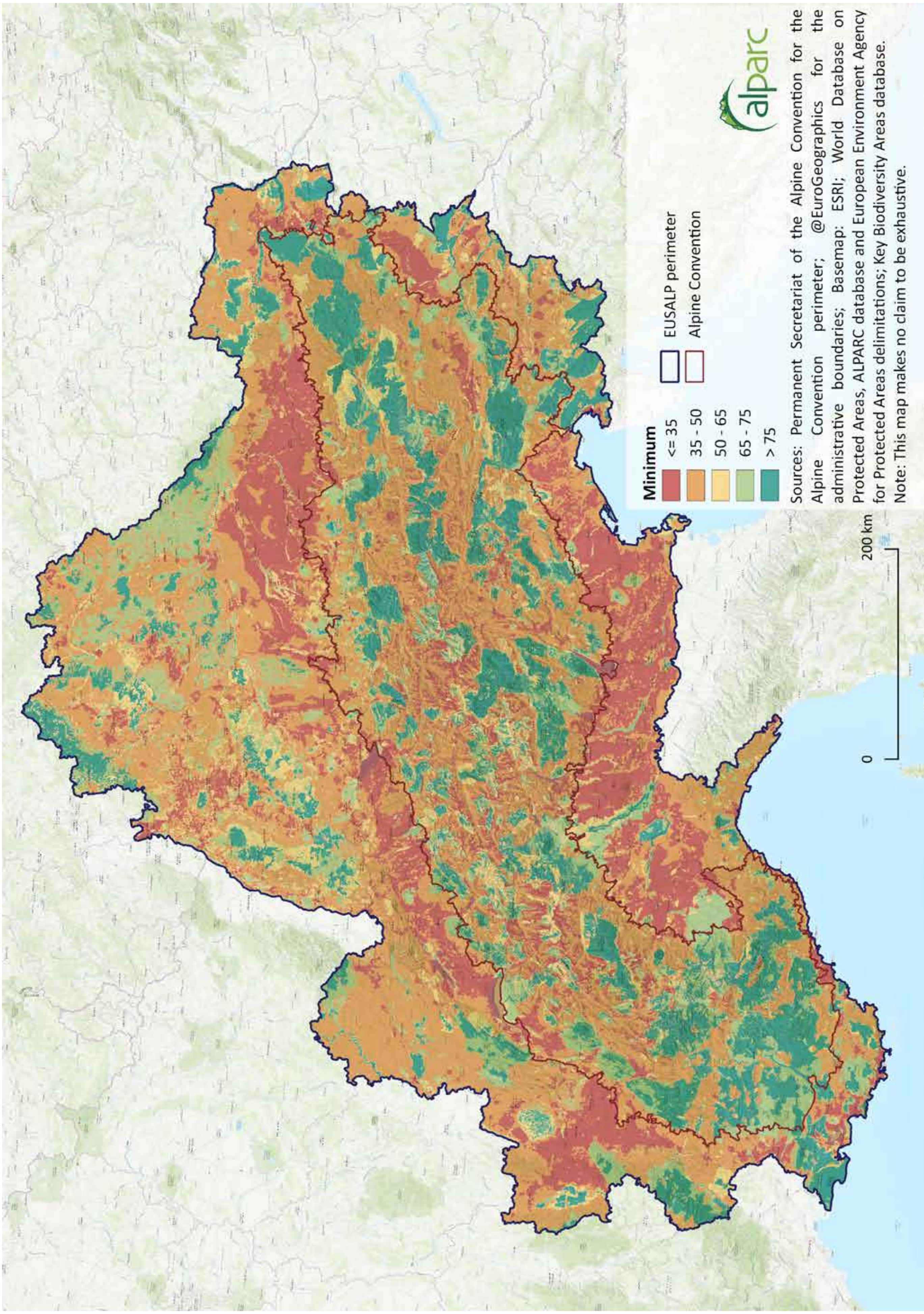
Table 54: Value Distribution Among EUSALP - Optimum

EFA	EFA surface km²	% Distribution of EFA within the EUSALP surface
<=35	80,874	18.3%
35-50	181,235	41.0%
50-65	23,638	5.3%
65-75	37,862	8.6%
>75	118,442	26.8%

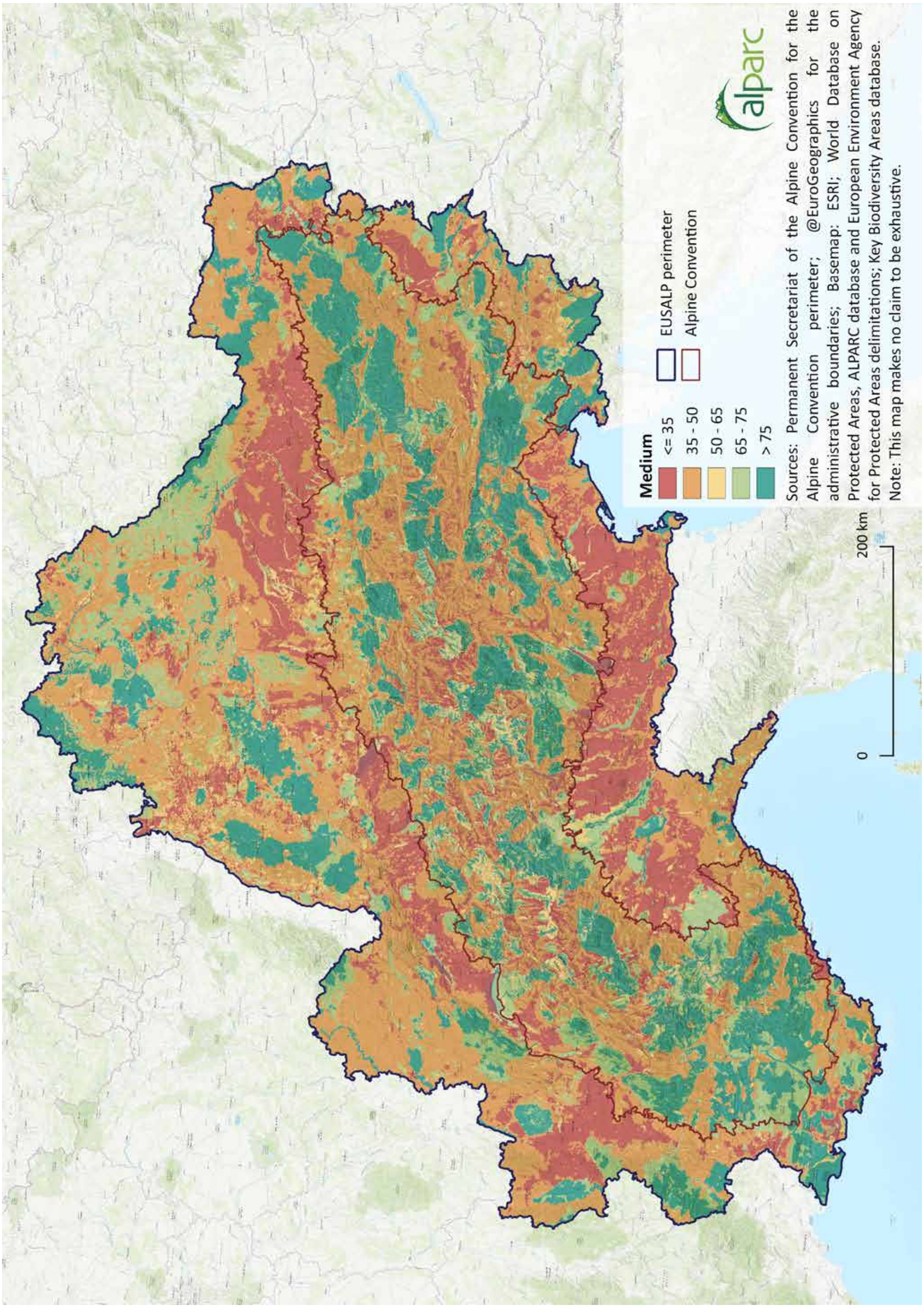
Table 55: Value Distribution Among Alpine Convention - Optimum

EFA	EFA surface km²	% Distribution of EFA within the Alpine Convention surface
<=35	18,982	9.9%
35-50	75,021	39.3%
50-65	11,300	5.9%
65-75	17,699	9.3%
>75	67,987	35.6%

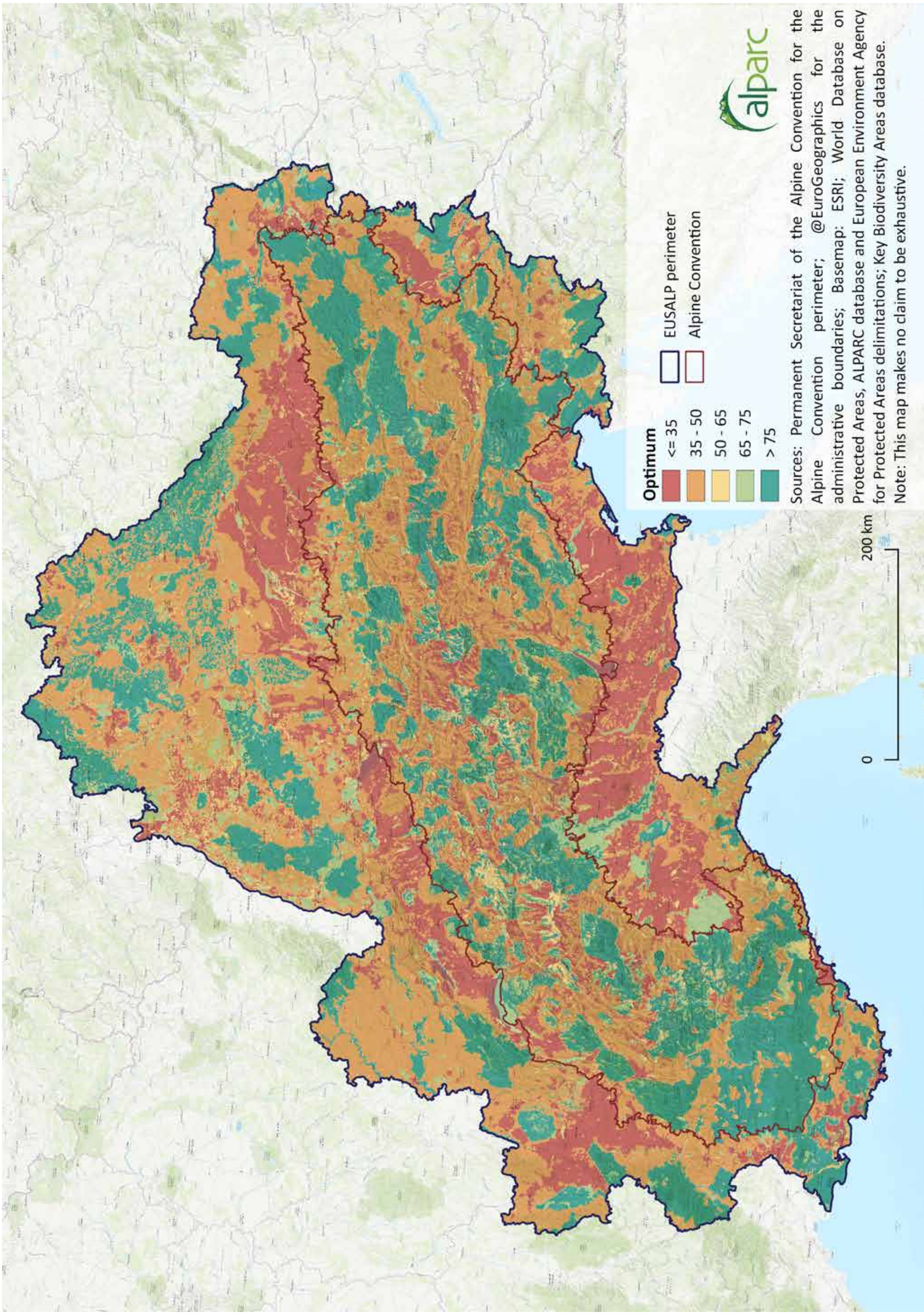
Map 106: Minimum - Increasing Overall Protection Scope and Connectivity



Map 107: Medium - Increased Improvements in Protection Scope and Connectivity



Map 108: Optimum - Major Improvements in Protection Scope and Connectivity



Unsurprisingly, there is clear improvement in all levels of categories – especially the increase in surface and the provision of a protection value for the KBAs and for protected areas with a weaker protection status (including those smaller than 100 ha of the WDPA in the case of the optimum scenario).

These scenarios demonstrate how important large and well protected areas are for the whole system of protected areas, which are the backbone of nature protection in the Alps. It is, nevertheless, evident that realities on the ground warrant different measures of different intensity, which can and should be employed. **Based on these simulations, it is clear that only significant measures will change the overall situation of Alpine biodiversity protection through an appropriate system of protected areas and interconnected habitats at all altitudes.**

The three final scenarios present an interesting basis for further environmental planning and political decisions to be taken in the future for the Alpine protected area system. Coordination between the Alpine countries within the Alpine Convention would be very helpful. The most important category in the simulation for the Alpine protected areas system, and a goal which should be achieved, is this over 75% of **ecologically favourable areas** in the Alpine space perimeter according to the Alpine Convention.

We should strive to elevate this percentage to the highest value possible. The three scenarios have shown what is necessary to achieve this goal and to get closer to the optimum scenario. Based on the simulation measures chosen for these scenarios for the Alpine space according to the Alpine Convention perimeter and the immediate periphery (interface Alpine Convention – EUSALP area[1]), we can present the following results:

Minimum scenario:
24,7% of ecologically favourable areas in the Alps (values >75%)

Medium scenario:
28% of ecologically favourable areas in the Alps (values >75%)

Optimum scenario:
35.6% of ecologically favourable areas in the Alps (values >75%)

These results are the most significant findings of the whole simulation as they directly address the Alpine protected areas system. They demonstrate that to improve the actual situation (19.7%[2] of ecological favourable areas over 75% in the Alps) by a mere five percentage points within the "minimum scenario", meaningful measures are necessary.

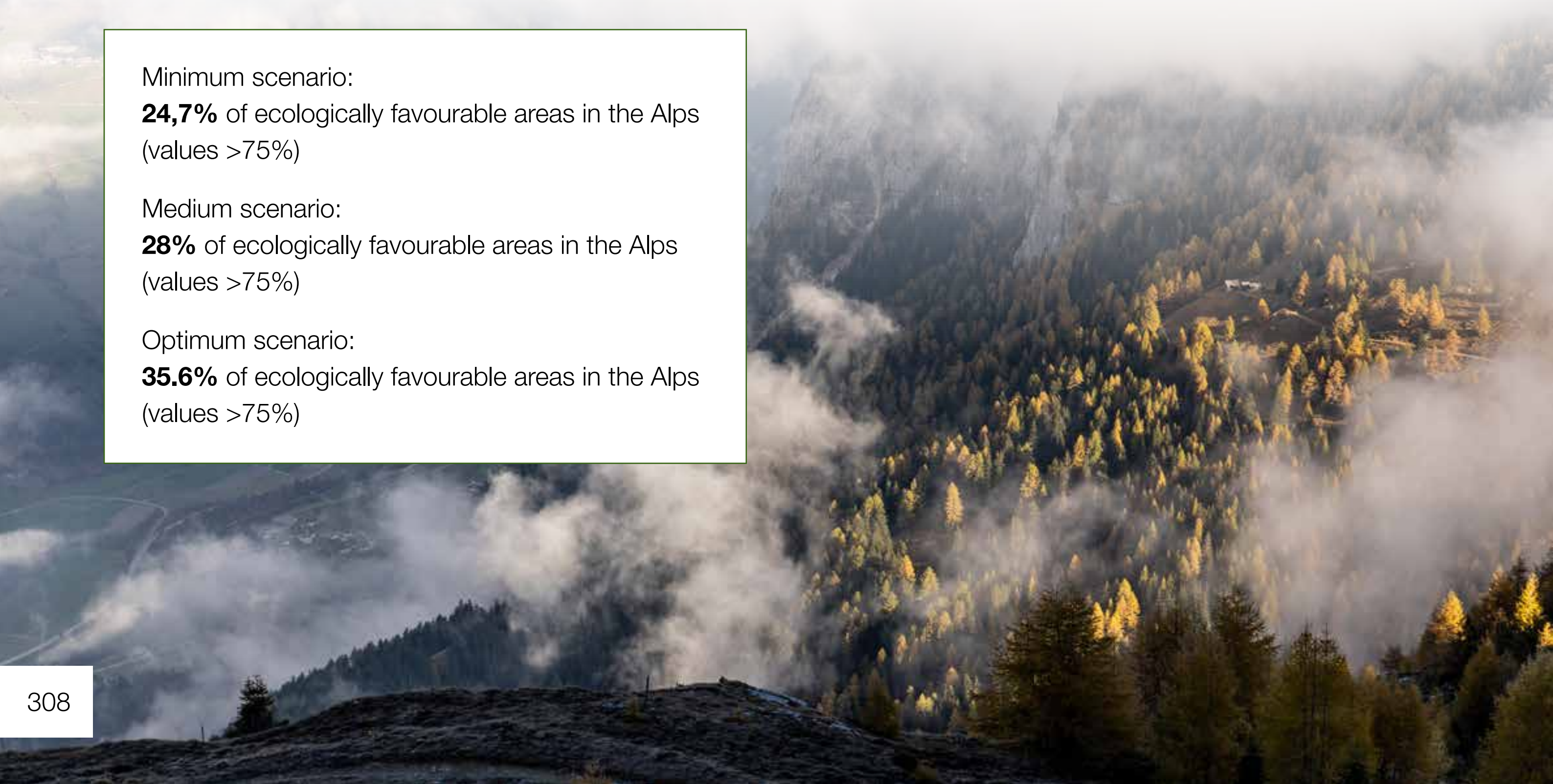
To achieve an improvement towards the "optimum scenario" would require amplification of efforts by a factor of at least 1.75, which means that we would need to almost double the intensity and importance (surface, level of protection…) of all measures available!

The 11 points difference between the minimum scenario and the optimum scenario of the Step 2 illustrate the wide range in the intensity of measures that could be implemented and how their outcomes compare.

To achieve higher values than those calculated with these simulations and the employed criteria and indicators would also demand the **creation of new protected areas in regions that are not currently in the highest category of ecologically favourable areas**. This could mean the establishment of new strong protected areas and mainly Alpine National Parks as we consider management structures essential for the success of existing biodiversity protection. **New large nature reserves with a high protection level would increase the percentage of the Alpine ecologically favourable areas as well.** These are political decisions.

[1] We consider this "interface" region as especially important for the Alpine area system as the immediate Alpine periphery greatly influences the Alpine biodiversity by fragmentation, land use, activities, and transport.

[2] See Table 35.



F.7

CONCLUSIONS FOR THE SITUATION OF THE SYSTEM OF ALPINE PROTECTED AREAS UNTIL 2022

Beyond the fact that these simulations and their techniques, which can be deployed anytime with regionally adapted values and indicators, are highly informative for spatial planning institutions and nature protection competent services of the Alpine countries, the results and the procedure should allow the Alpine Convention to respond to the legal obligations of the ratified articles of the Nature protection protocol, which have to be considered as international law and which have been presented in chapter D.2.6.

Other protocols, especially the spatial planning protocol and tourism protocol, can also be informed by those simulations.

The report highlights two main results:

1. Extension of protected areas needs to be prioritised and should encompass open spaces with the least infrastructure possible. The fragmentation factor is crucial; biodiversity needs an open landscape matrix. The integration of the SACA approach and the results from former projects have been very important for this work and its results.
2. Protected areas need to be truly protected: A certain level of protection is necessary to appropriately address biodiversity and habitat protection. This is not yet the case for all protected areas in the Alps.

The first result highlights the main criteria of surface and protection status (protection scope in the analysis). The larger the areas are, the higher the risk of fragmentation by infrastructure, settlement, and different land-use forms. The stronger the protection level is, the higher the risk that this protection takes place mostly exclusively in high altitudes. When increasing protection status for those large areas, it is important that the main protection of those surfaces take place in altitudes under 2000 m a.s.l. Both points need to be considered in spatial nature protection planning.

For these reasons we included in our analysis the indicator of altitudinal distribution of the protected areas and their fragmentation. These simulations support long-term planning for nature protection strategies of Alpine regions including the issues of open spaces, a permeable landscape matrix (ecological connectivity) and a representative system of protected areas of all altitudinal levels (topography). Open spaces factor can offer both lower areas and lower fragmentation, but they don't always have a protection status or consideration. They can, nevertheless, constitute an important potential for Alpine protected areas strategies.

Official protected areas function as large hubs between small-scale protection on other levels, such as contractual conservation measures. As it seems unlikely that a significant number of new large-scale protected areas with relevant protection status will be established, it is important to integrate biodiversity conservation outside of protected area perimeters. The definition of ecologically favourable areas provided in this report is helpful in that respect and allows a geographically targeted policy of nature protection.

National Parks and other protected areas with a high level of protection should be seen as the core of biodiversity and habitat conservation on a large scale. These areas are fundamental for the preservation of reproduction sites, undisturbed habitats, and the free development of natural processes. Other protected areas with less strict conservation regulations, such as regional nature parks (IUCN classes V and VI), play another role on a large-scale, but only if their governance and judicial mandate is applied across the Alps to fulfil conservation missions, such as landscape preservation and sustainable land use prohibiting harmful practices in agriculture and tourism.

We believe that, for biodiversity protection, at least some mandatory rules must be established for the concerned territories and must be controlled by the protected area administrations.

This brings us to the second main result, which seems obvious and is a long-standing political request of ALPARC. Areas called "protected" should be protected – at least to some degree.

This means that sites labelled "protected area" must fulfil minimal standards – or, as mentioned above, adhere to some "mandatory rules". So far, some categories have little or no legally binding conservation obligations, such as the French regional nature parks, Austrian and Swiss nature or regional parks, and also large zones of areas having a protected core area but as well very large peripheral zones with non-existent or very reduced measures for conservation of biodiversity.

Since these areas are usually quite large, it can be assumed that the numbers and percentages of surface covered by protected areas is misleading. It is already proposed in the recent French strategy for protected areas that all protected area categories need to establish a legal framework assuring the conservation of biodiversity and habitats.[1]

We consider that all protected areas having the word "park" or "protected" in their denomination need to provide a certain degree of concrete protection of biodiversity. Any other meaning is misleading for the purposes of nature protection strategies in the Alps.

Obviously, not all protected areas can have a high protection status as land-use and infrastructure as well as a variety of recreational and leisure activities are an important factor for the Alpine economy. Special regimes can be found for different categories, but in the future, the goal should clearly be to provide a protection status to all protected areas.

All the simulations have shown that improvements are possible according to different scenarios of criteria and indicators. **But the improvements are limited since all measures take place in areas already provided with positive nature features** (relative connectivity, protection status, important existing surfaces even if often and in combination with a strong protection status more in higher altitudes).

To meaningfully change the paradigm requires important measures affecting new areas not currently considered protected areas. The parts of the KBAs that are not protected could have such a potential, but only local investigations can confirm that. **The creation of new strong protected areas would represent such a paradigm change.** The unwritten "law" that the Alps have 13 National Parks and not one more needs to be modified. New large National Parks at all altitudinal levels would bring more biodiversity protection. More large nature reserves would be an important improvement too – unfortunately, they mostly lack the staff and, therefore, have less intervention possibilities especially within the regional population and stakeholders. Local populations need to be involved and to accept new protected areas – often a difficult but essential mission.

To further explore the spatial possibilities of Alpine nature protection, more simulations with different criteria are possible. Scenarios and data about Alpine ecological connectivity, including protected areas, are available on www.JECAMI.eu. All considerations and scenarios should lead finally to effective zoning of the Alpine space within the perimeter of the Alpine convention and its immediate periphery towards the EUSALP area, which strongly influences Alpine biodiversity as shown in the chapter before.

Such zoning could be comparable to the Bavarian Alpine Plan, probably the most visionary tool for Alpine spatial planning created 50 years ago and still functioning. The simulations of the Step 2 of the former chapter provides first indications for such a zoning with the definition of the potential "**ecologically favourable areas**" in the Alps.

