Towards the regeneration of mountain tourism territories. Insights from the Alta Valtellina region

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Abstract

Since the 1960s, tourism development in mountain areas has significantly influenced territorial structures. The legacy of this development model is exacerbated by global crises, including climate change and sociocultural challenges that make mountain tourism territories much more fragile. Within this framework, the multifaceted dimensions of the crisis claim for a broader regeneration of these contexts based on a territorial, integrated and multi-disciplinary approach.
Through the case of the Alta Valtellina region in the Lombard Alps, the paper provides a methodology to measure, spatialize and represent the multiple challenges occurring in mountain tourism territories as a necessary foundation to orient and shape the regeneration project in these contexts.

A partire dagli anni Sessanta, lo sviluppo turistico ha influenzato significativamente l'assetto territoriale delle regioni montane. L'eredità di questo modello di sviluppo è messa ulteriormente in discussione dalle crisi globali, tra cui i cambiamenti climatici e l'affermazione di nuovi paradigmi socioculturali, contribuendo ulteriormente alla fragilità costitutiva dei territori montani.
In questo quadro, le molteplici dimensioni ed effetti della crisi invocano una rigenerazione complessiva di questi contesti, basata su un approccio territoriale, integrato e multidisciplinare.
Attraverso il caso dell'Alta Valtellina, regione montana nelle Alpi lombarde, il contributo propone una metodologia per misurare, spazializzare e rappresentare i processi e le sfide che interessano i territori turistici montani, come presupposto analitico e interpretativo fondamentale per orientare e costruire il progetto di rigenerazione.

Keywords

Tourism, Mountain, Territorial regeneration, Alps.
Turismo, Montagna, Rigenerazione territoriale, Alpi.

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The multiple challenges of mountain tourism territories

In Europe, mountain tourism regions undergo a structural transition (Bourdeau, 2021). These territories are in tension between dominant industrial tourism-based economies and the effects of global crises regarding climate change and shifting sociocultural paradigms (Machiavelli, 2017; Steiger et al., 2019). First, mountain tourism territories result from the reproduction of extractive development models established in the postwar period (Perlik, 2019). Since tourism contributes to the construction of territory in its holistic meaning (Hatt, 2020), the legacy of these models is embedded in both physical structures and sociocultural assets (Pachoud et al., 2020).

Recognized for its impact on the mountain environment and landscape, tourism contributes to uncontrolled urban expansion regarding both tourist infrastructures (e.g. ski lifts, mountain resorts) and second homes that are often combined with the pauperization of built-up heritage with the loss of local constructive techniques in favor of out-of-context additions proper of exogenous building operations (De Rossi, 2016; Del Curto et al., 2016). In addition to these spatial transformations, a sociocultural change often occurs. While tourism contributes to local economic growth, enhancing demographic stability and the maintenance of the territory (Batzing, 1987; 2005), in some cases, it can trigger a process of deterritorialization (Raffestin, 1984). Zanzi (2018) describes this process as a "cultural migration" to explain the inhabitants' shift of cultural identity towards a model imposed by external forces. This cultural 'evolution' is often combined with a stereotypical image of these contexts, becoming places of consumption, *loisir*, and folklore (Bonesio, 2018). Nevertheless, this mountain touristification often reverses on local real estate markets with the jump in housing prices (Batzing, 2005). This process displaces permanent inhabitants to peripheral areas due to rising housing costs, exacerbated by short-term rentals (Celata and Romano, 2019).

These processes, which perpetuate old development models, are currently challenged by multiple global crises (Carrosio, 2019). The winter tourism industry in the mountains is particularly vulnerable to climate change (Steiger et al., 2019). The decrease in snow, the glacier retreat and water scarcity influence mountain tourist destinations, producing a reduction in demand, shorter winter seasons, the relocation of tourists in high altitude resorts and the increase in snow-making technologies (Butler, 2017). Besides, warmer weather encourages mountain summer tourism, forcing tourist destinations and mountain territories to manage this new demand (Haider et al., 2015).

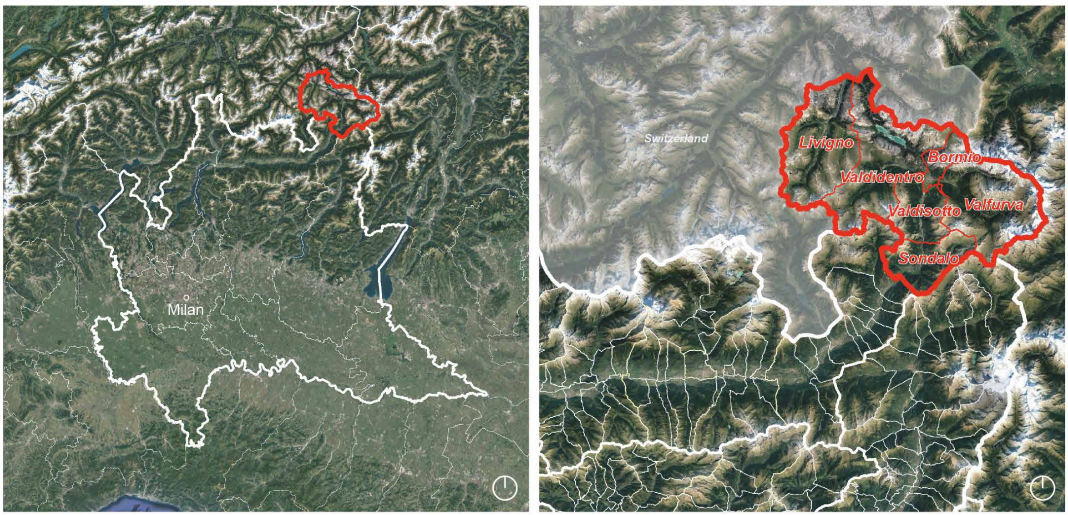


Fig. 1 - Alta Valtellina region localization (author's elaboration).

Beyond the climate, mountain tourism territories face a sociocultural evolution that rejects the consolidated tourism development models. The search for out-of-mainstream destinations, the awarness of environmental aspects, the appreciation of the historical identity, and the desire to be in contact with residents are the primary manifestations of this shifting paradigm (Corigliano et al., 2015; Machiavelli, 2009). In recent years, these trends have combined with the need to inhabit these territories instead of just being tourists also considering the last pandemic crisis (Di Gioia and Dematteis, 2020). Therefore, the current attention opens to different mountain territories less developed or known than touristic contexts and the spread of new development forms related to living, producing and visiting responsibly. The 'marginal mountain' arises as the subject of new living and tourism flows since it is plenty of potential and often unexpressed territorial resources capable of triggering new regeneration trajectories (Corrado, 2020; Dissart, 2012).

