WILDERNESS AREA ÖTZTALER ALPS

The Significance and Diversity of its Landscape and Ecosystems

A general assessment and ecological analysis

Innsbruck, February 2012

Univ.- Doz. Mag. Dr. Armin Landmann
Karl Kapfererstr.3, A-6020 Innsbruck, Austria

Summary

Background, context, aims

The Tiroler Wasserkraftwerke AG (Tyrolean Hydro-Electric Power Company) plans to divert water from the Southern Ötztal Alps and utilize it to generate hydro-electric power. These plans are likely to have a major impact on the environment as they involve essential modifications in the regional discharge regime and other interventions (construction works, infrastructure) in the natural surroundings that would change the landscape of the whole area.
This project, if realized, would affect large areas of a hitherto untouched region of the High Alps, an area which is not only unique but which is also for the most part under protection. The impact on the extensive wilderness area north of the main chain of the Central Alps would be lasting, negative and unavoidable.

However, the assessment and analysis of the impact of such plans and projects on the focus area of this study is not the subject off this study.

This summary and analysis rather has the following objectives:

- It aims to inform about the present scientific level of knowledge about the general nature, specific ecosystems and organisms of the mountain region of the Southern Ötztal Alps.

- It aims to assess scientific findings and put them into a larger context (e.g. features that are worthy of protection and need to be protected on a regional and international level).

- It aims to illustrate the ecological dimension of projects in this area and to point out the fundamental ecological problems involved in realizing projects such as the one mentioned above.

The Focus Area of This Study

The focus area of this study encompasses the greater part of the Southern Ötztal Alps within the Austrian borders. We are looking at a mountainous area of approximately 661 km² in size with a west-to-east extension of roughly 43 km and a north-to-south expansion of 22 km.

Findings

I have tried to characterize the focus area in terms of the following seven aspects and to evaluate the results in a larger context.

1. The Characteristics of the General Area, Landscape Settings and the Dimension and Degree of Human Impact

The focus area of this study is the largest connected glaciated area of the Eastern Alps. The Ötztal Alps are unique within Austria and the Eastern Alps in regard to the shape, size and dimension of land forms and formations that are typical for the High Alps.
The degree and dimension of human impact is one way of assessing how close to nature a specific area is as well as its remoteness. Based on the data at our disposal, the Ötztal Alps can be regarded as one of the most remote and undisturbed areas in Austria, if not in the whole of the Alps.

2. Geomorphological Natural Resources

- **The moraines** of the Ötztal Alps provide invaluable information on climate and climate changes in the past and present. The moraines in the small high alpine valleys of the Western Ötztal Alps are especially noteworthy in this context. Probably no other area of the Eastern Alps can boast such a large number of well preserved moraines of different types, for example the moraines of the Platzer Valley, which have recently undergone a thorough scientific investigation.
- The **rock glaciers** of the Ötztal Alps also bear witness to past climates (paleoclimates). The somewhat lower altitudes of the Southern Ötztal Alps, in particular, show an exceptionally high diversity of rock glaciers and other permafrost features.
- **Mineral Sites:** Ötztal garnets are unique. They are found in the Biosphere Reserve “Gurgler Kamm”. They are one of the inanimate natural resources of the Ötztal Alps and an example of the value of such resources not only for science but also for local history, economy and tourism.

3. Glaciology

The Ötztal Alps is the most glacierized area of the entire Eastern Alps and it also has the largest number of single glaciers. The Ötztal Alps are of the utmost importance not only for Austrian glaciology, they are also significant for the entire Eastern Alps, a claim that can be

substantiated: Over 15% of the large glaciers in the Eastern Alps and 20% of the Austrian glaciers are found in the Ötztal Alps. They encompass more than one third of the entire glacier surface of the Eastern Alps in Austria! The overall glacier surface and the abundance of different glacier types in the small area of the Southern Ötztal Alps is almost as large as all other glacierized areas in the Tyrol put together.

4. Hydrology – Streams

Water is one of the most valuable natural resources of the Ötztal Alps.

