EUROPEAN TERRITORIAL COOPERATION

2014-2020

ENVIRONMENTAL REPORT

OF THE STRATEGIC ENVIRONMENTAL ASSESSMENT OF THE "ALPINE SPACE" COOPERATION PROGRAMME

Partner States:

Austria
France
Germany
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Liechtenstein
Slovenia
Switzerland

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ASP	Alpine Space Programme
IP	Investment Priority
NÖ	Niederösterreich
OÖ	Oberösterreich
SEA	Strategic Environmental Assessment
SO	Specific Objective

1. Introduction

The European Parliament and the Council agreed on the directive 2001/42/EG on the assessment of the effects of certain plans and programmes on the environment. The directive shall contribute to a high level of environmental protection and shall support sustainable development by integrating environmental considerations into the preparation and adoption of certain plans and programmes.

According to this directive, plans and programmes that are likely to have significant environmental effects shall be subject to a so-called Strategic Environmental Assessment (SEA). The major elements of this SEA are:

- the preparation of an environmental report, for which the directive provides a framework of its contents,
- carrying out of consultations with the public, environmental authorities and neighbouring Member States, that are likely to be affected by the environmental impacts of the plan or Programme,
- and consideration of the results of the environmental report and consultations in the decision on the adoption of the plan or Programme.

The environmental report contains the assessment of the likely significant environmental effects of the Cooperation Programme Alpine Space2014-2020 (in the following mentioned as Alpine Space Programme or ASP) and has to cover the following aspects that are reflected in the table of contents:

- an outline of the main objectives and contents of the Alpine Space Programme,
- as well as the relationship of the ASP with other plans and programmes,
- the way environmental protection objectives and any environmental considerations have been taken into account,
- a description of environmental objectives relevant for the Programme,
- a description of the environmental status, relevant environmental problems and a prognosis of the environmental development without the Programme,
- the method of the assessment including difficulties inherent in the assessment,
- a description of the likely significant effects on the environment,
- an assessment of reasonable alternatives,
- mitigation or compensation measures for likely negative significant environmental effects and
- measures for monitoring the environmental effects of the ASP
- a non-technical summary.

Together with the draft of the Alpine Space Programme the environmental report has provided the basis for the current consultations within the planning process. The elaboration of the environmental report evolved out of a continuous discussion process in constant interaction with the drafting team of the Cooperation Programme. Changes in the Programme were therefore also influenced by the

feedback of the SEA-experts. Significant differences in the several versions of the ASP over the process are explained in chapter 8 (consideration of alternatives). The still on-going approach of interaction with the drafting team, the Task Force as well as the ex-ante evaluation team has led to steady improvements regarding the sustainability of the Programme. The approved methodological approach (Jiricka and Pröbstl 2013)[1] has been adapted to meet / integrate these future challenges.

The SEA also takes possible effects of climate change into consideration at several steps: Environmental Objectives, Description of the environmental states (characteristics) as well as the assessment of likely significant environmental impacts.

1 Jiricka, A; Probstl, U (2013): The role of SEA in integrating and balancing high policy objectives in European cohesion funding programmes. In:ENVIRON IMPACT ASSES. 2013; 38: 44-53

2. Main Objectives and Contents of the Alpine Space Programme 2014-2020

The main goal of the Alpine Space Programme is to set the objectives and strategies for the cooperation area "Alpine Space" in order to fulfil the objectives of the European Territorial Cooperation in the programming period 2014-2020. Hereby the Programme is considered by the Programme partners to be "a policy driver for transnational cooperation, and develop policy recommendation and instruments for sustainable solutions".

Of high relevance for the Alpine Space Programme are also *The Community Strategic Guidelines for Cohesion Policy* (2014-2020) which are strongly orientated along the Europe 2020 goals which comprise of three mutually reinforcing priorities:

- *Smart growth: Developing an economy based on knowledge and innovation*
- *Sustainable growth: Promoting a more resource efficient, greener and more competitive economy*
- *Inclusive growth: Fostering a high-employment economy delivering social, economic and territorial cohesion*

Further emphasis is put on the five main targets employment, R&D/innovation, climate change/energy, education and poverty/social exclusion. *The EU Sustainable Development Strategy (SDS)* as well as two *European Commission communications on smart and sustainable growth* (2010, 2011) are also of great importance for the Programme. Furthermore, the Programme *"takes into consideration the experience from the two forerunner programmes as manifested by the results delivered by the supported f projects, the "Impact Assessment Study" and the "Strategy Development Project".*

Particularly transnational cooperation shall create further added value in providing clear responses to the current main challenges of the Alpine Space. Being the successor of the INTERREG initiative 2000-2006 – the Alpine Space Programme under the European Territorial Cooperation objective in the period 2007-2013 – the newly established Alpine Space Programme 2014-2020 encircles the same geographic- and organisational areas as the previous Alpine Space Programme 2007-2013. The participating states and regions are:

EU-Members:

- Austria: whole country;
- France: Rhône-Alpes, Provence-Alpes-Côte d'Azur, Franche-Comté, Alsace;
- Germany: districts of Oberbayern and Schwaben (in Bayern), Tübingen and Freiburg (in Baden-Württemberg);

- Italy: Lombardia, Friuli Venezia Giulia, Veneto, Trentino-Alto Adige, Valle d'Aosta, Piemonte and Liguria;

- Slovenia: whole country.

Non-EU Members:

- Liechtenstein (whole country);

- Switzerland (whole country).

As can be seen by analysing the characteristics of the regions participating in the Alpine Space Programme, the area consists of the alpine mountain ranges and their surrounding lowlands and parts of the Mediterranean, the Adriatic seas as well as the river valleys of Danube, Po, Adige, Rhône and Rhine. As already stated within the previous Programme *"the mountainous "core area" is spatially inseparably linked with the surrounding "peri-alpine belt", containing some of the most attractive European metropolitan areas".*

The area provides a very diverse cultural as well as natural landscape and can also be regarded as the meeting place of the German, Latin and Slavic Cultures. All together almost 66 million people live in the Alpine Space contributing to the European GDP with a total of *€ 222 billion (2010)"*

The results and impacts of the projects funded in the programming period 2007-2013 were assessed in the so-called "impact assessment".

. A valuable source of information for drafting the new Programme was furthermore the *Study on the Strategy Development for the Alpine Space* by Gloersen et al (2013) which provided the basis for the SWOT-analysis of the co-operation area, defines driving forces and potentials as well as objectives for future alpine-wide co-operation The development of the objectives for the new programming period has been based on the above-mentioned analysis and study as well as a constant planning process which also included a Delphi Consultation to project the expected results of the Programme.. The study on the strategy development for the Alpine Space highlights the territorial diversity of the Alpine Space, ranging from metropolises of at least 750.000 residents with steadily growing rural areas in symbiosis with the larger cities to declining and shrinking rural areas. Tourism areas present the main economic activity in alpine core areas. According to the territorial heterogeneity complex, challenges are visible in the Alpine Space Programming area.

These challenges are reinforced by global driving forces, *"which affect the Alpine Space as an entity, but also on a different manner for each territorial type".* Analysing these forces helps to understand threats and opportunities for the regions, and to link them with different areas and territorial types. The forces to which the Programme will respond, concerning their implied pressure and impacts, are described in the Alpine Space Programme as follows:

- ***Climate change**, which is of particular importance for the mountain areas which are more sensitive to expected impacts like the intensifications of the hydrological cycle, glacier retreat, increase in extreme events, destabilization of soils etc. Apart from the effects which will influence each territorial type of the area in a different way and require different responses (i.e. the adaptation side of climate change action), the need to contribute to the fulfilment of climate protection objectives is also of relevance (i.e. the mitigation side of climate change action). In the case of the Alpine Space Programme, the heterogeneity of the area means that those areas most affected by the climate change impacts are usually not the same which can contribute mostly to mitigation.*

- ***Tensions on the energy market** are closely related to the climate change process. Stable energy prices are considered as a prerequisite of competitiveness especially for "traditional", energy intensive industries. On the other side global demand for energy and the pressure of meeting GHG emissions objectives mean that energy prices will go up. On the positive side, price rises in the "conventional" energy sources open a high potential for innovation in energy efficiency and renewable energy production.*

- ***Economic globalisation** is seen as a source of competition but also as a possible demand resort, in the light of saturated and shrinking European markets. For the Alpine Space the latter means an opportunity to rely on high quality, unique products, for which a strong industrial base already exists. On the other hand the area opens itself to a competitiveness race which can damage public goods and increase externalities.*

- *The **rise of an information society and a knowledge economy** can also be seen as one of the characteristics of globalisation. Since the regions of the Alpine Space area can hardly win the competitiveness race on a cost basis, taking in account the high environmental and social quality achieved, the logical choice is the investment in the knowledge economy and in innovation, attempting to maintain the R&D edge but also attracting the "best minds" at a global level.*

- ***Socio-demographic change** can be seen as a European trend with similar horizontal influence as climate change, since its impacts are more subtle. In the case of the Alpine Space area these impacts are "global", i.e. ageing population but also intraregional, with younger people leaving the peripheral areas in favour of the larger cities and the metropolises. The former has also an effect on the future form of public and social services but also products, in order to satisfy the needs of an ageing society. The latter leads to novel lifestyles, which enrich the cultural heritage but is also dependent on high energy and material inputs to be sustained.*

- *Last but not least **increased mobility of goods and persons** is a development formed by low energy prices, globalisation and popular lifestyles. While transport investments remain popular*

as growth preconditions, it is also known that they strengthen polarisation effects on the one hand and also generate additional demand, hence entering a vicious circle.

These forces, as well as main aspects from the previously mentioned SWOT analysis, act within the well-established networks in governance and cooperation such as ARGE ALP, Alpine Convention, CIPRA etc.. As a consequence, principles such as sustainability, territorial cohesion, equity, cultural diversity, social solidarity etc. have already been integrated into transnational programmes for several periods. However, a large number of these issues are generally considered to have reached maturity within the *"policy cycle"* (eg. energy efficiency, climate change mitigation etc.) and are considered to *"move on in their national surroundings".* This means, no further significant contribution to these topics is expected within the scope of the ASP.

Last but not least, the Programme highlights the value of specific natural resources for the core area, but also for the whole of Europe, and the value of specific economic systems of the Alpine Space. Furthermore, the Programme raises attention to environmental vulnerabilities of the area and considers social as well as natural transalpine connections as well as functional relations with surrounding areas.

Outcomes which are expected of the ASP , are: delivering policies and strategies, methodologies and tools, pilot actions, action plans, joint management cooperation agreements, structures and systems as well as investment preparation.

These services provide the tools to deal with the set of thematic objectives that are meant to be dealt with by the Alpine Space Programme. Based on the before mentioned *Study on the Strategy Development for the Alpine Space*, the SWOT analysis and the guiding questions on what a possible policy reaction to the SWOT could be, what is feasible to be achieved by a transnational programme and what the scope of addressing the thematic objectives defined by the European Union in the ASP could be, the following TO were chosen:

(1) Strengthening research, technological development and innovation

(4) Supporting the shift towards a low-carbon economy in all sectors

(6) Protecting the environment and promoting resource efficiency.

(11) Enhancing institutional capacity and an efficient public administration

These were captured in four priority axes and six investment priorities with close relation to the earlier discussed mutually reinforcing priorities of the Europe 2020 goals. These are:

** Priority Axis 1 "Innovative Alpine Space" addressing IP 1b*

** Priority Axis 2 "Low Carbon Alpine Space" addressing IP 4e;*

** Priority Axis 3 "Liveable Alpine Space" addressing IPs 6c and 6d;*

** Priority Axis 4 "Well-Governed Alpine Space" addressing TO 11.*

** Priority Axis 5 Technical Assistance.*

Apart from this vertical thematic orientation, the Alpine Space Programme aims to address certain horizontal thematic aspects such as sustainable development, equal opportunities and non-discrimination (see p. 26 ASP).

The priority axes and their investment priorities are explained in detail in the Alpine Space Programme, a short version is provided in chapter 7 at the beginning of the assessments of the strategic objectives. Thoroughly understanding these will provide the knowledge to comprehend the most important issues concerning the assessment procedure of this SEA.

3. Environmental Objectives

The subsequent overview of relevant national and international environmental objectives and regulations considers the following documents: *Neunter Umweltkontrollbericht* (UBA 2010), *SOER – The European Environment State and Outlook 2010* (EEA 2010), *Annuario dei dati ambientali, Edizione 2011* (ISPRA 2012), *Environmental Indicator Report 2012* (EIONET 2012) etc. as well as other national internet sources (see Internet-Sources) such as *Données essentielles del'environnement* (environmental data) and amendments by national environmental authorities. Furthermore transnational regulatory bodies such as the Alpine Convention with its protocols were taken into account. In the light of this, the Convention has also created a *declaration on Climate Change* to tackle the issue on a greater scale (Alpine Convention 2006).

Given the numerous international, national and regional regulations, the following listing constitutes merely a selection and cannot provide a complete overview. The issues were selected in accordance with the SEA directive and the topics raised, as a result of SEA- evaluation of the Alpine Space Programme 2007-2013 as well as in accordance with an update of assessments on environmental law, which had been conducted during previous projects.

3.1. SOIL

European and international objectives

A limitation of rural-urban land conversion is the explicit goal of *the 6th Environment Action Programme* (European Parliament and Council 2002) and is addressed in the new *7th EU Environment Action Programme* (European Parliament and Council 2012, European Parliament and Council 2013). Also there are several thematic documents related to it, such as the Commission *Communication "on Thematic Strategy on the Urban Environment"* (Commission of the European Communities 2006), the *EU Strategy for Sustainable Development* (Commission of the European Communities 2001) and its review (Commission of the European Communities 2009), the new general regulation for the Structural Funds (Council Regulation EC no 1260/1999), the guidelines for INTERREG IV (Council of the European Union 2006) and the *ESDP Action programme* (European Commission 1999) and E*SPON 2013 programme* (ESPON 2007).

The protection of soils against erosion and pollution is another objective of the *6th and 7th Environmental Action Programme*. In order to fulfil this target the *EU Thematic Strategy for Soil Protection* (STS) has been developed. The Communication on the STS (Commission of the European Communities 2006b) explains the importance of soil protection and gives objectives for further actions. Furthermore, there has been a proposal for a framework directive (Commission of the European Communities 2006c) in order to set common principles for soil protection and reach legal standards for soil quality at European level (Norer 2009). In 2005 the EC signed the *Protocol on Soil Protection to the Alpine Convention* (European Community 2005). It contains measures for the designation of protected areas, areas at risk or threatened by erosion, the economic and prudent use of soils and raw

materials, as well as certain activities such as agriculture, forestry and tourism. The latest document giving indices of the current status quo of European soils is the thematic assessment on soil as part of the above mentioned *SOER – The European Environment State and Outlook 2010* (EEA 2010).

Austria

Generally spoken, soil protection has been an important state objective with constitutional status since 1985 as *by BGBl Nr. 491/1984* and soil is therefore clearly denominated to be a matter which requires environmental protection (Austrian Parliament 1984). The protection of soils in Austria is a cross-cutting task of various regional and federal laws mainly tied up to the risks associated with. Chemicals and contaminated land are in federal powers, agricultural soils or nature protection is in the power of federal states as well as spatial planning. As stated above there are some specific regulations at the level of federal states (Salzburg, OÖ, Burgenland, NÖ and Steiermark) for the protection of soils. The reduction of land conversion, however, is one of the objectives of the Austrian Spatial Development Concept (*Österreichisches Raumentwicklungskonzept)* by the Österreichische Raumordnungskonferenz (2011). For closer studies on the complex and multi-disciplinary topic of soils in Austria qualified literature is given e.g. by Roland Norer (see: http://www.unilu.ch/deu/norer_forschung_new.html).

Germany

The conservation and, if required, regeneration of soils (and their enclosed ground water bodies) is the purpose of the national law on soil protection (*Bundesbodenschutzgesetz*) (German Bundestag 1998). It also contains the obligation to prevent sealing. Under certain conditions de-sealing is required. As the protection of soil is a multi-disciplinary target, relationships to regulations on other environmental issues can be found (eg. *Düngemittelgesetz*, *Klärschlammverordnung*, *Chemikaliengesetz etc.*). The rational use of soil is recommended by the *Baugesetzbuch (BauGB)* (German Bundestag 2004), which was amended by the *Europarechtsanpassungsgesetz Bau (EAG Bau*) of June the 24th 2004. It clearly attempts to put further constraint on future sealing. Another document of relevance for German Soils is the *Raumordnungsgesetz*, which clearly has the potential to limit sealing, deal with proper land use etc. (German Bundestag 2008). All the above regulations, laws etc. are supported by documents from the 16 states of Germany such as *Landesentwicklungsplan of Baden-Württemberg* etc..

Italy

The recent version of the “White book about the state of soils in Italy” (*Libro bianco sullo stato del suolo in Italia*) was published in 2008. It documents the cooperation of national environmental associations in terms of soil protection (such as APAT, CTN_TES, Osservatorio Nazionale Pedologico, SISS, SIPE and Strutture Pedologiche Regionali) (ISPRA 2008). The *regulation D.Lgs 152/06* (Italian Legislation 2006) deals with procedures for environment evaluations, soil protection, reclamation of contaminated soil, environmental damage protection etc.. The National Programme for

the amelioration of contaminated sites (*Programma nazionale di bonifica e ripristino ambientale dei siti inquinati*) also focused on the topic of soil contamination. Also on regional levels there are relevant documents, which shows a deep implementation of the topic into the Italian legislation. The Regione FVG for instance enacted a regional regulation aimed at the protection of soil (*Legge regionale 16/2002 "Disposizioni relative al riassetto organizzativo e funzionale in materia di difesa del suolo e di demanio idrico"*). The proposed laws 948/2013 and 70/2013 on the Promotion of Agricultural Areas and Containment of Land Consumption are aimed to focus towards land use and protecting of endangered means of land consumption (Italian Legislation 2013. The *Law 183/89 on water and soil conservation* is aimed at adopting an integrated approach to water and land conservation problems. Both planning and management of water and land conservation must be conceived within a single vision for the whole territory of each basin. It introduced the concept of River Basin Plan, which was conceived as a main tool to collect relevant information and to identify the actions necessary for soil conservation, among others (Italian Legislation 1989).

France

Counteraction against erosion is stipulated within the national "*Code Rural*" (Articles R114-1 according to the *"programmes de lute contre l'erosion"*), within the "*Code Forestier"* (Articles L141-1 for forest protection, L341-5 and L341-6 dealing with forest clearing, R141-36 for Water protection) and the *"Code de L'environnement"* (article L211-7 in order to protect against erosion and denominate it as a main topic of urge, 212-47 for water management). Soil pollution is also integrated within the *"Code de l'environnement"* (L515-12, L515-31 – in particular concerning contaminated sites).

Slovenia

The contamination of soils is regulated by the Decrees on the Input of Dangerous Substances and Plant Nutrients into the Soil and the Decree on the Limit, Warning and Critical Concentration Values of Dangerous Substances in Soil (Republic of Slovenia 1996, 2004). In addition there is the Decree on the Limit Input Concentration Values of Dangerous Substances and Fertilisers in Soil (Republic of Slovenia 2005, 2008, 2009) which also regulates annual input of dangerous substances as well as seeking reduction of this input.

Resume – main Objectives

- ***Decrease of land conversion in accordance with the objectives of European spatial development policies and the 7th Environmental Action Programme***
- ***Protection of soils against erosion and pollution***
- ***Preservation of the natural protection functions of soils in order to prevent natural disasters***

3.2. WATER

European and international objectives

The *Water Framework Directive* (European Parliament and Council 2000) requires a rational, balanced use of water resources, the protection of ground water as a source of drinking water, the protection of the water resources by means of an integrated management at the basin level and the systematic improvement of the chemical and ecological state of European water bodies by 2015 and 2021/2027 respectively. Member states had to adopt management plans in order to achieve the "good state" demanded by the European Union. Another important document is the *Blueprint to safeguard Europe´s Waters*, since it formulates actions that concentrate on better implementation of current water legislation and the integration of water policy objectives into other legislation papers (European Commission 2013).

Furthermore, there is the *Groundwater Directive* (European Parliament and Council 2006) designed to prevent and combat groundwater pollution and *Directive* (Commission of the European Communities 2009) *on technical specifications for chemical analysis and water status monitoring*. Other European regulations which have an indirect impact on water bodies are the *Nitrates Directive* (Council of the European Communities 1991b), aimed at reducing nitrate and organic matter pollution from agricultural land, the *Urban Waste Water Treatment Directive* (Council of the European Communities 1991), aimed at reducing pollution from sewage treatment works and certain industries, the *Integrated Pollution Prevention and Control Directive* (European Parliament and Council (2008), aimed at controlling and preventing the pollution of water by industry, and the *Drinking Water Directive* (Council of the European Union 1998).

Austria

The requirements of the *Water Framework Directive* were adopted into national law in 2003 (Austrian Parliament 2003). Regularly distributed amendments such as BGBl. I Nr. 87/2005, BGBl. I Nr. 123/2006 and BGBl. I Nr. 14/2011 have brought further specifications.

Other relevant regulations for the protection of water bodies are the *Qualitätszielverordnung Chemie Grundwasser* (Austrian Parliament 2010) and the *Trinkwasserverordnung* (Austrian Parliament 2001). These stipulate precise thresholds for the tolerated amount of pollutants in the water. In accordance with § 30 of the *Wasserrechtsgesetz* (Austrian Parliament 1959), groundwater bodies should be kept clean in order to be useable as drinking water resources in the future. Both quantitative andqualitative protection of water resources is part of the *Austrian Sustainability Strategy* (BMFLUW2002), which formed the basis for later reports in 2004, 2006, 2007 and 2009. Furthermore, this strategy led to the constant publication of indicators for sustainability by the Ministry of Life. In addition to the above mentioned documents there is the *Qualitätszielverordnung Ökologie*, which deals with thresholds for the ecological status of water bodies and groundwater (BMFLUW 2010). Last but not least a document

called *Österreichischer Wasserkatalog* aims at e.g. setting up ecological and economic criteria on how to evaluate hydropower projects (BMFLUW (2013).

Germany

Germany's most important national law is the new *Wasserhaushaltsgesetz* (German Bundestag 2009), which aims at protecting all water bodies as a living space for animals and plants with impact on the surrounding terrestrial ecosystems. It also formulates regulations concerning conversion of water bodies and flood protection. Apart from regulations within the *Wasserhaushaltsgesetz* (German Bundestag 2009b), there are a few other regulations concerning water protection, such as the *Abwasserabgabengesetz (*German Bundestag 2005), which was amended in 2005, or the *Trinkwasserverordnung (*German Bundestag 2001), aimed at setting standards for drinking water. The protection of water bodies is also the aim of the national nature conservation law (*Bundesnaturschutzgesetz* (German Bundestag 2009c).

Italy

The former *Law 183/89* on water resources use, flood defence and pollution control has been replaced by the national adoption of the *European Water Framework Directive*. A qualitative/-quantitative protection of Italian water resources by means of an integrated management at basin level, and an environment and ecosystems protection including water bodies is now regulated by the *D.Lgs. 152/2006* (Italian Legislation 2006). Within this decree, the requirements of the *European Urban Waste Water Treatment Directive* (Council of the European Communities 1991) and the Nitrates Directive (Council of the European Communities 1991b) are also covered. More efficient use of water has become mandatory because of decree *DM 12/06/03 n. 185* (Italian Legislation 2003), which also regulates the technical standards of recirculation of used water. Following the above mentioned laws, several decrees on water quality, transmission of water quality data, classification of water bodies and standards for the protection of water bodies against dangers etc. have been created. Flood dangers, in particular, are also taken into account by the *Attuazione della direttiva 2007/60/CE relative alla valuatazione e alla gestione dei rischi di alluvioni*. Further regulations and laws of great importance include the *Attuazione della direttiva 2008/105/CE relative a standard di qualità ambientale nel settore della politica delle acque, recante modifica e successive abrogazione delle direttive 82/176/CEE*… (Italian Legislation 2010), *D. Lgs n. 116 on Gestione della qualità delle acque di balneazione* (Italian Legislation 2008) as well *as D. Lgs n. 94 on la gestione delle acque di balneazione, nella parte relativa all'ossigeno disciolto* (Italian Legislation 2007). Drinking water and water use rights are dealt with in *decreto legislative 2 febbraio 2002 and n. 27 and D.M. 28 luglio 2004* (Italian Legislation 2002; Italian Legislation 2004). Ground water legislation is stipulated within *Attuazione della direttiva 2006/118/CE, relative alla protezione delle acque sotterranee dall'inquinamento e dal deterioramento* (Italian Legislation 2009).

France

The protection as well as the rational management and usage of water resources are required by Article L 210 to 218 of the *Code de l'environnement* (French Republic 2006), which also comprises the requirements of the *Water Framework Directive*. Since 2006, as part of the *Law on water and the aquatic environments* (LEMA) (French Republic 2006b), the necessary framework for achievement of water quality recovery by 2015, sustainable development of water management etc. are fully integrated into national law. The so called acts of the *Grenelle de l'environnement* also contribute to French water policy.

Slovenia

A major document in the field of the water issues in Slovenia is the *Resolution on National Environmental Action Plan* (Republic of Slovenia 2006), which seeks to improve the environment, quality of life and protection of natural resources – including water. Also requiring mention is the *Water Act* (Republic of Slovenia 2002-2012) of 2002 which was enacted in order to establish long-term protection of available water resources. Together with the *Decree on the chemical Status of Surface Waters* (Republic of Slovenia 2002c), it relates to the objectives of the *Water Framework Directive*. Further documents setting the regulatory framework of surface waters are the *Rules on methods for determining water bodies of surface water* (2003) and the *Rules on determining and classification for water bodies on surface water* (2005-2011). The protection of groundwater is regulated by the *Decree on the Quality of Underground Water* (Republic of Slovenia 2002b), the *Rules on methods for determining water bodies of underground water* (Republic of Slovenia 2003; Republic of Slovenia 2005), the *Decree on the Designation of the Status of Endangerment Due to Phytopharmaceuticals to Areas of Aquifers and Their Drainage Basins* and on the *Integrated Rehabilitation Measures* (Republic of Slovenia 2002d), the *Ordinance on the Areas of Aquifers and Their Drainage Basins Endangered Due to Phytopharmaceuticals* (Republic of Slovenia (2002e) and the *Rules on Drinking Water Quality* including *OJ RS No 46/97, 52/97, 54/98* and *7/00*) (Republic of Slovenia 2000). An indirect effect on groundwater resources derives from the *Decree on the Input of Dangerous Substances and Plant Nutrients into the Soil* (Republic of Slovenia 2004). The objectives of the *EC Council Directive 91/271/EEC* concerning Urban Waste Water Treatment are implemented by the *Decree on the Emission of Substances in Waste Water Discharged from Urban Waste Water Treatment Plants* (Republic of Slovenia 2001), which defines when the necessary treatment facilities for wastewater will be constructed in specific agglomerations. These targets are operationalized in the *Ordinance on the Operational Programme for Urban Waste Water Drainage and Treatment with the Programme of Water Supply Projects* (Republic of Slovenia 1999). Further important documents applying water law are the *Decree on the river basin management plan for the Danube Basin* and the *Adriatic Sea Basin* (Republic of Slovenia 2011, 2012), the *Rules on criteria for the designation of a water protection zone* (Republic of Slovenia 2003-2011), the *Decree on conditions and limitations for constructions and activities on flood risk areas* (Republic of Slovenia 2008) as well as the *Decree on the conditions and*

limitations of construction in the area of Log pod Mangartom under threat of fines (Republic of Slovenia 2004b). There also exist the *Operational programme for the prevention of pollution of water environment caused by dangerous chlorinated hydrocarbons from diffuse pollution sources* (Republic of Slovenia 2004c) and the *Operational programme for the discharge and treatment of urban waste water* (Republic of Slovenia 2004; 2005-2017), in order to improve current water policy.

Resume – main Objectives

- ***Protection of water bodies (ground- and surface water) according to the Water Framework Directive and national regulations***
- ***Rational use of water resources***
- ***Systematic improvement of the chemical and ecological state of contaminated water bodies by 2015 and 2021 respectively (in accordance with the Water Framework Directive)***

3.3. CLIMATE, AIR

European and international objectives

One of the most important issues that is discussed within this category is mitigation of climate change, which has been largely integrated into the European Union's objectives and after amendment of the *Law for Climate Protection* (eg. Klimaschutzgesetz etc.) into the legislative landscape of all countries will even be of greater importance due to the definition of maximums for greenhouse-gas-emissions on sectoral level. Also Emission ceiling targets for NOx, SO2, NH3 and volatile hydrocarbons (except Methane) are specified in both the EU *National Ceilings Directive* (NECD) (European Parliament and Council 2001) and the *Gothenburg Protocol*, established under the *United Nations Convention on Long-range Transboundary Air Pollution* (CLRTAP) (UNECE 1999). Emission reducing targets under the NEC-Directive for the new EU member states have been specified in the treaty of accession to the European Union 2003. Emission ceiling targets were amended in 2012 (UNECE 2012), yet there are still no specific overall EU emission targets for carbon monoxide (CO), methane (CH4) and primary PM10 (fine particles emitted directly to the atmosphere). An exception is given for fuels and new mobile sources where ceilings for carbon monoxide (CO) exist. Measures are currently focused on controlling emissions of the secondary PM10[2] precursors. Long-term objectives of the reduction of acidification, eutrophication and ground-level ozone are defined in the previously mentioned UNECE *Convention on Long-range Transboundary Air Pollution* and its protocols (CLRTAP). They provide critical loads of the entry of S and N compounds and heavy metals as well as critical levels of ozone for forests and agricultural plants. There is a *directive on substances that deplete the Ozone Layer* determining the usage of such substances (European Parliament and Council 2009). The EU-15 Kyoto Protocol target for 2008-2012 had been a reduction of 8% from 1990 levels (UNFCCC 2002).