Multiple challenges affect mountain tourism regions encompassing the territory in its broader complexity: from the socio-economic and cultural spheres to their spatial manifestations, involving popular tourist destinations and the surrounding territories interested in new tourism and residential flows (Bourdeau, 2021). Despite the cross-cutting nature of tourism in the territory, the UNWTO points out the lack of integrated approaches capable to create win-win situation for the economic prosperity in a holistic way, building upon the potential cooperation with other sectors such as agriculture, health, culture, natural hazard prevention and biodiversity conservation (UNWTO, 2021). This integration will contribute to the resilience of mountain tourism, as for the other sectors in the face of global challenges. Hence, this complex framework advocates a broader regeneration action according to multi-dimensional, integrated and territorial approaches to cope with the multifaceted dynamics of these territories.

The paper proposes a methodology for interpreting the multiple challenges occurring in mountain tourism territories through the case study of the Alta Valtellina region in the Italian Alps.

The construction of interpretative frameworks, explained in the next section, represents a fundamental base to orient and build the territorial regeneration project.

INDICATORS		DEMOGRAPHY			SOCIETY-ECONOMY-LIVELIHOODS						SERVICES AND NETWORKS
		I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	I_10	I_11
		Population variation (%)	Ageing index	Population density	Number of schools for 1000 inhab. (n)	Beds in healthcare for 1000 inhab. (n)	Local units workers variation (%)	Income per capita (euro)	Ustilized agricultural surface variation (%)	Real estate market price (euro)	Number of trains stations (n)
		1991-2021	2021	2021	2021	2021	2011-2018	2019	1982-2010	2022	2021
		ISTAT	ISTAT	ISTAT	POLIS LOMBARDIA	POLIS LOMBARDIA	POLIS-LOMBARDIA	ISTAT	ISTAT	OMI (AGENZIA DELLE ENTRATE)	POLIS LOMBARDIA
TOURISM DEVELOPMENT	I_9 Tourism intensity (stays/inhab)*100 (2021, POLIS LOMBARDIA)	+	-		-		+	+		+	

INDICATORS		SERVICES AND NETWORKS				ENVIRONMENT				BUILT-UP HERITAGE AND SETTLEMENTS	
		I_12	I_13	I_14	I_15	I_16	I_17	I_18	I_19	I_20	I_21
		Number of TPL stations (n)	Digital broadband cover (%)	Distance from main urban centers (SNAI indicator)	Protected areas surface (%)	Percentage of areas at landslide areas (%)	Urbanized areas expansion on agricultural land (%)	Agricultural surface reforestation (%)	Cultural resources endownments (museum, libraries, cinema, theaters) (n)	Percentage of non occupied dwellings (%)	Percentage of buildings with historical value (%)
		2021	2021	2020	2021	2020	1954-2021	1980-2021	2021	2019	2011
		POLIS LOMBARDIA	AGCOM	SNAI DATABASE	GEOPORTALE LOMBARDIA	ISPRA-IDROGEO	DUSAF	DUSAF	POLIS LOMBARDIA	ISTAT	ISTAT
TOURISM DEVELOPMENT	I_9 Tourism intensity (stays/inhab)*100 (2021, POLIS LOMBARDIA)	+		+	+	+	+	-		+	-

High correlation: >0,70
Medium-high correlation: 0,40 – 0,70
Moderate correlation: 0,30-0,40
\+ Positive correlation:
\- Negative correlation:

Fig. 2 - Correlation matrix (author's elaboration).

The methodology for the Alta Valtellina case study

The Alta Valtellina region is in the Lombard Italian Alps (fig.1). It is a Mountain Community comprising six municipalities that count 78% of the Sondrio Province overnight stays (Polis Lombardia, 2022). The region is selected as a representative case study for its tourism-based economy to further investigate the multiple challenges affecting mountain tourism regions.

To this purpose, a mixed approach is adopted. The first, mainly quantitative, uses and correlates 21 indicators at the municipal level through the correlation matrix tool with GIS to identify and measure the multiple challenges posed by tourism development on the territory. Five priority topics (PT) result from the most significant correlations between the proposed indicators. Secondly, to further support the quantitative part, a more qualitative approach is introduced that consists of the spatialization of the five priority topics with GIS mapping, defining four contexts as the interpretative frameworks capable of envisioning the territorial regeneration project.

Regarding the first part, the 21 indicators have been selected according to the current literature based on the assessment of mountain areas' fragilities and dynamics (Crescimanno et al., 2010; Di Gioia, 2013; Dematteis et al., 2019; Lella and Rota, 2021). The proposed indicators are mainly identified based on their elaboration feasibility and data availability from open-access national and regional datasets (Fig.2).

Specifically, one representative tourism development indicator (I9) is combined with the other twenty that represent the affected territorial dimensions (i.e. demography, society-economy-livelihoods, services and networks, environment, built-up heritage and settlements). The correlation matrix tool identifies the statistical correlations between I9 and the other indicators, allowing to understand which territorial dimensions are affected intensively by tourism development (Salata and Grillenzoni, 2021). Within the context of Alta Valtellina, the most significant correlations that emerge from the matrix are classified into five priority topics:

- tourism development vs residential demand (PT1);
- tourism development vs environmental fragility and values (PT2);
- tourism development and rural economy and landscape maintenance (PT3);
- tourism development vs cultural heritage conservation (PT4);
- tourism development and access to essential services (PT5).

Since the five priority topics represent thematic categories that synthesize the most relevant challenges without any spatial reference, the qualitative part is introduced to give further information about the spatial distribution of these processes in the region, supporting the quantitative part. The spatial analysis is based on two operations:

- the reproduction of some of the twenty-one indicators used for the matrix at the census level sections to have a more detailed spatial distribution of the related processes in the region;
- the representation of the correspondent territorial structures' elements affected and potentially interested by the investigated processes;

As a general result, for each relevant correlation, the combination of these methods allows to identify the most suitable areas where the correlations significantly occur.

Fig. 3 - Hotspots (author's elaboration).

