eco.mont – Volume 9, special issue, January 2017
ISSN 2073-106X print version – ISSN 2073-1558 online version: http://epub.oeaw.ac.at/eco.mont
https://dx.doi.org/10.1553/eco.mont-9-sis35

The opportunity costs of *worthless land*: The nexus between national parks and glacier ski resorts in the Alps

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Keywords: national parks, glacier ski resorts, Alps, opportunity costs, worthless land hypothesis

Abstract

This paper discusses the development of national parks and glacier ski resort in high mountain landscapes of the Alps formerly regarded as wild, and therefore worthless, lands. Surprisingly, both land uses are often located in direct neighbourhood, indicating that they share the same spatial requirements. While national parks aim at the preservation of unspoiled landscapes free from human influences, glacier ski resorts represent a high-tech type of tourism to extend the skiing season (summer skiing). As these land-use options appear mutually exclusive, sometimes sharp conflicts resulted from their spatial collision and raised questions about their pros and cons. Against this background this paper investigates why, where and when such land-use conflicts occurred in the Alps, how they were handled and how the situation looks today. Using the two case studies of the Hohe Tauern (Austria) and the Vanoise (France), both of which experienced highly controversial and emotional debates at a time, we trace the different solutions pursued, including the total ban on infrastructure development in favour of conservation as well as the partial violation of national parks by glacier ski resorts. However, such conflicts did not arise in every glacier ski resort and have receded since the 1980s anyway as a result of a fall in demand for summer skiing and the closure of several resorts.

Profile

Protected area

Hohe Tauern and Vanoise NP

Mountain range

Alps

Country

Austria and France

Introduction

In the high mountain landscapes of the Alps there could hardly be a harsher contrast than that between the wildernesses of national parks (NPs) and the high-tech landscape of a glacier ski resort (GSR). While NPs seek to preserve natural dynamics from human influences, GSRs adapt to the impact of climate change and tourism trends by strong man-made interventions. Given this stark contrast it is surprising that some GSRs are even situated in the core zones of Alpine NPs (Table 1). This fact and the observation that these mutually exclusive land-use options are often located in immediate neighbourhood (see Figure 2) indicate that GSRs and NPs share the same spatial requirements, which has occasionally led to major land-use conflicts in the past. However compared with other land-use conflicts in the Alps, the controversies resulting from the parallel development of NPs and GSRs have been less well documented and reflected. This is especially interesting as a number of cases gained great public attention (e.g. the *Affaire Vanoise* in France 1969–1971, Carlier 1972). However, as much knowledge about these conflicts seems to have been lost today, investigation into their present state and the ways in which conflicts may have been solved seems even more valuable (Wich et al. 2013). The conflicts between Alpine NPs and GSRs are also a culmination point in the long-standing debates whether and how high mountain areas should be opened up for tourism, what impacts tourism has on the landscape, to what extent tourism depends on unspoiled landscape, but also how tourism could contribute to landscape conservation (Krippendorf 1975; Mayer et al. 2011; Siegrist et al. 2015).

Not surprisingly a vast amount of literature is available on protected areas (PAs) in the Alps, especially on NPs and the challenges they face (Hammer et al. 2016; Job et al. 2003). In contrast, scientific literature on the development of GSRs appears fairly limited (see Mayer 2012 for a recent overview), while GSRs were at the core of popular criticism from the 1970s onwards. However, hardly any literature seems to focus on the often interlinked development of GSRs and NPs and the resulting conflicts, with the notable exception of Laslaz (2009).

Against this background, it is the purpose of this article to analyse why, where and when such land-use conflicts did occur, whether they have been resolved in the meantime and, if so, how. We first present theoretical considerations that provide a consistent framing for our investigation. Secondly, we describe the methods used. Thirdly, we provide an overview of the development of conflicts resulting from the collision of GSRs and NPs in the Alps. Fourthly, we look at two case studies in more detail, Hohe Tauern NP, Austria and Vanoise NP, France. Both cases are prominent examples of the conflicts we are addressing and represent the Eastern as well as the Western Alps with their differing tourism development paths. We close by discussing the findings and drawing general conclusions.

Theoretical background

Several concepts contribute to a consistent framing of our subject. Coming from different disciplinary backgrounds, they support better understanding of the processes and determinants: a) the worthless land hypothesis, b) changing human valuations of glaciers leading to varying opportunity costs, and c) competing concepts for regional economic development.

Ad a) First, Runte's (1973) worthless lands hypothesis offers orientation. According to Runte high-alpine landscapes can be regarded as worthless land and therefore have become the subject of conservation to a higher degree than other elevation zones. This is because traditionally there was no economic interest in these areas. Runte's argument is based on the American experience: *"National parks protected only such areas as were considered valueless for profitable lumbering, mining, grazing or agriculture"* (Runte 1973, 5). Similar observations could be made about the Alps. As much of the alpine cultural landscape is owed to traditional forms of land use (farming, forestry), hardly any interest in the use of higher elevation land due to its limited accessibility, natural hazards and rough climatic conditions (Bätzing 2015a). The validity of the worthless land hypothesis for Alpine PAs is proven by the clear overrepresentation of high-alpine zones if one compares the altitudes of NPs with the Alps as a whole (see Figure 1). These worthless lands were identified as an ideal target for the implementation of PAs such as NPs. Thus the first Alpine NP, founded in 1914 in the Swiss Alps, represented the *wilderness* of Alpine landscapes (Kupper 2012).