The Bavarian Alpine space, which is organised into three zones[2] – one of total protection, one of very limited traffic development possibilities, and one of further development possibilities - could serve as a model too. Certainly, the Bavarian Alpine space is small, and such a plan for the different Alpine countries would be very difficult to achieve and challenging to harmonise between different political systems (federal, national, autonomous regions), but it could be an ambitious task of the Alpine Convention to agree on common standards for different types of areas and to start an Alps-wide spatial planning of areas worth protecting by excluding further infrastructure and touristic development.

[1] The correspondence of the status of Regional Natural Park (RNP) with the international definition of a protected area is a matter of debate. Some experts consider that this tool – which covers 16% of the national territory – should not be counted a priori in the statistics of protected areas, without first verifying that the conservation of biodiversity is the main management objective and that it applies to most of the territories concerned.
They nevertheless recall that the first mission of a RNP is to "protect natural and cultural heritage and landscapes through appropriate management", that the other missions are contributions, and that the signatories of the charter - the State and the Collectivities - make commitments in this direction. Other experts consider, on the contrary, that these areas, which are based on a quality natural heritage, represent the main current dynamic of creation of protected areas and must be particularly encouraged in their actions to protect their natural heritage; and that the stated surface target of 30% could not be achieved without them.

[2] The Alpine Plan distinguishes between three different zones: In the strictest protection category, Zone C (43% of the Bavarian Alpine region), new traffic developments are inadmissible with the exception of necessary cultural measures (e.g., Alpine pasture and forest paths). In Zone B (23% of the Bavarian Alpine region), traffic development is only possible if a strict standard is taken into account. In Zone A (34% of the Bavarian Alpine region), the construction of further development facilities is generally possible. However, the spatially significant projects must also be checked for their spatial and environmental compatibility in Zone A (Wikipedia, translated from German).

Through participatory approaches between Alpine countries and with the regional stakeholder and the public, zoning can be arranged in a way that traditional use patterns can be preserved and integrated into conservation of biodiversity. Cooperation and collaboration should be the framework of this approach.

The maps and scenarios presented in this work could help inform such activity of the Convention and provides – with all needed adaptations – tools to define goals to be achieved in the next decades. In this context, the concept of "Open spaces" is an important element and could foster cooperation between planning and nature conservation services of the different Alpine countries.

Further conclusions of this work consist in the recommendation to provide as many protected areas as possible with staff. The implementation on local and regional level, which can include local knowledge and implementation, seems of utmost importance but is only possible if such processes are guided through a PA administration.

Such development needs a framework and guidelines and can only be realised on a small-scale. These factors, including the existing smaller protected areas (<100 ha), cannot be included in an analysis on an Alps-wide level when it comes to calculation of area covered by conservation measures or evaluation of management effectiveness. Nonetheless, they offer an important complement to area-based biodiversity conservation - especially in their role as stepping-stones for an ecological network.

Another component can only come from the spaces in between the officially recognised protected areas. All the measures usually gathered under the terms of green and blue infrastructure, the cross-sectoral greening of human activities - from industry, agriculture, forestry, infrastructure development, to land-use planning - must be leveraged to complement the efforts of the officially designated protected areas.

Biodiversity conservation and continuing economic growth are difficult to combine. The resources and the land needed to support the consumption and hence the production of ever more goods are not compatible with the efforts to stop the decline in biodiversity and habitats. This puts protected areas in a difficult position. Within their territory, they can do their best to protect biodiversity, but these efforts will be in vain if the developments outside outmatch them (Otero et al. 2020).

The Alpine protected areas have the potential and the opportunity to apply the international conservation goals defined by international agreements and convention at the regional and local level with concrete protection measures such as those described in this chapter. They must act as a catalyser or translator, as they are able to address both the global and the local requests and needs.

In addition to the quantitative and qualitative factors of the protected territories, a successful protected area strategy needs vision and goals, managers, and populations convinced by the necessity of biodiversity protection for the next generation. Only together will the Alps achieve this goal.

F.8

COP 15 DECISION AND OUTLOOK FOR 2030

While working on the last chapters of this report, governments across the globe reached a historic agreement to collectively commit to conserving at least 30% of lands and waters by 2030 at the U.N. Biodiversity Conference in Montreal, Canada (COP 15):

> *"Ensure and enable that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures, recognizing indigenous and traditional territories, where applicable, and integrated into wider landscapes, seascapes and the ocean, while ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognizing and respecting the rights of indigenous peoples and local communities including over their traditional territories".*
>
> *(CBD 2022)*

Another important decision from COP 15 is to: *"Reduce to near zero the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity". (CBD 2022)*

Both decisions are relevant to the Alps, and the question is how to reach the goal of 30% of effectively conserved, managed and well-connected areas. So-called “area-based conservation measures” can be part of these 30% according to the definition above. The decision is based on the realisation of the 30% goal by individual countries. Nevertheless, the Alps are a coherent biogeographical region and the Alpine Convention as an international treaty for the protection and the sustainable development of the Alps claims with its nature protection protocol an improvement of the spatial protection of the Alpine territory as described in the chapter D.2.6. For these reasons it is logical to consider the 30% goal as an opportunity to further implement the Convention, to fulfil national obligations and to contribute to the world-wide decision of the COP 15.

The link to the rights of indigenous people and the sustainability and compatibility of any use of such areas with conservation outcomes is crucial in this context and must also be considered in the Alpine context and Alpine economy (see chapter F.4.4 – F.4.5). This will inform new approaches to nature protection in the Alpine space to reach the goal of those 30% of those areas having efficient or (strong) protection.

According to our simulation, with the measures proposed in the last chapter (Table 56) and the results of this work as described in Step 2, it would be possible to generate up to **35.6%** of ecologically favourable areas within the Alps but only with very important and adapted measures

Table 56: Ecologically Favourable Areas According to Step 1 and 2

Indicator	EFA category	Current situation (STEP 1)	Future scenarios (STEP 2)		
			Minimum	Medium	Optimum
		Alpine Convention value distribution			
Ecologically favourable areas (EFA)	<=35	11.3%	10.0%	10.0%	9.9%
	35-50	44.7%	40.6%	39.9%	39.3%
	50-65	5.7%	9.6%	6.3%	5.9%
	65-75	18.6%	15.1%	15.8%	9.3%
	>75	19.7%	24.7%	28.0%	**35.6%**

This percentage is only achievable with the help of very important and strict nature protection measures based on the following previously mentioned improvements of the protected areas network:

1. Increase of **25% of all strong protected areas** (IUCN I, II, nature reserves, Italian nature parks) according to IUCN and ALPARC (APA[1]) definitions.
2. Providing a **protection status** comparable to IUCN cat. III and IV to all **KBAs**
3. Changing the **SACA 1** (ecological connectivity) areas in **connected areas** by spatially linking them (“creating larger non fragmented areas”)
4. Providing a **protection status to all weak protection areas** including protected areas smaller than 100 ha from the WDPA Database (comparable to IUCN cat III and IV: simulation value = 60, as illustrated in the “optimum scenario” and the table 55)

As the probability of the implementation of such measures is very low and must be considered as **unrealistic**, we are developing a final spatial planning (simulation) concept based on results of different important projects of the last years concerning ecological connectivity, the Alpine protected areas system, the importance of the involvement of spatial planning in the process of nature protection (especially ALPBIONET2030, OpenSpaceAlps, ecological favourable areas from Alpine Parks 2030), and data sets expressing an ecological value of the areas to be conserved (KBA’s, Natura 2000). Such a simulation concept should inform zoning for planning of nature protection in the Alps referenced above.

This approach specifically allows us to better define the **localisation** of new or extended protected areas as it determines which areas are less fragmented, less developed by infrastructure and human activities, and ecologically most valuable. These areas could be the framework for application of the four measures proposed above (1-4) to reach the 30% of protected (well conserved) areas. Local situations need to be considered, of course.

The analysis of the ecologically favourable areas (compare Table 56) is based on the criteria and indicators described in the last chapters and in the Annexes H.4 – H.6. **This analysis always includes the criteria “protection status” as we consider that the protection status, especially the strong protection, must be significant part of the calculation of the ecologically most favourable areas of the Alps. In most cases, the longer this status has been attributed to an area, the more ecologically intact the area is.** For this reason, it is an important factor but can also complicate the identification of new, still not protected areas as such areas are included within the EFA. We proceeded for this reason to overlays between EFA and APA.

Nevertheless, to facilitate identification of areas with potential for efficient protection (according to the definition of the 30% goal), we expand the analysis. For this, we consider the data we have available for the whole Alpine arch provided by the SACA analysis (ALPBIONET2030), the identification of areas with a low level of spatial development

[1] Alpine Protected Areas.

(OpenSpaceAlps), and the most ecologically favourable areas (Alpine Parks 2030) in a common data analysis.

To further provide an ecological value to the areas identified in this way, we add a criterion of "ecological significance" to this analysis by comparing those areas with the Natura 2000 sites and the KBA layer status, both expressions of a high ecological interest of an area.

We then process the final results from the Step 1 of the preceding chapter using the data from the former projects described above and combine them with data expressing a biodiversity interest (Natura 2000/KBA's).

This analysis provides an outlook calculating the most favourable areas for ecological conservation and **localising** them. In a second step, the resulting areas will be combined with the already existing protected areas already having a strong protection status. The remaining areas are interesting for further protection measures such as proposed in the Step 2 analysis.

The following analysis ("Alps 30x30") completes our evaluation of the current situation (Step 1) and possible improvements (Step 2), **based on existing protected areas in both highest categories of ecologically favourable areas**, by proposing sites for the creation of new protected areas or identifying sites that would benefit from strengthening of existing protection status. Wherever possible, this should occur at lower altitudes.

To reach the COP Biodiversity goal of 30% of efficient protection, the level of protection of the current protected areas needs to be increased – particularly in areas at lower altitudes.

The current representation of strong protected areas in the IUCN I and II categories is limited to 4.2%[1], and of all protected areas with a status that can be called strong (including the IUCN categories III and IV) that only expands to 10.4% (weighted surface). This is still low for a mountain range such as the Alps with a vast biodiversity but also intensive use (see Table 58, next page).

The current situation of protected areas in the Alps is summarised as follows:

Table 57: Summarising the Status According to APA Database and IUCN

Difference between APA and IUCN mainly due to the classification of Italian Nature parks and Nature Reserves in both systems[2]

	Surface of the Alpine Convention perimeter in km²	190,700
Nature protection	Weighted surface Alpine Protected Areas - ALPARC	28.5%
	Strong protection* - Including Nature / Regional parks IT	9.7%
	Strong protection*- Without Nature / Regional parks IT	6.5%
	Weighted surface IUCN categories (I, II, III, IV)	10.4%

**ALPARC Data APA*

These figures may give the impression that the 30/10 goal of many biodiversity strategies has already been reached in the Alps (30% of protection and 10% of strong protection). Nevertheless, the 28.5% includes numerous areas without protection status (or with a very low one) that do not contribute to biodiversity protection in the long run – meaning that the designation as protected areas in the sense of species and habitat protection is usually not justified. **The existing surface for protection in the Alps is too small for long-term biodiversity conservation**.

[1] Alpine Protected Areas.

[2] Refer to Annex H.7.

Table 58: Existing Protected Areas Protection Status and Altitudinal Distribution

Datasources	Category	Coverage AC		Altitudinal distribution						Biodiversity - surface covered by KBA	
		Surface km²	%	Under 1,000	1,000 and 1,500	1,500 and 2,000	2,000 and 2,500	2,500 and 3,000	Over 3,000	Km²	%
ALPARC	Nature / Regional park	25 708	13,5%	47%	20%	13%	11%	8%	1%	8 037	31%
	UNESCO Biosphere reserve - Transition area	13 560	7,1%	61%	15%	11%	8%	4%	0%	4 971	37%
	Particular protection status	16 912	8,9%	35%	19%	15%	15%	12%	5%	3 683	22%
	National Park - Core area	7 073	3,7%	5%	11%	18%	30%	28%	7%	6 428	91%
	Nature reserve	5 512	2,9%	19%	27%	33%	14%	5%	2%	2 875	52%
	UNESCO World heritage	2 650	1,4%	3%	8%	25%	36%	18%	9%	1 024	39%
	Strong protection* - Including Nature / Regional parks IT	18 425	9,7%	11%	19%	26%	25%	15%	4%	13 361	73%
	Strong protection - Without Nature / Regional parks IT	12 359	6,5%	12%	17%	25%	23%	18%	5%	9 054	73%
	Weighted surface protected areas	54 356	28,5%	33%	20%	18%	16%	10%	3%	19 700	36%
WDPA - IUCN	Ia - Strict Nature Reserve	514	0,3%	10%	28%	28%	22%	11%	0%	407	79%
	Ib - Wilderness Area	164	0,1%	9%	27%	21%	19%	21%	4%	150	92%
	II - National Park	7 526	3,9%	6%	13%	18%	30%	26%	7%	6 827	91%
	III - Natural Monument or Natural Feature	139	0,1%	57%	18%	13%	12%	1%	0%	74	53%
	IV - Habitat management area / Species Management Area	12 046	6,3%	14%	20%	29%	23%	12%	2%	5 401	45%
	Weighted surface IUCN categories	19 900	10,4%	11%	17%	25%	26%	17%	4%	12 470	63%
Alpine Convention		190 700	100,0%	42%	23%	17%	12%	6%	1%	34 942	18%

* National parks, nature reserves, Natural / Regional parks Italy

- IUCN protected areas categories with the strongest protection
- Other IUCN selected categories
- Weighted surface

- Highest altitude proportion
- Lowest altitude proportion

STEP 3 - FINAL ANALYSIS TOWARDS THE 30X30 GOAL OF THE COP 15 BIODIVERSITY FOR THE ALPINE SPACE

This further analysis is provided as a projection by calculating the most favourable areas for ecological conservation through analysis in three phases[1]:

1. Analysing the current situation of potential protected surface areas in ecologically interesting sites by using parameters from former projects (ALPBIONET2030, OpenSpaceAlps and results from Alpine Parks 2030). The indicator "protection status" is part of this analysis as it is the central factor representing the level of the protection.
2. Assessing whether the identified areas are also characterised by a high degree of biodiversity, with the help of KBA and Natura 2000 sites. Both reflect the ecological interest of the areas in terms of biodiversity and are available in a harmonised and comparable data set for the whole Alpine space.
3. Overlaying the resulting areas with existing strong protected areas (IUCN I – IV) should allow us to determine areas still potentially valuable for further protection measures. This last phase can be the foundation for a zoning of the Alpine space in terms of future nature protection policy and a planning concept to approach the 30% goal of the COP 15 towards *"**effectively conserved and managed** [areas] through **ecologically representative, well-connected** and equitably governed systems of protected areas and other effective area-based conservation measures" (CBD 2022).*

Indeed, all relevant components- effectively conserved, ecologically representative, and well-connected areas- are part of the analyses of all three steps and reflect the vision of the COP 15 decision.

[1] The following analysis and calculations are based on areas within the Alpine Convention perimeter.

PHASE 1:

Identifying potential areas for biodiversity protection

Map 109: Ecologically Favourable Areas (EFA): Degrees of Spatial Development and Ecological Connectivity

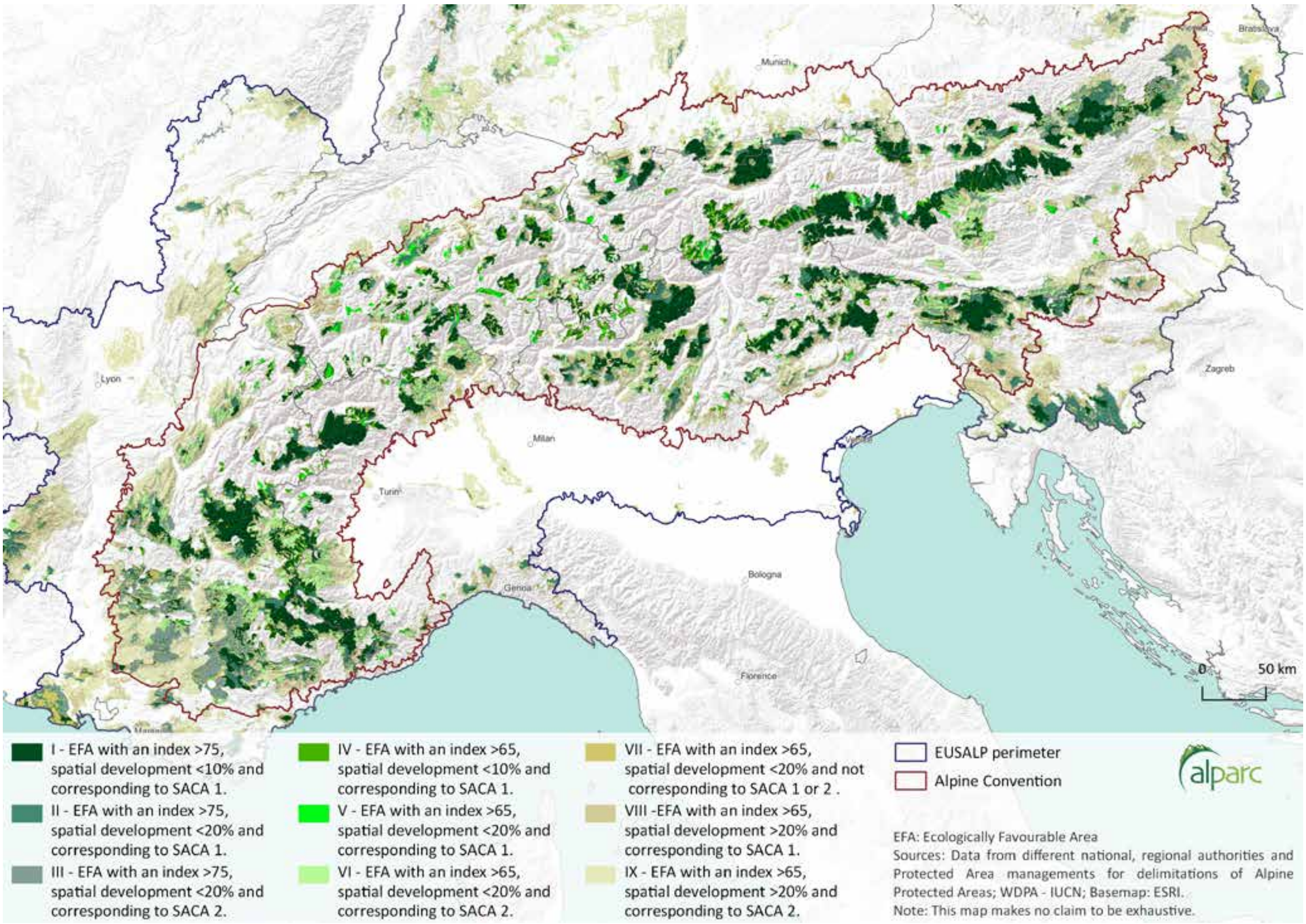


Table 59: Ecologically Favourable Areas (EFA): Degrees of Spatial Development and Ecological Connectivity (according to Map 109)

	Category	Surface area (km²)	Distribution within the AC surface area	Status Evaluation Rating[1]
I	EFA > 75 / OSA < 10% / SACA1	18,773	9.83%	AAA
II	EFA > 75 / OSA < 20% / SACA1	6,642	3.48%	ABA
III	EFA > 75 / OSA < 20% / SACA 2	7,913	4.14%	ABB
IV	EFA > 65/ OSA < 10% / SACA 1	4,792	2.51%	BAA
V	EFA > 65 / OSA < 20% /SACA 1	1,936	1.01%	BBA
VI	EFA > 65 / OSA < 20% / SACA 2	7,649	4.00%	BBB
VII	EFA > 65 / OSA < 20% / NO SACA 1 -2	3,087	1.62%	BBC
VIII	EFA > 65 / OSA > 20% / SACA 1	4,410	2.31%	BCA
IX	EFA > 65 / OSA > 20% / SACA 2	16,846	8.82%	BCB
TOTAL		**72,048**	**37,72%**	

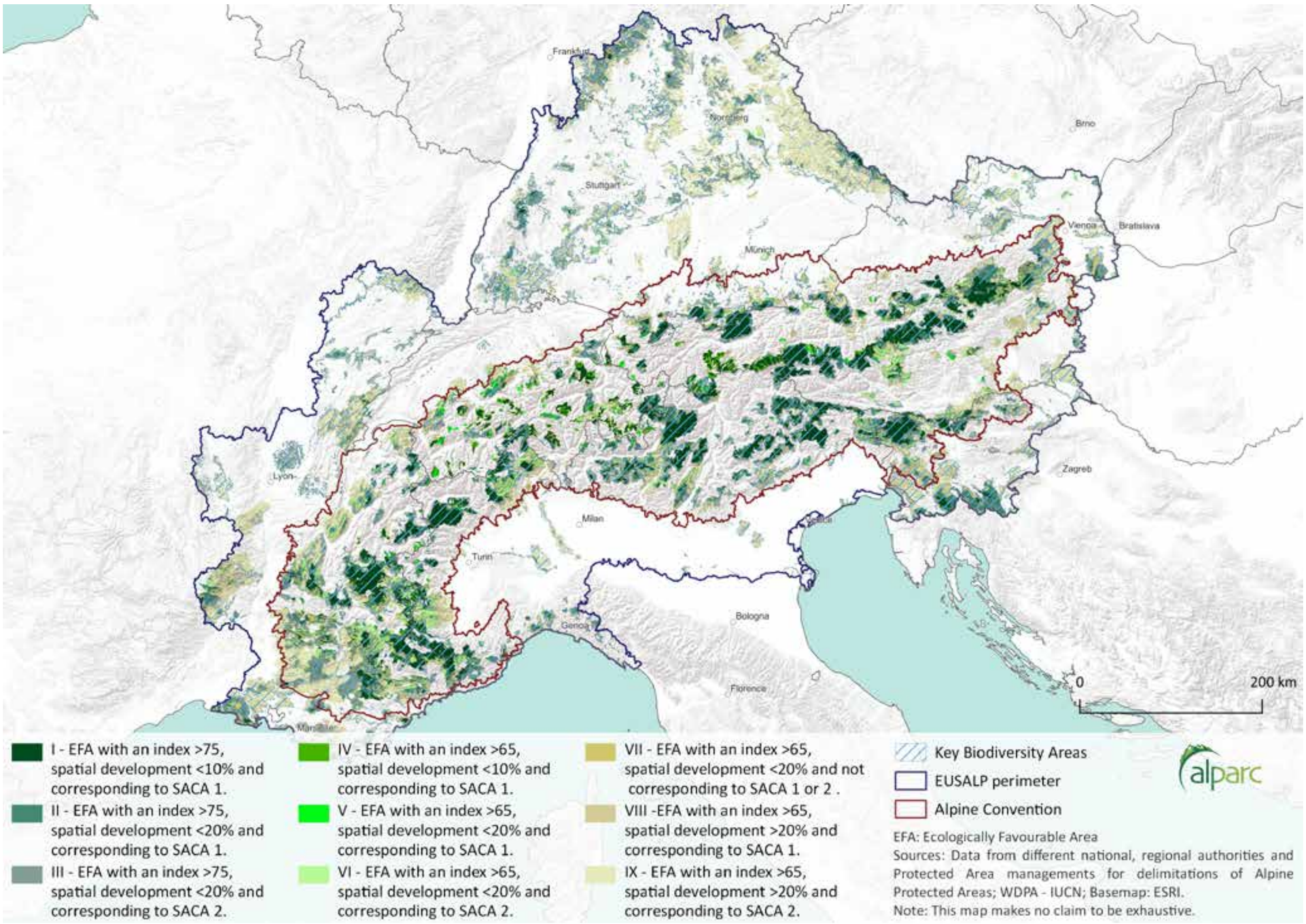
Information: This corresponds to a total of 37.72% of the Alpine Convention surface.

