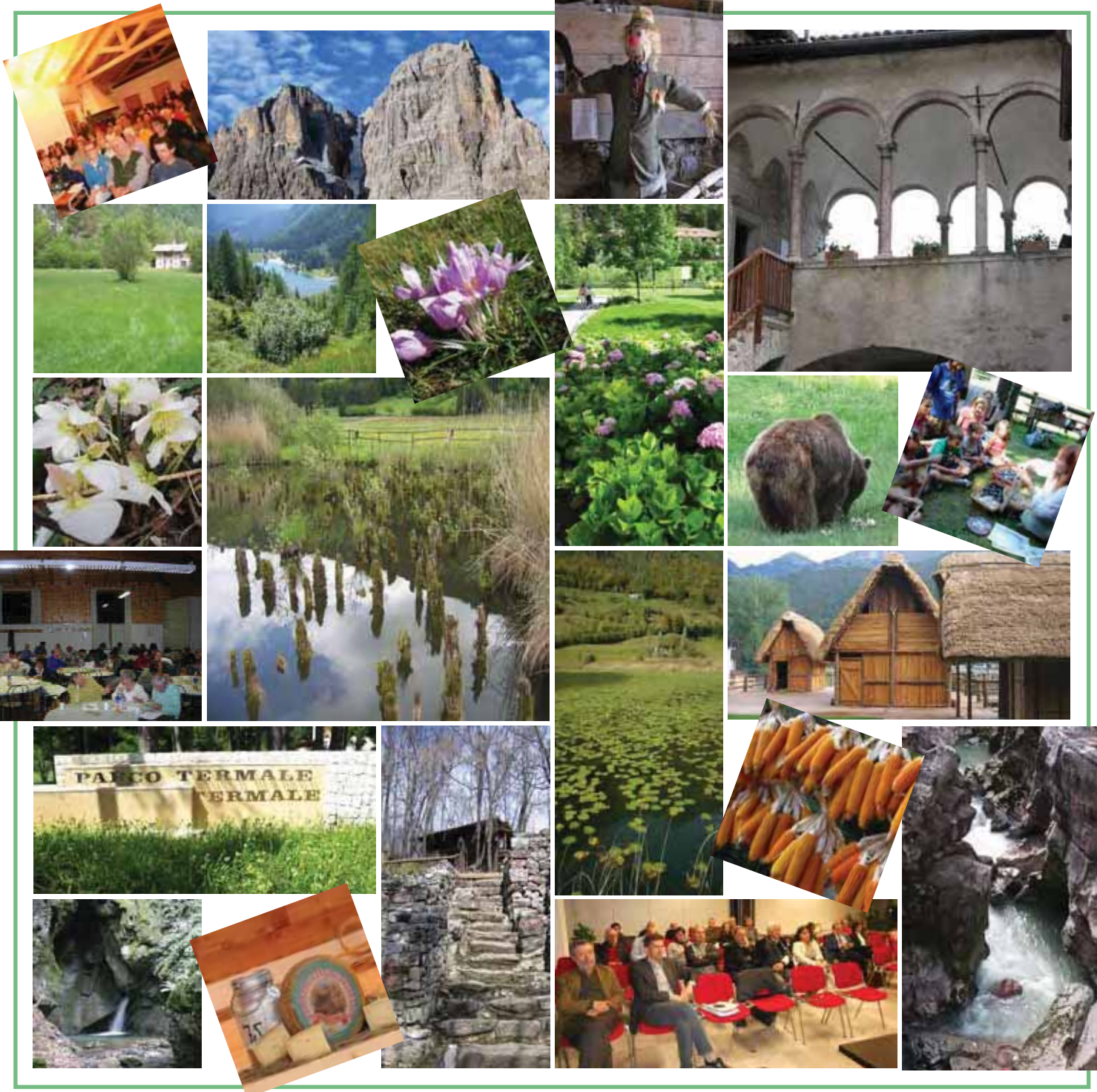


UNESCO BIOSPHERE RESERVE LEDRO ALPS AND JUDICARIA from the Dolomites to Lake Garda

Nomination form - September 2013



PROVINCIA AUTONOMA DI TRENTO



COMUNE DI COMANO TERME

UNESCO
BIOSPHERE RESERVE
LEDRO ALPS AND JUDICARIA
from the Dolomites to Lake Garda

Nomination form
September 2013

UNESCO - Man and Biosphere (MAB) Programme
Biosphere reserve nomination form, September 2013



“Under the shade of the picturesque old covered bridge which crosses the stream, we halted for a few minutes to admire a view almost unique in my alpine experience. Close beside us stood the castle of Stenico, perched high on a crag, commanding on one side the entrance of the gorge, overlooking on the other a wide sunny basin, girt by verdant ridges compared to which the shores of Como are bare and brown. The hollows and lower slopes sparkle with villages, and teem with Indian corn and trailing vines. The hills do not, as in the Northern Alps, rise in continuous ridges, but are broken up into masses of the most romantically beautiful forms”.

*Douglas W. Freshfield
Italian Alps; Longmans, Green and CO. 1875*

Lake Ampola

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MUSE

Museo Civico in Rovereto



A HERITAGE OF ENVIRONMENT AND HUMAN VALUES

ALBERTO PACHER, President of the Autonomous Province of Trento

The proposal to nominate the area of Trentino described as the “Ledro Alps and Judicaria - from the Dolomites to Lake Garda”, a chain of human communities and landscapes going from the Brenta Dolomites to Lake Garda, passing through the Giudicarie, Val di Ledro and the plain of the upper Lake Garda area, as a “UNESCO Biosphere Reserve” did not come out of the blue. It was not a marketing expedient to increase the added value of an enclave which is already rich in terms of its countryside, old towns, castles and archaeological sites. It rather represents a natural step in a process which has been constant and effective over time, designed to conserve and promote the environmental and cultural resources that enrich our land. In short, it is proof of a maturity which drives us to arrive at a further level of awareness, on the one hand of the fragility of the resources we watch over, and on the other of the need for our attention to centre on this heritage, making it the guiding principle behind our social and economic progress.

Becoming part of the World Network of Biosphere Reserves would mean that the validity of the environmental decisions made by us would be recognised and that the efforts of the people and organisations involved in the project - ASUCs, the Province,



Municipalities and Consortia of Municipalities, valley communities, tourist offices and Pro Loco consortia, museums and ecomuseums, volunteer associations, experts and technicians etc. - would be rewarded: in their field of jurisdiction everyone has agreed to accept a challenge and gamble on their ability to create dialogue, making available their skills, talent and experience.

It has been this common commitment that has made Trentino into an area in which environmental protection is not an empty term, but rather a solid awareness of the central value that nature has in the life of us all: the Sites of Community Importance, Trentino environmental education network,

network of museums and ecomuseums, and more recently the Networks of Reserves, have gradually developed out of this commitment, with the continuous and reciprocal combining of conservation and development, integrating safeguarding, tourism and agricultural activities. The “UNESCO Biosphere Reserve” has suggested to us a model which can be summarised by ‘3 Es’: Ecology, Economics and Equity, to which we can relate perfectly, as they have been applied in our sustainable development strategies for some time.

We would all be proud of the prestigious recognition for which the site has been nominated, also because becoming part of the World Network of Biosphere Reserves would to a certain extent complete the project of the UNESCO Dolomites World Heritage Site. However, above all it would be an additional way of encouraging and developing the idea of an area which is not fenced in or restricted: an area in which man lives and grows in a harmonious relationship of mutual attention and loving care, but where business activities are not banned, so long as they genuinely offer a guarantee of ecological compatibility and organic and ordered development; where all those responsible for protection, marketing, education, offering accommodation, agriculture, sport, culture and research are capable of bringing together projects and objectives in a more general framework of ongoing biodiversity and environmental sustainability, capable of

being translated into daily gestures and collective cultural behaviour.

In short, becoming a “UNESCO Biosphere Reserve” would represent not only the umpteenth goal of a political, cultural and economic vision that has been widely accepted throughout Trentino, obtaining the convinced support of individual citizens, public and private sector bodies and the most varied associations. It is and will be above all a further decision by all to accept responsibility, but also recognition that our more recent commitments have been recognised at international level.

Indeed, the area “from the Dolomites to Lake Garda” has a natural heritage (in which protected sites – parks, nature reserves and Natura 2000 sites – occupy a significant part of the nominated area) and cultural heritage (with the Fiavé and Ledro pile-dwellings already belonging to the network of more than one hundred alpine archaeological sites included in the UNESCO World Heritage List), and represents an example of good practice (taking concrete form in the European Charter of Sustainable Tourism promoted by the Adamello Brenta Nature Park, the setting up of the Ledro Network of Reserves and EMAS certification by several municipalities, for example), which will allow us to administrate and manage the new “Biosphere Reserve” in a practical and clearheaded manner, without new cumbersome superstructures, but rather by setting in motion the skills, talent and potential of all those involved.

Thus we are outlining a picture which will extend beyond a new form of environmental certification designed to enrich a specific area: the “UNESCO Biosphere Reserve Ledro Alps and Judicaria – from the Dolomites to Lake Garda” will offer itself as a genuine corridor between the Dolomites and the foothills linking them to the Brescian upper Lake Garda Park and the Adamello Brenta Nature Park,

joining and providing continuity for an area which will stretch up to the Swiss National Park through the Lombard Adamello Park and the Stelvio Park. In this way the largest, most extensive and diversified system of protected areas in the Alps will be constructed, representing a great “green heart” in the centre of Europe, which by pulsating will provide oxygen and energy to the whole alpine area.

RECOGNITION, AWARENESS AND THE FUTURE

LIVIO CALDERA, Mayor of Comano Terme



This nomination originated in the local area; it was not imposed from above, by some public institution or administrative organisation, but indeed came from those who know the area and live there every day. It was the Associazione Pro Ecomuseo “dalle Dolomiti al Garda” which suggested the idea of proposing our area as a “UNESCO Biosphere Reserve” to the municipalities of Comano Terme, Bleggio Superiore, Dorsino, Fivavé, San Lorenzo in Banale, Stenico and Tenno. An idea, or maybe the realization of a long lasting work, with the support of the Autonomous Province of Trento, that has immediately understood the deep value of this initiative¹. The proposal

¹ The Provincial Council on the 20th March 2013

was then shared with the other bodies concerned, namely Bondone, Ledro, Riva del Garda and Storo, together with the Upper Lake Garda and Ledro and Giudicarie communities, the Adamello-Brenta Nature Park, the Consortium of municipalities in the valley of the Sarca River, the Consortium of municipalities in the valley of the River Chiese, the tourist offices of Comano, Brenta Dolomites and Ingarda Trentino spa and the Tourism Consortium for the Ledro valley. With these bodies a political and administrative path has been shared, which culminated with the approval of a specific Memorandum of Understanding².

This idea, giving concrete form to a process which comes from afar, was shared and supported by the Autonomous Province of Trento, which immediately understood the underlying value of the initiative. The nomination of the “Ledro Alps and Judicaria, from the Dolomites to Lake Garda” area as a Biosphere Reserve is intended to recognise the work done by our forefathers, namely those who lived, worked, conserved and protected this land for whole generations. It also illustrates the

_____ unanimously approved a Policy Directive that approved and supported the initiative (Annex 3.2)

² On the 6th September 2013 the 20 proponents have undersigned the Memorandum of Understanding for the Proposed Biosphere Reserve (annex 3.1)

awareness we have today of the value of this heritage, a value which crosses the confines of Trentino and Italy and becomes an international heritage. We believe that the area of the proposed Biosphere Reserve is unique at national and international level, an area in which social, economic, historic, cultural and naturalistic processes have been stratified over the centuries, with the assistance of collective management and area planning. It is a geographical district which can boast a varied and precious landscape which goes from Cima Tosa in the Brenta Dolomites to Lake Garda, with an astonishing and exciting range of natural landscapes, including parks and nature reserves, World Heritage Sites, Lakes Tenno and Ledro, the thermal waters of Comano and the course of the Sarca River.

However, this nomination is also our way of launching a message to younger generations, so that they make the most of the fruits of the past, continuing along the path traced with conviction, but also bringing new ideas and innovative and creative stimuli, in order to become an active and integral part of the area. Indeed, the setting up of the Biosphere Reserve is intended to have a role not only in terms of conservation, but also in relation to sustainable economic and human development, through environmental education, training and research projects.

Among other things, the creation of the Biosphere Reserve also sets itself

the cultural objective of accompanying an evolution in the concept of nature conservation; from the traditional approach marked by the imposition of duties and restrictions (as has often taken place with the creation of protected areas), perceived by some categories of users in the area as negative, to a more mature concept linked to conscious promotion of natural (and cultural) resources in the context of sustainable development. In this important process, bottom-up procedures – such as those of the communities in the area of the proposed reserve – combine with policy, supporting participatory processes for the management of area resources undertaken for some time by PAT with local communities. There is no lack of ideas and there is a clear and determined intention to proceed. We are also aware that thanks to this MAB programme there will be no further limitations and impositions, as the area of the Biosphere Reserve is already protected bearing in mind the needs of the local area and the people who live there.

There is a saying of the Maasai, an ancient Kenyan people, which recites: *“The land is not inherited from our fathers, but on loan from our children”*: through this nomination we would like to formalise the commitment to give back to our children and the generations which follow an area aware of its own identity and most authentic values, but also capable of actively looking forwards towards the future.

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TABLE OF ACRONYMS

API	Area di Particolare Interesse (Area of Particular Interest of ABNP)
APPA	Agenzia Provinciale per la Protezione dell’Ambiente (Provincial Agency for Environmental Protection)
APT/PTA*	Azienda Promozione Turistica (Tourism Agency)
ASUC	Amministrazione Separata degli Usi Civici (Separate Administration of Civic Uses)
BIM	Bacino Imbrifero Montano (Consortium of Municipalities in the Valley of the River Sarca/Chiese (Bacino Imbrifero Montano)
CAGL	Comunità Alto Garda e Ledro (Community of Upper Lake Garda and Ledro)
CdG	Comunità delle Giudicarie (Community of Giudicarie)
CEIS	Consorzio Elettrico Industriale di Stenico (Industrial and Electric Consortium of Stenico)
CETS/ECST*	Carta Europea per il Turismo Sostenibile nelle Aree Protette (European Charter for Sustainable Tourism in Protected Areas)
CLC	Corine Land Cover
COPAG	Cooperativa pataticoltori giudicaresi (Cooperative of Potatoes Growers)
CTL	Consorzio per il turismo Ledro (Ledro’s Consortium of Tourism)
DOP	Denominazione di origine protetta (Protected Designation of Origin)
EdJ/EC*	Ecomuseo della Giudicaria (Judicaria Ecomuseum)
IG	InGarda – Azienda per il Turismo Trentino (Trentino Tourism Agency)
ISPRA	Istituto Superiore per la Protezione e la Ricerca Ambientale (Higher Institute for Environmental Protection and Research)
MAB	Man and the Biosphere
MUSE	Museo delle Scienze (MUseum of ScienceE)
PAES	Piano d’Azione per l’Energia Sostenibile (Action Plan for Sustainable Energy)
PAT/APT*	Provincia Autonoma di Trento (Autonomous Province of Trento)
PBR	Proposed Biosphere Reserve
PNAB/ABNP*	Parco naturale Adamello-Brenta (Adamello-Brenta Nature Park)
PRG	Piano regolatore comunale (Municipal Land Use Plan)

PSR	Programma di Sviluppo Rurale (Rural Development Programme)
PUP	Piano Urbanistico Provinciale della PAT (PAT's city plan)
ReLED/MNLED*	Rete Museale della Valle di Ledro (Museums network of Ledro Valley)
RR/NR*	Rete delle Riserve (Network of Reserves)
SIC/SCI*	Siti di Importanza Comunitaria della rete europea Natura 2000 (Site of Community Importance in the Natura 2000 European network)
TEN	Trentino Ecological Network
WHS	Sito del patrimonio Mondiale dell'Umanità (UNESCO World Heritage Site)
ZPS/SPA*	Zona di Protezione Speciale (Special Protection Area)

** Both forms of the acronyms can be found in the text.*

0. INTRODUCTION

Have you ever happened to find yourself in a place which, when observed from above, gave you an immediate feeling of wellbeing and harmony? We are sure this has happened to everyone at least once in their life. Some try only to capture this pleasant feeling and maybe take it home with them. Others wish to understand where this feeling comes from, trying to capture the 'secret'. Those who are responsible for managing an area do their best to ensure that this pleasant feeling can be maintained over time and if possible even increased; for the benefit of the occasional visitor, but also and above all of those who live there. In doing this, they look for models of reference and good practice which have had a similar effect in other places and which could work when transferred to different contexts.

This is what happened recently in the Judicaria and Ledro area, in Trentino, one sunny day in late spring this year, when a group of local administrators and experts (coming specially from outside) spent a few hours together discussing local development and its results in the area. The discussion followed previous examination of the MaB programme and the World Network of Biosphere Reserves by local and provincial administrators,

who had become aware of them thanks to recent training and informative activities organised in Italy. The more they talked about it, the more everyone became pleasantly aware of the fact that Judicarie and Ledro area has been an 'unknowing Biosphere Reserve' for a long time. The relative geographical isolation of these areas (and consequently their 'marginal' nature) has led to the conservation of the traditional rural forest landscape, with numerous small and fragmented human settlements, very different from those in the neighbouring valleys, which have seen greater tourist and urban development.

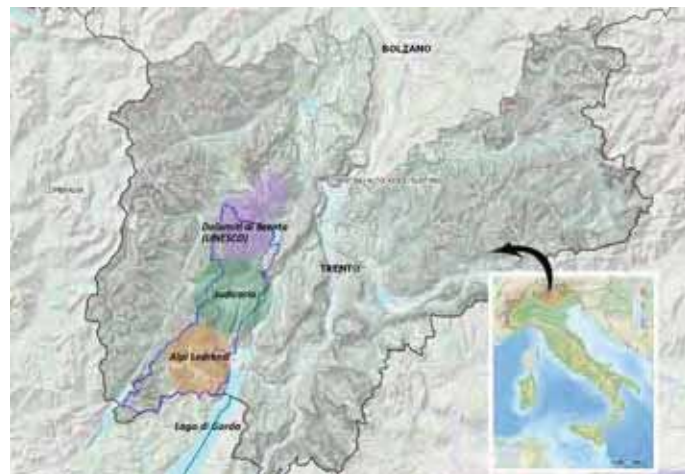
The attractive landscape stretching out before observers, in the form of a harmonious combination of small villages and cultivated and natural spaces, is indeed the result of collective area management practices which have gone on for centuries. However, at the same time this tradition of shared management has recently been reinterpreted, in the light of participatory planning methods which have become widespread at international level following the 1992 Conference in Rio de Janeiro. The question that everyone asked themselves regarded what was missing in such an inherently rich situation: the answer was unanimous,

admitting that there is not yet any instrument that can provide a coherent framework at local level for the many existing initiatives. In the attempt to identify such an instrument, the model of the Biosphere Reserve seemed to everyone to be the most appropriate. Its setting up would transform the rich – but still very fragmented – range of initiatives present in the Judicaria and Ledro area into a genuine local territorial system, whose sustainability would have two aspects: an ‘internal’ aspect linking the many existing initiatives underway within a functional network, and an ‘external’

aspect interacting with neighbouring areas, but also with the national and international context. Once again the model of the Biosphere Reserve and the existence of the World Network of Biosphere Reserves seemed to be the most appropriate for this scope. The drafting phase of the present document inherits a long-lasting tradition of local communities involvement in management decision activities and local development initiatives. The drafting process has been intense, efficient as well as highly participated.

PART I

SUMMARY



1. PROPOSED NAME OF THE BIOSPHERE RESERVE:

Italian Name:

Riserve dell Biosfera “Alpi Ledrensi e Judicaria: dalle Dolomiti al Garda”

English Name:

Biosphere Reserve “Ledro Alps and Judicaria. From the Dolomites to Lake Garda”

Justification of the name

The area lies in a mountainous territory at medium altitude, without physical limits internally. A close human community has developed, divided between two main poles represented by the Giudicarie Esteriori and Ledro, with elements which differentiate it in historic and socioeconomic terms as compared to other human communities in neighbouring alpine and pre-alpine areas .

The relative geographical isolation of these areas (and consequently their ‘marginal’ role) has led to the conservation of the traditional rural forest landscape, with numerous small and fragmented human settlements, very different from those in the neighbouring valleys, which have seen greater tourist and urban development.

The first part of the proposed name: “Ledro Alps and Judicaria” is intended to express the specific historical and geographical characteristics. The “Ledro Alps” represent a geographical

district commonly cited with reference to a mountainous area in the south-west of the province of Trento. The term “Judicaria” is the historic name given to this area from the beginning of the 11th century, also representing the root of the current geographical term of the “Giudicarie” (see historic background in section 3.2).

The second part of the name – “from the Dolomites to Lake Garda” – instead refers to two geographical contexts well-known internationally, one of which is included in the World Heritage List, and which delimit the area of the proposed reserve to the north and the south.

In this way the name chosen makes reference firstly to the historic and geographical nucleus of the proposed Biosphere Reserve, in which the local populations recognise themselves culturally, and secondly to the broader context of two very important geographical features useful for immediately placing the area within the global context.