Ad b) In agrarian societies people thought of glaciers as wastelands. They avoided them and feared their surges, which often led to floods or threatened farm land. This perception changed following the birth of alpinism (Bätzing 2015a). Cabins, huts and hiking trails were constructed. The period of Belle Époque mountain tourism showed for the first time that high-alpine areas have at least some economic value. However, it was only during the post-WW2 boom of Alpine tourism that plans for the development of GSRs came up. Targeting much of the same areas of hitherto worthless land, their development meant a striking change in attitudes towards the *wild* landscapes of the Alps. The concept of opportunity costs explains this change in human valuation, referring to the forgone income of alternative land-use options (Dixon & Sherman

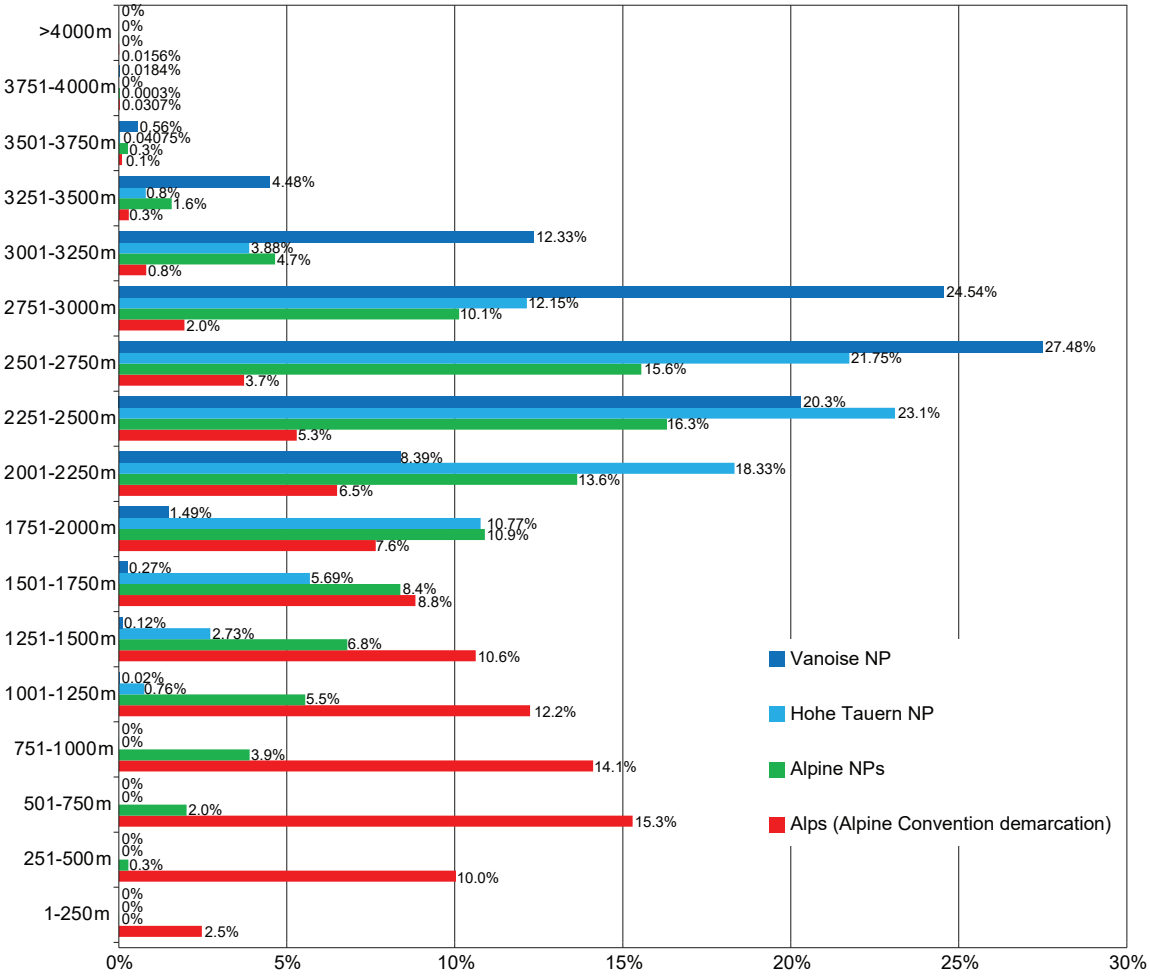

Figure 1 – Share of altitudinal zones of the Alps as a whole (Alpine convention demarcation) compared with all Alpine NPs, Hohe Tauern NP and Vanoise NP. Source: Authors' own ArcGIS analysis based on ASTER 2011 and shapefiles provided by Alpine NPs

1991; Job & Mayer 2012; Mayer & Job 2014). Whereas high-alpine land would previously not have offered economic benefits from traditional forms of land use, trends in tourism and technological progress suddenly opened up GSRs as a profitable land-use option. High expectations were often raised regarding the economic benefits for local communities, particularly in peripheral areas that lacked other development opportunities (e.g. Glatz & Scheer 1981). The conservation movements' equal interest in these areas fuelled the quickly emerging land-use conflicts. These conflicts would not have seen the light if it was not for the sudden boom of a highly profitable land-use option. However, these new opportunity costs were always twofold, as large infrastructure development reduces the landscape quality and impairs habitats of rare species and nature-based outdoor recreation.

Ad c): In the aftermath of the first GSR negative effects for the environment, landscape integrity but also social issues and doubts about the promised economic benefits became apparent (Haimayer 1989). Scepticism was supported by alternative regional development concepts of endogenous development (e.g. Hahne 1984; Glatz & Scheer 1981; Mose 1993). According to these, development of peripheral rural areas should rather prevent from large-scale infrastructure driven from outside and instead be based on the areas own (endogenous) potentials. These were seen particularly in the regions' physical but also socio-cultural assets that should become the basis for environmental friendly ways of development (e.g. the promotion of hiking or ski touring). However, in many cases decisions were taken in favour of GSR. As local / regional project developers could seldom finance the high capital investments necessary for a competitive GSR, thus, exogenous influence on tourism and regional development constituted a completely opposed development path similar to the growth pole concept (Perroux 1955). The proponents of those regional key projects expected the GSR to generate jobs, push tourism and stimulate regional development. Glaciers are of course also endogenous resources. The difference of the two development paths, thus, stems from the geographical source of capital and from the role of large-scale infrastructure required.

