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The UNESCO World Heritage Swiss Alps Jungfrau-Aletsch – protecting the cultural landscape by preserving the traditional irrigation system in the Upper Valais

Jessica Oehler

Keywords: World Natural Heritage, Swiss Alps Jungfrau-Aletsch, Upper Valais, traditional irrigation system, cultural landscape, cultural heritage preservation

Abstract

The Great Aletsch Glacier and world-famous peaks of Eiger, Mönch and Jungfrau make up the core of the UNESCO World Heritage Swiss Alps Jungfrau-Aletsch (SAJA), which was designated as a UNESCO World Heritage site in 2001, the first Alpine World Heritage designation. The natural and cultural landscape is very diverse due to its climatic differences and high altitudinal gradients. One extraordinary cultural element of the landscape in the UNESCO World Heritage SAJA is the traditional irrigation system. It mainly provides irrigation for meadows and vineyards, creating small-scale and species-rich habitats for animals and plants. As a result of agricultural structural change and workload, the traditional irrigation techniques are endangered and are being replaced by sprinkler systems or, in some cases, abandoned completely. The project *Preservation of Traditional Irrigation in the Upper Valais* served to detect areas still traditionally irrigated and to discuss challenges, solutions and perspectives with local actors and experts to develop a concrete action plan. Possible solution approaches proposed are: a) financial compensation; b) platform and volunteering; c) institutionalization; d) education and training; e) awareness raising; f) Expert Commission Irrigation Landscape Upper Valais Sun Mountains.

Profile

Protected area

UNESCO World Heritage Swiss Alps Jungfrau-Aletsch

Mountain range

Alps

Country

Switzerland

Introduction

The UNESCO World Heritage Swiss Alps Jungfrau-Aletsch (SAJA) is one of the most spectacular mountain landscapes in the Alps (see Figure 1 & 2).

A total area of 824 km², the UNESCO World Heritage SAJA covers almost all of the Bernese Alps in the territory of the cantons of Bern and Valais (Figure 4). About 90% of the World Heritage area is covered by rocks and ice, and the area hosts the largest contiguous glaciated area in the Alps.

The mosaic of natural habitats combined with adjacent cultural landscapes is responsible for the rich biodiversity. 60% of all animal, fungal and plant species that occur in Switzerland are found in the region, made up of 7,200 species. Compared to the entire country, this is above average and of inestimable value.

The fascinating combination of natural and cultural landscapes has contributed significantly to the designation as UNESCO World Heritage Site in 2001. SAJA thereby fulfils three out of four possible criteria for World Natural Heritage sites (see Table 1).

This article describes the contribution of the SAJA management centre to the preservation and restoration of an important cultural-history element of the cultural landscape, the traditional irrigation system, and the project *Preservation of the Traditional Irrigation in the Upper Valais*. The explanation of the traditional irrigation system is based on *Einblicke-Ausblicke*, a regular

Figure 1 – Oeschinensee. © R. Schmid

Figure 2 – The Grand Aletsch glacier. © R. Schmid

Table 1 – UNESCO criteria.

Criteria	Description
VII	The extraordinary scenic and aesthetic appeal of the region, which has frequently been attested to throughout cultural history.
VIII	The importance of the high-mountain region and its glaciation as a source of geological data and a witness to climate change.
IX	The importance of the region as a dynamic (due to glacier fluctuations) alpine and sub-alpine habitat rich in diversity.

publication to inform the population about the development of the World Heritage Region.

Traditional irrigation – a cultural heritage with a future?

One extraordinary cultural landscape element in the UNESCO World Heritage SAJA is the traditional irrigation system, which was created over hundreds of years in the Valais and can be traced back at least to the 13th century (UNESCO-Welterbe SAJA 2020).

The Valais is one of the driest regions of Switzerland because of the rain shadow effect (see Figure 3). In order to ensure water supply through generations, an irrigation system based on the water channels – variously called *Suonen*, *les bisses*, *Wasserleiten*, etc. – was developed (Figure 5). Water is transported via these channels from higher to lower altitudes, primarily for the irrigation of meadows, vineyards and orchards. The water is generally diverted from streams fed by springs, snowfields and glaciers. As a result, the channels can supply water from spring to autumn – in times when precipitation is low, evaporation is high, and the natural water supply for agriculture is insufficient (Bär & Liechti 2020).