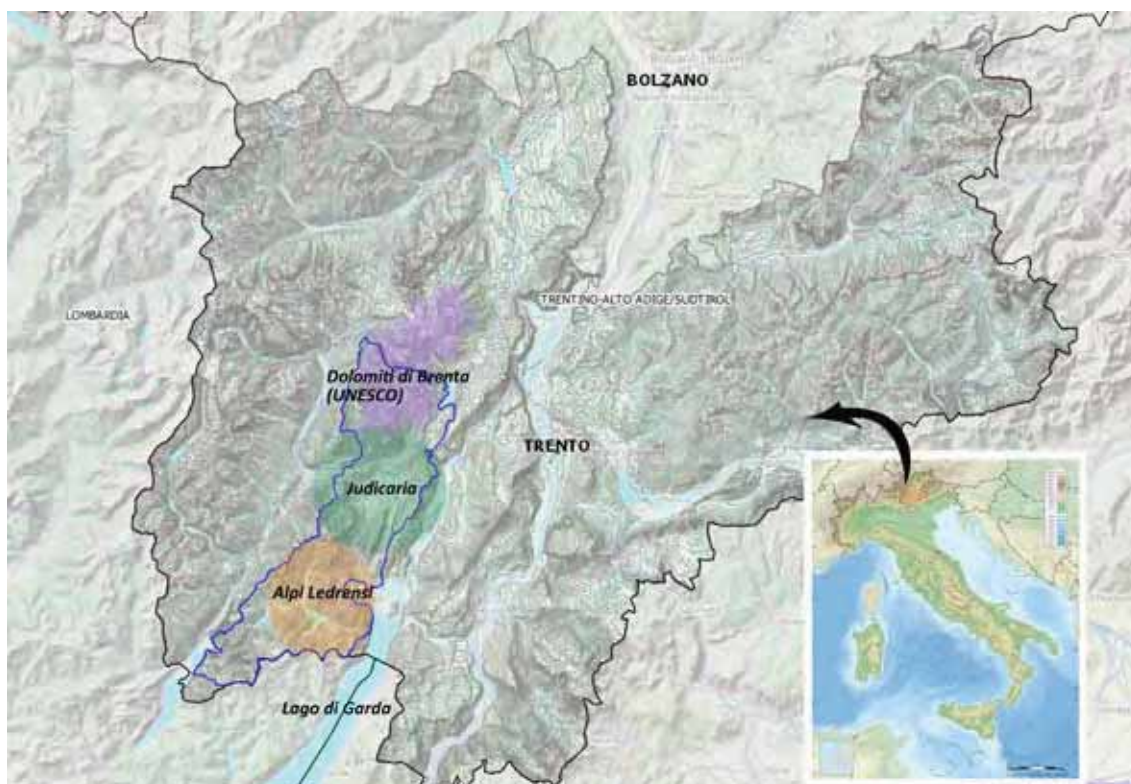


Fig. 1.1 The area of the PBR in relation to the national and provincial geographical context. The geographical references contained in the name “Ledro Alps and Judicaria” are highlighted

2. NAME OF THE COUNTRY: ITALY

3. FULFILLMENT OF THE THREE FUNCTIONS OF BIOSPHERE RESERVES:

3.1 “Conservation - contribute to the conservation of landscapes, ecosystems, species and genetic variation”

QUALITY OF THE NATURAL AND HUMAN ENVIRONMENT

The area of the proposed Biosphere Reserve is characterised by an extraordinary wealth of natural environments and landscapes. This can be explained by the particular location of the area, which acts as a “hinge” between the alpine and prealpine environments, in contact with the most southerly offshoot of the Mediterranean environment. In an area, just under 30 kilometres long there is a difference in altitude of more than 3000 metres, from the top of the hanging glacier of Cima Tosa (3173 m), the highest peak in the Brenta Dolomites, to the 63 metres a.s.l. at the lowest point in the reserve, near Lake Garda. (See Annex 1.1)

One of the aspects making the area of such great naturalistic value is the fact that it acts as a corridor across the Alps for migrating birds and large carnivores in the autumn. This role is an indicator, along with its overall environmental quality, the unitary nature of the area and the lack of internal ecological barriers, demonstrating the characteristics which have historically contributed towards characterising it as unique in terms of both human development and the landscape.

Another very precious element is the wealth of endemic species, resulting

from the position of the area, on the southern edge of the Alps. This area has always been characterised by a particularly favourable microclimate, with numerous “nunataks” (mountain peaks not covered by snow or ice, rising up within or on the edges of a glacier) forming in past glacial eras, contributing towards saving or differentiating the local flora and fauna.



Carex Baldensis, an endemic plant of the south of Trentino

The biodiversity heritage is linked not only to naturalistic aspects or natural history, but also to the traditional presence of human agricultural-forestry-pasture practices: wooded areas indeed alternate with agricultural terraces dating back hundreds of years and typical crops such as Pranzo chestnuts, Bleggio



Daphne petraea, one of the most “restricted” endemic species in the Ledro Alps

walnuts, potatoes, vines and olives, which are cultivated here at the highest latitude in the world. At the highest altitude the traditional animal husbandry system as example of active protection, contributes to maintain wide meadow areas and several endemic species.

INSTRUMENTS FOR SAFEGUARDING ENVIRONMENTAL QUALITY

Several protection instruments have been adopted in order to safeguard the relevant natural heritage of the proposed Reserve. Nevertheless, the different origin of these legislations cause partial or total overlapping of conflicting laws insisting on the same areas, engendering a complex situation. A thorough overview of the situation is described in section 14 and it is briefly shown as follows:

Provincial Adamello-Brenta Nature Park (PUP¹ 1967, Provincial Law 11/2007) see annex 3.5

Natura 2000 European network: SIC²/ZPS³ sites IT3120177, IT3120159, IT3120068, IT3120069, IT3120127, IT3120076, IT3120093, IT3120096, IT3120094, IT3120133, IT3120140 (among different laws, EC Decision 22.12.03) see annex 3.3

Provincial and local nature reserves: Fiavé, Lomasona, Lake Ampola, Laghetti, Pozza del Prete, Caiane (Provincial Law 11/07)

The establishment of the Biosphere Reserve and its proposed management structure (for details see chapt.17) envisage an effective

and connecting implementation of all these legal instruments, and therefore fulfilling the Madrid Action Plan target 13.



Agricultural landscape

STRATEGIC LOCATION AND ROLE AT GLOBAL LEVEL

The proposed Biosphere Reserve contributes towards creating a linking corridor between the Park of the Upper Lake Garda area in the Lombardia Region (to the south), and the Adamello-Brenta Nature Park (to the north). In the broader alpine context, the map of protected areas

indeed shows that the proposed Biosphere Reserve would contribute towards creating a broad corridor running north-south across the Alps, establishing territorial continuity between protected areas from the Po valley to the northern Alps (passing through Switzerland). In this way the designated area would fill in a large gap in the transnational series of protected areas.

¹ PAT's city plan; it is the main urban and socio-economics planning instrument of PAT (Annex 3.4).

² Site of Community Importance in the Natura 2000 European network, set up according to the Directive 92/43/CEE.

³ Special Protection Area, set up according to the Directive 79/409/CEE.

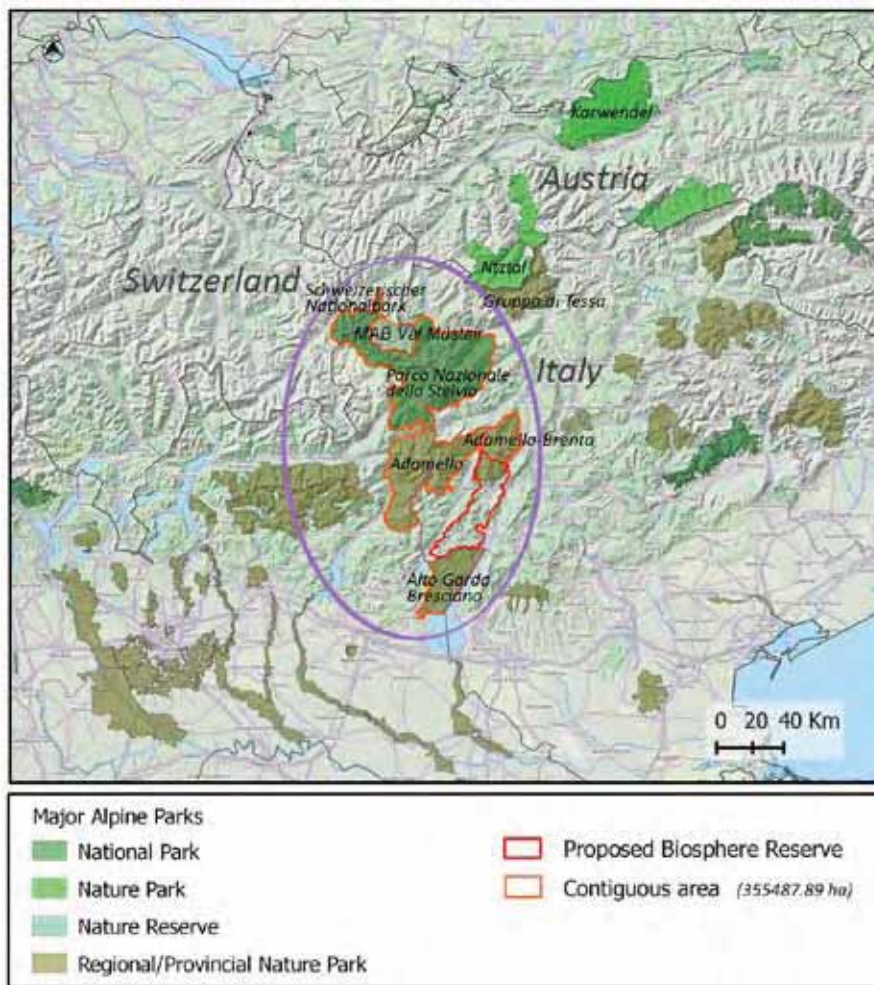


Fig. 3.1 The combination of areas neighbouring on the Ledro Alps and the Judicaria. The proposed BR represents a North/South linking corridor across protected areas in the Alps.

The contiguous protected areas system, more than 330.000 ha, outwards the Reserve Biosphere

boundaries, includes the following protected areas:

- the Adamello-Brenta Nature Park (Trentino);
- the Adamello Regional Park (Lombardia);
- the Stelvio National Park (Trentino Alto Adige and Lombardia)
- the Engadina Swiss National Park
- the Mustair reserve (Switzerland)
- the Upper-Garda Regional Park (Area of Brescia)

The proposed Biosphere Reserve will be linked with a wider protected areas

system thanks to its proximity with them.

3.2 “Development - foster economic and human development which is socio-culturally and ecologically sustainable”

THE ROOTS OF DEVELOPMENT

Over the centuries the human community in the original Judicaria Summa Laganensis¹ has developed a method of managing the area through community statutes, which establish the rights/duties of all inhabitants, in particular shared responsibility for management of “collective property”, above all waters, woods and alpine pasture (the main natural resources providing indispensable ecosystem services for the local community).

Map dating back to 1574 by Paolo Furlani, showing the “Zudicaria” and Lakes Garda and Ledro to the south



Map dating back to 1620, from the Giovanni Antonio Magini catalogue, showing the Judicaria; beyond the limit of the IUDICARIA, one can note Lake Garda (Riua) and Lake Ledro (Mezzolago) at the bottom; at the centre there is the Giudicarie Esteriori (Steneco, Coma Thermae)



¹ The earliest denomination “Judicaria” goes back to 927 A.C and it is mentioned in the testament of the bishop of Verona Notecherio, bequeathing “decarias meas proprias, quam habeo in Judicaria Summa Laganense”. In 927, at King Berengario’s time, this territory belonged to Judicaria Summa Laganensis. Indeed, in Longobardis’ period (VI-VIII sec.) some regions tracing preexisting Romanic military boundaries were called “Giudicarie” or “Giudicirie”. It is reasonable to imagine a Giudicarie system, placed at the Northern edges of the Longobardic empire.

The traditional use of collective property rights would seem to have been relatively widespread in the medieval era, but its continuation up to the present day, with the adaptation of current regulations within a modern and functional system, has very few comparisons at global level (here we are dealing with private but undivided property: “civic use” rights managed directly by the municipalities, or by special ASUCs - Amministrazione Separata degli Usi Civici¹, depending on the individual case). The tendency for citizens to participate actively in numerous public service activities and the attentive and responsible management of the area heritage is probably related to this traditional system.

As the Giudicarie Esteriori (namely the central-southern part of the former Judicaria) are more isolated and marginal as compared to other valleys in the ancient Judicaria due to the morphology of the mountains, together with Tenno and Ledro, centers of more importance, they have been less clearly affected by the economic boom and tourist and industrial development in Trentino. These have characterised neighbouring valleys to a greater extent, from the Rendena and upper

¹ Separate management of civic uses. The right of civic use is an historical management strategy of natural resources in some parts of the Alps. It belongs to the community right (hence collective), guaranteeing the access to some natural resources (such as wood and meadows) to each family. Currently this right of use refers to more than 80% of woods and meadows of the Province. ASUC is the authority for the management of this right.

Lake Garda area (intense tourist exploitation) to the Val del Chiese (heavy and light industry).

The population living in the heart of the ‘Giudicarie’ area still identifies with this term today, commonly adopted as a place name and as an indication of geographical and social identity. It is not by chance that a cultural association was founded 14 years ago, called the “Associazione pro Ecomuseo della Judicaria” (Judicaria Ecomuseum Association²). As compared to the rest of Trentino, the natural environment and cultural landscape have been better conserved, there are fewer holiday homes and warehouses and the cooperative movement has generally taken on a more important role when compared to similar areas, to the extent that it is present in all sectors of economic and social life.

However this model is showing some signs of crisis, including a growing tendency for local residents to commute; this is indicative of the need to reinforce opportunities for work locally, but at the same time of the fact that the population is deeply rooted in the area. Local employment mainly revolves around farming and forestry, and tourist activities at a not particularly intensive level. The type

² Funded within L.P. in 2003, it is an inter-municipalities body including Municipalities of Giudicarie Esteriori and Tenno. It is based on a cultural project of territorial valorization acting through a staff and strictly related with other elements for the local touristic and cultural promotion (APT, different associations, Pro Ecomuseo association and Municipalities) see annex 8.4.

of tourist activities present would appear to be compatible with the geographical area:

- “soft”/family tourism at Lake Ledro;
- old villages in the Tenno area;
- Comano spa (still “collectively” owned by Giudicarie Esteriori Communities)

Comano spa represents the core of “well-being district”. The thermal area is extended though the whole Giudicarie Esteriori. Particularly important is the effort to integrate tourism, agriculture and animal husbandry. There is however also a drive towards different, less sustainable models of development in the area. Agricultural activities and animal husbandry start from a traditional base marked by a strong identity and full environmental

compatibility, but today they appear to have changed in part. In the past few decades, the fertile plain of Lomaso and Fiavé has been involved in forms of intensive animal husbandry that have led to several problems in terms of coexistence with the geographical area, with the risk of standardisation of the agricultural landscape and difficulties in waste management. The acceptance of the Biosphere Reserve (MAB) model comes precisely from the desire to better manage the grafting of new business activities onto traditional activities, allowing the possibility of development, but without at the same time uncritically importing models typical of plain environments or involving major settlements and exploitation of the area.



The village of Rango, in the Bleggio area, an example of the conservation of traditional types of building.

PROSPECTS FOR DEVELOPMENT COHERENT WITH THE MAB PROGRAMME

Through a process of exchanging ideas with all local stakeholders, the nomination as a Biosphere Reserve is intended to consolidate a long process of cooperation already undertaken in order to implement individual projects, such as the setting up of the Judicaria Ecomuseum (which effectively followed the model of a local Agenda 21 process), the participatory landscape project “Comano Valley 2.0”, the creation of the Ledro museum network, the setting up of the Ledro Network of Reserves, the CEST for the Adamello-Brenta Park, UNESCO’s nominations (Pile Dwellings ad Dolomites), integrated development project of Ledro’s Network of Reserves¹ within the EU project LIFE+ “Trentino Ecological Network”².

¹ The Network of Reserves represents a new instrument for the small protected areas, currently being established and provided by local legislation (L.P. 11/07), with a surprising similarity of intentions in relation to those of the MAB programme. It is proposed to make the management and enhancement of protected areas more effective with an approach from below, activated on a voluntary basis by municipalities in which there are area systems of particular natural, scientific, historic, cultural and landscape interest. The Networks of Reserves were officially established in the recent L.P. 11/07 “Governance of forest and mountain areas, watercourses and protected areas” which converted the concepts of “ecological network” and coherence described in the European “Habitat” directive into institutional terms.

² LIFE+ T.E.N (Trentino Ecological Network) project, funded by EU and lead by Autonomous Province of Trento with the scientific support of MUSE (Museo delle Scienze), carries on several concrete actions aimed at improving the ecological connectivity of the area, through the creation of new reserve networks. Moreover,

The Biosphere Reserve will therefore make it possible to develop synergy between the area institutions involved, allowing better coordination of the activities of organisations which have not yet fully expressed their potential, due to their size and political and institutional influence, while moving in the same direction, and in this way addressing the target 26 of the Madrid Action Plan.

This is the case of the Judicaria Ecomuseum and the Ledro museum network that do not exclusively deal with territory protection. They are in charge of involving various actors in cultural initiatives.

During the public meetings held in the preparatory phase, clear indications emerged from the main players involved, making it possible to outline new overall strategies for local development, based on three decisive factors:

- a) Safeguarding/valorization of the environment and landscape;
- b) social cohesion;
- c) sustainable socioeconomic development, founded mainly on promoting local products and on the production of energy from renewable sources.

In this framework of sustainable local

it considers an intense dialogue phase on the interrelated themes of nature and socio-economics development, mostly thought the involvement of local administrators, economic operators (farmers and touristic infrastructures) and local associations. A plan for the economic development of the Ledro area is planned in Action C19 of LIFE+ T.E.N. project. The results achieved from this study will be used for the implementation of new initiatives of sustainable tourism, defined with a participation process, started in 2013.

development, the future Management Plan of the Biosphere Reserve will thus concentrate on identifying new opportunities for traditional activities. The new opportunities for openness and collaboration at national and international level, resulting from inclusion in the World Network of Biosphere Re-

serves, will lead to a useful exchange of experience in terms of finding solutions to development problems also common to other reserves, such as compatibility between farming, local communities and tourist activities and the support and promotion of local products.



Old houses in the Giudicarie: the thatched roof represented a traditional element typical of dwellings up to the first half of the 20th century

3.3 Logistic support - support for demonstration projects, environmental education and training, research and monitoring related to local, regional, national and global issues of conservation and sustainable development.

Various bodies operate in the area in the field of research and dissemination at local, national and international level, often organised into permanent collaborative networks or networks created for specific projects.

For several years the Adamello-Brenta Nature Park, set up in 1988, has (a) promoted experimental projects for active safeguarding of secondary ecosystems, also carrying out research and monitoring of different biotic and abiotic components related to species and ecosystems, (b) carried out information projects in relation to environmental conservation and the use of sustainable resources, (c) carried out actions in the field of sustainable mobility and sustainable tourism, promoting local food and agriculture products, and finally (d) managed two important visitors centres in the area (the centre at the S. Lorenzo in Banale Park “C’era una volta” (Once upon

a time), on an ethnographic theme, and the botanical gardens of Stenico (Natural Area of Rio Bianco (White River) with its visitors centre), also dealing with the maintenance of an extensive network of footpaths, which represent the basic infrastructure for encouraging tourism with a low environmental impact and for encouraging the economies of disadvantaged or marginal mountain areas.

For around twenty years the Science Museum has also activated a permanent survey station to record migration and ring birdlife at Bocca di Caset, in the Val di Ledro.

In 1997 this station became part of the network of stations surveying migration in the alpine area within the context of “Progetto Alpi”. Furthermore, at the ringing station there is a small visitors centre which organises guided trips and activities to observe the fauna.



Bird-ringing activities by researchers from MUSE at the Bocca di Caset site, a ZPS of international importance.

The museum network of the Valle di Ledro (ReLED¹),) was established in 2012 as a link between the various museums in the Valle di Ledro, with the scope of reinforcing cultural, educational, scientific and tourist facilities, managed by a single body. The network was entrusted to the Science Museum (a museum complex headed by MUSE², inaugurated in July 2013 – formerly MTSN – Trento Natural Science Museum) and in particular to the area offices of the Lake Ledro pile-dwelling museum, attached to the pile-dwelling site included in the World Heritage list, as regards management, dissemination and scientific research. The six participants in the network are distributed in an area which goes from Lake Garda to Lake Idro and includes museums of archaeological, naturalistic and historic interest.

Since 2002 the Judicaria Ecomuseum has operated in the field of training, dissemination and promotion of the area, particularly in relation to historic and cultural aspects. The ecomuseum is an extensive cultural project, which places the area heritage to be safeguarded and promoted at the centre of its activities, through the active involvement of the community living there. It is different from a traditional museum, as the space of reference is not a building, but

¹ Museum network of Ledro Valley; it manages with coordinated actions different cultural and environmental structures with educational purposes. It is implemented by MuSE.

² MUSE: Museum of Sciences, provincial body with scientific and educational goals.

rather the whole area. Furthermore, for several years it has carried out popular cultural dissemination activities for the population and tourists.



Activities to raise awareness of the area, by the Associazione Pro Ecomuseo at a local farm

The Museo Civico in Rovereto has implemented the strategy of the “extended museum”, which has led it to operate effectively in the area, going beyond the institutional confines of museum buildings. The museum is divided into seven sections. Specifically, for more than twenty years the botanical department of the Museo Civico in Rovereto has been involved in a census of flora in Trentino, for which it is the organisation of reference in a project to compile a map of flora on the European model. This project has provided in-depth knowledge of the flora in the proposed area.

Since 2000 the information and monitoring department of the Agenzia Provinciale per la Protezione dell’Ambiente (APPA) – (Provincial



Educational activities in experimental archeology

Agency for Environmental Protection) – has carried out activities in the field of ‘Informazione, formazione ed educazione ambientale’ (INFEA) – (information, training and environmental education) - through the Rete Trentina di educazione ambientale per lo sviluppo sostenibile (Trentino network of environmental education for sustainable development), which operates locally through a branch of the network housed at the Community of Giudicarie³. In the Ledro Valley

³ The Community of Giudicarie covers about one fifth of the territory of the Autonomous Province of Trento, with about 38.000 inhabitants, including 39 Municipalities and more than 120 residential zones. The area includes Giudicarie Esteriori, with Lomaso, Bleggio, Banale and River Giudicarie Interiori, formed by Sarca and Chiese basin. Communities of valley are public bodies, placed between the Autonomous Province of Trento and the Municipalities; they have specific functions and are in charge of building and adopting suitable politics for their needs and features of their land. Among their competencies there are territorial and urban planning, as well as planning and funding of local inter-municipal

area there is also the “Villino Campi” environmental education centre at Riva del Garda.

The Biotopes Office of the Autonomous Province of Trento plans and carries out educational and cultural promotion activities and initiatives for the social exploitation of biotopes, reserves and areas in the Natura 2000 network, including the production of educational and informative material. It also carries out tasks related to the identification of features of particular naturalistic value and consequential safeguarding provisions, also dealing with initiatives directed at monitoring, research, training and refresher courses. Much of the knowledge regarding Natura 2000 species and habitats at sites in the area has come from the activities of the Biotopes Office. The office also supervises the visitors centre at Lake Ampola.

projects (www.comunitadellegiudicarie.it).

The Heritage Office of the Autonomous Province of Trento manages research and environment educational activities, related to the pile-dwelling site and peat bog of Fiavé, already been acknowledged by UNESCO as cultural heritage. In particular, the pile-dwelling Museum of Fiavé, inaugurated in 2012 and managed by the Autonomous Province of Trento, represents an exceptionally important point of reference for the history of the most ancient European farming communities. The museum explores the history of the different pile dwelling settlements following one another along the banks of Lake Carera, a lake of glacial origin, between the Late Neolithic era and the Bronze Age. It also displays a selection of extraordinary objects providing precious evidence of considerable technical and construction expertise and artisan skills. One section of the museum is dedicated to the Fiavé-Carera biotope, a provincial nature reserve and site of European Community interest, where the remains of the pile dwelling can still be seen.