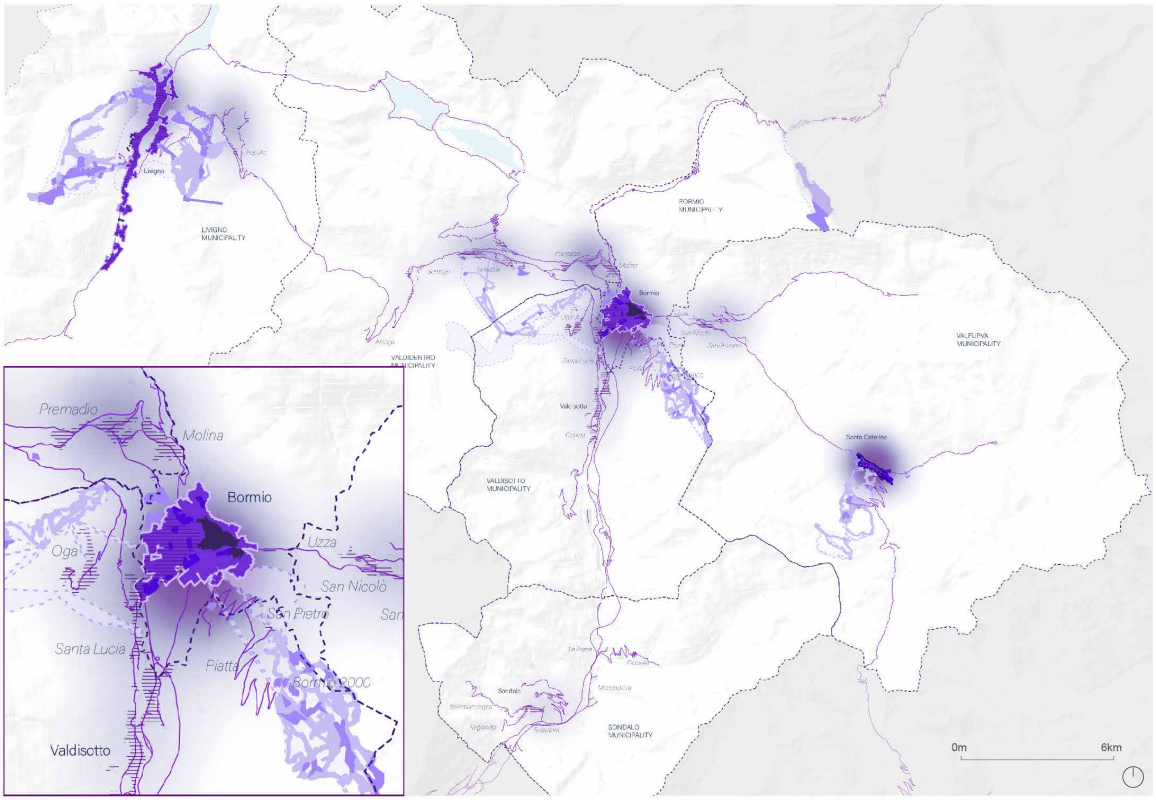
Four contexts are introduced to synthesize the spatial overlap between the priority topics:

- Hotspots;
- Fringes;
- Places of unexpressed potential;
- Valleys of environmental value.

Each context is the interpretative framework that combines the five priority topics in the space. Thus, it is possible to find two or more priority topics in each context. This operation is not only a formal or interpretative exercise but it provides an immediate overview of risks and opportunities, opening to the design path to be undertaken. Thus, the four contexts represent the foundation of the design process, that through a critical re-interpretation based on a selective and formal approach, clarify the project dimensions.

Interpretative frameworks to investigate mountain tourism territories challenges

Starting from the theoretical background (section 1), the emerging correlations are classified into five priority topics. The PT1 results from the highest positive correlations between tourism intensity (I9), real estate values (I10), demographic growth (I1), and local units' workers increase (I6). The decision to further investigate their relation stems from the major



Demographic and socio-economic conditions

Whitin municipalities with highest tourism intensity values: Bormio-Livigno-Valfurva.
*Method: (Number of overnight stays/population)*100 in 2022 per municipality. Alta Valtellina municipal values are graduated according to Natural Jenks obtaining 3 classes (high: >5092; medium: 479 – 5092; low: <479). Data from Polis Lombardia*

Major concentration of accommodation (hotels and extrahotels).
Method: concentration map GIS plugin. The size of the circle and the intensity of the color indicates a higher concentration. Data from Open Data Lombardia

Tourist multifunctional service centers
a Census sections with highest real estate values (>5000 euro/mq)
Method: GIS spatial intersection between OMI zones and census sections 2021. Real estate values for census sections are graduated according to Natural Jenks obtaining 4 classes (high: >5000 euro/mq, medium-high: 3000-5000, medium: 2000-3000, low: <2000. Data from Osservatorio Mercato Immobiliare (OMI)
b Census sections with a major population increase in external areas of the same urban settlement
Method: population variation for census section from 1991 to 2021. Data from ISTAT
c Census sections with highest concentration of facilities (i.e. schools, pharmacies, banks, post offices, socio-health services) accessible in 1 km distance by walking (>15).
Methods: GIS tool "Isochrones from Point", setting 1 km distance from the central point of each census sections. The number of facilities per census section is graduated according to Natural Jenks obtaining 3 classes (high >15; medium 3-15; low: <3). Data from Open Street Map

Tourist enclaves
a1 Census section with medium-high real estate values (from 3000 euro/mq)
Method: see description a
b1 Census sections with increasing demographic trends (> 5%)
Method: population variation for census section from 1991 to 2021. The value of population variation is graduated according to Natural Jenks obtaining 7 classes (Negative: high >-50%, medium-high -50%- -20%, medium -20%- -5 stationary -5% - 5%. Positive: medium 5%-20%; medium: 20%-50%, high >50%. Data from ISTAT
c1 Census sections with scarce concentration of facilities (i.e. schools, pharmacies, banks, post offices, socio-health services, doctors, accessible in 1 km distance by walking (<3).
Method: see description c

Physical and spatial elements affected and potentially interested by tourism development

Ski areas
Method: data from PTRA (Piano Territoriale Regionale d'Area Media-Alta Valtellina)

Ski slopes
Method: data from Dusaf 2021 (1421)

Urbanized areas for sport and entertainment use between 1980 and 2021
Method: variation of urbanized areas for leisure use (class 1421 Dusaf) between 1980 and 2021.Data from Geoportale Lombardia (Dusaf 1980-Dusaf 2021)

Urbanized areas with more than 50% of buildings constructed after 1971
Method: percentage of buildings constructed after 1971 for census section. Data from ISTAT census 2011

Historical settlements in hotspots
Method: data from Geoportale Lombardia (PGT Tavola delle Previsioni di Piano)

Intercluded agricultural areas in hotspots
Method: data from PPR (Piano Paesaggistico Regionale)