As Leibundgut & Kohn (2014) described, traditional irrigation is a complex land and resource management system. In the past, and to some extent still today, the water associations (*Geteilschaften*) have regulated the maintenance of a water channel. A member (*Geteilè*), who owns a piece of land that can be irrigated by a water channel, has the right to take water, but also the obligation to contribute to the maintenance of the water channel (UNESCO-Welterbe SAJA 2020).

According to the cantonal inventory of 2018, there are more than 180 water channels, of about 740 km length in total. Of these, about 130 km are located in the World Heritage Region (Kanton Wallis 2018).

Multiple significance of traditional irrigation

The main function of traditional irrigation is the irrigation of agricultural areas (UNESCO-Welterbe SAJA 2020). In addition to its agricultural significance, traditional irrigation also has many other functions (Rodewald 2010; Liechti 2015). It has influenced the ecosystem and produced a structurally rich cultural landscape of high biodiversity (Leibundgut & Vonderstrass 2013; Melliger et al. 2014). The minerals in the glacier water act as natural fertilizer and supply soils and plants with valuable nutrients (UNESCO-Welterbe SAJA 2020). The slope irrigated landscape of the Valais and the hiking trails following the course of the water channels are an attractive hiking and landscape experience for visitors. Water channels are also slope stabilizing and serve as fire and flood prevention by regulating and draining surface water. The spectacular constructions, the collective management and the traditional irrigation techniques are also valuable expressions of cultural history (Figure 5 & 6). In this way they play a significant role for regional identity and are a valuable cultural heritage (Bär & Liechti 2020).

The project *Preservation of the Traditional Irrigation in the Upper Valais*

This project investigated the complex water management system to find out more about challenges and solutions. The project was supported by *Bundesamt für Umwelt, Fonds Landschaft Schweiz* and *Stiftung Landschaftsschutz Schweiz*. Together with local residents

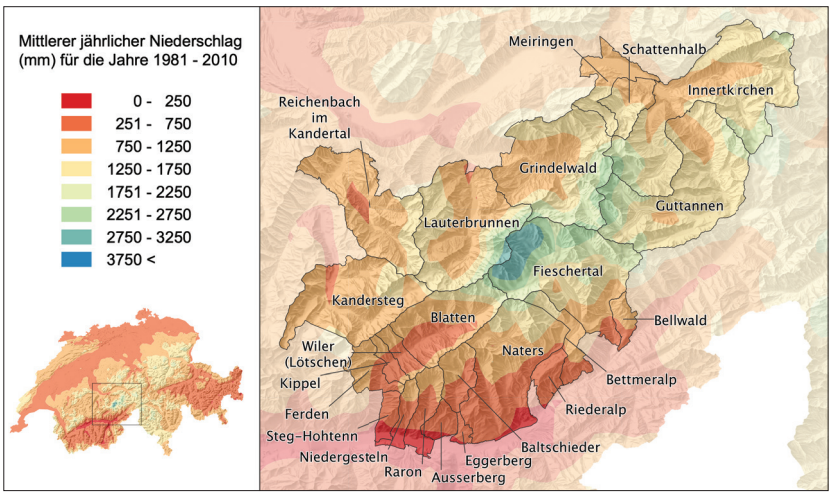

Figure 3 – Annual mean precipitation (Bär R.; data from: Meteo Schweiz, Normwert-Karte für den Niederschlag 1981–2010).