The Stenico Castle, belonging to PAT, is more than 2000 years old, witnesses the importance of the area as transition area between the Giudicarie and Garda lake. It hosts a museum which is open all the year long. Nowadays it represents the most important building of the whole area, therefore, in case of recognition, it will

host the seat of the PBR. For more details see chapt. 10.6 and annex 8.8.

Finally, the activities of the tourist offices¹ of Ledro and Comano, InGarda² and Consorzio pro Loco³ di Ledro should be recalled, directed at promoting various activities in support of 'soft' tourism: sustainable mobility, coordination of activities and promotion of excursions and cycling, cultural tourism and naturalistic itineraries.

The establishment of the Biosphere Reserve aims at building a network of research and education projects (as those above mentioned), following the recommendations developed within the framework of the "United Nations Decade of Education for Sustainable Development" (UNDESD) and the related UNESCO guidelines.

¹ The Provincial Tourism Agency (APT), it is a co-operative society with a private/public partnership with tourism promotion purposes.

² Trentino Tourism Agency of Upper Garda.

³ Voluntary association founded in Trentino in XIX century for the protection and the valorisation of the traditional local heritage; they currently have great social relevance and are widely spread in Italy.



Stenico Castle, an old manor house, formerly used to govern the local area, suggested as the headquarters for the proposed BR



View of the Giudicarie

4. CRITERIA FOR DESIGNATION AS A BIOSPHERE RESERVE

4.1 “Encompass a mosaic of ecological systems representative of major biogeographic region(s), including a gradation of human interventions.”

According to the 'Udvardy' international classification, the area nominated falls within the “Mixed

Mountain system (biome 12), Central European Mountains (Province 32), Palaeartic (Region 2)” (see Fig. 4.1).

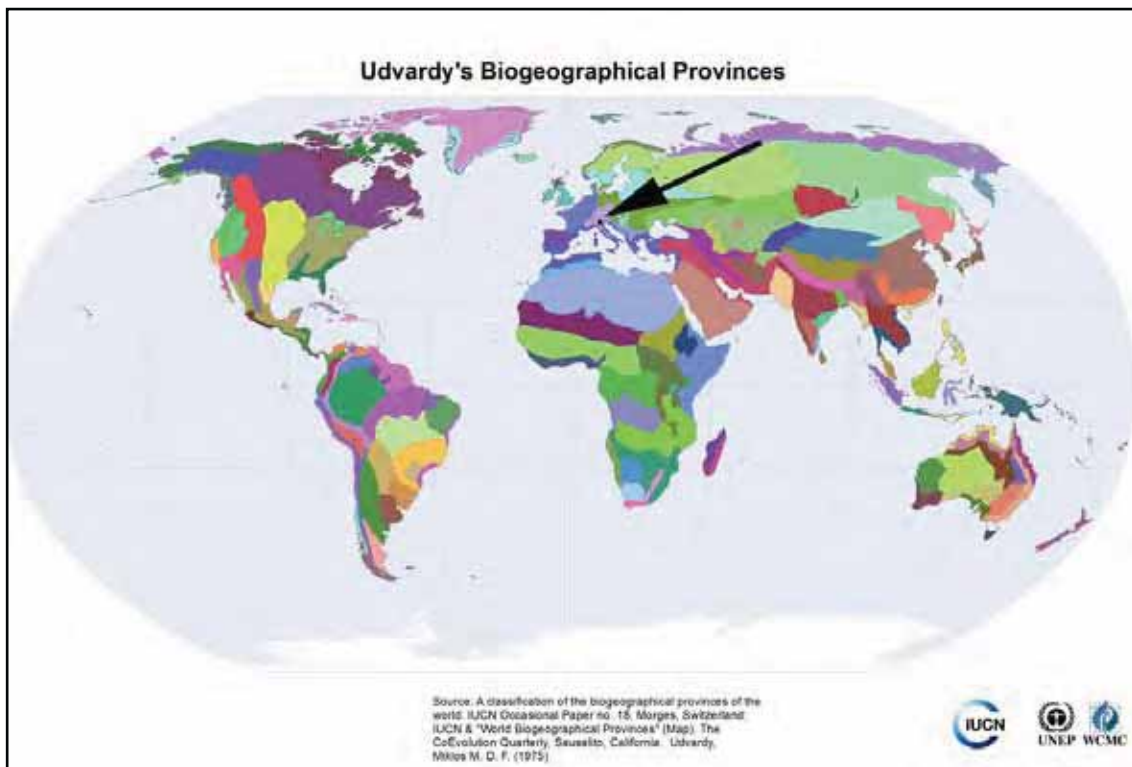


Fig. 4.1 - Udvardy map of the biogeographical provinces in the world: the area of the proposed BR falls within the biome of the mixed mountain system.



The northern part of Lake Garda, a sub-Mediterranean environment in the midst of the mountains

The area of the Biosphere Reserve is representative of the southern slopes of the carbonate central-eastern Alps and represents an imaginary transect of environments leading from the

Mediterranean to the alpine tundra, passing through a wide prealpine band with a mantle of spruce and beech woods, alternating with traditional crops.



Woods represent the most widespread form of land cover in the proposed BR; here the forests of the Val Concei at Ledro are shown



Its southern and eastern boundary is the Lake Garda area, which represents the most well-known Mediterranean enclave in the continental area. Thanks to a microclimate resulting from the presence of the lake and the specific morphology of the area, the vegetation has typically Mediterranean characteristics, with holm oak woods and thermophilous-xerophilous species that arrive here at the upper limit of their area of distribution.

The extreme north of the reserve area instead has the typical appearance of continental alpine zones, well-represented in the area by the Adamello-Brenta Nature Park, with the typical Dolomitic landscape of carbonate pinnacles and faces, along with alpine meadows.

The heart of the reserves is represented by the rural landscape, traditionally given over to crops and stable grasslands, together with traditional forestry management.



The Giudicarie Esteriori, in the central part of the PBR, home to traditional agriculture of various kinds

The reserve therefore reflects the nature of the southern carbonate Alps, surrounded structurally by a wide prealpine band, with an alternation of gentle basins and inaccessible sites, therefore including significant environmental changes within a short distance. These are areas which although difficult to live in, have undergone a slow process of “domestication” (anthropization) over the centuries by the local population, which has concentrated itself in the few flat areas used for the cultivation of crops and permanent grasslands, whereas silviculture has prevailed on the wooded slopes.

The wide variety of environments is thus translated into an extraordinary wealth of plant and animal species, along with important historic and cultural evidence, partly as a result of the isolation of the resident population.

More specifically, the area nominated as a Biosphere Reserve includes a mosaic of habitats with different levels of conservation; from perfectly intact natural habitats at high altitude (culminating in the rocky pinnacles and peaks of the Brenta Dolomites, reaching a maximum altitude of 3,173 m a.s.l.), to semi-natural habitats with traditional management by man

(lowland meadows and pasture), agricultural areas and human settlements.

Taking for granted the value of more natural environments, here we wish to underline that the focus in terms of conservation and management of the PBR is on semi-natural habitats, created and shaped by traditional use and which require active management in order to also conserve their structural characteristics and flora in the future; this type of management has already been started up experimentally in the areas under the jurisdiction of the PNAB, to the extent that a special reserve has been set up for the purpose.

Core areas indicate the best conserved areas of natural or semi-natural habitats, of most value and equipped with appropriate instruments for their safeguarding. Buffer zones include situations which are not dissimilar, but of slightly less value or less effectively protected. Finally, areas most affected by human impact are transition zones, where the activities are mainly tourism and agriculture, making up a mosaic of business and farming activities, human settlements and residual areas of high naturalistic interest, leading to the traditional landscape.

4.2 “ Be of significance for biological diversity conservation”.

The variety of environments characterising the area of the PBR has led to considerable biodiversity. The extensive system of protected areas included within the area has made it possible to gain a relatively good knowledge in relation to the

presence of valuable elements, which include: habitats whose protection is considered to be a priority at European level; an exceptional wealth of endemic species; various areas of particular importance in terms of fauna.

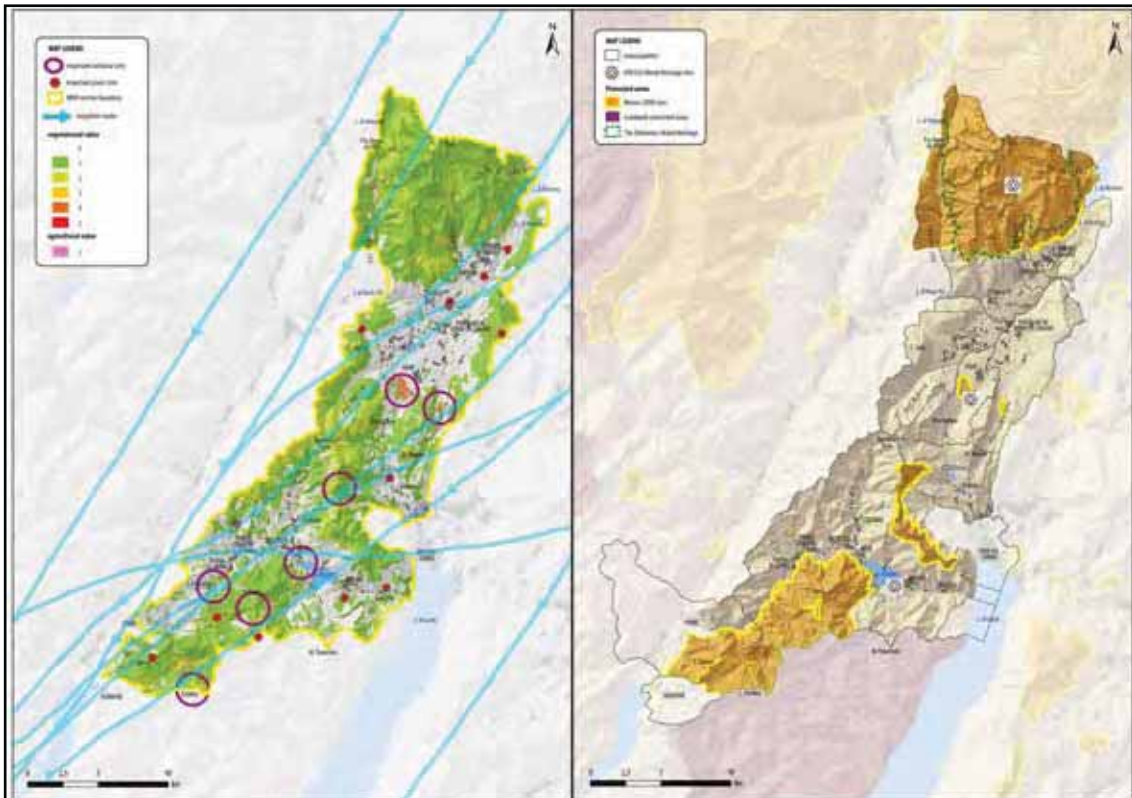


Fig. 4.2 On the left, areas of naturalistic value due to the presence of valuable habitats are shown (*), sites with important flora or sensitive sites for birdlife. On the right, the presence of various types of protected areas are highlighted, corresponding with areas of naturalistic value. Protected areas cover around 17.000 ha, namely 36% of the proposed area. The attributing of value in terms of flora takes place using a points system based on the value of the habitats according to Natura 2000 and their position within the provincial and national Red List – see habitat table in the following section. For internal zonation see map. par. 4.5.

PLANT BIODIVERSITY

Monitoring projects for Natura 2000 network sites¹ and a census of flora underway for several years in Trentino have made it possible to obtain an excellent knowledge of the area in terms of flora and vegetation.

The following table shows that the area of the proposed Biosphere Reserve is highly representative of

the flora in Trentino, containing no less than 68% of the species of flora present in the whole province.

The area has a considerable concentration of sites of interest in terms of flora, with rare, protected or endemic species of high value in relation to conservation; protected species represent 7.3% of the flora present in the territory of the proposed reserve.

Approximate number of species in the reserve	1600
% of flora in Trentino	68%
% of flora in Italy	24%
% protected and/or endemic specie in MAB	7.3%

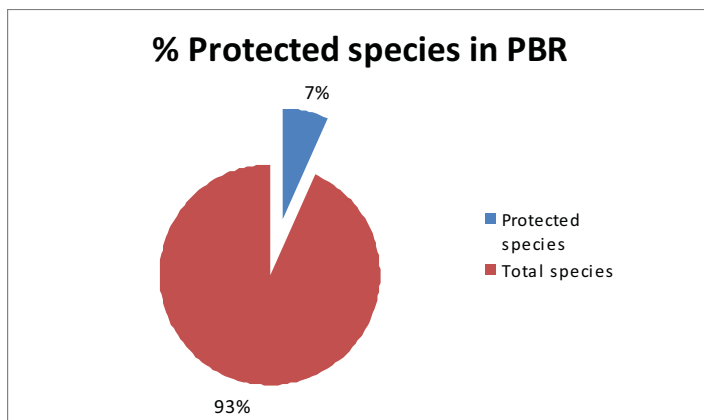


Fig. 4.3 The flora heritage of the proposed BR, also in terms of endemic species, in relation to provincial and national data

¹ The Natura 2000 network is the largest ecological network in the world. The protected areas it identifies cover 20% of EU territory. The share rises to 30% at local level in the Province of Trento. The network is based on two European directives: the “Birds” Directive (2009/147/CEE) and the “Habitats” Directive (92/43/CEE). The “Birds” Directive protects all wild birds in Europe and is designed to conserve the main habitats of rare, vulnerable or threatened species. The “Habitats” Directive extends the field of application of protection measures to other threatened

habitats, plants and animals, rare or endemic, for a total of more than 1000 species. It should be noted that the latter directive pays particular attention to human activities. Man is an integral part of nature. The directive states: “The main aim (is) to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements (...) the maintenance of such biodiversity may (...) require the maintenance, or even the encouragement of human activities”.

PROTECTION	No. of species
Red List for TN - 2001	84
Red List for ITA IUCN-2013	17
IUCN	8
Berne	6
Cites B	18
Habitat annex 2	4
Habitat annex 4	2
Habitat annex 5	4
<i>Steno-endemic species</i>	33

Fig. 4.4 Number of species of rare flora present in the various types of national and international classifications.

The abundance of sites of interest in terms of flora can be attributed mainly to the high concentration of endemic species, with very high levels at provincial level and more generally in the Alps.

The rich endemic flora of the area includes, among others, *Saxifraga tombeanensis* and *Daphne petraea* (both in Annex II, Dir. 92/43/CEE),

Gentiana brentae, *Erysimum sylvestre* subsp. *aurantiacum*, *Festuca austrodolomitica*, *Silene elisabethae*, *Viola dubyana*, *Daphne reichsteini*, *Euphorbia variabilis*, *Telekia speciosissima*, *Ranunculus bilobus*, *Laserpitium nitidum*, *Nigritella buschmanniae* and *Aquilegia thalictrifolia*.



Nigritella buschmanniae, endemic orchid in the Red List for Trentino.



Tulipa australis, one of the many endemic species that characterise the Ledro Alps.



The variety of flora in the Ledro Alps: one of the most valuable areas at alpine level

A survey of plants present within the proposed Biosphere Reserve shows a wide variety of different environments, with 32 Natura 2000 habitats, including 7 priority habitats, with no less than 15 present in the Red List for Trentino (Lasen, 2006). The following table shows priority

habitats or those present in the regional or national Red Lists, whereas the full list is presented in section 11.

The data given in the table represents the basis for the map of valuable flora presented at the beginning of section 4.2.

Habitat		Nat.2000 priority	Trentino red list	National red list
4070	Bushes with <i>Pinus mugo</i> and <i>Rhododendron hirsutum</i>	yes	/	low
6110	Rupicolous calcareous or basophilic grasslands of the <i>Alyso-Sedion albi</i>	yes	CR	low
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>)	yes	EN/CR	low
6230	Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)	yes	LR	low
8240	Limestone pavements	yes	EN	low
9180	<i>Tilio-Acerion</i> forests of slopes, screes and ravines	yes	VU	low
91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)	yes	VU/EN	high
3130	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i>	no	CR	high
4080	Sub-Arctic <i>Salix</i> spp. scrub	no	CR	/
3150	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation	no	EN	medium
3240	Alpine rivers and their ligneous vegetation with <i>Salix elaeagnos</i>	no	EN	low
6410	<i>Molinia</i> meadows on calcareous, peaty or clayey-siltladen soils (<i>Molinion caeruleae</i>)	no	EN	high
6510	Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)	no	EN	medium
6520	Mountain hay meadows	no	EN	low
7140	Transition mires and quaking bogs	no	EN	medium-high
7230	Alkaline fens	no	EN	high

Fig. 4.5 EU habitats present in relation to rarity and conservation.

The priority habitats in the reserve include forest habitats of particular rarity and value, such as riparian forests with European alder (*Alnus glutinosa*) and European ash (*Alnus incana*) (91E0), Tilio-Acerion forests (9180) and bushes with mountain pine (4070), but also semi-natural formations such as *Nardus* grasslands, dry grasslands and hay meadows.

The dry grasslands in the area of the reserve are particularly important,

being well-represented locally by plant species relating to the rare *Festuco-Brometalia* (6210). They are dry to mesophile grasslands, at all events dry, widespread from the slopes of hills to the mountainous band. The permanence of this kind of habitat is guaranteed by regular use (traditionally mowing or pasture) and by the absence of fertilisation. Habitat 6210 is considered a priority when it represents an important orchid site, a condition which has been verified to still exist in the case of many of

the dry grassland areas included in the census of the area, but which in the event of abandon (or vice-versa excessive intensification) runs the risk of not being automatically continued in the future.

This habitat is often situated outside protected areas, precisely due to its nature, closely linked to use by man. Modification in traditional mowing

practices (and frequent substitution of mowing with pasture) has led in recent times to a strong decline. For this reason it is also considered to be at risk (category EN/CR), in the Red List of habitats in Trentino. The search for balanced and integrated development respecting the environment is the best guarantee for its perpetuation.



Cypripedium calceolus, included in the Red List for Trentino. It is protected by Natura 2000

BIODIVERSITY OF THE FAUNA

The area of the proposed reserve is characterised by a varied landscape, with rocky environments, meadows, large forests, rivers and peat bogs. The wide variety of environments means that area is frequented by numerous species of animals, which find a suitable place for living, reproducing and stopping off during transit.

The reserve coincides with one of the most important corridors in the Alps for carnivorous fauna and autumn post-reproductive migration of birdlife, as demonstrated by the permanent migration survey station set up at Bocca di Caset by MUSE. The relevance of this phenomenon is well addressed by Life+ TEN project¹.

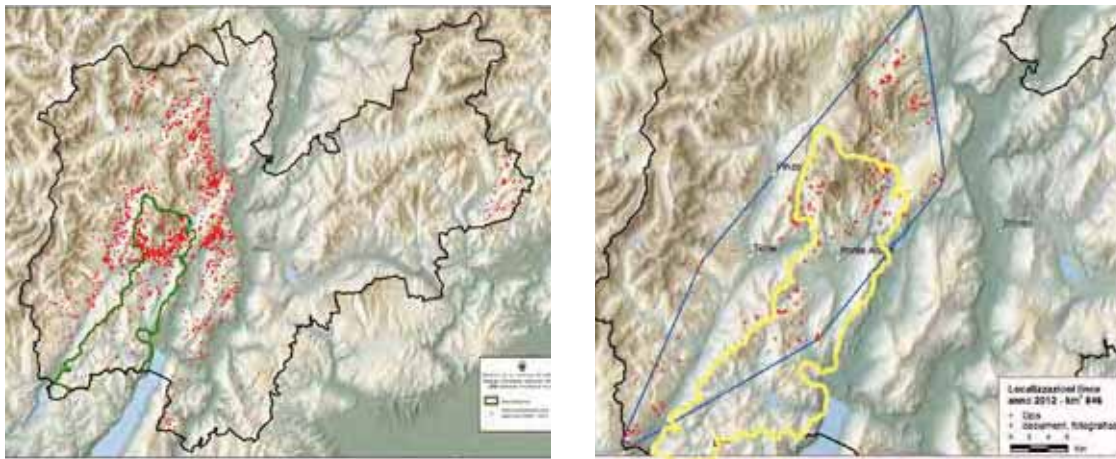


Fig. 4.6 Bear (*Ursus arctos*) and lynx (*Linx linx*) sighting distribution. PBR works as corridor between the source area of PNAB and the pre-alpine areas of Garda.

¹ LIFE+ T.E.N. project, supported by EU, considers the Provincial Ecological Network as an interconnected group of natural areas linked through ecological corridors, namely stripes of land allowing the migration of species, animal species mostly. This provincial network is open towards the surrounding zones and hence it is included in the wider alpine ecological network.



Fig. 4.7 (Left): migratory routes between 1000 and 2000 m high with light wind and favourable weather. Numbers refer to relevant sites and crossing places for migratory transit. (Right): low-altitude migratory routes with west winds and shallow cloud cover.

From the lynx and bear to invertebrates, the reserve can boast a healthy diversity of fauna, with one priority species included in Annex II of Directive 92/43/CEE (*Ursus arctos*), 4 species of community interest and more than 35 species of birds listed

in Annex I of Directive 92/43/CEE. There are no less than 149 protected species recorded in the area of the proposed Biosphere Reserve. The following table shows the number of species subject to different levels of protection.

PROTECTION	No. of species
IUCN	132
L. 157/92 – Italian law	109
79/409 CEE, Annex 1	37
BERNE	136
CITES, Annex A	21
CITES, Annex B	6
BONN, Ap.2	27
HABITAT Dir., Annex 2	5
HABITAT Dir., Annex 4	12
HABITAT Dir., Annex 5	3

Fig. 4.8 Number of species of rare fauna present in the various types of national and international classifications.

The following table (Fig. 4.9) summarises some of the most significant fauna reported in the area

of the reserve, the complete list being presented in the Annex.

Species	Name	Group	Motivation	Species of comm. interest	Priority species
<i>Vertigo angustior</i>	Narrow-mouthed whorl snail	Invertebrates	Annex II, Dir. 92/43/CEE	x	
<i>Austropotamobius pallipes</i>	Freshwater crayfish	Invertebrates	Annex II, Dir. 92/43/CEE	x	
<i>Barbastella barbastellus</i>	Barbastelle	Mammals	Annex II, Dir. 92/43/CEE	x	
<i>Ursus arctos</i>	Brown bear	Mammals	Annex II, Dir. 92/43/CEE		x
<i>Lynx lynx</i>	Lynx	Mammals	Annex II, Dir. 92/43/CEE	x	
<i>Alectoris graeca saxatilis</i>	Rock partridge	Birds	Annex I, Dir.79/409/CEE		
<i>Aquila chrysaetos</i>	Eagle	Birds	Annex I, Dir.79/409/CEE		
<i>Bonasa bonasia</i>	Hazel grouse	Birds	Annex I, Dir.79/409/CEE		
<i>Tetrao tetrix tetrix</i>	Black grouse	Birds	Annex I, Dir.79/409/CEE		
<i>Tetrao urogallus</i>	Capercaillie	Birds	Annex I, Dir.79/409/CEE		
<i>Gypaetus barbatus</i>	Bearded vulture	Birds	Annex I, Dir.79/409/CEE		
<i>Lagopus mutus helveticus</i>	Ptarmigan	Birds	Annex I, Dir.79/409/CEE		

Fig. 4.9

4.3 “Provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale”.