[1] This rating system is based on a scale from “AAA” to BCB” according to “our” classification of Ecologically Favourable Areas for the establishment of Alpine Protected Areas

PHASE 2:

Appreciating the "biodiversity value" of the identified areas

Map 110: Potential Areas for Biodiversity Protection according to their "Biodiversity Value" – EUSALP



Just as it already does for Step 1, the protected areas reference layer for this analysis concerns areas from the KBA, Natura 2000, and Emerald Network. The overlay of these layers and the 9 defined categories allow us to illustrate the level and spatial presence of biodiversity valuable parts of said categories. Table 60 shows the precise figures for Maps 110 and 111.

Map 111: Potential Areas for Biodiversity Protection according to their "Biodiversity Value" – Alpine Convention Perimeter

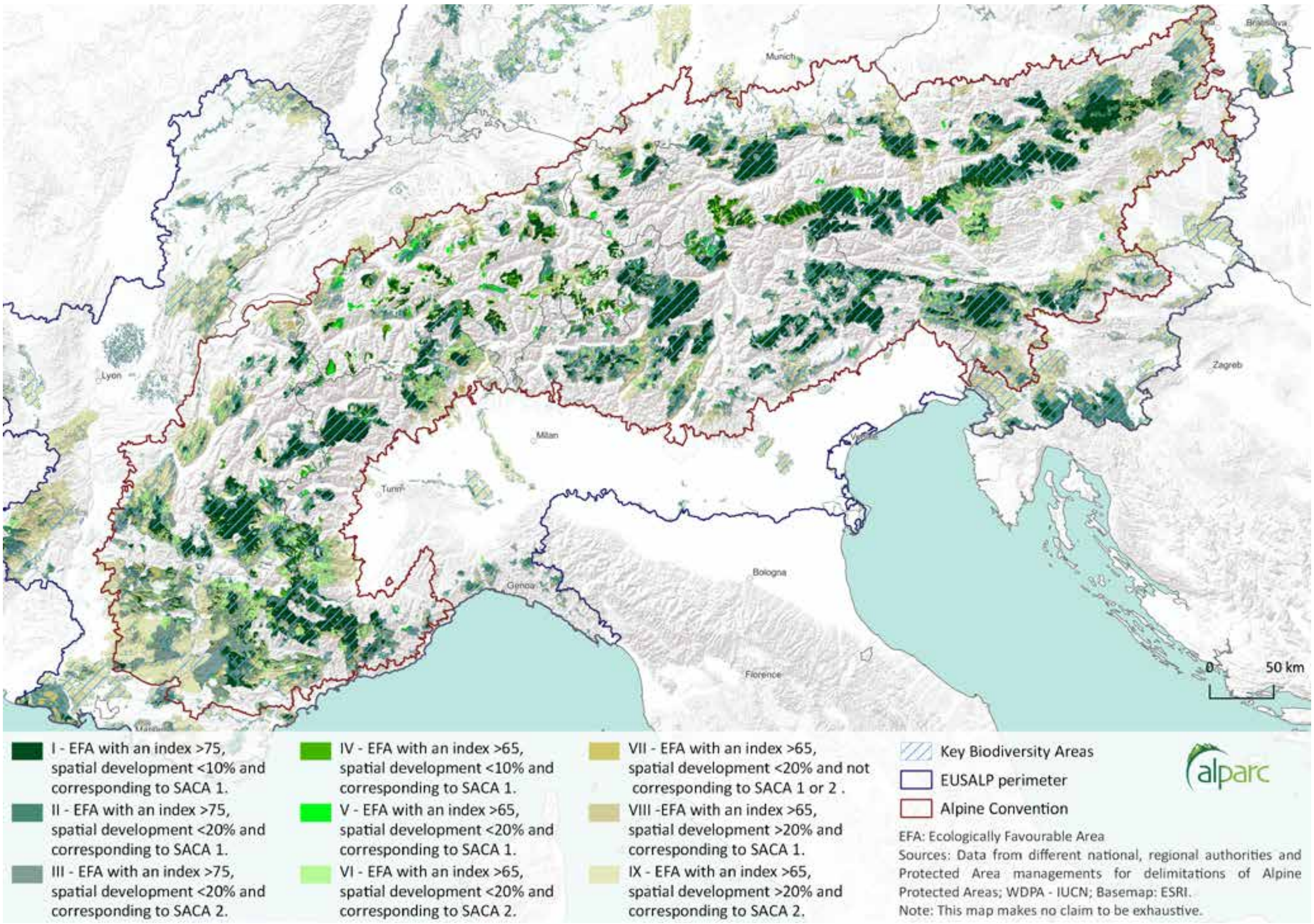


Table 60: Categories of Potential Areas for Biodiversity Protection according to their "Biodiversity Value" – Alpine Convention Perimeter (according to Maps 110 and 111)

			Biodiversity Value			
			Covered by Natura 2000 / Emerald Network / KBA		Not covered by Natura 2000 / Emerald Network / KBA	
	Category	Status Evaluation (Rating)	Surface (km²)	% Over category	Surface (km²)	% Over category
I	EFA > 75 / OSA < 10% / SACA1	AAA	14,998	80%	3,775	20%
II	EFA > 75 / OSA < 20% / SACA1	ABA	4,710	71%	1,932	29%
III	EFA > 75 / OSA < 20% / SACA 2	ABB	2,555	32%	5,358	68%
IV	EFA > 65/ OSA < 10% / SACA 1	BAA	2,913	61%	1,879	39%
V	EFA > 65 / OSA < 20% /SACA 1	BBA	1,165	60%	771	40%
VI	EFA > 65 / OSA < 20% / SACA 2	BBB	2,331	30%	5,318	70%
VII	EFA > 65 / OSA < 20% / NO SACA 1 -2	BBC	1,600	52%	1,487	48%
VIII	EFA > 65 / OSA > 20% / SACA 1	BCA	3,162	72%	1,248	28%
IX	EFA > 65 / OSA > 20% / SACA 2	BCB	5,295	31%	11,552	69%
TOTAL			**38,728**	**54%**	**33,320**	**46%**

**Reference: KBA/Natura 2000/Emerald Network*

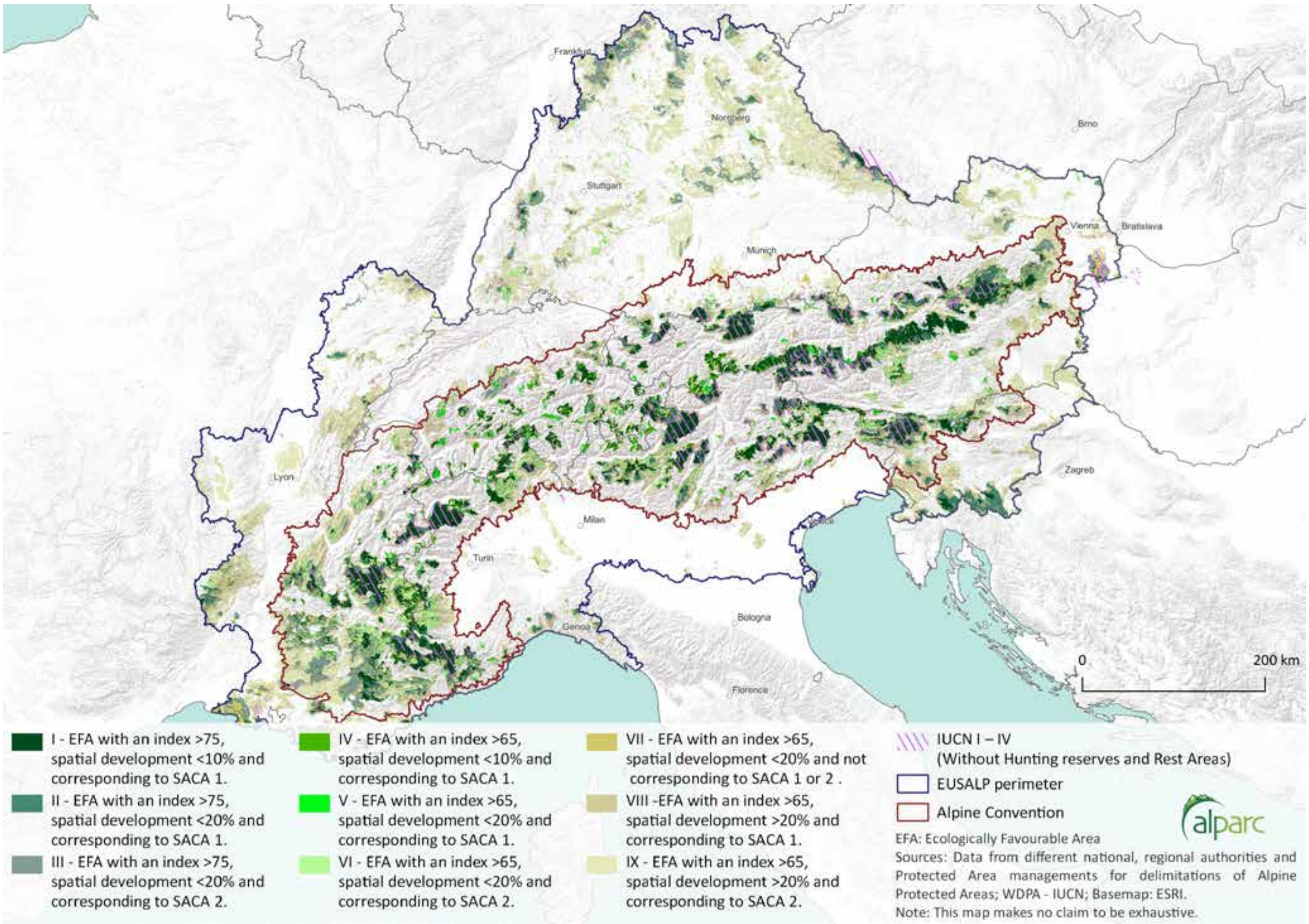
The result represents the cross-section between areas with a low or limited fragmentation (SACA 1 and SACA 2), a very low or low spatial development, and a very high or high ecological suitability including the pre-existing protection status parameter. Furthermore, the classification takes into account indicators expressing the biodiversity "value" of the resulting areas of the analysis – whether they are covered by a KBA or Natura 2000 site or not.

The result also clearly illustrates that we need to use almost all those surfaces to approach the goal of 30% of effectively conserved and managed areas of the COP 15 decision. Indeed the current surface of the 9 categories covered by Natura 2000, Emerald or KBA's achieve only about 20% of the surface of the Alpine Convention perimeter. When establishing new protected areas, priority should be given to areas with the highest scores of biodiversity value indicators (Natura 2000 / KBA) as shown in table 60.

PHASE 3:

Proposing a spatial planning system to reach the COP 15's 30x30 Goal

Map 112: Potential Planning Areas for Biodiversity Protection – EUSALP



To identify the potential and ecologically interesting areas to be protected with a strong protection status (or already protected with such a status), the phase 3 consists of an overlay of strong protected areas according to the IUCN definition[1] of the categories I to IV. To allow this zoning, the criteria "strong protection" (or no strong protection) is applied to the 9 categories defined in table 59 from phase 1. The zoning comprises the whole area as it encompasses 37.72% of the Alpine area according to the Alpine Convention perimeter. The immediate periphery of the Alpine arch within an approximately 30 km range around the Alpine Convention perimeter should be considered as well because of its intrinsic importance for migration, direct impacts from human activities and fragile ecosystems. For this reason, the mapping analysis only considered the EUSALP space.

The nine classes (or zones) of this model could be a first step to a zoning model for biodiversity protection for the whole Alps to approach the 30x30 goal of COP 15.

Map 113: Potential Planning Areas for Biodiversity Protection – Alpine Convention Perimeter

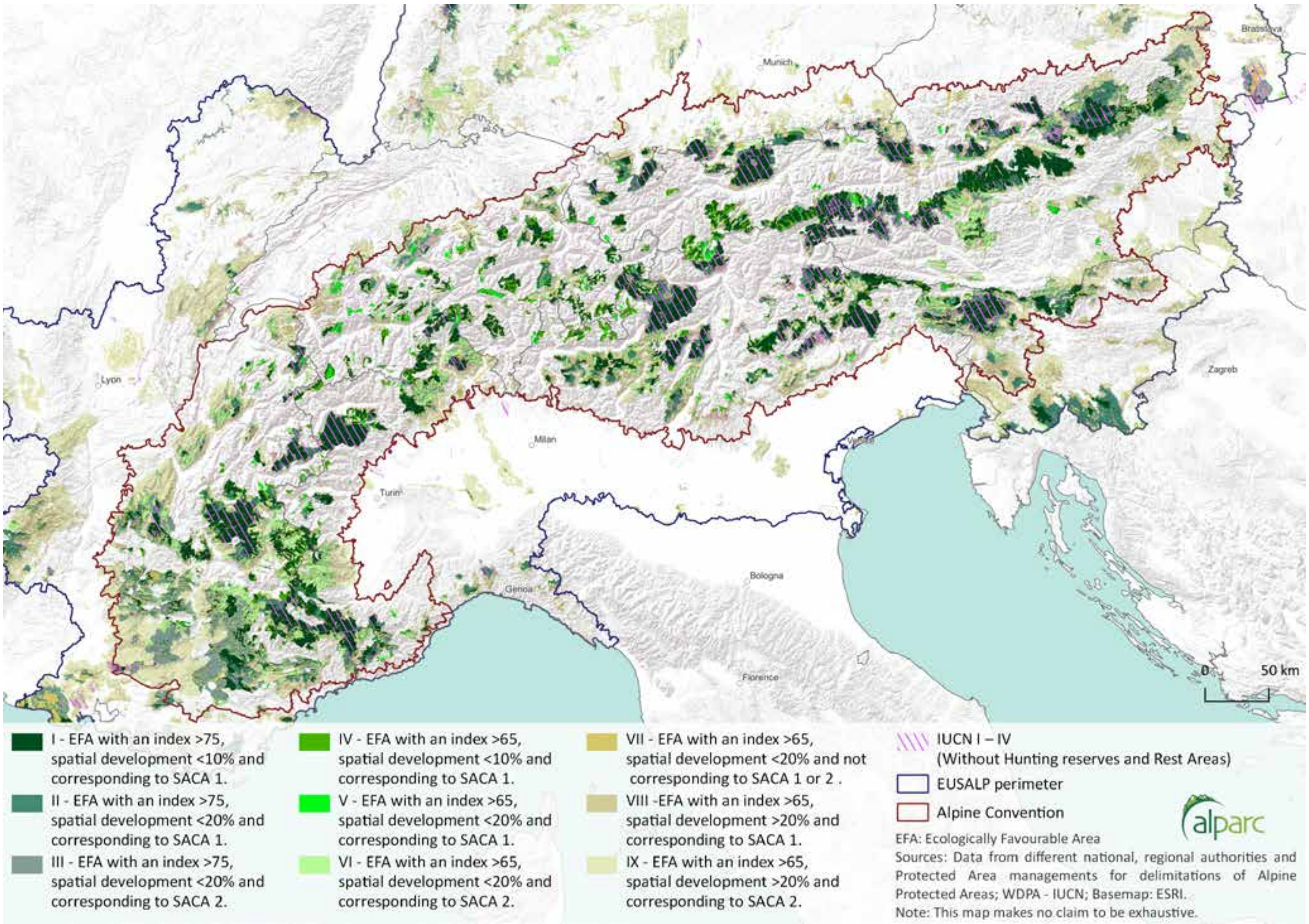


Table 61: Categories of Potential Planning Areas for Biodiversity Protection - Alpine Convention Perimeter (according to Maps 112 and 113)

			Strong Protection			
			Covered by IUCN (I-IV*)		Not covered by IUCN (I-IV*)	
	Category	**Status Evaluation (Rating)**	**Surface (km²)**	**% Over category**	**Surface (km²)**	**% Over category**
I	EFA > 75 / OSA < 10% / SACA 1	AAA	10,028	53%	8,745	47%
II	EFA > 75 / OSA < 20% / SACA 1	ABA	1,888	28%	4,754	72%
III	EFA > 75 / OSA < 20% / SACA 2	ABB	576	7%	7,337	93%
IV	EFA > 65/ OSA < 10% / SACA 1	BAA	608	13%	4,184	87%
V	EFA > 65 / OSA < 20% /SACA 1	BBA	329	17%	1,607	83%
VI	EFA > 65 / OSA < 20% / SACA 2	BBB	269	4%	7,380	96%
VII	EFA > 65 / OSA < 20% / NO SACA 1 - 2	BBC	372	12%	2,715	88%
VIII	EFA > 65 / OSA > 20% / SACA 1	BCA	1,051	24%	3,358	76%
IX	EFA > 65 / OSA > 20% / SACA 2	BCB	638	4%	16,208	96%
			15,760	**22%**	**56,288**	**78%**

**Surface without the IUCN IV - Hunting Reserves (National and Federal) and the Rest areas*

[1] The IUCN criteria allow an Alps-wide harmonisation of the definition of "strong protected areas" even if the definition from the APA Data bank (ALPARC) is probably more adapted to the Alpine space but submitted to complex situations in the different Alpine countries making an international zoning approach more difficult. The different analysis of Step 1 and Step 2 confirm the validity of this approach.

For this planning of protected areas, the nine categories combining the criteria of low fragmentation, low spatial development, and a high level of ecologically favourable areas create the framework, along with the identification of already existing areas with strong protection. This facilitates the determination of further potentials of protected areas within the Alpine region.

The different categories of Table 59, combined with the conservation status of the corresponding areas, shows the potential of areas without an adequate (IUCN I-IV) or non-protection status, according to the different categories which vary between 47 and 96%. This needs of course to be related to the available surface area of each category. In summary, around 22% of the 9 defined categories are protected by an IUCN status I-IV, while 78% are not (see table 61).

Considering the most favourable situations of the nine-category model (most adapted for protected areas) of table 61, by using only the first seven categories, and relating the results to the perimeter of the Alpine Convention, the strong protection surface area is approximately 7.4% (14,071 km²)[1], the potential being around 19.2% (36,722 km²)[2].

By considering the IUCN evaluation of the existing 10.4% of strong PAs (Table 58), along with the complementary potential of a further 20% (19.2 %), as mentioned above, the 30x30 goal of COP 15 could be almost achieved.

Using our criteria of the nine-category model makes us more selective, meaning that only the 7 most favourable categories would be considered, which wouldn't allow for the achievement of our goal (only 26.6%)[3]. For this reason, the consideration must also be extended to categories VIII to IX, using the potential of all categories. The strong protected areas achieve 8.25% (15,760 km²), with a potential of 29.47% (56,288 km²). The total achievable result would, in this case, be 37.72%.

Nevertheless, as categories with a higher spatial development than 20% are not well adapted for the establishment of protected areas, the use of those categories (VIII-IX) should be as limited as possible. The overall evaluation of the different scenarios allows an objective planning of alpine surface area protection between approximately 27 to 37% of the Alpine region, according to the Alpine Convention perimeter.

A combination of phases 2 and 3 of this model (Step 3) would be useful for the definition of protected areas on a local or regional level to integrate the appreciation of the "biodiversity value" of an area (see Map 114 and Table 62: Potential Planning Areas for Biodiversity Protection according to Biodiversity Value and Strong Protection Status).

The model presented in this report can only refer to an Alps-wide scale.

To proceed to a "limited" analysis of an appreciation of the ecological value we completed our spatial planning model with a simulation of the redundancy of the protection status (IUCN I-IV) and the presence of Natura 2000 or KBA areas. Or otherwise expressed: how important is the surface of KBA's and Natura 2000 within the spatial planning model protected by an IUCN category I to IV?

[1] The difference of about 3% in the IUCN statistics is due to the fact that the calculation in this work refers to more limited areas with numerous criteria (ecologically favourable areas, low spatial development, and ecological significance). This excludes some of the PAs not corresponding to all of these criteria.

[2] These results confirm an analysis conducted by ALPARC with a slightly different approach available on demand at ALPARC. The use of only the first seven categories of the model has been chosen to insure the comparability of the results with this other approach which did not consider a spatial development (OSA indicator) of more than 20%"

[3] 7,4% of strong protected areas according to our model of the first seven categories and 19,2% of potential for strong protected areas based on the first seven categories of our model (table 61).

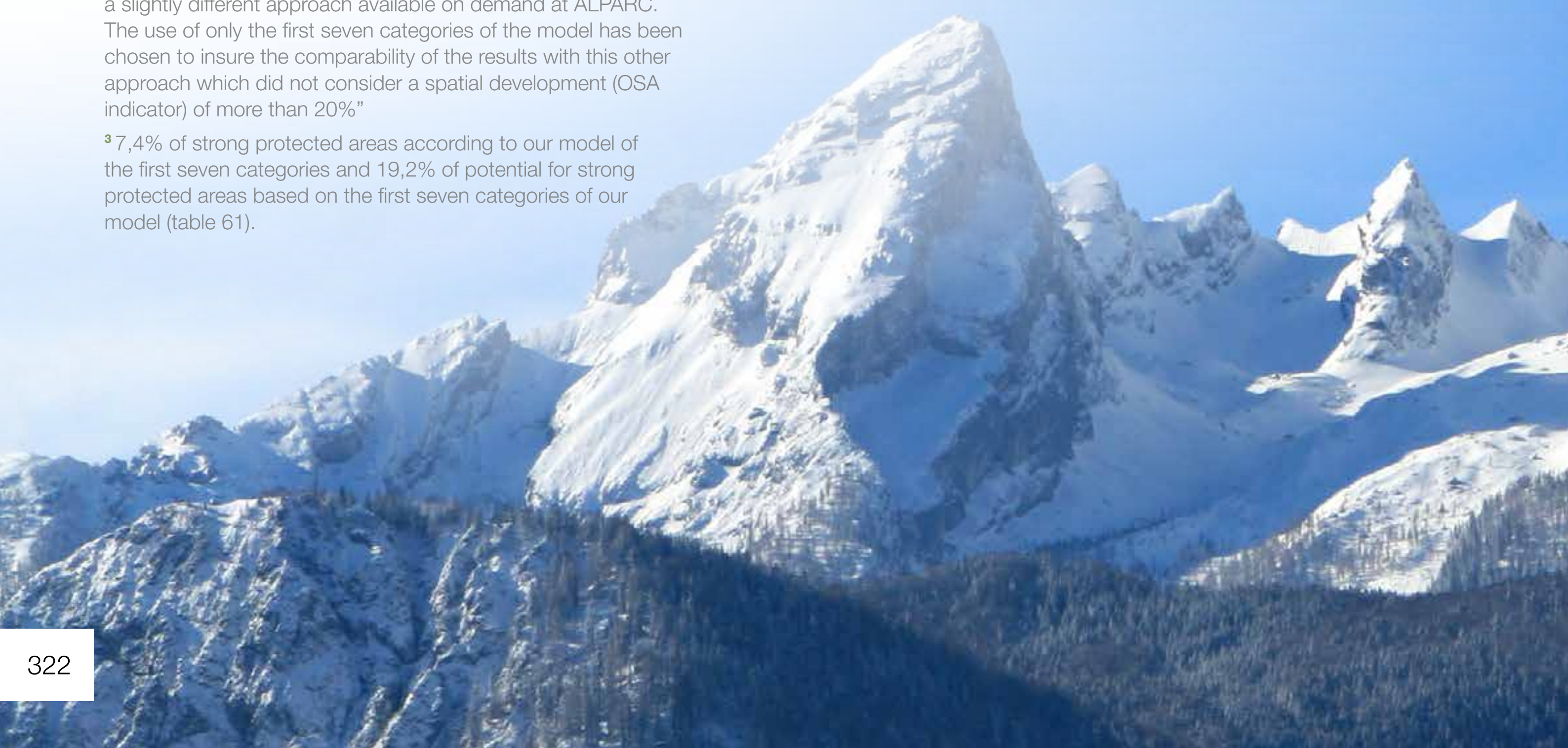
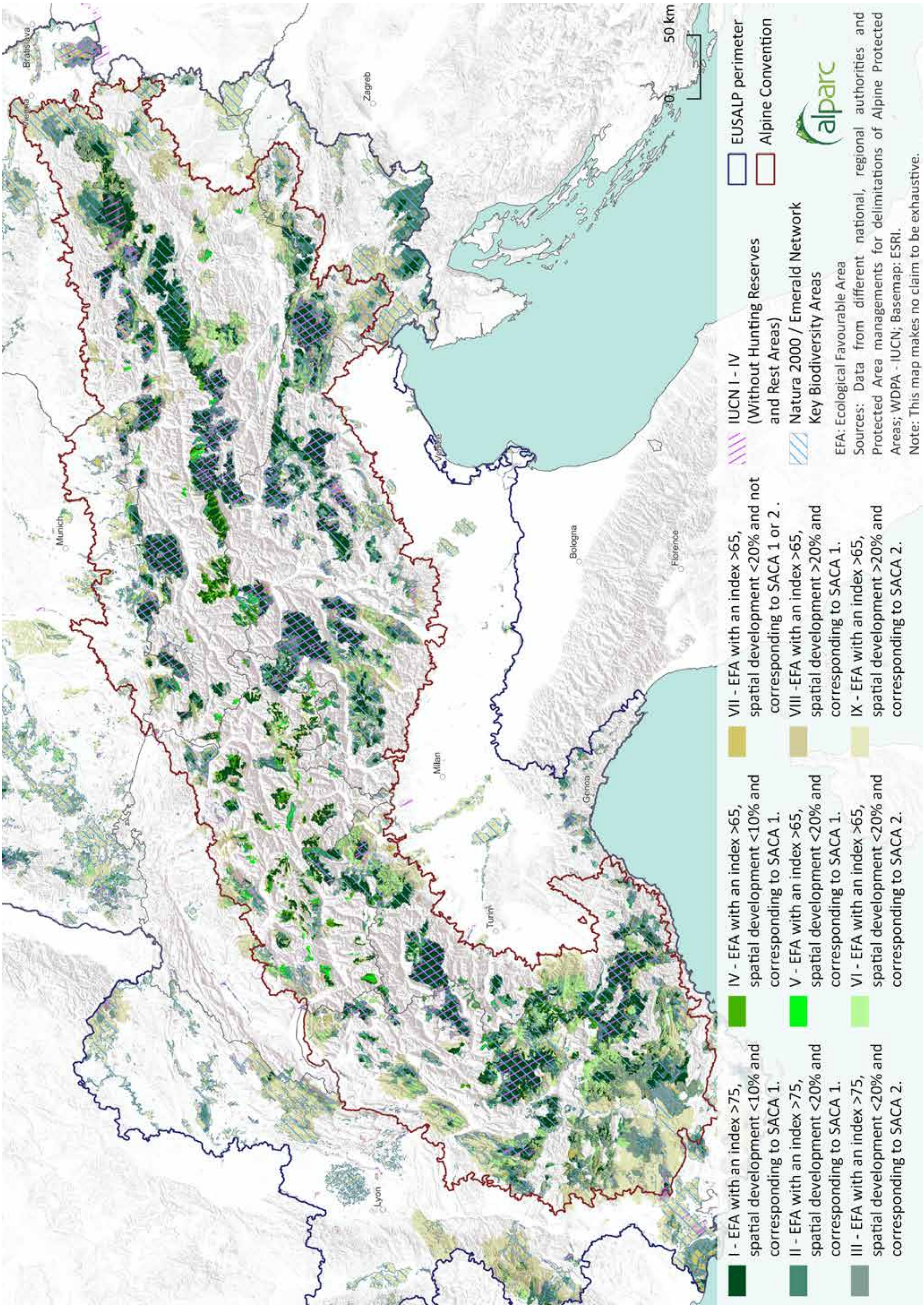