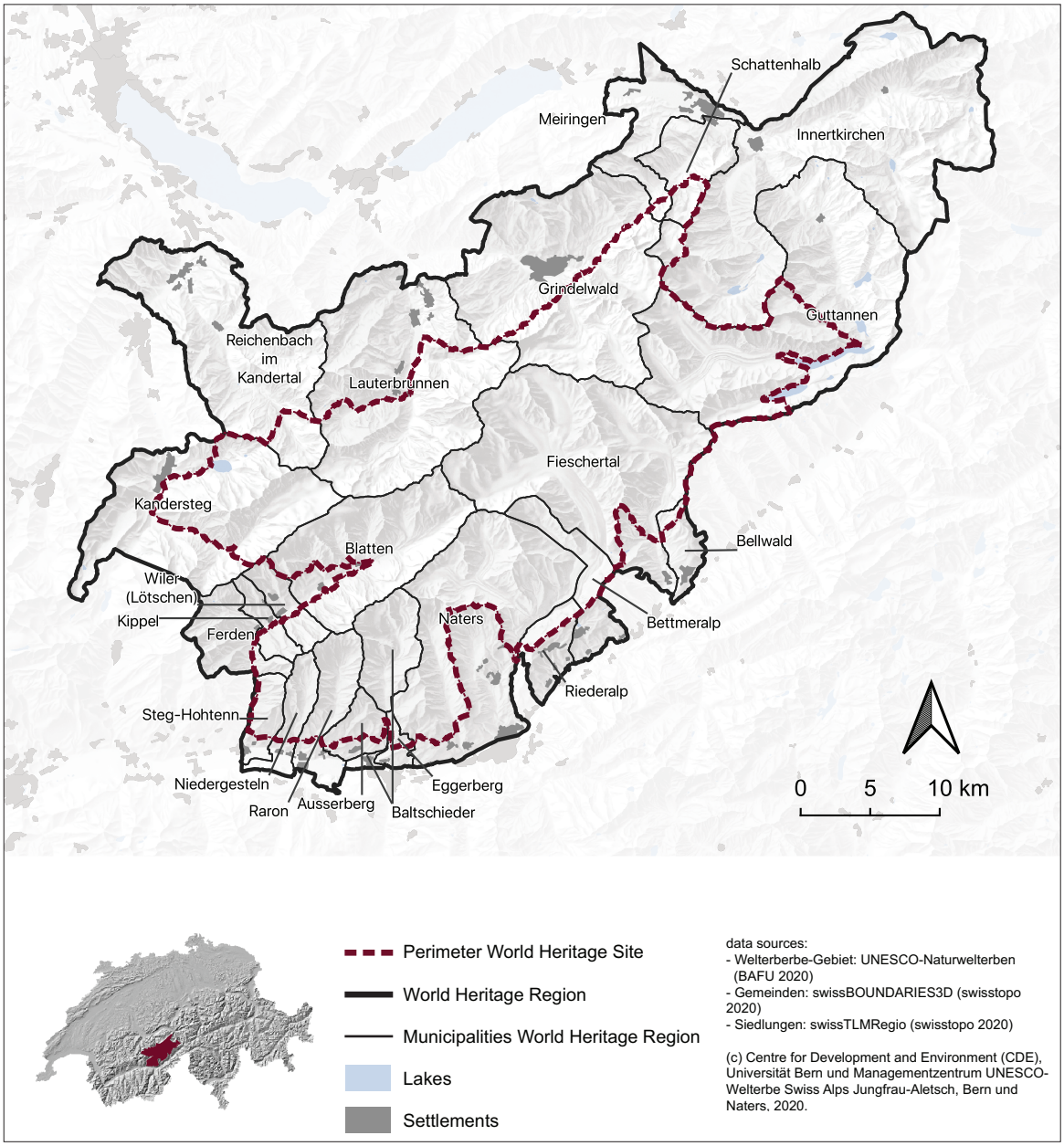

Figure 4 – The UNESCO World Heritage Swiss Alps Jungfrau-Aletsch (SAJA).

(especially farmers), cantonal authorities and the University of Bern, an inventory of traditional irrigated areas in Naters was created and a concrete action plan for the preservation of the traditional irrigation developed.

Challenges and perspectives

The following section showcases the challenges identified in the workshops and interviews with farmers and experts.