The interpretation of the model of the Biosphere Reserve by local communities lies in the sustainability of development in a fragile and delicate alpine area with a wealth of man-biosphere relations, which over the centuries have led to landscapes of great value in terms of ecosystems and socioeconomic development, with repercussions on identity and social organisation.

The objectives related to the nomination as a Biosphere Reserve, which will also represent the guidelines for defining the future Management Plan for the reserve, have been developed with reference to several strategic documents issued recently by the MAB secretariat; in particular, the ‘Seville Strategy for the World Network of Biosphere Reserves’ and the ‘Madrid Action Plan for Biosphere Reserves 2008-2013’. Additional international strategic instruments, as the Alpine Convention and the European Landscape Convention, as well as provincial documents, as the Statute of Autonomy of Trentino Alto Adige, have also been considered for the proposed areas. At local level (Province of Trento, Comunità di Valle, municipalities, Nature Park) the framework is completed by a complex series of town-planning instruments and laws essentially in

agreement with the objectives of the MAB programme: PUP, L.P. 11/07, PNAB Plan and the preliminary version of the CdG Territorial Plan (see Annex 4.1) ascribe relevancy to the landscape and aim at a territory sustainable development.

The complex range of rules, plans and programmes (see chapt.13 and 17) is also the result of lively social and area dynamics and a consolidated tradition of participation and sharing, which has its roots historically in the collective management of public assets (civic use) over centuries, and in the exceptionally widespread presence of the cooperative model, which involves almost the whole population in the area.

The participatory process related to the MAB nomination represents the natural continuation of a similar process followed in support of processes of voluntary membership and the setting up of the ‘Network of Reserves’ of the Ledro Alps and tourism development plans for the areas concerned.

The drawing up of the Nomination Dossier for recognition of the Biosphere Reserve capitalises on 14 years of work by the Judicaria Ecomuseum and the “participatory landscape project” called “Comano Valley 2.0” which in the last 4 years has seen the involvement

of more than a hundred people under 25 through numerous Open Space Technologies, study trips and meetings. The processes involved in the drawing up of the CETS for PNAB, the recent review of the Park Plan, the creation of the Ledro museum network and the setting up of the Ledro Alps network of reserves have also followed a bottom-up procedure, and have been developed following extensive exchange of ideas with all the local stakeholders. Other participating processes dealt with the Well-being District of Giudicarie Esteriori Plan (Piano Distretto Benessere Giudicarie Esteriori), preliminary document of the Community of Giudicarie Territorial Plan and the pile-dwelling sites and Dolomites sites WHS. It can therefore be affirmed that the recognition for which the nomination is presented did not represent the reason behind the initiatives in the area, but rather a natural consequence of these: obtaining a 'logo' is not the objective, but rather the starting point for systematically incorporating numerous projects and activities, given that administrators have become aware that they have been following since years the same orientation given by UNESCO's MAB programme. Thus the area is currently in a position of being able to demonstrate that it has operated according to the same principles and criteria and wishes to continue along the route taken, with an aware renewed commitment thanks to recognition at international

level.

For this reason we can affirm that while consultation with the population on the specific issue of the Biosphere Reserve has been relatively recent, as it began in spring 2013, on the more general topic of the sustainability of development it has taken place in a widespread and in-depth manner in the context of various participatory processes, with aims and objectives entirely in line with those pursued by the UNESCO's MAB programme. To mention the main ones, we recall the processes taking place in the last few years in relation to the CETS and PNAB's new Park Plan, the setting up of the Ledro Alps RR, the preliminary document for the PTC of the CdG community, together with consultation carried out by the Ecomuseum, described in detail in section 13.3. The combination of these virtuous processes has given rise to a general awareness of the models of development to pursue, which has also been followed by coherent choices in the field of area planning. It is therefore not an exaggeration to suggest that idea of joining the network of Biosphere Reserves has been nurtured at length over the last decade, with the decision to nominate the area as a Biosphere Reserve representing the formal conclusion of a process of growth progressively maturing over time.

We can therefore undoubtedly consider this phase of consultation as preparation for the nomination and therefore an integral part of it.

Initially 18 relevant Themes and Objectives have been identified, in relation to which one or more activities may be started up or completed in

the future Management Plan for the reserve, which will be subject to the analysis and approval of the institutions and other parties involved.

A. ENVIRONMENT

	Themes and Objectives	Examples of activities for the Management Plan
1	Protecting the climate	Membership of the area in the Covenant of Mayors (and hence to PAES ¹). Carbon storage provided by forest resources
2	Environmental management of the area	Extension of EMAS registration ²
3	Safeguarding of waters	Setting up of "Sarca River Park" network of reserves Appraisal of reserve water resources
4	Conservation of biodiversity	Green corridor Upper Lake Garda-ABNP Setting up of Ledro Alps Network of Reserves; Putting into effect of SR/API2 ³ management plan of ABNP
5	Safeguarding of the landscape	Landscape map Comunità Giudicarie and CAGL ⁴

¹ Action Plan for the Sustainable Energy; it is a key document where agreement subscribers define strategies to achieve the minimum objective for the Co2 emission reduction by 2020.

² At the present moment the following public entities have received the EMAS certification: Municipality of Fivavé, Municipality of Ledro, Municipality of Tenno, CdG and PNAB (see annex 8.2)

³ API 2 is a zone in the southern Brenta area, set up in order to actively conserve dry meadow habitat.

⁴ The Community of Upper Lake Garda and Ledro includes 7 Municipalities and more than 40.000 inhabitants. The territory covers the low flow of Sarca, Tenno Municipality and the Valley of Ledro.

B. SOCIETY

	Themes and Objectives	Examples of activities for the Management Plan
6	Cultural heritage network	Coordination of cultural activities starting from Ecomuseum and ReLED Local network of traditions and folklore
7	Environmental education	Education on sustainable development, footprint
8	Communication	Social media, meetings, traditional media
9	Network	Partnership in the context of MAB network and the Euregio
10	Cooperation	Cooperative and Partner Network – Fondaz. Guetti
11	Solidarity	International Cooperation projects – e.g. EdJ with Bosnia, Congo "Open-without barriers" reserve

C. ECONOMY

	Themes and Objectives	Examples of activities for the Management Plan
12	Sustainable tourism	Extension of the CETS ¹ to the reserve (provided for in the programme agreement of the Ledro Alps RR) Extension of the "Family in Trentino" project
13	Energy from renewable sources	"Solar Reserve" – autonomy in terms of energy
14	Quality agriculture	PSR – agronomic use plans Alpine pasture plan Ledro agricultural park, provided for in the Ledro Alps programme agreement
16	Local products	Extension of actions within the Quality Park PNAB project
17	Sustainable (and "slow")mobility	Alternative fuel, electric transport Network of footpaths, MTB, cycle paths, horse-riding trails
18	Technology and IT	SMART Reserve web valley, gis, open data, monitoring

¹ PNAB has achieved CETS (annex 8.1) . It is foreseen by art. 5 of the programme agreement of RR of Ledro Alps (annex 4.3)

Adopting a principle of shared decisions, skills evaluation and assumption of responsibility at wider level, each of the activities proposed for the Management Plan corresponds with a series of players who can be directly involved, who will identify a coordinator or lead partner among themselves.

+In this way it will be possible to create a solid "skills network", capable of enhancing the individual processes dealt with by the promoting organisations. These will be further

encouraged to demonstrate and provide examples, good practice and support to other players involved and committed to achieving similar objectives.

Finally, the model of governance anticipated for the Biosphere Reserve also provides for the aforementioned series of organisations being organised systematically by the Biosphere Reserve Coordinator, an organ which will become operational as soon as the nomination process has been concluded successfully.

4.4 “Have an appropriate size to serve the three functions of biosphere reserves”.

The area proposed to be recognized has a surface of ca. 47.000 ha and counts around 16.000 inhabitants.

The zoning proposed for the Biosphere Reserve area derives from territorial strategic choices that already are in line with the MAB model. These choices aim at:

- contributing and strengthening the protection of biological and cultural biodiversity;
- acting as a bridge (an ecological corridor, but also a “cultural corridor”) between prealpine areas adjoining the Po valley and the central-alpine areas of internal valleys;
- consolidating and offering new prospects related to sustainable use of the area, on the basis of the principle of responsible subsidiarity;
- reinforcing the virtuous characteristics of social identity and environmental sustainability;
- starting up synergistic processes with the above characteristics.

To the north, the boundary is represented by the physical barrier of the Brenta Dolomites, a range of high mountains (crossed with difficulty), which represents a natural frontier, both in relation to biological and anthropic aspects.

Towards the prealpine areas, to the south, the physical limit is also unequivocal, being established at the main watershed in the area, along the range of the Tremalzo and Tombea mountains. As compared to the Dolomites, this is a lower mountain range, but its role as a border is reinforced by the clear difference in ecosystems on the two sides (see 11.6) and by an important and historically consolidated administrative frontier (which not by chance represents the frontier between the territory of the Autonomous Province of Trento and the rest of the country). These physical boundaries do not allow to trace a transition area around the buffer zones, namely close to the northern and south-western boundaries of the PBR. These inhospitable areas impede the establishment of stable human communities and consequently the implementation of cooperation activities for sustainable development projects.

Towards the parallel valleys, to the west, the external frontier runs along a ridge and coincides with the physical limit of the hydrographic basin; as compared to the external area, the internal area, especially in the south-westerly area, is also differentiated by the type of use for the land (the



The ridges of the Tremalzo and Tombea mountains (Ledro) represent the southern confine of the proposed BR

situation described regarding the surroundings of Lake Garda to the east is repeated to the west towards Lake Idro – with less intensity). To the east the physical limit is less clear (it runs along a ridge acting as a hydrographic sub-basin), but the quality of the human system, the density of settlements (residential, commercial and manufacturing) and the expectations of the population as regards the model of socioeconomic development are very different.

The core areas correspond with the areas of greatest naturalistic value in terms of the quality and quantity

of species and habitats present. Administratively, they correspond with areas with stricter protection regimes, reinforcing their conservational role through active protection measures in favour of semi-natural habitats, consolidating and systematically organising research and monitoring activities in relation to birdlife (migration), flora (endemic species) and vegetation (priority habitats at European Union level). In this sense, particularly relevant is the presence of some alpine summer houses, alpine huts and an important research center for birds. The buffer zones include areas of significant

naturalistic interest, but in a less continuous manner, peripheral areas or those equipped with less stringent protection measures. With their inclusion in buffer zones, the areas and communities voluntarily propose (for the most important aspects) a management model similar to that in core areas, reinforcing and extending this as much as possible in their area of influence through “networking”. In concrete terms this means limiting the changes in the use of the land and reinforcing the development of traditional agricultural, forestry and pasture activities compatible with the historic and natural environment, along with research and dissemination activities.

The presence of facilities/seasonal settlements such as those below contribute to this scope:

- numerous operating alpine summer houses (malghe)¹ and grazings (27 units), that in addition to economics aspects, promote the conservation of pastures and meadows habitats of great relevance for the biodiversity
- alpine huts in Dolomites area (3 buildings), supporting high-mountain tourism
- restaurants and visitors accommodations (5 buildings), in

¹ Malga is a traditional building placed at heights, composed by one or more facilities (shepherd accommodation, cattle shed, milk-processing location) and several grazing areas. Activities are carried on during the summertime.



The basin of the Giudicarie Esteriori; on the left the ridge of Monte Casale delimits the proposed BR to the East

- easily accessible areas
- various storing hays units (in 8 groups) or ex-storing hays at heights, representing a defense for the conservation of pastures.

The buffer zones completely surround the core areas; in its turn, the outside of the buffer zone borders on the transition zone, but in this case there are some exceptions in which buffer zones are situated directly in contact with the external boundary of the reserve. These are areas in which highly natural areas continue well beyond the physical limit which has historically determined the area of influence of the human community. The transition zone is a continuum, and not by chance the nomination as a Biosphere Reserve is centred on this area, with strong support from the local resident population. While

the area is unified, it has an ‘hour-glass’ shape, with two main nuclei centred respectively in the Giudicarie Esteriori and Ledro, namely the two main centres for the sustainable development proposals. The transition zone is made up of areas on the valley floor, at medium and low altitude, characterised by villages and agricultural areas. The agricultural, forestry and pasture activities compatible with – or even necessary for – the protection of the buffer zones and core areas, or at all events with the conservation of the semi-natural areas, find the social and economic driving force for their implementation in the transition zone.

The relationship between the surface areas of the zones outlined can be graphically portrayed as follows:

- 10,09 % core
- 33,26 % buffer
- 56,65 % transition



On the left, the ridge of the Cadria and Gavardina delimits the proposed BR to the West



The peaks of the highest mountain in the Brenta Dolomites (Cima Tosa, 3,173 m), delimits the proposed BR to the North

The central nucleus of the core area is well protected by wide bands of buffer zones making it possible to extend good practice towards the outside; the transition zone is of adequate size to confirm/reinforce the type of socioeconomic development already established, defending it from uncoordinated discordant activities.

Individual municipalities, or even a possible partial group of neighbouring municipalities, would not be of sufficient size and force to successfully promote coordinated sustainable development, whereas the combination of areas proposed in the reserve, with their complementary characteristics, represent a 'critical mass' on which it is possible to rely.

4.5 Through appropriate zonation:

The different zones in the Biosphere Reserve are analysed below in detail (Fig. 4.10).

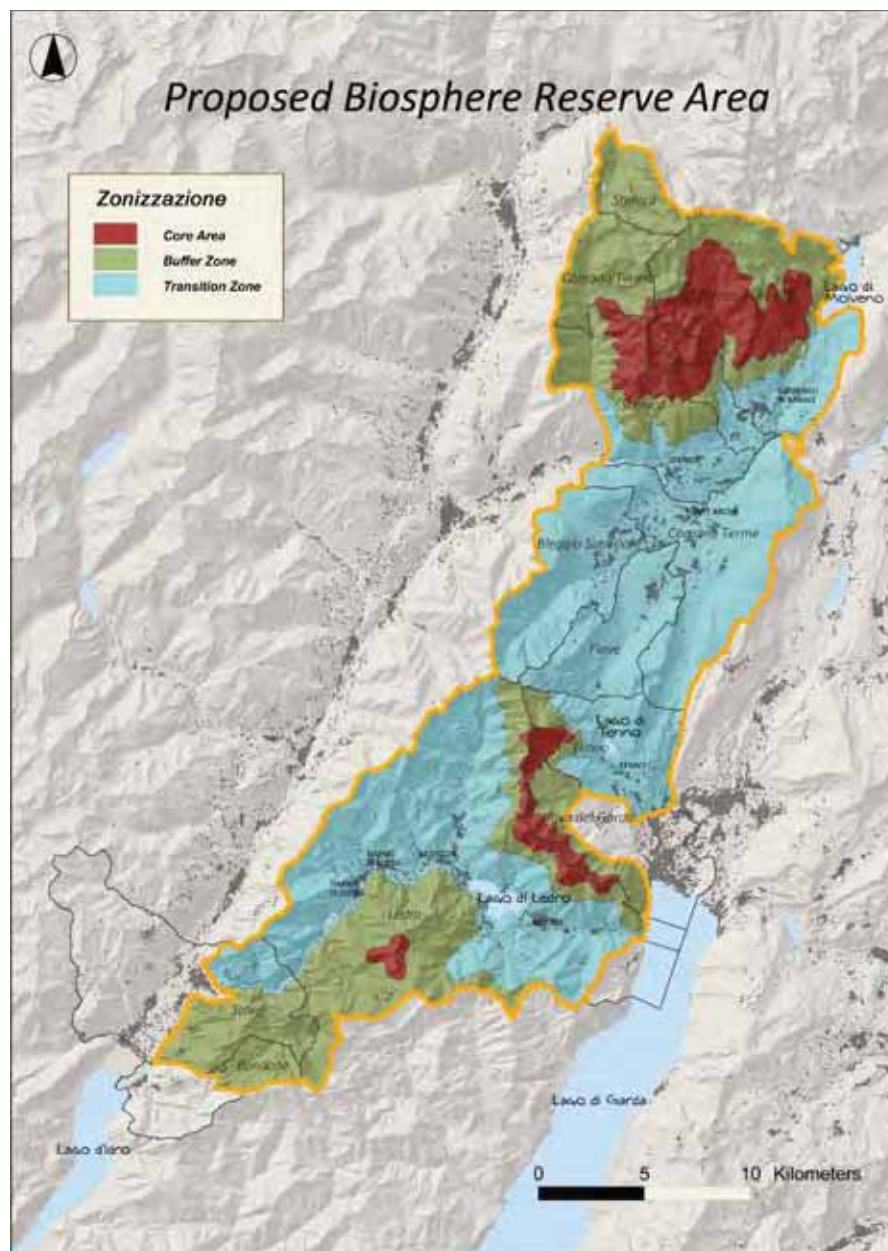


Fig. 4.10

CORE AREAS

Legal framework

The core areas are divided into three separate nuclei, as they are situated on hills which are physically separated. The three nuclei lie entirely within Natura 2000 sites classified both as SICs and ZPSs, which are thus equipped with a full set of conservation measures for habitats and species¹.

These are areas in which important studies, monitoring and experimental activities are underway, directly linked to the conservation of habitats and species.

The southern and central nuclei correspond respectively with the “Bocca di Caset” and “Crinale Pichea – Rocchetta” SIC/ZPSs, following the perimeter exactly. From 2014 it is expected that a management plan will have been defined for the Network of Reserves of the Ledro Alps, which includes these areas.

The northern nucleus is situated within the large “Dolomiti di Brenta” SIC/ZPS (and the “Dolomites” WHS),

¹ “Habitat” Dir. 92/43/CEE and “Birds” Dir. 79/409/CEE, adopted and regulated at provincial level by the following legislative measures: Adoption of general measures to safeguard SICs - D.G.P. of 30 December 2005, no. 2956; Adoption of measures to conserve ZPSs - D.G.P. of 27 October 2006, no. 2279; Identification of ZPSs - D.G.P. of 22 February 2007, no. 328; L.P. of 23 May 2007, no. 11 and subsequent amendments; Regulations regarding protected areas in the province - D.P.P. of 3 November 2008, no. 50-157/leg.; Identification of ZPs - D.G.P. of 5 August 2010, no. 1799; Conservation measures for ZPSs - D.G.P. of 17 February 2011, no. 259; Resolution with list and updated conservation measures for sites and areas in the Natura 2000 network in Trentino - DGP 632/2013.

representing a sub-group. More specifically, in this case the perimeter coincides with a Special Reserve (called API2) provided for by the new Park Plan, in the process of adoption. Among the reasons leading to the setting up of the API (Area of Particular Importance) in question there was precisely the active safeguarding of semi-natural habitats of very high value in terms of flora.

Size

4,785.82 ha, around 10% of the total area of the Reserve.

The three core areas in the Reserve cover the following surface areas respectively:

N zone – 3,726.39 ha, central zone – 1,009.16 ha, S zone - 50.28 ha

Conservation objectives

As declared by the EU environmental policy, the main conservation purpose is “to safeguard biodiversity by keeping a satisfactory conservation status of natural resources (natural and semi-natural habitats, wild flora and fauna) within the EU territory. Biodiversity contributes to sustainable development and has to be safeguarded while respecting economic, social and cultural needs and regional and local peculiarities. In all the SIC/ZPSs areas monitoring of habitats and species is underway. Major research over a period of several years is underway at Bocca di Caset, where there is an important capture and ringing station for migrating birdlife.

Nature itineraries and informative and educational material are gradually being prepared on naturalistic themes. The use of forests is regulated by special forestry management plans, which in Natura 2000 areas pay particular attention to nature protection.

Activities are also underway to recover abandoned hay meadows and to promote pastoral activities, along with actions to actively safeguard semi-natural species-rich habitats (implementing the mountain huts plan of the Municipality of Ledro and that of PNAB).



The dry grasslands of Ion Valley (core area) represent one of the environments with the greatest diversity of flora



The series of mountain hay meadows, in the Tremalzo buffer zone, are an example of active protection of permanent grasslands and the traditional landscape

BUFFER ZONES

Legal framework

Around four fifths of the buffer zones (c. 78%) lie in Natura 2000 areas not dealt with previously with reference to the core areas. These are peripheral or less sensitive areas from the naturalistic point of view, or are not equipped with the dual designation of SIC + ZPS or – in the case of the PNAB – not identified as APIs, namely areas of less conservation interest. The municipalities of Ledro, Tenno, Riva del Garda, Storo, Bondone, the CAGL, CdG, BIM Sarca and BIM

Chiese have signed on September, 24th 2013, a planning agreement with the Province of Trento in order to set up a Network of Reserves (according to the L.P. of 11/07) aimed at networking the Natura 2000 areas present within their territories (see Annex 4.3). The corridor and ecological integration areas included in the network of reserves with the scope of improving the ecological links between individual protected areas are not subject to new restrictions, but may be the object of active protection measures. The

areas identified in the RR of these municipalities have contributed to the identification of buffer zones in areas outside the SICs, representing around 15% of the total.

The restrictions provided for by the PUP and PRGs, as well as the forestry measures provided for by the L.R. of 11/2007 for all the buffer zones (and therefore also for the remaining 7% outside the SICs, ZPSs or RR) are in any case valid. These are therefore wooded, meadow, pasture or rocky areas subject to provincial and municipal jurisdictional/urban restrictions, as stated in PUP and subordinate planning levels, protecting them from changes in the use of the land, not suitable with the Biosphere Reserve purposes.

Size

15,774.44 ha, around 33% of the total area of the Reserve.

Activities underway

In areas of buffer zones coinciding with SIC areas, monitoring of habitats and species is underway, although there are no significant research activities such as those taking place in the core areas. The monitoring will be extended to the remaining buffer

Reserves.

Nature itineraries and informative and educational material are gradually being prepared on naturalistic themes, to complement (and network) those centred on the core areas.

The use of forests is regulated by special forestry management plans, which in Natura 2000 areas pay particular attention to nature protection and which are subject to assessment of their effects.

Independently of this, the forestry management plans for areas outside the SIC and ZPS areas are based on natural forestry criteria (sustainability). Activities are also underway to recover some areas of abandoned hay meadows and to promote pastoral activities (implementing the mountain huts plan of the Municipality of Ledro and that of the PNAB).

Similar intervention has been planned and implemented to improve the environment for fauna (Municipality of Ledro's environmental improvement plan for the purposes of fauna). Other interventions are studies focused on the recovery of hay meadows, according to the Preliminary Document to PTC (in Annex 4.1) of CdG in areas under its responsibility (see section 6.2).