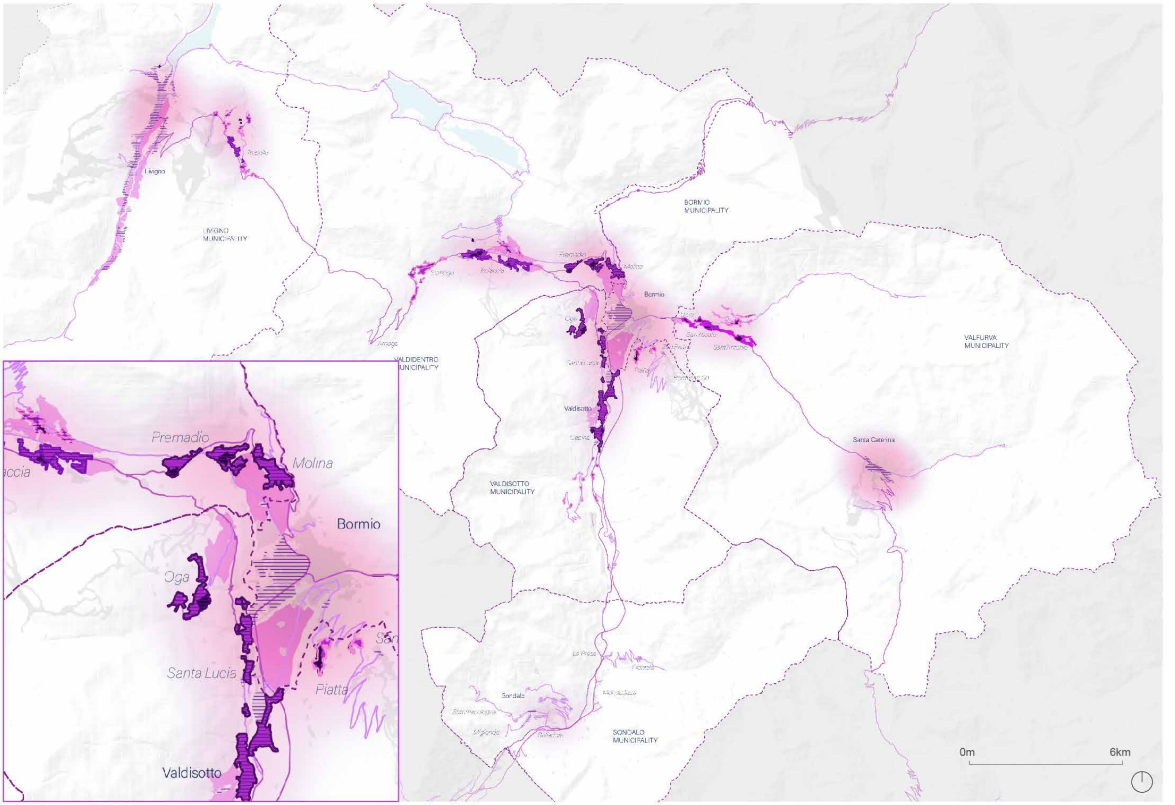
trend observed in similar tourist destinations in the Alps and beyond. Intensive tourism development has led to rising real estate values, a shift from long-term to short-term rentals, and subsequent migration of residents and workers from highly touristified areas to the surrounding peripheries. The PT2 results from the significant positive correlation between tourism intensity (I9), the percentage of Protected Areas (I15) and the percentage of landslide risk areas (I16). This topic is relevant concerning the current tourism pressure on increasingly fragile mountain ecosystems, especially considering climate crises. The PT3 regards the negative correlation between tourism intensity (I9) and the percentage of agricultural land interested in reforestation processes (I18). This is a crucial issue since it highlights the potential role of tourism in contributing to agricultural land preservation and maintenance, counteracting territory abandonment and landscape depauperation. The PT4 results from the moderate-medium correlation between tourism intensity (I9), the percentage of historical buildings constructed before 1918 (I21) and the percentage of urbanized areas expansion (I17). As noted in section 1, tourism can develop according to exogenous models and out-of-context operations, contributing to the overwhelm of local historical assets. The PT5 considers the medium-moderate correlation between tourism intensity (I9) and distance from the main service centres (I14). Since Alta Valtellina tourist destinations appear far from the major public services hubs (i.e. Sondrio), this topic expands the issue of local provision of facilities (education, healthcare, public transportation, essential services) in the area.

The investigation of the five priority topics through the spatial analysis is synthetized by the four contexts, which rise as interpretative territorial devices able to express the multiple challanges of tourism mountain regions.

Hotspots (fig.3) are the centers where tourism has established over time, making them popular destinations worldwide with the highest tourism intensity and density accommodation (i.e. Livigno, Bormio and Valfurva). Their attractiveness contributes to the unprecedented jump in real estate market values (PT1). On one side, the increasing housing prices have affected the residential demand, contributing to the loss of inhabitants in central tourist settlements, as in other alpine tourism destinations[1]. This trend is generally associated with the migration of the population in the peripheral borders, located both in the same municipality and the surrounding ones. However, this process is recognizable where tourism development and tertiarization dynamics combine, with a further concentration of services besides the diffusion of tourist infrastructures (Di Gioia, 2013). This is the case of Bormio and Livigno central settlements that are identified as tourism services centers (PT5).

In other cases, tourism development has meant only the proliferation of tourist-related activities, with a scarce provision of services for local inhabitants, as in the case of French stations (Franco and Maumi, 2016). Santa Caterina is representative of this condition, emerging as a monofunctional tourist enclave (Saarinen and Wall-Reinus, 2019), where demographic stability matches with a strict tourism specialization and a general lack of public services (PT5). Beyond demographic and socio-economic conditions, hotspots have experienced an unprecedented ex-

Fig. 4 - Fringes (author's elaboration).



Demographic and socio-economic conditions

Whitin municipalities with medium tourism intensity values: Valdidentro-Valdisotto.
*Method: (Number of overnight stays/population)*100 in 2022 per municipality. Alta Valtellina municipal values are graduated according to Natural Jenks obtaining 3 classes (high: >5092; medium: 479 – 5092; low: <479). Data from Polis Lombardia*

Medium concentration of accommodation (hotels and extrahotels).
Method: concentration map GIS plugin. The size of the circle and the intensity of the color indicates a higher concentration. Data from Open Data Lombardia

Census sections with medium real estate values
Method: GIS spatial intersection between OMI zones and census sections 2021. Real estate values for census sections are graduated according to Natural Jenks obtaining 4 classes (high: >5000 euro/mq, medium-high: 3000-5000, medium: 2000-3000, low: <2000. Data from Osservatorio Mercato Immobiliare (OMI)

Attractive fringes I
a Census sections with a positive demographic variation between 1991 and 2021 (>5%)
Method: see description a1-hotspots
b Census sections with scarce concentration of facilities (i.e. schools, pharmacies, banks, post offices, socio-health services, doctors, accessible in 1 km distance by walking (<3).
Method: see description c1-hotspots
c Census sections in high spatial proximity to hotspots (in 5-10 minutes by car)
Method: GIS tool GIS tool "Isochrones from Point", setting 5,10,15 minutes distance from the central point of each hotspot driving-car.