[2] Pollutants that are partly transformed into particles by photo-chemical reactions in the atmosphere.

However, for 2020 the ambitious goal of a reduction of overall greenhouse gas emissions by 20% compared to 1990 levels is set for its 27 Member States. This objective among others is stipulated within the *Europe 2020 strategy* (European Commission 2010). Most of the above legislation on air quality has been united into the important *directive on ambient air quality and cleaner air for Europe* (European Parliament 2008) in order to provide accumulated information in one single document.

Austria

The requirements of the NEC-Directive are integrated into national law by the *"Emissionshöchstmengengesetz-Luft"* (Austrian Parliament 2003). The regulation on immission thresholds, *"Immissionsschutzgesetz Luft"* (Austrian Parliament 1997), defines limits of the following air pollutants:SO2, airborne particles, PM10, NO2, CO, Lead in PM10, benzene as well as dust deposit and its contents lead and cadmium for purposes of human health, and limits of NOx, SO2 respectively NO2 in order to protect ecosystems and vegetation.

The ozone-regulation, *"Ozongesetz"* (Austrian Parliament 1992), which was last changed in 2003, contains information values and alarm values as well as target values for the protection of human health and environment, which have to be respected from 2010 onwards. The reduction target in order to fulfil the objectives of the Koyoto-Protocol was a 13% reduction of greenhouse gases by the goal-period 2008-12 (compared to basis-year 1990). New reduction goals for greenhouse gas emissions are set to be reached in 2020, including a decrease by -16% compared to the base year 2005 (Austrian Umweltbundesamt (2011).

Germany

The construction and operation of emission producing machines, the measurement of emissions, the construction and alteration of traffic infrastructure as well as other emission related issues are regulated in the new version of the national imission law (*Bundesimmissionsschutzgesetz*) from 2002 (German Bundestag 2002). Further regulations are set by the federal states. The reduction target in accordance with the EU directive are a reduction of greenhouse gases of -14 % by 2020 compared to the base year 2005. However, in the *Integrated Energy and Climate Programme* (Integrierte Energie- und Klimaprogramm), reductions of -40% from 1990 to 2020 have been planned (German Umweltbundesamt (2011).

Italy

The reduction and gradual cessation of use of ozone depleting substances is regulated by *law number 549 of the 28/12/93* (Italian legislation 1993). According to this regulation, the usage, sale, import and export of ozone depleting substances had to be stopped by December 31st 2008. National limits in accordance with National Emission Ceilings Directive are set in the *D.Lgs. 171/2004* (Italian legislation

2004). The reduction target of greenhouse gases in accordance with the aims of the Kyoto Protocol were 6.5% in comparison to emissions in 1990. However, the 2020 targets have been raised and now lie at -13 % for non-Emissions Trading Scheme (ETS) sectors by 2020 compared to 2005 levels (EEA 2010). The deliberation *CIPE 123/2002* (Italian legislation 2002) assigns a reduction target of GHG emissions to every economical sector. Reacting to the *European Directive 2003/87/CE,* a national plan on the assigning of CO2 quota (*Piano di assegnazione nazionale delle quote di CO2*) was elaborated. It defines the maximum quota of greenhouse gases that is allowed to be emitted by industries from 2005 onwards (Italian legislation 2003). Also operating in this field is *law 4 giugno 2001,* concerning relevant national programs for the reduction of greenhouse gases. Furthermore, the *decreto legislativo 4 agosto 1999, n.351* implements *the directive 96/62/CE* for ambient air quality assessment and management, the *decreto del Ministero dell'Ambiente e della Tutela del Territorio* (19 novembre 1997, n. 503 (Italian legislation 2005)) contains implementation rules for the *directives 89/369/CEE* and *89/429/CEE* on the prevention of air pollution coming from urban waste incineration plants. Furthermore, the *decreto legislativo 4 aprile 2006, n. 216* (Italian legislation 2006) implemented the *directives 2003/87* and *2004/101/Ce* concerning greenhouse gas emission allowance trading within the Community. At a regional level, several measures and laws deal with the prevention of air pollution and establish a monitoring network for air quality, like for example in *Liguria legge regionale 7 luglio 1994, n. 35* or in *Provincia di Bolzano, legge provinciale 16 Marzo 2000, n. 8*.

France

Regulations concerning air and atmosphere are included in the *Code de l'environnment* (Livre I, Titre II: articles L220 à 229). It includes measures for the survey of air quality and public information. It prescribes establishment of "schémas régionaux climat air énergie", "plans de protection de l'atmosphère", "plans de déplacements urbains" and technical measures for prevention atmospheric pollution and for the rational use of energy. The national target in accordance with the Kyoto-Protocol was an 8% reduction of greenhouse gasses during the period 2008-12. After completion of this period and the creation of the Europe 2020 strategy, a reduction of greenhouses not covered by EU-ETS (Mainland and part of the overseas France) by 14 % until 2020 (from baseline of 2005) (CITEPA 2012) has been agreed on.

Slovenia

In July 2003, two national regulations, one for the management of halons and one for chlorofluorocarbons, were adopted as a result of the *European directive on substances that deplete the Ozone Layer* (European Parliament and Council 2009). In 1998, a first regulation was enacted concerning prohibitions and restrictions with respect to the management of ozone-depleting substances in production, imports, exports, entry into circulation, as well as the use of substances and products whose air emissions deplete the ozone layer. The requirements of the EU regulation regarding ozone depleting substances (*Regulation (EC) No 2037/2000*) are fulfilled by the *national Rules on the Management of Ozone-Depleting Substances* and *Rules on the Management of Waste*

Ozone-Depleting Substances (Republic of Slovenia 2003). Emissions are regulated in the *Decree on national emission ceilings for atmospheric pollutants* (Republic of Slovenia 2005). Another decree influencing the quantity of emissions is the *Decree on the use of products and equipment containing ozone depleting substances or fluorinated greenhouse gases* (Republic of Slovenia 2010). Slovenia had committed to achieve an 8% reduction of GHG emissions during the period 2008-2012. New goals for the period until 2020 as part of the Europe 2020 goals had not been set at the time of editing this chapter (European Union 2013).

Other regulations which seek to implement climate- as well as air protection are the *Decision on the establishment of subzones for the management of ambient air quality* (Republic of Slovenia 2011), the *Decree on ambient air quality* (Republic of Slovenia 2011b) and the *Order on the establishment of zone and classification of zones, agglomerations and subzones in relation to ambient air pollution* (Republic of Slovenia 2011c).

Further recommended documents are the *Revision on Operational programme for complying with national emission ceilings for atmospheric pollutants from 2005* (Republic of Slovenia 2007), the *Operational programme of the Republic of Slovenia for the management of halons* (Republic of Slovenia 2003), the *Operational programme for limiting greenhouse gas emissions until 2012* (Republic of Slovenia 2009), the O*perational programme for the protection of ambient air against pollution caused by PM10* (Republic of Slovenia 2010) and the *Operational programme on national emission ceilings for atmospheric pollutants in ambient air* (Republic of Slovenia 2005).

Resume – main Objectives:

- ***Compliance of reduction targets of greenhouse gases with the Europe 2020 strategy targets as well as the emission reducing targets formulated by the NEC-Directive and the UNECE CLRTAP protocols (critical loads and levels)***
- ***Reduction of traffic related emissions***
- ***Reduction of ozone depleting substances***

3.4. FAUNA, VEGETATION, BIODIVERSITY

European and international objectives

Halting the loss of biodiversity by 2020 is an objective of the European strategy *"Our life insurance, our natural capital: an EU biodiversity strategy to 2020"*, adopted in 2011 and further endorsed by the European Parliament in 2012 (European Commission 2011) as the EU biodiversity strategy. The

protection and, if required, also reconstitution of natural systems to maintain the variety of species is also a target of the *6th environment action programme* which has already been assessed by the *European Commission* (European Commission 2011b) and the newly signed *7th action programme*, which will contain more strategic objectives for the upcoming period until 2020.

The main legislations for nature conservation are the *birds directive* (European Parliament and Council (2009) and the *habitats directive* (European Parliament and Council 1992). Together, they establish a legislative framework for protecting and conserving the EU's wildlife and habitats, as the member states are forced to designate protected areas within the Natura 2000 network. At a global level, the UN-Convention on Biological Diversity (CBD) has set relevant so-called "Aichi-Targets" to be achieved between 2011 and 2020 including halving or even stopping the loss of biodiversity on the planet (CBD 2010). Also, the convention calls for a "*conservation target of 17% of terrestrial and inland water areas and 10% of marine and coastal areas"* and a restoration of *"at least 15% of degraded areas through conservation and restoration activities"*.

Nature protection, biodiversity and care of landscape are also targets of the Alpine Convention. These are dealt with in the individual protocols such as the *Protocol on Mountain Forests* (Alpine Convention 2005a), the *Protocol on Conservation of nature and countryside* (Alpine Convention 2005b) etc.. The European Commission, in agreement with the Member States concerned, has drawn up a list of sites of Community importance for the alpine biogeographical region (European Commission 2012).

Austria

Within the scope of the *UN-Convention on Biological Diversity* (Austrian Parliament 1995), Austria committed to reducing loss of biodiversity until 2010. Similar goals are yet to be implemented for the period until 2020 according to the above mentioned *Aichi Targets* (CBD 2010). The targets of the Alpine Convention regarding the protection of nature and landscape were also implemented into national law in 1995, when Austria became a member in the Alpine Convention (Protocol "*Naturschutz und Landschaftspflege*") (Alpine Convention 1991)). Further relevant law includes the *FFH-directive, which governs the* setting up Natura 2000 areas, and the *Pflanzenschutzgesetz* (Austrian Parliament 2011).

Germany

Guiding regulation on the protection of nature is the *Bundesnaturschutzgesetz,* originally from 1976 and newly announced in 2009 (German Bundestag 2009). It foresees, amongst others, the rational use of natural resources, the protection of animals and plants and the promotion of the compliance with targets, duties and responsibilities of nature protection.

Of further importance is the *Bundeswaldgesetz* (BWaldG – German Bundestag 1975), which contains regulations concerning forest conservation and cultivation. Measures for the cultivation of forests are specified in forestry framework plans. Protection forest areas are established, in order to reduce

negative environmental impacts such as erosion. Another relevant law for the protection of flora in Germany is the "*Pflanzenschutzgesetz"* (German Bundestag 2012).

Italy

In 1991, a law providing guidelines for the protection of important natural areas (*Legge Quadro nazionale sulle aree protette* - Italian Legislation 1991) was issued. This goes hand in hand with the *Criteri minimi uniformi per la definizione di misure di conservazione relative a zone speciali di conservazione (ZSC) e a Zone di protezione special (ZPS)* (Italian Legislation 2007). Additionally focusing on Italy's forests are *Law 113/1992 on re-forestation* (Italian Legislation 1992) and *Orientamento e modernizzazione del settore forestale* (Italian Legislation Dlgs 2001). Also of great importance are *Esecuzione della convenzione relative alle zone umide d'importanza internazionale, soprattutto come habitat degli uccelli acquatici* dating back to 1971 (Italian Legislation 1971) and *Esecuzione del protocollo di emendamento della convenzione internazionale, di Ramsar* (Italian Legislation 1982). Another important legislative document is The National Plan on Biodiversity *Piano Nazionale Sulla Biodiversita* (D.M. Gab/97/568/Dec Del 15 Maggio 1997) which was enacted in 1997. Similar goals are integrated into the *Strategia Nazionale per la Biodiversitá*, which was created in 2010 (Italian Ministero Dell'Ambiente (2010). Also the *decreto del Presidente della Repubblica 8 settembre 1997, n. 357* (Italian Legislation 1997) for the implementation of the *directive 94/43/CEE for the protection of natural and semi natural habitats and of the wild flora and fauna* needs to be considered. Of particular importance is the *Legge 157/1992* (Norme per la protezione della fauna selvatica omeoterma e per il prelievo venatorio) (Italian Legislation 1992) and its update of 2006 (Italian Legislation 2006) containing rules for the protection of wild fauna and for hunting activities. Management of migratory species is handled within *Ratifica e esecuzione della convenzione sulla conservazione delle specie migratory appartenenti alla fauna selvatica* (Italian Legislation 1979b).

At regional level there are many laws concerning Natural Parks and protected areas (eg. *Lombardia leggi regionali 1 dicembre 2003,n. 23 e 24* or *Piemonte legge regionale 8 novembre 2004, n.32 as well as Legge Regionale 16 giugno 2008, n. 14 "Norme per la valorizzazione del paesaggio"*). Connections with the above "leggi" should be taken into account with the *Ratifica ed esecuzione della convenzione relative alla conservazione della vita selvatica e dell'ambiente naturale in Europa* (Italian Legislation 1971), the *Ratifica ed esecuzione della convenzione sulla diversità biologica (CBD), con annessi* (Italian Legislation 1992), *Istituzione Comitato paritetico per la Biodiversità, dell'Osservatorio Nazionale per la biodiversità e del Tavolo di consultazione* and the *Regolamento recante modiviche ed integrazioni relative alla conservazione degli habitat naturali e seminaturali, nonche della flora e della fauna selvaticha* (Italian Legislation 2003) since they provide an important framework for protection of biodiversity and the country's flora and fauna.

France

Stipulations regarding national protection areas as well as the protection of flora and fauna are

contained in book III and IV of the *Code de l'environnment* . The conservation of natural heritage is a major target of the environmental code. Yet there are also other codes and laws, eg. the *Arrété du 13 Octobre 1989* (French Republic 1989), which was last updated in 2009, as well as implementations of the *habitats-directive* including Natura 2000 areas etc..

Slovenia

The national *Environmental Action Programme* focuses on the preservation of unspoilt large forest ecosystems and moderately intensive, ecologically acceptable forms of agricultural production as well as the prevention of decline in biodiversity at the level of ecosystems, species and genomes. Another target is to prevent further threats to natural balance due to inappropriate exploitation of animal and plant species (Republic of Slovenia 2005). It contains objectives until 2012, meaning that a newer plan is likely to be published after the European Union's *7th action programme* is finalized. This could also be the case for a new *Operational programme – Natura 2000 management programme*, of which the most recent version was formulated for 2007-2013 (Republic of Slovenia 2007).

Of great importance for Slovenia's flora and fauna is the *Nature Conservation Act* (1999-2004), which provides the basis for conservation of biodiversity and protection of Slovenia's natural heritage. The *Rules on the Inclusion of Endangered Plant and Animal Species in the Red list* (Republic of Slovenia 2000, 2002-2010)) apply the IUCN criteria (IUCN 1994) for endangered species. Other measures are taken by the *Decree on protected wild plant species* (Republic of Slovenia 2004-2009), the *Decree on protected wild animal species* (Republic of Slovenia 2004-2011) the *Decree on habitat types* (Republic of Slovenia 2003-2013), the *Decree on ecologically important areas* (Republic of Slovenia 2004, 2013) and the *Decree on special protection areas* (Republic of Slovenia 2004-2013). The regulatory framework for management of issues of high importance for the country is broad, and further documents such as the *Cave Protection Act* (Republic of Slovenia 2004, 2006), the *Rules on the assessment of acceptability of impacts caused by the execution of plans and activities affecting nature in protected areas* (Republic of Slovenia 2004-2011b) and specific policies such as the *Triglav National Park Act* (Republic of Slovenia 1981-2010) and the *Strategy for the management of wolf (Canis lupus) in Slovenia* (Republic of Slovenia 2009) exist.

Of additional importance is the national Strategy for Biodiversity as well as Slovenia's membership in organisations including the Alpine Convention, CIPRA and the creation of Natura 2000 areas.

Resume – main Objectives:

- ***Stop the loss of biodiversity between 2013-2020, in accordance with the European Community biodiversity strategy and the UN-Convention on Biological Diversity***
- ***Continuation of the Nature-2000-network and its conservation targets as a tool for the protection of natural habitats and ecologically important areas.***

3.5. LANDSCAPE

European and international objectives

Apart from the *Alpine Convention Protocol on Conservation of Nature and the Countryside* (Alpine Convention 1991) the *European Landscape Convention* (ELC) (European Council 2000) has to be taken into account in the fields of landscape conservation, management and planning. According to the ELC, a landscape policy shall be implemented consisting of protection, management and planning of landscapes. The ELC does not address areas of nature conservation, but focuses on the everyday landscapes as areas perceived by people, *"whose character is the result of action and interaction of natural and/or human factors"*. The general agreement to promote collaboration and establish an international framework for Europe in the fields of landscape and conservation has been part of the so called *Pan-European Biological and Landscape Diversity Strategy* (European Council 1995).

Austria

Within the scope of the Alpine Convention *Protocol on Conservation of Nature and the Countryside* (*Protokoll Naturschutz und Landschaftspfleg*e), which was implemented and renewed by national law (Austrian Parliament 2002), the conservation or, if required, restoration of landscape regarding its variety, speciality and beauty is comprised in each federal state's law.

Germany

The conservation of landscape as recreational space as well as the protection of cultural landscape is the goal of the national law on nature protection (*Bundesnaturschutzgesetz*) 1976/2009 (German Bundestag 2009c). The national law on land use planning 2008 (*Bundesraumordnungsgesetz*) addresses the conservation of cultural landscapes (German Bundestag 2008).

Italy

For Italy, the ELC entered into force on September 1st, 2006. Particularly important is the *decreto legislativo 22 Gennaio 2004, n. 42* (Italian Legislation 2004) that represents the code for cultural and environmental goods and landscape conservation (concerning the protection of territory is related to L. 1439/39 and law "Galasso" L. 431/85). Furthermore, in 2003, Italy adopted the legge 24 dicembre 2003, n. 378 (Italian Legislation 2003), containing rules for the protection and valorisation of rural architecture, especially rural settlements that bear witness of traditional rural economy. Relevant is the legge 21 novembre 2000, n. 353 (Italian Legislation 2000) that deals with wood fires. At a regional level, several measures and rules concern the landscape such as in: Friuli Venzia Giulia the decreto del Presidente della Giunta Regionale 8 luglio 1996, n. 245 regarding environmental assessment, in Liguria legge regionale 19 marzo 2002, n.13 for the protection of landscape, and the legge regionale 22 gennaio 1999, n.3 about public architecture, transport and protected areas, in Piemonte legge regionale 3 aprile 1995, n. 50 for the protection and valorisation of monumental trees, in the Provincia

di Trento the legge provinciale 15 dicembre 2004, n. 10 containing rules about public architecture, transports, public works etc, in Valle d'Aosta the legge regionale 27 maggio 1994, n. 18 that delegates to municipalities administrative functions for the protection of the landscape.

France

The *European Landscape Convention* (European Council 2000) entered into force on July 1st, 2006. Furthermore, the *Code de l'environnement* deals with landscape in articles L350-1 and R350 which introduce the notion of *"directives paysagères"* for remarquable landscapes protection, L350-2 which introduces the "*aires de mise en valeur du patrimoine architectural et paysager (AVAP)"* and L341 (protecting natural monuments and sites).

Slovenia

Of major importance for Slovenia's landscape development is the *Ordinance on Spatial Planning Strategy of Slovenia* (Republic of Slovenia 2004). Apart from this, in the 1990s an inventory of Slovenia's landscape was carried out. The result was an extensive study that not only reviewed the country's landscape, but also based its evaluation on visible morphological and symbolic qualities. Landscape management guidelines were prepared. These were not compulsory, but were a recommended framework for land use planning and for adopting measures that might affect the landscape. Landscape planning in Slovenia also takes place at the national level. The Spatial Development Strategy of Slovenia includes not only sections on Population Distribution and Infrastructure but also a chapter on Landscape Development, which contains plans on the development and protection of open spaces and discusses the overall image of landscape, valuable natural features, the use of natural resources and the limitations on spatial planning that result from the natural features and value of landscape. An update is provided by Corine 2006, the Europe wide inventory, which also projects land use changes between 2000 and 2006 (EIONET 2010). With the ELC, aspects on protection, management and planning are implemented e.g. in the spatial planning act Republic of Slovenia (2007-2013), the environmental protection act (Republic of Slovenia 1993), the cultural heritage protection act (Republic of Slovenia 1999).

Resume – main Objective:

- ***Conservation of variety, uniqueness and beauty of landscape as a source of biodiversity and recreational use for the population***
- ***Maintainence of a mutually appreciated landscape development in the light of structural changes due to socio-demografic change.***

3.6. HUMAN HEALTH, POPULATION

European and international objectives

Reduction of the number of people in exposure to constant noise, caused especially by public and individual traffic, is one of the major targets of the *6th environmental action programme* (European Commission (2011) and is also integrated into the 7th version. The decrease of harmful impacts on human health caused by noise is also the purpose of *directive 2002/49/EC* (European Parliament and Council 2002) of the European parliament, relating to the assessment and management of environmental noise. Emissions, too, have a huge impact on human health. Emission reduction targets for traffic and industry related emissions as well as air pollution caused by other sources are fixed both within European regulations and therefore integrated on a national and international level (q. v. Air/ Climate). This is also to ensure that climate change impacts are kept at low levels as well as that climate change adaptation measures, which ensure security and health for the population, are taken.

Austria

The reduction of noise is the major content of the *"Bundes-Umgebungslärmschutzgesetz"* (Austrian Parliament 2005). It aims to prevent harm to human health caused by noise (particularly caused by traffic). Also, the *Austrian strategy for adaptation to climate change* indirectly plays an important role to protect human health (Austrian Ministry of Life 2012).

Germany

The protection of the population against emissions and noise disturbances is one of the major objectives of the national immission law (*Bundesimmissionsschutzgesetz*) from 2002 (German Bundestag 2002).

Italy

Limitations for the acceptable strains on human health caused by noise are constituted in law *L 447/95* (Italian Legislation 1995). Special thresholds for transport infrastructure are defined by *DPR 142/04* (Italian Legislation 2004). For a general approach on Safety and Health*, D.L.vo 626/94* was issued. Additionally, a number of specific rules were developed in order to guarantee the health of the population, faced with natural and artificial pollutants present in the environment and at working places. The *decreto del Ministro dell'Ambiente e della Tutela del Territorio 2 aprile 2002, n. 60* implements the *directive 1999/30/CE,* concerning air quality thresholds for sulphur dioxide, nitrogen dioxide, nitrogen oxide, and the *directive 2000/69/CE,* concerning thresholds of air quality for benzene and carbon monoxide (Italian Legislation 2002).

France

Part of the aim of titre VII of the fifth book (Livre V) “on the Prevention of pollution, risks and nuisances” of the *Code de l’environnement* is the prevention of acoustic and lightning nuisances. Section 4 of Chapter One deals in particular with noise caused by trafic.

Slovenia

Slovenia adopted limitations on air pollution and water pollution, which have been mentioned in the previous chapters. Also there are limitations for noise emissions (*Decree on limit values for environment noise indicators* (Republic of Slovenia 2005-2010)) and light emissions (*Decree on limit values due to light pollution of environment* (Republic of Slovenia 2007-2010. Of further importance is the *Decree on thresholds of* [(electromagnetic fields)] *EMF in the Natural and Living Environment* which was created in 1996 (Republic of Slovenia 1996). Due to the high necessity of providing drinking water as a basic need for human health, the *Action plan for water supply* (Republic of Slovenia 2006) should be highlighted in this chapter. It aims at an integral protection of water sources and water supply in water deficiency areas.

Resume – main Objective:

- ***Decrease of discomfort and diseases caused by noise and emissions***
- ***Adaptation to climate change in order to ensure human health protection***
- ***Relationships can be observed with other environmental issues such as water, soil, flora, fauna, landscape in context of recreational use of natural resources and prevention of natural disasters.***
- ***Protection of quiet areas in the natural environment (restorative/recovery function)***

3.7. MATERIAL ASSETS AND CULTURAL HERITAGE

European and international objectives

Relevant UNESCO conventions aimed at the protection of cultural heritage are the *Convention on the Protection and Promotion of the Diversity of Cultural Expressions from 2005*, the *Convention for the Safeguarding of the Intangible Cultural Heritage of 2003*, the *UNESCO Universal Declaration on Cultural Diversity of 2001* and the *Convention Concerning the Protection of the World Cultural and Natural Heritage of 1972*. Lately, also recommendations such as the *Recommendation on the Historic Urban Landscape of 2011*, including a glossary of definitions, have taken on relevant issues (UNESCO s.a.). Maintaining cultural heritage is also aimed at by the Alpine Convention in the *Recommendation on Population and Culture* (Alpine Convention 2006). More detailed information on the countries’ legislation on culture is listed by the Council of Europe (2013).

Austria

Austria is a signatory of the *Convention on the Protection of the World Cultural and Natural Heritage of 1972* (UNESCO 1972). The so called Bundesdenkmalamt, as an institution of the Austrian Federal Ministry for Education, the Arts and Culture, is in charge of issues concerning material assets and cultural heritage of high value.

France

Protection and enhancement of the archéological and architectural heritage are directed by the *"code du Patrimoine"*, especially its 5th and 6th books.

Italy

Italy signed the *Convention on the Protection of the World Cultural and Natural Heritage of 1972* (D.L.vo 22.01.2004 n.42 and UNESCO 1972) and manages cultural issues via the Ministero per I Beni e le Attività Culturali. Further organisational structures in terms of culture are provided by individual decrees including eg. Decree 28/2004, Decree 233/2007 and Decree 91/2009. Also of high relevance are *Legge 1 gennaio 1939, n. 1089, in materia di Tutela delle cose d'interesse artistico e storico* (Italian Legislation 1939), *Legge 30 marzo 1998, n. 88, in materia di Norme sulla circolazione dei beni culturali* (Italian Legislation 1998)*, Decreto legislativo 20 ottobre 1998, n. 368, in materia di Istituzione del Ministero per i beni e le attività, culturali, a norma dell'articolo 11 della legge 15 marzo 1997, n. 59* (Italian Legislation 1998b)*, Decreto legislativo 29 ottobre 1999, n. 490, in materia di Testo unico delle disposizioni legislative in materia di beni culturali e ambientali, a norma dell'articolo 1 della legge 8 ottobre n. 352* (Italian Legislation 1999)*,* and *Decreto legislativo 22 gennaio 2004, n. 42, in materia di Codice dei beni culturali e del paesaggio, ai sensi dell'articolo 10 della legge 6 luglio 2002, n. 137* (Italian Legislation 2002)*.*

Germany

Germany signed the *Convention on the Protection of the World Cultural and Natural Heritage* of 1972 (UNESCO 1972). Unlike the other member countries, in Germany the federal states have their individual Kultusministerium (federal ministries for culture) and individual laws relevant to the Protection of German Cultural Heritage against Removal Abroad, the Copyright Law, Federal Building Act etc.. Important for the preservation of monuments are eg. the *„Gesetz zum Schutz und zur Pflege der Denkmäler"* (Denkmalschutzgesetz – DSchG) in Bavaria (Bayern 2009) and the *„Gesetz zum Schutz der Kulturdenkmale"* (Denkmalschutzgesetz – DSchG BW) of Baden-Württemberg (1983).

Slovenia

Slovenia signed the *Convention on the Protection of the World Cultural and Natural Heritage* of 1972 (UNESCO 1972), and implemented these objectives in the *Cultural Heritage Protection Act* (Republic

of Slovenia 2008-2012). The ministry in charge is the Ministrstvo za kulturo.

Resume – main Objective:

- ***· Protection of material and intangible cultural heritage of the alpine area (historical ensembles of buildings, traditional customs, liveries, languages) as well as material assets.***

3.8. References

Introduction

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4. Environmental Characteristics

For each environmental issue special emphasis was given on the consideration of climate change at the end of the chapter.

4.1. SOIL

One of the two major problems concerning alpine soils is the frequent occurrence of soil erosion. The susceptibility to erosion is on the one hand dependent on the different types of rocks, which are very diverse in the alpine area. Basically there are two main formations (silicates and carbonates). In addition, flysch as well as clay and sandstones can also be found. Sedimentary rocks are typical for border areas whereas the central Alps are dominated by silicates (Broggi, Staub and Ruffini, 1999).

The internal characteristics of the soil, which include texture, structure, density, porosity, consistency, temperature, colour, resistivity etc., influence erosion to a certain degree and are quite variable. However, according to Konz et al. (2012) and others, to a substantial degree erosion is also driven by external effects as well as by weather conditions which can cause rock falls, landslides or avalanches.

An important factor which is likely to lead to increasing erosion over the next decades is climate change. This effect, which is intensified by human action, will cause a rise in temperature and, as a consequence, threaten existent permafrost soils. On the whole, it has the potential to change soil structures and cause numerous side effects. Many studies such as Kääb et al. (2007), Kellerer-Pirklbauer et al. (2012) have focused on soil changes in alpine areas. The stability of soil can dramatically decrease when permafrost, which will be degraded especially in lower altitudes, starts melting.

As the inclination in alpine valleys is mostly quite steep, a decreasing soil stability by degradation of permafrost enhances the already existing risk of erosion caused by water and snow running/gliding down the hills. The following gives an overview on the alpine areas and a model on erosion by water runoff in t/ha/yr, signalizing that a fair amount of its areas are prone to constant change by this phenomenon.