TRANSITION AREA

Size

26,867.47 ha, around 57% of the total area of the Reserve.

Sustainable development activities

In line with the physical characteristics of the transition area, homogeneous but centred around two main valleys, human settlements in the area are organised around two separate but communicating centres; the Giudicarie Esteriori and Ledro.

For both these communities an institutional process of contiguous municipalities union is underway: from the initial 17 municipalities, 6 municipalities have already been merged within the municipality of Ledro and 2 in the case of Comano Terme. For the whole community of the Giudicarie Esteriori one should recall the coordination of cultural initiatives lead by the Giudicarie Ecomuseum.

The newly created municipality of Ledro (with Storo, Riva and Bondone) has autonomously undertaken a similar process to that of the MAB programme on a local scale, being one of the first in Trentino to become involved in setting up a Network of Reserves¹, specifically that of the Ledro Alps. The two main communities (Ledro and Giudicarie) have now set themselves the objective of together following the integration process (already started up) aimed at sustainable

development.

Actions designed to support development, carried out on the initiative of numerous public and private sector bodies and institutions, include various cultural activities, along with conservation, promotional and supporting activities, encouraging sustainable forms of tourism and mobility.

One of the main players involved in the promotion of cultural activities is the Giudicarie Ecomuseum, which organises initiatives related to traditions, the archaeological and culinary heritage and the local area.

Tourism and sustainable mobility are regularly promoted within the PNAB (and in the Geopark and UNESCO WHS included within it) and in some municipalities. Other tourism promotion activities are carried out by tourist offices (Comano and Ingarda) and the Consorzio Pro Loco in Ledro, with a programme of visits and information² based on promoting the natural environment.

The project to implement the Network of Reserves of the Ledro Alps (including a planning agreement between 6 municipalities and definition of governance; see Annex 4.3) provides for conservation and area promotion activities based on the value of the natural environment.

Other initiatives take place at the pile-dwelling museum of Ledro and Fiavé and in relation to UNESCO sites.

Finally, there are a number of

¹ The terms Reserve is used in this chapter to translate the Italian original word "Riserve" but is not related with the Biosphere Reserves.

² www.vallediledro.com and <http://www.visitacomano.it>

specifically local initiatives which take place at municipal level or are organised by the private sector: for further details see section 15. It is underlined that the Biosphere

Reserve would offer an opportunity to coordinate and develop this complex range of activities, initiatives and regulations.



Cultivated area in the Giudicarie Esteriori, in the transition area

4.6 “Organizational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and the carrying out of the functions of a biosphere reserve”.

4.6.1 Describe arrangements in place or foreseen.

Participatory forms of management are part of the background and traditions of the communities living in the area of the proposed Biosphere Reserve. Indeed, nomination of the area emerged from previous processes of participatory management related to sustainable development projects, which

reach their logical culmination with participation in the MAB programme. For this reason we can affirm that while consultation with the population on the specific issue of the Biosphere Reserve has been relatively recent, as it began in spring 2013, on the more general topic of the sustainability of development it has taken place in a widespread and in-depth manner in the context of various participatory processes, with aims and objectives

	Conservation role			Development role			Logistical role (research & education)		
	C	B	T		B	T	C	B	T
RR of the Ledro Alps	C	B	T		B	T	C	B	T
Dolomites and pile-dwelling sites included in the World Heritage List					B	T	C	B	T
ABNP Plan	C	B			B	T	C	B	
ECST (ABNP)					B	T	C	B	T
Geopark (ABNP)	C	B			B	T	C	B	T
Tourist offices' strategic plans					B	T		B	T
EMAS (CdG, 5 municipalities and ABNP)					B	T			T
Area Plans for the Giudicarie Community: preliminary document approved on 9/07/2013	C	B	T		B	T		B	T
ECOMUSEO					B	T			T
ASUCs					B	T			
Family project in Trentino (Giudicarie Esteriori district)						T			

Fig. 4.11 List of players providers for participatory actions, in the different roles and areas (C=core; B=buffer; T=transition)

entirely in line with those pursued by UNESCO's MAB programme. To mention the main ones, we recall the processes taking place in the last few years in relation to the CETS and PNAB's new Park Plan, the setting up of the Ledro Alps RR, the preliminary document for the PTC of the CdG community, together with consultation carried out by the Ecomuseum, described in detail in section 13.3. The combination of these virtuous processes has given rise to a general awareness of the models of development to pursue, which has also been followed by coherent choices in the field of area planning. It is therefore not an exaggeration to suggest that idea of joining the network of Biosphere Reserves has

been nurtured at length over the last decade, with the decision to nominate the area as a Biosphere Reserve representing the formal conclusion of a process of growth progressively maturing over time.

We can therefore undoubtedly consider this phase of consultation as preparation for the nomination and therefore an integral part of it. Below there is a list of players whose activities provide for structured participatory action from the beginning, with informative meetings and participation in agreements or understandings. The roles and areas (C=core, B=buffer, T=transition) in which the activities they carry out are particularly important is specified for each party.



Participatory process in CdG

The “Memorandum of Understanding for the proposed Biosphere Reserve” reinforces and brings together all these different forms of participatory management within a single

framework.

With a view to signing the agreement, a series of coordination meetings was organised with the local bodies signing the agreement:

Place	Subject	Date
Municipality of Comano Terme	Information regarding the proposed nomination for Mayors and local authorities in the Giudicarie	February-March 2013
Terme di Comano	Introduction of proposed MAB nomination to municipalities and local bodies	16 April 2013
Trento, PAT	Joint meeting between Mayors, the Presidents of the Communities and the President of PAT	20 May 2013
Trento, PAT	Joint meeting between Mayors, the Presidents of the Communities, representatives of other bodies involved and PAT Directorate-General for the Environment	19 June 2013
Trento, PAT	Joint meeting between Mayors, the Presidents of the Communities, representatives of other bodies involved and PAT Directorate-General for the Environment	8 July 2013
Trento, PAT	Meeting of the steering committee to decide on the name	30 July 2013
Municipality of Comano Terme	Meeting of the steering committee to decide on governance	29 August 2013
Trento PAT	Meeting of the signatories to sign the Memorandum of Understanding	6 September 2013
Municipality of Comano Terme	Meeting of the steering committee for definitive approval of the dossier	10 September 2013

Fig. 4.12 List of meetings between administrators to decide on a common proposal

Various informative and consultation meetings open to the public and/or the main stakeholder categories were also organised; for details see section 17.3.



Public meeting to present the initiative at the Municipality of Stenico

The framework of informative and participatory activities carried out during the nomination process also involved the following:

- preparation and sending of a newsletter regarding MAB topics and another one (currently being prepared) regarding the content of the dossier, to all those living in the area (enclosed);
- presentation of the initiative in the regional TV news programme
- (RAI3) on 8 May 2013;
- guided visit to the Ticino Valley Biosphere Reserve, with meetings with local administrators and stakeholders (May 2013)
- preparation of a special section within the EdJ web site¹ and activation of links within the web sites of each municipality;
- collection of letters confirming participation in the initiative from

¹ <http://www.dolomiti-garda.it/>, <https://it-it.facebook.com/EcomuseoDellaJudicaria>

bodies and parties who may be involved in the future activities of the reserve (see Annex 8.9).

Press releases regarding the various informative events are enclosed.

The participatory activities begun during the nomination process will continue in the near future; the following appointments have already been scheduled:

- Autumn 2013: public meetings at municipal level to provide information about the content of the nomination dossier;
- Autumn 2013 – Winter 2014: meetings with representative associations (farming, tourism, forestry associations) to begin to establish sector programmes aimed at drawing up a Management Plan for the Biosphere Reserve;
- Autumn 2013 – Winter 2014: meetings with local bodies (ASUCs, BIM², RR, Ecomuseo) to begin to establish sector programmes aimed at drawing up a Management Plan for the Biosphere Reserve;
- Autumn 2013 – Winter 2014: meetings with local authorities to begin to establish sector programmes aimed at a MAB Management Plan, also in relation to new and existing sector funding

² Bacino Imbrifero Montano is the body responsible for managing the profits coming from additional fees charged for the use of water for hydroelectric purposes; the profits are managed with the scope of providing economic and social support.

instruments (PSR³, PAT funds for sustainable development);

- Summer 2014: meetings with local authorities to provide information on the result of the nomination procedure.

The aforementioned Memorandum of Understanding already provides for methods to continue participatory management activities once that MaB recognition is obtained: to ensure the participation of stakeholders in decision-making processes, the setting up of one or more permanent area forums is provided for to support the working group in the phases of drawing up and subsequently implementing the future Management Plan for the reserve (see section 4.7), following the Madrid Action Plan target 19 and 22.

³ PSR: Programma di Sviluppo Rurale, Rural development Programme, and EU financial instrument for rural development.



Public meeting to present the initiative at the Municipality of Ledro



Dissemination activities organised by the EdJ on the subject of medicinal herbs

4.6.2 Have any cultural and social impact assessments been conducted, or similar tools and guidelines been used?

Evaluation of the concerns of the local population is normal practice in the area in question. Examples of these kinds of activities and procedures are represented by EMAS, CETS, the Ecomuseum (which can be compared to an Agenda 21 process), questionnaires

regarding the perception of PNAB's role etc. The whole framework outlined in the previous section is effectively completed with more or less structured feedback. Once again these are standard procedures, but which concern partial areas or sectors. The Biosphere Reserve will make it possible to carry out complete and systematic activities in this field, through the adoption of a specific coordinating mechanism (Biosphere Reserve Coordinator).



Information activities by the Ecomuseum in the Romanesque church at Vigo Lomaso

4.7 Mechanisms for implementation

EXISTING TOOLS

The area proposed to be nominated as a Biosphere Reserve is subject to numerous planning instruments, which regulate human activities in the different areas:

The Piano Urbanistico Provinciale (provincial planning scheme), which sets out policy and general strategy for social and economic development of the area, is followed in order by the Area Plans of the Comunità di Valle (valley communities) currently being drawn up¹, the general planning schemes of the municipalities and the management plan of the Adamello-Brenta Nature Park, with the relevant plans for the special reserves.

According to the Habitat directive and the L.P. of 11/07 (Annex 3.5), management plans for the Network of Reserves of the Ledro Alps and the Fiavé and Lomasona SICs will also be prepared. According to the Habitat directive and the L.P. of 11/07, management plans for the Network of Reserves of the Ledro Alps and the Fiavé and Lomasona SICs will also be prepared.

Furthermore, all publicly owned forests in the Reserve (which make up 88% of the wooded surface area, pastures and areas at high altitude) are subject to sector planning at the

level of hydrographic basins (forestry and mountain plans) and municipal property (forestry management plans) which identify the methods and extent of exploitation of the forests in the context of sustainable use of resources.

There are also other documents which while not having legal and normative value, as in the case of those stated above, nevertheless supply important strategic guidelines for sustainable socioeconomic development of the area: of these one should recall the provincial Pa.S.So (Autonomous Province of Trento's pact for sustainable development), the Action Plan of the Adamello Brenta Geopark, PNAB's Environmental Plan, the strategic guidelines for the development of tourism adopted by the tourist office of Terme di Comano-Dolomiti di Brenta and the tourism guidelines adopted by the Fondazione Dolomiti UNESCO for the site included in the World Heritage List. The Judicaria Ecomuseum has prepared various policy documents designed to promote cultural activities and sustainable development in the area.

THE FUTURE MANAGEMENT PLAN FOR THE BIOSPHERE RESERVE.

Given the point of departure, with a

¹ In July 2013 the Comunità di Valle delle Giudicarie approved the Preliminary Document for the Area Plan of the Community (Annex 4.1).



Experimental archaeology activities relating to the pile-dwelling era (Bronze Age) managed by MUSE at the Pile-Dwelling Museum in Ledro

wealth of planning tools and strategic documents already in place, it would make no sense for the Reserve's Management Plan to represent the umpteenth level of planning in the area.

The Management Plan has rather be understood as a framework document, which regarding the three fundamental roles of the Biosphere Reserve, will be useful for coordinating actions already underway or planned by the different bodies participating in the management of the designated areas, in the context of an overall vision. As regards conservation, the

Management Plan of the Biosphere Reserve will therefore make reference as applicable:

(1) for the conservation function, to the management plans of the Network of Reserves of the Ledro Alps, the Park Plan and management plans of Natura 2000 sites, in addition to forestry planning instruments and the water protection plan. In this context it should be added that the institution of the PBR won't impose any kind of restrictions, nor use limitation of natural resources, especially for haunting activities.

(2) As regards development, the

plan will interact with the plans of the Comunità di Valle for example, the CETS of PNAB and the tourism policy documents of the tourist offices and the Fondazione Dolomiti UNESCO, but also with the Management Plan of the Network of Reserves of the Ledro Alps (which also deals with sustainable local development processes).

Finally, (3) as regards logistical aspects linked to training, research and education regarding sustainable development, reference will be made to the environmental plan of PNAB, and dialogue will also be possible with the different public institutions responsible for implementing environmental education policy and research, such as (once again) PNAB, the Network of Reserves of the Ledro Alps, the Science Museum in Trento,

the architectural and archaeological heritage office, the Museo Civico in Rovereto, the Agenzia Provinciale per la Protezione dell'Ambiente (APPA), the Ledro museum network and the Judicaria Ecomuseum. One example of efforts to network aspects of research, dissemination activities and sustainable development is represented by the OPENLOC project.

A final fundamental aspect regards the fact that the plan will be accompanied by a phase of intensive information and participation activities with the local population and stakeholders. As already provided for in the Management Plans of the Park and the Network of Reserves, participation is a fundamental requisite for effective and concrete implementation.



Meeting between the members of the Steering Committee to decide on the proposed BR

It will therefore be possible to aspire to a shared and streamlined plan, not costly in financial terms, capable of bringing together all the public and private sector players participating in the sustainable development of the Reserve area, in a relatively brief time (expected to be around a year). The plan will then need to be updated at regular intervals.

THE “MEMORANDUM OF UNDERSTANDING” FOR MANAGEMENT OF THE TRANSITIONAL PHASE

As a preliminary step to presenting this nomination for recognition as a Biosphere Reserve, the 20 proposing organisations¹ (namely the Municipalities belonging to the area of the “Dalle Dolomiti al Garda” Judicaria Ecomuseum, those belonging to the RR of the Ledro Alps, the CdG and PAT) have approved in September 2013 a Memorandum of Understanding aimed at the setting up of a Steering Committee with the task of:

- agreeing methods for communication and the participation of the local population and stakeholders;
- approving the Nomination Dossier to be presented to the national MAB committee at the Ministry of the Environment;

¹ The 20 proposing organisations are: Municipalities of Comano Terme; Bleggio Superiore; Dorsino; Fiave'; Ledro; San Lorenzo in Banale; Stenico; Tenno; Riva del Garda; Storo; CdG; CAGL; PNAB, BIM Sarca; BIM Chiese; APT Terme di Comano; Ingarda Trentino; Consortium of tourism of Ledro Valley, PAT.

- nominating the Management Plan Working Group;
- nominating the General Coordinator;

The “Memorandum of Understanding” recognises the Municipality of Comano Terme, already lead partner in the convention for the management of the “Dalle Dolomiti al Garda” Judicaria Ecomuseum, as the lead municipality in the context of the process to draw up and present the Dossier. Subsequently the “Steering Committee”, made up of Mayors or their delegates, and representatives nominated by the other bodies signing the understanding, may identify a different lead partner within the committee.

A “PROGRAMME AGREEMENT” TO MANAGE THE OPERATIONAL PHASE

In the event of recognition, the proposing bodies will draw up and sign a Programme Agreement, possibly extended to include other bodies in the area, which goes beyond and substitutes the previous Memorandum of Understanding, and which will define, among other things:

- the management structure of the Biosphere Reserve and in particular:
 - the lead partner;
 - the Steering Committee;
 - the Executive Committee;
 - the President;
 - a technical coordinator;
 - a possible technical/scientific

- committee
- methods for ensuring the participation of stakeholders in decision-making processes, for example by setting up one or more permanent forums in the area;
- the operational and representative headquarters
- the intention to draw up a Management Plan, which will specify:
 - objectives, timescale and costs of drawing up the plan;
 - methods for linking it to other planning instruments in force;
 - methods of approval;
 - methods of implementation;
- the programme of activities in the first three years and financial commitments, with relative division of costs;
- the duration of the agreement.

RESEARCH AND DISSEMINATION PROGRAMMES

Numerous scientific research activities and programmes to raise the awareness of the public have been underway in the area for some years. Activities directed at school parties, and at tourists in the summer, are of particular social relevance. Dissemination takes place both at visitors centres (present at some sites of great naturalistic value and at historic and prehistoric human settlements), and through guided visits to the area. As regards the latter, visits to the birdlife capture and ringing centre at

Caset (organised by MUSE) are of particular value (also in terms of public appeal).


In addition to having a demonstrative value, the ringing activities also have an effective scientific role at transnational level. The same can be said of research in the archaeological field linked to pile-dwelling sites and those in the environmental field in which PNAB participates.

A further thread of research in which studies relating to some areas are underway regards the environmental compatibility of business activities, such as tourism or more or less intensive animal husbandry (OPENLOC studies and research by the FEM - Fondazione Edmund Mach).

All these activities will be offered an opportunity for consolidation and reinforcement in the event that the area is recognised as a Biosphere Reserve. This will be true in terms of better reciprocal integration between different research projects and dissemination activities, and as a result of the driving force coming from membership of an international network at global level such as the MAB programme. It will be possible – with the coordination of the Reserve – to make existing research structures and those to be set up shortly available to the thematic networks of the MAB programme, and in particular to the Mountain Biosphere Reserves Network and research programmes linked to them (e.g. GLOCHAMOST).

5. ENDORSEMENTS

5.1 Signed by the authority/authorities in charge of the management of the core areas:

Full name:	Livio Caldera
Title:	Major of Comano Terme
Date:	
Address, email, phone number:	Fraz. Ponte Arche – Via G. Prati, n°1 – 38077 Comano Terme (TN) protocollo@comune.comanoterme.tn.it Tel. +39 0465 701434
Signature	

Full name: Giorgio Libera

Title: Major of Dorsino

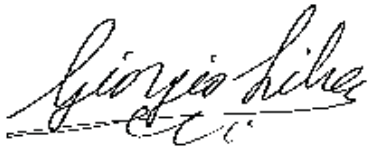
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Signature



Full name: Achille Brigà

Title: Major of Ledro

Date:

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Tel. +39 0464 592711

Signature



Full name: Adalberto Mosaner

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Date:

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Signature

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Full name: Gianfranco Rigotti

Title: Major of San Lorenzo in Banale

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Signature

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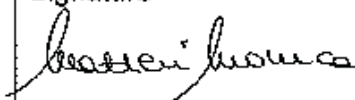
Full name: Monica Mattevi

Title: Major of Stenico

Date:

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segreteria@comune.stenico.tn.it
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Signature



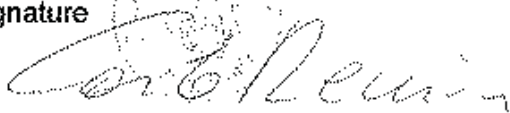
Full name: Carlo Remia

Title: Major of Tenno

Date:

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Tel. +39 0464 500624

Signature



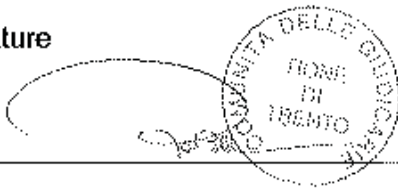
Full name: Patrizia Ballardini

Title: President of Community of Valley of Giudicarie

Date:

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Signature



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Signature



Full name: Antonio Caola

Title: President of Natural Park Adamello Brenta

Date:

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info@pnab.it

Tel. +39 0465 806666

Signature



5.2 Signed by the authority/authorities in charge of the management of the buffer zones:

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Title: Major of Comano Terme

Date:

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Signature



Full name: Giorgio Libera

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Signature



Full name: Achille Brigà

Title: Major of Ledro

Date:

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Signature



Full name: Monica Mattevi

Title: Major of Stenico

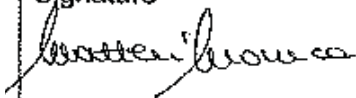
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Date:

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Full name: Graziano Scalmazzini

Title: Major of Bondone

Date:

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Full name: Vigilio Giovanelli

Title: Major of Storo

Date:

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Signature



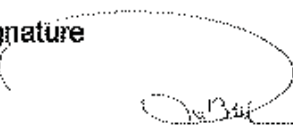
Full name: Patrizia Ballardini

Title: President of Community of Valley of Giudicarie

Date:

Address, email, phone number: Via Gnesotti, n°2 - 38079 Tione (TN)
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Signature



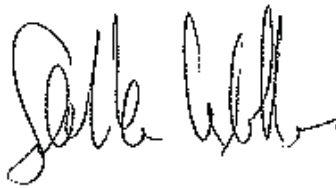
Full name: Salvator Valandro

Title: President of Community of Valley of Alto Garda and Ledro

Date:

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Signature



Full name: Antonio Caola

Title: President of Natural Park Adamello Brenta

Date:

Address, email, phone number: Via Nazionale, n°24 - 38080 Strembo (TN)

info@pnab.it

Tel. +39 0465 806666

Signature



5.3 Signed as appropriate by the National (or State or Provincial) administration responsible for the management of the core areas and the buffer zones:

Full name: Alberto Pacher

Title: President of Provincia Autonoma di Trento

Date:

Address, email, phone number: Piazza Dante, n°5 – 38122 Trento (TN)

presidente@provincia.tn.it

Tel. +39 0461 495111



Signature

Alberto Pacher

5.4 Signed by the authority/authorities, elected local government recognized authority or spokesperson representative of the communities located in the transition areas.

Full name: Livio Caldera

Title: Major of Comano Terme

Date:

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Signature



Full name: Alberto Pacher

Title: President of Provincia Autonoma di Trento

Date:

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presidente@provincia.tn.it

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Signature



Handwritten signature of Alberto Pacher in black ink.