Research methods

Our research is largely based on an extensive literature review and document analysis. For the two case studies in particular a wide range of additional material was used, such as current and historic maps, plans, newspaper articles, exhibition documentaries, etc., some of which were neither easy to access nor had they been scientifically analysed before. The authors do know a great number of Alpine NPs and GSRs from personal visits. The NP regions of the case studies, Hohe Tauern and Vanoise, are representative within the Alps for the research issue because one is situated in the Eastern and the other in the Western Alps with the highest number of GSR (projects), making them prominent examples of the conflicts we are addressing. Furthermore, Hohe Tauern and Vanoise illustrate the outcome of different tourism development paths (decentralized, driven by private investment in Austria vs. centralized, state-driven in France, see Bätzing 2015a). The regions of the case studies have been the subject of continuous empirical research of either author over long periods of time, with the emphasis either on conservation (Mose 2007; Mose & Weixlbaumer 2012), tourism development (Mose 1988; Mayer et al. 2011; Mayer 2012) or both (Wich et al. 2013). Mainly qualitative interviews taken during the respective visits as well as site observations of NPs and GSRs provided additional data.

Results

Overview

Following the exceptional growth of winter tourism based on alpine skiing after 1960, new ideas developed quickly regarding the possible use of glaciers for ski tourism. Following successful examples from Italy (Cervinia, Passo Stelvio) a quick diffusion started. Between 1960 and 1985, the number of GSRs increased from five to 42. Since then the number of GSRs as such did not go down, except for small resorts with difficult access, but the share of resorts offering summer skiing has gone down continually (Figure 2) (Mayer 2012).

At the same time the number of Alpine NPs increased significantly with 10 out of 13 parks designated after 1960 (Job et al. 2003).

Given the unique physical environment of high-alpine landscapes and their ecological value, plans for both GSRs and new NPs became the subject of increasing dispute, mutually enforcing the urgency for either type of project in a kind of race for the remaining suitable areas from the early 1970s onwards. Not surprisingly, considerable conflicts emerged and raised questions about the pros and cons of either development option. These engaged and sometimes highly emotional debates led to different spatial outcomes: a) (still existing) GSRs, which were built despite all opposition, sometimes also in violation of NP core zones, b) (still existing) GSRs which only constitute (smaller) parts of much larger projects prevented by the opposition from either locals or environmental pressure groups / PA projects, c) GSRs which were developed but are closed / renaturalized today and d) never realized projects of varying degrees of development (planning and / or implementation), which make it difficult to assess their prospects today. Especially the outcome types b) and c) constitute sometimes awkward compromises with GSRs directly adjacent to NP core zones or even overlapping considerably. Thus, to illustrate the real effects of Alpine NPs, a fair number of prevented and downsized projects would need to be added to Figure 2.

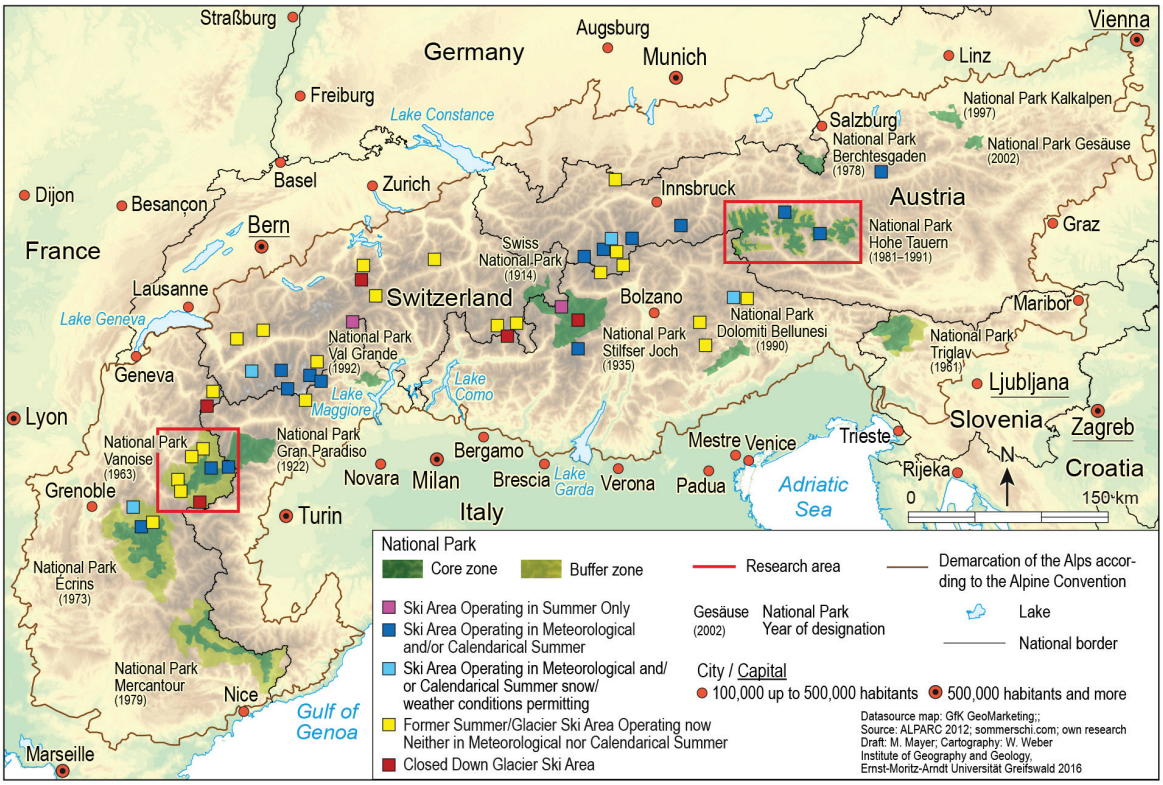

Figure 2 – National parks and glacier ski resorts in the Alps 2015. Source: authors' own design

Figure 2 shows the spatial conflation of NPs and GSRs in the Alps. Five of the 13 NPs contain large glaciers. 19 of the GSR (projects) are spatially related to Alpine NP (Table 1), mostly located in or adjacent to what is now Hohe Tauern (9), Vanoise (4), Stelvio (2), Écrins (2) and Berchtesgaden NP as well as Triglav NP. Two GSRs are closed now (Chavière, Casati), eight were never built (Venediger North and South, Großglockner South, Schareck North, Hochalmspitze, Stallersattel / Almerkees, Watzmannkar, Triglav), six are still offering summer skiing (Passo Stelvio, Les Deux Alpes, Grande Motte, Pisaillas, Kitzsteinhorn, Mölltal), two are operating in the winter season only (La Grave, Péclet / Thorens), while one is operating, but never expanded onto glaciers (Weißsee). However, most current summer ski resorts have been reduced in size and operation due to a complex nexus of supply (shrinking glaciers, worsening snow conditions in summer, higher operating costs, snow-making replacing summer skiing as a marketing tool) and demand factors (declining demand, negative image etc.) (see Mayer 2012; Falk 2016).