Table 62: Categories of Potential Planning Areas for Biodiversity Protection according to Biodiversity Value and Strong Protection Status (according to Map 114)

			Biodiversity Value and Strong Protection			Only Biodiversity Value without Strong Protection			Only Strong Protection without Biodiversity Value		
			Covered by Natura 2000 / Emerald Network / KBA and IUCN (I-IV)*			Covered by Natura 2000 / Emerald Network / KBA without IUCN			Covered by IUCN (I - IV)* without Natura 2000 / Emerald Network / KBA		
	Category	Surface km²	Surface km²	Distribution within category (%)	Distribution within AC surface (%)	Surface km²	Distribution within category (%)	Distribution within AC surface (%)	Surface km²	Distribution within category (%)	Distribution within AC surface (%)
I	EFA > 75 / OSA < 10% / SACA1	18,773	9,483	50.5%	5.0%	5,516	29.4%	2.9%	545	2.9%	0.3%
II	EFA > 75 / OSA < 20% / SACA1	6,642	1,691	25.5%	0.9%	3,019	45.5%	1.6%	198	3.0%	0.1%
III	EFA > 75 / OSA < 20% / SACA 2	7,913	496	6.3%	0.3%	2,059	26.0%	1.1%	80	1.0%	0.0%
IV	EFA > 65/ OSA < 10% / SACA 1	4,792	608	12.7%	0.3%	2,305	48.1%	1.2%	0	0.0%	0.0%
V	EFA > 65 / OSA < 20% /SACA 1	1,936	308	15.9%	0.2%	857	44.3%	0.4%	21	1.1%	0.0%
VI	EFA > 65 / OSA < 20% / SACA 2	7,649	228	3.0%	0.1%	2,102	27.5%	1.1%	41	0.5%	0.0%
VII	EFA > 65 / OSA < 20% / NO SACA 1 - 2	3,087	353	11.4%	0.2%	1,248	40.4%	0.7%	19	0.6%	0.0%
VIII	EFA > 65 / OSA > 20% / SACA 1	4,410	915	20.7%	0.5%	2,247	50.9%	1.2%	136	3.1%	0.1%
IX	EFA > 65 / OSA > 20% / SACA 2	16,846	527	3.1%	0.3%	4,767	28.3%	2.5%	111	0.7%	0.1%
		72,048	**14,609**	**20.3%**	**7.6%**	**24,119**	**33.5%**	**12.6%**	**1,151**	**1.6%**	**0.6%**

Map 114: Potential Planning Areas for Biodiversity Protection according to Biodiversity Value and Strong Protection Status



Map 115: Potential Planning Areas for Biodiversity Protection according to Biodiversity Value, Strong Protection Status, and Available Surface, to Achieve COP 15's 30x30 Goal

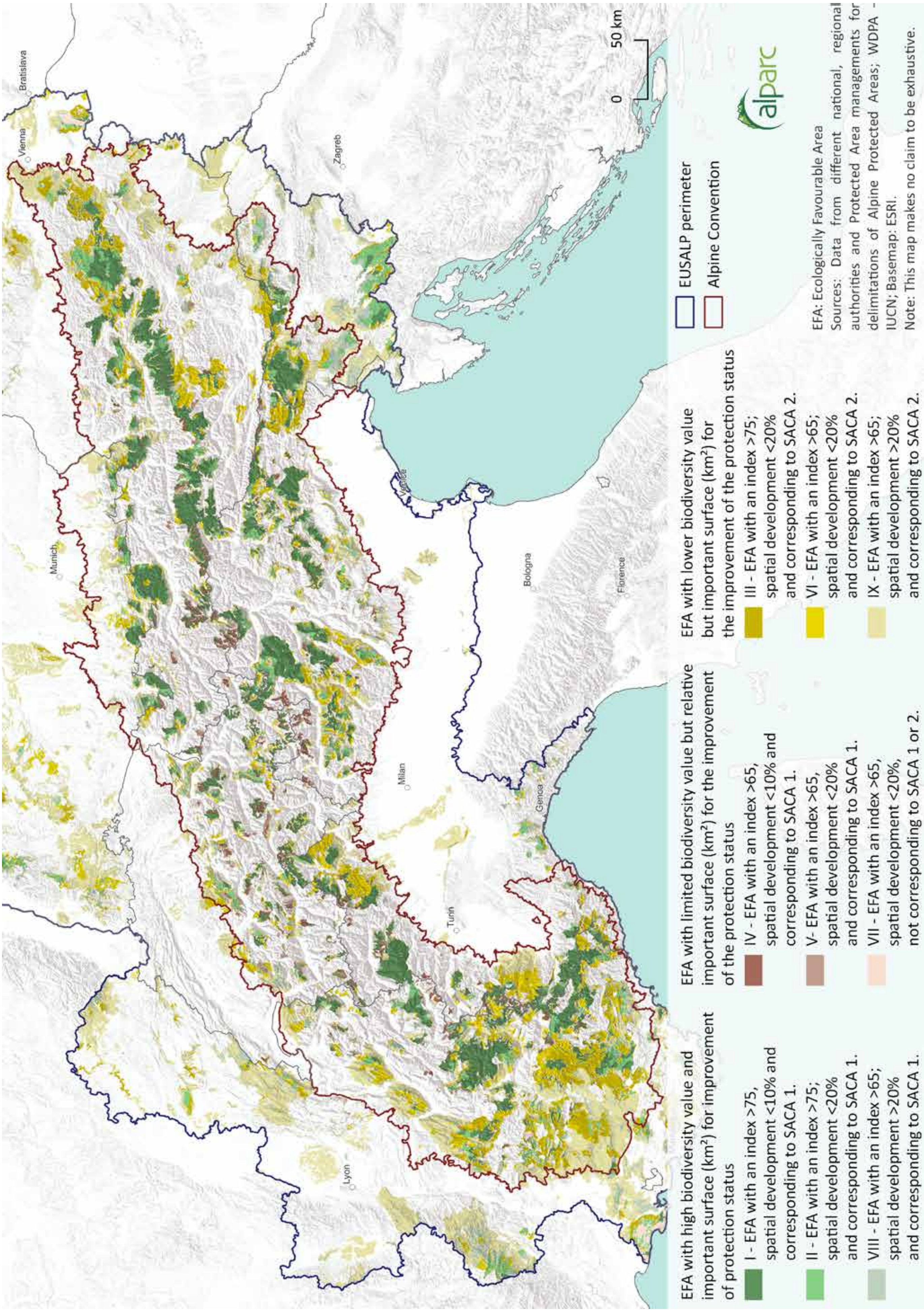


Table 63: Categories of Potential Planning Areas for Biodiversity Protection according to Biodiversity Value, Strong Protection Status, and Available Surface, to Achieve COP 15's 30x30 Goal (according to Map 115)

					Biodiversity Value			Strong protection		
Cat.	**Description**	**Surface km²**	**Distribution within the AC surface[1]**	**STATUS EVALU-ATION (RATING)**	**Surface km²**	**Distribution within cate-gory (%)**	**Distribution within AC surface**	**Surface km²**	**Distribution within cate-gory (%)**	**Distribution within AC surface**
I	EFA > 75 / OSA < 10% / SACA1	18,773	9.83%	**AAA**	14,998	79.89%	7.85%	10,028	53.42%	5.25%
II	EFA > 75 / OSA < 20% / SACA1	6,642	3.48%	**ABA**	4,710	70.91%	2.47%	1,888	28.43%	0.99%
III	EFA > 75 / OSA < 20% / SACA 2	7,913	4.14%	**ABB**	2,555	32.29%	1.34%	576	7.28%	0.30%
IV	EFA > 65/ OSA < 10% / SACA 1	4,792	2.51%	**BAA**	2,913	60.79%	1.53%	608	12.68%	0.32%
V	EFA > 65 / OSA < 20% / SACA 1	1,936	1.01%	**BBA**	1,165	60.18%	0.61%	329	17.01%	0.17%
VI	EFA > 65 / OSA < 20% / SACA 2	7,649	4.00%	**BBB**	2,331	30.47%	1.22%	269	3.52%	0.14%
VII	EFA > 65 / OSA < 20% / NO SACA 1 -2	3,087	1.62%	**BBC**	1,600	51.83%	0.84%	372	12.05%	0.19%
VIII	EFA > 65 / OSA > 20% / SACA 1	4,410	2.31%	**BCA**	3,162	71.70%	1.66%	1,051	23.84%	0.55%
IX	EFA > 65 / OSA > 20% / SACA 2	16,846	8.82%	**BCB**	5,295	31.43%	2.77%	638	3.79%	0.33%
TOTAL		**72,048**	**37.72%**		**38,729**	**53.75%**	**20.28%**	**15,760**	**21.87%**	**8.25%**

EFA with high biodiversity value[2] and important surface (km²) for improvement of protection status

EFA with limited biodiversity value but relative important surface (km²) for the improvement of the protection status

EFA with lower biodiversity value but important surface (km²) for the improvement of the protection status

[1] Alpine Convention Perimeter 190,989 km2 (GIS area).

[2] These areas and especially the first group have already an important surface protected but still a high surface potential for more efficient nature protection (e.g. between 46,58 – 76,16% of the overall surface of the three categories of this first group)

Map 114 shows the distribution of strong protected areas within the Ecologically Favourable Areas (EFA) covered by surface areas with high biodiversity level (or value) presented by the KBA and Natura 2000 layer. Generally, the surface of those areas is decreasing accordingly from category I to IX. (see table 62) This comes as no surprise, as the protected area status is part of the definition of the EFA. This approach by categories of EFA, combined with the spatial development (OSA) and the ecological connectivity indicator (SACA), allows for a more precise level of analysis according to these features, showing in which category the most surface area is available for the establishment of protected area expansion (tables 61 and 63).

By considering the overview on an alps-wide level, (Map 114 and Table 62) it becomes evident that the areas with the highest frequency of such features (protection level and biodiversity value) are mostly situated in the center of the Alps, and that the Natura 2000 sites and the KBA are indeed concentrated within strong protection areas. It could therefore be interpretated that protected areas are presenting good levels of alpine biodiversity, but it could also be assumed that biodiversity data is more present in protected areas, especially in strong protected areas due to research and long-lasting monitoring programs.

Table 62 shows that by applying all the criteria of the most favourable ecological areas, combined with the presence of a Natura 2000 site or a KBA, the strong protected areas are still present within up to 7,6% of the Alpine Convention's surface. Areas with high biodiversity value that are not strongly protected, while being situated in a spectrum between 26 and 50.9% of the different categories, seem not to be representative of the overall surface area of the Alpine Convention perimeter (12.6%). This is confirmed with the data concerning the distribution of strong protected areas without a significative biodiversity value according to the presence of Natura 2000 or KBAs. Only 0.6% of the whole Alpine space is confronted with this exceptional situation.

Globally, one can confirm that the strong protected areas seem to represent the biological value of the Alpine area well, according to the Alpine Convention's perimeter, but can also state that with only 7.6% of the area fulfilling all the variables employed in this analysis, the Alps are still far from achieving the 30x30 goal of COP 15.

The different figures of strong protected areas: 10.4% (table 58) according to only IUCN criteria; 8.25% (table 63) according to the distribution of strong protected areas within the 9 defined categories (calculated for the whole Alpine area); and the 7.6% of strong protected areas (table 62) according to their presence within the 9 categories, coinciding with areas of high biological value according to our definition and available data, can only be explained by the fact that criteria with higher exigences have been applied by us on the "only" IUCN criteria. These criteria have been necessary in our mind to better reflect the Alpine situation of a very intensively used mountain range.

The IUCN figures include the hunting reserves (especially in Switzerland and France) and Rest Areas as well. For the ALPARC data these sites have not been considered because of their different category status.

An alpine spatial planning model for protected areas

Maps 114 and 115 are based on data that has been adapted for an alpine spatial planning model to achieve the 30% goal of efficient protected areas of COP 15. This overall approach for the Alpine Convention perimeter consists of identifying the most favourable areas for the expansion of the existing network of protected areas. The established protection status of different protected areas has been considered, together with its ecological significance ("biodiversity value" criteria).

While on an alps-wide level, and according to the overall figures for the Alps, it is theoretically possible to achieve 37.72% of surface area protection for the Alps by transforming the whole surface of the 9 EFA categories into "efficient" protected areas, it is interesting to see in which categories the most efficient increase of the global surface of alpine protected areas could be operated. This would allow a more specific spatial planning of the protected areas surface extension and a more realistic planning as well, according to different categories adapted to local situations.

Table 63 shows a ponderation of the different categories, including their biodiversity value; the extension of existing protected areas (and consequently, the current potential for further protection measures), and the overall surface of the category. This ponderation leads to three groups of categories, allowing a prioritisation for protected area spatial planning. The group with the highest biodiversity value has an overall surface area of 29 825 km² (Cat. I, II, VIII)[1], from which between 24-53% of the surface area is already protected by a strong protection status. A second group, which is more limited, but still has a high biodiversity value, provides an overall surface area of 9 815 km² (Cat. IV, V, VII)[2], and an existing (strong) protected area percentage between 12-17%. The final group, with lower biodiversity indices, has an important overall surface area of 32 408 km² (Cat. III, VI, IX)[3]. Only 4-7% of this category is already (strongly) protected, which leads to a high potential of this last group due to its important surface but by considering the lower biodiversity indices (around 30%).

[1] 22 870 km² of this surface corresponds to a high biodiversity value.
[2] 5 678 km² of this surface corresponds to a high biodiversity value.
[3] 10 181 km² of this surface corresponds to a high biodiversity value.

Table 64: Spatial Planning for Alpine Protected Areas - Available Surface Area for more Biodiversity Protection

Category group	Biodiversity indices	Potential increase of protected area surface
Group 1	71 – 80%	16,857 km²
Group 2	52 – 61%	8,506 km²
Group 3	30 – 32%	30,925 km²
TOTAL	**-**	**56,288 km²**

The table shows that the most important part of the Alpine surface according to the Alpine Convention Perimeter (78% in total) of the different categories is still not protected. Especially the first group and the third group shows high potential. To achieve the highest level of biodiversity protection, ecological spatial planning should orientate itself towards the expansion of protected area surfaces based on the ecological representativity of the areas. This indicates that priority should be placed, where possible, to local situations of the higher categories of a group and, if possible, by using the potential of group 1 and 2, before considering group 3 of this planning model.

Such a targeted spatial planning for Alpine protected areas would also contribute to the recently voted Nature Restoration Law within the European Union, a key element of the European Biodiversity Strategy, and a core part of the European Green Deal.

For this spatial planning model, the presence of KBA's and Natura 2000 sites should be considered. They may present interesting "stepping-stones" or areas for a further extension of the protected area system. Nevertheless, especially the Natura 2000 sites are often redundant with existing protected areas in the Alps as it is shown by the following table:

Table 65: Protected Areas, Natura 2000 and Emerald Network – Alpine Convention Perimeter

Category	Surface (km²)	Distri-bution within AC (%)	Distribution within Natura 2000/Emerald Network (%)
Overlay Natura 2000 / Emerald Network and strong protected areas (IUCN I - IV) *	14,254	7,5%	37%
Overlay Natura 2000 / Emerald Network and (all) alpine protected areas	22,581	11,8%	58%

**Surface without the IUCN IV - Hunting Reserves (National and Federal) and the Rest areas*

The model finally shows that with a conscientious spatial planning system (Step 3) based on zoning of the most favourable areas according to the chosen criteria and indicators and with the implementation of the planning results, the goal of the 30% could be (theoretically) achieved by considering the available and suitable territory[1]. Such a spatial planning system for Alpine biodiversity would be comparable to - but more complex than - the previously mentioned Bavarian "Alpine Plan". The success of the latter indicates that deployment of consequent planning by zoning is the most promising approach.

A long-term solution for the biodiversity protection in the Alps is indeed a zoning strategy comparable to the Bavarian Alpine Plan: dividing the Alpine space according to zones of different protection categories or, as defined by the COP 15 decision, "area-based conservation measures" contributing to the 30% goal.

As illustrated by the simulation of Step 2, it seems difficult to reach the 30% goal of efficient protection with traditional and even very strong measures (such as an extension of all existing strong protected areas by 25% and the attribution of a strong protection status to less protected areas). Nevertheless, if the territory potentially available identified by Step 3 would be designated as strong protected areas, the goal could narrowly be achieved!

Finally, it is not very realistic to expect that all available areas for biodiversity protection identified in Step 3 will be transformed into protected areas according to IUCN categories I-IV. Even if a coherent spatial planning concept for biodiversity protection similar to the Bavarian Alpine Plan accepted by Alpine states could be established, the potential for "*green-washing*" to achieve the goal remains a danger by including all protected areas with a low protection status or to proceed by the establishment of further weak protected areas and traditional forms of spatial protection only.

New forms of territorial nature protection need to be invented and applied. The Alps, as an area of intensive land use by diverse activities – especially tourism, need concepts adapted to this fragile and highly frequented mountain range.

Concepts such as light-free parks or silent areas, and specific protection forms for energy-free production areas would be protection categories responding to the challenges of our time. Protected zones around horizontal and vertical transects could complete the existing protected area models. These areas of "vertical and horizontal wilderness" could be mindfully dedicated to research and monitoring as early warning systems observing the loss of habitats and species in the context of climate change.

The so-called area-based conservation measures, linked to a more contractual nature protection approach considering private properties, need to be further developed. Besides very specific local protection forms related to singular features, a minimum surface area for all forms of spatial protection is recommended. Based on numerous references in the specialised literature, this would entail 1,000 hectares for an efficient area protection[2] and 100 hectares for areas considered as "stepping-stones" between ecologically functioning habitats. These are crucial elements to make ecological corridors efficient and to establish the Alpine ecological network. Well-conserved and connected areas offer the most promising route to achieving the COP 15 goal of 30% in the long term.

The protected areas of 2030 must be more flexible, locally adapted to specific situations, and large enough to be efficient for the protection of biodiversity for generations to come. This is a considerable challenge. Many elements have been discussed within this report, others will be developed in the coming years - especially the topic of protected areas claimed and managed by local populations. The aspirational notion of "Our Park"[3] will be one of the strongest concepts of the future.

The concept of "Our Park" would probably be very much adapted for categories V-IX of the model described before. This means in areas exposed to important land-use conflicts and where a common concept of nature protection among the regional stakeholder and the population is of particular interest. Especially for sites where those areas present high ecological connectivity functions (SACA1), and where a social understanding and motivation for their preservation is crucial.

Solutions can take different forms but must always respond to the other very central claim of the COP 15: "*Reduce to near zero the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity".*

Local participation and responsibility of local communities is the key concept to achieve the 30% goal. The Alpine countries enjoy the shared resource of an international treaty ratified by all Alpine states – The Alpine Convention. This instrument must be the trigger and framework to launch meaningful coordination between the Alpine countries to create and strengthen Alpine protected areas according to its Nature Protection Protocol and the recent decisions of the COP Biodiversity.

***

[1] Not considering specific local situations and circumstances and the ownership of the land.

[2] 10 000 hectares as an absolute minimum for a national park would be our recommendation.

[3] See chapter F.5.2.

F.9

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G

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H

ANNEXES

H.1

STEERING GROUP AND FURTHER EXPERTS

To gather and to check information, we have been in contact with a multitude of protected area managers and other professionals within the conservation community. A key role was insured by the Project Steering Committee in helping with the consistency and accuracy of the project and report. We would like to express our gratitude to all the people who have participated in the Project Steering Committee (as listed below). The inquiries were made by different means, such as via email, telephone, personal interviews, and workshops.

We are very grateful to all who helped gather the information, documents, and who contributed their own extensive knowledge – without them, this work wouldn't have been possible.

A special thanks to the Swiss National Park, its director Dr. Ruedi Haller, and his staff, who helped with numerous simulations and maps within this report, especially in the Ecological Connectivity section in Chapter 3.