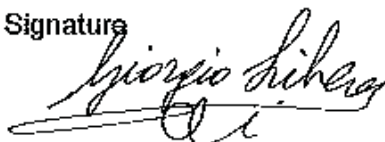
Full name: Giorgio Libera

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Date:

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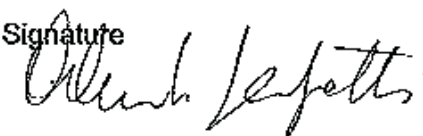
Full name: Achille Brigà

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Full name: Gianfranco Rigolli

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Full name: Carlo Remia

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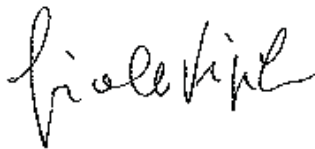
Full name: Vigilio Giovanelli

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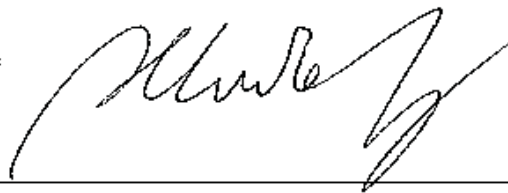
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Title: Mayor of Bleggio Superiore

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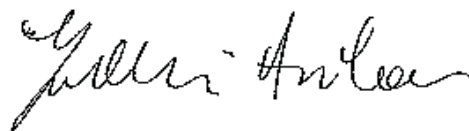
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Full name: Patrizia Ballardini

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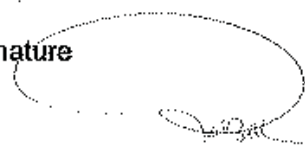
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Full name: Salvator Valandro

Title: President of Community of Valley of Alto Garda and Ledro

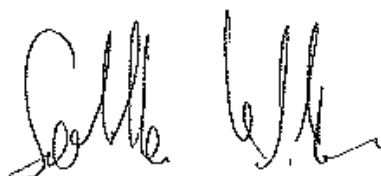
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Signature

PART II

DESCRIPTION



6. LOCATION (COORDINATES AND MAPS)

6.1 Provide the biosphere reserve's standard geographical coordinates (all projected under WGS 84)

The geographical coordinates to be used for a Geographic Information

System (GIS) are reported in the table and map below.

Cardinal points:	Latitude	Longitude
Most central point:	5093290.705299	638713.932255
Northernmost point:	5116737.322389	640987.094532
Southernmost point:	5073238.573482	624292.450023
Westernmost point:	5074642.354106	620342.487918
Easternmost point:	5107245.633999	652126.091077

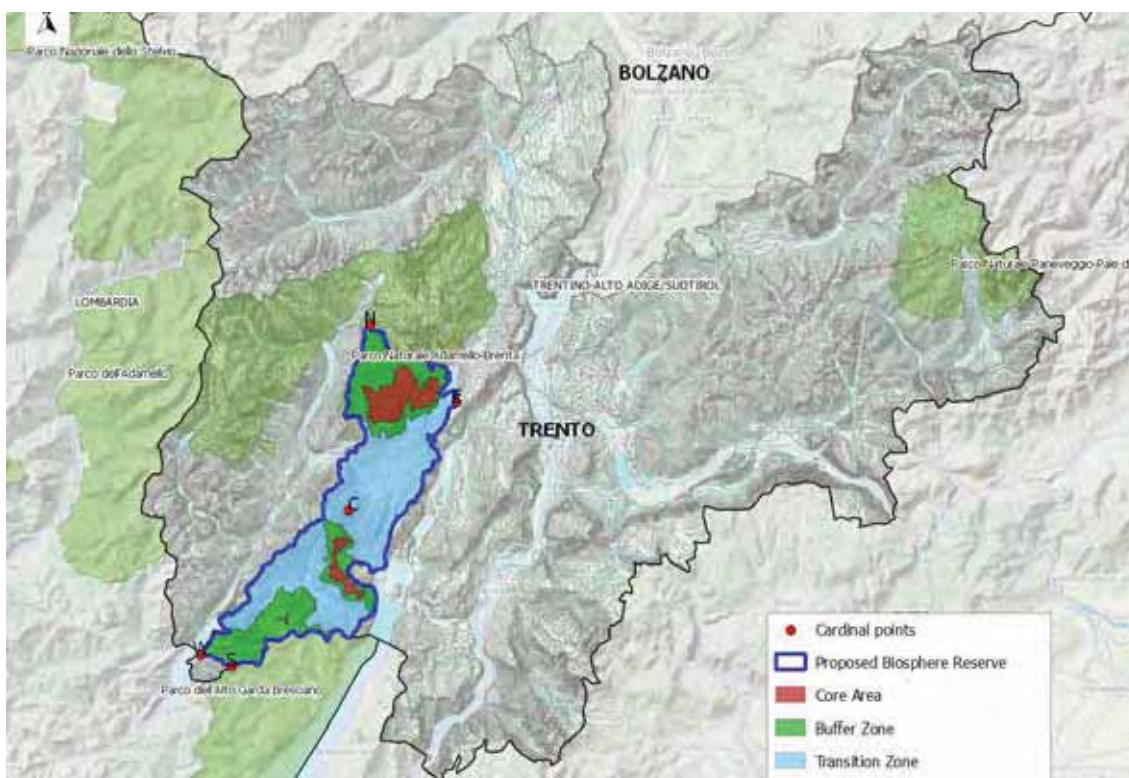


Fig. 6.1 Location of the coordinates shown in the table above

6.2 Provide a map(s) on a topographic layer of the precise location and delimitation of the three zones of the biosphere reserve (Map(s) shall be provided in both paper and electronic copies). Shapefiles (also in WGS 84 projection system) used to produce the map must be attached to the electronic copy of the form. If possible, also provide a link to access this map on the internet (Google map, website...)

The map¹ shows the proposed Biosphere Reserve zones; the three areas are shown in different colours.

¹ Available at <http://www.dolomiti-garda.it/riserva-biosfera-dell-unesco/95-riserva-biosfera-le-mappe>

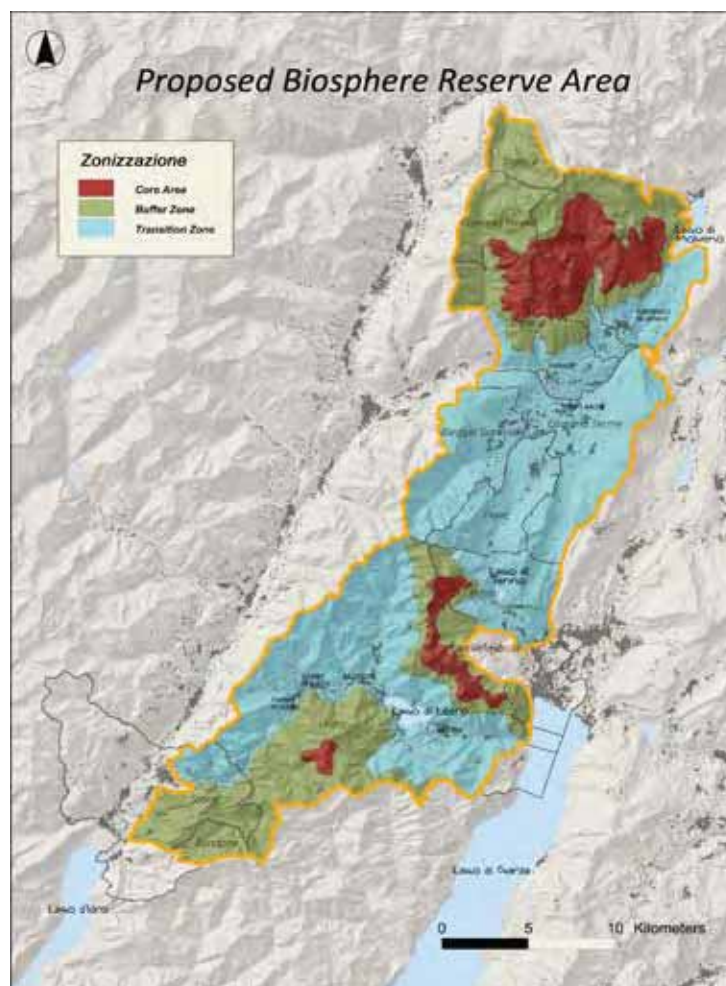


Fig. 6.2 Proposed Biosphere Reserve Area

7. AREA (SEE MAP)

Details of the surface areas representing the separate components are given below (Fig. 7.1).

	Terrestrial	Marine (if applicable)	Total
7.1 Core Area(s):	4786 ha	----- ha	4786 ha
7.2 Buffer Zone(s):	15,774 ha	----- ha	15,774 ha
7.3 Transition Zone(s):	26,867 ha	----- ha	26,867 ha
TOTAL:	47,427 ha	----- ha	47,427 ha

Fig. 7.1



Lake Ledro

7.4 Brief rationale of this zonation in terms of the respective functions of the biosphere reserve. If a different type of zonation also exists indicate how it can coexist with the requirements of the biosphere reserve zonation

The proposed reserve lies in a mountainous area at medium altitude, without physical limits internally. It has a particularly rich naturalistic heritage, due both to the high intrinsic quality of the environment and the way in which human activities have taken place to date in relation to natural resources, with the adoption of sustainable practices based on the principles of collective ownership, cooperation and social cohesion. The area is delimited by physical boundaries and the hydrographic basin, particularly clear towards the north and south/west. These physical boundaries do not allow to trace a transition area around the buffer zones, namely close to the northern and south-western boundaries of the PBR. These inhospitable areas impede the establishment of stable human communities and consequently the implementation of cooperation activities for sustainable development projects.

To the east the limit is represented above all by historic-cultural and socioeconomic differences, with evident repercussions on the landscape, quality and quantity of settlements and the expectations of the population.

The main scope of the PBR is to consolidate and offer new prospects for sustainable use of the area,

threatened by different models of development, with possible negative consequences both in terms of the abandoning of marginal semi-natural areas (as has taken place in other alpine areas, also very close to this area), and in terms of excessively intensive use of the most favourable areas (as can be seen in almost all the main valleys in the Alps). In other words, with designation as a reserve, the local communities propose to guarantee biological and cultural diversity by reinforcing the virtuous characteristics of social identity and environmental sustainability, setting in motion synergistic processes.

From the geographical point of view, the PBR is intended to act as a 'bridge' (in the sense of an ecological corridor) between prealpine areas facing onto the Po valley and the central-alpine areas of internal valleys, in this way contributing to the MAP target 13.

The zonation within the perimeter and the relationship of the surface areas in the zones outlined reflect the characteristics and scope of the PBR:

- **47,427 ha in total**
- **core area 10%**
- **buffer zones 33%**
- **transition zone 57%**

The core area is situated in a relatively limited area of high value, with stringent protection measures (reinforcing safeguarding of the area) and with rules in line with those of the reserve; protection of valuable species and natural and semi-natural habitats, promoting active forms of conservation particularly in the latter. The regulations are contained in management plans, as in the case of the PNAB, or other legal instruments of a national and supranational nature: measures for the conservation of habitats and species adopted in the framework of the Natura 2000 network.

The buffer zones include further areas of significant naturalistic interest, less continuous, in their turn protected, but with less complex area management instruments at more local level. With the recognition of buffer zones, the areas involved will standardise and consolidate the use of the areas concerned and relate them better to other areas in the PBR. In addition to implementing safeguarding policy coherent and synergistic with the policy adopted in the core area, the buffer zones have a fundamental role in creating physical links with similar environments (in so far as this is permitted by the morphology of the area), thus giving material form to the ecological network. In this context, relatively large buffer zones have been proposed, also in contact with protected areas stretching beyond the perimeter of the proposed

reserve. These are areas in which highly natural areas continue well beyond the physical limit which has historically determined the area of influence of the human community. For example, to the north the naturalistically intact area of the Dolomites extends well beyond the main watershed acting as an external boundary for the proposed reserve (and for the area of influence of the human community of the Giudicarie Esteriori); it should be noted that protection of these peripheral areas is in any case guaranteed by various superimposed instruments of protection: Natura 2000 European network, PNAB. A similar consideration can be made in relation to the areas beyond the watershed to the south, gravitating around a completely different administrative region, but in their turn protected by the Natura 2000 European network and the Nature Park of the Brescian upper Lake Garda.

The transition zone is made up of large areas on the valley floor, at medium and low altitude, in which there are extensive wooded areas exploited for production purposes and agricultural areas, alongside small remaining natural areas, often of great value and easily exploitable (such as the Fiavé and Lomasona peat bogs and Lakes Ledro, Ampola and Tenno). Within these there are numerous villages characterising the settlements in the proposed area. The agricultural, forestry and pasture activities compatible with – or even necessary

for – the protection of the buffer zones and core areas, or at all events for the conservation of semi-natural areas, find the social and economic driving force for their implementation in the transition zone. With the preparation of the Management Plan for the reserve the economic activities of participating municipalities will be standardised and contextualised, in line with the general aims and based on participatory planning criteria, with the scope of pursuing synergistic effects and avoiding the multiplication of activities or discordant trends. In the past, the human community present in the transition zones has promoted numerous sustainable development initiatives in line with those proposed for the Biosphere Reserve. The area and community have indeed been the object of research in the historic, social and economic fields. However, to date these have been limited initiatives confined to small areas or to a single field of intervention.

The legal framework present, and

the area zoning supported by this (with particular reference to protected areas: PNAB, areas in the Natura 2000 network), will be reinforced and standardised thanks to the Biosphere Reserve and the relative management system.

The relations between the proposed zonation, previously existing zonation and roles, as regards previously existing protected areas of different kinds, are clarified in section 14.1.3. Furthermore, we recall the plan and CETS of the Adamello-Brenta Nature Park, the plans currently being prepared for the CDG and the upper Lake Garda and Ledro and the PRGs of the municipalities, as some of the most important documents and initiatives determining the roles of different parts of the territory. Finally, the Ledro Alps Network of Reserves (according to LP 11/2007 “Provincial law on forests and nature protection”) and the tourism development plans for the areas concerned within the territory also contribute to functional characterisation of the area.



Biotopo Lomasona

8. BIOGEOGRAPHICAL REGION

According to the ‘Udvardy’ international classification, the area of the proposed reserve falls within the “Mixed Mountain system (biome 12), Central European Mountains

(Province 32), Palaeartic (Region 2)”. A map of the location in relation to the international classification is given in section 4.1.

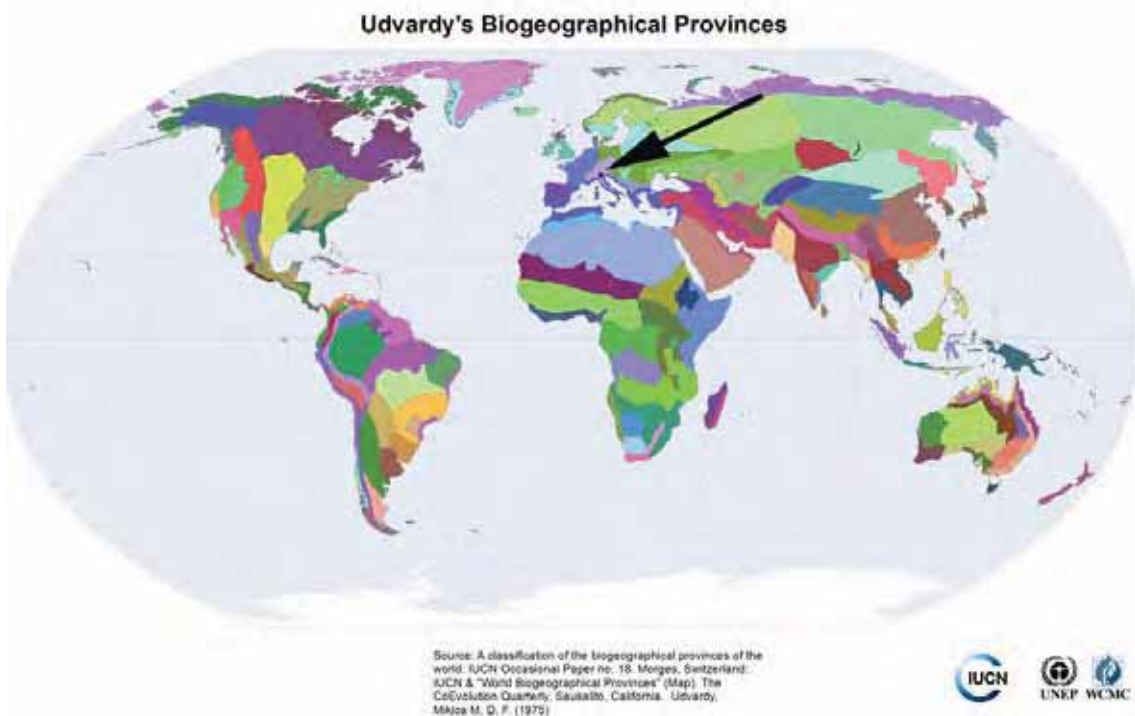


Fig. 8.1 Udvardy map of the biogeographical provinces in the world: the area of the PBR falls within the biome of the mixed mountain system

On a European scale, the area of the Judicaria and Ledro Biosphere Reserve belongs to the biogeographical Alpine region, in the heart of the continent. The map below shows the Biogeographic Regions in Europe supplied by the

European Environment Agency (official guidelines used in the Habitats Directive 92/43/EEC and for the EMERALD Network set up under the Convention on the Conservation of European Wildlife and Natural Habitats - Berne Convention).

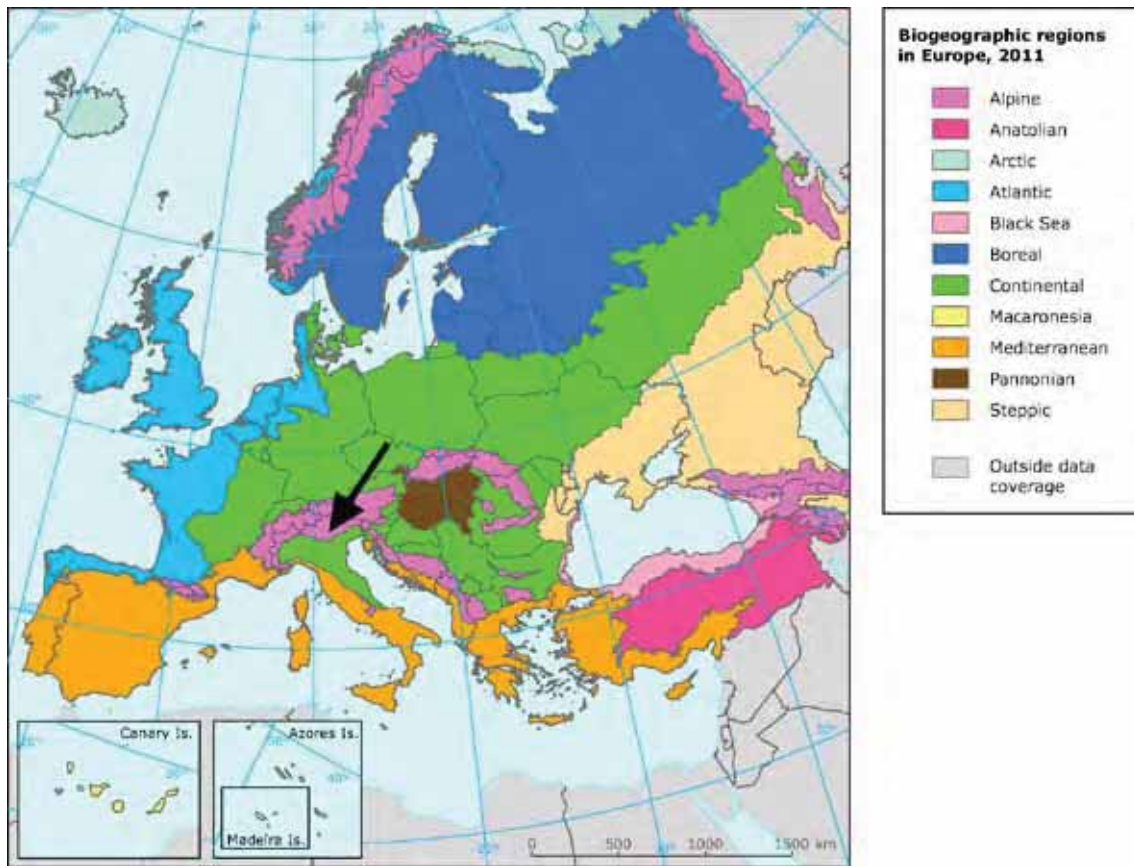


Fig. 8.2 Location of the PBR in the Biogeographic Regions in Europe (from the European Environment Agency)

Over and beyond their geographical position, the massifs belonging to the alpine biogeographical region are all characterised by a relatively cold, severe climate, high altitude and varied and often complex topography. Whereas the lower slopes are often covered with forests and semi-natural grassland formations, as the altitude increases and the temperature diminishes the trees gradually become more and more scattered, until they give way to alpine meadows, heath and moorland. On the peaks, as a result of the rocks and snow, the vegetation is reduced to a handful of plants adapting perfectly to

the situation and capable of tolerating these extreme conditions.

Due to major changes in level, the mountains are characterised by extremely small latitudinal bands, where the distribution of habitats and species changes drastically with the changing altitude. Climbing 100 metres in the mountains is equivalent to moving 100 km to the north on a plain. The complex topography and different exposure (sheltered south-facing slopes, pockets of snow, cliffs exposed to the wind and irregular scree etc.) contribute towards creating countless different microclimates. This is why the alpine region has

such rich and varied biodiversity. It is home to almost two thirds of the plants in the European continent. The high peaks offer refuge to many examples of endemism, whereas on the slopes at low altitude diversity is strongly influenced by the passage towards other biogeographical regions and the long history of more or less sustainable practices adopted by man

to exploit the land.

On a local scale one can note that the area of the PBR is situated close to the limit between the alpine and continental biogeographical regions, so with less extreme climatic and orographic conditions, but at the same time offering a particular wealth of species as a result of the ecotone.