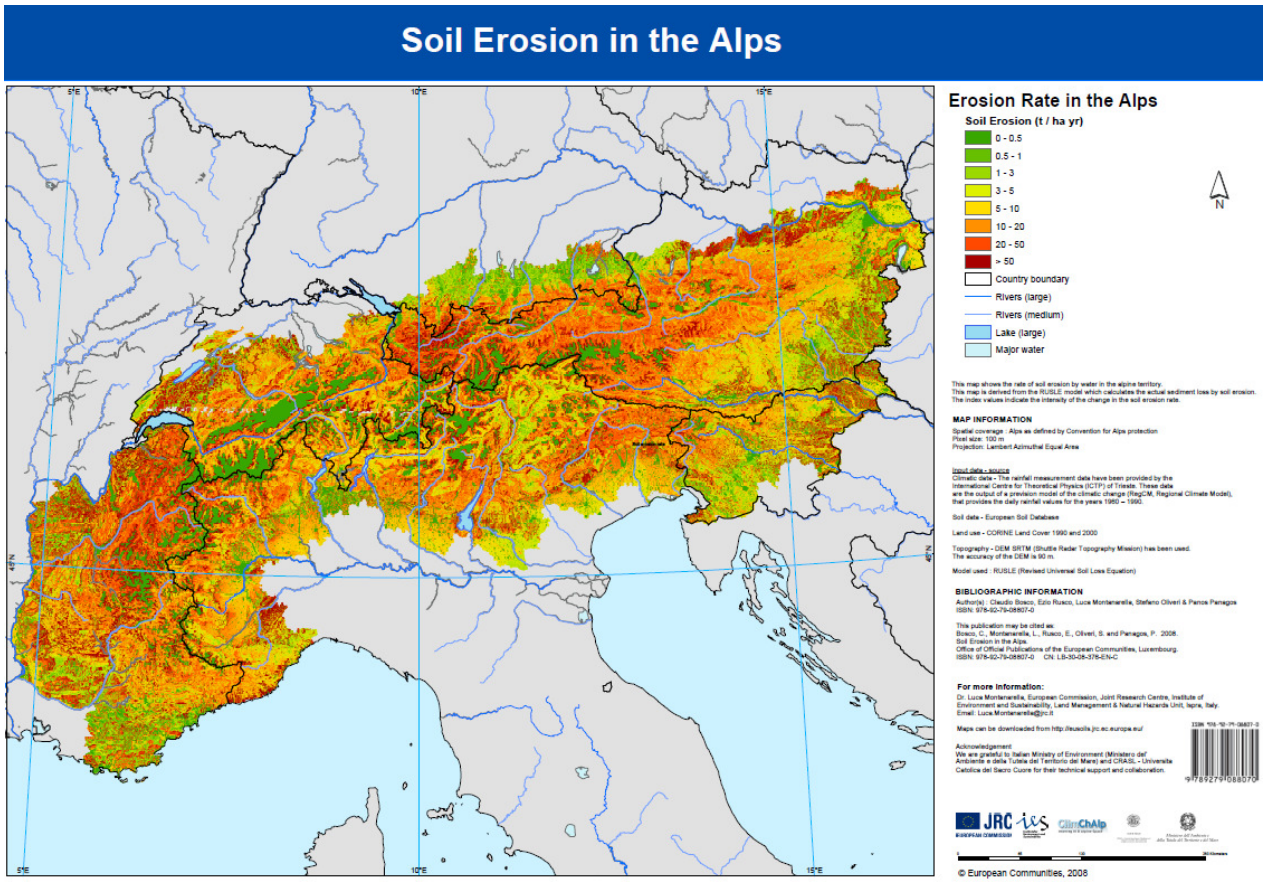


Figure 1: Soil Erosion in the Alps (European Commission 2012b)

The susceptibility of soil is also strongly linked to the vegetation cover (sufficient protection of soil is guaranteed only if the vegetation cover is about 70-80%) and land use practices. Whereas the degradation of soils is almost zero if the vegetation cover is closed, at vegetation-free places the removal of soil rises up to 1kg per m_2 of soil (Tappeiner, Cernusca, Pröbstl 1998 p.80). As a consequence, special caution should be given to interrelationships between vegetation and soil. For example there are activities that might destroy the vegetation cover and thereby increase the surface run-off, hence cause soil erosion.

Due to the short vegetation period and the extreme climatic conditions, the requirements for soil organisms are very special and the formation of humus is limited. Therefore soil-building processes proceed quite slowly. At the alpine altitudinal zone (above 2000m) these processes can be a matter of more than 4000 years (Wüthrich 2001 p.59). On the other hand, dramatic changes due to erosion can happen within short periods of time, which raises evidence that land use and also changes in land use need a great amount of care and attention. Another important factor which needs special consideration when it comes to changes in land use and which is also capable to create great long term damage on soil is sealing and will be discussed later. The importance of giving care and attention to proper choice of land use is supported by Seeber and Seeber (2008) who state that *"Land-use changes clearly affect humus forms. Reducing or abandoning management leads to the accumulation*

of litter material and the development of more differentiated, irregularly distributed humus layers. As a consequence, the soil pH also decreases, while both humus and soil C/N, along with organic matter content, increase from intensively managed areas to the forest".

Human activities including alpine skiing, hiking or overuse of pastures can, under certain circumstances, increase the probability of soil erosion. Infrastructural measures (roads, other transport measures etc.), if not planned properly, can also intensify the risk of slides (compare eg. Ruth-Balaganskaya and Myllynen-Malinen 2000, Geneletti 2008, Tomczyk 2011 etc.). Intensification of agriculture leads to a decline of species and different agricultural methods can have significant influence on the scale of erosion (Wainwright 1996 etc.). The fewer species there are present in a meadow, the more homogenous the root system becomes, and a homogenous root system caused by less diverse flora increases the likelihood of slides. Levelling further intensifies the negative effects.

In alpine regions like the valleys' flatlands or pre-alpine areas the state of soils is mostly influenced by the intensive agriculture. One of the major pollutants is nitrate. In addition, other fungicides, herbicides, insecticides and bactericides further deteriorate the quality of soil. For example, in Slovenia, following the adoption of the *Decree on the Input of Dangerous Substances and Plant Nutrients into the Soil in 2001,* the entire territory of the Republic was designated as a vulnerable zone (EIONET 2003). Topsoils are often loaded with inorganic pollutants (lead, cadmium, copper and quicksilver). At the opposite end of the gradient from intensified land use, especially in more remote areas where agriculture evolved historically and is now too expensive to be kept on, scrub encroachment can also cause changes in the composition of soils, thereby possibly leading to erosion (Caviezel et al. (2013), Anthelme et. al (2007)).

The second major concern related to soil in the alpine countries is sealing. *"Sealed areas are lost to uses such as agriculture or forestry while the ecological soil functions are severely impaired or even prevented (e.g. soil working as a buffer and filter system or as a carbon sink). In addition, surrounding soils may be influenced by change in water flow patterns or the fragmentation of habitats"* (European Commission 2012a).

This comment clearly reflects the main problems that arise when it comes to soil sealing. On the one hand the severity of this loss to other land uses by soil sealing– which has already been discussed on the previous page – is that after renaturating the soil it may take several centuries to reach former soil quality. On the other hand the above quote highlights the *"change in water flow patterns"*. This is not only crucial due to the loss of habitats, yet another threat is, that a change in runoff (lack of potential for percolation, runoff at other areas) also has the power to create possible flooding (eg. European Commission 2012c).

Constant sealing throughout the last years has shown that this trend is still to be continuing, yet counteracting and causing a halt to this process would be crucial. In the whole of Austria, for instance, an increase of sealed building land between 2002 and 2012 of around 11 % was reported

(Umweltbundesamt 2011). Also in Switzerland sealing of soil has been a major issue with an increase of sealed areas of around 13 % between 1985 and 1997. Alpine areas like the Central Alps, Southern- and Northern Alps have experienced a slower increase in the rate of sealing than the lower midlands, yet it is a crucial fact that, in these alpine areas, sealing is usually highly concentrated on valleys and regions with higher population densities (Swiss BAFU 2011). Treaties like the Alpine Convention, and projects funded under the ASP have committed themselves to counteracting this problem.

Climate Change:

Future challenges of climate change will be caused by the loss of permafrost, which will lead to rockfall, instability and impacts by debris flow. Furthermore natural erosion processes will be increased due to extreme weather conditions. Further effects might occur due to a loss of soil means and a reduced water storage capacity plus CO_2 sequestration capacity of soils.

4.2. WATER

The alpine area comprises one of Europe's most important fresh water sources. According to Psenner (2006) and others, water from the alpine space could provide around 40 % of Europe's fresh water consumption. The graphic below shows the most important freshwater areas of the Alps in 2004.

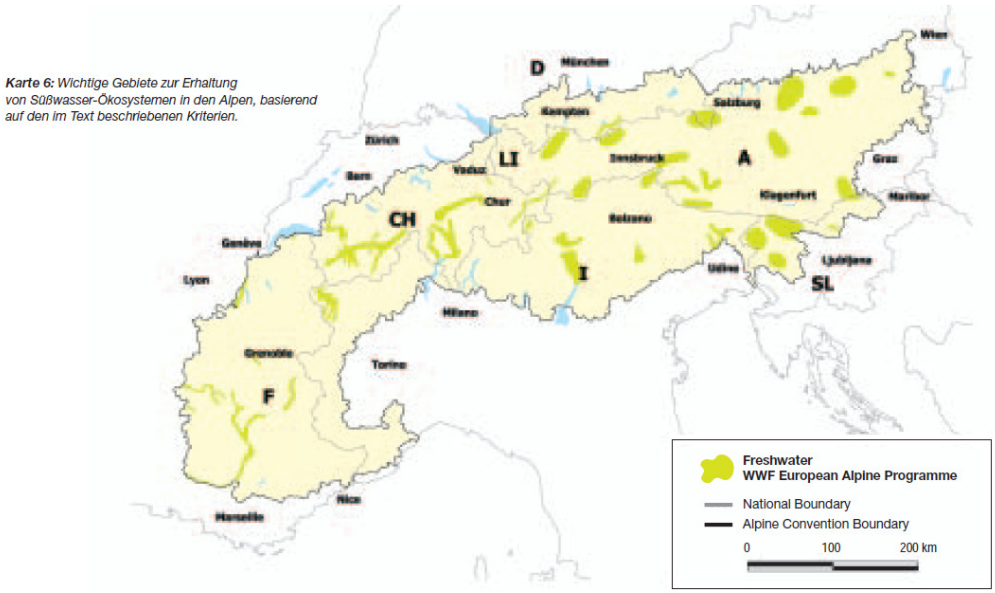


Figure 2: Freshwater-ecosystems (WWF Deutschland 2004)

The high amounts of fresh water correlate directly with precipitation in the areas. In general, precipitation in mountainous regions is higher than in lowlands due to the congestion of rainfalls. This is shown by the following graphic by EEA 2002, where the alpine areas report similarly high average precipitations as European coastal regions.

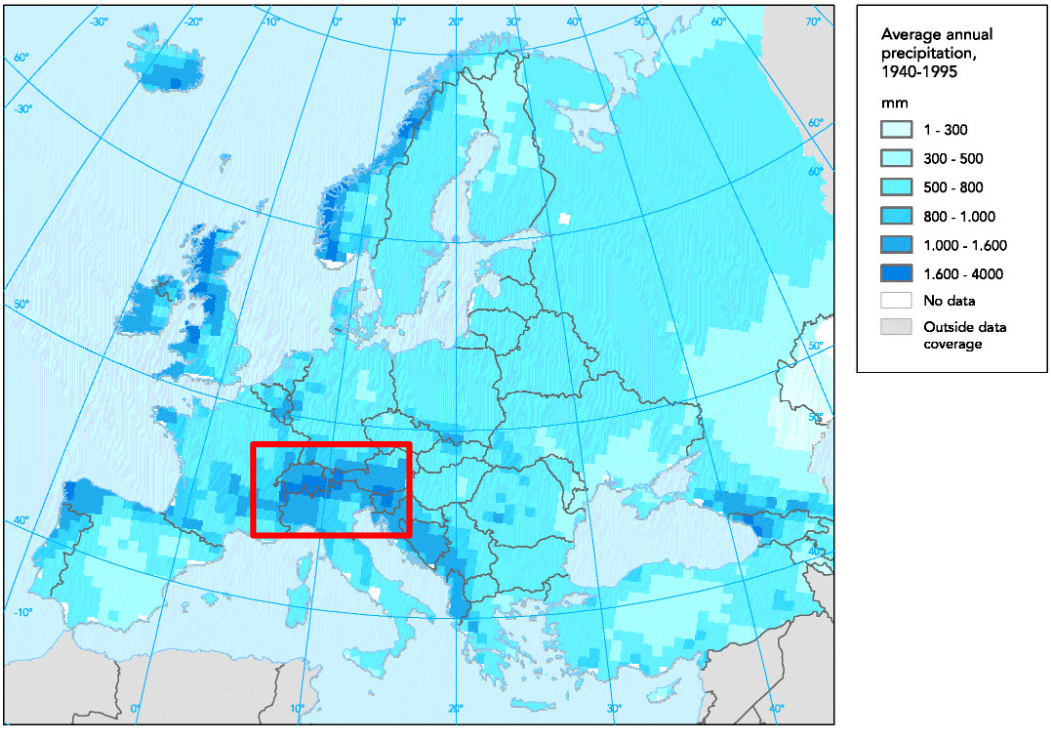


Figure 3: Average annual precipitation 1940-1995 in Europe (EEA 2002)

In France, for example, the alpine regions receive 1/5th of the total national precipitation, although they cover only 1/15th of the total national territory. There are, however, very dry areas as well. Inner alpine valleys and basins (such as the Wallis or Vinschgau) show annual precipitations below 700mm (eg. Niederfriniger sa., Bätzing 1991 etc.). At the border area, precipitation increases with the altitude of the mountains. In inner-alpine regions the annual amount of precipitation is steady and, as stated by Bätzing (1991), may also at times create areas with significantly lower annual rates of rainfall.

The dispersal of precipitation corresponds to the continental climate and peaks during summer. Only in the South-western part of the Alps are dry summers the norm, as a consequence of the Mediterranean influence (Broggi, Staub, Ruffini 1999 p. 65). Generally, thunderstorm caused heavy rainfalls, with an increasing intensity in higher areas, are more likely to occur more frequently during summer in the future as the ongoing climate change is boosting the frequency of extreme occurrences. In total, however, many assessments including Bogataj (2007) project a possible decrease in runoff for alpine rivers by 40-70 % due to higher temperatures and lower precipitation rates in general (in particularly a seasonal change in runoff due to the reduced snow melt). Heavy events such as winter floods, summer droughts- and floods are more likely to occur. Particularly in light of the overall decrease in runoff due to climate change, especially the above mentioned areas with lower precipitation rates should receive special attention in terms of adaptation- and resilience measures. Important groundwater bodies as well as soils would be at risk with increasing water scarcity, which can have considerable impact on agricultural areas and drinking water reserves in the Alps such as in South Tyrol (see Schirpke et al. 2012; Tappeiner et al. 2010). Therefore, early-warning

systems as well as holistic water management measures are to be developed within the Alpine Space boundaries (Alp-Water-Scarce Konsortium 2011).

Also artificial snowmaking should be further analysed, as it is sometimes related to water scarcity or, in some cases, can cause pollution of water resources, due to the residuals of the oil and diesel needed to operate the snow-making equipment. This is only relevant, however, for low pressure machines powered by gasoline or diesel, which are nowadays rarely used. Stabilizers used in context with ski races have since been regarded as being more harmful to ground water resources (Pröbstl 2006).

Another issue that might create seasonal water scarcity or imbalances is the fact that the seasonal peak times of winter-tourism in alpine areas may not correlate with the natural availability of water resources all year around. This poses a challenge for the provision of clean drinking water on the one hand but also for satisfactory handling of wastewater including greywater and blackwater all year around.

One major interrelationship of water to other resources in alpine regions is the already previously discussed soil erosion caused by surface-run off. The impact as well as intensity of surface run-off is strongly related to other environmental issues such as flora and soil. As stated in the chapter on Soil, a compact vegetation cover is important in order to retain water and, as a consequence, avoid soil erosion.

Being a source of drinking water, the alpine ecosystems should be kept free of pollutants that might be harmful to human health. However, in proximity to major transit routes within the Alps, traffic related water pollution occurs. Furthermore, as discussed by Formann and Alexander (1998), the compression and sealing through newly established transport infrastructure leads to changes in water eco-systems by changing the run-off.

Another major concern is raised by agriculture and industrial activity together with wastewater run-off. They cause an increasing leakage of nitrogen compounds and phosphorus into groundwater bodies. Regulative policies such as direct payments towards the agricultural industry (eg. Swiss Bundesrat 1998) have countered these effects. In Switzerland, measures to protect water quality ensured that most lakes and the majority of water bodies reached the level “very good” or “good” by 2005 (Swiss Federal Office for the Environment 2010). However, in other fields or regions, organic pollution caused by discharges of urban and industrial waste and leaching from agricultural land indicated by high biochemical oxygen demand (BOD_5), and high ammonium values are still an important issue. In Slovenia in 2002, for instance, 28.6% of the total amount of drinking water had been physically and chemically unsuitable for human consumption, 11.2% had contained microbiological impurities and 8.2% was toxically unsuitable (EIONET 2003). However, measures taken by the country have reported steady and successful improvement in some areas. By 2007, a reduction of non-compliant large supply areas (provision of drinking water for >10.000 inhabitants) from 7% of all samples in 2004 to below 2% in 2007 was reached. A problem is still presented by small supply areas (<500 inhabitants),

of which around 25 % reported non-compliant samples for faecal contamination (the presence of E. coli) in 2007 (Republic of Slovenia 2013).

Alpine rivers and lakes originally contained a very specific, highly specialized fish fauna. Many attempts have been made, however, to introduce exotic species. As the alien species affect the local species, these interferences are harmful to the alpine water bodies. The table (below) from a study by Peter (2006) in Tockner et al. (2009) shows amounts of alien species in Italian rivers. It can be seen that all observed rivers contain substantial numbers of alien species which, in one case, even exceed the number of native species.

Table 1: Distribution of fish species in Italian rivers (Peter 2006 in Tockner et al. 2009)

River	Tagliamento	Brenta	Adige	Po	Sangro	Amendolea	Alcantara	Tiber	Arno
Mean catchment elevation	987	508	1468	736	920	921	911	506	320
Native fish species	26	25	37	44	8	1	2	20	18
Non-native fish species	6	11	17	25	3	1	2	21	17

Alpine rivers transport huge amounts of debris. Thereby new habitats are constantly created, while others are destroyed. Fluvial systems are therefore highly dynamic. Thus, the creation of impounding reservoirs in terms of energy generation is to be seen critically (WWF Deutschland 2004 p.18-19). Likewise, the OEAV (2005) sees natural rivers in Austria, e.g. nine of 19 existing untouched glacier rivers at risk if possible dam projects are realised. Negative effects would be particularly noticeable in case of regularly flooded alluvial plains, which are then separated from the main course of the river (WWF Deutschland 2004).

Climate Change:

In the alpine area the water storage in the glaciers are of significant importance. This storage of potable water will be reduced in the future and will affect the living conditions in the Alps. The water bodies in the Alps will be influenced by extreme weather events and floods on the North side of the Alpine chain. The South is more affected by droughts and limitations of freshwater use.

4.3. CLIMATE/ AIR

The alpine region, due to its multitude of different terrains and altitudes, is prone to very diverse climatic conditions that can appear on small scales. Generally spoken, there are four main climatic conditions including the predominantly wet West winds, cold polar winds from the North, dry conditions approaching from the East and the warm Southerlies coming from the Mediterranean. A major concern of the alpine area is its vulnerability against climate change which leads to changes in weather and regional climatic conditions. Extreme climatic conditions such as storms, temperature variability etc. are more likely in the alpine region and changes of conditions are estimated to appear sooner than on a global level. The Northern Alps, for instance, have reported an increase in average temperature that was at least double the global temperature change of 0,8 °C over the last century (Alpine Convention 2006). Many studies and institutions have therefore analysed possible effects of climate change on alpine areas, projecting fauna, flora, water bodies, cultural heritage etc. at risk and calling for mitigation and adaptation (Alpine Convention 2007, Alpine Convention 2006, EEA 2009, Agrawala 2007 etc.).

Global warming as the result of climate change should therefore, especially, be of major concern for the alpine countries. Global warming is principally attributable to increased greenhouse gas emissions, which are the outcome of human activity, especially due to the increased consumption of fossil fuels. Greenhouse gases are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6), CFC-compounds (chlorofluorocarbons), and HCFC-compounds (hydrochlorofluorocarbons). CFCs, HCFCs and greenhouse gases also belong to the group of ozone depleting substances (for more information on global warming and climate change see also AAAS (2006); G8 Academies (2007); IPCC (2007), UNFCCC (1992) etc.).

One noticeable impact of climate warming are receding glaciers (for instance the surface of Triglav glacier decreased from 18 ha in 1976, to 4.3 ha in 1992, to 0.7 ha in 2003. A slight increase to 2.4 ha in 2010 could be reported) (Triglav-Cekada and Gabrovec 2013). Heavy rainfalls and the warming of permafrost soils (as discussed in the chapter on soil and water) are also associated with climate change.

Alpine areas are often influenced by the big industrial zones in the peri-alpine belt. Pollutants may be transferred into the alpine area. At the Northern border of the Alps, damages caused by air pollutants (tree defoliation etc.) are more intense because of the predominantly Western winds. At local level, traffic and domestic fuel uses are the major sources of air pollution. Especially frequently transited valleys like Chamonix are prone to substantial air pollution (Brulfert et al. 2005). These emissions can cause damages to forests, pose a threat to human health or pressure the natural environment (compare eg. Heimann et al. 2007, UNEP 2009 etc.).

Whereas the emissions of industry and agriculture are decreasing, traffic emissions including emissions from transit routes pose the major problem. Private traffic, especially, is steadily increasing. Several studies in alpine regions have been able to indicate the high dependency of regional air quality on traffic emissions (Suppan 2006, Chélala and Thudium 2011, etc.). However there have been suggestions that proper infrastructure design, wise land use and decreasing peak flows of traffic have the power to improve current situations (Stel and Giaiotti 2012).

As stated previously, unique climatic conditions can also appear on a small scale. As alpine valleys such as the above mentioned Chamonix valley can be rather narrow, the exchange of air occurs slower than in open spaces. Inversions are likely to occur. If emissions occur in these areas, then sufficient evacuation of air pollutants may be affected, as can be seen in the below graphic from a study by Chélala and Thudium (2011), analysing the amount of NOx with and without temperature inversion in alpine regions. *"Pollution problems are, most often, associated with low wind conditions, when significant stratification develops an inversion layer that reduces the exchange to the meteorological scales"* (Anquetin et al. 1999). Anquetin et al. (1999) refer to this as pollutant trapping. A reduction of emission of pollutants and particulate matter is therefore crucial. Another side effect of general inversion is that, in the majority of the alpine valleys, deterioration of trees is noticeable at the border of the inversion layer, which highlights a significant interrelationship between alpine climatic conditions and impact on flora and biodiversity.

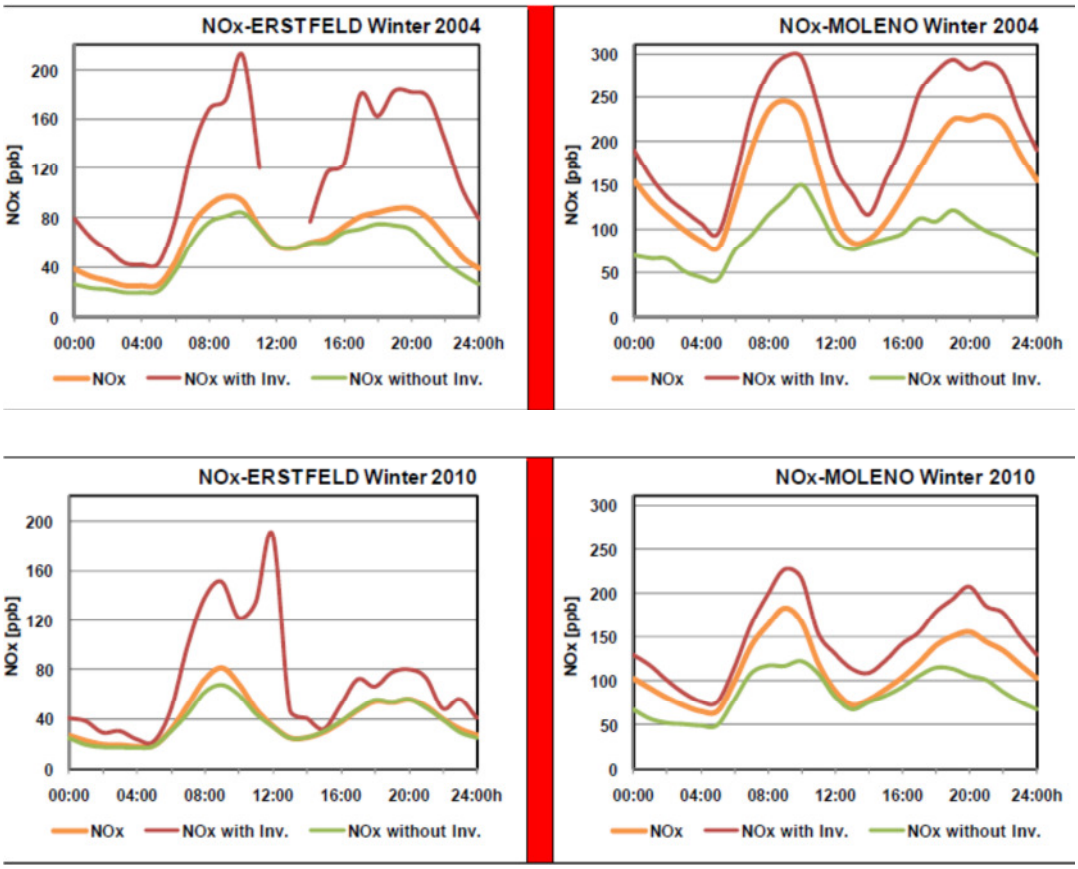


Figure 4: NOx evacuation with temperature Inversions (Chélala and Thudium 2011)

A similar alpine phenomenon with a similar background as inversion, however on a meso- to micro climate scale, which is linked to the steepness of the alpine hills, is the trapping of cold air. Emerging during the evening hours, the cold air glides down the slopes. Lakes of cold air form at the bottom of the valleys. About 100-300 meters above the bottom of the valleys, a warm zone tends to predominate. Problems arise if the cold air is dammed behind obstacles (houses, walls, etc.) as lakes of cold air are formed in front of the barrier. This effect leads to an amplification of freeze above the barriers, whereas beneath them the local climate is slightly warmer than elsewhere (fewer freezes) (Tappeiner, Cernusca, Pröbstl 1998).

Climate Change:

The alpine area will be significantly affected by climate change. The average temperature until 2050 is supposed to be higher than the global increase. Strong winds and impacts of temperature variability in wind systems are more likely in alpine areas. An increase of temperature inversions may have an impact on air quality in some regions. The Alpine cities are already often affected by tropical nights in summer.

4.4. FAUNA, VEGETATION, BIODIVERSITY

As a result of the various climatic conditions in the alpine area and the resulting difference in habitats, the alpine flora and fauna is very rich. Many endemic species can be found (most of them occur either in the Eastern or the Western part of the Alps). Only in South-Tyrol about 2/3 of the fauna of Central Europe can be observed. Yet, especially due to the existence of this unique fauna and flora, upcoming invasive species may create preasure on the already scarce Alpine sites. Proper land use, reintroduction of regionally extinct species, pest control, further research on the topic etc. have therefore been a major topic of concern for managers of alpine biodiversity (compare Gallien et al. 2012, Greater Alpine National Parks 2010 etc.). The amount of species generally increases from North to South and from higher alpine areas to lowlands (Broggi, Staub, Ruffini, 1999).

Unique Fauna of the Alpine Space

Regarding mammals there are some species which had to be reintroduced such as the wolf (*Canis lupus*), the brown bear (*Ursus arctos*) or the lynx (*Lynx lynx*). Several herbivores are of special importance for the alpine area, such as the ibex, the chamois (*Rupicapra rupicapra*) and the red deer (*Cervus elaphus*). Furthermore, there are several bats which are typical of the Alps (e.g. *Eptesicus nilssonii, Rhinolophus euryale*). Significant for fluvial areas is the European otter (*Lutra lutra*) (WWF Germany 2004; WWF s.a.). Especially with carnivores, reintroduction can cause political difficulty and, as seen with the brown bear (Ursus arctos) reintroduction in South Tyrol, can require further attention to remain accepted by regional stakeholders (Autonomus Province of Trento 2013).

About 200 species of birds breed in the Alps and another 200 migratory species find resting places in the region. There are no endemic species, however. Some species, in particular falconiformes such as the golden eagle (*Aquila chrysaetos)* of which around 1200 pairs were breeding in the Alps in the early 2000s, the peregrine falcon (*Falco peregrinus)* and the bearded vulture (*Gypaetus barbatus)* were highly endangered by human interference, but over the last few years their populations have started to recover. About 50 species breed above 2000 meters altitude, such as the rock partridge (*Alectoris graeca*) or the Eurasian dotterel (*Charadrius morinellus*). Other species are restricted to special habitats such as mountain forests (e.g. *Tetrao urogallus, Picoides tridactylus, Serinus citrinella*). Another rare species is the common rock thrush (*Monticola saxatilis*), which is spread over the whole alpine area (WWF Germany 2004; Mebs and Schmidt 2006, WWF s.a.). Only few amphibian species can be found in the Alps. Those which live there are, however, highly specialized and dependent on scarce living spaces (e.g. caves). In total, there are 21 species of amphibians and 15 species of reptiles indigenous to the Alps (WWF Germany 2004; Alparc s.a.).

Unique Flora of the alpine region

The alpine flora is very rich. Of the approximately 4500 species of plants (which is almost 40% of the complete European flora), about 350 are endemic to the Alps. Around 900 different phytocenoses can be found. Some plants are used to extreme living conditions and are very rare (e.g. *Saxifraga diapensioides, S. tombeanensis, S. burseriana*). **Figure 5** shows Natura 2000 network of protected areas across the alps (Alparc s.a.b; WWF Germany 2004).