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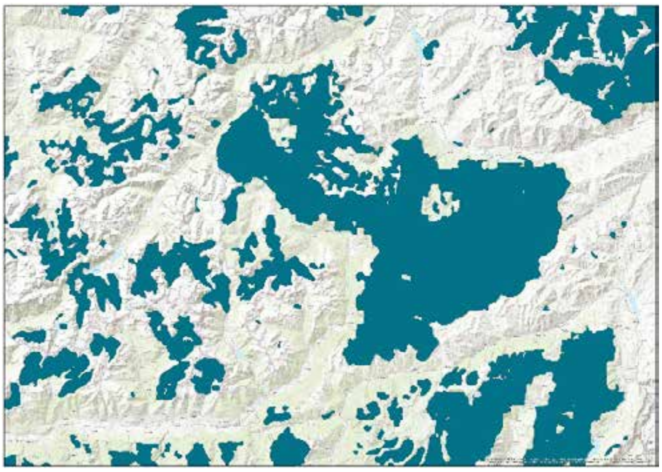
Name	Alpine Parks 2030
Prof. Dr. Mario Broggi (FL)	Steering group member Alpine Parks 2030
Dr. Michael Vogel (D)	Steering group member Alpine Parks 2030
Dipl. Ing. Bernhard Schön (A)	Steering group member Alpine Parks 2030
Emmanuel Michau (F)	Steering group member Alpine Parks 2030
Dott. Patrizia Rossi (I)	Steering group member Alpine Parks 2030
Marie-Odile Guth (F)	Steering group member Alpine Parks 2030
Martin Solar (SI)	Steering group member Alpine Parks 2030
Andi Götz (CH)	Steering group member Alpine Parks 2030
Dr. Peter Oggier (CH)	Steering group member Alpine Parks 2030

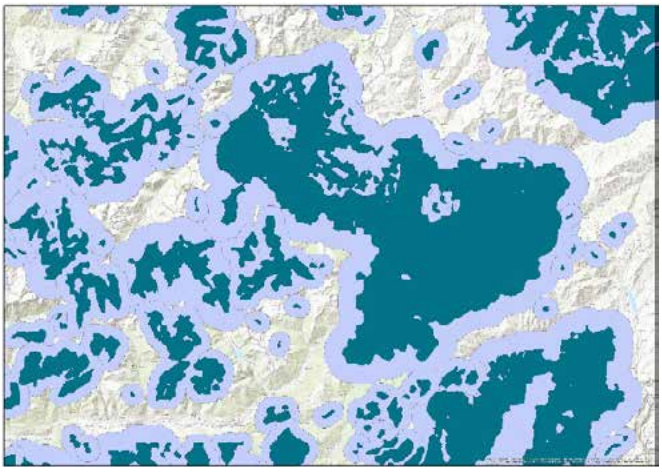
H.2

BUILDING CONNECTED AREAS

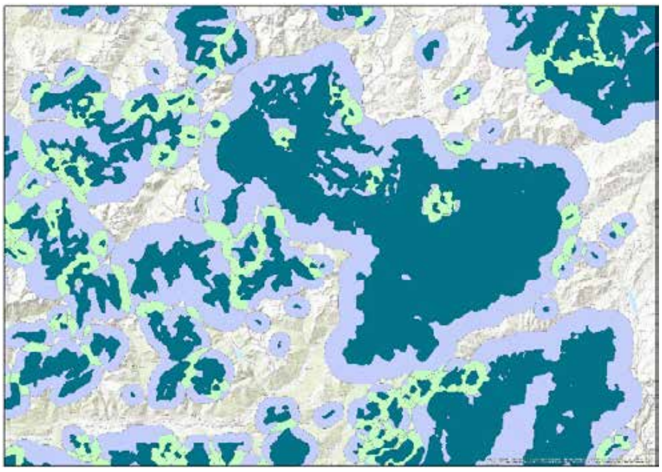
1. Ecological Conservation Area – SACA 1



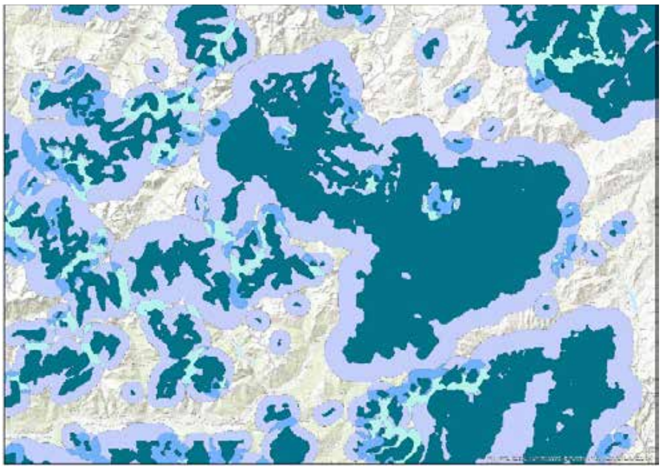
2. Buffer around SACA 1 – 2.5 km



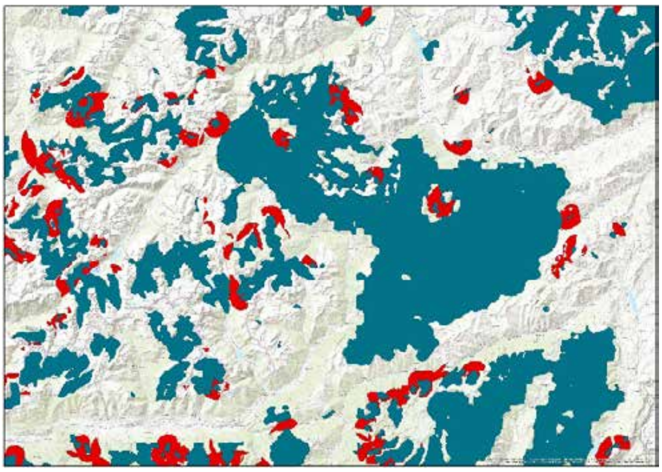
3. Selection of buffer that intersect with SACA 1



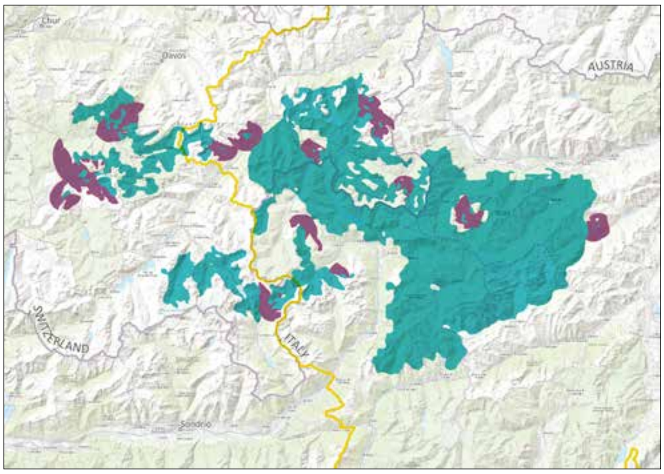
4. Selection of buffer zones from point 3 inside a SACA 2



5. Identification of potential corridors between SACA 1



6. Enlargement of potential corridors by ~300 m – creating connected areas



H.3

TYPOLOGY OF ALPINE PROTECTED AREAS

Typology of Alpine protected areas

Protected area type	Country	IUCN equivalent	Goals					Zoning	Mgt. Plan	Monitoring	Human impact regulation: Human settle-ments/ construction	Human impact regulation: Hunt- ing	Human impact regulation: Tourism w/infra-structure	Over-lapping PA types?	Legal competence for desig-nation/ admi-nistration	Remarks
			Nature/ biodiv. cons.	Research	Outreach/ visitor educ.	Recr.	Sust. reg. devel.	Y/N	oblig./ usually Y/N	oblig./ usually Y/ N	Y/N/temp.	Y/N	Y/N/ restricted	(e.g. biosphere reserve, NP)		
Wilderness area (France: integral reserve)	Austria	I	1	1	2	res	-	Y	oblig	oblig	N	res	res.	Y	prov.	The Rothwald Primeval Forest is the only area in Austria that follows the concept of the "Wilderness Areas", the highest protection category of the IUCN. It overlaps with Natura 2000 area Ötscher-Dürrenstein; wildlife-ecological management (regulation) even in the core zone
	France	I	1	1	N	N	-	Y	oblig	oblig	N	N	N			Corresponds to wilderness area, no tourism, no access to the public
	Germany (Bavaria)	-	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Italy (Riserve integral)		1	1	N	N	-	Y	oblig	-	N	N	res.	Y		Val Grande National Park
	Liechtenstein	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Switzerland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Although not called such, the Swiss National Park corresponds in terms of protection to an integral reserve in France.
National Park (core) (incl. special protection zones)	Austria 1/	II	1	2	2	2	N	Y	oblig	oblig	N	Y*	res.	Y	prov; distr. Admin./mgt. committee	* Insofar as it is necessary to secure the protective purpose of a special protection area, the provincial government prohibits any or a certain type of use, including agricultural and forestry use and the pursuit of hunting and fishing or entering territory or parts thereof.
	France	II	1	2	1	1	1	Y	oblig	oblig	res.	N	res.	-	fed; admin. Council	
	Germany (Bavaria)	II	1	2	2	2	2	Y	oblig	oblig	N	N/res.	res.	Y	prov; NP admin.	Core zone goal 75%; hunting restricted, regulation possible in exceptional situations, no wildlife feeding
	Italy	II	1	1	1	2	1	Y	oblig	oblig	N	N	N	Y	fed./admin. (Ente parco)	The core zone is classified as integral reserve (riserve integral), where nature is protected in its entirety. No agriculture or other human impact, in integral reserves. No hunting in integral reserves, or in Nature reserves, but exception rules (no hobby hunting)
	Liechtenstein	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Slovenia	II	1	1	2	2	-	Y	oblig	Y	-	N	res.	Y	Natl.forest service/NP Adm.	TNP is dived into three zones, 1st protection zone where hunting IS NOT ALLOWED, 2nd and 3rd protection zones where hunting is allowed. However, both 1st and 2nd protection zone constitute the CORE ZONE Infrastructure is regulated, all tourism which negatively affects natural and cultural heritage is prohibited. It overlaps with a Biosphere reserve and Natura 2000.
	Switzerland	Ia/Ib	1	1	2	2	-	Y	oblig	Y	N	N	N	Y	natl.	The SNP protects nature in the park against all human impact. This National Park is more strictly protected than any other NP in the Alps. It de-facto corresponds to what is elsewhere called a Wilderness Zone. Unlike in other Alpine National Parks, not even agriculture is allowed or pasturing. Tourism is regulated, even without infrastructure.

Protected area type	Country	IUCN equivalent	Goals					Zoning	Mgt. Plan	Monitoring	Human impact regulation			Over-lapping PA types?	Legal competence for desig-nation/ admi-nistration	Remarks
											Human settle-ments/ construction	Hunt- ing	Tourism w/infra-structure			
			Nature/ biodiv. cons.	Research	Outreach/ visitor educ.	Recr.	Sust. reg. devel.	Y/N	oblig./ usually Y/N	oblig./ usually Y/ N	Y/N/temp.	Y/N	Y/N/ restricted	(e.g. biosphere reserve, NP)		
National Park (buffer zone)	Austria	V	1	2	2	2	2	Y	oblig	?	Y	Y	res.	Y	prov; distr. admin./mgt. committee	
	France	V	1	-	-	-	-	Y	oblig	?	Y	res.	Y	Y	fed; admin. Council	French property owners may prohibit hunting on their property
	Germany (Bavaria)	V	1	2	2	2	2	Y	oblig	?	Y	Y	Y	Y	prov; NP admin.	
	Italy	V	1	1	1	2	1	Y	oblig	?	res.	N	res.	Y	fed; NP admin.	In Italy zoning is in several categories in addition to the core (riserve integral) - Riserve Generali Orientate, Aree di protezione, Aree di promozione economica e sociale - with progressively less focus on conservation and more on sustainable development, but all with the overall goal of protection
	Liechtenstein	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Slovenia	V	1	2	1	1	2	Y	oblig	Y	Y	Y	res.	Y	natl.	Triglav NP is part of the Julian Alps Biosphere Reserve; it is unique among NPs in that it has a park administrator designated by State parliament
	Switzerland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	The entire Swiss National Park is considered core zone of a biosphere reserve; the "buffer zone" would then be the area that is adjacent and has been designated part of the Biosphere Reserve
Nature reserve (nature conservation area)	Austria (Naturschutzgebiet)	IV	1	2	2	2	-	N	usually Y	N?	N	Y	res.	Y	prov/distr. Admin.	Exception: agricultural and forestry uses "to the usual extent"
	France (Réserve naturelle nationale)	IV	1	1	-	-	1	some	-	-	res.	res.	res.	-	prefect	Human impact can be limited oder forbidden by special decrees; in France there are also regional equivalents to most protected area categories. These are not listed here.
	Germany (Bavaria) (Naturschutzgebiet)	IV	1	2	2	2	-	Y	-	-	N	Y	N	Y	prov. (Ministry)	zoning is not mandatory, but there may be zones with different protection levels; tourism only without infrastructure
	Italy 2/ (Riserve Natural)	IV/I	1	-	-	-	-	N	Y	-	res.	N	res.	?	natl./mgt. body	The nature reserves may be national (statale) when their importance is great, or regional (Regione) when they are less important
	Liechtenstein	V	1	1	-	-	-	Y	-	-	res.	res.	-	?	natl./ communities	Around Nature reserves there should be buffer zones to protect these areas.
	Slovenia (Naravni rezervat)	I/IV	1	2	-	-	.	possible	-	-	res.	res.	res.	Y	natl. or local authorities	Nature reserves may be part of a National Park zone. The Nature Conservation Act defines restrictions and prohibitions in Nature Reserves. There are strict and regular Nature Reserves. Anything that could damage biodiversity or the structure and function of ecosystems or endangered species is prohibited, except for research and education with Ministerial permit.
	Switzerland (Appenzell: Naturschutzzone)	IV	1	-	-	-	-	N	-	-	res.	Y	N	-	Canton/distr.	In Appenzell, hunting is allowed, but tourism is prohibited in "Naturschutzzonen"
Landscape protection area	Austria	V	**1**	-	-	**1**	-	N	N	N	res.	Y	Y	-	prov/distr. admin.	Construction of roads, afforestation, air traffic need special permit
	France	V	2	-	-	-	-	N	N	N	res.	Y	res.		State	
	Germany (Bavaria)	V	1	-	-	1	1	N	N	N	res.	Y	Y	Y	district admin.	Any action that contravenes the protection goals is prohibited; new construction activity restricted
	Italy (Bolzano - Alto Adige: Zone Corografiche/ Paesaggi Protetti)	-	1	-	-	-	-	N	N	N	Y	Y	-	-	Prov.	In Bolzano - Alto Adige there are "wide landscapes/landscape protection areas" that are established to minimise pollution and noise.
	Liechtenstein	IV	1	-	-	1	1	N	N	N	Y	Y	Y	-	natl./ communities	
	Slovenia (Krajinski park)	V	1	-	1	1	1	N	N	N	Y	Y	Y	Y	natl. or local authorities	Natura 2000 (e.g. Logar Valley Landscape Park), also natural monuments and assets of national and local importance
	Switzerland (Appenzell: Landschaftss-chutzzone)	V	-	-	-	1	2	N	-	-	Y	Y	res.	-	distr.commun.	These areas are instituted for recreation or cultural reasons, not for nature protection per se. They are controlled by different organisations from forestry, hunting and fishing, or the police.

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Protected part of a landscape	Austria	III	**1**	2	-	2	-	N	N	N	res.	Y	res.	N	distr.admin. (prov.)	Only for (relatively small) areas that are not already part of a protected area and that cannot be designated a natural monument; may or may not contain human settlements
	France (Sites classés)	III	1				-	N	N	N	res.	Y	N	-	Dept.	No camping, building of tourism villages, no billboards (except with Ministry permit)
	Germany (Bavaria)	III	1	-	-	1	1	N	N	N	res.	Y	Y	Y	district admin.	
	Italy (e.g. Piemonte Zone di Preparco/ di Salvaguardia;)	-	2	-	-	1	1	Y/N	-	-	res.	Y	Y	Y	Reg.	In Piemonte there are "Pre-Park zones" or "Protection zones" established to create a buffer between strictler park regulations and the surroundings of parks. It is similar to a NP buffer zone. It may or may not be zoned, and in them there may be isolated biotopes.
	Liechtenstein	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Switzerland (e.g. Plant protection)	V	1	1	-	1	-	N	-	-	N	res.	N			(Data from Reservat Vanil Noir, botanical reserve istablished by NGO)
Special conserva-tion area (Sonder-schutzgebiet)	Austria (Carinthia, Salzburg,Tirol)	-	1	2	-	-	-	N	-	-	N	Y	N	Y	prov; distr. Admin	Special type of Nature Conservation Area, where any impact on nature is normally prohibited, but exceptions are possible, e.g. for "customary agriculture and forestry". Fishing and hunting require a special permit. It is possible to prohibit access, but usually hiking is allowed on designated paths.
	France (biotopes, Type 1)	-	1	-	-	-	-	N	N	N	res.	Y	res.	-	state (prefect)	Special type of habitat protection areas for biodiversity protection. Traffic may be restricted if necessary.
	Germany (Bavaria)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Italy (e.g. Friuli/ Piemonte/Alto Adige: biotop)	IV	1	1	-	-	-	-	-	-	-	res.*	res.	Y	reg../prov./ communities	Natural "biotopes" are of limited extent and can be designated outside of parks and protected areas by decree of the Regional Assembly in cooperation with the concerned communities. They are characterised by natural elements of extraordinary interest and in danger of destruction. There are currently 33 biotopes in Friuli-Veneto. Incentives are paid for special eco-agricultural measures. *In Bolzano-Alto Adige, biotopes appear to have a level of protection similar to nature reserves elsewhere, with restrictions on hunting and tourism infrastructure.
	Liechtenstein (Plant protection areas)	-	1	-	-	-	-	-	-	-	-	-	res	-	natl/community	Alpine plants in plant protection areas must not be picked or damaged.
	Slovenia	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Switzerland (e.g.waterbird reserve, peatland, floodplain)	IV	1	-	2	-	2	some			N	N	N	Y	Canton	Not all special types have zoning, but e.g. flat moors have buffer zones. Moors and other special habitat types may also be contained in other protected areas. Any type of activity that could damage peat lands/moors is prohibited. In waterbird habitats, hunting is prohibited, in other special habitats, it is regulated.
(Regional) Nature park	Austria	IV/V	2	1	1	1	2	N	N	N	Y	Y	res.	Y	prov; distr. Admin	Not a separate protection category, label awarded to nature conservation or landscape conservation areas that are especially suited for recreation and public outreach
	France (parcs naturels régionaux)	V	1	1	2	2	-	Y	Y	Y	res.	Y	res.	Y	region/mgt. body	within the nature park, there are no special nature protection regulations. Such parks may (but need not) be the basis for a nature protection area within it.
	Germany (Bavaria)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Italy (Parchi Naturali Regionali)	V/IV/I	1	1	1	2	1	Y	oblig	Y	res.	N	res.	Y	region/mgt. body	E.g. Friuli: Julian Pre-Alps. Regional Nature parks are zoned into areas of strict and less strict protection and are also subject to a multi-year management plan, which is established by an administrative body and approved by the Regione. Their aim is to promote initiatives that foster economic, social and cultural growth in the local communities. The Plan may be updated annually. Every regional park has its own administrative entity. Hunting is not allowed.
	Liechtenstein	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Slovenia	V/II	1	1	1	1	1	Y	oblig	oblig	Y	Y	Y	Y		Natura 2000, Biosphere Reserve; this is more or less equivalent to a landscape protection area, but has its own state management plan and management office.
	Switzerland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	

Protected area type	Country	IUCN equivalent	Goals					Zoning	Mgt. Plan	Monitoring	Human impact regulation: Human settle-ments/ construction	Human impact regulation: Hunt- ing	Human impact regulation: Tourism w/infra-structure	Over-lapping PA types?	Legal competence for desig-nation/ admi-nistration	Remarks
			Nature/ biodiv. cons.	Research	Outreach/ visitor educ.	Recr.	Sust. reg. devel.	Y/N	oblig./ usually Y/N	oblig./ usually Y/ N	Y/N/temp.	Y/N	Y/N/ restricted	(e.g. biosphere reserve, NP)		
Natural monument/ natural space	Austria	III	1	-/2	-	-	-	N	N	-	res.	Y	-	Y	district	Small protected objects (often inside a larger protected area, but not necessarily); may or may not be of research or recreation interest
	France (sites classés/sites inscrits)	III	1	-	-	-	-	possible	N	N	res.	Y	res.	-	Mnistry/state council	Protected zones may be declared around the classified sites; no active management is foreseen
	Germany (Bavaria)	III	1	2	-	-	-	N	N		res.	Y	res.	Y	nature protection authority	
	Italy (Bolzano - Alto Adige)	III	1	1	1	2	-	N	-	-	-	res.	res.	Y	prov.	
	Liechtenstein	III	1	-	2	-	-	N	N	N	res.	-	-	-	natl./ communities	
	Slovenia (Naravni spomenik)	III	1	-	-	-	-	N	N	N	res.	res.	res.	-	local authorities	The Nature Conservation Act defines prohibitions and restrictions in the protected area
	Switzerland	III/V (IV)	1	2	-	1	-	possible	-	-	-	-	-	Y	natl./Canton	Further protected areas (peatlands, floodplains, hunting ban areas, etc.) may be part of these Natural Monument areas.
Natural forest reserve ("Natur-waldreservat") or strict protection forest	Austria	-	1	1	-	-	-	N	-	Y	N	Y	-	N	private contract with province	Focus on preserving different natural forest types. Natural forest reserves are usually contract-based with private forest owners. All types of forest management is prohibited by contractual obligation for usually 20 years. There are 200 such reserves in Austria, total 8.603 ha. 33% belong to the Bundesforste AG. Hunting is mandatory to protect the trees.
	France (banbois/ Bannwald)	-	1	-	-	-	-	N	-	-	res.	Y	res.	-	state forest office	Focus on protection of forest per se, not as habitat. No off-road traffic, visitors subject to regulations
	Germany (Bavaria)	IV	1	1	-	-	-	N	-	Y	res.	Y	Y	Y	Ministry of agric./ dept. of forestry	Can overlap e.g. with Natura 2000; no harvesting, unless out of necessity
	Italy															
	Liechtenstein (Forest Reserve /& protected forest)	1b/IV	1	-	-	-	-	N	N	N	-	-	-	-	natl.	Liechtenstein has 9 Forest Reserves and 22 designated protected forest areas. Strictly protected forest reserves are designated by the Ordinance LGBl. 2000 Nr. 230 in order either to allow forest ecosystems to develop according to their inherent dynamics (70 %) or to preserve endangered vegetation units by specific management and conservation measures (30 %). Old stands of typical Forest-Vegetation Types are specially preserved in order to conserve the gene pools of the respective trees, also in respect of the – limited – afforestion activities or the artificial reproduction.
	Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Switzerland		1							Y						Since the revision of the Forest Act in 1991, the federal government's "Forest Biodiversity" strategy has been in place, promoting natural forest reserves.
Hunting and game protection area	Austria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	In some areas there is no hunting, but no legal protection
	France	IV	1	1	1	-	-	N	-	-	res.	N	res.	-	state (prefect)	In the RCFS and RNCFS, any act of hunting is in principle prohibited. However, the order establishing the reserve provides for the execution of a hunting plan or a game management plan when it is necessary for the maintenance of biological and agro-sylvo-cynegetic balances. The conditions of execution of this plan must be compatible with the protection of game and the preservation of its tranquility.
	Germany (Bavaria)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Italy	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	e.g. Prealpe Giulie, no hunting inside the park
	Liechtenstein	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Wildschutzgebiete?
	Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	Core zone hunting? Probably no
	Switzerland	IV	1	-	-	-	-	Y	Y	Y	N	N	N	-	Cantons, based on fed.invent.	Jagdbanngebiet Cat.1 - no kill rule; Cat. 2 and 3 regulated; Zoning via "Wildschadenperimeter", special measures for habitat and species protections; enforced by rangers

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Natural recreation area	Austria		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	France		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Germany (Bavaria)		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Italy (Friuli-Veneto: Aree di reperimento; Piemonte Aree Attrezzate)	.	1	-	1	1	-	N	N	N	res.	N	res.	Y	Regione	This type of area seems unique to Italian regions In Friuli, there is no hunting, no forestry, and tourism infrastructure or other construction is restricted. Agriculture is allowed, in Piemonte these are intended to safeguard nature and provide sustainable recreation opportunities, but unlike in Friuli, human impact is less strictly regulated.
	Liechtenstein	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Switzerland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
Quiet zone ("Ruhegebiet")/ Extraordinary protected area ("Sonderschutzge-biet")	Austria (Tirol only)	V	1	-	-	1	-/2	N	N	N	N	Y	res.	?	prov/distr. Adm.	High elevation; No noise, new roads, airtraffic, cablecars, lifts, special permit for car traffic
	France	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Germany (Bavaria)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Italy	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Liechtenstein	III	1	-	-	-	-	N	N	N	-	-	-	-	natl./ communities	large-scale habitats for wildlife that should remain quiet and avoid disturbances by recreational activities. Agriculture and forestry has to respect the quality of life of wildlife.
	Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
	Switzerland	V	1	2	2	-	-	-	-	-	-	N	res.	-	Canton	These are areas where wildlife is protected primarily during the winter months to allow them to rest. Such zones are instituted by rangers or hunters or ornithologists, usually because of a regional problem such as decreases in species populations in optimal wintering grounds, or also willife damage to forests.