The following two cases illustrate different ways of how land-use conflicts between GSRs and NPs emerged, how they were handled and how the situation looks at present.

Selected case studies

Hohe Tauern, Austria

Major parts of the central Austrian Alps are covered by Hohe Tauern NP, with a size of 1856 km² the largest NP in Central Europe (Bauch & Lainer 2014, Figure 3). Its realization was marked by complex and long-lasting conflicts, including controversies about several GSRs (Table 1). In 1992, however, the park project was completed and has come to be regarded as an exemplary piece of Alpine area protection (Kupper et al. 2014; Haßlacher 1999).

Although officially implemented in three steps, with each of the years 1981, 1984 and 1992 marking a territorial extension into the federal provinces of Carinthia, Salzburg and Tyrol, the NP project dates much further back. With growing visitor numbers, first controversies about the future development of the area did arise, the case of the Großglockner, the highest summit of Austria, providing an impressive illustration. Even in the early 19th century plans were put forward for a technical development of the area. However, at the same time people became also aware of the possible threats to the landscape caused by the rise of tourism. As a result conservation groups, including the Austrian Alpine Club, owner of about 4000 ha of high-alpine land including the Großglockner, argued for protection of the area. Similarly the German Verein Naturschutzpark, owner of land in the Lower and Upper Sulzbach Valley in the Oberpinzgau region, expressed protest in the same way (Mose & Weixlbaumer 2012).

From the early 20th century onwards, the Hohe Tauern region experienced an accumulation of further controversies about development versus protection. While in 1935 the land owned by the Austrian Alpine Club was officially declared a nature reserve

Table 1 – Overview of conflicts between Alpine NPs and GSRs.

NP	GSR/project	Development and current state of conflict
Stelvio NP (IT)	Passo Stelvio	- Still operating, the only feasible GSR open solely in summer - Plans to connect it with the village of Trafoi and to make year-round operation possible not realized so far because of the NP
	Refugio Casati/ Cevedale	- Small resort with only two ski lifts, situated directly in the NP near a big Alpine Club hut; access only by foot - operation abandoned, some remnants in the glacier (T-bar pylons)
Écrins NP (F)	Les Deux Alpes/Glacier de Mont-de-Lans	- During the planning phase of the NP both glaciers were excluded from the core zone to avoid conflicts and political resistance against the park project - Glacier de Mont-de-Lans was developed in the year when the park was finally designated (1973); today: one of the most highly frequented summer ski resorts - Just two ski lifts were erected on Glacier de la Girose in not until 1989; summer skiing only in 1991, then abandoned (crevasses); one ski lift out of service due to rock fall
	La Grave/Glacier de la Girose	
Vanoise NP (F)	Ia Resort Val Chavière; Ib Glacier de Chavière/de Thorens (Val Thorens)	- Huge resort project (3000 beds, 18 lifts) from 1969 and 1971 was abandoned following the *Affaire Vanoise* - Compromise: development of Upper Chavière Glacier inside the core zone in 1975 with two ski lifts, summer skiing until 1990, lifts removed in 2002 - Further development plans from 1988 (five additional lifts) not realized - Today: shrinking glaciers complicate/impair ski operation in the buffer zone of the NP (part of Trois Vallées)
	II Glacier de Péclet (Val Thorens)	- Small, steep GSR equipped in 1973 with two chairlifts and three ski lifts directly bordering the core zone of the NP. - Much more frequented than the bigger Glacier de Chavière due to direct access from the destination via cable car - Summer skiing stopped in 1999 (due to shrinking glacier) - Today: only one chairlift operating on the remains of the glacier (Trois Vallées)
	III Glacier de la Grande Motte (Tignes)	- Second GSR still located partly inside a core zone; remainder situated in a nature reserve (NR) - As compensation for violation of the core zone, Grande Sassière NR was designated in 1973 in an area not suitable for tourism development - Modernization measures in the 1990s in part based on environmental arguments: replacement of several dozens of cable car pylons (inside the core zone) with an underground cable car, project Dôme de Pramecou abandoned - Today: still one of the bigger summer ski resorts, but reduced in extent, quality and visitor numbers as a result of climate change impacts and declining demand; modernization complicated by its location in the core zone/NR (newer lifts routed out to avoid the core zone)
	IV Glacier de Pisaillas (Val d´Isère)	- Ski lifts constructed in the same year as the NP designation (1963) and directly adjacent to the core zone; situated in Iseran NR - Today: after a long decline (of glacier and operation, number of lifts), modernization post-2000 (possible after downgrading of the NR): snowmaking and new lifts, now reduced summer skiing June to mid-July - Possible connection to Bonneval-sur-Arc (underground cable-car) cutting through the core zone regularly debated since the 1980s but vetoed by the NP so far
Berchtesgaden NP (G)	Watzmannkar	- Important push for the NP plans were ideas in 1968 to build a Watzmann cable car. Parallel plans to develop a ski resort in the Watzmannkar (one of the few German glaciers). However, no real glacier/summer skiing was planned - Today: extremely shrinking glacier, Watzmannkar part of the NP since 1978 and frequently visited by ski tourers
Triglav NP (SI)	Triglav Glacier	- Concrete ski resort project in the mid-1960s with 3–4 cable-cars, three chairlifts and one ski lift on the then existing Triglav Glacier - For reasons not uncovered yet the project never materialized - Today: NP since 1981, glacier mostly disappeared, Triglav highly frequented by ski tourers and especially by hikers
Hohe Tauern NP (AT)	1 Kitzsteinhorn/ Schmiedinger Kees (Kaprun)	- First Austrian GSR in 1965/1966. No influence of the NP in the early decades - Later: Plans to extent the GSR south to Hocheiser (3206 m) and its glaciers were prevented by the NP (no detailed plans available) - Today directly adjacent to the NP and collaborating in environmental edutainment (National Park Gallery at 3029 m); Summer skiing until end of July
	2 Weißsee Gletscherwelt/Stubacher Sonnblick (Stubachtal)	- Originally developed by Austrian Federal Railways for hydropower generation - 1982 construction of two cable cars, but third section up to Stubacher Sonnblick (3088 m) and its glacier never built (Salzburg part of NP designated in 1984). - Today: small-scale ski resort; small extension into the non-glaciated area in 2010/2011 after long debates
	3 Stallersattel/Almerkees (Defereggental)	- Small-scale ski resort (at maximum three ski lifts) in East Tyrol/Defereggental. - Extension plans from 1974 and 1976 included the development of Almerkees Glacier with two ski lifts - Extension plans were not realized, the original resort closed in 2003
	4 Schareck/Wurtenkees (southbound project), Mölltal Glacier (Flattach)	- Wurtenkees Glacier (set aside from the NP) was developed in 1987, based on earlier hydropower installations. In the first ten years only summer ski operation possible because of accessibility problems, limited success - Resort only succeeded after 1997 when underground cable car provided year-round access; still offers summer skiing despite drastic ice shrinkage – the resort was among the first to install snowmaking facilities along and on a decaying glacier - GSR and NP cooperate in tourism marketing, further extension plans of the resort (like a valley run) are at odds with PA and nature protection laws