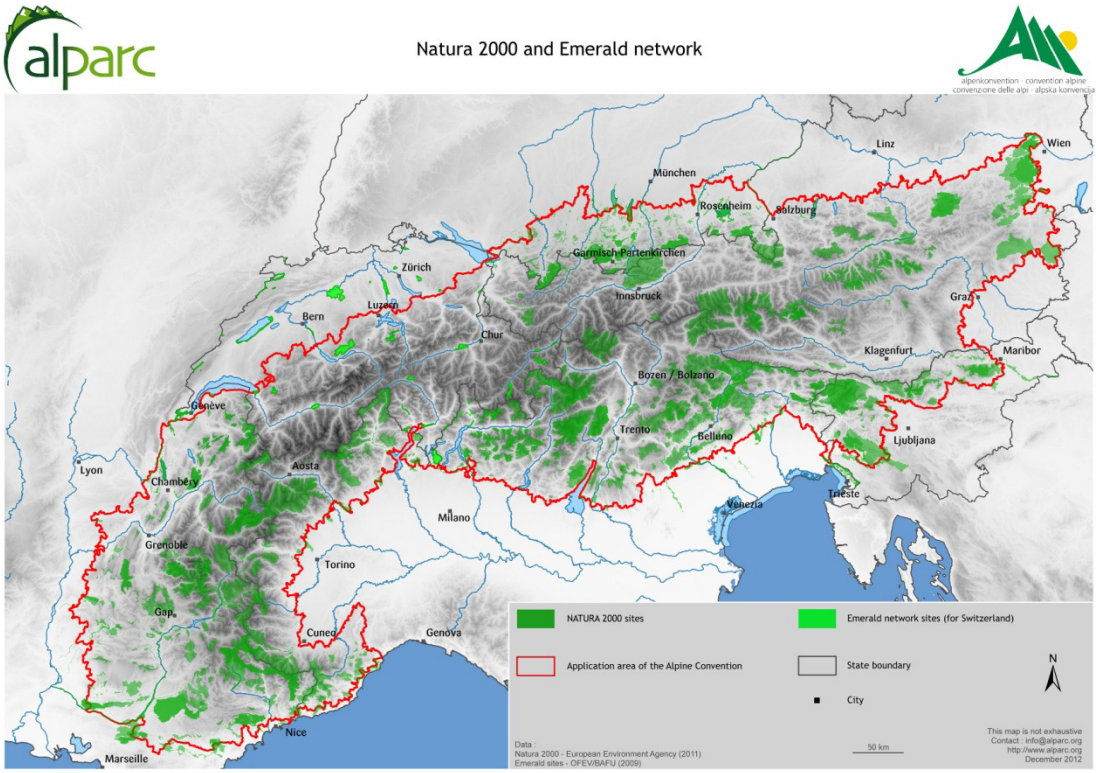


Figure 5: Natura 2000 and Emerald Network (Source: Alparc 2012)

Of great importance for the biodiversity in alpine regions are human-related species of plants which can be kept only by cultivation. The tendency to keep formerly agricultural land fallow is increasing. In these areas succession proceeds quite fast, leading to a reduction of species. According to Bätzing 2003, species of the traditional agricultural land cultivation are most endangered. Species diversity is declining because of both the abandonment of agricultural production in some areas, as well as the intensification in other parts of the Alps (Bätzing 2003; Höfer et al. 2010).

Biodiversity of the alpine region

Due to their extreme living conditions, alpine ecosystems are highly vulnerable to external interferences. Development processes in alpine ecosystems take place quite slowly because of the unfavourable climatic conditions in higher alpine sites. Regeneration terms after disturbances are much longer than in low lands. Therefore, long-term effects need to be considered properly in order to prevent ecological harm (Tappeiner, Cernusca, Pröbstl 1998). This is supported by the fact that endemism and pioneer species occur especially in the higher terrains (EEA 2012; Nagy et al. 2003 etc.). Hence the alpine region is regarded as an important gene-bank.

Land use plays a very important role in mountainous regions. Phytosociological investigations clearly show the link between land-use and vegetation (Cernusca, Tappeiner, Bayfield 1999). More species can be found in extensively used alpine agricultural lands than in intensively used agricultural lands. As already mentioned previously, proper land use is crucial in order to preserve alpine ecosystems, as the variety of species is strongly dependent on the intensity of human interference. Neither too much human activity nor total lack of intervention is beneficial to the richness of flora and fauna. Taking meadows as an example, too frequent mowing inhibits the natural regeneration process, whereas a certain number of swaths (in general one or two swaths per year) are necessary in order to maintain the diversity of species. The cut leads to a dense vegetation cover, which ensures the water retaining capacity and improves the resistance of soil so as to prevent natural hazards. As far as pasture is concerned, neither too many nor too few animals should be kept in alpine areas. In particular cows can cause severe injuries to the vegetation cover (Government of the Fürstentum Liechtenstein 2011; Jessel 2010; Höfer et al. 2010). Also a temporal alternation of animals is advisable (e.g. goats-sheep-cows-horses) (eg. Bätzing 2003).

A human related stress caused by specific land use is the creation of second generation biogas for transportation, electricity and heating production as one tool in order to mitigate climate change and reduce the emission of greenhouse gases. Changing type and patterns of plant cropping within the alpine area for the production of biogas may create further stress on already endangered species and lower biodiversity of native species. However, forests would also constitute an important sink of GHG emissions and usage of *“biomass to heat and power is more effective in reducing GHG emissions than the production of transportation fuels”* (Klima und Energiefonds 2011). Yet, while tree defoliation and

forest decline are increasing in some areas due to use as biomass and other uses, the general amount of woodlands in the Alps is increasing (see flora, fauna, biodiversity).

Skiing and other forms of alpine tourism, as well as the wrong intensity of agricultural land use, pose possible threats to alpine ecosystems and biodiversity. Research shows that the most disturbed plant communities can be found in sites between 1400 and 1600 meters altitude, where human activities are most intense in most alpine regions (Tappeiner, Cernusca, Pröbstl). In particular new sports such as rafting, free climbing, "*canyoning*", etc. pose severe problems, as the athletes expand into hitherto unused areas (Bätzing 2003). The overlapping of different usages (skiing, pasture, hiking, etc.) poses additional stress on the vegetation cover. A prolonged winter season (by means of artificial snow e.g.) leaves no time for the vegetation to recover before the beginning of the summer season (Tappeiner, Cernusca, Pröbstl, 1998).

Forest ecosystems are of great importance as far as the prevention of natural hazards is concerned. In woodlands, part of the precipitation can already be collected by the leaves or needles of the trees and will afterwards either evaporate or be conducted slowly into the soil. The rest will be absorbed by the roots. A dense system of roots contributes to stabilizing the soil and to prevent erosion. In general the size of forests is increasing. The largest woodlands of the Alps can be found in Austria (East-Carinthia, Styria and Lower-Austria). Yet their ecological stability is decreasing which leads to a reduced protection function against natural disasters (Bätzing 2003 p.238).

According to the Alpine Network of Protected Areas, currently there are about 13 national parks, 77 nature parks, 269 nature reserves, 11 biosphere reserves, 4 UNESCO naturalworld heritage sites as well as 3 geological reserves (Alparc 2013a). In total, more than 15 % of the alpine landscape is covered by these areas (EEA 2002). The protection network is based on the new Birds Directive (2009/147/EC) (European Parliament and Council 2009) and the Habitats Directive (92/43/EEC) from 1992 (council of the European Communities 1992). The Alps together with the Apennines, the Pyrenees, the Scandinavian Shield and part of the Carpathians are included in the alpine biogeographic region.

Of a total of 218 habitat types, which are listed in *Annex I of the Habitats Directive*, 79 were present in the Alps in 2004 (European Commission 2004). The initial list for the alpine biogeographic region (except Slovenia) listed more than 660 Sites of Community Importance (SCIs), however in 2013 implementation of the newest version, including the alpine regions of Slovenia has been completed (European Commission 2013). According to Kaissl (2002) and the WWF *Ecoregion Conservation Plan* (WWF 2005), across the entire alpine region there are about 830 areas which are barely influenced by human activities. Their size averages about 32 km^2 (ranging between 0.04 and 1387 km_2). Most of them lie in high alpine regions, sometimes hardly accessible.

The below figure provides an overview of the protected areas in the alpine area.

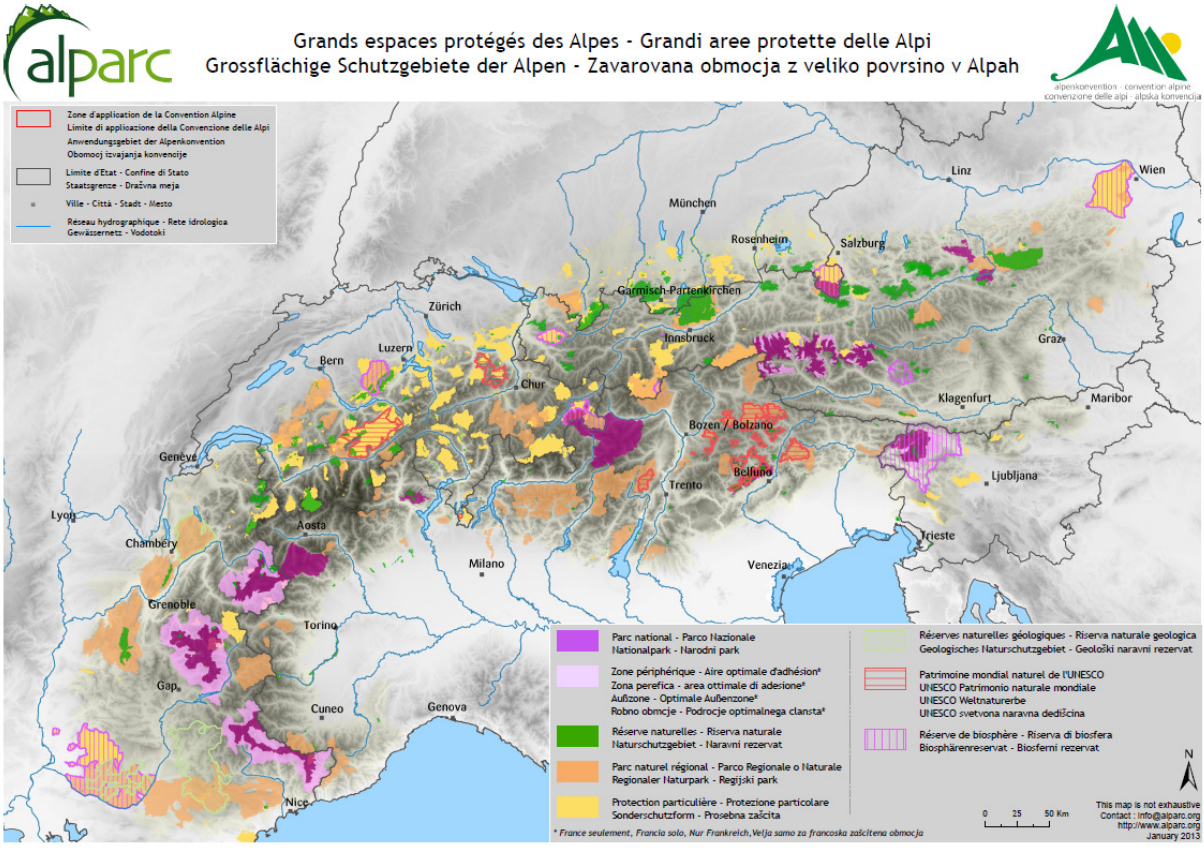


Figure 6: Protected areas of the Alps (Alparc 2013b)

Climate Change:

In the alpine area the effects of climate change on the biodiversity are expected to be significant. Substantial problems concerning plant health and a loss of species must be expected due to increasing temperatures when no ecological niche of those species has adapted to higher altitudes. The invasion of speciesfrom other European countries and continents , which is already a substantial problem and has been previously discussed (see also Greater Alpine National Parks 2010, Gallien et al. 2012), will increase and impact the existing flora, fauna and biodiversity. We also expect new and increasing deceases destabilizing forests and other habitats. The fragmentation of species population will increase. On the other hand biomass plays an important role as a mid-range CO_2-sink.

4.5. LANDSCAPE

A fair amount of Europe's alpine scenery comprises of a mixture of villages, mountain scenery and traditional cultivated landscape (Kapelari s.a.) – meaning a very diverse landscape. While the valleys are comparably densely populated, the steeper areas and more alpine landscapes as well as the

heads of the valleys comprise of landscape with less land use (EEA 2012). This typical landscape is a major important resource especially for touristic alpine areas. In particular summer tourists – yet to a lower degree also winter tourists – rank the factor “landscape” above all other criteria when coming to alpine regions (Österreich Werbung 2009, Österreich Werbung 2012, Jiricka et al. 2013a, Jiricka et al. 2013b, etc.).

However, the diminishing diversity of landscapes as well as increasing pressure on natural resources and on natural heritage are expected to mark most strongly the future territorial developments of the alpine area (Alpine Space Prospective Study 2005). The loss of structural diversity of alpine landscapes is not only linked to the steady increase of technical infrastructure as well as tourism related facilities (eg. Zurflüh et al. 2001) but to great extent also to abandonment of as well as intensification of agricultural land use (eg. Bacher 2010). As a result, while former cultural landscapes created a mosaic-like structure, nowadays the alpine landscape appears more and more uniform.

Some studies (incl. Regalp 2004) have analysed possible changes of alpine landscape until 2020 and particularly highlight the ongoing trend of changes of landscape in valleys and alpine cities as well as intensively used touristic regions. Furthermore, the unique landscape that has evolved through centuries of cultivation is becoming less and less widespread (see also chapter Fauna, Flora, Biodiversity). Structural changes such as a decrease of extensive agriculture, investments in infrastructure etc. in these areas have the potential to cause significant shifts in the image of alpine landscape (Regalp 2004; OEAV Österreichischer Alpenverein 2005; Haßlacher (2006) etc.)

Of the different types of landscape concerned, wild fluvial landscapes are the most endangered. The WWF (s.a.) states that for example only around 33 % of Austria’s natural river landscapes are still ecologically untouched. According to Bätzing (2003), floodplains with very high geomorphologic and biological dynamics, are particularly strongly constricted by human activities. The second most threatened landscapes are the cultural landscapes of the inner-alpine dry lands as well as the Mediterranean Southern part of the Alps with its ample terrace-culture. A third type of seriously endangered landscapes are the cultural landscapes of the North alpine fringe and in fourth place are the large-area pastures, which are common throughout the whole alpine area.

There are only two types of landscapes which are steadily increasing: fallows and woodlands. Between the state of fallows and woodlands, several types of bush-vegetation can be found. The natural growth of low woody species is proceeding rapidly. According to the Alpine Convention (2007) this trend of increasing forest landscape is most likely to persist despite, or especially because of, global warming which may cause a change in the composition of the woodlands.

It should be pointed out that lately the preservation of landscape has been given special attention by alpine institutions such as the International Commission for the Protection of the Alps (CIPRA) or the Alpine Convention (AC). CIPRA (2008), for instance, states that the traditional alpine landscape on the one hand is *“a key element of regional identity in the Alps”*. On the other hand it supports the approach

of the European Council and its Landscape Convention (ie. Florence Convention), which highlights the modern landscape approach to offer *"holistic assessment and planning tools to define and develop the interface between nature and culture. Hence, landscape, as the place of human interaction with nature appears to be the heart of sustainability*" (European Council 2000).

Climate Change:

The above described effects on soil, water and biodiversity will be visible in the landscape and may impact landscape aesthetic.

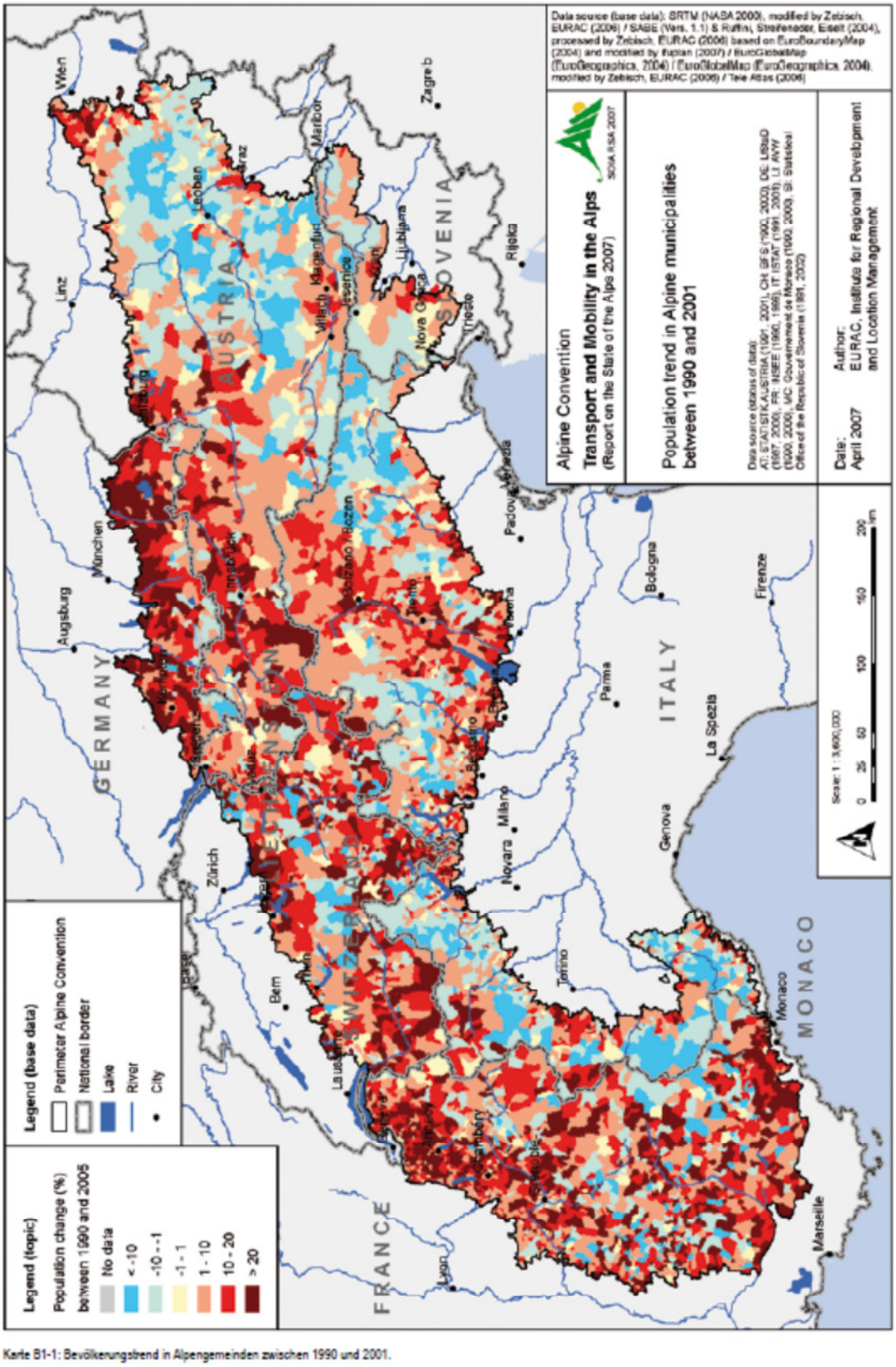
4.6. HUMAN HEALTH/ POPULATION

The major impacts on human health result from the increasing intensity of traffic caused by the ever increasing exchange of goods within the European Union and the boom of alpine tourism. Furthermore many inhabitants of alpine regions regularly commute to urban centres in order to make a living (Müller and Scheurer 2004). The major stresses caused by traffic are noise and air pollution. Given a business-as-usual scenario, projects like MONITRAF, creating alpine traffic scenarios for 2020, predict especially a deterioration of noise pollution, and hence increased pressure on human health, in 6 out of 8 alpine model regions (Central Switzerland Government 2012). Furthermore the prognosis of future development of air temperatures due to global warming will make the alpine region, with its moderate temperatures even more important as a refugee to people suffering from warm temperatures – especially during the summer months.

As the Alps serve as leisure space for the alpine population and foreign visitors, maintaining the recreational potential is a very important target. Air quality, quiet areas in nature and stimulating climateare favourable for the treatment of numerous diseases. Therefore particularly traffic, mentioned above, as well as the earlier discussed agricultural- and industrial actions including land use (see chapters on Water, Climate/Air, Landscape and Soil) and their impact have to be taken into account. Standard economic uses of the alpine area conflict in some areas with recreation, health and recuperation objectives (eg. EEA 2009, Heimann et al. 2007).

At the moment, a full two-thirds of the alpine population live in urban areas. While in 1870 the population of the Alpine Space was about 7 million, nowadays, according to the Report on the State of the Alps, it is about 13 million. Whereas some mountain regions (especially urban centres like Milano, Munich, Vienna and Lyon) (Perlik and Debarbieux (2001) are more and more densely populated, other areas face serious problems of depopulation (Wüthrich 2001 p.199 et. sqq.). The spread of population differs significantly throughout the alpine area. Major growth centres are peri-urban regions and tourist centres (especially in the Eastern Alps and Central Alps– Bavaria, Tyrol, Salzburg, Vorarlberg, parts of

Switzerland and Liechtenstein). Disadvantaged regions are those with poor accessibility. Particularly in some valleys of the South-western Alps (France- Piemonte, Liguria), the Slovenian parts, some North-Italian parts as well as Eastern Austria and some regions in Switzerland there is a tendency towards people moving away (Alpine Convention 2007). The below graphic shows the development of population in the alpine area:



Karte B1-1: Bevölkerungstrend in Alpengemeinden zwischen 1990 und 2001.

Figure 7: Population changes in alpine communities between 1990 and 2001 (Alpine Convention 2007)

Climate Change:

Several studies such as the *Case Studies on Climate Change on Austria* from StartClim2007 (Kromp-Kolb and Schwarzl. 2008) or the part on Human Health of the *Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Confalonieri et al., 2007) etc. highlight several effects of climate change on human health. One cause are tropical nights and heat days in cities which already increased the mortality at specific times in summer. Further dangers are related to soil erosion and natural hazards caused by extreme weather events. Often effects on human health are also related to introduced species and their distribution (Plants as well as insects relevant for dangerous deceases.

4.7. CULTURAL HERITAGE/ MATERIAL ASSETS

Over the last few decades, rapid changes of the traditional building structures can be observed. The traditional way of building is replaced by modern style architecture, which sometimes is very controversial to the old inventory. However, some alpine regions like Alpbach have resisted this trend by a strict following of building regulations (see Pikkemaat et al 2006; European Forum Alpbach 2010).

Traditional forms of agricultural land use have been replaced by the modernisation of agricultural practices, in order to lower costs and input as well as to adapt to climate change. These range from simple solutions like hail nets, to adaptation of livestock buildings to changes in management for waterways (Wagner et al. 2011).

Furthermore, adaptation has occurred for the fact that agricultural income has been replaced by alternative sources of income that now contribute the main funds to household earnings. Tourism, in particular, plays an important role and has in many cases replaced agriculture as the major source of income for the alpine population. Estimations state that, for instance, in Austria around 20 % of the population are directly or indirectly dependent on incomes from tourism (WKO 2013).

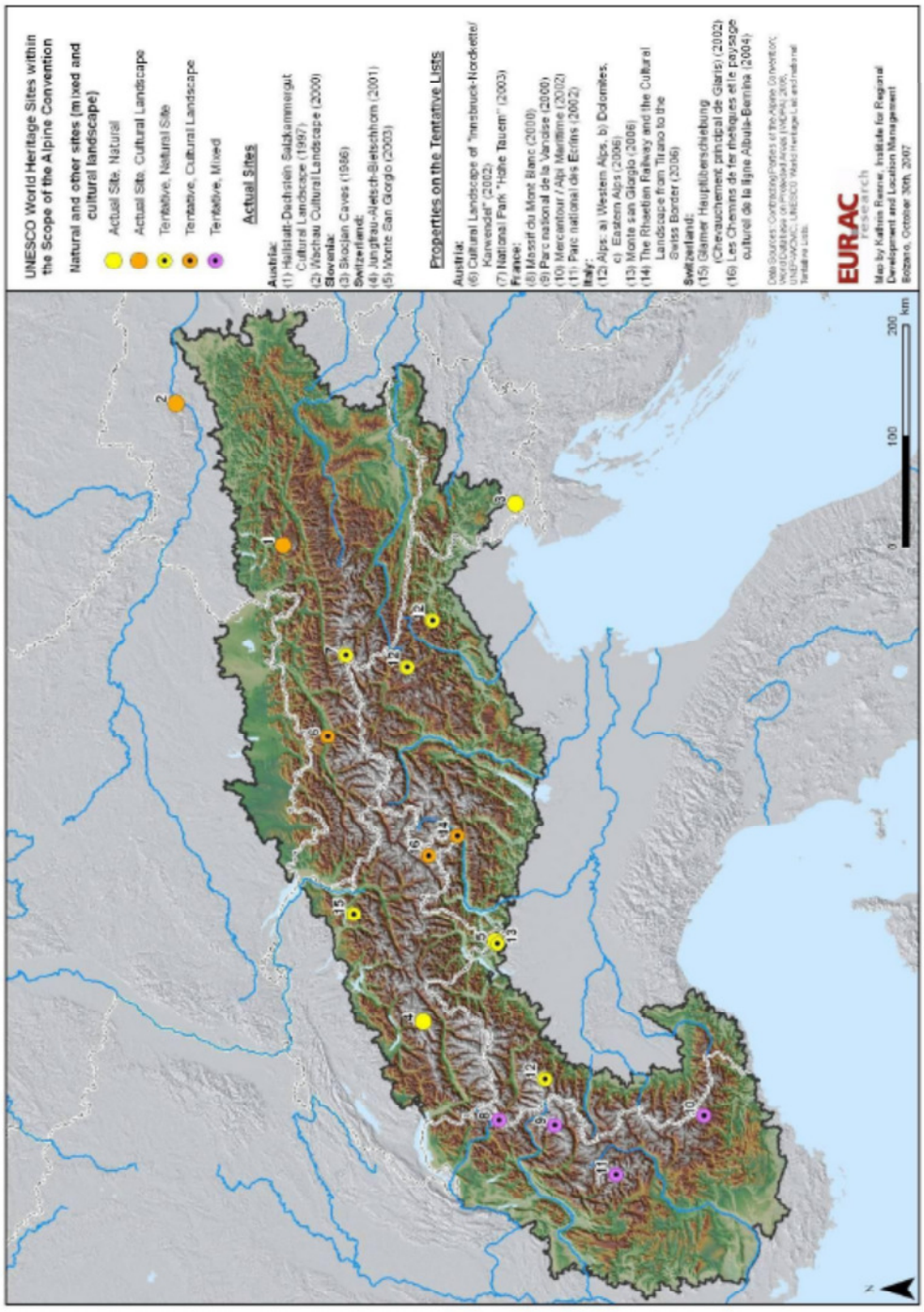
Traditional customs are often kept alive only in the context of tourist activities. As a relic of former times they are associated with pureness and evoke an image of an “ideal world” which in most cases, however, no longer exists. The more customs turn into clichés, the more they become fiction and removed from their actual background. The exposure to alpine traditions is afflicted with great uncertainness. Linking old customs with modern perceptions will be the goal of the future. Furthermore, it is important to maintain the diversity of culture, as the alpine region includes many different ethnic groups – all with their own languages and traditions (Bätzing 2003). According to Debarbieux (in Lebensministerium 2005) one major challenge for the future is the support or creation of local economic systems, which are based on handcraft and occupational culture, and pose strong cultural reference points to local societies.

Material cultural heritage is also of great importance, and needs to be protected. Traditional

ensembles, historic town centres and villages have become more and more endangered and disturbed by the increasing number of tourist facilities and other commercial buildings in the last decades. One approach to enhance awareness for proper protection of special areas has been to classify unique alpine regions eg. as part of the UNESCO world heritage list. The following figure shows the distribution of the currently declared UNESCO world heritage sites within the area of the Alpine Convention (2010). A more important aspect to preserving material cultural heritage is, however, to maintain villages and especially to keep old centres populated. In addition, this cultural heritage needs to be protected from natural disasters such as floods and avalanches, which are (as stated in previous chapters on soil, water, climate etc) likely to become more frequent and severe as a result of climate change (see again: AAAS (2006); G8 Academies (2007); IPCC (2007), UNFCCC (1992) etc).

Climate change:

Due to an increasing frequency of extreme weather conditions material cultural heritage might be endangered, in particular in mountainous and higher alpine areas (see also impacts on soil/water).



Map of Alpine natural, mixed sites and cultural landscapes

Figure 8: Map of alpine natural, mixed sites and cultural landscapes (Alpine Convention 2010)

CLIMATE CHANGE:

Extreme weather events may pose threat to material cultural heritage if protection measures are not sufficient.

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5. Development of the alpine area without the Alpine Space Cooperation Programme

5.1. SOIL

As discussed in chapter 4, a major problem concerning alpine soils is the high susceptibility to erosion. Due to the inclination of the sites, the extreme climatic conditions etc., the soils are already highly vulnerable and substantially prone to erosion, leading to landslides or rock falls. However, climate change will exert still higher pressure on soils through an increase of extreme weather events such as hail, heavy rainfalls, temperature fluctuations and extreme winds. Furthermore, the accompanying rise in average temperatures due to global warming will cause great amounts of permafrost to thaw and dramatically decrease the soils' stability in these areas.

It is therefore, as it has been also for previous periods, crucial to take measures that will contribute to adaptation to climate change. In order to prevent further soil degradation, maintenance of traditional land use patterns such as farming and enhancing vegetation cover will be of great importance. Programmes such as Alpine Space make successful adaptation measures more likely to happen.

The second big challenge for alpine soils is sealing. With regard to the impacts of climate change, this aspect deserves special consideration, in particular because of the water retention capacity of soils. Caution is therefore advisable as far as infrastructural measures and economic development in the Alps are concerned. Further building activities and ground sealing could possibly have negative side effects, in which case the conduction of the Programme could be disadvantageous compared to the likely development without the Programme in some areas. Proper caution is therefore needed when facing the development goals of the Programme. Focus should lie on addressing brownfield development and the minimization of negative effects where possible (eg. roof top greening, careful selection of sites etc.).