1/ For Austria, laws and designations differ among the Provinces, but all Austrian protected area designations are represented here, except for flora protection area (Vorarlberg only). The designations in Tirol were used as an example. Nature parks may overlap with landscape PAs, quiet zones, Nature reserves, special conservation areas, or natural monuments, and Natura 2000 areas, and vice versa. The category example for a UNESCO Biosphere Reserve in Austria draws on the Carinthian Nockberge/Lungau. It overlaps with other PAs, such as Natura 2000, Nature reserves, landscape protection areas, and natural monuments.

2/ For Italy, there are different categories in different Regions. The examples listed here are taken from the Regione of Friuli-Veneto, Piemonte, and the Autonomous Province of Bolzano - Alto Adige.

Legend
1 = primary goal
2 = secondary goal

Y = allowed
res. = restricted or regulated
N = prohibited
- = no information
n.a. = not applicable

H.4

SIMULATIONS OF CLASSIFICATION SCHEMES

The classification schemes allow to indicate the values attributed to the selection of indicators for the Step 1 and 2. The results were obtained through the combination of four indicators and only two of this selection were modified with a new value assignation on the Step two.

Protection scope

PS = (Surface*0.5) + (Protection status*0.5)

Surface original values – Step 1

Surface km²	Value
> 100	100
50 - 100	80
10 - 50	60
5 - 10	40
< 5	20

Protection status values – Step 1

Category	Value
IUCN I	100
IUCN II	80
Strong protection without IUCN I and II	60
Other protected areas Natura 2000	40
No protection status	0

Changes considered on protection scope only for Step 2

Protection status

Step 1	Minimum	Medium	Optimum	Value
IUCN I	IUCN I	IUCN I	IUCN I	100
IUCN II	IUCN II	IUCN II	IUCN II	80
Strong protection* without IUCN I and II	Step 1+ KBA	Step 1 + KBA + weak protection**	Step 1 + KBA + weak protection + Other IUCN categories	60
Other protected areas ***	Other protected areas	Step 1 - excluding weak protection	Step 1 - Excluding weak protection and IUCN categories	40
Natura 2000	Natura 2000	Natura 2000	Natura 2000	
No protection status	No protection status	No protection status	No protection status	0

* *Nature reserves, Italian nature parks from ALPARC Protected Areas Database*
** *Other protection categories from ALPARC Protected Areas Database*
*** *Other protection categories from ALPARC Protected Areas Database and WDPA Database*

Surface

Minimum	Medium	Optimum
Increase 10% surface Strong protected areas - IUCN I, II, nature reserves, Italian nature parks)	Increase 20% surface Strong protected areas - IUCN I, II, nature reserves, Italian nature parks)	Increase 25% surface Strong protected areas - IUCN I, II, nature reserves, Italian nature parks)

Topography

TP = (Value Altitude*0.5) + (Value slope*0.5)

Altitude	Value
< 1,000	100
1,000 – 1,500	80
1,500 – 2,000	60
2,000 – 2,500	40
> 2,500	20

Slope	Value
< 30º	100
30 - 40º	80
40 - 45º	60
> 45º	40

Connectivity

Connectivity original values – Step 1

Category	Value
SACA 1	100
SACA 2	50
SACA 3	40
No classification	0

Changes considered on connectivity only for Step 2

Category	Value
Connected areas	100
SACA 2	50
SACA 3	40
No classification	0

Spatial development

Category	Value
0 - 10	100
10 - 20	80
20 - 30	60
30 - 50	40
> 50	20

H.5

INDICATORS SELECTION – INTERMEDIATE SIMULATIONS

STEP 1

Phase 1
Relevant indicators to measure criteria related to the current state of Alpine Protected Areas

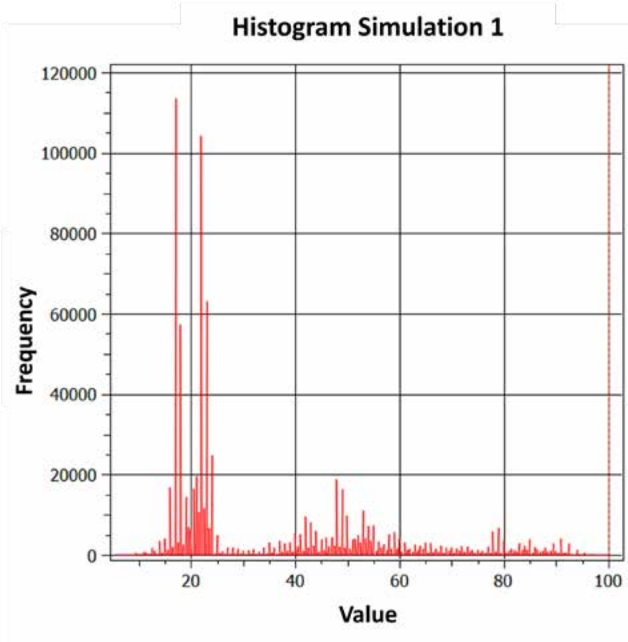
A selection of seven criteria and eight indicators were included in the analysis of the selection of key features of Alpine protected areas. The table below shows the relation between the assigned values and the defined classes.

Table 1 (H.5):

Criteria	Indicator	Weight	Class indicator	Class value
Surface	Protected areas surface ALPARC database and WDPA	0.2	> 100 km²	100
			50 - 100 km²	80
			10 - 50 km²	60
			5 - 10 km²	40
			< 5 km²	20
	Natura 2000 surface	0.1	> 100 km²	100
			50 - 100 km²	80
			10 - 50 km²	60
			5 - 10 km²	40
			< 5 km²	20
Topography TOP= 0.5*value altitude + 0.5 value slope	Elevation segments	0.15	max	100
			min	30
Connectivity	SACA	0.1	SACA 1	100
			SACA 2	50
			SACA 3	40
			Not classified	0
Protection status	Protected areas ALPARC database and WDPA	0.15	IUCN I	100
			IUCN II	80
			Strong protection without IUCN I and II	60
			IUCN V and other protected areas	40
			No protection status	0
Open spaces	Level of spatial development	0.05	0 - 10	100
			10 - 20	80
			20 - 30	60
			30 - 50	40
			> 50	20
Biodiversity value	Key biodiversity areas	0,2	Presence	100
			No presence	0
Management	Selection of protected areas with management structures	0.05	Management	100
			No management	0

The result is a combined analysis of landscape protection, connectivity and intactness. The result gives an initial insight into the existing situation of protected areas under the selected criteria.

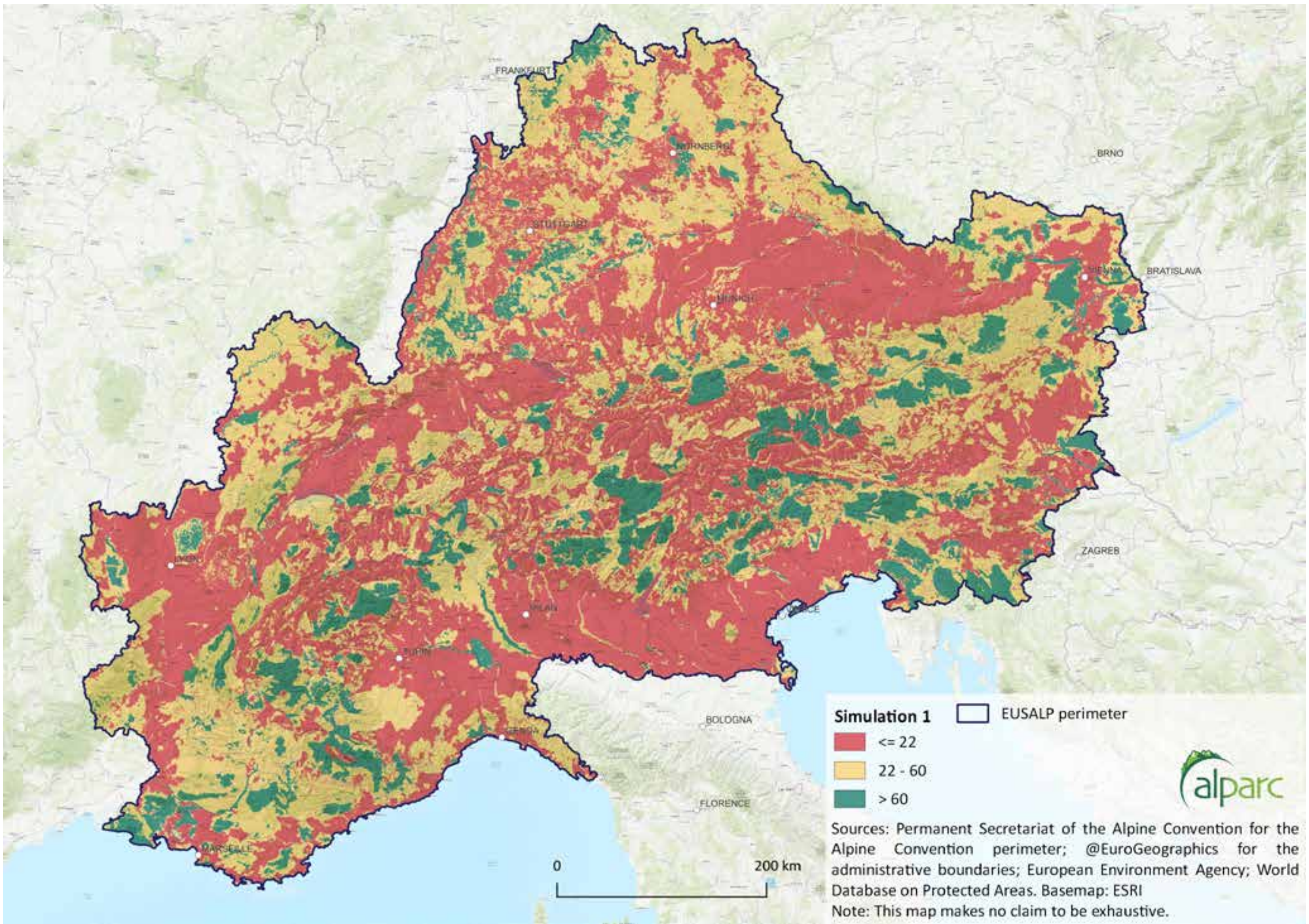
In the figure below, the distribution of the values obtained for the Simulation 1



The key zones were selected from the pixels with values equal to or greater than 60. Even though the frequency of this threshold is less significant than for lower values, this selection allows to better identification of the zones that partially met the criteria defined for the analysis.

Three categories regrouping different values were created to obtain a clearer visualisation of the spatial distribution of the landscapes corresponding to regions with a protection status linked to the features of connectivity, absence of infrastructure, biodiversity presence (KBA) and managed protected areas. These are all characteristics best suited to a potential biodiversity presence and intactness of nature. The result is a picture of the Alps where mainly the strong protected areas are apparent, which is a bit of an exaggeration relative to the actual situation. Regions with a protection status or potentially interesting to be protected because of valuable habitats and biodiversity presence are more frequent in the Alps, and the situation on the ground is more complex.

Map 1 (H.5): Simulation 1 - First Indicators Selection



Phase 2
Elaboration of a synthetised surface indicator

To improve the representativity of the map for the potential of protected regions, a selection of seven criteria and seven indicators were included in the analysis of the selection of key features of protected areas. In this perspective, the indicators for protected areas and Natura 2000 have been combined into one to avoid assigning none of these two different approaches too much weight as the protection significance of Natura 2000 sites is often higher than those of weak protected areas.

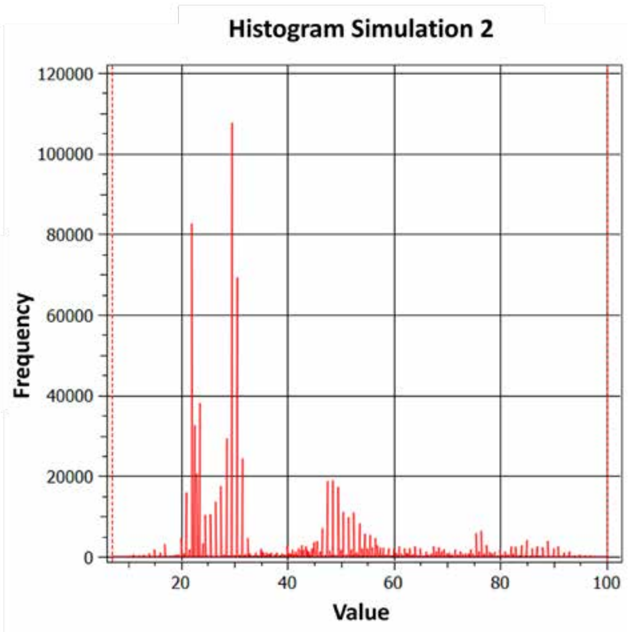
The table below shows the relation between the assigned values and the defined classes.

Table 2 (H.5): Classification Scheme of Simulation 2

Criteria	Indicator	Weight	Class indicator	Class value
Surface SUR = 0.6*value PA + 0.4*value Natura 2000	Protected areas surface ALPARC database and WDPA	0.2	Max	100
			Min	0
Topography TOP= 0.5*value altitude + 0.5*value slope	Elevation segments	0.2	Max	100
			Min	30
Connectivity	SACA	0.15	SACA 1	100
			SACA 2	50
			SACA 3	40
			Not classified	0
Protection status	Protected areas ALPARC database and WDPA	0.15	IUCN I	100
			IUCN II	80
			Strong protection without IUCN I and II	50
			IUCN V and other protected areas	40
			No protection status	0
Open spaces	Level of spatial development	0.05	0 - 10	100
			10 - 20	80
			20 - 30	60
			30 - 50	40
			> 50	20
Biodiversity value	Key biodiversity areas	0.2	Presence	100
			No presence	0
Management	Selection of protected areas with management structures	0.05	Management	100
			No management	0

The result is a combined analysis of landscape protection, connectivity, and intactness. The result gives a first insight into the initial situation of protected areas under the selected criteria.

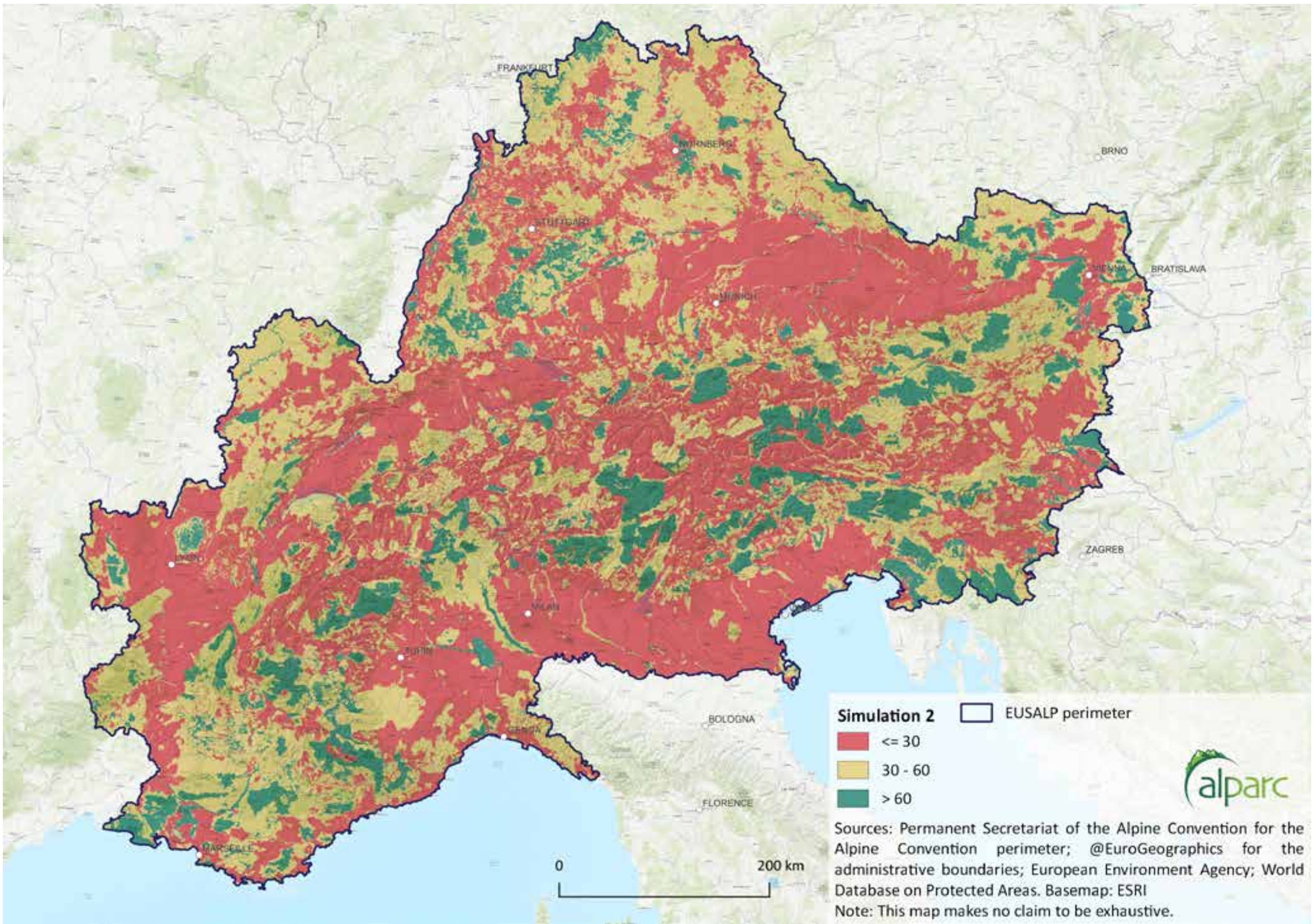
In the figure below, the distribution of the values obtained for the simulation 2.



The key zones were selected from the pixels with values equal to or greater than 60. Even though the frequency of this threshold is less significant than for lower values, this selection allows for better identification of the zones that partially met the criteria defined for the analysis.

Three categories regrouping different values have again been created. However, the map shows only slight improvements concerning the spatial differentiation of the different areas and the presentation of the complexity of the protection system. Some areas switched to more positive value (> 60), especially in the western part of the Alps. More differentiation is needed to present the current situation. This can probably be achieved by further reducing the number of criteria to reduce the redundancies between criteria and indicators, which generally risk strengthening the polarisation of the results.

Map 2 (H.5): Simulation 2 - Synthetised Surface Indicator



Phase 3
Calculation with a selection of five criteria

A selection of five criteria and five indicators has now been tested. For the first time, the management and KBA layers are excluded, as the first one shows a high redundancy with the protection status, and the second seems not to be representative enough for the whole Alpine space.

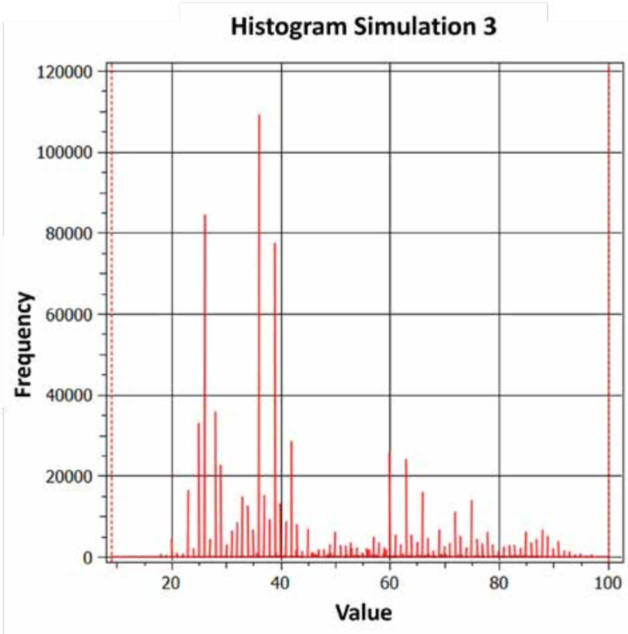
The result is a map with a higher differentiation of the actual status of protection and areas potentially adapted for protection within the EUSALP perimeter.

The table below shows the relation between the assigned values and the defined classes.

Table 3 (H.5): Classification Scheme of Simulation 3

Criteria	Indicator	Weight	Class indicator	Class value
Surface SUR = 0.6*value APA + 0.4*value Natura 2000	Protected areas surface ALPARC database and WDPA	0.3	Max	100
			Min	0
Topography TOP= 0.5*value altitude + 0.5*value slope	Elevation segments	0.2	Max	100
			Min	30
Connectivity	SACA	0.2	SACA 1	100
			SACA 2	50
			SACA 3	40
			Not classified	0
Protection status	Protected areas ALPARC database and WDPA	0.15	IUCN I	100
			IUCN II	80
			Strong protection without IUCN I and II	60
			IUCN V and other protected areas	40
			No protection status	0
Open spaces	Level of spatial development	0.15	0 - 10	100
			10 - 20	80
			20 - 30	60
			30 - 50	40
			> 50	20

In the figure below, the distribution of the values obtained for the simulation 3.

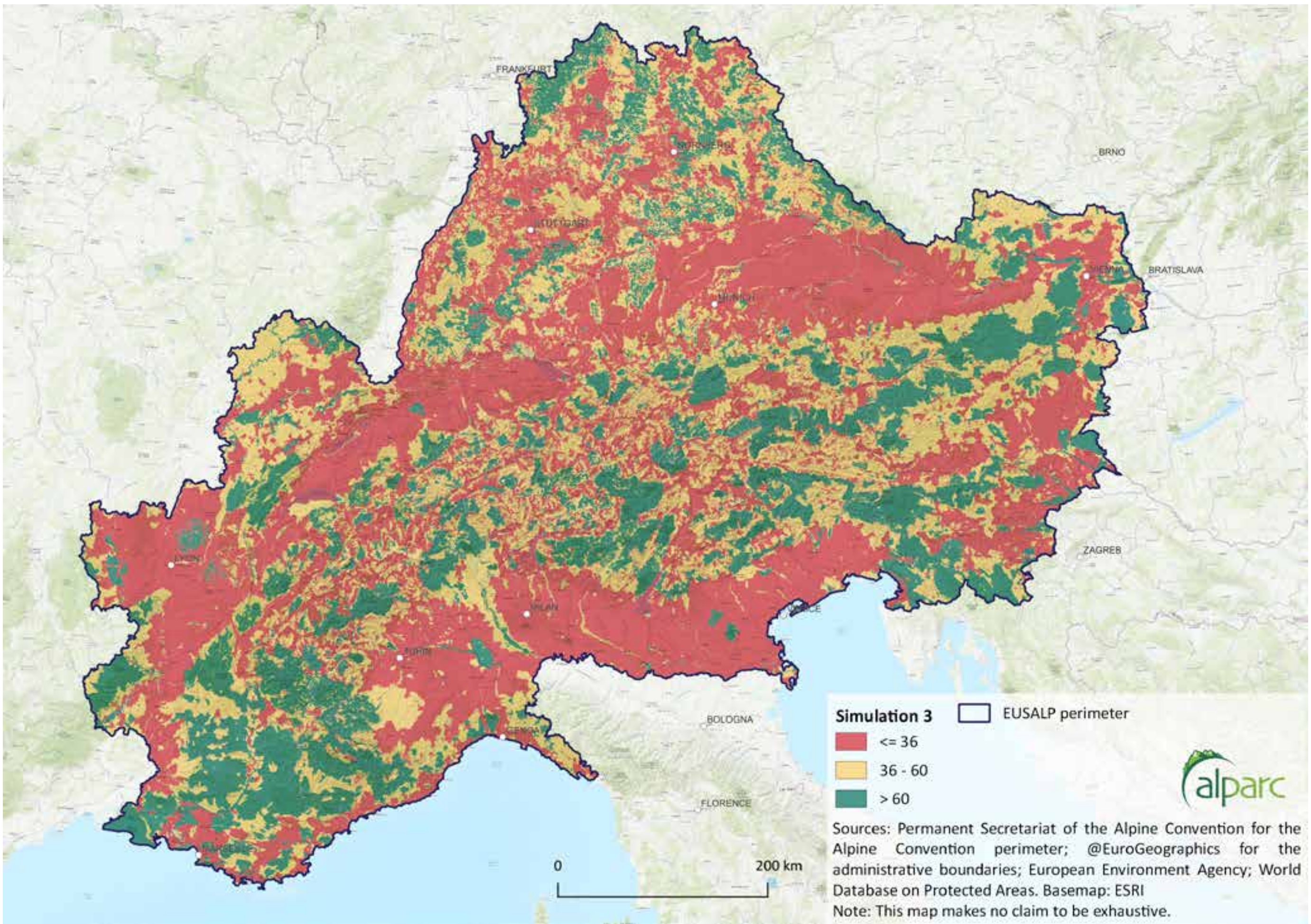


The key zones were selected from the pixels with values equal to or greater than 62. Even though the frequency of this threshold is less significant than for lower values, this selection allows us to better identify the zones that partially met the criteria defined for the analysis.