Attractive fringes II
a1 Census sections with a positive demographic variation between 1991 and 2021 (>5%)
Method: see description a1-hotspots
b1 Census sections with a medium concentration of facilities (i.e. schools, pharmacies, banks, post offices, socio-health services, doctors, accessible in 1 km distance by walking (3-10).
Method: see description c1-hotspots
c1 Census sections in medium spatial proximity to hotspots (in 15 minutes by car)
Method: see description c-attractive fringes I

Shrinking fringes I
a Census sections with a negative demographic variation between 1991 and 2021 (>-5%)
Method: see description a
b Census sections with medium concentration of facilities (i.e. schools, pharmacies, banks, post offices, socio-health services, doctors, accessible in 1 km distance by walking (3-10).
Method: see description c1-hotspots
c Census sections in high spatial proximity to hotspots (in 5-10 minutes by car)
Method: see description c-attractive fringes I

Shrinking fringes II
a1 Census sections with a negative demographic variation between 1991 and 2021 (>-5%)
Method: see description a
b1 Census sections with scarce concentration of facilities (i.e. schools, pharmacies, banks, post offices, socio-health services, doctors, accessible in 1 km distance by walking (<3).
Method: see description c1-hotspots
c1 Census sections in medium spatial proximity to hotspots (in 15 minutes by car)
Method: see description c-attractive fringes I

Physical and spatial elements affected and potentially interested by tourism development

Urbanized areas with more than 50% of buildings constructed after 1971
Method: percentage of buildings constructed after 1971 for census section. Data from ISTAT census 2011

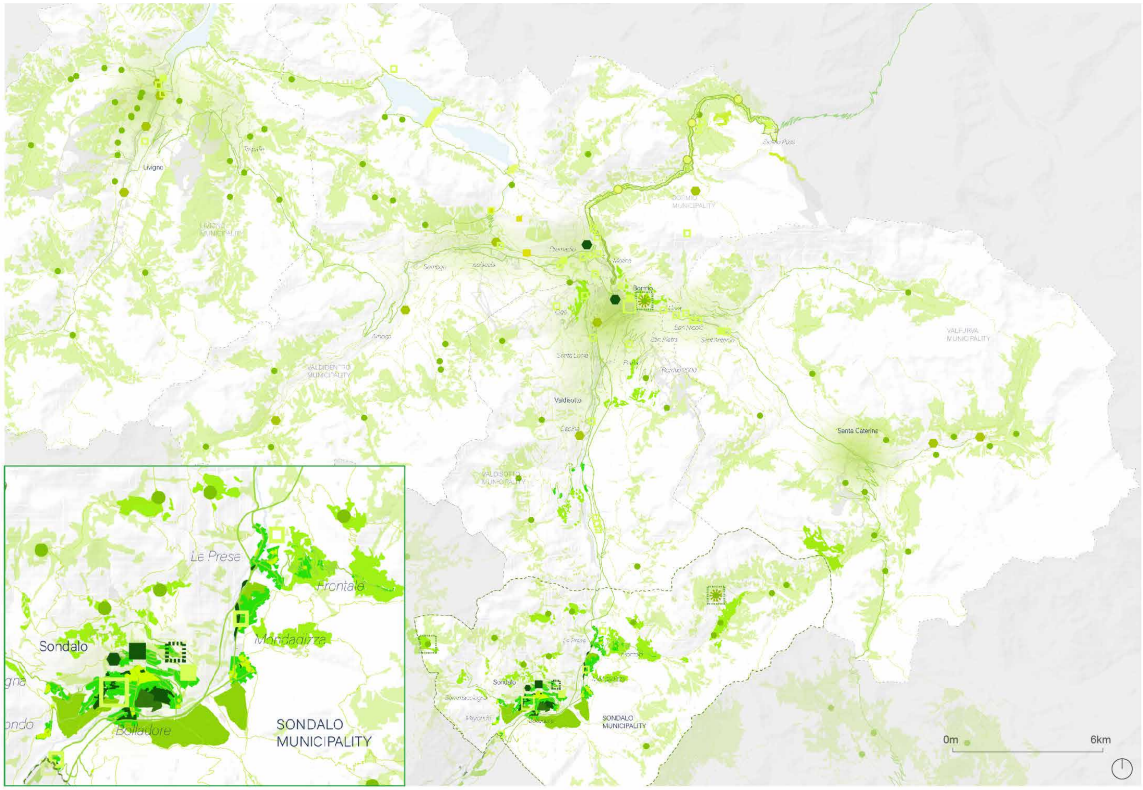
Historical settlements in fringes
Method: data from Geoportale Lombardia (PGT Tavola delle Previsioni di Piano)

Intercluded agricultural areas
Method: data from PPR (Piano Paesaggistico Regionale)

Agricultural strategic areas
Method: data from PTCP (Piano Territoriale di Coordinamento Provinciale)

Gates
Methods and source: data from Geoportale Lombardia (Rete Ecologica Regionale)

Conurbation trends
Method: data from PPR (Piano Paesaggistico Regionale)



Demographic and socio-economic conditions

Whitin municipalities with low tourism intensity values: Sondalo.
*Method: (Number of overnight stays/population)*100 in 2022 per municipality. Alta Valtellina municipal values are graduated according to Natural Jenks obtaining 3 classes (high: >5092; medium: 479 – 5092; low: <479). Data from Polis Lombardia*

Low concentration of accommodation (hotels and extrahotels).
Method: concentration map GIS plugin. The size of the circle and the intensity of the color indicates a higher concentration. Data from Open Data Lombardia

Declining places
Census sections with lower real estate values
Method: see description a-hotspots
Census sections with a negative demographic trend (<-5%)
Method: see description a1-hotspots

Physical and spatial elements affected and potentially interested by tourism development

Places of health, wellness, sport amenities
- Morelli hospital
- Cittadella dello sport
- Vallesana training center
- Ancient healthcare and wellness centers currently abandoned (Ex-Sanatorium)
- Termal baths

Method: data from Geoportale Lombardia

- Intercluded green agricultural areas in declining places

Method: data from PPR (Piano Paesaggistico Regionale)

Places of alpine agricultural practices
- Agricultural land affected by reforestation processes

Method: land use transition from agricultural land (Dusaf class 2 - 1980) to wooded land (Dusaf class 3 - 2021)

- Pastures and permanent fields

Method: data from Geoportale Lombardia (DUSAF 2021)

- Strategic agricultural areas in declining places

Method: data from PTCP (Piano Territoriale di Coordinamento Provinciale)

- Underused alpine huts (limited to seasonal breeding activity)
- Alpine huts in a bad stay of conservation

Method: data from PAF (Piani Assestamento Forestale)

- Alpine huts system
- Agritourism

Method: data from Geoportale Lombardia

Places of diffused cultural heritage
- Historical settlements in declining places

Method: data from Geoportale Lombardia (PGT Tavola delle Previsioni di Piano)

- Cultural goods with national bound
- Museums
- Hydropower stations
- Dams
- Forts
- WWII trenches
- Case cantoniere
- Stelvio road system

Method: data from Geoportale Lombardia

Fig. 5 - Places of unexpressed potential (author's elaboration).