Hohe Tauern NP (AT)	5 Schareck/Wurtenkees (northbound project), Hoher Sonnblick/Goldberggletscher, Kleinfleißkees (Sportgastein)	- In the early 1970s extremely large ski resort projects covered the heads of the valleys in Gasteiner Tal, Rauriser Tal, Mölltal and Großfleißtal. Core project: GSR on Wurtenkees (see no. 4) linked to Hoher Sonnblick and its glaciers, mainly accessed from the ex-nihilo resort Sportgastein (this part of the project collapsed due to internal reasons and already built cable car pylons were removed in 1986) and Kolm-Saigurn (Raurisertal). Part of the NP in Carinthia since 1981 and in Salzburg since 1984. - Later projects included an underground cable car from Sportgastein through the core zone of the NP to Mölltal GSR, but the government of Salzburg dismissed the plans several times between 2003 and 2010 - Today: Sportgastein as a small ski resort, no other project realized
	6 Großvenediger Northern Slopes (Neukirchen a. Gr.vd.)	- Ski resort project in regional development plan 1962 for the Upper Pinzgau - Summer ski resort planned in 1965 on Obersulzbach and Krimmler Kees. Access by helicopters - Regional development plan created in 1973, later these projects were abandoned and, according to the *Treaty of Heiligenblut*, a planning area for the future NP was envisaged; NP finally designated in 1984 for the Salzburg part
	7 Großvenediger Southern/Eastern Slopes (Virgental)	- Several large-scale GSR projects up to 3400 m. Plans from 1965, 1972 and 1976 include several high-alpine roads and/or underground cable cars; intended as supplement for parallel hydropower projects and the NP plans - Austrian Alpine Club advocated the concept of *gentle tourism* as part of alternative development strategies to avoid these projects - None of the projects were realized - Today: Since 1991 part of the Tyrolean part of the NP
	8 Großglockner Southern Slope (Kals a. Gr.gl.)	- Ski resort extension of Kals to the south face of the Großglockner (Ködnitzkees Glacier) - High-alpine road project connecting the existing Großglockner High Alpine Road and Kals via the Bergertörl, 2630 m (26 km length) - Neither GSR nor road realized - Today: Since 1991 part of the Tyrolean and since 1981 part of the Carinthian NP
	9 Hochalmspitze/Hochalmkees (Maltatal)	- GSR project (year-round operation) driven by the landowner in the mid-1970s: three sections of cable cars from 1200 to 3350 m, several ski lifts on Hochalmkees Glacier. Realization prevented by lack of financial backing - Since 1981 part of the Carinthian NP, mostly core zone. - In 1988 the Austrian Alpine Club purchased the whole area by auction for ATS 1.12 million to prevent future development plans

Note: Arabic numerals refer to the examples in Figure 3, Latin numerals refer to examples in Figure 4
Source: Authors' research; Berger 1968; Haßlacher & Cipra Österreich 2014; Jury & Rüscher 2014; Laslaz 2004, 2009; Loibl 2006; Maher 1991; SETAM & STOR 2009; Wich et al. 2013.

(NR), major infrastructure projects were launched at the same time, such as the Großglockner High Alpine Road (opened in 1935), a scenic road across the Hohe Tauern. New development ideas were put forward since the 1960s, including plans for no fewer than nine GSRs (Table 1). However, only two of the planned resorts were realized in the end: Kitzsteinhorn (1965) and Mölltal Glacier (1987) (Figure 3). This outcome was due to the so-called *Treaty of Heiligenblut*, agreed between the provincial governors of Carinthia, Salzburg and Tyrol in 1970 on the joint target of designating Hohe Tauern NP as a means to protect the highly valuable alpine ecosystems. Following this agreement the opportunities for large-scale infrastructure projects shrank. As a result, no further projects could be realized (Haßlacher & CIPRA Österreich 2014).

Another reason for the rejection of the GSR plans on the southern slope of the Tauern could be the poor accessibility from the northern peri-Alpine agglomerations which constitute important demand areas for GSRs in general. Mose pointed out this aspect as early as 1982. Even the Felbertauern tunnel, opened in 1967, did not completely change this disadvantage.