Again, only three categories regrouping different values have been created to obtain a comparable visualisation of the spatial distribution of the results between the maps of the three methodological steps.

The result is now more complex concerning the areas with a value > 62, and the differentiation is clearly improved. Now, we need to overlay the KBA layer and the management layer to see if the analysis allows for better interpretation and conclusions regarding the current situation of the protected area system.

Map 3 (H.5): Simulation 3 - Reselection of Criteria



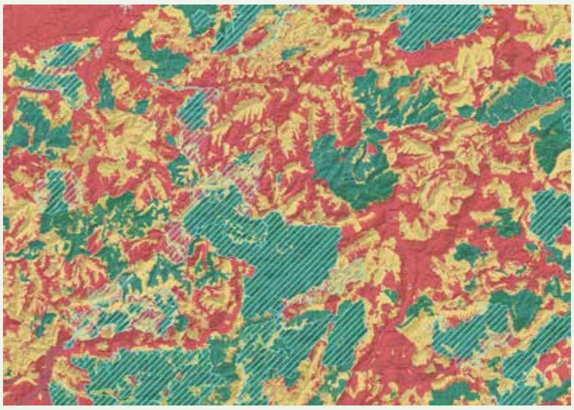
Phase 4 – Comparative analysis with the KBA and Management structures

A comparative analysis based on the results from the third phase and the KBA and management layers illustrates that, even when presenting higher than average values in the selection of indicators, there are some spots that most probably do not meet the selection criteria for being considered as Key Biodiversity Areas, but that are still relevant to current and future nature protection.

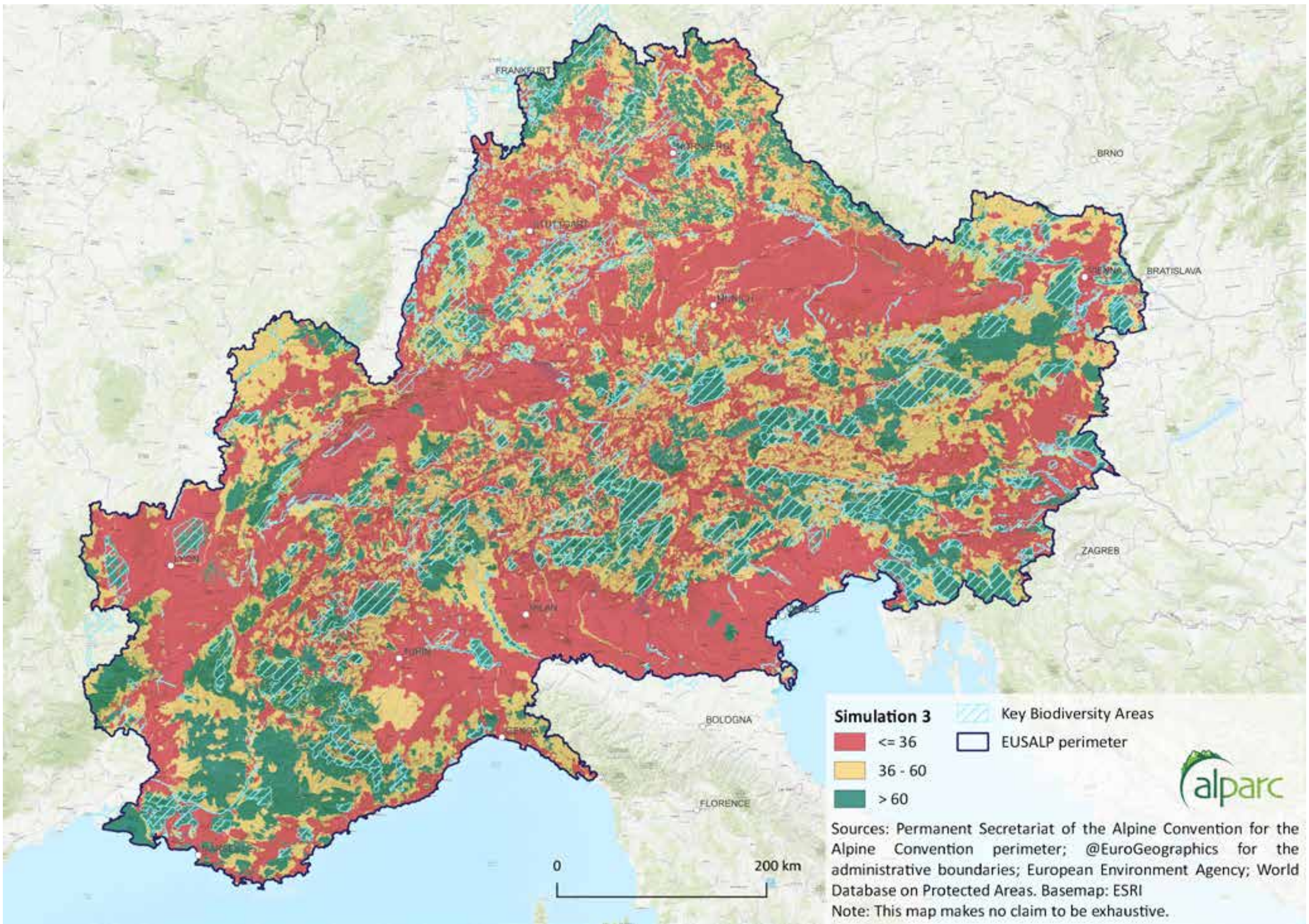
These zones are more clearly visible in the south-western Alpine region, which is currently under protection of different status (Biosphere reserve, Geopark, Nature park), but also in some central parts of the Alps – they are protected because of their biodiversity potential and habitat uniqueness.

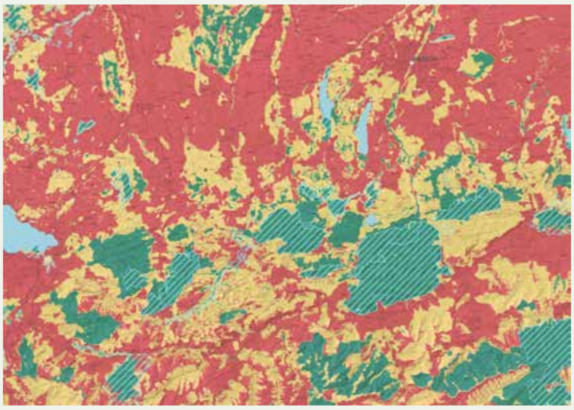
This illustrates why the KBA layer should be analysed separately from the indicator built with the five indicators (Surface, topography, connectivity, protection status and development level). Based on fieldwork and expert opinion, we know that there are important biodiversity hotspots in the southwestern Alps, especially created by the Mediterranean climate, which influences the southern Alps. But there are also important reservoirs of biodiversity not covered by the KBA layer in the central Alps and

The KBA located inside the Raethian triangle for instance, are partially covered by some protection status, this coverage is mainly explained by the presence of National Parks (Stelvio National Park and Swiss National Park) there are few KBA around this protection perimeter that could benefit from a larger protection scope.

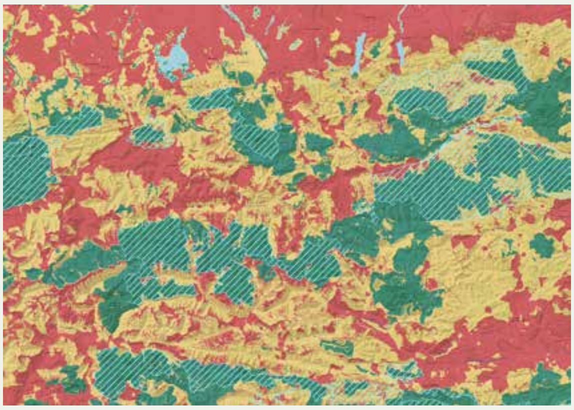


Map 4 (H.5): Comparative Analysis with Key Biodiversity Areas -KBA

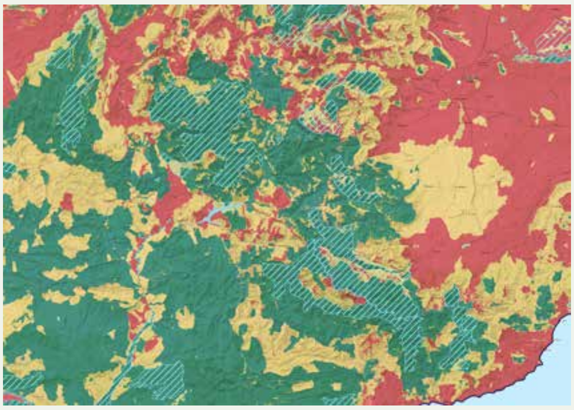




The Northern Central Alpine region has almost a total coverage of the KBA by some form of nature protection, the similarity between the surfaces with a high value and the KBA is explained by these measures.



Even though the Eastern central Alpine region is partially covered by strong protected areas such as National Parks and Nature Reserves, these are not large enough to cover all the KBA, the challenge for this region is mainly focused on connecting the protected areas to effectively cover all its biodiversity hotspots.

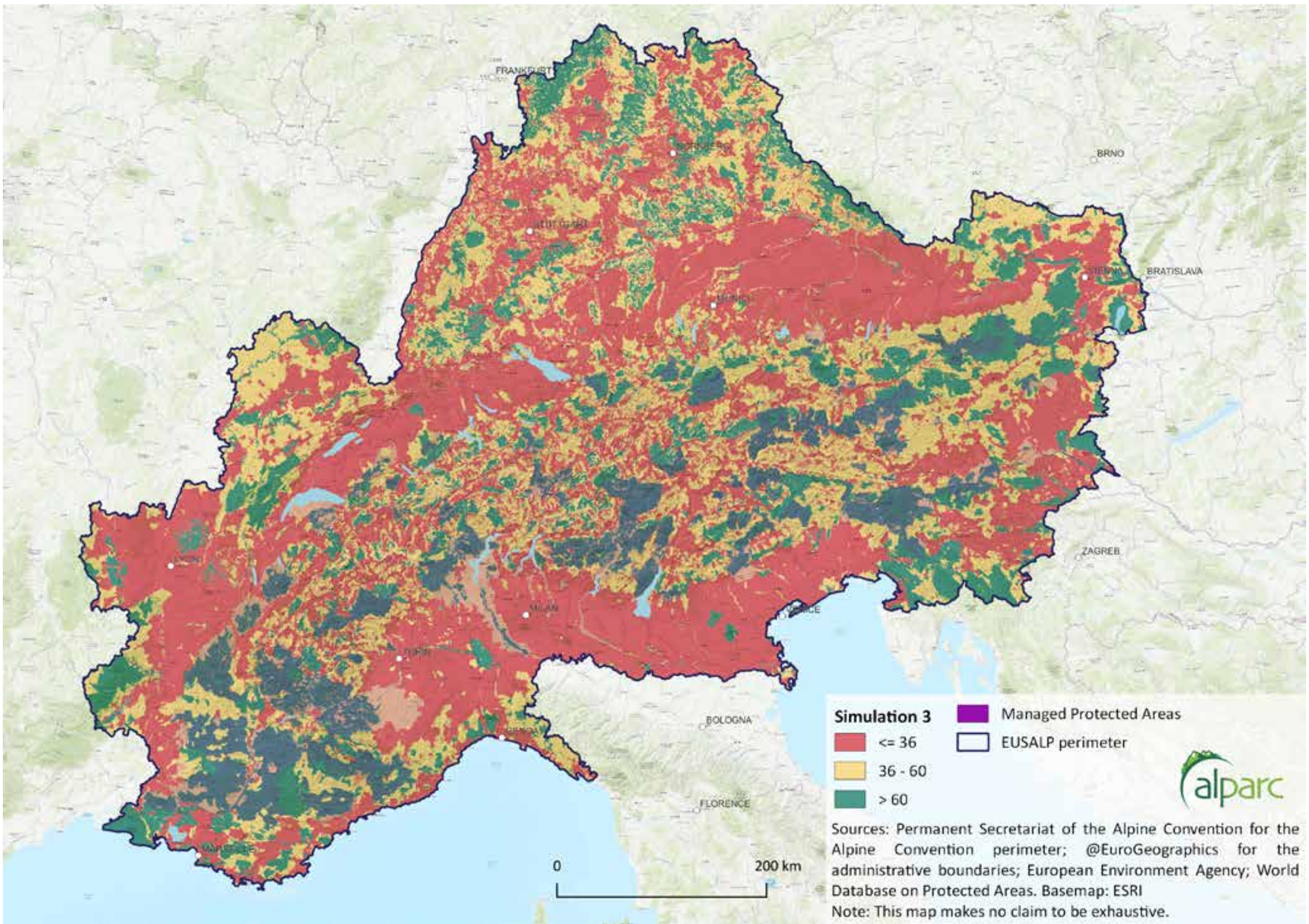


The KBA inside the Western - Central Alps are mostly covered by some form of nature protection (National Parks and regional parks), one of the major challenges of this zone is to create coordinate strategies to preserve the KBA present on the transboundary zone around the Maritime Alps.

The next map demonstrates how the management layer cannot give any additional value on the calculation as this layer was built with a selection of protected areas (National Parks, Natural regional parks, Biosphere reserves, Geoparks and a small number of Nature reserves). This was a workaround due to the lack of data related to protected areas management. While the redundancy with the protection status makes this layer unsuitable for the evaluation of the status of protected areas within the statistical analysis, it can, however, be interpretated in a second step as further information for the overall evaluation of the situation of the protected areas system of the Alps.

The simulations are built through the aggregation of different indicators mentioned before, given that the managed protected areas are in fact a sub selection of the Alpine protected areas layer, redundancy issues occur for the calculation process. Management is nevertheless a key feature to nature protection, and a clear identification of the protected areas with an available and implemented management plan would allow to better define the scope and degree of the current protection helping to improve our current analysis that are mostly linked to the analysis of protection categories.

Map 5 (H.5): Comparative Analysis with Managed Protected Areas



H.6

TESTING IMPROVEMENTS – INTERMEDIATE SIMULATIONS

STEP 2

Both of the following simulations are based on weaker indicators for the most favourable ecological areas than the simulation n°1, these are the results of a preparatory stage to obtain the results in Step 2. Theoretically, simulation 2 should produce medium values and simulation 3 the lowest. The objective is to propose alternatives regarding the choice of measures to be taken to achieve satisfying results that increase the overall surface of favourable ecological areas based on a "lower cost model" (to achieve almost the same outcome with lower investment in measures).

Testing Different Improvements – Simulation 2

Table 1 (H.6): Modified Simulation - Slight Changes on Overall Protection Scope and Connectivity

Criteria	Indicator	Modifications	Weight
Pro-tection scope	Protection status	KBAs with a protection status (Value=60)	0.45
	Surface	Extending all cat. I / II and Nature reserves in 10% of size	
Topogra-phy	Altitude and slope	Not modified	0.3
Connec-tivity	SACA	Replacing SACA 1 by Connected areas	0.15
Open spaces	Level of spa-tial develop-ment	Not modified	0.1

Map 1 (H.6): Improvements in some Aspects of Protection Scope and Connectivity – Simulation 2

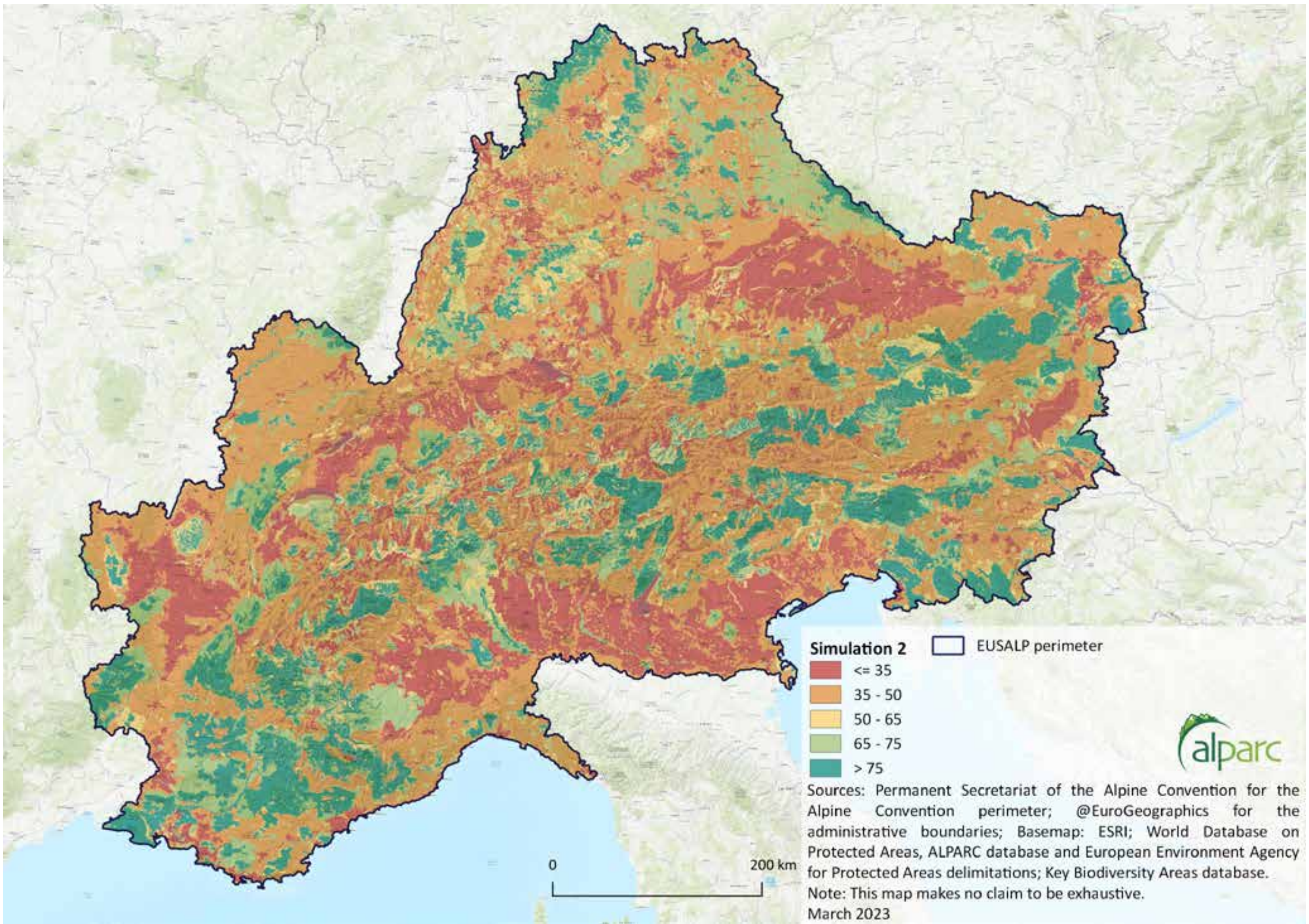


Table 2 (H.6): Value Distribution Among EUSALP – Step 2 Simulation 2

EFA	Surface km²	% Distribution of EFA within the EUSALP surface
<=35	82,801	18.7%
35-50	190,797	43.2%
50-65	39,267	8.9%
65-75	60,927	13.8%
>75	68,365	15.5%

Table 3 (H.6): Value Distribution Among Alpine Convention– Step 2 Simulation 2

EFA	Surface km²	% Distribution of EFA within the Alpine Convention surface
<=35	19,628	10.3%
35-50	79,450	41.6%
50-65	17,079	8.9%
65-75	29,418	15.4%
>75	45,413	23.8%

Testing improvements– Simulation 3

Table 4 (H.6): Modified simulation - Moderate Changes on Overall Protection Scope

Criteria	Indicator	Modifications	Weight
Protection scope	Protection status	Increasing the surface by 10% of the three strongest protection categories (I, II and Strong protection status)	0.45
	Surface	Extending wilderness sites inside all National Parks and Nature reserves with a surface above 50 km² in 10% of size	
Topography		Not modified	0.3
Connectivity	SACA	Replacing SACA 1 by Connected areas	0.15
Open spaces	Level of spatial develop-ment	Not modified	0.1

Map 2 (H.6): Minor Improvements in Protection Scope and Connectivity - Simulation 3

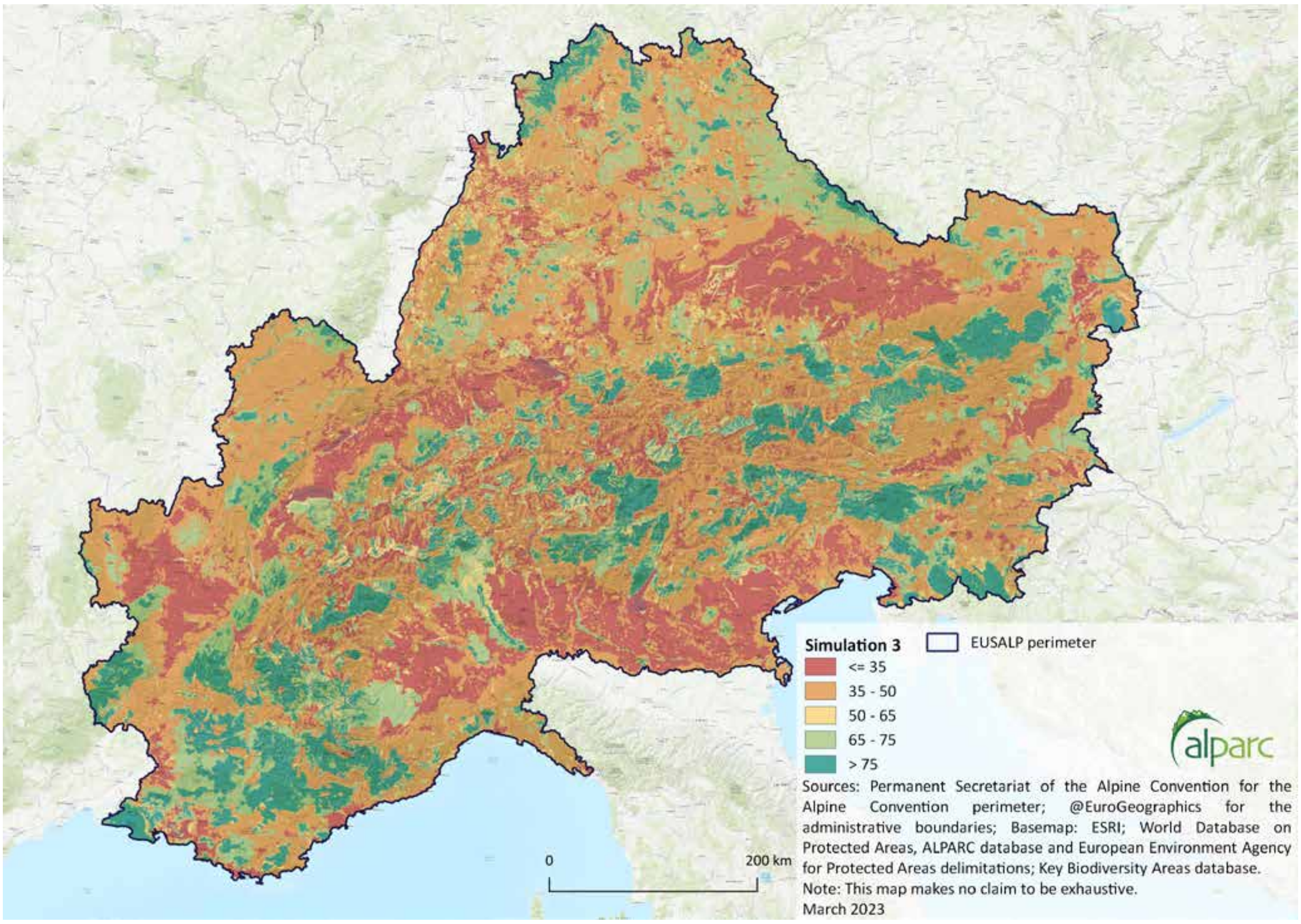


Table 5 (H.6): Value Distribution Among EUSALP – Step 2 Simulation 3

EFA	Surface km²	% Distribution of EFA within the EUSALP surface
<=35	85,188	19.3%
35-50	201,193	45.5%
50-65	28,833	6.5%
65-75	68,612	15.5%
>75	58,295	13.2%

Table 6 (H.6): Value Distribution Among Alpine Convention – Step 2 Simulation 3

EFA	Surface km²	% Distribution of EFA within the Alpine Convention surface
<=35	20,403	10.7%
35-50	83,482	43.7%
50-65	12,700	6.6%
65-75	32,118	16.8%
>75	42,287	22.1%

H.7

DIFFERENT RESULTS ACCORDING TO DIFFERENT DATA BANKS (IUCN – APA):

The problem of a certain incompatibility between the figures of different data sources is explained first because of the comparison of two different concepts and categories of strong nature protection: The one of the IUCN categories and the Alpine concept developed by ALPARC (APA)[1] and adapted specifically to the Alpine situation. We take two examples:

National Parks (examples of Hohe Tauern/A and Triglav/SI):

For this category there is a difference because the peripheric areas of the Hohe Tauern and Triglav National Parks are listed under the IUCN II category while for the APA concept of strong protection the peripheric part of the Parks is not corresponding to a strong nature protection. In this sense the ALPARC data base (APA) is more precise.