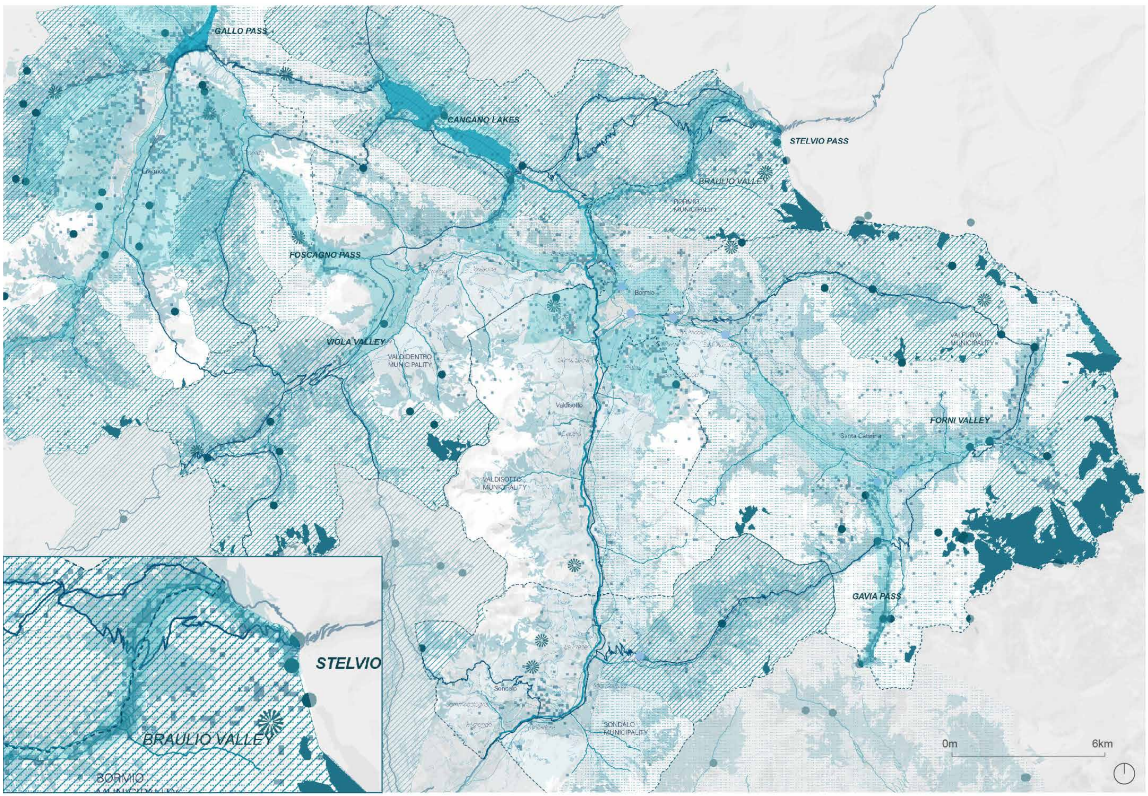
pansion of tourist infrastructures and second homes since 1960. As a result, in the Alta Valtellina hotspots, the built-up areas are saturated while the remaining public and private green open spaces are fragmented (PT2). This tourism-oriented urbanization has led to the alteration of built-up historical feautures, as in the case of Santa Caterina and Livigno (Bartaletti, 1995) and the most recent second homes expansions (PT4).

The fringes are those contexts in spatial proximity to hotspots (fig. 4). Fringes have gone through the hotspots' influence, making tourism one of the most important sectors of their local economy. However, as secondary/complementary destinations, they have experienced lower touristification and terziarization processes. Municipal-level data underscores these trends, revealing fewer tourist flows and accommodation density. As hotspots' peripheral settlements, fringes undergo a dual transformation: they are engaged in the broader built-up expansion, entailing significant processes of agricultural land consumption and pressure (PT2) and transformative interventions on historical tissues[2] (PT4). Simultaneously, their proximity to tourism hotspots has ensured their dependency on hotspots' primary services. Indeed, a minor concentration of facilities is generally visible (PT5).

Lower real estate values characterize fringes due to the lower touristification and tertiarization compared to hotspots (PT1). This condition triggers a critical process complementary to the trends in hotspots: the outmigration of population in hotspots, notably in the case of Bormio, stimulates new residential demand in the fringes, due to the lower housing prices (i.e. attractive fringes). Here, the ongoing processes fuel new built-up demand and intensify the dependency on Bormio as a central service hub, with the consequent excess load on hotspots' services and infrastructures.

Places of unexpressed potential are non-touristic contexts out of the established mainstream (fig. 5). First, they lie in those declining contexts, incapable of positioning themselves in the tourist region economy. However, the absence of dominant tourism development models have ensured the preservation of many territorial resources that can be potentially reactivated. Secondly, places of unexpressed potential are founded also in tourist territories, where they have been silenced and ignored by extractive tourism-based economies in favor of generic resources (e.g. skiing, competitive sports) (Collange et al., 2021). These places are concentrated in Sondalo municipality, where the demographic decrease and the declining economy combine with the degradation of valuable historical built-up heritage[3] (PT4), the devaluation of housing stock (PT1), and the contraction of agricultural practices (PT3). Beyond these negative trends, the potential expressed by the unrevealed resources is much more relevant since it pushes new development and regenerative trajectories. Specifically, three different systems of potential territorial resources emerge: places of health, wellness and sports amenities, places of alpine agricultural practices and places of diffused cultural heritage.

The last context identifies those elements of environmental value and hydrogeological fragility that conflict with the growing anthropic pressure of tourism attractiveness (Buckley, 2004). After hotspots these valleys are the most visited areas within the



Demographic and socio-economic conditions

Within municipalities where the number of summer tourist arrivals in 2022 has exceeded the number of winter tourist arrivals (Bormio, Valdisotto,Valdidentro, Valfurva, Sondalo)
Method: data from Polis Lombardia

Census sections with medium-high values of tourist flows
Method: number of cells representing the density of pictures taken from 2005 to 2017 for census section (excluding urbanized census sections). Data from INVEST

Number of pictures taken from 2005 to 2017
Method: cells representing the density of pictures taken in the indicated point from 2005 to 2017. Data from INVEST

Physical and spatial elements affected and potentially interested by tourism development

Elements of environmental system fruition

- Alpine shelters
  Method: data from Geoportale Lombardia
- Stelvio Park centers
  Method: data from Stelvio Park Plan 2020-2024
- Main hiking landscape paths
  Method: data from PTRA (Piano Territoriale Regionale d'Area)
- Hiking trail network
- Alpine agricultural roads (Strade agro-silvo-pastorali)
  Method: data from Geoportale Lombardia

Elements of hydrogeological instability

- Landslides and hydrulic risk areas
  Method: data from ISPRA (Idrogeo platform)

Elements of environmental and landscape value

- Protected areas
  Method: data from Geoportale Lombardia
- Paesaggi del Silenzio
  Method: data from PTRA (Piano Territoriale Regionale d'Area)
- Pastures and permanent fields
- Wooded areas
- Glaciers
  Method: data from Geoportale Lombardia (Dusaf 2021)
- Geositi
- Primary hydrological network
  Method: data from Geoportale Lombardia

Fig. 6 - Attractive valleys of environmental value (author's elaboration).