However, the implementation of a NP instead of GSRs might not have succeeded without the specific conceptual frame applied. Taking into account interests of about 1100 directly affected land owners, mainly farmers, and ca. 58000 people living in the wider NP area, protection and development were being pursued simultaneously. On the one hand, a zoning system was established to separate areas of largely unspoilt nature (core zone) from areas devoted to traditional forms of mountain farming and environmentally adapted tourism (buffer zone). On the other hand, a regional policy was implemented to promote the area surrounding the NP: Funding has been provided for park communities on the basis of an agreement between the national and the provincial governments since 1982 (Haßlacher 1999). In recent years, additional European funding has been made available to support projects to increase the quality of the tourism profile of the area. As a result, acceptance of the NP among the local population and decision makers has risen considerably. However, the question whether the NP really creates considerable economic effects for the region or not remains a subject of controversial debate (Bachleitner & Weichbold 2004; Bodenhöfer et al. 2009; Getzner 2010).

Both GSRs in the Hohe Tauern still offer summer skiing despite the impact of climate change, but its economic importance is marginal nowadays. The focus has shifted to a very extended skiing season beginning early in autumn, while the summer season is dominated by non-skiing visitors. Although Hohe Tauern NP prevents access to the Mölltal GSR (via an underground cable car) from the north, both resorts today try to generate synergies with Hohe Tauern NP by promoting summer activities and offering edutainment (e.g. the National Park Gallery at 3029 m on the Kitzsteinhorn, GBK 2016). This suggests a pragmatic approach which does not cling to former ideological controversies but prioritizes success in tourism.

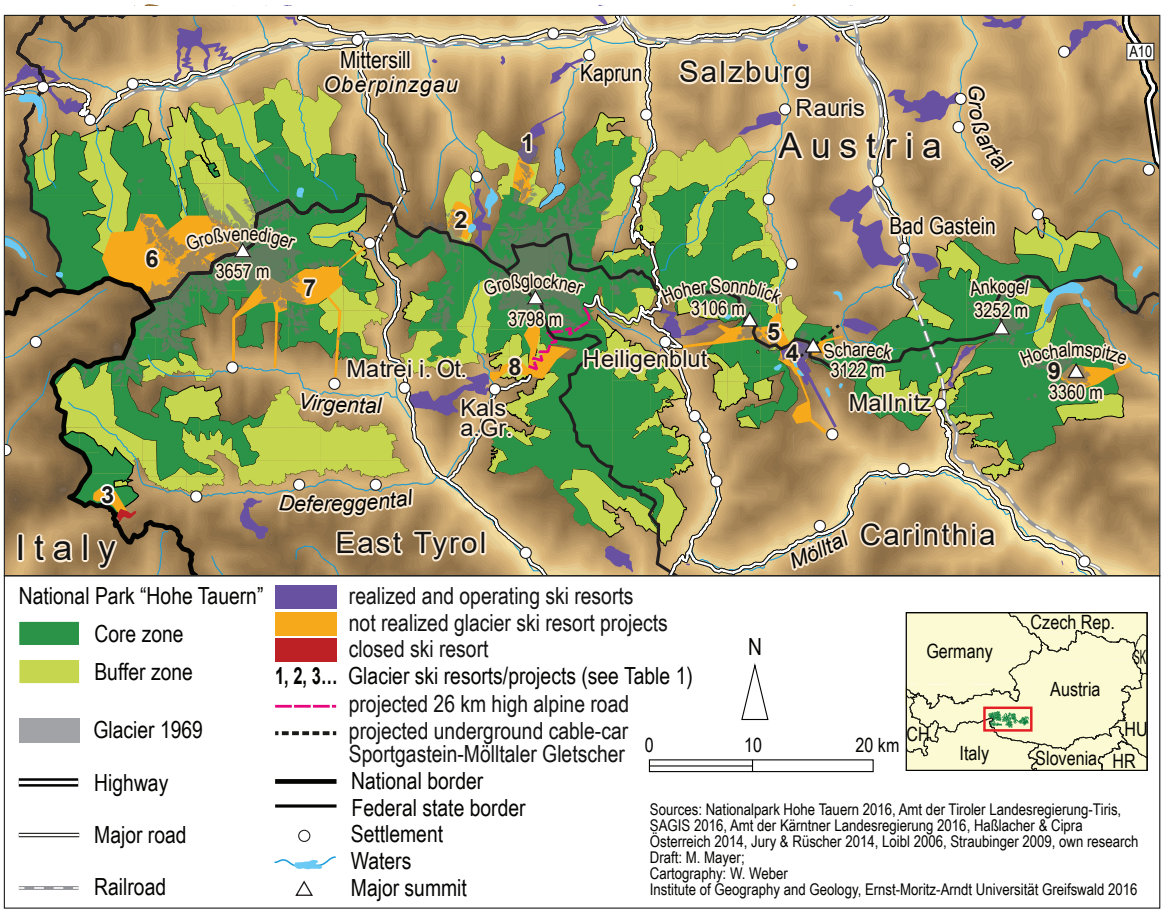

Figure 3 – Hohe Tauern NP with realized and prevented GSR projects. Note: As there were several projects for the same sites in different years, the map shows a highly generalized synthesis of the areas in question. For instance, project 7 (Venediger South) includes projects from 1969, 1974 and 1976. For some projects where no detailed plans are available (e.g. Hochalmkees) likely GSR boundaries were assumed. Source: Authors' design

Vanoise, France

Vanoise NP is the oldest French NP and was designated in 1963 to preserve the alpine fauna and flora while regional development was not a priority – to the disappointment of the local municipalities who had been won over for the park project with this argument (Mauz 2007). Vanoise NP has a core zone (530 km²) and a buffer zone (1 450 km²) with a less strict nature protection (Wich et al. 2013). In parallel with the NP designation, the government was also pushing large-scale ski tourism projects all over the French Alps (Plan neige, Knafou 1978). Even though the most suitable areas for winter skiing had already been excluded from the core zone (Cumin 2009), the emerging summer ski trend led to several severe conflicts between the NP and GSR projects (Table 1, Figure 4).