Nature Reserves (examples of the Vercors Nature Reserve/F and the Karwendel Nature Reserve and Nature Park/A):

The main difference between the figures is because numerous nature reserves designated at the national level are not integrated within categories Ia or Ib of the IUCN but mostly within the category IV or not at all. The direct comparison between the IUCN strongest categories (I and II) even including the category IV and the ALPARC definition of strong nature protection including nature reserves, leads to important differences. For this reason, we included especially in the final chapter of the report the IUCN category IV (most of the nature reserves) in our simulations to reach more compatibility between both data banks even if important differences in surface are remaining.

[1] Avoiding overlay.

Comparison IUCN to APA

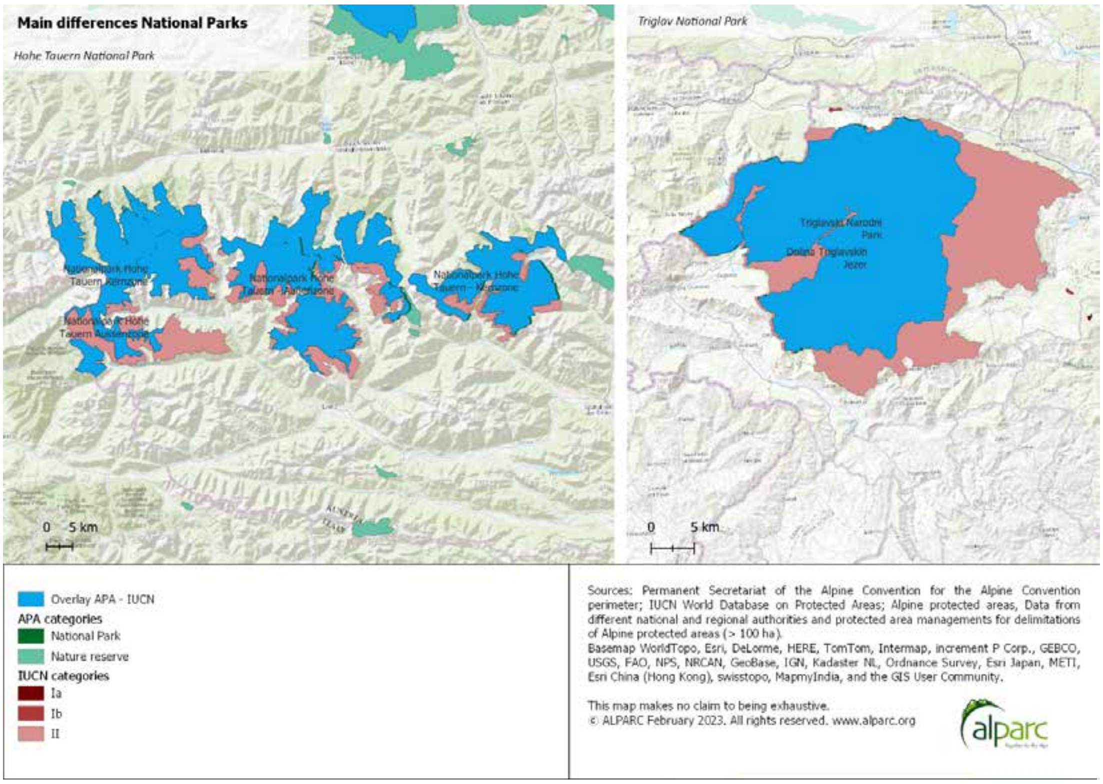
IUCN Category	Surface inside AC Km²	Covered by APA Km²	Not covered by APA Km²	Covered by APA %	Not covered by APA %
Ia	514	429	85	83.5%	16.5%
Ib	164	146	18	89.2%	10.8%
II	7,526	6,799	727	90.3%	9.7%

Comparison APA to IUCN

APA Category	Surface inside AC Km²	Covered by IUCN Km²	Not covered by IUCN Km²	Covered by IUCN %	Not covered by IUCN %
National Park	7,073	6,996	77	98.9%	1.1%
Nature reserve	5,512	319	5,193	5.8%	94.2%
Total[1]	12,359	7,095			

Hohe Tauern and Triglav National Parks

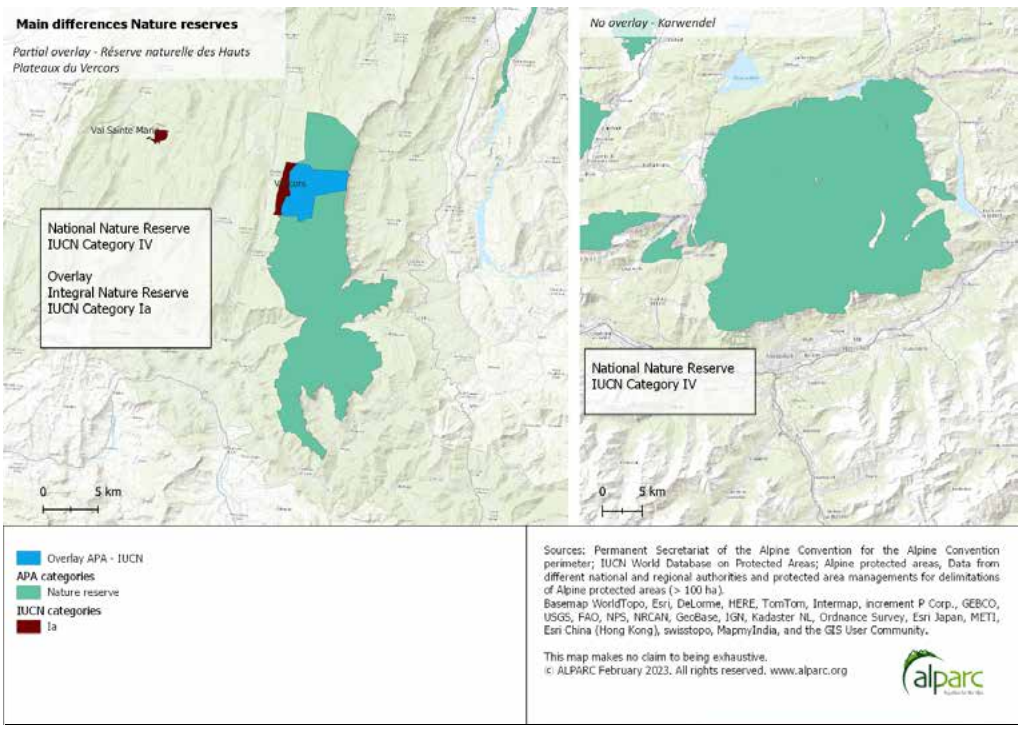
The IUCN data bank is not distinguishing between the core area and the peripheric zones, all is listed under category II but not corresponding to the same level of protection. Here the APA data bank from ALPARC is more precise because more adapted to the Alpine specific situation.



Nature Reserves

The specific case of the Nature reserves of Vercors and Karwendel is interesting in this context:

The largest nature reserve of France (*Hauts plateaux du Vercors*) with strong nature protection, is not included in the strongest IUCN categories I or II (or only partially). For ALPARC the whole territory is classified as strong nature protection. The only possible comparison is on the level of the categories I – IV of the IUCN.



The situation of the Austrian-Bavarian *Karwendel* nature reserve is even more complex as it is a nature reserve on both sides of the border between both countries, individually considered by the IUCN and as a global strong protected surface by the APA data bank. The area is at the same time a nature park. Only the strongest status is considered in the direct comparison and evaluation.

H.8

KBA DESCRIPTION

A. Threatened biodiversity		
A1 Threatened species		Assessment parameters
A1a	≥0.5% of global population size and ≥5 reproductive units (RU) of a CR/EN species	(i) no. of mature individuals (ii) area of occupancy (iii) extent of suitable habitat (iv) range (v) no. of localities (vi) distinct genetic diversity
A1b	≥1% of global population size and ≥10 RU of a VU species	
A1c	≥0.1% of global population size and ≥5 RU of a species listed as CR/EN due only to past/current decline [= Red List A only, but not A3 only]	
A1d	≥0.2% of global population size and ≥10 RU of a species listed as VU due only to past/current decline [= Red List A only, but not A3 only]	
A1e	Effectively the entire population size of a CR/EN species	
A2 Threatened ecosystem types		
A2a	≥5% of global extent of a CR or EN ecosystem type	
A2b	≥10% of global extent of a VU ecosystem type	
B. Geographically restricted biodiversity		
B1. Individual geographically restricted species	≥10% of global population size and ≥10 RU of any species	(i) no. of mature individuals (ii) area of occupancy (iii) extent of suitable habitat (iv) range (v) no. of localities (vi) distinct genetic diversity
B2. Co-occurring geographically restricted species	≥1% of global population size of each of a number of restricted-range species in a taxonomic group: ≥2 species or 0.02% of the total number of species in the taxonomic group, whichever is larger	
B3. Geographically restricted assemblages		
B3a	≥0.5% of global population size of each of a number of ecoregion-restricted species in a taxonomic group: ≥5 species or 10% of the species restricted to ecoregion, whichever is larger	(i) no. of mature individuals (ii) area of occupancy (iii) extent of suitable habitat (iv) range (v) no. of localities
B3b	≥5 RU of ≥5 bioregion-restricted species or ≥5 RU of 30% of the bioregion-restricted species known from the country, whichever is larger	
B3c	Site is part of the globally most important 5% of occupied habitat for ≥5 species in the taxonomic group	(i) relative density of mature individuals (ii) relative abundance of mature individuals
B4. Geographically restricted ecosystem types		
	≥20% of the global extent of an ecosystem type	
C. Ecological integrity		
	Site is one of ≤2 per ecoregion with wholly intact ecological communities	composition and abundance of species and interactions
D. Biological processes		
D1. Demographic aggregations		
D1a	≥1% of global population size of a species, over a season, and during ≥1 key stage in life cycle	no. of mature individuals
D1b	Site is among largest 10 aggregations of the species	no. of mature individuals
D2. Ecological refugia	≥10% of global population during periods of environmental stress	no. of mature individuals
D3. Recruitment sources	Produces propagules, larvae or juveniles maintaining ≥10% of global population size	no. of mature individuals
E. Irreplaceability through quantitative analysis		

Source: KBA Standards and Appeals Committee of IUCN SSC/WCPA (2022). Guidelines for using A Global Standard for the Identification of Key Biodiversity Areas. Version 1.2. Gland, Switzerland: IUCN.

H.9

DISTRIBUTION PROTECTED AREAS PER COUNTRY Alpine Protected Areas

Country	Alpine Convention - Area (km²)	Number of National Parks (core zone)	National Parks (core zone) - Area (km²)	National Parks (core zone) - Share in the AC (%)	Number of National Parks (buffer zone)	National Parks (buffer zone) - Area (km²)	National Parks (buffer zone) - Share in the AC (%)
Germany	11,154	1	210.5	1.89	0	0.0	0
France	40,782	3	2,137.4	5.24	3	2,878.1	7.06
Italy	52,279	4	2,467.1	4.72	0	0.0	0
Liechtenstein	161	0	0.0	0.00	0	0.0	0
Monaco	2	0	0.0	0.00	0	0.0	0
Austria	54,626	3	1,518.6	2.78	1	659.3	1.21
Slovenia	6,761	1	552.2	8.17	1	288.7	4.27
Switzerland	25,225	1	171.9	0.68	0	0.0	0
Total	**190,990**	**13**	**7,057.7**	**3.70**	**5**	**3,826.1**	**2**

Country	Number of nature parks	Nature parks - Area (km²)	Nature parks - Share in the AC (%)	Number of nature reserves	Nature reserves - Area (km²)	Nature reserves - Share in the AC (%)	Number of other protected areas*	Other protected areas - Area (km²)	Other protected areas - Share in the AC (%)
Germany	1	400.3	3.59	37	1,038.6	9.31	76	1,846.1	16.55
France	9	10,760.2	26.39	27	566.8	1.39	54	4,575.2	11.22
Italy	45	6,108.7	11.68	55	406.9	0.78	8	47.9	0.09
Liechtenstein	0	0.0	0.00	1	1.1	0.67	0	0.0	0.00
Monaco	0	0.0	0.00	0	0.0	0.00	0	0.0	0.00
Austria	30	4,241.7	7.77	79	2,691.8	4.93	52	2,966.5	5.43
Slovenia	2	24.7	0.37	11	68.9	1.02	20	282.3	4.18
Switzerland	9	2,783.0	11.03	53	625.6	2.48	324	6,837.3	27.10
Total	**96**	**24,318.7**	**12.73**	**263**	**5,399.7**	**2.83**	**534**	**16,555.2**	**8.67**

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Country	Number of UNESCO world heritage site	UNESCO world heritage site - Area (km²)	UNESCO world heritage site - Share in the AC (%)	Number of UNESCO biosphere reserves	UNESCO biosphere reserve - Area (km²)	UNESCO biosphere reserve - Share in the AC (%)
Germany	0	0.0	0.00	1	839.6	7.53
France	0	0.0	0.00	3	3,449.2	8.46
Italy	1	1,418.0	2.71	1	1,680.6	3.21
Liechtenstein	0	0.0	0.00	0	0.0	0.00
Monaco	0	0.0	0.00	0	0.0	0.00
Austria	0	0.0	0.00	3	1,363.3	2.50
Slovenia	0	0.0	0.00	1	1,950.0	28.84
Switzerland	3	1,160.6	4.60	2	756.3	3.00
Total	**4**	**2,578.5**	**1.35**	**11**	**10,039.0**	**5.26**

Country	Number of all protected areas	All protected areas - Area (km²)	All protected areas - Share in the AC (%)	Overlap** (km²)	Overlap (%)
Germany	116	3,305.2	29.63	1,029.8	31.2
France	99	18,809.7	46.12	5,557.2	29.5
Italy	114	10,749.8	20.56	1,379.3	12.8
Liechtenstein	1	1.1	0.67	0	0.0
Monaco	0	0.0	0.00	0	0.0
Austria	168	9,966.6	18.25	3,474.7	34.9
Slovenia	36	2,240,4	33.14	926,5	41.4
Switzerland	392	9,399.0	37.26	2,935.6	31.2
Total	**926**	**54,471.8**	**28.52**	**15,303.1**	**28.1**

Note: All figures and sums relate to the Alpine protected areas > 100 ha/1 km² and the parts of them located within the territory covered by the Alpine Convention.
*Legend: AC = Alpine Convention surface; * Further protected areas: landscape conservation areas, wildlife refuges, etc.; **Overlap: difference between the sum of the Coverage of the individual protected area sites per type and the sum of the GIS areas.*
(Source: ALPARC Alpine Protected Areas database, December 2016. No claim of exhaustiveness.)

H.10

PRINCIPAL PROTECTED AREAS IN THE ALPS CONSIDERED IN THIS REPORT

Biosphere Park
Biotope Protection Order
Emerald Network
Federal Hunting Reserves
Federal Inventory of Alluvial Zones of National Importance
Federal Inventory of Amphibian Spawning Areas of National Importance
Federal Inventory of Dry Grasslands and Pastures of National Importance
Federal Inventory of Fenlands of National Importance
Federal Inventory of Raised and Transitional Mires of National Importance
Federal Inventory of Reserves for Waterbirds and Migratory Birds of International And National Imp.
Flora Protection Area
Forest Integral Biological Reserve
Forest Managed Biological Reserve
Forest Reserve
Forest Reserves
Horticultural Monument
Land Acquired by A Regional Conservatory of Natural Areas
Land Acquired by Conservatoire Du Littoral (National Seaside and Lakeside Conservancy)
Landscape Park
Landscape Protection Area
National Hunting and Wildlife Reserve
National Nature Reserve
National Park - Buffer Zone/Area of Adhesion
National Park - Core Area
National Park - Integral Reserve
Natura 2000
Natural Monument
Nature Park
Nature Reserve
Other Protected Natural Regional Areas
Private Nature Reserves
Protected Forest
Protected Habitat
Protected Landscape Section
Protected Natural Objects of Local Importance
Protected Perimeter Around a National Nature Reserve
Ramsar Site, Wetland of International Importance
Regional Nature Park
Regional Nature Reserve
Regional Park
Regional Protected Areas
Regional/Provincial Nature Park
Regional/Provincial Nature Reserve
Rest Area
Site of Community Importance (Habitats Directive)
Special Conservation Areas
Special Protection Area (Birds Directive)
Special Purpose Forest
Specially Protected Area
State Nature Reserve
Wilderness Area
World Heritage Site (natural or mixed)

H.11

REDUNDANCY OF ALPINE PROTECTED AREAS (APA), NATURA 2000/EMERALD NETWORK AND KBA

	Natura 2000/ Emerald Network	WDPA all categories*		IUCN all categories		APA-ALPARC	
	Surface within AC km²	Surface km²	%	Surface km²	%	Surface km²	%
Overlay with Natura 2000/ Emerald Network	38,683	38,661	99.9%	22,161	57.3%	22,581	58.4%

**WDPA includes the Natura 2000 as the concerned government reported the area on the database*

	Redundancy with weak protection categories		Redundancy with strong protection categories		Redundancy with Alpine Protected Areas		Surface of the category within the AC km²
	Surface within the AC km²	%	Surface within the AC km²	%	Surface within the AC km²	%	
KBA	6,338	18.1%	13,361	38.2%	19,700	56.4%	34,949
Natura 2000/ Emerald Network	7,278	18.8%	15,302	39.6%	22,581	58.4%	38,683

H.12

PRINCIPAL ABBREVIATIONS USED IN THIS REPORT

AC	Alpine Convention
APA	Alpine Protected Areas
BAFU	Federal Office for the Environment (CH)
BMUV	Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (D)
CBD	Convention on Biological Diversity
COP 15	Conference of the Parties – UN Biodiversity Conference 2022
CRA	Connectivity Restoration Areas
ECA	Ecological Conservation Areas
EEA	European Environment Agency
EFA	Ecological Favourable Areas
EIA	Ecological Intervention Areas
EUSALP	European Strategy for the Alpine Region
FOEN	Federal Office for the Environment (CH)
GI	Green Infrastructure
GIS	Geographic Information System
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPPC	International Plant Protection Convention
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas
MAB	UNESCO's Man and Biosphere Programme
NGS	The National Geographic Society
OECD	The Organisation for Economic Co-operation and Development
PA	Protected Area
PEEN	Pan European Ecological Network
SAC	Special Areas of Conservation
SACA	Strategic Alpine Connectivity Areas
SAPA	System of the Italian Alpine Protected Areas
SCI	Sites of Community Importance
SDG	Sustainable Development Goals
SPA	Special Protection Areas
UNEP-WCMC	World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCPA	World Commission on Protected Areas database on Protected Areas
WDPA	World Database on Protected Areas
WWF	World Wide Fund for Nature

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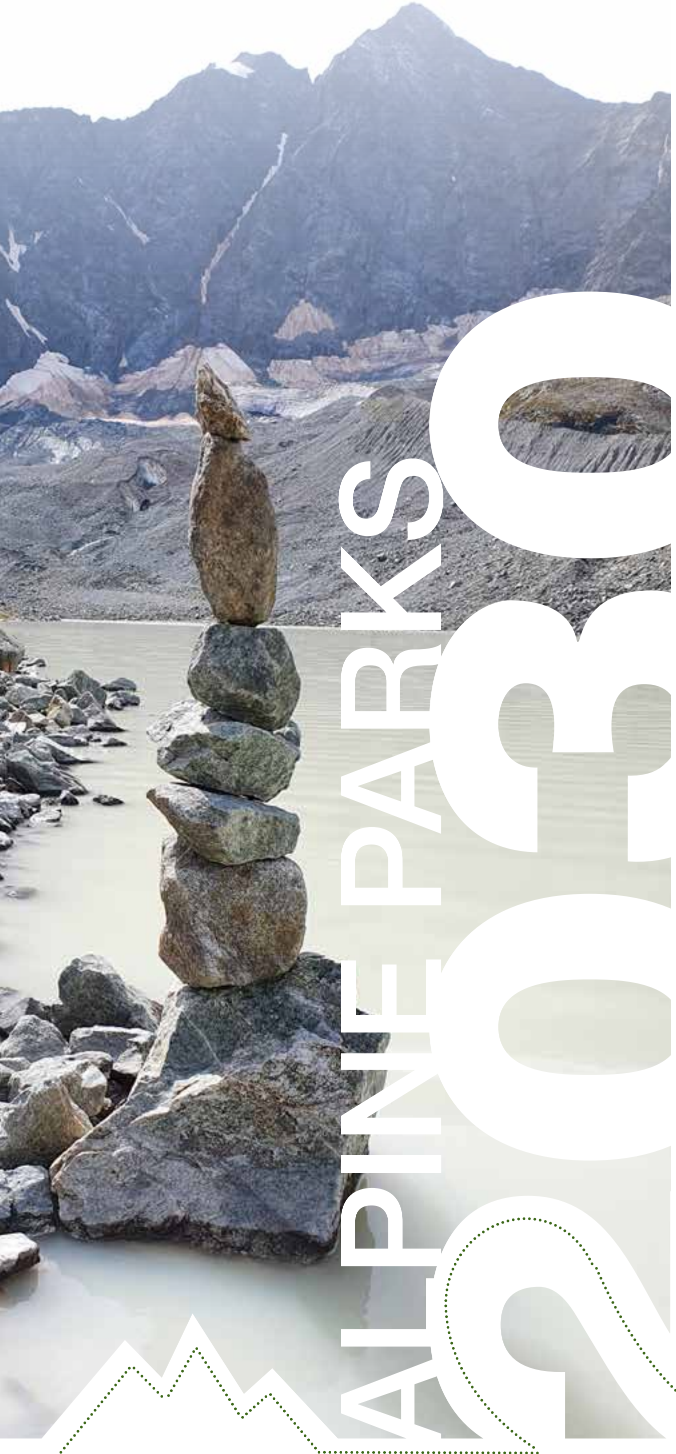

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