- The focus area of this study encompasses 21 alpine streams, each with a catchment area of >10 km² and an overall flow length of approximately 154 km. In addition to this, there are at least 80 tributary streams with a further overall length of approximately 120 km.
- This means that the area as a whole has more, and more varied freshwater ecosystems than most other areas in the Eastern High Alps.
- The streams in the focus area of this study are of immense ecological value, mainly because they have not been modified or tampered with. Almost all streams and rivers are in excellent ecological condition, the hydromorphological conditions are almost completely natural, and they have a free, unspoilt flow with natural discharge dynamics.
- The two large glacier rivers “Venterache” and “Gurgler Ache” with their main tributaries - the glacier streams of the Rotmoos-Valley, the Königs-Valley, the Ferwall-Valley, the Vergnat-Valley and the Niedertalbach-Valley - are in excellent ecological condition and especially deserving of protection. These two mountain rivers can be regarded ecologically as high quality sites and should therefore be classified as “sites of national importance”.
- The latest analyses of the WWF confirm the fact that the glacier and mountain spring streams of the Southern Ötztal Alps are of major importance within the Tyrol.
- The high altitude braided river systems in the level areas of the typical U-shaped valleys are a unique feature of the Ötztal Alps. These systems provide the setting for a surprisingly high number of strongly adapted freshwater specialists that are in many cases restricted to such high altitude environments.
- The high alpine glacier fed streams of the Ötztal Alps are of great importance and interest to scientists studying the effects of climate change on the sensitive communities of alpine organisms.
- Anthropogenous interventions in the freshwater systems of this area, such as the diversion of water or flooding, must be classified as irresponsible.

5. Ecosystems, Habitats, Flora and Fauna

Ecosystems, habitats and plant communities worth protecting

- A recent survey of the local vegetation communities revealed that more than 71 % of the Natura 2000 Network Area Ötztal Alps, an area of approximately 406 km², belong to one or another type of protected habitat on a regional, national or international scale (= Annex 1 of the EU Fauna Flora & Habitat Directive).
- The results of this survey emphasize the fact that the focus area of this study is worthy of protection on an international level.
- According to the Natura 2000 data form pertaining to the Ötztal Alps area, more than a third (24 of 65) of all habitat types occurring in Austria as listed in Annex 1 of the EU Fauna Flora & Habitats Directive can be found, at least on a small scale, in the Ötztal Alps, and this in spite of the high altitude of the area.
- In this connection, the significance of priority habitats needs to be emphasized. The pioneer formations of Caricion bicoloris-atrofuscae are such a priority habitat, as they occur in the North Tyrol only in the focus area of this study. These communities colonize the gravely edges of rivulets and glacial streams, and are found in the Ötztal area mainly in the Biosphere Reserve “Gurgler Kamm” valleys, an area that is targeted for the diversion of water for the purpose of generating hydro-electric power.
- A wide variety of other habitats sensitive to changes in the hydrologic balance are to be found in the area, such as transition mires and other bogs, communities with eutrophic tall herbs and endangered communities of scrub-willows.

The Ötztal Alps as a refuge for endemic organisms of Austria and the Alps

- According to our data, 167 plant, fungus and animal species or subspecies (taxa), whose range lies entirely (endemics) or predominantly (subendemics) within the political borders of Austria, have been recorded as occurring within the five larger protected mountain areas of the Tyrol. 72 (or 42%) of them occur in, or exclusively in the Southern Ötztal Alps. This is especially significant if one takes into account that, in Austria, endemic taxa (species) occur predominantly in the North-Eastern Calcerous Alps, the Eastern Central Alps, and especially in the Southern Alps and/or Lower Austria, Styria and Carinthia.
- The significance of the Ötztal Alps as a protected area for species and subspecies that are either unique to the area or typical for the Alps becomes clear if one compares the Ötztal Alps with the Stubai Alps, the Zillertal Alps and the Karwendel. With the exception of the Hohe Tauern mountain range, which is more favourably located from a biogeographical

point of view, the Ötztal Alps must be regarded as the most important mountain area of the Tirol based on the information at our disposal at the present time.

- The Ötztal Alps are an absolute hotspot for certain endemic groups (e.g. spiders, algae). They are, however, an additional (!) refuge for many other endemic species of the Alps or Eastern Alps, species that occur, for example, predominantly in Switzerland or in the South-West Alps and have spread into Austria where the areas they populate are for the most part or exclusively in the Ötztal Alps.
- The Tyrol has a great responsibility nation-wide and on an international level to protect species that are typical for or unique to the Alps, and within Austria the Ötztal Alps are significant as one of, and partly the most important area for such species.

The Diversity of Endangered or Protected Organisms

The exceptional value of the focus area of this study for the protection of a unique alpine environment according to regional, national and international criteria becomes obvious, if one takes into account the large number of species that not only occur in the area but are also listed in the Red Data Books and/or are protected by regional conservation regulations or international directives (e.g. the EU Council FFH and Bird Conservation Directive).
A brief summary:

- A large percentage of all freshwater algae in the Southern Ötztal Alps are listed in the Austrian and/or German Red Data Books.
- At least 1171 taxa of vascular plants have been verified as occurring in the focus area of this study. This means that approximately 50% of the entire flora occurs on only 6.2% of the area of North Tyrol.
- 524 taxa known to occur in the Ötztal Alps are featured in one of the Red List Threat Categories of North Tyrol, East Tyrol or Vorarlberg. In other words, more than one third (36%) of all species (taxa) known to be endangered in the Tyrol or Vorarlberg occur on the 661 km² predominantly high alpine focus area of this study (i.e. on 4.4% of the total area of the Tyrol and Vorarlberg).
- Almost one third (248 = 31.3%) of all regionally endangered species (taxa verified as being endangered in North Tyrol) occur in the focus area of this study, i.e. on 6.2% of the total area of North Tyrol.
- 77 (31%) of the 367 critically endangered taxa in North Tyrol, are known to occur in the Southern Ötztal Alps. These species are in great need of protection. Most of them are typical species of the alpine to subnival zones that are, however, restricted to a very small area. This means that, from a local point of view, the focus area of this study is of paramount importance for the survival of these species.

- The Species Conservation Regulations for the Tyrol list 89 different species of ferns, clubmosses and flowering plants that can be categorized as under full or partial protection. At least 119 taxa of protected plants occur in the focus area of this study.
- One example of this: The Ötztal Alps are a regional diversity hotspot for **willows** (genus S*alix*). 21 of the 29 North Tyrolean *Salix* species can be found in this area. Two thirds of them, including all endangered species, are confined to habitats bordering on streams and wetlands.
- At least 6 vascular plant species, 16 moss and lichen species, 13 bird species and 15 other animal species that are listed in the annexes of the FFH Directive and the EU Bird Conservation Directive and are also under the full protection of the conservation laws of the Tyrol occur in this area.

<u>The Importance of the Öztal Alps for animals from the Viewpoint of Population Ecology</u>

- The Ötztal Alps are also a conservation hotspot, a refuge and gene reservoir for a number of widespread but at the same time highly representative alpine verterbrates. The Ötztal Alps are therefore of international importance in regard to population ecology. Examples of this are the Alpine Rock Ptarmigan or the Snowfinch. More than 10% of the entire Austrian breeding population of these species occur in this area (1% of the national alpine area) – that is approximately 5 % of the breeding population within the German speaking area of the Alps.
- The Ötztal Alps are home to probably the largest stock of native (autochtonous) Alpine Marmots and are important as a refuge for a genetically diverse alpine population of this well-known and popular species.
- As a result of climate change we may be facing a dramatic loss of high mountain biotopes in the coming decades. This means that the Ötztal Alps will become increasingly important as a refuge for various species.
- In times to come, Austria and the Tyrol will bear a tremendous amount of responsibility for the preservation and protection of high mountain species not only on a national but also on an international level.

6. Dimension, Categories and Significance of Protected Conservation Reserves

- The mostly pristine landscape of the Ötztal Alps is covered by a dense network of international and regional conservation reserves that are most likely without equal within the Eastern Alps in regard to density and number. An area of approximately 480 km² of the 661 km² large focus area of this study is classified as a conservation reserve.

- The Biosphere Reserve “Gurgler Kamm” is special and to a certain extent unique. The UNESCO designates biosphere reserves within the framework of the programme “Man and Biosphere”. These reserves aim to protect precious nature embedded in cultural landscapes. The “Gurgler Kamm” (15 km²) is one of only three biosphere reserves in the entire Central Alps and the only large reserve of this type in the Eastern Alps. As such it is not only of enormous significance for the environment but also for science.
- It is obvious that diverting water from the valleys of the Gurgler Kamm for generating hydroelectric power cannot be considered as consistent with the idea behind the concept of biosphere reserves.

7. Research, Cultivation, Culture

- For a long time now the Ötztal Alps have been a focal point for alpine research and research on the Alps as a whole. Far more than 1700 scientific publications relating to the focus area of this study have been released in the last decades. This fact alone “speaks volumes”.
- Current research is focused on international issues that are becoming increasingly important, such as the retreat of glaciers, the development of global climate and the global patterns of diversity relating to the latter.
- For this reason the focus area of this study should not be regarded on a purely Austrian level, as a uniquely important and traditional area focused on the scientific study of ecosystems, climate and alpine research. The area is also, without doubt, indispensable as centre of research on global issues.
- The southern Ötztal Alps are also important in regard to the history and culture of the Tyrol: economic history (e.g. mining), agricultural history (e.g. ancient grazing forms and rights), archaeology (e.g. scientific analysis of “Ötzi the Iceman”) and the history of farming and husbandry.
- From the point of view of tourism, the southern Ötztal Alps have a lot to offer. Nature in this area is still unimpaired and its beauty and diversity can be enjoyed throughout the year. It also has, as mentioned above, a wealth of history and culture.

This study illustrates the exceptional value of this unique and as yet unimpaired high mountain area. It should be evident that areas such as this need to be protected on a large scale because only the extensive protection and conservation of such areas will ensure that mankind will be able to use and enjoy them not only in the near future but also in the long term.