In the very year when Vanoise NP was designated, the Pisaillas GSR was equipped with ski lifts and therefore not included in the core zone but in Iseran NR: an inherent contradiction from today's perspective anyway.

The first major issue was the illegal construction of the Grande Motte GSR in 1967 situated partly in the core zone of Vanoise NP and in Tignes-Champagny NR (Figure 4, Table 1). This violation did not meet with strong resistance and was secretly accepted as a matter of fact. Park zoning was not adapted as this might have attracted unwanted attention. As compensation, Grande Sassière NR (with 2 230 ha much larger than the GSR) was established in 1973 in an area not suitable for ski tourism and so without generating opportunity costs. Local actors still regard this bargain as a fair and mutually helpful deal, especially as the GSR turned out to be highly frequented in the summer season until the 2000s (with 115 000–130 000 skiing days in the summer seasons of 1988 and 1989, ASADAC 1989, 29) (Laslaz 2004, 279 f., 2009; Wich et al. 2013).

These events make it understandable why the same promoter, Pierre Schnebelen, tried to replicate this coup de main against Vanoise NP by developing a gigantic ski area: the resorts of Val Thorens in the NP buffer zone (planned with ~50 000 beds) and Val Chavière in the NP core zone (3 000 beds), both connected by a vast GSR on the glaciers Chavière and Thorens offering year-round skiing on six glaciers in total. The price for the envisaged creation of 15 000 jobs would be the degratation of the Vanoise NP core zone by 18 cable cars and ski lifts on 1 792 to 2 500 ha. Influenced by local and regional pressures, the NP authority initially approved this project in 1969. How-

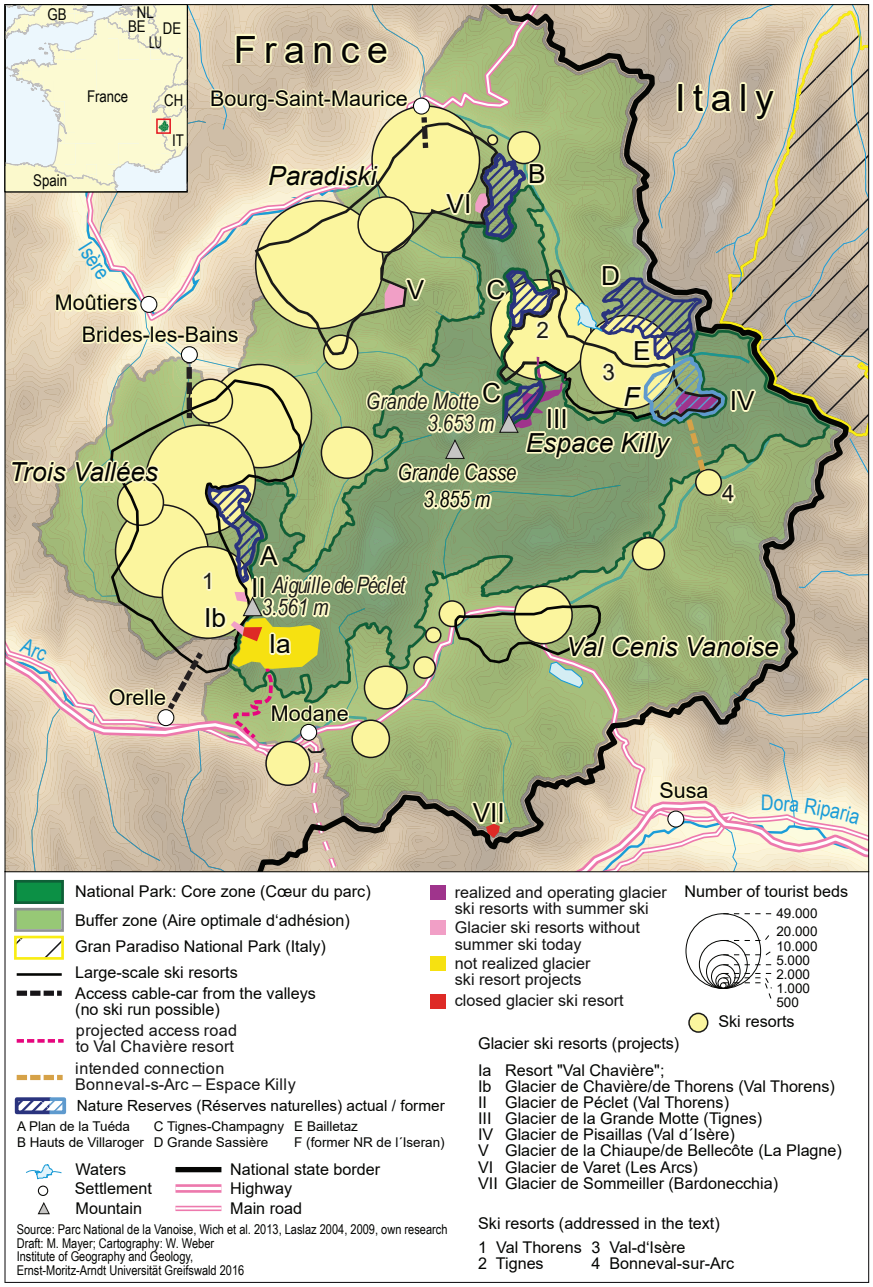

Figure 4 – Vanoise NP with realized and prevented glacier ski resort projects. Source: Authors' design

ever, this time strong resistance arose against this renewed attempt to violate the NP core zone, a broad alliance formed within French society (beginning with the scientific board of the park and ecologists), which is today regarded as a decisive moment for environmental consciousness and the ecological movement in France. This *Affaire Vanoise* even involved the prime minister and president Pompidou. The politicians decided against the resort project in 1971 but instead suggested approving at least *modest development* of the Upper Chavière Glacier as a compensation for the promoters. (Laslaz 2004, 312–335; Laslaz 2009; Carlier 1972). This was realized in 1975 with two summer skiing lifts situated in the core zone. This violation was tolerated as an adjustment of Vanoise NP zoning was deemed too complicated and would have quasi-legalized the development of the GSR. From a nature protection perspective, it was crucial that the integrity of Vanoise NP as a whole was defended from then on and, although still contested in the decades to come, has never been touched since then (Laslaz 2004, 2009). Compared to the days of the *Affaire Vanoise*, the park is today widely accepted among the local stakeholders (Wich et al. 2013).