5.2. WATER

Particularly in light of the overall decrease of runoff due to climate change, areas with lower precipitation should receive special attention in terms of adaptation- and resilience measures. Pressures on the water resources have also derived from the increasing extraction activity and the commercialisation of alpine (mineral) water. Integrated water management as it is already implied by the Water Framework Directive, leading to trans-boundary river basin management, can help to balance the joint impact of the manifold uses of a certain water resource and relieve the pressure on alpine water bodies somewhat. Development as part of the Alpine Space Programme has the power to reinforce already existing procedures.

Another issue has been the degradation by intensive agricultural use as well as, in some cases, by tourism and recreation of the pureness of alpine water resources, which are of great importance as a source of drinking water for the entire alpine population as well as surrounding areas. However, as exemplified in chapter 4, successful improvements of water bodies have been reached and are likely to be maintained or improved due to existing regulations and strict thresholds.

Traffic related water pollution constitutes an increasing stress factor on water bodies along the major transit routes. Furthermore, soil compression and sealing through newly established transport infrastructure leads to changes in water eco-systems by altering run-off. This poses an interrelation with the impact on soils. Improvements can be expected through the implementation of sustainable mobility within the Alpine Space Programme.

5.3. CLIMATE/ AIR

Given the increasing transport activity of goods and people within the European Union and surrounding countries, deterioration of the alpine air quality can also be expected. Temperature inversions on highly used routes boost this effect in some areas. On the whole, the emitted greenhouse gasses also contribute negatively to climate change at a global level. This fact has yet to be tackled even more intensively, especially bearing in mind that traffic is the major contributor to emissions in the tourism sector, which yet again is one of the strongest economies in the alpine area.

Regarding the emissions of industry and agriculture, a positive trend through emission reduction policies has been noticeable. Pollution controlling systems, regulations, technical improvements etc. have played important roles when it comes to decreasing pollution.

The most efficient and hence important target of the Programme – to contribute to a decrease of air pollutants and reduce production of greenhouse gases – can be reached by focusing on innovative mobility models, smart planning of transportation infrastructure and by guiding the existing trend for renewable energy production in an appropriate direction in order to decrease CO_2 emissions.

5.4. FAUNA, VEGETATION, BIODIVERSITY

Regarding mammals and bird populations, the situation has been improving thanks to successful reintroduction measures. The wolf, the bear, the lynx and other large mammals and several highly endangered bird species are slowly recovering due to intensified attention within various projects (i.e. golden eagle, peregrine falcon, bearded vulture etc.).

On the other hand, alpine amphibian and fish fauna is in danger due to the deterioration of natural fluvial landscapes and the tourist overuse of lakes and rivers, as well as the introduction of alien species for the purpose of sport-fishing. Hydropower generation poses an additional threat for native water biota.

As far as the alpine flora is concerned, negative trends can be expected due to both the intensification

of conventional land use as well as to the giving up of cultivation (including traditional land use patterns). Neither process is favourable to species diversity as they lead to a decline of biocoenoses. A decrease in biodiversity caused by a loss of vegetation cover through sealing can be expected because of continuous building activities for tourism, transportation and industrial purposes. As a consequence of the Programme, an increasing awareness concerning the loss of habitats and fragmentation can be expected. Similarly to effects on soil, some development objectives may contradict protection aims, if economic growth in sensitive areas is involved. The overall goal of the Alpine Space Programme however aims at a sustainable use & conservation of natural heritage of the alpine regions. Thus, even positive impacts can be expected.

In addition to the above, also climate change is likely to influence biodiversity. Increasing temperatures will have an impact on fauna and flora and most probably force some species into higher altitudes. Additionally the influence of neobiota in the valley areas needs to be considered If mitigation as well as adaptation will not be further enforced by programmes such as Alpine Space, extinction of some alpine species is even more likely.

5.5. LANDSCAPE

In the future, the alpine area will face a diminishing diversity of traditional alpine landscape, caused by a loss of small structures through the steady increase of technical infrastructure, as well as tourism related facilities. To a great extent it is also caused by the abandonment as well as intensification of agricultural land use. The outward appearance of the alpine landscape is becoming more and more uniform.

Specialists have seen fluvial landscapes, cultural landscapes of the inner-alpine dry lands and the Mediterranean Southern parts, as well as cultural landscapes of the North alpine fringe and large-area pastures particularly at risk without further projects and programmes. Special focus has already been given to the topic of landscape by CIPRA, the Alpine Convention and the Landscape Convention of the European Council.

The Alpine Space Programme might contribute in part to maintaining the diversity of landscapes by supporting traditional land use patterns while focusing on endogenous potentials (natural & cultural heritage, sustainable economies etc.).

5.6. HUMAN HEALTH/ POPULATION

Without the Programme, an intensification of regional disparities in mountainous areas is conceivable. Especially valleys with bad accessibility will continue to report serious problems of depopulation. Over-ageing and lack of employment for young people will continue to be dominant problems in the future. By fostering the development of peripheral regions, the Programme can contribute to reducing territorial and social imbalances. The Programme can enhance infrastructural and educational facilities in the most disadvantaged regions.

Concerning traffic related diseases, the situation is likely to deteriorate due to the increasing traffic by industry and the delivery of food products. Furthermore, individual transportation from and to the alpine area by tourism still needs to take large steps towards less harmful systems. Sustainable transport solutions are implemented only scarcely. In this context the Programme might provide a positive input.

5.7. CULTURAL HERITAGE/ MATERIAL ASSETS

Over the last decades, rapid changes to the traditional structures have occurred. The forces of globalization will continue to add to this trend. The traditional methods of building have been replaced by modern style architecture. Traditional forms of agricultural land use have been displaced by the modernisation of agricultural practices.

Also, tourism is replacing agriculture as a major source of income and, with it, brings significant changes. As a consequence, some traditional customs are only kept alive because of tourist interests. A negative effect is that the natural diversity of languages and dialects in the alpine area is decreasing steadily as a result of the increasing interexchange between the regions and with internationals.

Material assets (including flood defences, gauging stations, pumping stations, locks, weirs etc.) are endangered by natural disasters with increasing occurrence due to climate change. As a consequence, sufficient protection of cultural heritage is at risk if these material assets cannot cope with natural disasters. Furthermore, cultural heritage will be further endangered by traffic related fumes and vibrations as well as industrial activities. Through the implementation of the Alpine Space Programme, problems arising from this trend can be tackled more effectively, since material and immaterial heritage will be promoted and valued higher.

6. Method and Difficulties of the Assessment

The methodological approach is based on the SEA-Directive. The presented version also considers **climate change**, which may increase the relevance to study impacts on certain environmental issues or specific aspects more carefully, in chapter 3 to 7 (see also separate sections in chapter 4 and 7 on climate change).

6.1. Method of the Assessment

The primary focus of the Strategic Environmental Assessment of the Alpine Space Programme is on the priority axes with their investment priorities and their specific objectives. Such an emphasis of the assessment reflects the strategic level of the Alpine Space Programme and aims at an evaluation of potentially associated environmental effects.

The evaluation includes the following aspects:

1. The likelihood of significant environmental effects based on the evaluation of the programming period 2007-2013: if, in the past, a similar priority did not cause any significant impacts, then the same can also be expected for the new Programme 2014-2020.
2. The likelihood of significant environmental impacts based on the available information: Within the Priorities, the context and rationale of the Priority, the indicative activities of the Priorities and the target groups, target sectors, target areas and main beneficiaries are all listed. This information shows, even for these very broad and general objectives, what possible projects could look like and what kind of projects the Programme partners can expect. This interpretation of the Priorities and Objectives is used to estimate the environmental effects and to justify the assessment results.

The assessment of environmental impacts is based on a verbal argumentation. The possible impacts are classified into “significant negative” impacts, “significant positive” impacts and “no significant” impacts. An environmental impact is detected for any environmental issue if a change can be observed in the trend of the indicators listed in the table below:

Table 2

Environmental Issues	Indicators
Soil	• Sealing • Influence on soil quality (contamination) • Susceptibility to erosion
Water	• Influence on ground water (quality, scarcity, etc.) • Impact on surface water • Connectivity
Climate/Air	• Air quality • Influence on greenhouse gas emissions • Influence on mirco- and mesoclimate conditions
Fauna/Vegetation/Biodiversity	• Habitat fragmentation/ corridors and networks • Influence on habitats and species (condition) • Especially influence on Natura 2000 sites
Landscape	• Influence on cultural landscapes • Impact on landscape aesthetics and natural scenery
Human Health/ Population	• Emissions (such as noise, air pollution, vibrations) • Emission related diseases • Impact on recreational and restoration capacities / attractiveness for recreation and restoration • Registration of public complaints against noise
Material Assets/Cultural Heritage	• Impact on cultural ensembles/ traditional settlement structures • Impact on cultural heritage by emissions/ vibrations • Enhancement of exchange of immaterial cultural heritage

The basis for the assessment provides the base alternative. It constitutes the likely path of development of the region without the implementation of the Programme. Furthermore, the significant negative impacts are differentiated into “high”, “medium” and “slight” categories according to the following classification rules:

- An Objective has a “high negative” impact if the expected impacts on the environmental issues are severe and irreversible and cannot be minimized by any mitigation measures. This is the case if areas sensitive to environmental impacts are likely to be affected, e.g. near-natural landscapes, or if the environmental effect can be intensive, e.g. effects from industrial facilities, large areas to be sealed, considerable increases in traffic.
- A negative impact is classified as “medium” if, from the context of the Objective, it can be concluded
  - that only areas with medium sensitivity are prone to negative impacts.

- environmental impacts are of medium scale.
- Furthermore, the objective is assessed as having a “medium negative” impact in case of a high negative impact that can be reduced accordingly by mitigation measures.

- Negative Impacts are classified as “slight”, whose impact on the environmental issues are significant
  - but either limited in time or space or
  - provoke only slight disturbances to the original state of the environmental issue or
  - concern an environment that is relatively insensitive to environmental impacts, e.g. monotonous agricultural landscapes with intensive use or settlement areas with a high share of building land.
  - Furthermore, objectives with medium significant impacts are classified as slight if mitigation and compensation measures can be applied.
- If an objective is likely to have simultaneous positive and negative impacts on a particular environmental issue, the assessment results are reduced by one level, as mitigation of negative impacts by probable positive impacts can be expected.

The resulting assessment scheme can be summarised as follows:

Table 3

Assessment Scheme	
positive impacts	• Positive impacts on the environmental issue likely expected
no significant impacts	• No relevancy concerning the respective environmental issue
high negative impacts	• High significant impacts on the environmental issue, no mitigation measures available
medium negative impacts	• high significant impacts on the environmental issue, but effective mitigation measures available • medium significant impacts on the environmental issue, no mitigation measures available
slight negative impacts	• medium significant impacts on the environmental issue, but effective mitigation measures available • Low impact on the environmental issue

The argumentation is formalised in assessment tables:

Table 4

Objective		
Environmental Issues	**Possible impact**	**Explanation and possible mitigation measures**
Soil		
Water		
Climate/Air		
Fauna, Vegetation, Biodiversity		
Landscape		
Human health, Population		
Material assets and cultural heritage		

Interrelationships between the environmental effects of the Priorities and Objectives as well as synergetic and cumulative environmental effects are addressed in a separate chapter following the assessment of the Priorities. These considerations are carried out by verbal argumentation.

6.2. Difficulties of the Assessment

Difficulties in the assessment are present for four reasons:

Firstly, because of the low level of detail of the Alpine Space Programme the range of possible co-financed projects is quite wide. To solve this problem, the objectives were interpreted by using the information given in the Alpine Space Programme and provided by the Programme partners during the programming process with regard to the present Programme 2007-2013. Furthermore, projects of the funding period 2007-2013 were analysed. This approach implies that if a similar objective was implemented in the past, the co-funded projects would be similar in the future as well. If completely different projects are submitted in the future, the basis for this assessment would change, so the results would have to be reconsidered.

The comparison with assessment results and project selection of the first SEA, carried out in 2006 for the Alpine Space Programme 2007-2013, helps also to identify possible outcomes for the newly drafted Cooperation Programme. Furthermore, it is not possible to quantify environmental impacts of the ASP. To solve this problem, the method of qualitative scoring and qualitative classification was

chosen. The time component of the environmental effects could not be included in the assessment due to a lack of information.

Secondly, as the spatial scope of the Programme´s Objectives is not thoroughly defined and due to the diversity of the alpine region´s environments, a precise connection between Programme Objectives and the environmental status is challenging, to say the least. To tackle this problem, predictions about the kind of areas where environmental effects might happen are included in the interpretation of the Programme Objectives. The environmental assessment shows an outline of possible environmental effects of the Programme and gives hints on a strategic level as to which Objectives might cause environmental problems. This approach also stands in agreement with the SEA-Directive, as the methods and level of detail of the environmental assessment should also reflect the level of detail of the plan or Programme.

Thirdly, the Programme planning process was confined to a strict time schedule. Environmental authorities of the alpine countries, other than those represented within the Task Force, were involved in the SEA-process by e-mail as well as during the public consultation.

Fourthly, there are difficulties involved in data collection. Only very few sources offer descriptions of the relevant environmental situation of the entire alpine space. Frequently, data are not fully comparable between participating countries, and international sources are scarcely available.

7. Assessment of Likely Significant Environmental Effects

Each chapter is structured as follows:

1. Presentation of the original text in the priority
2. Description of the main ideas within the Programme
3. Formulation of the background to facilitate the assessment
4. Assessment table and interrelationships

7.1. Priority Axis 1 Innovative Alpine Space

Priority 1 is defined by the following specific objectives:

- 1b.1 Improve the framework conditions for innovation in the Alpine Space
- 1b.2 Increase capacities for the delivery of services of general interest in a changing society;

Indicative Actions to be supported according to the Programme are:

- *Set up transnational frameworks, platforms and networks for the identification of existing innovation resources, potentials and obstacles, as well as the valorisation of proven concepts in the fields of technology, business, social services and governance (mapping of resources, studies, pilots and strategies on research and innovation needs, market and product development potentials, human resources etc.) (rel. 1b.1, 1b.2);*
- *Set up transnational frameworks, platforms and networks for the coordination of innovation policy (coordination of regional and national RIS3 strategies, innovation alliances, resources pooling structures, integrated supply chains, innovation governance initiatives and competence networks) (rel. 1b.1);*
- *Develop transnationally designed products, services, investment models and funding support instruments of business support centres, chambers of commerce, public administration and financing institutions, with emphasis on start-ups and dynamically growing SMEs (rel.1b.1);*
- *Develop contents and adapt education and training concepts for the uptake and diffusion of innovation and the provision of capacity development mechanisms (rel. 1b.1, 1b.2);*
- *Develop transnational models for the design, testing, up-scaling, comparison and evaluation of innovations (policies, tools, processes, actors, organisations and interfaces) in the fields of business innovation, services of general interest, social services and public administration (rel. 1b.1, 1b.2);*
- *Develop transnational models for the design and testing of open innovation modes of cooperation (rel. 1b.1, 1b.2);*
- *Design local, regional and transnational action plans for social inclusion via set-up of social enterprises as a demonstration of the feasibility of the innovative transnational concepts (rel.1b.2);*
- *Set up models and test pilot actions for a better participation of all social groups, actors and users in the design and delivery of social services and services of general interest (rel. 1b.2);*
- *Set up a policy foresight for governance challenges and cooperation modes in relation to the Alpine Space driving forces, innovative tools, approaches and participation procedures (rel. 1b.1, 1b.2).*

Target groups

General public;

Those groups listed in the Alpine Space Programme under the caption "Indicative types of beneficiaries";

Enterprises, including SME.

Specific territories targeted

- *>none<*

Types of beneficiaries

- *Local Public Authorities;*
- *Regional Public Authorities;*
- *National Public Authorities;*
- *Agencies;*
- *(Public) service providers;*
- *Higher education institutions;*
- *Education/training centres;*
- *Business support organisations;*
- *Enterprises, including SME, if relevant;*
- *Interest groups including NGOs.*

7.1.1 1b.1 Improve the framework conditions for innovation in the Alpine Space

"The Alpine Space is rich in terms of highly ranked universities, research institutions, a good business culture and support structures; it further offers high innovation potential in both research and business. However, there is relatively little transversal cooperation between universities and research institutions, administration and business.

At the same time, the Alpine Space's socio-geographic, economic and environmental features offer both a high and growing demand for solutions to specific challenges, as well as high opportunities for specialisation in products and services with a significant regional demand and global market potential. The SWOT analysis has outlined a number of topics (e.g. specific Alpine topography and resulting spatial structures, climate change vulnerability, risk management, socio-demographic change and ageing society, transport, water, forests, tourism, and consumers taste, barrier free accessibility and health services, valorisation of environmental goods, traditional activities, natural and cultural heritage, creative industries, green innovation, resource efficiency and green growth etc.) These can be summarised as "topics of Alpine Space importance".

This priority Axis builds on the ASP 2007-2013 and its successful experience made in the former Programme priority 1 of "Competitiveness and Attractiveness". Most of projects focused on "Strategic policy development" and "Exploration, Piloting" and did not reach the "implementation phase" in the policy cycle. None of the projects succeeded to unlock private investments. Against this background, the IP focuses on projects reaching the implementation phase and unlocking private/public investments.

The Programme aims to improve framework conditions (awareness and foresight, legal, economic, administrative, governance, organisational issues, policy solutions, technology impact assessments) for stakeholders in the fields of research and innovation in order to increase knowledge transfer between business, users, academia and administration actors (quadruple helix approach) of the Alpine Space area. Thereby, it should enhance the potential for business innovation using research results on topics of Alpine Space importance. The results to be delivered by the projects supported by the Programme are residing initially in the common analysis and identification of innovation resources and obstacles as a base for further actions.

A further result expected is the formation of an "innovation vision for the Alpine Space". In this respect, a programmatic approach will be created based on an innovation policy foresight and on the coordination of actions in the delivery of innovation. The result will be strengthened through preparatory steps (e.g. related to innovation related capacity building) as well as "post-processing" i.e. in the transnational delivery of innovation.

The projects should result in concrete instruments for supporting innovation and improving the framework conditions for innovation through design, testing, up-scaling, comparison and evaluation of

innovations. Transnational cooperation structures will facilitate the formation of partnerships among the different actors, thus enhancing the enabling environment for innovation governance.

Last but not least, the Programme shall deliver conclusions on the relevance, effectiveness and sustainability of the above through monitoring and evaluation initiatives." (ASP, Page 24).

7.1.1.1 Background

The discussion of future development of the Alpine Space recognises that some regions are facing relevant socio-economic threats which could be reduced by the outcome of this objective. In the SWOT analysis that was conducted for the Alpine Space Programme, relevant risks are identified regarding the heterogeneity of the Alpine Space in terms of economic structures and innovation potentials linked to Research & Development Institutions. These are *"Risk of losing some competitive edge in front of new global competitors especially taking into account the lack of an Alpine specific approach and capitalisation"* and *"Medium sized cities near metropolises will be the winners, rural areas the losers".* Actively counteracting against those issues by innovation in a "classical-growth approach" may also bring along negative environmental effects by boosting land- and resource consumption.

In the light of the above it should be considered that the programme describes its intentions concerning 1P 1b that it will *"enhance the potential for business innovation using research results on topics of Alpine Space importance"*. Innovation – especially in the explicitly mentioned peripheral and vulnerable areas – might pose a threat to the already sensitive regions. This threat cannot be categorically excluded and further precaution has to be taken to limit possible negative influence by the above mentioned indicative actions with emphasis on " *start-ups and dynamically growing SMEs".* What is more, the term Alpine Space importance – even though defined within the Alpine Space Programme – leaves room for interpretation.

Projects funded by the programme 2007-2013 with relevance for the objective by being considered to set up institutional as well as business frameworks and foster innovation include MANFRED (Setting up frameworks to be used for forestry management), Climalptour (Research Results for successful creation of a Natural Park), Enerbuild (Knowledge for innovative building business), INNOCITÉ (Use knowledge to set up frameworks for small/medium township's business), AlpStore (Setting up a sustainable e-vehicle network), AlpHouse (Traditional building culture as an innovative business concept). These projects have in common that their analysis could not expect any deterioration of the environmental issues. Rather positive effects may be the case for some of these projects.

Nevertheless, without topical restriction medium to high negative effects may still be given due to increasing resource consumption. The assessment addresses mitigation measures to reduce possible impacts. For example the project AlPlastics encourages SME industry which does not focus on sustainable material related to the identity of the alpine area, and can evolve environmental impacts.

Finally it should still be mentioned that in general enhancement of knowledge transfer – as also stated within some of the indicative actions – is considered neutral to the environmental issues. Still the SEA needs to consider as well the future actions evolving from studies and action plans designed under the ASP and therefore cannot fully eliminate the risk of supporting business innovation leading to environmental impact as it was previously discussed. This is particularly relevant since in this funding period “the IP focuses on projects reaching the implementation phase and unlocking private/public investments” (ASP p. 25).

The focus on green growth as discussed among the topics of alpine Importance, decoupling growth from resource consumption and innovation in the fields of mitigation measures, as it is discussed within priority 6, could exclude high negative impacts. Taking this in mind as prime selection criteria also for this Objective could fully eliminate any negative environmental impacts.

7.1.1.2 Assessment of the Objective

1b.1 Improve the framework conditions for innovation in the Alpine Space		
Environmental Issues	**Possible impacts**	**Explanation and possible mitigation measures**
Soil	Slight to medium negative impacts	• The objective may subsequently lead to new development of industry which could cause sealing. • Possible mitigation could be applied by brownfield development, use of existing buildings and infrastructure etc.
Water	No significant to slight negative impacts	• Legal documents on water bodies, groundwater etc. ensure that possible impact on water is well regulated
Climate/Air	No significant to slight negative impacts	• Similarly to water, also for the environmental issue climate/air there are legally binding documents (eg. Industrial Emissions Directive) which limit possible impacts.
Fauna, Vegetation, Biodiversity	No significant to medium negative impacts	• Especially in sensitive peripheral areas there may be substantial impacts, however compensatory measures (eg. brownfield development) can lead to a substantial reduction of negative effects
Landscape	Slight negative to medium negative impacts	• Increase of business may subsequently lead to an increase of building activities which in turn may have negative impacts on existing alpine landscapes • Mitigation by brownfield development is possible as well as integration of buildings into topography and adaptation to landscape characteristics
Human health, Population	Slight negative to positive significant impacts	• Indirectly positive impacts on health may be expected • Slight negative impacts might occur on recreational areas/ function
Material assets and cultural	No significant impacts	• The impact of the objective on this environmental issue are expected to be not significant

heritage		
Additional Explanation		
Mitigation by concentration on brownfield development and careful selection of sites, if no differentiation is taken within the Programme significant negative impacts are still to be expected.		

Interrelationships:

Due to degradation of soils interrelationship with Fauna/Vegetation/Biodiversity can be expected. Additional negative interrelations may be expected with Human health/Population.

Consideration of Climate Change Aspects:

Climate change vulnerability is mentioned as one important topic of Alpine Space importance.

7.1.2 1b.2 Increase capacities for the delivery of services of general interest in a changing society

"The Alpine Space area will have to cater also for the provision of a balanced level of social services and services of general interest, as well as to raise the capabilities for utilising social capital and strengthening governance efficiency as a contribution to sustainable and cohesive territorial development. At the same time, providers of social services and services of general interest could face reduced public budgets, hence meeting a double challenge of reducing unit costs and expanding services.

The IP 1b.2 builds on the previous ASP experiences and results, which on the one hand emphasize the small-scale dynamics in demographic change and the derived challenges for the delivery of services of general interest, and on the other hand develop strategic policies and demonstrate successful pilot actions and broad implementation. Services of general interest tackle a great variety of sectors (health, education, transport/social/cultural infrastructure, public transport, local supply) and therefore still require innovative solutions. A stronger focus can be put on specific sectoral solutions.

The Programme will help to achieve more efficient, adaptable and adequate services of general interest through developing, testing and adopting new social innovation solutions. Innovation is crucial in the face of a rapidly changing framework (i.e. on demographic and social transition, demand, environmental and community trends, societal challenges, public finances etc.). Services of general interest should not only be safeguarded, but continuously developed; action plans should be provided for the promotion of social inclusion and utilisation of its potentials.

The Programme aims to assist social organisations and public authorities to deliver more efficient, adaptable and "fit for purpose" services of comparable quality in the entire Alpine Space.

The results to be delivered by the projects supported by the Programme are initially expected in raising the awareness and understanding of the potentials of social innovation related to the services of general interest.

Transnational analysis and common identification of innovation resources and obstacles will be the base for further actions. This will be accompanied by the capacity development and training for identification, design, uptake and diffusion of social innovation.

The field for social innovation will be identified and delineated, hence earmarking the potential for transnational cooperation. This will happen through the design of strategic elements, e.g. policy foresight, open innovation approaches and local and regional action plans. Projects should result in concrete instruments for supporting social innovation and enhancing capacities through design, testing, up-scaling, comparison and evaluation of social innovations. This includes test applications for inclusion of all social groups, actors and users in the design and delivery of social services and services of general interest. As a final result, actual support materials should be available for the

launch, operation and monitoring of social enterprises.

This experimental approach will be fostered by the transnational cooperation structures, facilitating the formation of local and regional partnerships among relevant actors (social enterprises, non-profit sector, public bodies etc.)." (ASP, Page 26&27)

7.1.2.1 Background

Similarly to Objective 1b.1 also 1b.2 aims at increasing the capability of the Alpine Space to cope with current challenges – here in the field of social issues. This particular objective ensures the handling of evolving situations that were discovered in the SWOT analysis including *"new challenges in […] areas with ageing population", "Lack of available labour force in some branches and communities", "Overall mismatch between academic supply, capitalisation and local needs and little life-long-learning concepts for special target groups"* etc.

The term "general interest" as defined by the "Commission Green Paper of 21.May 2003 on services of general interest"[3], covers a very broad range of possible issues including all *"types of activities from the big network industries (energy, postal services, transport and telecommunications) to health, education and social services".* Resulting from this broad description, the SO also generates the potential for a broad set of activities that may be funded.

In general tackling these issues may imply negative effects due to changes of infrastructure in different areas. On the other hand possible benefits for the issue "Human health, Population" may create positive impacts.

Looking at the programming period 2007-2013, however, no negative impacts are to be expected:

A project called ACCESS focused on strategies to improve accessibility to services of general interest in rural mountain areas. The project CAPACITIES is also relevant for tackling issues of competitiveness of alpine cities. These examples are not reported to have created any negative environmental effects – ACCESS has actually tended to decrease motorized private transport. Yet it should be mentioned that the enhancement of services in the fields of energy, transport and telecommunications may, in some cases also cause negative effects if no further specifications are made. In this particular case a reference to the Specific Objectives 4e.1 and 4e.2 would be appropriate, since they are tailored to the issues of energy and transport.

When screening the relevant indicative actions, however, no negative impact on any environmental issues may be expected. They are focusing on issues like education, training systems, mapping of resources and development of transnational models as well as actions for social inclusion.

In light of the above we expect the impact on the relevant environmental issues to be small or not

[3] Source: COM(2003) 270 final -Official Journal C 76 of 25.03.2004" (16.09.2013 in: http://europa.eu/legislation_summaries/competition/state_aid/l23013_en.htm)

significant and rather positive for the population related issues.

7.1.2.2 Assessment of the Objective

1b.2 Increase capacities for the delivery of services of general interest in a changing society		
Environmental Issues	**Possible impacts**	**Explanation and possible mitigation measures**
Soil	No significant impacts	• Focus of the specific objective (SO) is put on education/training system/transnational mapping. Therefore no significant impacts are expected
Water	No significant impacts	
Climate/Air	No significant impacts	
Fauna, Vegetation, Biodiversity	No significant impacts	
Landscape	No significant impacts	
Human health, Population	positive impacts	• Better access to health services/transport/accessibility
Material assets and cultural heritage	No significant impacts	• Focus of the SO is put on education/training system/transnational mapping. • Therefore no significant impacts are expected

Interrelationships:

Interrelationships between the environmental issues are not expected.

Consideration of Climate Change Aspects:

Negative effects on climate change might be avoided due to reduced transportation and logistics improvements as well as the use of electronic media.

7.2. Priority Axis 2 Low Carbon Alpine Space

Priority 2 is defined by the following programme objectives:

- *4e.1 establish trans-nationally integrated low carbon policy instruments*
- *4e.2 Increase options for low carbon mobility and transport*

Indicative Actions to be supported according to the Programme are:

- *Set up transnational frameworks, platforms and networks for the identification of existing innovation resources, potentials and obstacles in the fields of low-carbon economy and low-carbon mobility and transport (mapping of resources, studies, pilots and strategies on research and application needs, market and product development potentials, prerequisites and "soft" factors for implementation etc.) (rel. 4e.1, 4e2);*
- *Develop research to business networks and cooperation structures on relevant issues for capitalisation and/or generation of Alpine Space low-carbon applications and technologies (conversion to a post-carbon energy system through energy saving, energy efficiency, decentralised energy grids based on renewable resources, energy saving settlement patterns and public transports etc.) (rel.4e.1);*
- *Develop policy networks, strategies, models and toolboxes (e.g. of an Alpine Space climate footprint system, "carbon proofing" tools for integrated spatial development policies, strategies and processes etc.) for setting up local/regional low carbon model areas and regions including special needs areas such as nature protection regions (rel.4e.1 and 4e.2);*
- *Set up networks for the ex-ante assessment of the maturity and the anticipated impacts and the monitoring of the outcomes of low carbon policies, technologies and applications. Foster the promotion of debate among stakeholders, governance and citizens, the generation of creative ideas and the provision of capacity development mechanisms (rel.4e.1 and 4e.2);*
- *Set up, test and implement negotiation, mediation, participation and conflict resolution models and standards for the adoption and implementation of low-carbon policies, technologies and applications (rel.4e.1 and 4e.2);*
- *Support the transfer and uptake of existing local/regional solution and instruments and shape a framework for capitalisation of on-going technological innovation for a more sustainable organisation of mobility and transport including inter-modality and ICT applications (rel.4e.2);*
- *Design and test operational, technological and funding models for low-carbon mobility and transport (rel. 4e.2);*
- *Develop tools to better integrate/coordinate mobility and transport strategies and plans of regions (rel. 4e.2)*

Target groups

- *General public;*

- *Those groups listed in the ASP under the caption "Indicative types of beneficiaries".*

Types of beneficiaries

- *Local Public Authorities;*
- *Regional Public Authorities;*
- *National Public Authorities;*
- *Agencies;*
- *Infrastructure and (public) service providers;*
- *Higher education institutions;*
- *Business support organisations;*
- *Enterprises, including SME;*
- *Interest groups including NGOs.*

7.2.1 4e.1 Establish trans-nationally integrated low carbon policy instruments

The Alpine Space is characterised by a high potential for energy savings, potentials for energy sufficiency and energy efficiency interventions, as well as rich natural resources and renewable energy sources. Investments in the direction of "Alpine Space appropriate" low carbon solutions, both for the private and the public sector can have a local impact and a global contribution in fighting climate change. Furthermore, it can strengthen the competitiveness of the Alpine Space in the fields of technology development and innovation, and reduce the dependency on imported fossil energy resources. The Alpine Space has the potential to advance to a worldwide-leading low carbon and energy sufficient model region.