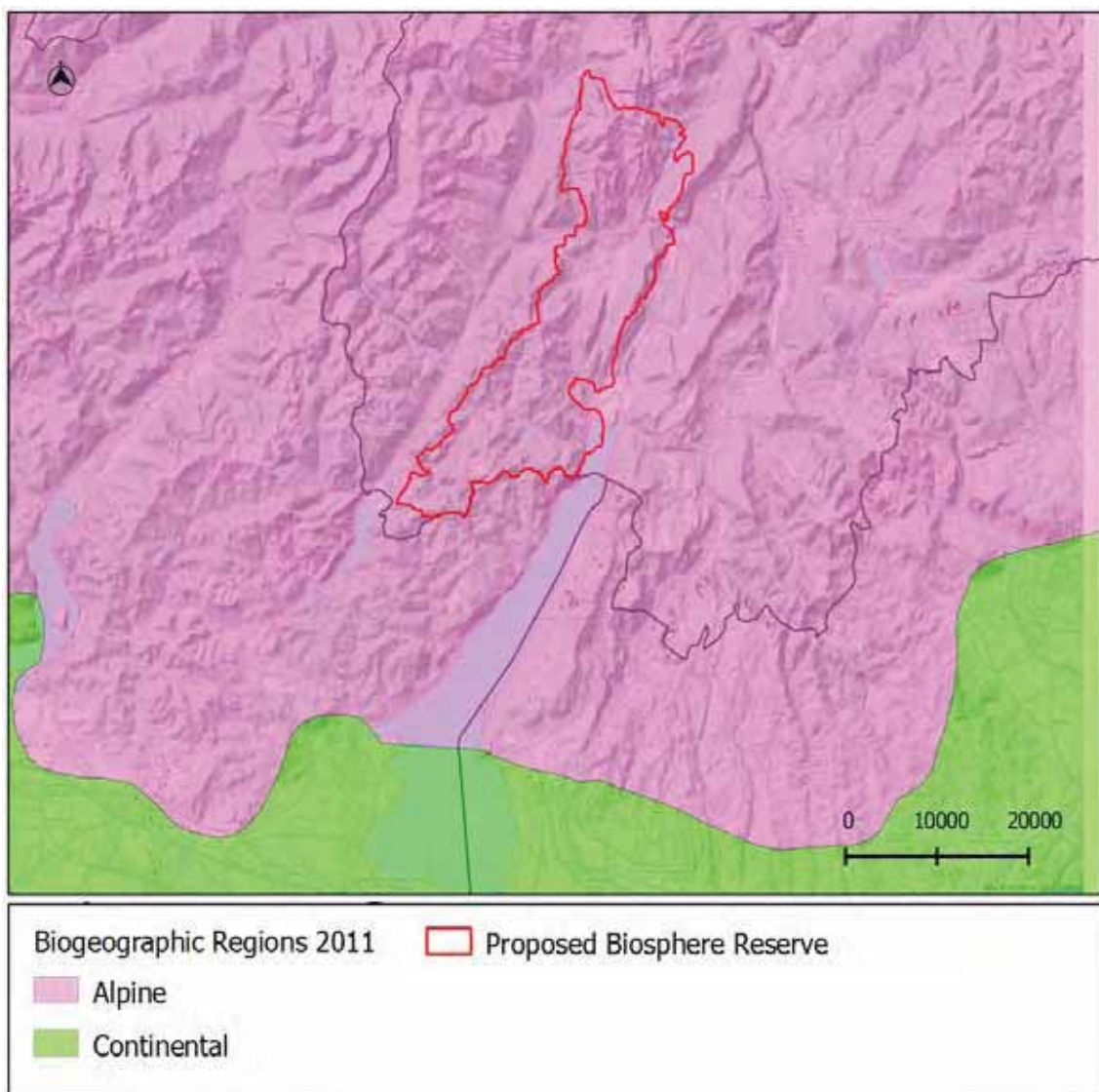


Fig. 8.3 Location of the PBR in Biogeographic Regions in Europe, in detail

9. LAND USE

9.1 Historical

Use of the area began in the early Mesolithic period with a number of seasonal settlements of hunter-gatherers in the southern area of the PBR (Ledro). Subsequently there was increasing use of primary resources by the pile-dwelling settlements of Ledro and Fiavé and later village communities – documented from the early Middle Ages – scattered throughout the area.

The history of the use of natural resources is characterised by a clear dominance of the primary sector, which represented more than 90% of the local economy right up until the second half of the 20th century.

In terms of **land use**, one can note:

- progressive intensification of land use in relation to the increase in population; a significant aspect starting from the Middle Ages;
- intensification should be understood as extension of agriculture and animal husbandry to the detriment of woodlands and as an increase in the exploitation of the woods themselves through the removal of significant quantities of biomass and widespread grazing;
- the maximum level of exploitation of the land for primary purposes was probably reached in the 19th century



Clay cups from Bronze age (WHS pile-dwelling site in Fiavé).

and first half of the 20th century;

- after the Second World War there was a gradual reduction in anthropic pressure on primary resources and gradual recolonisation of marginal agricultural areas by woodland, in addition to significant regeneration of the biomass present.

The **causes** can be linked to changes in the type and intensity of land use by man in almost the whole of the territory; in higher areas, with high mountain grasslands and rocks, global warming in the last 150 years has been decisive in sparking off more favourable conditions for vegetation, also at altitudes above 2000 metres. The following images provide a comparison between current land use and representations of the same area in the 1860 Austrian land register (area in the Municipality of Fiavé); one can clearly note the expansion of woodland (brown areas in the land register map) over agricultural areas:



Fig. 9.1 Comparison between the 1860 land register (left) and a recent aerial photograph shows the recent expansion of the woods over extensive areas formerly cultivated.

The same dynamics can also be seen in the images that follow, taken respectively from a drawing dating back to the end of the 19th

century and a recent photograph of the same stretch of landscape (Municipalities of Comano Terme and Fiavé).



Fig. 9.2 Comparison between a late 19th century print (left) and the current landscape along the slopes of Monte Misone (Fiavé); one can note extensive open areas along the slopes of the mountain, now covered by continuous woodland

The table and graph below provide a comparison of current land use and the 1936 land register, in terms of surface area. One can note:

- the expansion of woodland and bushes to the detriment of agricultural areas on the valley floor and pasture at high altitude;
- the reduction in stable grasslands,

- mostly in favour of arable land, unproductive and urbanised areas;
- the expansion of urbanised areas;
- the data – based on Corine land cover analysis – shows an increase of around 100%; in actual fact the increase is certainly higher. (See annex 2.1)

classes	ZONES (ha)						total	
	core		buffer		transition		1936	2011
	1936	2011	1936	2011	1936	2011		
waters	1	6	21	24	363	356	0.8%	0.8%
woodlands	1,333	1,864	8,068	11,085	15,676	19,794	52.8%	69.0%
permanent crops					258	215	0.5%	0.5%
pasture, grasslands	2,915	1,837	5,080	1,430	4,082	1,065	25.5%	9.1%
stable grasslands	218	0	466	85	3,760	589	9.4%	1.4%
arable crops	1		3	1	1,778	2,840	3.8%	6.0%
urbanised areas	0	0	10	24	410	766	0.9%	1.7%
wetland areas					3	82	0.0%	0.2%
unproductive areas	318	1,079	2,122	3,122	536	1,161	6.3%	11.3%
Total	4,786	4,786	15,770	15,770	26,867	26,867	100.0%	100.0%

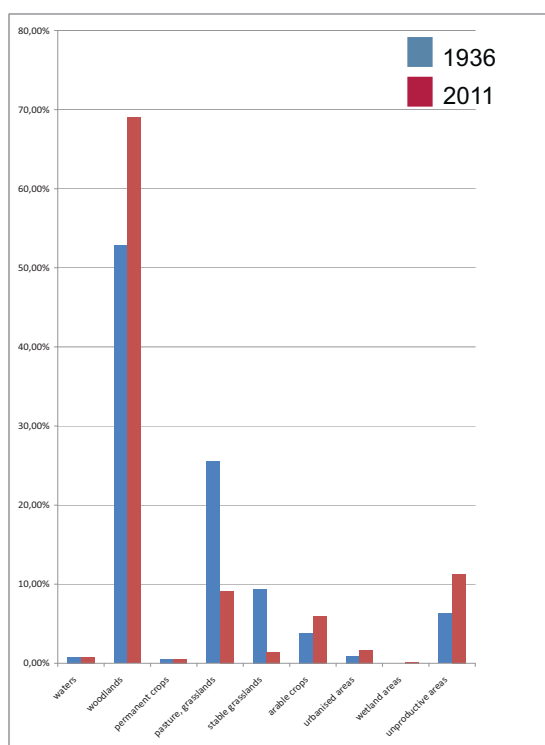


Fig. 9.3 Distribution of land cover on the basis of 1936 land register data and the situation today

Specifically, as regards the landscape dynamics underway in the different zones, one can note:

- in the core areas, situated at high altitude, a relatively slow – given the climatic conditions high in the mountains – but constant advance of vegetation at various levels:

- enrichment of the flora on the rocks, expansion of grasslands over scree, expansion of bush and tree vegetation over pastures and grasslands;
- in the buffer zones the same trends described above are essentially repeated, except in

forest environments where one can see the gradual substitution of spruce trees (and conifers in general) with beech or other thermophilous broad-leaved trees. More generally there has been widespread expansion of woodland over former pastures or cultivated areas on the slopes, along with a substantial increase in forest biomass (and hence the creation of forest environments of greater scenographic impact);

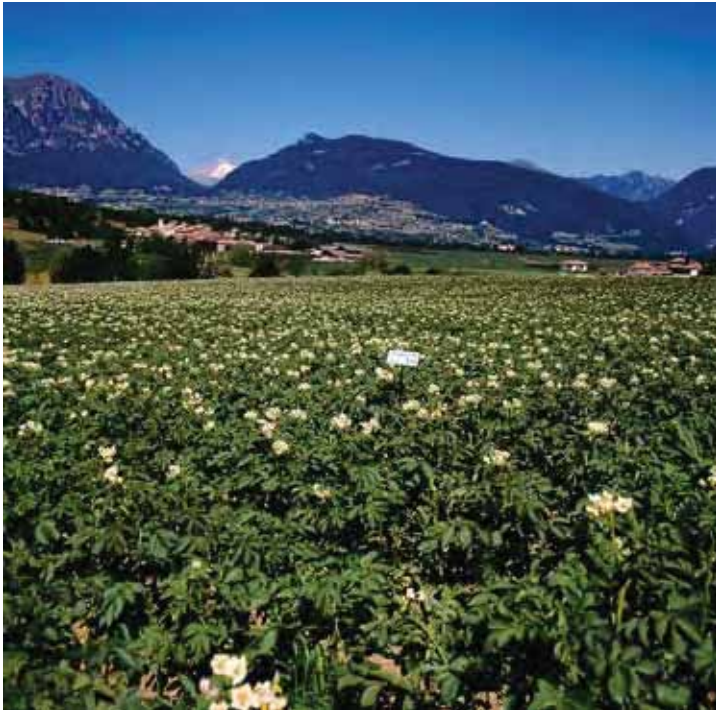
- in the transition areas, the same trends described above apply within forests; one can also see a significant reduction in marginal agricultural areas (as shown in the images on the previous page), and an expansion in maize and potato cultivation in the more favourable areas. It follows that as compared to the agricultural landscape a century

ago, there has been a simplification of the landscape, in terms of the drastic reduction of valuable elements such as scattered trees and hedges; there has also been a significant expansion in urban districts on the edges of historic towns, to the detriment of agricultural areas.

In general the current area is nevertheless characterised by a substantial extension of natural landscapes (90%) or agricultural landscapes (8%), also in comparison to the rest of Trentino; the conservation of these traditional environments characterises the landscape, also due to the limited extent of uncontrolled urban development (with second homes and warehouses).



A gradual reduction in grazing pressure has led to colonisation by trees and shrubs



The intensification of agriculture in the most favourable areas leads to an expansion in arable crops and potatoes

Historic use of the natural resources available has been characterised by the following underlying elements:

- the total dependence of the mountain community on a closed primary economy, and hence a traditional continuous and close link with the local area for the whole local population;
- the consolidated tradition of century-long collective management of public assets, the result of recognition of self-government rights granted by rulers, officially guaranteed for centuries (the first documents date back to the first centuries of the 2nd millennium) in the 'Carte di Regola' (regulatory charters);
- from the end of the 19th century, the development of cooperative models

for hydroelectric management and the sale of agricultural products.

The two latter aspects are further described in sections 9.2 and 9.3. As regards recent evolution in terms of the use of resources, in addition to the changes outlined above, in more recent decades one can note:

- a reduction in the intensity of use of forestry resources in the broader sense (timber, firewood, edible products of the woods, fauna);
- an increase, also significant, in the use of agricultural land, with an increase in crops and relative external emissions; the same trend can also be seen in relation to water resources, used in gradually increasing quantities for drinking water, irrigation and hydroelectric purposes.

9.2 Who are the main users of the biosphere reserve? (for each zone, and main resources used). If applicable, describe the level of involvement of indigenous people taking into account the “United Nations Declaration on the Rights of Indigenous Peoples”.

88% of areas covered by woodland, pasture or rocky zones at high altitude are owned publicly or collectively. In the agricultural and urban context ownership is instead mostly private. These aspects define relatively clearly the availability of resources for the use of local inhabitants.

Water represents a resource common for all uses and every type of area. It is mainly used for public purposes. In



The ancient spa of Comano, used since Roman times, is currently one of the main sources of income in the Giudicarie Esteriori

this context:

- all aqueducts are municipally owned and managed by local authorities; only in the case of the Municipality of Tenno is management dealt with by a private company with public participation (called GEAS);
- it is extensively used in hydroelectric plants to produce electricity (more than 30 million Kwh a year), the plant belonging to the CEIS, whose members/beneficiaries are almost all the heads of households in the Giudicarie Esteriori; a smaller quantity (around 2 million Kwh a year) is produced directly by the Municipality of Ledro;
- extensive exploitation of hydroelectric power takes place using the waters of Lake Ledro by GEAS, which has its headquarters in Riva del Garda;
- another specific use of water regards the thermal springs and spa in Comano, which is the biggest company and source of employment in the Giudicarie Esteriori; this is also publicly owned and managed directly by the municipalities, following donation at the end of the 19th century;
- water for agricultural irrigation, taken from springs, is managed by



High mountain pasture represents one of the main uses of natural resources; it is managed

consortia of private farmers.

In the **core areas** the main resources used by man are grasslands, pastures and the natural landscape. In this context:

- pastures/grasslands and related structures (mountain huts or 'malghe', described in section 10.4) are entirely publicly or collectively owned and regulated by traditional customs (the 'Regole', described in section 9.3), which guarantee that recorded residents (or rights

holders) can make use of the resource, purely for the scope of family requirements; these rights are still in force and public types of management have adapted to changing socioeconomic conditions, with redistribution of profits;

- the landscape of the high mountains represents one of the resources on which tourist promotion is based (one should recall that tourism is by far the main economic resource for the region); such areas are freely accessible and their use is based

on footpaths and refuges almost entirely managed by the Società Alpinisti Tridentini (SAT) and the local branch of Club Alpino Italiano (CAI);

- the hunting of animals for game is managed by the local branches of hunting associations, delegated with the task by the provincial administration, and is reserved exclusively for residents in the individual municipalities.

In the **buffer zones**, in addition to the resources described above, the presence of woods is significant in the broader sense, for the production of timber, but also for the edible products found in the woods (mushrooms,



Cultivation of olives; an example of private initiatives supported by cooperative organisations for the transformation and marketing of products

fruit, herbs) and as an element in the natural landscape. Once again more than 80% of the surface area is publicly or collectively owned, in particular as regards almost all the production areas for the timber market. As in the case of pasture land, use is linked to ancient rights of the community which guarantee that each family is entitled to benefit from such use.

In the **transition area**, in addition to the resources described above, the most distinctive aspect concerns land use for agricultural purposes.

The area is almost entirely privately owned (although there are some collectively owned areas, around 5-10%), mostly by people resident in the area.

Production, but above all sales and marketing are almost entirely managed by cooperative producers' associations (Agraria Riva del Garda for olive oil and wine, Consorzio Produttori del Tennesse, Cooperativa Pataticoltori Giudicariense for potatoes and fruit, Caseificio Sociale Latte Trento, Cantina Sociale Toblino).

Forms of private sale are limited and mostly concern the animal husbandry (meat and milk) and fruit production sectors.

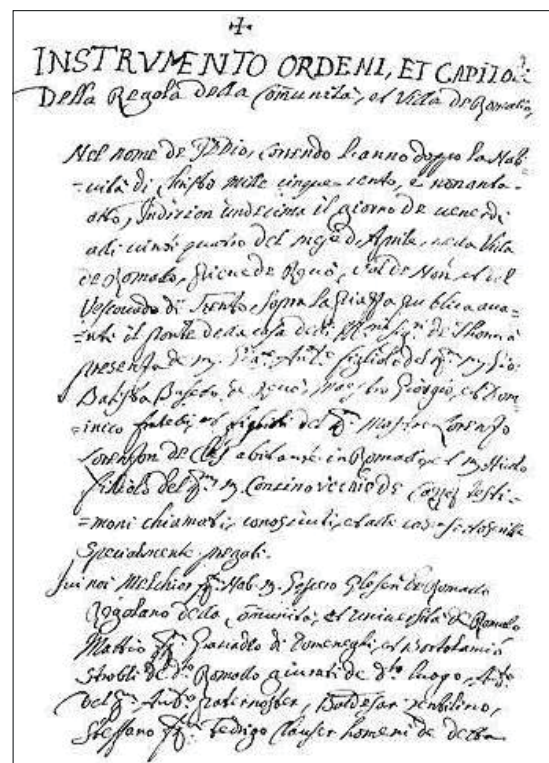
9.3 What are the rules (including customary or traditional) of land use in and access to each zone of the biosphere reserve?

As described in section 9.2, the high level of forms of public or collective ownership of natural resources in the area of the PBR is a unique feature of the area. Considering also the presence of cooperative organisations, this applies to almost all the primary production sectors. This high concentration of non-private use and management is an aspect specifically linked to this area and its history. In this context one should note:

- the existence of 'Carte di Regola' which established civic rights of use; these regulated property which was not strictly public, but rather the property of the assembly of the heads of household in the community;
- the area represents the birthplace of the cooperative movement at provincial level and is one of the first examples at national level as regards cooperative banks and services;
- collective forms of ownership also extended to the use of water for hydroelectric purposes and the spa.

The **Carte di Regola** were established in the Middle Ages and grew out of the existence of village communities. These documents containing rules for the communities are the oldest evidence of the autonomy that Trentino communities

had in relation to the authority of the Prince Bishop. Each villa and community had its own "regola" which certified the rights for each head of household; the right to make use of existing resources in accordance with the needs of the family. The rights regarded "mountain" resources and not agricultural terrain, with the exception of small areas. The rules regarded the use of firewood, timber, pasture, hay, forage and gravel. Although referring constantly to the Statute of the City of Trento (the main town) the "boni homines" of the



Cover page of an ancient Carta di Regola

villages, called to a public assembly, drew up rules establishing the rights and duties of all inhabitants and outsiders in the area – particularly as regards access to collective property (woods and alpine pasture) and the right to pick products of the wood and bush. All the *carte di regola* and people’s assemblies of the Trentino community were suppressed by the Austrian and Bavarian rulers in 1805 “as illicit bands of people”. The “*regole*” were subsequently re-established and are still recognised by current legislation. The bibliography is extensive: as an example see “Nequirito, M., *Le Carte di Regola delle Comunità Trentine*. Mantova, 1988. The “*Regole*” still represent methods for the management of forests and high mountain pasture. Following the socioeconomic changes taking place in the last few decades, they are no longer applied in relation to individuals’ need for materials, but are rather managed as a public asset of the assembly of elected householders, while the profits are redistributed to the community. As regards other resources, such as fruit from the woods, hunting for game or even straightforward access to funds, there is a single set of regulations at provincial level that guarantees the priorities – in line with the property of the “*Regola*” – in terms of use for residents in the individual municipalities. These regulations thus concern all the core areas, as they are collectively owned, and almost all of the buffer zones. As regards the



Old village of Rango

transition areas, the rules are valid for “mountain” areas, with the exclusion of agricultural and urban areas. The cooperative model can be seen as a modern evolution of the longstanding ability of local communities to work together, collectively managing the resources of the mountains, and the ways in which this takes place. It was indeed within the area of the reserve, starting from 1872, that the first cooperative societies were set up, thanks to the initiative of a village priest, Don Lorenzo Guetti. Initially they were established to manage commercial activities in a cooperative manner, but the model was immediately extended to credit (with the birth of the ‘*Casse Rurali*’, cooperative banks inspired by the Reiffeisen German model), hydroelectric production, farming activities and so on. Today cooperative enterprises represent a distinctive feature of Trentino and within the reserve they are present to a higher than average extent.

9.4 Describe women’s and men’s different levels of access to and control over resources.

Access to resources has changed significantly over time. Traditionally only male heads of household were entitled to collective property. Over time, in the rare cases in which a woman could be a head of household, she was granted a “half fire”, namely half the quantity granted to a male. Only in the second half of the 20th century were equal rights between men and women recognised in terms of rights in the context of the “Regole” for the exploitation of mountain

resources. Today, men and women have completely equal rights. In terms of customs there are still differences in traditional sectors, in line with what takes place in neighbouring Italian and European regions. The presence of women within management organs, whether political or administrative, is still much lower as compared to male representatives. The table below shows the presence of women (in %) in local administrations:

Area	Mayors	Municipal councillors
Giudicarie and Ledro municipalities	18.2	22.8
Province of Trento	12.0	24.8
Italy	11.4	20.5



As regards councillors the local data is essentially in line with figures at provincial and national level, whereas one can note a significantly higher than average presence of women Mayors.

Farmer carrying out traditional agricultural activities

10. HUMAN POPULATION OF PROPOSED BIOSPHERE RESERVE

The following table provides a picture of the population living permanently or seasonally in the different areas:

	Permanently	Seasonally
10.1 Core Area(s)	-	30
10.2 Buffer Zone(s)	-	200
10.3 Transition Area(s)	15,845	c. 28,000
Total:	15,845	c. 28,000

The data regarding the permanent resident population is certain, as it comes from public registers. The data regarding seasonal residents is estimated on the basis of the number of tourists present (and the average duration of their stay – see chapter 15) during the most popular period in summer (from June to September).

The seasonal population in the buffer zones and core areas was calculated on the basis of PAT data regarding the residential structures (huts, barns and refuges) present there.

All the stable resident population lives in the transition areas. The following table shows how they are divided between the municipalities:

Municipality	2012 residents
Bleggio Superiore	1,568
Bondone	(668)
Dorsino	435
Fiavè	1,120
Riva del Garda	(16,052)
San Lorenzo in Banale	1,164
Stenico	1,149
Storo	(4,668)
Tenno	2,010
Comano Terme	2,944
Ledro	5,455
	(37,233)
Overall total complessivo	15,845

The numbers shown in brackets refer to inhabitants resident within the municipalities, but outside the perimeter of the area identified as the proposed Biosphere Reserve, namely in heterogeneous areas as compared to the candidate area. It can be observed that in the Municipality of Riva del Garda alone there is a larger population than in the whole area of the proposed reserve.

From the historic point of view, the size of the resident population in the various municipalities has remained stable or decreased slightly, the

decrease being more marked up to the 1960s-70s. Starting from the 1990s there was a turnaround, with an increase of around 15% in the last 20 years.

More specifically, the maintenance of the human system would still seem to be difficult in the smaller municipalities, demonstrating the need to adopt a systematic approach in order to confirm the development policy adopted in the last few decades and which would seem overall to have halted the trend towards marginalisation.