Fig. 7 - Hotspots: Bormio 2000 ski station. The station is located in the Stelvio ski slope and it represents the traditional seasonal tourism-based station built in the '70s. The low quality and out-of-context character of the buildings solely dedicated to tourism facilities combines with the desertification of the area during mid-season and summer (foto: Francesca Mazza).

Alta Valtellina context (fig. 6). This trend emerges in the broader framework where summer tourism flows have overcame winter season arrivals (Polis Lombardia, 2022). If winter tourism flows are more concentrated in hotspots, summer tourism tends to involve scarcely-anthropized valleys plenty of environmental valuable resources, including protected areas, glaciers, geomorphological sites, and waterscapes that are also characterized by a high degree of hydrogeological instability (PT2).

The increasing polarization of summer flows in these sensitive environments is further worsened by an unequal distribution of tourism services and accessibility (PT5). The most crowded areas are those accessible by car (Laghi di Cancano, Val Viola), or along transnational infrastructural axes (Stelvio, Gavia and Foscagno pases). These territories also coincide with a more efficient provision of tourism amenities (shelters, hiking paths, and accommodation).

Towards the regeneration project

The proposed methodology offers an interpretation of mountain tourism territories' challenges, showing the incidence of tourism on the territory. According to the four contexts, the project dimensions are defined, highlighting the role of the analytical-interpretative phase in orienting the design process. Hence, three strategies and their corresponding operational actions derive from the four contexts, serving as the foundation for the regeneration project.

The first strategy highlights the need to promote a decentralized urban and territorial development, act-

Fig. 8 - Fringes: Molina settlement and surroundings. '70s scattered residential expansion with ongoing built-up pressure due to increasing residential demand with the consequent fragmentation and depauperation of the agricultural area visible in the foreground (foto: Francesca Mazza).
Fig. 9 - Places of unexpressed potential: Sondalo historical center. The historical center of Sondalo is undergoing a relevant abandonment and depopulation processes that translate in the physical degradation of the built-up heritage and the inappropriate use of the public space, despite of their architectural and historical value (foto: Francesca Mazza).

ing on an equal distribution of services and housing. This means reducing the excess load of existing services and infrastructures in hotspots by enhancing those in the fringes and creating attractive facilities and residential opportunities in declining places. To this purpose, specific actions could include: i) in hotspots, the realization of affordable housing together with the support to long-term rents would contribute to permanence of local population; ii) the strength of services both in fringes and hotspots to face the increasing residential demand in the first and the service over-use in the latter could be addressed by turning tourism-specialized services or accommodation venues into poly-functional services suppliers (e.g. hotel academy, conventions between thermal baths and public healthcare system); iii) the accessibility to hotspots should be equally re-balanced and reorganized to cope with in-coming external flows, for example by introducing Uvar measures (i.e. urban areas vehicle access regulations), including physical intervention on mobility spaces, traffic regulation measures and pricing policies; iv) places of unexpressed potential could complement the system of hotspots and fringes in terms of attractiveness. Hence, the recognized potential related to sport, wellness, and healthcare could be strengthened by restoring the degraded built-up heritage and improving existing services for tourists and inhabitants.

A second strategy regards the balance between landscape-environmental conservation, environmental fruition, and climate change adaptation. Also in this case, specific actions result from the four contexts: i) the fragmented intercluded green areas left over by the tourism-based urbanization in hotspots should be enhanced by greening, re-wilding and nature-based measures; ii) in declining places, a more comprehensive restoration of green areas is required, due to their current degradation state, also re-thinking their uses to make them attractive again; iii) in fringes, the system of peripheral agricultural areas requires protection and enhancement measures both to prevent further urbanization due to the increasing residential demand and to maintain the agricultural function for the survival of the whole alpine agricultural practices; iv) in the valleys of environmental value, a sustainable and balanced fruition should be ensured by the combination between environmental heritage valorization, the contrast to hydrogeological risks (e.g. landslides, hydraulic risks) and the regulation of fruition in the more sensitive ecosystems (e.g. glaciers, crowded zones).
The third strategy advocates the valorization and reclaim of the cultural territorial identity, which includes i) the preservation and valorization of hotspots and fringes historical settlements through conservative interventions oriented to maintain the historical as-

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sets' legibility, favoring mainly residential permanent uses; ii) in declining places, the whole degraded historical tissues, both built-up and open spaces, should be restored, re-functionalized and re-activated according to multiple uses, integrating residential with commercial, services and diffused hospitality functions; iii) for places of unexpressed potential, the systems of underestimated territorial resources (i.e. places of health, wellness and sports amenities, places of alpine agricultural practices and places of diffused cultural heritage) could be valorized creating thematic tourism-cultural infrastructures, enriching the existing tourism supply, but also increasing the knowledge and the diffusion of local culture and economy.

The four contexts structure the project's directions, guiding and prioritizing operational actions and intervention areas. However, the guidelines resulted from the four contexts show that the regeneration of mountain tourism territories encompasses a plurality of sectors and disciplines, crosses multiple scales and intercept numbers of potential stakeholders. This nature of the regeneration project advocates, as a following step, the necessity of considering how it can be grounded and implemented using existing planning and design tools. Often, a gap between the strategic vision and its implementation occurs due to the inadequacy of current tools to respond to the complexity required by the regeneration project (Gatti et al., 2020). Therefore, thinking about project implementation and governance should be the following step to make the proposed path of regeneration effective.

Notes

1 https://www.are.admin.ch/are/it/home/sviluppo-e-pianificazione-del-territorio/programmi-e-progetti/progetti-modello-sviluppo-sostenibile-del-territorio/progetti-modello-sviluppo-sostenibile-del-territorio-2014-2018/creare-un_offerta-di-alloggi-sufficiente-e-adeguata/alloggi-a-prezzi-moderati-per-i-residenti-di-zermatt.html

2 Valdisotto municipal plan, Tav. 11 "Nuclei di antica formazione classificazione degli edifici".

3 Sondalo municipal plan, "Carta dei nuclei di antica formazione".

References

Bartaletti F. 1994, *Le grandi stazioni turistiche nello sviluppo delle Alpi italiane*, Pàtron Editore, Bologna.

Bätzing W. 2005, *Le Alpi: una regione unica al centro dell'Europa*, Bollati Boringhieri, Torino.

Buckley R. 2004, *Environmental impacts of Ecotourism*, CABI Publishing, Wallingford.

Bonesio L. 2018, *Montagne senz'aura. Le Alpi tra spettacolo e patrimonializzazione*, «Spazio e tempo nelle civiltà montane», <https://www.academia.edu/41690714/Luisa_Bonesio_MONTAGNE_SENZAURA_LE_ALPI_TRA_SPETTACOLO_E_PATRIMONIALIZZAZIONE_1_Disalpinizzazione> (10/12).