Various projects in the previous period addressed at least indirectly low carbon policy instruments under the Priority Axis 2 "Accessibility and Connectivity" and under the Priority Axis 3 "Environment and Risk Prevention". As a contribution towards local carbon Alps, projects developed best practise platforms and decision support tools, databases and guidelines for the promotion of renewable energies and sustainable power systems in the Alpine Space. Hence this IP can build on achievements of the previous period, but offers the opportunity to deepen and widen the scope of the projects, to involve new sectors, beneficiaries and actors and to build on existing knowledge and experience in the Alpine Space.

Experience shows that adoption of low carbon technologies often fails not due to lack of suitable solutions but due to weak "enabling environment". The process of establishing trans-national integrated low carbon policies is also a forum for spatial development and growth debates, hence addressing a broad range of sectors related to energy inputs and emission outputs (ranging from housing and buildings to agriculture and forestry). The Alpine Space Programme can act as a bonding element among sectors and interests.

The Programme aims to establish low carbon policy instruments in the area with practical responses to the specific Alpine Space needs and challenges, spatial development policies, strategies and processes through the combination of available or potential technological and operational innovations and tools in low carbon systems.

The results to be delivered by the projects supported by the Programme are residing initially in the promotion of awareness and understanding of the potentials and the implications of low carbon policy instruments among decision makers and key administrations in sectoral (e.g. energy, transport, housing) but also cross-sectoral departments (e.g. spatial planning).

In a next step, the Programme actions should result in capacity building. This will increase the institutional potential for the capitalisation and up-scaling of existing solutions, the operational setup and generation of tailor-fitted applications through transnational networks and cooperation structures.

A further inherent result of these structures is the opening of the gates for a broad participation and

exchange on the regional planning and decision making process among stakeholders and the public; this could be achieved through debates on the assessment of impacts of low carbon policies, technologies and applications.

Last but not least, the Programme shall deliver conclusions on the relevance, effectiveness and sustainability of the above in order to deliver an enhanced enabling environment for the low carbon policy design, adaptation and implementation in the long term. This will happen through monitoring and evaluation initiatives but also through the promotion of negotiation, mediation, participation and conflict resolution models. (ASP Page 33-35)

7.2.1.1 Background

In the discussion on carbon related topics within the Alpine Space, documents such as the protocols of the Alpine Convention have helped to make sure that the awareness of a need to implement low carbon policies on a transnational basis has been created. Proper handling of the issue is regarded as crucial to support and protect the alpine environment.

In 2007-2013 several projects were funded by the Alpine Space Programme that support the general enhancement of energy efficiency and aim at creating both trans-nationally integrated low carbon policies. These include eg. AlpEnergy (including research with case studies in different alpine regions and recommendations for policy level), AlpStore (mobile intelligent storage technologies for decentralised generation of power from renewable energy sources and stationary storages) as well as SHARE *("development, test and promotion of a decision support system to merge, on an unprejudiced base, river ecosystems and hydropower requirements"*). Furthermore projects like ENERBUILD deal with energy efficiency in the building sector.

Judging from the previous projects, sustainable solutions appropriate to the specific and diverse requirements of the territory are to be expected. With regard to projects which encourage the construction of power production, impacts cannot be entirely excluded. The most severe impact on environmental issues would be caused by the establishment of hydropower in sensitive alpine areas. This, as well as wind energy related projects in mountain areas, needs to be excluded by selection criteria.

In light of this fact, the wording of the general description of the first versions of the Investment Priority are helpful by highlighting eg. to create a forum *"for conflict resolution among different stakeholders and corresponding land uses"* (in the current version of the Programme 2014-2020 addressed under priority 3, 6d1) as well as the explicit mention of "*negotiation, mediation, participation and conflict resolution models and standards for the adoption and implementation of low-carbon policies, technologies and application"* in the indicative actions. With regard to this a precautionary approach can be expected since the consideration of potential fields of conflict is explicitly mentioned (this includes nature protection, agricultural use etc.).

For the assessment, we consider an approach which includes restrictions concerning the construction of infrastructure for renewable energy, which might arise as a consequence of the ASP. These restrictions include excluding sensitive areas, deciding against large constructions at open sites in mountainous territory as well as against infrastructure in environmental hotspots. If this is adopted in a satisfactory way, possible impacts are avoided or mitigated.

Furthermore it should be mentioned that the wording of this specific objective as well as the strategic level of “low carbon policy” primarily address projects with a positive impact on energy efficiency and on reducing carbon footprint, in particular by alpine traffic. This is supported by the fact that the indicative actions are focusing to greater extent on energy efficiency/saving etc. and only to a small share on energy production.

Knowledge from past projects, like RECHARGEGREEN (which considered and examined in detail the environmental impacts caused by low carbon strategies) should be used and integrated into future projects in order to achieve the best effects in environmental issues.

7.2.1.2 Assessment of the Objective

4e.1 Establish trans-nationally integrated low carbon policy instruments		
Environmental Issues	**Possible impacts**	**Explanation and possible mitigation measures**
Soil	No significant impacts	• A reduction in energy consumption is not expected to cause any significant impacts on environmental issues Soil and Water
Water	No significant impacts	
Climate/Air	Positive impacts	• Reduction of greenhouse gas emissions and exhaust fumes is expected
Fauna, Vegetation, Biodiversity	positive impacts	• A reduction of emissions indirectly also leads to better conditions for fauna/flora/biodiversity and less stress on their ecosystems
Landscape	No significant impacts	• A reduction in energy consumption is not expected to cause any significant impacts on landscape. Significant construction activities are not likely
Human health, Population	Positive impacts	• Reduction of emissions and noise can be expected by the aimed shift
Material assets and cultural heritage	Positive impacts	• A reduction of emissions also leads to better conditions for material assets as well as cultural heritage.

Interrelationships:

Interrelationships between the environmental issues are not expected.

Consideration of Climate Change Aspects:

Climate change mitigation is considered within the objective and must be a part of the proposed projects.

Additional Explanation – Renewable energies
Judging from the previous projects funded by the Alpine Space Programme 2007-2013 sustainable solutions appropriate to the specific and diverse requirements of the territory are to be expected. Projects which might also encourage the establishment of hydropower in sensitive alpine areas as well as wind energy related projects in mountain areas need to be avoided. A Careful selection of the location of a project during project assessment is a suitable form of a mitigation measure.

Interrelationships:

With regard to renewable energy production interrelationships can occur between fauna/vegetation/biodiversity and human health/ population. Cumulative effects could be possible – because of existing stress on the environmental issues –in correlation with 1b1.

Consideration of Climate Change Aspects:

Climate change mitigation is considered within the objective and is an essential part of the proposed projects.

7.2.2 4e.2 Increase options for low carbon mobility and transport

"Existing spatial interaction and mobility patterns, business models and lifestyles are energy intensive and rich in emissions and accentuate the disparities between strong centres and metropolitan areas on the one side, and the rural areas on the other. Due to the topography of the Alpine Space, on the one hand people in peripheral areas are especially dependent on private vehicles for commuting and freight transport and thus cannot avoid high carbon activities; on the other hand space for individual traffic is limited.

The IP 4e.2 builds on several successful experiences made in the former Programme Priority Axis 2 "Accessibility and Connectivity". In these, projects demonstrated the principle feasibility of (and paved the way for) a modal shift from road transport/traffic to rail transport/public transport. Most of the projects addressed "strategic policy development" and "exploration/piloting", but some also succeeded to reach the implementation phase. Building on valuable policy recommendations, tools boxes for planners in transport and mobility, the current Programme continues to tackle these challenges. The achievement of the implementation phase and the unlocking of public/private investments should be a main focus in the current Programme period. The projects in the previous period showed, that there is a strong need to support the development, the testing and the implementation of new low carbon technologies due to the complexity of the introduction of technological innovations on a system level (for example e-mobility).

The Alpine Space regions need to manage these "high carbon" activities by fostering the availability and use of low-carbon mobility (passenger trips) and transport (freight and logistics) solutions. Yet, "low carbon" mobility and transport are not a matter of technical applications alone.

The Programme aims at an integrated organisation of spatial interaction, economic activity and mobility and transport patterns in order to provide the prerequisites for a low carbon economy and society. It is necessary to increase the options available for low-carbon mobility and transport by adopting technological, financial and organisational solutions taking also in account climate change aspects, resource efficiency and resilience.

The results to be delivered by the projects supported by the Programme are residing initially in the promotion of awareness and understanding about the potentials and the implications of low-carbon mobility and transport options. This includes the discussion on strategies, tools and operational modi among decision makers and key administrations in sectoral (e.g. energy, transport, housing) but also cross-sectoral departments (e.g. spatial planning).

In a next step the Programme actions should result in the identification of existing mature and applicable low-carbon mobility and transport options and to foster their operational setup in the specific regional and local contexts through exchange in transnational networks and cooperation structures.

Further the Programme actions should result in the improvement of the "ground" for integration and

implementation of low-carbon mobility and transport solutions via strategies and plans. It should also foster the change for low carbon mobility and transport behaviour through operational, technological and funding applications at Alpine scale.

Last, but not least, the Programme shall deliver conclusions on the relevance, effectiveness and sustainability of the above in order to deliver an enhanced enabling environment for the low carbon mobility and transport design, adaptation and implementation in the midterm. This will happen through monitoring and evaluation initiatives but also through the promotion of negotiation, mediation, participation and conflict resolution models." (ASP, Page 35-36).

7.2.2.1 Background

The SWOT analysis addresses the need for new innovative transport solutions which cope adequately with the challenges of the alpine area topography and barriers in accessibility. Climate change is a dominant topic in mountain regions, which are exposed to its impacts in multiple ways.

Having a look at projects resulting from the programme period 2007-2013 shows the strong focus on sustainable mobility:

Projects such as AlpCheck 2, AlpInfoNet and MORECO have already focused on transportation and sustainable mobility. Furthermore PUMAS (Planning sustainable regional-Urban Mobility in the Alpine Space), fostering integrated mobility planning, urban/peri-urban development, commuting/travel and interoperablity/intermodality can be seen as a reference project for SO 4e2. Social and environmental impacts of traffic were examined in a project called MONITRAF. Especially the project CO2 Neutralp, which brought along 13 innovative and sustainable traffic solutions for the Alpine Space, can be seen as a benchmark project for most other projects that were funded within this field. By implementing eco-innovative solutions such as sustainable public transportation solutions, photovoltaic systems for E-mobility, E-Bike systems etc., the impact on environmental issues was partly even positive – especially when focusing on Climate, Human Health and Cultural Heritage.

The range of target groups to be addressed by the specific objective is quite broad but particularly favours the alpine residents as well as regional institutions. However indirectly it also affects tourists. These stakeholders (tourists), who could be even more encouraged to travel to alpine regions when facing better accessibility and traffic solutions need to be encouraged to use green transportation options, thereby creating no additional significant effect on environmental issues.

Also the set of indicative actions that are listed within the Programme are in line with implementing "low carbon" mobility solutions at several stages. These include *"a framework for capitalisation of on-going technological innovation for a more sustainable organisation of mobility and transport including inter-modality and ICT applications*". Against the background of the previous ASP, the wording of the SO and the listed indicative actions, a sustainable traffic-planning approach can be expected for future

projects. No significant negative but for some environmental issues significant positive impacts are to be expected.

7.2.2.2 Assessment of the Objective

4e.2 Increase options for low carbon mobility and transport		
Environmental Issues	**Possible impacts**	**Explanation and possible mitigation measures**
Soil	No significant impacts	• In accordance with the background no further increase of sealing and reduction of contamination by traffic emissions is expected, as the subsidised actions are e.g. car sharing, public transport, travel on demand, soft mobility, improvements in inter-modality of motorised individual traffic.
Water	No significant impacts	• Reduction of contamination by traffic emissions of ground and surface water is expected, as the subsidised actions are e.g. car sharing, public transport, travel on demand, soft mobility, improvements in inter-modality aiming at a reduction of motorised individual traffic.
Climate/Air	Positive impacts	• Reduction of greenhouse gas emissions and exhaust fumes is expected, as the subsidised actions are e.g. car sharing, public transport, travel on demand, soft mobility, improvements in inter-modality aiming at a reduction of motorised individual traffic.
Fauna, Vegetation, Biodiversity	No significant impacts	• As no new building activity is indicated by the actions, no negative impacts are expected, however also no improvements are expected in terms of habitat fragmentation with regard to the current situation.
Landscape	No significant impacts	• As no new building activity is indicated by the actions no negative impacts are expected.
Human health, Population	Positive impacts	• Reduction of emissions and in some cases noise can be expected by the targeted shift from individual

		to public transport.
Material assets and cultural heritage	No significant impacts	• As no new building activity is indicated by the actions, no negative impacts are expected. Improvement might be possible due to the reduced need of parking space in traditional centres, due to the shift towards public transport, especially in tourism areas.

Interrelationships:

Interrelationships between the environmental issues are not expected.

Consideration of Climate Change Aspects:

Climate change mitigation is considered within this objective.

7.3. Priority Axis 3 Liveable Alpine Space

This priority is defined by the following programme objectives:

- *6c.1 Sustainably valorise Alpine Space cultural and natural heritage*
- *6d.1 Enhance the protection, the conservation and the ecological connectivity of Alpine Space ecosystems*

Indicative Actions to be supported according to the Programme are:

- *Organise knowledge transfer, inventorying, exchange of good practice examples, networking and development of innovations concerning models for non-profit organisations and voluntary work in the cultural and social sector, neighbourhood activities as well as empowerment and governance of regions and communities;*
- *Develop Alpine Space wide cultural initiatives to promote a transnational alpine identity and enhance the awareness of the alpine cultural heritage;*
- *Develop education, training and qualification models and networks and set up of pilot actions to re-invent traditional jobs in an innovative context;*
- *Design implementation strategies, set up and test of models to better capitalize alpine cultural and natural heritage by enterprises, research institutions, NGOs and local population using exchange of experiences , mutual learning and pilot activities;*
- *Design implementation strategies, set up models and test pilot actions to combine mass tourism with the promotion and protection of alpine natural and cultural heritage;*
- *Develop and test control systems for the labelling and funding of green and fair alpine products respecting and promoting Alpine Space cultural and natural heritage.*
- *Set up transnational frameworks and platforms for the interoperability of existing databases, promotion of data availability and the integration of management approaches (hazard and risk assessment, planning methodologies, management plans, sustainability and adaptation assessments etc.);*
- *Develop concepts, strategies, models and pilots for sustainable and innovative management of resources, green infrastructure and biodiversity, landscape management and green corridors;*
- *Set up, test and implement negotiation, mediation, participation and conflict resolution models in the context of land use, management of Alpine resources and assets with a view to diverging interests of stakeholders and territories;*
- *Design implementation strategies, set up models and test pilot activities and transnational, regional and intercommunity cooperation of risk management (risk assessment, risk*

communication, risk managing measures and hazard prevention) as a tool of ecosystem conservation and protection

- *Set up networks and partnerships for the provision of capacity development mechanisms in order to develop alternative valorisation approaches for Alpine ecosystem services, increase awareness and integrate them in the implementation of policies.*

Target groups

- *Beneficiaries; SMEs and private sector; voluntary organizations, land owners and land users; tourists and the Alpine Space population*
- *General public;*
- *Those groups listed under the caption "Indicative types of beneficiaries";*
- *Enterprises, including SME.*

Types of beneficiaries

- *National, regional and local authorities and their institutions dealing with natural and cultural heritage;*
- *National authorities and their regional branches for social and cultural affairs, regional development and tourism;*
- *Protected Areas management organisations;*
- *NGO's, Non-Profit-Organisations and other civil society associations dealing with natural resources, social and cultural issues;*
- *Chambers, business collective organisations and associations dealing with tourism;*
- *Institutions specialized in education, training and capacity building,*
- *Local Public Authorities;*
- *Regional Public Authorities;*
- *National Public Authorities;*
- *Agencies;*
- *Higher education institutions;*
- *Education/training centres;*
- *Business support organisations;*
- *Interest groups including NGOs.*

7.3.1 6c.1 Sustainably valorise Alpine Space cultural and natural heritage

In the Alpine Space area different cultures meet in relatively limited space. The combination of the cultural and natural diversity makes the Alpine Space an attractive place for inhabitants, newcomers and visitors. The Alpine Space is also rich in natural resources providing a high quality of life and global attractiveness.

Cultural and natural heritage are at risk, but they can be the starting point for innovation and new development options. The right balance between conservation/protection and advancement is one of the main challenges for the Alpine Space. Both elements, however, are indispensable parts of the cultural resources of the area. Additionally, in the context of green growth, emphasis is put in decoupling of material input and economic growth. The Alpine Space Programme needs to strengthen an Alpine cultural identity and assume a pioneer role in utilising its material and non-material assets and establishing green growth as constituent elements of an alternative and distinct Alpine lifestyle.

This IP can build on experiences and results of several projects addressing the sustainable valorisation of natural heritage; the valorisation of cultural heritage was however limited to the building sector. The positive experiences of projects addressing building culture justifies the expectation that a more comprehensive approach on the valorisation of transnational Alpine culture will open up the Programme for new and innovative incentives. As regards the valorisation of natural heritage, further steps towards policy implementation should be aimed at.

The Alpine Space Programme can provide a framework for the exchange and interaction of organisations involved in the protection of natural and cultural heritage. It embraces the overall goal of strengthening a transnational Alpine Space identity and supports cooperation structures by developing adapted strategies, tools and models to this end.

The Programme aims to increase the consistent, balanced and sustainable use of the Alpine Space cultural and natural heritage by increasing awareness on the present potential and future challenges and developing new solutions (e.g. adoption of governance tools and solutions and the development of new production chains, conflict management tools etc).

The results to be delivered by the projects supported by the Programme reside initially in the fostering of a transnational Alpine identity using the transnational "label" as a catalyst.

In a next step, the Programme actions should result in the formulation of what "sustainable valorisation" means in the local and regional context. This should result will be delivered by exchange within transnational networks and cooperation structures at the Alpine Space level and through negotiation, mediation, participation and conflict resolution exercises at the local and regional level but also through capacity development actions.

After achieving that, the next result lies in the development of innovative approaches for the sustainable valorisation of cultural and natural heritage to foster green growth and resource efficiency.

This can be achieved on the one hand by focusing on the improvement of the "ground" for formulation, implementation and evaluation of strategies, and on the other hand by focusing on practical demonstration, evaluation and broad adoption of sustainable valorisation tools and models through knowledge transfer, exchange of good practice examples, networking and development of cultural initiatives. (ASP, Page 42 and 43).

7.3.1.1 Background

In the discussion on increasing innovation, depopulation and migration as well as mass tourism activities, the cultural and natural diversity of the Alpine Space is seen at risk. In the SWOT analysis, the following issues are relevant to understanding the purpose of this SO: *"Tourism favours seasonal "monocultures", "Socio-demographic trends will pose new challenges in areas affected by climate change, especially rural areas with ageing population"* and *"Medium sized cities near metropolises will be the winners, rural areas the losers*" etc.. Objective 6c.1 therefore is aimed at providing support for authorities, citizens, land owners but also tourists etc. to protect the unique cultural as well as natural heritage in combination with exploring economic potential linked to conservation issues (e.g. encouraging traditional land use and pasture by selling agricultural products or offering sustainable tourism activities). It can be expected that this will not pose any negative effects on environmental issues, but may even have a positive influence, also by creating awareness for the relevance of protecting natural and cultural heritage.

Previous projects focusing on suitable fields included Transitects (mitigation of negative effects of traffic on the alpine heritage), AlpBC (preservation and advancement of Alpine Building Culture as well as its capitalization), AlpHouse (energy-efficient renovation of traditional alpine old buildings and settlements). These projects clearly strive to support a sustainable development in order to strengthen the existing cultural and natural heritage, which allows for the assumption that "no significant" to "positive impacts" on environmental issues can be expected.

However, according to the wording of the objective demanding to "sustainably valorise" the Alpine Space heritage some caution has to be taken. Valorisation in many cases has a strong marketing/money-related connection, and therefore poses a contrast to the sustainability issue as well as the cultural and natural heritage, which are to be protected. Relevant indicative actions like *"Design implementation strategies, set up and test of models to better capitalize alpine cultural and natural heritage by enterprises, research institutions, NGOs and local population using exchange of experiences , mutual learning and pilot activities"* or *"Design implementation strategies, set up models and test pilot actions to combine mass tourism with the promotion and protection of alpine natural and cultural heritage"* therefore should not be consulted separately but always together while clearly keeping in mind the other indicative actions. We assume that sustainably valorising actually focuses on the conservation/maintenance aspect as well as on the exchange of knowledge on traditional land-use. To summarize, according to the background, the objective can be assessed as having "no significant negative" or "significant positive" impacts, depending on the addressed environmental issue.

7.3.1.2 Assessment of the Objective

6c.1 Sustainably valorise Alpine Space cultural and natural heritage		
Environmental Issues	**Possible impacts**	**Explanation and possible mitigation measures**
Soil	No significant to positive impacts	• Keeping up traditional land use is an important tool to prevent soil erosion.
Water	No significant impacts	• In light of the above background negative effects on water and climate/air can be excluded. • Positive effects might occur if the projects deal with protected areas management and conservation.
Climate/Air	No significant to positive impacts	
Fauna, Vegetation, Biodiversity	No significant to positive impacts	• Cultural Heritage includes traditional land use patterns. If the management of cultural landscapes can be maintained it secures biodiversity and protection against natural hazards
Landscape	Positive impacts	• Provided the conservation & maintenance of cultural landscape is included
Human health, Population	No significant to positive impacts	• Positive impacts on human health depend on possible effects on recreation opportunities in protection areas and provided by areas preserved as cultural heritage.
Material assets and cultural heritage	Positive impacts	• Cultural heritage is a main factor of local identity. Therefore, strengthening local identity can likely contribute to maintaining cultural heritage.

Interrelationships:

Interrelationships between the environmental issues are not expected.

Consideration of Climate Change Aspects:

The carbon sink in protected areas and the protection of green spaces contributes to mitigation effects.

7.3.2 6d.1 Enhance the protection, the conservation and the ecological connectivity of Alpine Space ecosystems

"The Alpine Space is featuring exceptional and unique landscapes and biodiversity, thus offering high quality of life and global attractiveness. Due to its topography, the Alpine Space is also characterised by high environmental vulnerability being strongly influenced by impacts of human activities and climate change. The Alpine Space also provides ecosystem services not only for the residents, but as well for visitors, tourists and for other parts of Europe (for example the Alps are a "water tower" for Europe).

In the dense Alpine Space these ecosystem services, and the factors influencing them, are in constant interaction.

In this context, interventions under Investment Priority 6d should respect and integrate two aspects:

- *one oriented towards dynamic protection and risk management (protection, conservation and connectivity of "ecosystems");*
- *one oriented towards sustainable use and risk prevention (integration of ecosystem services)*

Protection, preservation and the connectivity of Alpine Space ecosystems have been addressed in previous Alpine Space Programmes. Several projects with a high number of involved environmental authorities and NGOs paved the way to implementation by strategic policy development and diverse pilot actions. The current Programme period should focus on policy implementation and unlocking public/private investments, which stayed behind the expectations.

The Alpine Space Programme will focus on providing the room for common trans-alpine tools and methodologies, combination of knowledge bases, but also for common responses in form of strategies, (green) infrastructures, management structures and hazard/risk response mechanisms.

The Programme aims to harmonise management approaches, facilitate knowledge transfer and share responsibilities with the goal of integrating Alpine Space ecosystems functions and needs into policies.

The results to be delivered by the projects supported by the Programme reside initially in drawing a conceptual landscape, which will comprise on the one hand the existence and quality of transnational, national and regional governance instruments and tools addressing ecosystem services; and on the other hand the relevance, awareness and acceptance of ecosystem services in transnational, national and regional decision-making and -planning processes.

Building up on that, the Programme should deliver, through exchange within transnational networks, partnerships and cooperation structures as well as capacity building, the "binding element" for the development of valorisation approaches for Alpine Space ecosystem services, and their implementation in policies and decision making and planning processes.

At the practical level, the Programme actions should result in a harmonised transnational operating environment in the field of protection, preservation and ecological connectivity of Alpine Space ecosystems through:

an interoperable information base (databases, platforms, monitoring systems surveillance mechanisms etc.); and

a harmonised and coordinated management system (risk assessments, management strategies and plans, sustainability and adaptation assessments etc.).

Last but not least, the Programme actions should result in the establishment of the concept of ecosystem services in the public debate through fostering of dialogue among administration, economic actors and citizens by means of negotiation, mediation, participation and conflict resolution approaches." (ASP, page 47-49).

7.3.2.1 Background

Particularly in consideration of the multiple stresses (e.g. the impact of climate change) which influence the future development of alpine ecosystems, their protection, preservation and connectivity is of major importance for alpine stakeholders. Therefore, the topic was also highlighted in the SWOT analysis of the current Cooperation Programme. Especially the following two lines among others report very well which challenges are tackled within this objective:

- *"Climate change impact will affect the fragile mountain ecosystems, causing loss of biodiversity, erosion and degradation of eco-services"*
- *"The ASP area is a zone of high environmental sensitivity affected by climate change"*

Nature conservation as well as its management was already an important part of the Alpine Space Programme 2007-2013, where two specific objectives were dedicated to the issue (SO: *"Enhancing cooperation in environmental protection issues"*; SO: *"Stimulating integrated approaches to planning and management of natural resources and cultural landscape"*). This led to numerous projects. ECONNECT (enhancement of ecological connectivity, protection of biodiversity and natural heritage in the Alpine Space), Alp FFIRS (creation of a shared alpine forest fire warning system), Alp-Water-Scarce (shared warning system against water scarcity) or SILMAS (creation of tools for management of lakes in the Alpine Space) are some of the most suitable projects for providing an estimation of the nature of future projects. Lessons learned from previous projects as well as linkage to those projects may also help to amplify positive results.

In total so far, the expected impact on environmental issues created by this Specific Objective is positive. The indicative actions make the specific objective broad. In accordance with the MA and Drafting team, however, it has been clarified that only the core objective of protection, conservation and ecological connectivity of Alpine Space ecosystems is envisaged.

This is outlined in the latest draft as *"Design implementation strategies, set up models and test pilot activities and transnational, regional and intercommunity cooperation of risk management (risk assessment, risk communication, risk managing measures and hazard prevention)* ***as a tool of ecosystem conservation and protection****."*

Focus is set on risk prevention in connection with improving the condition of soil, water, flora, fauna and biodiversity.

7.3.2.2 Assessment of the Objective

6d.1 Enhance the protection, the preservation and the connectivity of Alpine Space ecosystems

Assessment of Core Topic

Environmental Issues	Possible impacts	Explanation and possible mitigation measures
Soil	Positive Impacts	• In accordance with the core topic and the relevant indicative actions, only positive or no significant impacts on environmental issues are to be expected. The core areas protection, preservation and connectivity are appreciated means to support the Alpine Space Ecosystems.
Water	Positive Impacts	
Climate/Air	Positive Impacts	
Fauna, Vegetation, Biodiversity	Positive Impacts	
Landscape	Positive Impacts	
Human health, Population	Positive Impacts	
Material assets and cultural heritage	No significant impacts	

Interrelationships:

Interrelationships between the environmental issues are not expected

Consideration of Climate Change Aspects:

The carbon sink in protected areas and the protection of green spaces contributes to mitigation effects.

Interrelationships:

Strong interrelationships can occur between landscape and material assets and cultural heritage as well as with human health/population. Furthermore there may be interrelationships between soil, water and fauna/vegetation/biodiversity. Cumulative effects can be expected as a consequence.

Consideration of Climate Change Aspects:

Climate change adaptation would be considered within this objective if – as discussed above – the focus is set on soil protection, stabilization of ecosystems in order to minimize susceptibility to risks. As explained in chapter 4 climate change can imply changes in composition of species. The consideration of its influence on biodiversity topics is strongly recommended.