The centuries-long practice of collective water use can serve as a model for the sustainable use of a scarce resource. However, its future is now uncertain (Bär & Liechti 2020). The water associations are breaking up. The biggest challenge is the amount of time needed to keep up traditional irrigation: The farmer has to be present the whole time to distribute the water, which is difficult for part-time farmers (UNESCO-Welterbe SAJA 2020). In addition, many members don't participate in the joint maintenance day, preferring instead to pay a certain amount. The young lose interest in agriculture, so some farms give up and the water associations lose members.

This combination of agricultural structural change, workload and less awareness means that the traditional irrigation techniques are endangered and are being replaced by sprinkler systems, or in some cases, abandoned completely (Bär & Liechti 2020).

Moreover, climate change influences water availability. The consequences are difficult to estimate (UNESCO-Welterbe SAJA 2020).

It is expected that these dynamics will continue in the future, particularly with climate change, the expected drier summers and the altered availability of

Figure 5 – Suone Wyssa. © R. Schmid

Figure 6 – Traditional irrigation. © K. Liechti

glacier water. This results in a conflict of goals: the technical simplifications, especially the operation of sprinkler systems, make water use and work more efficient. At the same time, a valuable form of cooperation, a traditional craft and knowledge system and landscape qualities are lost – and with them a part of the cultural heritage and regional identity (Bär & Liechti 2020).

Solutions to the challenges of traditional irrigation

In the project a concrete action plan with possible solutions was developed. One option to support farmers who irrigate their land traditionally could be to compensate them better for the more elaborate work financially and to conclude a contract. In addition, a financial incentive could be offered to the people who help on the joint maintenance day. Within the prevention of natural hazards, some of the maintenance could be taken on by forest districts. Other possibilities include work assignments with volunteers and school classes to support the water associations. The discussions also pointed to the importance of raising the awareness of the population for the cultural value of the water channels and the traditional irrigation as well as of education and training for its preservation (UNESCO-Welterbe SAJA 2020).

Several measures were taken to support the preservation of the traditional irrigation in Naters. A contract should be made with the farmers to ensure sustainable and targeted maintenance of the areas. In cooperation with the municipality and the interested communities, SAJA is setting up an agency platform to serve as an overview page and planning tool. It provides information and manpower for the annual maintenance of the water channels. SAJA also supports the communities of the water channels with the annual maintenance projects through groups of volunteers. In addition, an in-depth study on irrigation in Naters with specific planning of measures to deal with the problems identified in the present study is planned in a next step (UNESCO-Welterbe SAJA 2020).

Also, the international appreciation of the cultural heritage is important to support traditional irrigation systems. The program Traditional Irrigation as Cultural Heritage of Europe should preserve traditional irrigation for the future. Traditional irrigation systems should receive the status of immaterial cultural heritage of the UNESCO. Different actors are involved to demonstrate how shared water use can be used for future sustainable joint property management (Bär & Liechti 2020).

Conclusion

The traditional irrigation channels are an important cultural-historical element in the landscape of the Upper Valais and have high priority in the canton of Valais and especially in Naters. This important role of this system comes from its various uses and its significance for ecology, economy and society. The project Preservation of the Traditional Irrigation in the Upper Valais was initiated to contribute to the preservation of the cultural landscape. It identified various challenges and discussed possible solutions with local actors to develop a concrete action plan.

Preservation of the water channels and traditional irrigation is a holistic task and depends on the commitment of numerous contributors. Only when everyone participates, will it be able to preserve this World

Infobox

824 km² World Heritage area
1,629 km² World Heritage region
23 communities: 15 in the Upper Valais and
8 in the Bernese Oberland
9 peaks above 4,000 m a.s.l.
Finsteraarhorn the highest at 4,273 m
About 50 peaks are above 3,500 m
About 350 km² are glaciated areas
With a length of 20 km, the Great Aletsch glacier is the biggest and longest glacier of the Alps
88% are unproductive and vegetation-free areas

Cultural Heritage in the Upper Valais in the long term (UNESCO SAJA 2020).

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Author

Jessica Oehler

is a geographer (MSc) for the Foundation UNESCO World Heritage Swiss Alps Jungfrau-Aletsch. Her work there focuses on environmental education, preservation and restoration of its outstanding universal value as well as on territorial monitoring and development.