Bourdeau P. 2021, *Dilemmes de transition. Les destinations francaises de sports d'hiver entre agir crèatif, inerties et maladaptation*, «Geocarrefour», vol.95, n.2, <http://journals.openedition.org/geocarrefour/18943> (25/11)

Butler R.W. 2017, *Tourism and Resilience*, CABI Digital Library, <https://www.cabidigitallibrary.org/doi/book/10.1079/9781780648330.0000> (25/11)

Carrosio G. 2019, *I margini al centro. L'Italia delle aree interne tra fragilità e innovazione*, Donzelli, Roma.

Celata F., Romano A. 2020, *Overtourism and online short-term rental platforms in Italian cities*, «Journal of Sustainable Tourism», vol.30, n.5, pp. 1020-1039.

Collange Y., Duval M., Gauchon C., Francois H. 2021, *Transition touristique et patrimoine archéologique: le cas de l'art rupestre de Haute-Maurienne*, «Géocarrefour», vol.95, n.2.

Corigliano M.A., Viganò G., Mottironi C. 2015, *Tourism in the Alps: governing sustainability*, <https://www.mite.gov.it/sites/default/files/archivio/allegati/convenzionealpi/16_06_201 6/pubblicazioni/Turismo_Sost_270516B.pdf> (20/09)

Corrado F. 2020, *Le fragilità della montagna. Tra micro (innov)azioni e grandi eventi*, «Economia e società regionale», n. 3, pp. 29-38.

Crescimanno A., Ferlaino F., Rota F.S. 2010, *La montagna del Piemonte. Varietà e tipologie dei sistemi territoriali locali*, IRES Piemonte, <https://core.ac.uk/download/pdf/199701397.pdf>.

De Rossi A. 2016, *La costruzione delle Alpi. Il Novecento e il modernismo alpino (1917-2017)*, Donzelli, Roma.

Del Curto D., Dini R., Menini G., 2016, *Alpi e architettura. Patrimonio, progetto, sviluppo locale*, Mimesis Edizioni, Milano.

Dematteis G., Ferlaino F., Rota F.S. 2019, *Le montagne del Piemonte*, IRES Piemonte, <https://www.ires.piemonte.it/pubblicazioni_ires/LE%20MONTAGNE%20DEL%20PIEMONTE%202019_RAPPORTO_03_APRILE_2019.pdf>

Di Gioia A. 2013, *Analisi GIS delle dotazioni urbane e spaziali nelle Alpi. Marginalità, isolamento e autonomia funzionale*, «Politiche Piemonte», <https://www.politichepiemonte.it/argomenti/colonna1/ambiente-e-territorio/254-analisi-gis-delle-dotazioni-urbane-e-spaziali-nelle-alpi-marginalita-isolamento-e-autonomia-funzionale> (19/12).

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Fig. 10 - Valleys of environmental value: Viola valley and Viola stream. It is part of the Natura 2000 network as a Special Area of Conservation (ZSC). Currently it is one of the most crowded valleys of Alta Valtellina during summer and it is increasingly characterized by hydrogeological and hydraulic risks (foto: Francesca Mazza).

Di Gioia A., Dematteis G. 2020, *I rischi della specializzazione mono-funzionale turistica dei sistemi montani rivelati dal Covid-19*, «Scienze Del Territorio», Special Issue 2020, pp. 126-132.

Dissart J.C. 2012, *Co-construction des capacités et des ressources territoriales dans les territoires touristiques de montagne. Étude de cas sur l'Oisans*, «Journal of Alpine Research», vol. 100, n.2.

Franco C., Maumi C. 2016, *The construction of a territory in the Alps. Infrastructure for mass tourism*, «Journal of Technology for Architecture and Environment», n. 11, pp. 172–179.

Gatti M.P., Cacciaguerra G., Indrigo A. 2020, *Regenerate the Alpine territories, regenerate the abandoned villages, regenerate the Terragnolo Valley*, «Valori e Valutazioni», n. 25, pp.29-35.

Haider W., Probstl-Haider U., Wirth V., Beardmore B. 2015, *Will climate change increase the attractiveness of summer destinations in the European Alps? A survey of German tourists*, «Journal of Outdoor Recreation and Tourism», vol. 11, pp. 44-57.

Hatt E. 2020, *Coastal tourism development and planning in France. From state planning schemes to territorial coherence schemes*, «Gèographie, Economie, Sociètè», vol.22, n.1, pp. 81-104.

Lella L., Rota, F.S. 2021, *Le montagne italiane tra dinamicità e marginalità. La ripartizione del Piemonte in montagna interna, montagna integrata e distretti turistici*, «Scienze del Territorio», vol. 9, pp. 90-101.

Machiavelli A. 2009. *Alpine tourism. Development contradictions and conditions for innovation*, «Journal of Alpine Research», vol. 97, n. 1, pp. 99-111.

Machiavelli A. 2017, *Il turismo della neve nelle Alpi italiane: nascita, sviluppo e cambiamento*, <https://www.e-periodica.ch/cntmng?pid=hda-001%3A2017%3A22%3A%3A306> (01/12)

Pachoud C., Koop K., George E. 2022, *Societal transformation through the prism of the concept of territoire: A French contribution*, «Environmental Innovation and Societal Transitions», n.45, pp. 101-113.

Perlik M. 2019, *The Spatial and Economic Transformation of Mountain Regions*, Routledge, London

Raffestin C. 1984, *Territorializzazione, deterritorializzazione, riterritorializzazione e informazione,* in A. Turco (ed.), *Regione e regionalizzazione,* Franco Angeli, Milano, pp. 69-82.

Romeo R., Russo L., Parisi F., Notarianni M., Manuelli S., Carvao S., UNWTO 2021, *Mountain tourism – Towards a more sustainable path*, Rome, FAO, <https://doi.org/10.4060/cb7884en>

Saarinen J., Wall-Reinius S. 2021, *Tourism Enclaves, Geographies of Exclusive Spaces in Tourism*, Routledge, London.

Salata S., Grillenzoni C. 2021, *A spatial evaluation of multifunctional Ecosystem Service network using Principal Component Analysis: A case of study in Turin, Italy*, «Ecological Indicators», vol. 127.

Sonderegger R., Batzing W. 2013, *Second homes in the Alpine Region. On the interplay between leisure, tourism, outmigration and second homes in the Alps*, «Journal of Alpine Research», Special Issue, 2013, pp. 1-14.

Steiger R., Scott D., Abegg B., Pons M., Aall, C. 2019, *A critical review of climate change risk for ski tourism*, «Current Issues in Tourism», vol. 22, n. 11, pp. 1343-1379.

Zanzi L. 2018, *Opus Montanum. Il popolo delle Alpi: una sorte ambientale comune a diverse culture*, Il Mulino, Bologna.