7.4. Priority Axis 4 – "Well-Governed Alpine Space"

The objective of this priority is

Increase the application of multilevel and transnational governance in the Alpine Space

Indicative Actions

- *Set up transnational frameworks, platforms and networks for the identification of existing resources and obstacles, as well as the valorisation of proofed concepts in the field of governance (mapping of resources, studies, pilots and strategies governance needs, development potentials, human resources etc.);*
- *Set up frameworks for the stimulation and coordination of projects and initiatives responding to the identified resources, obstacles and concepts;*
- *Strategic processes to check the feasibility of new projects and initiatives;*
- *Develop transnational models for the design, testing, up-scaling, comparison and evaluation of innovations (tools, processes, actors, organisations and interfaces) in the field of public administration;*
- *Set up a policy foresight for governance challenges in relation to the Alpine Space driving forces;*
- *Develop innovative models for institutional co-operation and spatial organisation for and between different territorial types;*

- *Set up frameworks for knowledge transfer and capitalisation activities addressing the entire Alpine governance through a more active involvement especially of non-institutional actors*

Target groups

- *General public;*
- *Those groups listed under the caption "Indicative types of beneficiaries";*
- *Policy makers.*

Types of beneficiaries

- *Local Public Authorities;*
- *Regional Public Authorities;*
- *National Public Authorities;*
- *Agencies;*
- *Higher education institutions;*
- *Education/training centres;*
- *Business support organisations;*
- *Interest groups including NGOs*

7.4.1 Increase the application of multilevel and transnational governance in the Alpine Space (11.1)

"The Alpine Space is characterised by a long-lasting tradition of international and inter-regional cooperation on governmental and non-governmental level. The diversity and functions as well as the strategic objectives of these co-operations reflect the different background and are represented in various institutional settings. With the upcoming challenges due to the global driving forces like climate change, economic globalisation and migration and cultural and societal transformation, which cannot be addressed at the national level, the need for alignment of strategies and objectives has increased. The upcoming Macro-Regional Strategy for the Alpine Region (EUSALP) emphasises the need for increased multilevel and transnational governance. Here the cooperation programme can act as support and develop new transnational governance models and tools.

Although the administration systems of the Alpine Space are characterised as advanced and effective, these developments pose new challenges on them. Additionally, public administration has to address also inherent elements such as indigenous demographic dynamics, regional decline and oversized infrastructures, shrinking public budgets etc.

The results to be delivered by the projects supported by the Programme reside initially in drawing a mental landscape of the status quo. This has two dimensions:

• on the one hand the knowledge and understanding among decision makers and key administration operating in the respective sector about the potentials, obstacles and limits of multilevel and transnational governance and

• on the other hand on the opportunities delivered by the EU Strategy for the Alpine Region.

Following that, the Programme will contribute to the realisation of the influence of the transnational dimension when stakeholders are formulating regional and national strategies and action plans. This influence will be achieved through transnational frameworks, platforms and networks, capacity building and capacity development. The Programme actions should result in concrete instruments for enabling and improving multilevel and transnational governance application. This could be through design, testing, up-scaling, comparison and evaluation of tools, processes, actors, organisations and interfaces in the field of public administration.

Last but not least the Programme shall deliver conclusions on the relevance, effectiveness and sustainability of the above through monitoring and evaluation initiatives." (ASP, Page 53-55)

7.4.1.1 Background

This objective intends to reduce weaknesses identified in the SWOT analysis. These range from *"spatially fragmented local markets"* to the fact that the *"Mix of governance system in the countries poses limits to the potential for cooperation (federal vs. centralised states)"*. It can be expected that innovation in governance poses no negative effects on environmental issues.

The public sector was included in the past programming period in projects such as DEMOCHANGE – which focused on governance in social issues. ALPSTAR on the other hand was aimed at governance innovation in the fields of carbon neutrality on regional and local levels. Poly5 and RURBANCE attempted to link governance actions across areas or regions. These projects are clearly situated in the fields of promoting the innovation of governance in terms of cooperation, coordination and shared responsibilities. Yet no negative effect on the environment is to be expected. Rather, a positive development through social integration, sustainable innovation, reduction of emissions etc. could be foreseen.

With reference to the above the screening process of the indicative relevant actions provides further explanation as to the possible outcome of the SO. The actions encourage the implementation of transnational models or policy foresights related to governance issues. Furthermore, young people as well as women should be better integrated into the local governance system. These aspects make it clear that projects will result in Alpine Space wide integration, efficacy as well as positive social effects in the public sector that will bring benefits to all different levels.

In total, and especially after analysing previous projects, negative effects from the Strategic Objective are not expected to be significant.

7.4.1.2 Assessment of the Objective

<table>
<tr><th colspan="3">11.1 Increase the application of multilevel and transnational governance in the Alpine Space</th></tr>
<tr><th>Environmental Issues</th><th>Possible impacts</th><th>Explanation and possible mitigation measures</th></tr>
<tr><td>Soil</td><td>No significant impacts</td><td rowspan="8">• The focus of the SO is put on training/ system improvement/transnational mapping.
• Furthermore, the explicitly highlighted focus to innovate governance reduces the likelihood of impacts on environmental issues.</td></tr>
<tr><td>Water</td><td>No significant impacts</td></tr>
<tr><td>Climate/Air</td><td>No significant impacts</td></tr>
<tr><td>Fauna, Vegetation, Biodiversity</td><td>No significant impacts</td></tr>
<tr><td>Landscape</td><td>No significant impacts</td></tr>
<tr><td>Human health, Population</td><td>No significant impacts</td></tr>
<tr><td>Material assets and cultural heritage</td><td>No significant impacts</td></tr>
</table>

Interrelationships:

Interrelationships between the environmental issues are not expected.

Consideration of Climate Change Aspects:

Additional effects on climate change are not to be expected.

8. Choice of alternatives

During the development of the Alpine Space Programme the structure and especially the objectives were discussed in an intensive process. During this phase, several objectives were elaborated, reformulated or abandoned. All discussed objectives were considered as alternatives.

In preparing the new Programme 2014-2020 a focus was put on a constant influence throughout the drafting process. As already stated in chapter 1 the SEA evolved out of a continuous discussion process in constant interaction with the drafting team of the Programme. Changes in the Programme were therefore also influenced by the feedback of the SEA-experts.

As a result the objectives were in many cases redrafted. As a consequence of this elaboration process, an evaluation concerning their impact on environmental issues became possible with regard to their wording as well as related indicative actions and explanations made. Even though it made the drafting process as well as the process of shaping the Environmental Report more complex and extensive, it led to a constant improvement, since former alternatives were concretized. In some cases improvements regarding the expected impact on environmental issues can be seen.

In the following, in order to allow a traceability of the above-explained processes, tables including the assessment of former drafts of the programmes objective that were relevant are listed...

1.1. Priority Axis 1

First draft Version of the ASP (Draft from 30.04.2013)

Assessment Results

Environmental Issues	IP 1a Identify and establish centres of competence on topics of alpine importance	IP 1b Enhance and broaden innovation networks in order to serve the Alpine SME landscape	TO 10 Harmonise the educational supply among ASP regions and accentuate education contents to support the innovation effort
Soil	No significant impact to high negative impacts	Positive to high negative impacts	No significant impacts
Water	No significant impact to medium negative impacts	Positive to medium negative impacts	No significant impacts
Climate/Air	No significant impact to high negative impacts	Positive to medium negative impacts	No significant impacts
Fauna, Vegetation, Biodiversity	No significant impact to high negative impacts	Positive to high negative impacts	No significant impacts
Landscape	No significant impact to medium negative impacts	Positive to medium negative impacts	No significant impacts
Human health, Population	No significant impact to high negative impacts	Positive to medium negative impacts	No significant impacts
Material assets and cultural heritage	No significant impact to high negative impacts	Positive to medium negative impacts	No significant impacts

Second draft Version of the ASP (Document: Development of Specific Objectives based on the discussion of the drafting team, Munich, 19.06.2013)

Assessment Results

Environmental Issues	**1b.1 Enhance the potential for Knowledge generation and transfer on topics of Alpine Space importance among research institutions and between the R&I sector and SMEs around and between the innovation poles of the Alpine Space**	**1b.2 Promote the introduction and development of innovative solutions for the delivery of social services for an ageing society among R&I sector, public administration and civil society in order to maintain a sufficient and cost effective level of social services in the declining areas of the Alpine Space**	**1b.3 Enhance capitalisation and diffusion of applied research results of R&I institutions to the diverse SME "landscape" with emphasis on R&I central poles delivering to start-ups and young SMEs in the structurally weak areas**
Soil	evaluation not possible yet	No significant impacts	positive to high negative impacts
Water		No significant impacts	positive to medium negative impacts
Climate/Air		No significant impacts	positive to medium negative impacts
Fauna, Vegetation, Biodiversity		No significant impacts	positive to high negative impacts
Landscape		No significant impacts	positive to medium negative impacts
Human health, Population		positive impacts	positive to medium negative impacts
Material assets and cultural heritage		No significant impacts	positive to medium negative impacts

Third draft Version of the ASP (Draft from 10.09.2013)

Assessment Results

Environmental Issues	1b.1 Enhance the potential for business innovation using research results on topics of Alpine Space importance	1b.2 Promote the introduction and development solutions for the delivery of services of general interest and for the support of social inclusion;	1b.3 Enhance governance innovation as a mean for sustainable and effective public sector.
Soil	evaluation not possible yet	No significant impacts	No significant impacts
Water		No significant impacts	No significant impacts
Climate/Air		No significant impacts	No significant impacts
Fauna, Vegetation, Biodiversity		No significant impacts	No significant impact
Landscape		No significant impacts	No significant impacts
Human health, Population		positive impacts	No significant impacts
Material assets and cultural heritage		No significant impacts	No significant impacts

Conclusion Priority Axis 1

In the interim versions a sound assessment of environmental impacts was not possible to due general wording and lack of concrete information on topics and intended actions. Overall negative impacts in priority axis 1 have been reduced through a change in focus and further specification on the topics.

1.2. Priority Axis 2

First draft Version of the ASP (Draft from 30.04.2013) **– Assessment Results**

Environmental Issues	**IP 4b Enhance the potential for energy efficiency and RES applications for the "alpine SME"**	**IP 4c Enhance the potential for energy efficiency and RES applications for the "alpine domestic consumer"**	**IP 5b Develop transnational and interoperable early warning, disaster and risk management systems in the Alpine Space**	**IP 4e promotion of sustainable urban mobility and mitigation relevant adaptation measures**	**IP 6g Promote alpine solutions which lessen material input of high and enhance regional economic cycles**	**IP 4b indicative actions focusing on renewable energy production**
Soil	No significant impacts	No significant impacts	Slight negative impacts	No significant impacts	No significant to positive impacts	Slight negative impacts
Water	Positive impacts	No significant impacts	medium negative impacts	No significant impacts	No significant to positive impacts	Slight negative impacts
Climate/Air	Positive impacts	Positive impacts	Slight negative impacts	Positive impacts	No significant impact impacts	Positive impacts
Fauna, Vegetation, Biodiversity	No significant impacts	No significant impacts	Slight to medium negative impacts	No significant impacts	No significant to positive impacts	No significant to medium negative impacts
Landscape	No significant impacts	No significant impacts	Slight to medium negative impacts	No significant impacts	No significant to positive impacts	Medium negative impacts
Human health, Population	Positive impacts	No significant impacts	Positive impacts	Positive impacts	No significant impacts	No significant to slight negative impacts
Material assets and cultural heritage	Positive impacts	No significant impacts	Positive impacts	Positive impacts	No significant impacts	no significant impacts

Second draft Version of the ASP (Document: Development of Specific Objectives based on the discussion of the drafting team, Munich, 19.06.2013) – **Assessment Results**

Environmental Issues	**4e.1 Promote the elaboration of integrated transnational and regional low carbon strategies and Alpine Space wide environmental friendly organisation of transport; integrating local administration, citizens, public utility providers at urban-rural interfaces and in car-dependent sparsely populated areas;**	**4e.2 Support sustainable mobility and transport systems using low carbon technologies in particular considering urban-rural relationships**	**4f.1 Support capitalisation and adoption of "Alpine Space adequate" low carbon technologies developed or adapted by Alpine Space R&I and adoptable by the local SME potential**	**4f.2 Enhance exchange, transfer and mainstreaming of low carbon technologies among research, industry, financing institutes and consumers**
Soil	No significant impacts	No significant impacts	No significant to high negative impacts	No significant impacts
Water	No significant impacts	No significant impacts	No significant to high negative impacts	No significant impacts
Climate/Air	Positive impacts	Positive impacts	Positive impact to no significant impacts	Positive impacts
Fauna, Vegetation, Biodiversity	No significant impacts	No significant impacts	No significant to high negative impacts	No significant impacts
Landscape	No significant impacts	No significant impacts	No significant to high negative impacts	No significant impacts
Human health, Population	Positive impacts	Positive impacts	Positive impact to no significant impacts	Positive impacts
Material assets and cultural heritage	Positive impacts	Positive impacts	no significant impacts	Positive impacts

Third draft Version of the ASP (Draft from 10.09.2013)

Assessment Results

Environmental Issues	4e.1 Promote the elaboration of integrated transnational and regional low carbon policies)	4e.2 Support sustainable mobility and transport systems using low carbon technologies.	4f.1 Enhance exchange, transfer and adoption of Alpine Space adequate low carbon technologies
Soil	No significant impacts	No significant impacts	No significant impacts
Water	No significant impacts	No significant impacts	No significant impacts
Climate/Air	Positive impacts	Positive impacts	Positive impacts
Fauna, Vegetation, Biodiversity	No significant impacts	No significant impacts	No significant impacts
Landscape	No significant impacts	No significant impacts	No significant impacts
Human health, Population	No significant impacts	No significant impacts	Positive impact to no significant impacts
Material assets and cultural heritage	No significant impacts	No significant impacts	No significant impacts

Conclusion Priority Axis 2

Positive environmental impacts evolved from the revision of the ASP. The target area of climate-friendly mobility options has been enlarged from urban to rural areas, which integrates explicitly those areas of the alpine space with a currently high share of individual mobility. Mitigating climate change has become the strongest target of this priority. Negative impacts are limited to a minimum, due to a focus on energy efficiency, spatial development policies and tools in low carbon systems. Caution is recommended only with regard to energy production in sensitive areas.

1.3. Priority Axis 3

First draft Version of the ASP (Draft from 30.04.2013)

Assessment Results

Environmental Issues	IP 6c Create the critical mass for the systematic protection and development of the Alpine heritage	IP 6d Enhance and dense the cooperation of the institutions engaged in nature protection, administration and research	IP 6e Expand the knowledge base and application of tools and methods in the field of urban environmental hotspots	IP 8b Expand the knowledge base and application of integrated area based strategies in specific areas
Soil	No significant impacts	Positive impacts	Positive impact	evaluation not possible yet
Water	No significant impacts	Positive impacts	Positive impact	
Climate/Air	No significant impacts	Positive impacts	Positive impact	
Fauna, Vegetation, Biodiversity	No significant impacts	Positive impacts	positive impact	
Landscape	No significant to positive impacts	Positive impacts	positive impact	
Human health, Population	No significant impacts	Positive impacts	positive impact	
Material assets and cultural heritage	Positive impacts	Positive impacts	positive impact	

Second draft Version of the ASP (Document: Development of Specific Objectives based on the discussion of the drafting team, Munich, 19.06.2013)

Assessment Results

Environmental Issues	6c.1 Support the sustainable utilization and valorisation of the Alpine cultural and natural heritage	6c.2 Enhance social capital of the traditional alpine settings in the light of an ageing society, increasing in- and out-migration, changing life-styles and gender perspectives as a development factor of the Alpine Space	6d.1 Support the protection, connectivity and management of protected areas, biodiversity and ecosystems in the natural Alpine Space continuum.	6d.2 Enhance the awareness about and the effectiveness of ecosystem services in the field of risk prevention and mitigation in the areas of intensive land use being affected by natural risks	6d.3 Promote the awareness about the utilisation of ecosystem services in the context of welfare for the population in the agendas of public administration, social security institutions, economic actors and civil society in vulnerable alpine areas under the pressure of conflicting land uses.	6g.1 Enhance the reorientation of the productive base towards resilient, low input business models and sustainable and fair products and services in the core of the economic activity in the Alpine Space.	6g.2 Promote green growth as a development and growth asset and establish "green growth" as an alternative alpine lifestyle enabling exchange and negotiation among authorities, industry, NGOs and citizens with a view to diverging interests of actors and territories.
Soil	evaluation not possible yet	evaluation not possible yet	Positive Impacts	Positive Impacts	evaluation not possible yet	evaluation not possible yet	evaluation not possible yet
Water			Positive Impacts	Positive Impacts			
Climate/Air			Positive Impacts	Positive Impacts			
Fauna, Vegetation, Biodiversity			Positive Impacts	Positive Impacts			
Landscape			Positive Impacts	Positive Impacts			
Human health, Population			Positive Impacts	Positive Impacts			
Material assets and cultural heritage			No significant impacts	Positive Impacts			

Third draft Version of the ASP (Draft from 10.09.2013)

Assessment Results

Environmental Issues	6c.1 Support innovative and sustainable utilization and valorisation of the Alpine cultural and natural heritage	6d.1 Enhance the protection, connectivity and management of Alpine Space ecosystems and promote the integration of ecosystem services in the policy system	6d.2 Support risk prevention and risk management in the Alpine Space	6g.1 Promote resilient, low input business models and sustainable and fair products and services as a development and growth asset and establish green growth as an alternative alpine lifestyle
Soil	no significant impacts	Positive Impacts	no significant impacts	no significant to slight negative impacts
Water	no significant impacts	Positive Impacts	no significant impacts	no significant to positive impacts
Climate/Air	no significant impacts	Positive Impacts	no significant impacts	no significant impacts
Fauna, Vegetation, Biodiversity	no significant impacts	Positive Impacts	no significant impacts	no significant impacts
Landscape	no significant impacts	Positive Impacts	no significant to Slight negative impacts	no significant to slight negative impacts
Human health, Population	positive impacts	Positive Impacts	no significant impacts	no significant impacts
Material assets and cultural heritage	positive impacts	No significant impacts	no significant impacts	no significant impacts

Conclusion Priority Axis 3

Positive environmental impacts evolved from the revision of the ASP. For several objectives of the previous versions a sound assessment of environmental impacts was not possible due to unclear wording and lack of concrete information on intended actions or even contradicting results to be expected as an outcome. In the final version of the programme the intentions of the objectives have been made clear.

9. Interrelationships and Cumulative Effects

Cumulative impacts can occur when stress is put on environmental issues through multiple impacts deriving from several objectives. However, also positive cumulative effects can derive from a program, when several objectives foster similar interests.

In the following table only those environmental issues are highlighted, which are supposed to create cumulative impacts in connection to other specific objectives of the ASP. Furthermore the existing influence (pre-conditions) as described in chapter 4 is taken into consideration.

Possible negative cumulative impacts **Assessment Results**		
Environmental Issues	**1b.1 Improve the framework conditions for innovation in the Alpine Space**	**4e.1 Establish trans-nationally integrated low carbon policy instruments – indicative actions focusing on renewable energy production**
Soil	Slight to medium negative impacts	No significant to slight negative impacts
Water	No significant to slight negative impacts	No significant to slight negative impacts
Climate/Air	No significant to slight negative impacts	Positive impacts
Fauna, Vegetation, Biodiversity	No significant to medium negative impacts	Slight to medium negative impacts
Landscape	Slight to medium negative impacts	Slight to medium negative impacts
Human health, Population	Slight negative to positive significant impacts	No significant to slight negative impacts
Material assets and cultural heritage	No significant impacts	No significant to medium negative impacts
Assessment of Cumulative Effects: Due to scarcity of land especially in inner-alpine areas pressure is put on several environmental issues by diverse infrastructure projects and land consumption related to economic development. Cumulative impacts might evolve on the environmental issues soil, fauna/vegetation/biodiversity and landscape, subsequently to Alpine Space projects which involve planning for further constructions in the areas.		

Possible positive cumulative impacts **Assessment Results**			
Environmental Issues	**4e.1 establish trans-nationally integrated low carbon policy instruments - indicative actions focusing on renewable energy savings**	**1b.2 Increase capacities for the delivery of services of general interest in a changing society**	**4e.2 Increase options for low carbon mobility and transport**
Soil	No significant impacts	No significant impacts	No significant impacts
Water	No significant impacts	No significant impacts	No significant impacts
Climate/Air	Positive impacts	No significant impacts	Positive impacts
Fauna, Vegetation, Biodiversity	Positive impacts	No significant impacts	No significant impacts
Landscape	No significant impacts	No significant impacts	No significant impacts
Human health, Population	Positive impacts	Positive impacts	Positive impacts
Material assets and cultural heritage	Positive impacts	No significant impacts	No significant impacts
Assessment of Cumulative Effects: Cumulative positive impacts are expected with regard to human health and population, especially with regard to changes in mobility options and access to public service, which again affect quality of living. Furthermore positive impacts are likely with regard to climate/air.			

Possible positive cumulative impacts **Assessment Results**		
Environmental Issues	**6c.1 Sustainably valorise Alpine Space cultural and natural heritage**	**6d.1 Enhance the protection, the preservation and the ecological connectivity of Alpine Space ecosystems**
Soil	No significant to positive impacts	Positive Impacts
Water	No significant impacts	Positive Impacts
Climate/Air	No significant to positive impacts	Positive Impacts
Fauna, Vegetation, Biodiversity	No significant to positive impacts	Positive Impacts
Landscape	Positive impacts	Positive Impacts
Human health, Population	No significant to positive impacts	Positive Impacts
Material assets and cultural heritage	Positive impacts	No significant impacts
Assessment of Cumulative Effects: Cumulative positive impacts are expected for the environmental issues landscape, and human health/population due to synergies in conservation and preservation of a high recreational value of alpine landscapes.		

10. Mitigation and Compensatory Measures

As some objectives of the programme are likely to have significant negative effects on the environmental issues, mitigation measures must be applied in order to reduce their harmful impacts. There are several types of measures possible, depending on the cause and type of disturbance.

In most cases a reduction of negative impacts can be expected through foresighted spatial planning procedures, legal frameworks and nature or cultural heritage conservation policies.

Within the ASP funding context, careful selection of projects can be based on criteria and lead to the mitigation of negative effects.

Possible strategies are:

For objectives which may subsequently cause building activities (in particularly objective 1b.1), ***green innovation,*** sustainable spatial planning including ***sparing greenfield development***, hence focus on ***brownfield development*** (as suggested for objective 1b.1) is advised. As for risk management (see objective 6d.1), ***reducing the focus on technical options*** and shifting the focus towards ***"soft" methods,*** including stabilisation of soils through proper land-use as well as flood risk management by creation of retention spaces, is recommended.

Of particular importance is pointing out a sustainable approach towards renewable energy facilities (regarding objective 4e.1). Mitigation measures refer to the disturbances of local ecosystems caused by energy related infrastructure. In this context, special attention needs to be paid to **avoiding construction in sensitive areas**. The ***concentration on, and combination with, existing infrastructure*** is generally preferable (also suggested for objective 1b.1).This relates to a ***thoughtful selection of the type and location*** of these installations with special regard to rare habitats and endangered species. Special attention should be paid to the cultivation methods applied for biomass production for the generation of biogas etc. as well as the negative consequences resulting from hydro power. In the last case, mitigation measures in general cannot fully compensate the negative impacts resulting from the interference in water balance and natural dynamics of water bodies. As for biomass production a commitment for sustainable and reasonable development of existing landuse patterns is crucial to guarantee the maintenance of the areas in terms of biodiversity, landscape, soil etc.

To compensate negative impacts from increased economic activities (also mainly objective 1b.1) the ***fostering of environmentally friendly technologies*** as well as the ***decoupling of economic growth from the throughput of material and energy resources*** should be envisaged. ***Integrated strategies for waste and emission reduction and prevention*** should be chosen instead of end-of-pipe solutions.

In general, amelioration of the impacts of the objectives on the environmental issues can be achieved by paying special attention to the selection of:

- **The beneficiaries** – to ensure that the projects will focus on innovation and knowledge exchange and not on building measures.
- **The target groups** – see beneficiaries.
- **The indicative actions** – strategically guiding the projects.
- **The target area** – to ensure that sensitive areas are excluded, if the objective is likely to cause negative impacts on environmental issues.

An anticipatory approach will respect the principle of sustainability and will focus on the conservation of natural and cultural resources; it would be advisable for the selection of the respective projects.

11. Monitoring

The goal of monitoring is to investigate the effects of the implementation of the Alpine Space Programme 2014-2020 on the respective environmental issues. The monitoring shall enable the Programme authorities to take remedial action if unexpected environmental effects should occur.

Specifically the tasks of the monitoring are:

- To reveal unforeseen significant environmental effects,
- To check the validity of the environmental assessment documented in this report,
- To check the effectiveness of mitigation and compensation measures.

The aspects of revealing unforeseen significant environmental effects and checking the validity of the assessment are of particular importance within this environmental assessment, as already described in the methods section:

The foundation of the assessment is the interpretation of the broad meanings of the Objectives, with the Priorities based on assumptions concerning the kind of measures most likely being subsidised. Even if it is unlikely, measures could be implemented within the Alpine Space Programme that are not within the range of the interpretation and that could cause significantly different environmental effects. To discover such circumstances would have to be a main task of the monitoring.

It is suggested that the indicators mentioned in chapter 6 are used for the monitoring process. These indicators constitute the basis for the assessment and make it possible to reveal the environmental effects of the subsidised projects relevant for the operation of the Alpine Space Programme. In most cases, these qualitative assessments will be sufficient. Where appropriate, also quantitative data should be included in the evaluation.

In the midterm of the programming period, detailed monitoring is recommended. Environmental effects of the Programme should be noticed by then, while there is still opportunity to take remedial action.

The results of the monitoring process must be documented in a separate monitoring report in order to ensure sufficient documentation, which can provide support for further monitoring processes as well as the formulation of future Programmes in this area.The monitoring process could be carried out either by the Joint Secretariat or by external experts. Subject of the monitoring are all objectives of the Programme. Special focus should, however, be put on those objectives which are more likely to produce negative effects on some environmental issues.

According to the assessment results based on the final version of the programme this are in particular the objective 1b.1; as well as single aspects of 4e.1 (possible projects focused on renewable energy production in sensitive areas).

12. Non-technical Summary

The environmental report fulfills the requirements of annex 1 of the directive 2001/42/EG on the assessment of the effects of certain plans and programs on the environment.

Chapter 1 (Intent and structure of the Environmental Report) explains the purpose, structure and content of the environmental assessment process. Thereafter, chapter 2 (Main Objectives and Contents of the ASP) illustrates the content of ASP and lists the priorities and objectives which are the basis for the assessment to follow. Subject of the assessment are the main objectives of the three priority axes (Innovative Alpine Space, Low Carbon Alpine Space, Liveable Alpine Space).

In chapter 3 (Environmental Objectives) all relevant regulations as well as the most important environmental objectives at the respective national and the European levels are presented. The subsequent chapter 4 (Environmental Characteristics) describes the current state of the environmental concerns, i.e. soil, water, fauna/vegetation and biodiversity, landscape, human health/population and cultural heritage/material assets. As the programme area comprises the whole alpine area broad circumstances on a rather generic level are addressed. Chapter 5 describes the likely Development of the alpine area without the programme. This so called “base alternative” serves as the basis for the assessment.

Subsequently the method and difficulties of the assessment are illustrated (Chapter 6). The assessment is based on a verbal argumentation. The possible Impacts of the priorities of the programme are classified into five levels of intensity (high negative, medium negative, slight negative, no significant and positive) according to their expected impacts on the environment. In accordance with common guidance on SEA for cohesion policy the assessment follows a likelihood scenario based on the detailed description of the targets, intended actions, beneficiaries, target areas as well as previous projects under the ASP.

The main part of the Environmental report (Chapter 7) uses this framework for the Assessment of Likely Significant Environmental Effects. Within the four Priorities of the ASP, a total of seven Objectives were assessed in the final version of the ASP. Of these seven Objectives one is likely to lead to slight or medium effects on several environmental issues. This objectives is part of Priority 1 Innovative Alpine Space. Negative development on part of the environmental issues is expected because of probably increased resource consumption. Under consideration of already existing land use conflicts in the various inner-alpine settings, subsequent effects by protection against natural hazards and particular aspects of renewable energies on sensitive locations. Mitigation and compensation measures will have a high relevance to reduce the environmental effects as much as possible. In case focus is set on sustainable innovation (green economy) even positive impacts are possible by this objective, however.

In general a strong attention is paid to a sustainable development process and a sound consideration of relevant mitigation criteria can therefore be expected. Thus no high negative impacts are contained

in the final version of the Alpine Space Programme 2014-2020.

In summary it can be concluded that the majority of objectives either have no significant impacts or might actually contribute positive effects. The results of the assessment for each priority are shown in the tables below.