The further development of summer skiing in Val Thorens proved the critics right: the Chavière Glacier was not at all a success because the slope is too flat, access complicated and uncomfortable and skiing conditions deteriorated. Exploitation stopped in 1990 and the remnants of the lifts were finally removed in 2002 (SETAM & STOR 2009). This did not happen without a final attempt at a larger-scale development

between 1984 and 1988 based on the compromise of 1971 (Laslaz 2009).

The unsatisfactory situation of the Pisaillas GSR in Iseran NR (1 491 ha) was resolved in 2000 when the NR designation was reversed. As compensation Baillettaz NR (495 ha) was designated which is free of ski lifts / runs and connects Grande Sassière NR with the Vanoise NP core zone and the neighbouring Gran Paradiso NP. For the ski resort operators this deal made the modernization of ski lifts and snowmaking installations feasible. The latter allowed summer skiing again from 2004 onwards. However, Vanoise NP still prevents the connection of the small ski resort of Bonneval to the large Espace Killy, which would cut through the smallest part of the core zone (Figure 4) (Laslaz 2004, 343–358; Wich et al. 2013).

Discussion and conclusion

What are the similarities and differences between the two cases? As shown above, both NPs prove the worthless land hypothesis in terms of altitudinal distribution. In addition, their zoning spared already developed and most proposed skiing areas. Nevertheless, both NPs prevented several GSRs and thus preserved vast high-alpine areas. The conflicts between the NPs and GSR (projects) largely diminished since the 1980s. This is mainly due to the downturn of summer skiing which greatly reduced the opportunity costs of nature protection in NPs. However, even though both NPs are well established now there are still plans to violate the core zones of both protected areas to connect GSRs to other destinations. This points to future research needs regarding the relations between Alpine NPs and conventional ski resorts.

A major difference is the longer history of Vanoise NP, which was established in exact parallel to the world's largest ski areas. In contrast, Hohe Tauern NP was only designated when nature protection and the resistance against further GSRs had already gained considerable weight. In Hohe Tauern NP regional development measures were also taken from its very beginning, while Vanoise NP focused mostly on strict nature protection. The *Affaire Vanoise* demonstrates that the development pressures on the NP were much more severe than those faced by the Hohe Tauern area, which shows a below average ski tourism development overall compared to the rest of Western Austria. Therefore it is not surprising that the core zone of Vanoise NP and its adjacent NR were violated by two GSRs while neither happened in Hohe Tauern NP. This direct vicinity of ski resorts with Vanoise NP has also meant high numbers of free riders skiing into the core zone, which is not the case in Hohe Tauern NP where few lifts border on the core zone.

Some general conclusions can be drawn: GSRs and NPs competing for high-alpine landscapes represent two different outcomes of a fundamental change of human perception and valuation of these areas. Traditionally glaciers were perceived as worthless lands. It was only in the service society that the technological feasibility and the demand for glacier skiing occurred in parallel. At the same time the rise of the environmentalist movement in the Alps fostered the conservation of high-alpine areas regarded as last resorts of wilderness. The glaciers became symbols of resistance against the total economic use of even the highest mountains. The most remote dangerous wilderness became endangered itself, symbolized as peaceful nature in contrast to the negatively connoted tourism *merry-go-round* of GSRs. It was only now that a specific protection of glaciers became necessary because GSRs promised high returns on the former worthless lands. However, this perspective is mostly urban, peri-Alpine and intellectual, while the locals originally were often in favour of GSRs, hoping for prosperity and progress.

The conflict between GSRs and NPs, however, neither occurred for every GSR nor for all NPs. Naturally it only emerges in glaciated mountain ranges suitable for skiing (EAV 1978). Therefore one explanation for the reduction of conflicts is the fact that the majority of suitable glaciers is already being used for skiing. As summer skiing has continuously declined since the 1980s (and professional skiers nowadays travel to the southern hemisphere for summer training in Chile or New Zealand) and the autumn / spring demand is sufficiently covered by existing destinations, there was / is no need for new GSRs in the Alps. Moreover, the carrying capacity of existing GSRs has risen because of innovations in ski lift technology. Nor, in times of area-wide snowmaking, is a glacier any longer relevant in terms of snow reliability. This is even truer as the effects of climate change on Alpine glaciers also affect the GSRs (Mayer 2012). Laslaz (2009, 213) may argue rightfully that the relations between protected areas and GSRs should not be reduced to conflicts. While the resorts use the NP label attracting the free rider clientele for their marketing, the NPs used to justify their existence and actions with the proximity of GSRs and their continuous threats to nature.

NPs are of course not the only way of keeping Alpine areas free from GSRs. Other types of protected areas, like the Austrian *Ruhegebiete* (refugia) where no ski tourism or road infrastructure is allowed, are similarly valuable (Haßlacher 2016). Moreover, spatial planning is an effective means of protection, particularly in the German Alps, where 43% of the area is covered by Zone C of the so-called Alpenplan (Job et al. 2014). In Switzerland large glacier areas also remain undeveloped without an NP or other large-scale protected area designation If planning authorities are backed by political will and do not issue permissions, then there is no need for protected areas to prevent developments.

Regarding the present debate for a more sustainable development of the Alps, new GSRs do not provide a reliable perspective for peripheral rural areas. It is only the combination of use and non-use, the iden-

tification and development of endogenous resources, as well as the orientation towards exogenous demands that offer a secure future for the Alps (Bätzing 2015b). In this perspective, NPs and GSRs may well co-exist for some time to come.

Acknowledgements

The authors would like to thank Winfried Weber for his invaluable cartography support, as well as Johannes Schamel and Felix Kraus for their GIS analyses. Additional thanks go to Peter Haßlacher and Matjaž Kristl for providing plenty of otherwise not available *grey literature*.

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