Priority Axis 1 **Assessment Results**		
Environmental Issues	**1b.1 Improve the framework conditions for innovation in the Alpine Space**	**1b.2 Increase capacities for the delivery of services of general interest in a changing society**
Soil	Slight to medium negative impacts	No significant impacts
Water	No significant to slight negative impacts	No significant impacts
Climate/Air	No significant to slight negative impacts	No significant impacts
Fauna, Vegetation, Biodiversity	No significant to medium negative impacts	No significant impacts
Landscape	Slight ot medium negative impacts	No significant impacts
Human health, Population	Slight negative to positive impacts	positive impacts
Material assets and cultural heritage	No significant impacts	No significant impacts

Priority Axis 2 **Assessment Results**		
Environmental Issues	**4e.1 Establish trans-nationally integrated low carbon policy instruments**	**4e.2 Increase options for low carbon mobility and transport**
Soil	No significant impacts	No significant impacts
Water	No significant impacts	No significant impacts
Climate/Air	Positive impacts	Positive impacts
Fauna, Vegetation, Biodiversity	Positive impacts	No significant impacts
Landscape	No significant impacts	No significant impacts
Human health, Population	Positive impacts	Positive impacts
Material assets and cultural heritage	Positive impacts	No significant impacts

Priority Axis 3 **Assessment Results**		
Environmental Issues	**6c.1 Sustainably valorise Alpine Space cultural and natural heritage**	**6d.1 Enhance the protection, the preservation and the connectivity of Alpine Space ecosystems**
Soil	No significant to positive impacts	Positive Impacts
Water	No significant impacts	Positive Impacts
Climate/Air	No significant to positive impacts	Positive Impacts
Fauna, Vegetation, Biodiversity	No significant to positive impacts	Positive Impacts
Landscape	Positive impacts	Positive Impacts
Human health, Population	No significant to positive impacts	Positive Impacts
Material assets and cultural heritage	Positive impacts	No significant impacts

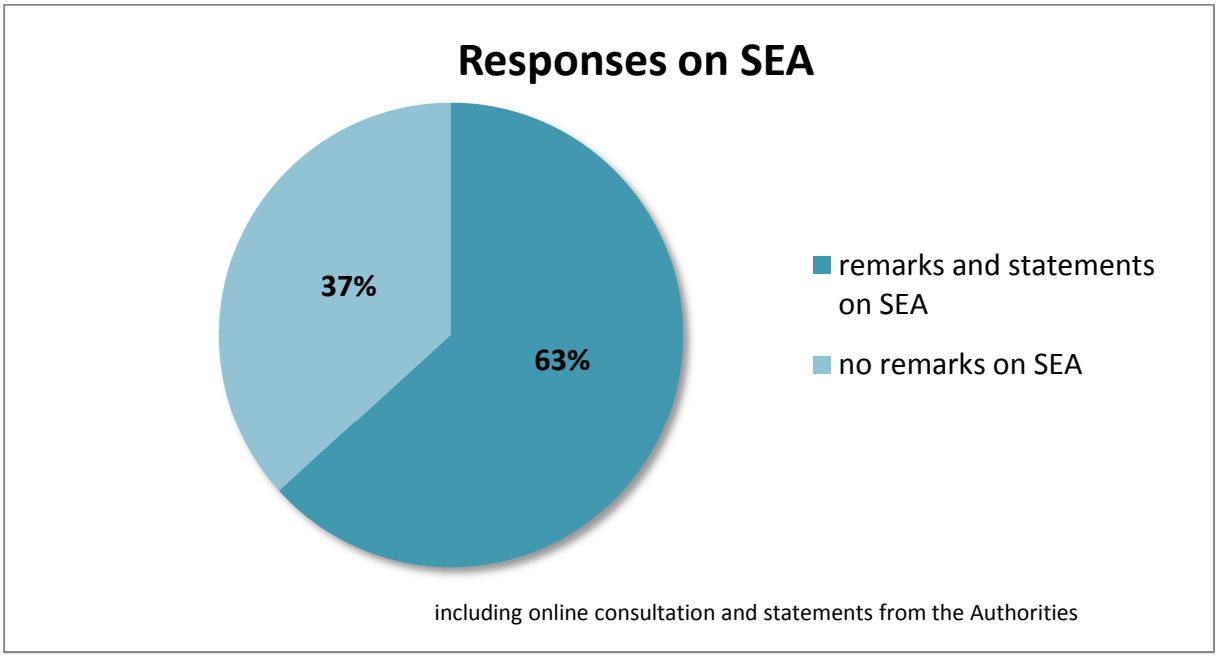
Priority Axis 4 **Assessment Results**	
Environmental Issues	**11.1 Increase the application of multilevel and transnational gobernance in the Alpine Space**
Soil	No significant impacts
Water	No significant impacts
Climate/Air	No significant impacts
Fauna, Vegetation, Biodiversity	No significant impacts
Landscape	No significant impacts
Human health, Population	No significant impacts
Material assets and cultural heritage	No significant impacts

13. Consideration of comments of the consultation process

Reactions from the public consultation on the draft Programme and the draft Strategic Environmental Assessment came from altogether 223 online responses from stakeholders of the Alpine area on a survey opened from 1st to 29th November 2013 on http://www.alpine-space.eu. In sum there have been 45 online responses addressing the Strategic Environmental Assessment, and 28 of these responses gave direct remarks to the SEA during that period of time.

Separate statements to the Environmental Report came from the Environmental Authorities from Austria (Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft), Slovenia (Ministry of Agriculture and the Environment), Italy (Ministero dell'ambiente e della tutela del territorio e del mare) and France (Region Rhone Alpes).

The following graph displays the overview on the number of statements directed at the SEA in comparison with the overall statements received during the consultation process;



To gain a better overview the remarks and statements were classified into general remarks on the quality of the SEA and three further categories. General remarks on the quality of the SEA

First category: textual improvements and minor modifications which have been added or corrected at once

Second category: modification proposals which are not required by the SEA-Directive and seem not appropriate from the point of view of the SEA-team

Third category: fundamental modification proposals which have been adjusted with the Task Force

General remarks on the quality of the SEA

The general remarks on the quality of the SEA which refer to the overall report have been classified as quite positive feedback (see the citations below).

- Remarkable quality of the environmental report.
- As in recent years, it is a valuable document, with many interesting aspects. Some parts are well elaborated, and others on the same level too vague.
- Much clearer than the OP for some aspects, maybe another understanding of the priority and its indicative actions.
- The SEA is providing general assessment – well prepared overview of general framework.

Remarks referring to the three categories

Remarks referring to the first and third category have been considered and integrated into the SEA-report and or additional explanation is given as requested by the statements. The table in the Annex shows the original responses, the chapter they refer to and their consideration or integration into the environmental report if possible.

14. Sources relevant for the SEA process (Scoping)

14.1. General Data Sources

Sources for whole Europe

- European Environment Agency (EEA): www.eea.europa.eu
- European Comission (2013): Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment
- CORINE Land Cover: http://www.umweltbundesamt.at/umwelt/raumordnung/flaechennutzung/corine/
- Eurostat: http://epp.eurostat.ec.europa.eu/
- European Soil Portal: http://eusoils.jrc.ec.europa.eu
- European Environment Information and Observation Network (EIONET): www.eionet.europa.eu

Sources for the whole Alpine Space

- Commission Internationale pour la Protection des Alpes (CIPRA): www.cipra.org
- European Academy of Bozen/Bolzano (EURAC): www.eurac.edu, www.eurac.edu/Org/AlpineEnvironment/AlpineEnvironment
- Alpine Convention: www.alpconv.org/pages/default.aspx

Country-specific Sources

AUSTRIA

- Umweltbundesamt: www.umweltbundesamt.at
  - neunter Umweltkontrollbericht 2010
- Austrian Ministry of Life (Lebensministerium BMLFUW): www.lebensministerium.at
  - (Die österreichische Strategie zur nachhaltigen Entwicklung – NSTRAT 2002
  - EU Wasserrahmenrichtlinie (Österreichischer Bericht der Ist-Bestandsaufnahme)
- Österreichische Raumordnungskonferenz (ÖROK): www.oerok.gv.at
  - (Umweltbericht STRAT.AT,
- Naturschutz: www.naturschutz.at
- Statistik Austria: www.statistik.at
- Bundesministerium für Verkehr, Innovation und Technologie (BMVIT) www.bmvit.gv.at
  - modal split
  - traffic increase

FRANCE

- Directions régionales de l'environnement, de l'aménagement et du logement (DREAL) Ministère de l'Écologie, du Développement Durable et de l'Énergie - Commissariat général au Développement durable: http://www.statistiques.developpement-durable.gouv.fr/
- Ministère de l'Égalité des Territoires et du Logement (DREAL)
- Rhône-Alpes
- Profil environnemental régional 2011-2014
- Provence Alpes-Cote D'Azur DREAL: www.paca.developpement-durable.gouv.fr
- INSEEInstitut national de statistique et des études économiques: http://www.insee.fr/
- Prévisions et observations de la qualité de l'air en France et en Europe (Prév'air): www.prevair.org/fr
- Qualité de l'Air pour regions:
  - www.atmo-franche-comte.org/
  - www.atmo-alsace.net/
  - www.atmo-rhonealpes.org/site/air/polluants/
  - www.atmo-qualitair.net/
- Agences de l'eau: www.lesagencesdeleau.fr
- Inventaire national de patrimoine naturel (INPN): inpn.mnhn.fr/
- Centre d'échange français pour la convention sur la diversité biologique: biodiv.mnhn.fr/

GERMANY

- Bundesregierung: www.bundesregierung.de
  - Nachhaltigkeitsstrategie: www.bundesregierung.de/Webs/Breg/DE/Themen/Nachhaltigkeitsstrategie/_node.html;jsessionid=4C1B2CD83DEF25D882DFEC9D192A021A.s4t2
- Umweltbundesamt: www.umweltbundesamt.de/
  - Luftdaten: http://www.env-it.de/umweltbundesamt/luftdaten/index.html
  - Umweltdaten: http://www.umweltbundesamt-daten-zur-umwelt.de/umweltdaten/open.do
- Statistisches Bundesamt Deutschland: www.destatis.de/
- Bayern Umwelt: http://www.stmug.bayern.de/umwelt/index.htm
- Baden-Württemberg environmental plan: http://www.umweltplan.baden-wuerttemberg.de/
- Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg (LUBW): http://www.lubw.baden-wuerttemberg.de/servlet/is/35855/

ITALY

- Ministero Dell'ambiente e della tutela del territorio e del mare: http://www.minambiente.it/home_it/menu.html?mp=/menu/menu_ministero/&m=Enti_ed_Organismi_Vigilanti.html
- Rete del Sistema Informativo Nazionale Ambientale (SINA): www.sinanet.apat.it/site/it-IT/
- Italian National Institute of Statistics: http://www.istat.it/
- South Tirol Environmental Data (all issues):
  - Landesagentur für Umwelt: http://www.provinz.bz.it/umweltagentur/
  - Dachverband für Natur- und Umweltschutz: http://www.umwelt.bz.it/
  - Ressort für Umwelt, Energie, Bauten und Vermögen: http://www.provinz.bz.it/ressorts/bauten/
- Trento:
  - Agenzia Provinciale per la Protezione dell'Ambiente (APPA) www.appa.provincia.tn.it/
  - Portale Geocartografico Trentino: http://www.territorio.provincia.tn.it/portal/server.pt/community/s_i_a_t/255/s_i_a_t/18995
  - Soil/Natural Risks: Proteezione Civile: www.protezionecivile.tn.it/frame.asp?Site=6
  - Biodiversity/ Landscape: Aree Protette del Trentino: www.areeprotette.provincia.tn.it/
  - Water (Opere Idrauliche) www.magisacque.it./
  - Energy: www.energia.provincia.tn.it
- Veneto:
  - Regione Veneto: http://www.regione.veneto.it/web/guest
  - Water: www.magisacque.it./
  - Agenzia Regionale per la Protezione dell'Ambiente (ARPA): www.arpa.veneto.it/home2/htm/home.asp
- Friuli-Venezia Giulia:
  - Ambiente e Territorio and Water: www.regione.fvg.it/ambiente/ambiente.htm
  - ARPA: www.arpa.fvg.it/
- Lombardia:
  - Regione Lombardia: www.regione.lombardia.it/
  - Ambiente: http://www.reti.regione.lombardia.it/cs/Satellite?c=Page&childpagename=DG_Reti%2FDGHomeLayout&cid=1213277017319&pagename=DG_RSSWrapper
  - ARPA: www.arpalombardia.it/new/live/index.asp
  - Rapporto sullo stato dell'ambiente: www.arpalombardia.it/new/live/ambiente/rapporto/2005.html
- Piemonte:
  - ARPA www.arpa.piemonte.it/
- Val d'Aosta:
  - ARPA www.arpa.vda.it/
- Liguria:
  - ARPA http://www.arpal.gov.it
  -

SLOVENIA

- Republic of Slovenia Ministry of Agriculture and Environment (Slovenian Environment Agency: http://www.arso.gov.si/en/
  - European Environment Information and Observation Network Slovenia (EIONET): http://nfp-si.eionet.eu.int/, http://www.arso.gov.si/
- Statistics Slovenia (Statisticni urad): www.stat.si/
- *Data sources from Ministry of the Environment and Spatial Planning Directorate for Environment - SEA Department (Vesna.Kolar-Planinsic):*
  - National Environmental Programm and operational programmes (Nacionalni program varstva okolja)
    http://www.arhiv.mop.gov.si/
    http://www.npvo.si/
  - Operativni program za ohranjanje in izboljšanje kakovosti zunanjega zraka
  - Operativni program zmanjševanja emisij v zrak
  - Nacionalni program upravljanja z vodami
  - Operativni program za varstvo voda pred onesnaženjem z nitrati iz kmetijske proizvodnje
  - Operativni program odvajanja in čiščenja odpadnih voda
  - Operativni program varstva pred hrupom
- Resolucija o nacionalnem energetskem programu: Dolgoročne energetske bilance RS za obdobje 2006 – 2026Resulution about transport policy
- Resolucija o prometni politiki RS (RePPRS)
- Cultural heritage in SEA
  - Vključevanje varstva kulturne dediščine v pripravo okoljskih poročil in celovite presoje vplivov na okolje
- Environmental indicators
  - www.arso.gov.si
  - http://kazalci.arso.gov.si
- Noise, Natura 2000, air, water , nature conservation, waste management, climate change, soil:
  - Katalog informacij javnega značaja: http://www.ckijz.gov.si/
  - Seznam javnih evidenc

14.2. Relevant Sources for Environmental Indicators

Environmental Issue	Relevant sources
Soil	• EEA (SOER The European Environment State and Outlook 2010, www.eea.europa.eu/soer) • European Soil Portal: http://eusoils.jrc.ec.europa.eu • • CORINE Land Cover (http://www.eea.europa.eu/publications/COR0-landcover) • Austria: Umweltbundesamt (neunter Umweltkontrollbericht – 2010 www.umweltbundesamt.at, BORIS http://www.umweltbundesamt.at/umweltsituation/boden/boris/) • Germany: www.umweltbundesamt.de/ • France: GIS Sol (http://gissol.orleans.inra.fr/actualite/publications.php) • Italy: APAT (Annuario dei dati ambientali, Edizione 2011), SINA, APPA, ARPA, additional regional data – q.v. list of data sources • Slovenia: EIONET(Environmental Indicators) and Slovenian Environment Agency: http://kazalci.arso.gov.si/?data=about&lang_id=94
Water	• France : Agences de l'eau (www.lesagencesdeleau.fr) • Italy: APAT (Annuario dei dati ambientali, Edizione 2012), SINA, APPA, ARPA, additional regional data – q.v. list of data sources • Slovenia: EIONET(Environmental Indicators) and Slovenian Environment Agency: http://kazalci.arso.gov.si/?data=about&lang_id=94 • Germany: www.umweltbundesamt.de/ • Austria: Umweltbundesamt www.umweltbundesamt.at
Climate, Air	• France : Prév'air (www.prevair.org/fr) www.atmo-franche-comte.org/, www.atmo-alsace.net/, www.atmo-rhonealpes.org/, www.atmo-qualitair.net/ • Italy: APAT (Annuario dei dati ambientali, Edizione 2011), SINA, APPA, ARPA, additional regional data – q.v. list of data sources • Slovenia: EIONET(Environmental Indicators) and Slovenian Environment Agency: http://kazalci.arso.gov.si/?data=about&lang_id=94 • Germany: www.umweltbundesamt.de/, Luftdaten: http://www.env-it.de/umweltbundesamt/luftdaten/index.html • Austria: www.umweltbundesamt.at • Austria : Bundesministerium für Verkehr, Innovation und Technologie (BMVIT) www.bmvit.gv.at
Fauna, Vegetation, Biodiversity	• Mario F. Broggi, Rudolf Staub und Flavio V. Ruffini (1999): Großflächige Schutzgebiete im Alpenraum • France: Inventaire national de patrimoine naturel, (http://inpn.mnhn.fr/) • France: Centre d'échange français pour la convention sur la diversité biologique (http://biodiv.mnhn.fr/) • France : DREAL (i.e. Cartopas) • Italy: APAT (Annuario dei dati ambientali, Edizione 2011), SINA, APPA, ARPA, additional regional data – q.v. list of data sources

	• Slovenia: EIONET(Environmental Indicators) and Slovenian Environment Agency: http://kazalci.arso.gov.si/?data=about&lang_id=94 • Germany: www.umweltbundesamt.de/ • Austria: www.umweltbundesamt.at, Naturschutz: www.naturschutz.at
Landscape	• CORINE Land Cover • Austria : Österreichische Raumordnungskonferenz (ÖROK): www.oerok.gv.at • Italy : Ministero Dell'ambiente e della tutela del territorio e del mare: http://www.minambiente.it/home_it/menu.html?mp=/menu/menu_ministero/&m=Enti_ed_Organismi_Vigilanti.html • Mario F. Broggi, Rudolf Staub und Flavio V. Ruffini (1999): Großflächige Schutzgebiete im Alpenraum • France: DREAL and IGN (Institut national de l'information géographique et forestière) (i.e. Cartopas) • Italy: APPA, ARPA, APPA
Human health, population	• Eurostat (http://epp.eurostat.ec.europa.eu/) • France : Ministère de L'Écologie, du Développement durable et de L'Énergie, IFEN – Institut francais de l'environnement (Chiffres-clés de l'environnement, Données essentielles de l'environnement dans : http://www.statistiques.developpement-durable.gouv.fr/) • France : INSEE – Institut national de statistique (http://www.insee.fr/fr/) • Italy: APAT (Annuario dei dati ambientali, Edizione 2011), SINA, APPA, ARPA, additional regional data – q.v. list of data sources, www.istat.it/ • Slovenia: EIONET(Environmental Indicators) and Slovenian Environment Agency: http://kazalci.arso.gov.si/?data=about&lang_id=94 , Statisticni urad (www.stat.si/) • Germany: www.umweltbundesamt.de/, Statistisches Bundesamt www.destatis.de/ • Austria: Statistik Austria (Jahresbericht 2011), Umweltbundesamt
Material assets and cultural heritage	• Austria: Bundesdenkmalamt (http://www.bda.at/) • Italy: Ministero per i beni culturali e le attività culturali (http://www.beniculturali.it/mibac/export/MiBAC/index.html) • France: Ministre de la culture et communication (http://www.culturecommunication.gouv.fr/) • Germany: Kultusministerium (federal countries ministries) • Slovenia : Ministrstvo za kulturo (http://www.arhiv.mk.gov.si/)

Note: for further detailed sources listed by country please see the tables of references of the chapters 3 and 4.

ANNEX

Consideration of comments of the consultation process

1st category: Responses - original citation	Chapter	Comments/ Consideration in SEA-report
soil themes should be regarded better (page 48)	Environmental Characteristics 4.1. Soil	precise comments on soil will be integrated (see comments BMLFUW)
Regarding Water Management & WFD issues in Austria, it would be very important to mention not only the "Qualitätszielverordnung Chemie", but also the "Qualitätszielverordnung Ökologie" which deals with thresholds & definitions for the "ecological status" of water bodies & groundwater - the main goal of the EU WFD, see http://www.lebensministerium.at/wasser/wasser-oesterreich/wasserrecht_national/planung/QZVOekologieOG.html for details & english version. In terms of conflicting issues WFD & Res-E Directive (i.e. hydropower production), i highly recommend to mention/cite the document "Österreichischer Wasserkatalog", see http://www.lebensministerium.at/wasser/wasser-oesterreich/plan_gewaesser_ngp/wasserwirtsch_planung/wasserkatalog.html for details, this frame gives ecological and economical criteria how to evaluate new hydropower projects and is a consensus of various stakeholders & administrative units in Austria. On the European scale, mentioning the document "A Blueprint to safeguard Europe's Waters" will be essential, see http://ec.europa.eu/environment/water/blueprint/ this document outlines actions that concentrate on better implementation of current water legislation, integration of water policy objectives into other policies, and filling the gaps in particular as regards water quantity and efficiency.	Environmental Objectives 3.2. Water	consideration and integration into the environmental report

1st category: Responses - original citation	Chapter	Comments/ Consideration in SEA-report
Chapter 3.1 (Soil) is quite fragmentary, there is a lot more relevant problems and regulations (Loi Grenelle en France, Raumordnungsgesetz in Germany, Landesentwicklungsplan in Baden-Württemberg)	Environmental Objectives 3.1. Soil	consideration and integration into the environmental report
it is not clear why possible negative impacts are defined at all if there will be no physical impacts	7. Assessment of Likely Significant Environmental Effects	explanation provided in the background and assessment table of chapter 7 as well as in chapter 6 (methodology)
Page 59 - protected areas: in the moment more than 25% of the surface of the Alps according to the Alpine Convention ciconference have a protection status, sometimes only very low like "protected landscapes". ALPARC can provide actualised cartographic material and statistics about this topic.	Environmental Characteristics 4.4. Fauna, Vegetation, Biodiversity	will be considered and integrated into the environmental report
p. 59 the "Severe problems" by the so called new sports (f.e. free climbing has very traditional roots in alpinism) seems to be very overrated. Usually the main problem is the irritation or coexistence with other "users" of the same space (f.e. hunters). The study by Bätzing 2003 has quite subjective conclusions	Environmental Characteristics 4.4. Fauna, Vegetation, Biodiversity	will be elaborated and reconsidered through consideration of additional sources of literature
In general, this document ignores all environmental issues related to natural risks. Many topics remain important to assess in relation with some priorities (ICT development : e.g. information sharing, liveable alpine space : territorial, integrated approach of risk) ...	overall report	relevant for OP, consideration of natural hazards in chapter 3 and 4 as well as during the assessment where relevant
the main challenge for the next decade are new challenges and risks for human health, animal health and plant health as invasive alien species and emerging	7. Assessment of Likely Significant Environmental	topics are already addressed but will be elaborated further

1st category: Responses - original citation	Chapter	Comments/ Consideration in SEA-report
diseases . that is not addressed at all.	Effects	
Elle est un peu légère par rapport à ce que représente le volet envirronnement et développement durable dans le futur programme.	very general remark	very general remark
Over all the strategic environmental assessment is well elaborated, but I don`t understand in the figure in the non-technical summary why priority 6d.1 Enhance the protection, the preservation and the connectivity of Alpine Space ecosystems (i.a. risk management) leads to medium negative impacts.	12. Non-technical Summary	explanation is given in the assessment table in chapter 7
3.5. Landscape; a question on landscape maintenance in relation to socio-demographic change in rural (declining) areas (missed among resume/main objectives)	Environmental Objectives 3.5. Landscape	will be considered and integrated into the environmental report
on page 15 the part concerning the Soil of the Italy is not done well. 1. Does not talk about 'inter-table for sustainable spatial development of the Area Po-Alps-Maritime' and then Agenda of Bologna (27 January 2012) [The table at the time of committing the regions of Liguria, Piedmont, Valle d'Aosta, Lombardy, Friuli Venezia Giulia, Veneto, Emilia-Romagna and the Autonomous Provinces of Trento and Bolzano]. 2. Does not talk about the proposed law on the promotion of agricultural areas and containment of land consumption, the n. 948/2013 and the n.70/2013. 3. talk also about a little Region as Friuli Venezia Giulia (Why?)	Environmental Objectives 3.1. Soil	will be considered and integrated into the environmental report

1st category: Responses - original citation	Chapter	Comments/ Consideration in SEA-report
The SEA is providing general assessment - well prepared overview of general framework. Erosion is addressed (important!) Reduction of CO2 emissions - development of renewable resources - i.e. hydropower could be potentially extremely harmful. See page 105, 141, water - No significant to slightly negative impact? Under consideration of proper location, only slight to medium negative impacts to be expected; ??? Conditional? page 120 - High negative impacts on water can happen due to technical measures of natural hazard prevention, like the technical construction of river beds or dams. - Why is the technical construction of river beds or dams set as a measure in the 6d.1?	7. Assessment of Likely Significant Environmental Effects assessment of hydro power and description of mitigation measures	explanation is given in the assessment table and background description in chapter 7
While for instance, on might accept all soil targets easily, the mentioning of the 6th EAP 2002- 2012 at least should gradually be adapted by the on-going 7th EAP throughout the whole texts.	3. Environmental Objectives	will be considered and integrated into the environmental report
Generally speaking, and while several texts on each country are available e.g. SOER 2010 , SoE Report of the Austrian FEA, several chapters come across as revealing fairly arbitrary explanations of recent policy developments.	3. Environmental Objectives	SOER Report will be considered and integrated into the environmental report

1st category: Responses - original citation	Chapter	Comments/ Consideration in SEA-report
The text as it stands is both unacceptable and misleading. Along the lines of SOER 2010 one should in any case reformulate the para and could perhaps say something like: Unlike the majority of the 28 EU countries, Austria has a federal system of government. The Republic is made up of nine federal states (Bundesländer). The division of legislative and executive powers between federation and states is set out in the federal constitution. Since 1985, comprehensive protection of the environment has been an important state objective and has constitutional status in Austria. The protection of soils in Austria is a cross-cutting task of various regional and federal laws mainly tied up to the risks associated with. Chemicals and contaminated land are in federal powers, agricultural soils or nature protection is in the power of regions as well as spatial planning. The complex and multi-disciplinary issue may be best studied in qualified literature e.g. Roland NORER.	3. Environmental Objectives	will be considered and integrated into the environmental report
While soil sealing is mentioned briefly, it´s strategic and ultimately prohibitive significance on any major soil functions at all, again seems to be partly forgotten versus the erosion issue which undoubtedly is important. Note that the same 2 soil priorities seem to be comparatively more balanced on p.78.	4. Environmental Characteristics	will be considered and integrated into the environmental report
It is somehow unclear to us, why the creation of second generation biogas which generally is still in the research or infant stage, is seen as a “human related stress factor” in the Alpine region. Perhaps the increased use of usual biomass is meant (?).	Environmental Characteristics 4.4. Fauna, Vegetation, Biodiversity	will be considered and integrated into the environmental report
The statement that no further increase of sealing is expected is welcomed but slightly	7.2.2.2 Assessment of the	will be considered and integrated

1st category: Responses - original citation	Chapter	Comments/ Consideration in SEA-report
amazing.	Objective	into the environmental report
Take account of the amendment of the Law for Climate Protection (2013) which defines maximum greenhouse-gas-emissions on sectoral level.	3. Environmental Objectives 3.3. Climate, Air	will be considered and integrated into the environmental report
The first aspect of the evaluation *"…..if in the past, a similar priority did not cause any significant impacts, then the same can also expected for the current programme"* is not comprehensible. This statement is too general and presumptive, not based on facts or experiences and therefore not provable.	6.1. Method of the Assessment	reconsideration and more precise explanation

1st category: Responses - original citation	Chapter	Comments/ Consideration in SEA-report
Regarding the protection of human health and wellbeing from environmental noise we provide the following comments and suggestions: In the topic »Public health, population« we suggest highlighting the importance of public complaints and preservation of quiet areas in nature (restorative function). • In Chapter 3.6 in the resume on page 29 we suggest adding an indent – »Protection of quiet areas in the natural environment (restorative / recovery function)« . • On page 45 the old decree from 1995 is quoted. It is necessary to cite the new decree »Decree on the Assessment and Management of Environmental Noise, 2004«. • In the introductory part of Section 4.6 we suggest exposing restorative function of quiet areas in nature. We believe this is an important feature that differs from recreation, although both can partly overlap. The statement »Air Quality and the stimulating climate are favourable for the treatment of numerous diseases« should be changed to – »Air quality, quiet areas in nature and stimulating climate ...« • In section 6.1, in Table 2 we suggest adding the indicator in the topic »Public health, population« – »Registration of public complaints against noise«. The indicator »Impact on recreational capacity / attractiveness for recreation« should be changed to - »Impact on recreational and restoration capacities / attractiveness for recreation and restoration«.	3.6. Human Health, Population 3.8. References Environmental Characteristics 4.6. Human Health/ Population 6.1. Method of the Assessment	will be considered and integrated into the environmental report

1st category: Responses - original citation	Chapter	Comments/ Consideration in SEA-report
in § 4.4 - "*Fauna, Vegetation, Biodiversity*", it is reported that in the area there are several Natura 2000 sites (of which only is provided the numerical data on the number of sites present), while it is absent any reference to the Incidence Assessment . This is in contrast with the Italian law that requires integration between the procedures of Incidence Assessment and Strategic Environmental Assessment. In the preliminary phase was requested as follows: "*an appropriate assessment on the basis of directive 92/42/CEE for this areas have to be carried out, it is possible conduct an integrated procedure with the SEA*".	Environmental Characteristics 4.4. Fauna, Vegetation, Biodiversity	will be considered and integrated into the environmental report
In our opinion, the document "non-technical summary" produced, appears to be an extended index of the chapters of the Environmental Report, while it should be a stand-alone document and should contain the essential elements of the assessment in summary form, clear and understandable to a non-technical audience.	12. Non-technical Summary	reconsideration and more precise explanation/ concrete statements
It would be appropriate, finally, explicit the indications and recommendations to be considered in the implementation of the Programme that can be drawn from the results of the SEA, for example, with reference to the Chapter 10 contents, it is stated that ""*Special attention should be paid to the cultivation methods applied for biomass production as well as the negative consequences resulting from hydro power*".	10. Mitigation and compensatory Measures	reconsideration and more precise explanation/ concrete statements
amendments to chapter 3 - update French law /regulations for several environmental issues	3. Environmental Objectives	will be considered and integrated into the environmental report
soil contamination (problem sites) should be addressed in context with danger of health	4. Environmental Characteristics	will be considered and integrated into the environmental report

1st category: Responses - original citation	Chapter	Comments/ Consideration in SEA-report
update of data sources for Region Rhone Alpes for several environmental issues	4. Environmental Characteristics	will be considered and integrated into the environmental report
water scarcity	4. Environmental Characteristics	explanation is given in chapter 4 (water)
address the thematic of neophytes (invasive species)	5. Development of the Alpine Space without the Programme	explanation is given in chapter 4 - will be integrated into the chapter 5
assessment of objective 4e.2: significant impacts expected (building of new infrastructure cannot be completely excluded)	7. Assessment of Likely Significant Environmental Effects	not relevant with regard to the background of the objective
assessment of objective 6c.1: negative impacts of valorisation addressed	7. Assessment of Likely Significant Environmental Effects	not relevant with regard to the background of the objective