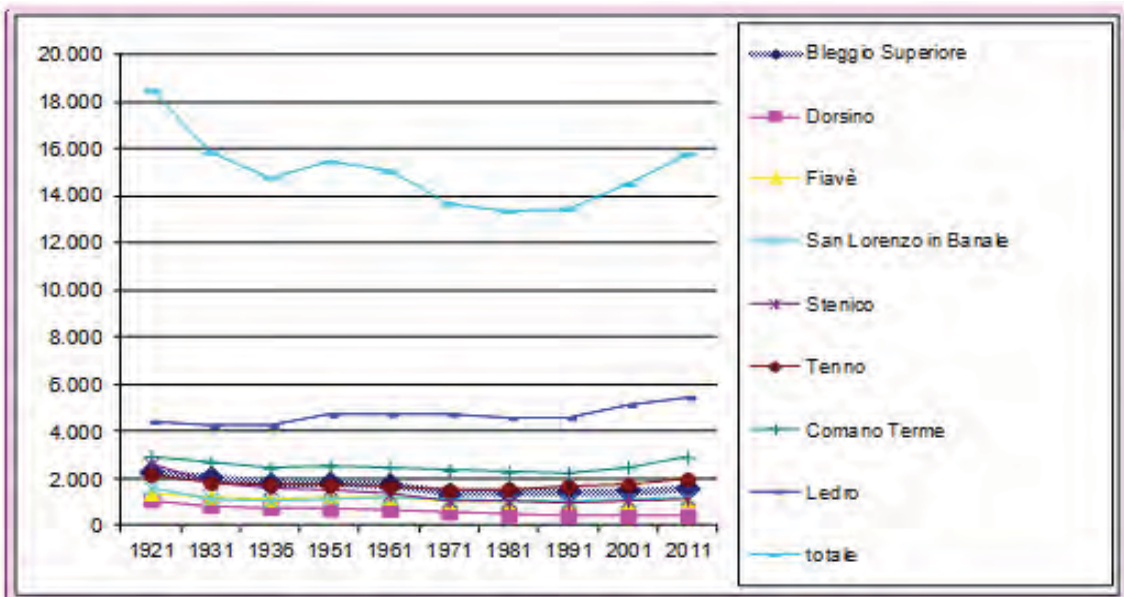


Fig. 10.1 Demographic trend for towns within the PBR, from 1921 to the present day

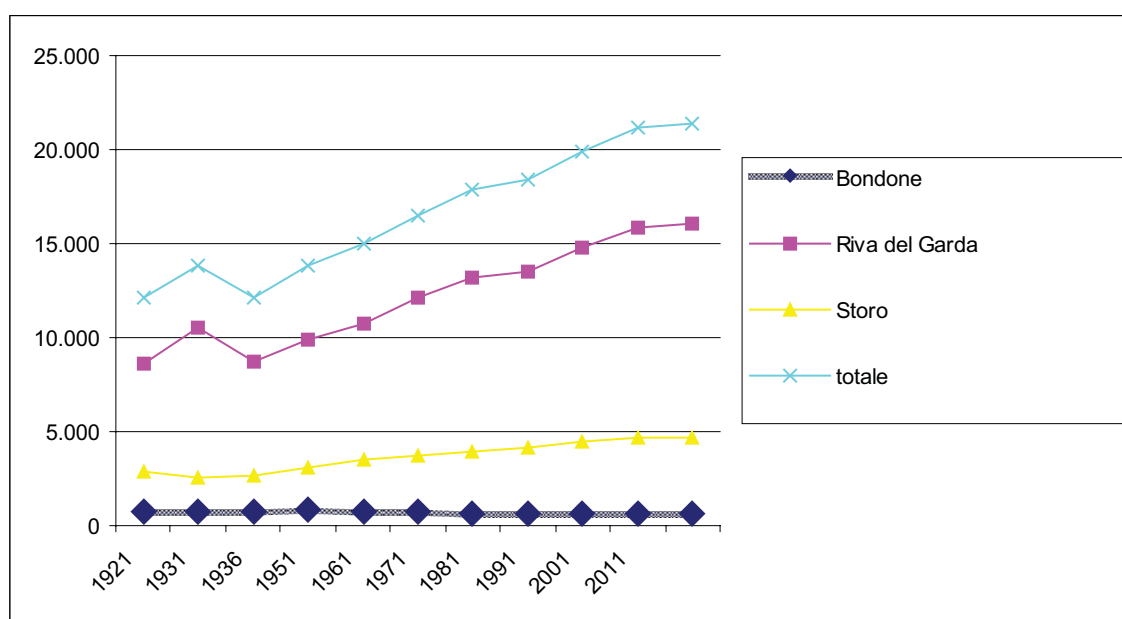
The population estimates for seasonal residents (in the summer) highlight an overall and substantial propensity for tourism, while at the same time raising questions about the quality of

current forms of tourism, the seasonal and geographical distribution of visitors, past trends and development objectives which will be dealt with in section 15.

10.4 Brief description of local communities living within or near the proposed biosphere reserve

The differences between the PBR area and the heavily settled areas on the valley floor nearby, including areas neighbouring on Lakes Garda and Idro, are further underlined by the graph below: there has been a

substantial increase in the population in the Municipalities of Riva del Garda and (secondly) Storo, which essentially doubled their number of residents in the period considered.



10.2 Demographic trend for towns nearby the PBR, from 1921 to the present day

The local population does not include autochthonous ethnic minority groups or groups different to those prevailing in the region.

However, in the last few years there has been a flow of foreign migrants to the areas in question for the purposes of employment; specifically, it is possible to note the presence of:

- Pakistani and Indian nationals, employed in the animal husbandry sector (Lomaso and Fiavé);
- Macedonian nationals, employed in the construction industry;
- Eastern European nationals, employed as carers.

As compared to the main valleys in Trentino the PBR is characterised by a low population density (around 33 inhabitants/Km²) and at the same time by the high level of fragmentation of settlements. These are spread over a large number of municipalities and with numerous villages and hamlets in each municipality (many of which very

valuable in historical and architectural terms).

This is linked to the traditional agricultural nature of the area, with a widespread human community that has had a relatively minor impact and has historically been capable of shaping the natural and anthropic environment into a landscape in which aesthetic and perceptual aspects come together with the natural beauty of the area.

In relation to the internal dynamics of the population in the last twenty years, limited to settlements within the area, the graph below shows:

- a constant population of young people (aged <24), who represent just over 20%;
- an increase in the adult population (aged 25 – 64), who represent around 45%;
- an increase in the elderly population (aged >65) who represent almost 20% of the population.

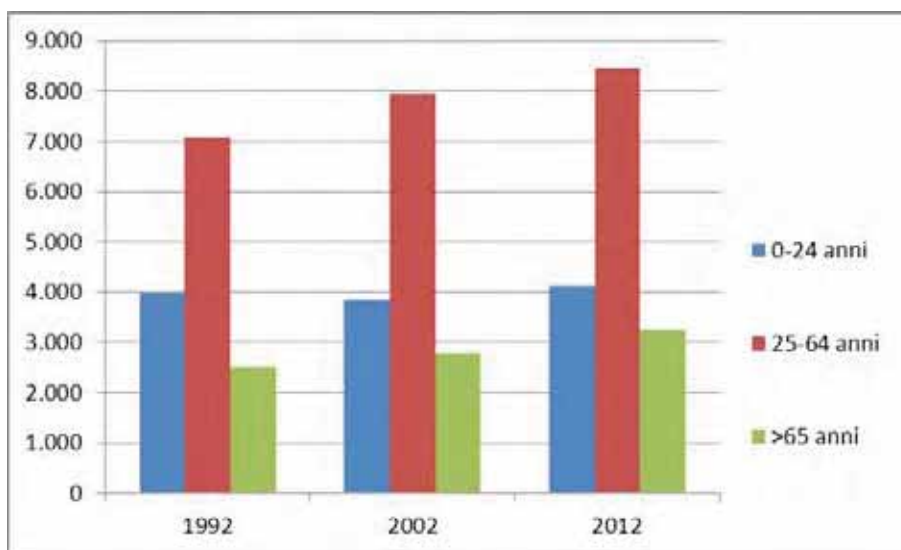
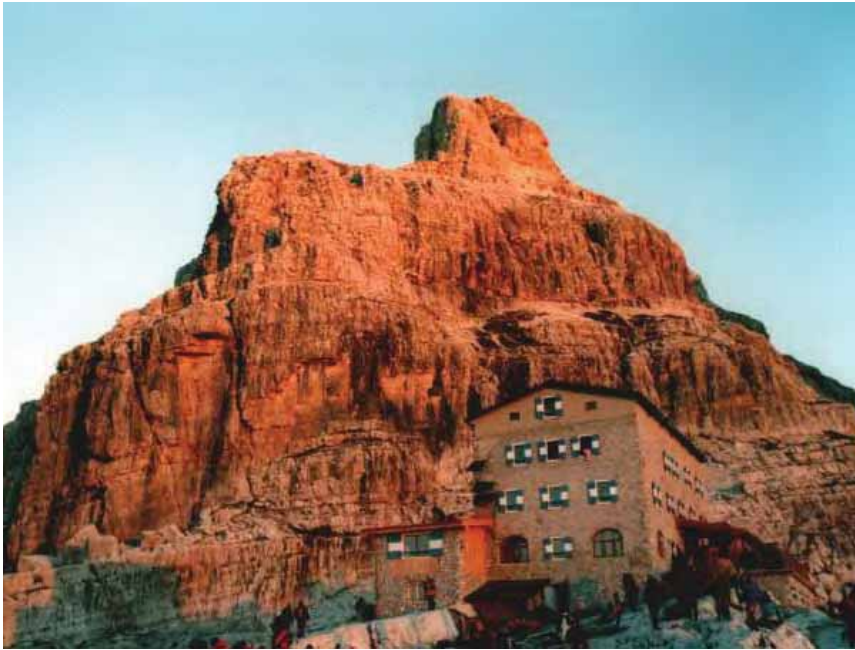


Fig. 10.3 Changes in population age groups in the last twenty years



The Pedrotti refuge, an example of seasonal buildings used for the purposes of tourism in the core area

More recently the most relatively active settlement areas have centred around the main tourist destinations : the Comano spa and Lake Ledro. Given that there are no permanent settlements in the core areas and buffer zones, the relationship between the human community and the different area environments described here refer almost exclusively to the transition area. In the buffer zones and core areas there are very few people present and the human presence is not continuous over time. Activities are therefore of a seasonal nature and traditionally centre around alpine grazing of domestic livestock (especially cattle). The herds follow a model of vertical migratory pasture, from the valley floor to grazing areas above the wood line. In this type of migratory pasture the 'malghe' (mountain huts and dairies) have a central role in supporting summer

pasture, whereas the grassland areas at medium altitude were destined to produce hay for the winter. The importance of pasture at mountain huts (although decreasing overall) has not yet been exhausted (indeed there are signs of recovery), whereas there is a serious crisis in terms of the grasslands at medium altitude. The abandoning of structures has been partly countered by the development of tourist activities high in the mountains. Excursions and summer tourism are indeed favoured by a network of refuges and some small accommodation facilities (or restaurants), in addition to the malghe themselves and converted barns that are no longer used for their original function.

The human presence in summer in the core areas and buffer zones is organised around the following structures:

CORE AREAS

- Malga Giumella
- Malga Asbelz
- Malga Ben
- Malga Senaso di Sotto
- Malga Senaso di Sopra
- Malga Prato di Sotto
- Malga Prato di Sopra
- Roccolo Caset, birdlife research station
- Pernici refuge
- Cacciatore refuge

BUFFER ZONES

- Malga Dromaè
- Malga Saval
- Malga Grassi
- Malga Gelos
- Malga Pranzo
- Malga Trat
- Malga Caset
- Malga Bezzecca di Tremalzo
- Malga Tiarno di Sotto di Tremalzo
- Malga Tremalzo di Molina
- Malga Tiarno di Sopra di Tremalzo
- Malga Giù
- Malga Pertica
- Malga Pegol
- Malga Alpo di Bondone
- Malga Alpo di Storo
- Malga Tenera
- Malga Cap dei Guì
- Malga Plaz
- Malga di Seo
- Malga Ceda di Villa
- Malga Laon
- Malga Vallon
- Malga Nambi

- Malga Stablei
- Malga Movlina
- Malga Valagola
- Agostini refuge
- Pedrotti refuge
- XII apostolic refuge
- Algone barns
- S. Martino barns (Pieve di Ledro)
- Jon farm
- Dengolo farms
- Alpo di Storo and Bondone barns
- Barns at Piola, Lorina, Spessa and Nar (Storo)
- Dromaè barns
- Baita Ca de Mez
- Prè da Mont barns (Tiarno di Sopra)
- Tremalzo restaurant
- Capanna Grassi restaurant
- Ghedina restaurant
- Brenta restaurant
- Garda restaurant



Algone Valley meadows

10.5 Name(s) of the major settlement(s) within and near the proposed biosphere reserve with reference to the map (section 6.2)

CITIES CLOSE TO THE RESERVE		
Name of the city	Location	Distance from the reserve (km)
Trento	Trentino-Alto Adige Region	27.99
Bolzano	Trentino-Alto Adige Region	67.38
Verona	Veneto Region	61.40
Vicenza	Veneto Region	73.61
Brescia	Lombardia Region	66.47
Sondrio	Lombardia Region	74.71

Fig. 10.4 Distance of the PBR from the main cities as the crow flies

Trento is the city with which the area of the PBR has the closest relationship. This is not only due to its geographical vicinity, but also for



historic reasons and as a result of the current administrative situation (Trento is the main town and administrative centre for the region, where the main services accessible to the local community are found). Given the north-south orientation of the main valleys, influence and movement along the Brescia (Verona) – PBR – Bolzano axis can be easily demonstrated. Much longer distance transfers also take place along this axis, as in the case of tourists coming from northern Europe (Germany and the Netherlands) and the Po valley. There are instead no particular links, even in terms of tourist flows, with the cities to the east and west: Vicenza and Sondrio.

Old bus driving up the winding road of Ponale

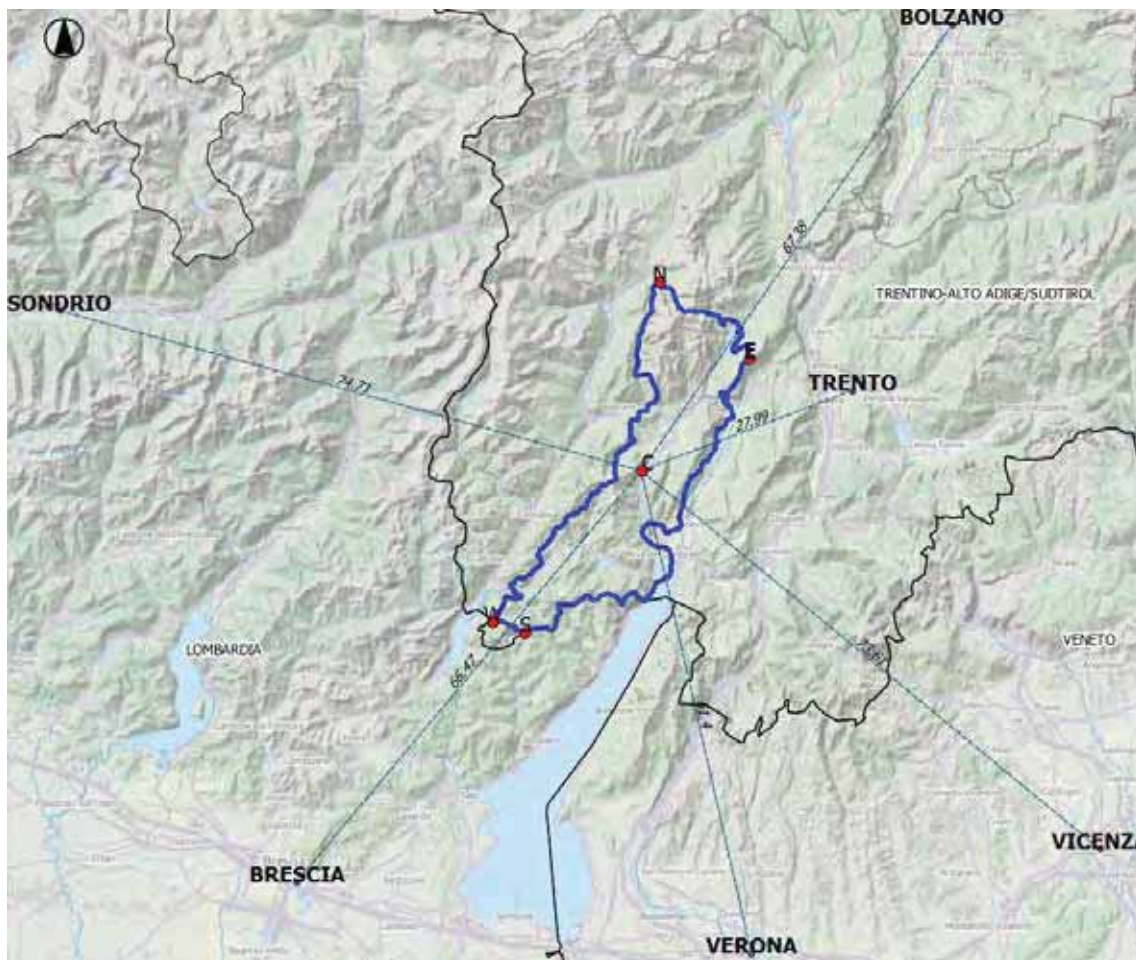


Fig. 10.5 Distance of the PBR from the main cities as the crow flies

10.6 Cultural significance

Since prehistoric times the Tenno area and overlying Ledro and Giudicarie Esteriori valleys have represented routes for penetrating the Alps – via the Trat, Ballino and San Pietro passes. Recent findings in the Val di Ledro date the presence of seasonal human settlements at high altitude right back to the Mesolithic era. The first permanent settlements (dating back to c. 4500 years ago) have been documented around Lake Ledro and Lake Carera at Fiauvé. These were Bronze Age pile-dwelling settlements

whose importance is such that both were recognised as UNESCO World Heritage Sites in 2011. Research on artefacts and pollen surveys have showed, among other things:

- that they were inhabited over a continuous period of more than 1000 years;
- the documented presence of forestry, animal husbandry and farming activities;
- communication and trading with the Po valley and with transalpine areas.

Following the Roman conquest of the Alps, with the relative submission of the indigenous peoples, the area of south-west Trentino (including more or less the hydrographic basins of the River Sarca and the River Chiese, and thus only the southern slopes of the Brenta Dolomites) was assigned to the Municipium of Brescia (Flavia tribe), in contrast to the northern slopes of the Brenta mountains, which were part of the Municipium of Trento. During the period of Lombard domination the name “Judicaria” appeared, probably referring to the role of a “judge” exercising power on behalf of a King over a vast frontier area.

Of the different “Judicarie” known at the time in northern Italy,

the term “JUDICARIA SUMMA LAGANENSIS” emerges for the first time in a document dating back to 927 AD. Areas today belonging to the Lombardia Region, such as Valvestino (Alto Garda-Bresciano Park) and Bagolino, up to Passo Croce Domini (Adamello Park) were also part of this ancient territory. From 1027 to 1803 the whole area of the original Judicaria Summa Laganensis became part of the Prince Bishopric of Trento, in its turn subsequently part of the County of Tyrol and belonging to the Austro-Hungarian Empire up to 1918. Over this long period, inheriting previous experiences of self-government, methods for managing the area through community statutes or “Carte di Regola” were developed and consolidated. These stated the rights/duties of all inhabitants and in particular shared responsibilities for the management of “collective property” such as waters, woods and alpine pasture. Recognition of self-government rights would appear to have been a sort of prize granted by the ruler of the time to faithful populations involved in clearing and populating difficult areas. It is a rare example of this kind of tradition at global level, a tradition which still exists in the municipal registers, civic uses managed by municipalities or special ASUCs (civic use management associations) and in the participation of citizens in numerous



The “Zudicaria” in an old map conserved in the Vatican museums



WW1 is still a important part of the collective memory, above all in Ledro

public service activities.

After 1918, having suffered serious damage during the First World War, the area was characterised by a high level of emigration, both seasonal and definitive, which continued up to the Second World War. Only the economic and social model conceived at the end of the 19th century by the local priest Don Lorenzo Guetti, inspired by the German model of Wilhelm Reiffeisen, was capable of setting a limit to this with the creation of the cooperative movement. This took root and found fertile terrain precisely in the tradition of “collective assets” and the longstanding practice

of dealing with and solving problems together.

The historical background briefly summarised here, interweaving with the physical and biological characteristics of the mountain environment, has given the area a cultural and natural heritage of great importance, starting with the sites already recognised by UNESCO as WHSs:

- Ledro pile-dwelling site;
- Fiavé pile-dwelling site;
- Brenta Dolomites.

The list can be supplemented with

numerous other important cultural assets;

- some of the “most beautiful villages in Italy”¹: Rango, S. Lorenzo in Banale, Canale di Tenno;
- Castle Stenico, the proposed headquarters for the Biosphere Reserve and the second most important castle in the region (enclosed 8.8);
- Castel Campo;
- Castel Spine;
- Castel Restor;
- Castel Tenno;
- former Algone glassworks;
- archaeological sites: S. Martino (Comano Terme), S. Martino (Campi di Riva);
- Franciscan monastery at Campo Lomaso;
- The parish churches of Vigo Lomaso, S. Croce di Bleggio and Pieve di Tavodo.

To these one can add other resources linked to the earth, but nevertheless part of the intangible local culture of food and wine:

- Giudicarie potato;
- Storo maize (Marano var.);
- Ciuiga del Banale (Slow food project);
- Bleggio walnut (local *Juglans regia* variety and traditional product);
- carne salada (traditional product);
- Pranzo chestnut (traditional Trentino product);
- olio di oliva del Garda Trentino DOP (local olive oil).



Lorenzo Guetti, from Lomaso, founded the first cooperative associations at the end of the 19th century

Natural resources, in addition to their biological value, extensively documented in chapters 11 and 14, can also take on a monumental value:

- geosites (Forra del Limarò, Forra del Rio Nero, Forra del Palvico, Forra del Ponale, Forra della Scaletta, Forra del Rio Ambiez, Pozza Tramontana, waterfalls of Rio Bianco, Camerona cave, Arca di Fraporte);
- ludrin forest reserve;
- monumental trees;
- lakes (Tenno, Ledro, Nembia)

¹ Annually acknowledged by Legambiente

10.7 Specify the number of spoken and written languages (including ethnic, minority and endangered languages) in the biosphere reserve

The area is Italian-speaking. Alongside Italian there is the local dialect, with more or less marked characteristics in each individual town. The different roots and inflections of the dialect recall the position of the

local community as a bridge between the Brescia, Veneto and Trento areas and the influence of the German-speaking area to the north of the region.



The “Camerona” of Ballino.

11. BIOPHYSICAL CHARACTERISTICS:

11.1 General description of site characteristics and topography of area

The area of the Biosphere Reserve is representative of the southern slopes of the carbonate central-eastern Alps and represents a hypothetical transect of environments leading from the Mediterranean to the alpine tundra, passing through a wide prealpine band skirted with spruce

and beech woods, alternating with traditional crops.

On a geomorphological and pedological basis, the Trentino land map identifies a hierarchical series of areas and soil systems of clear importance in understanding the landscape.

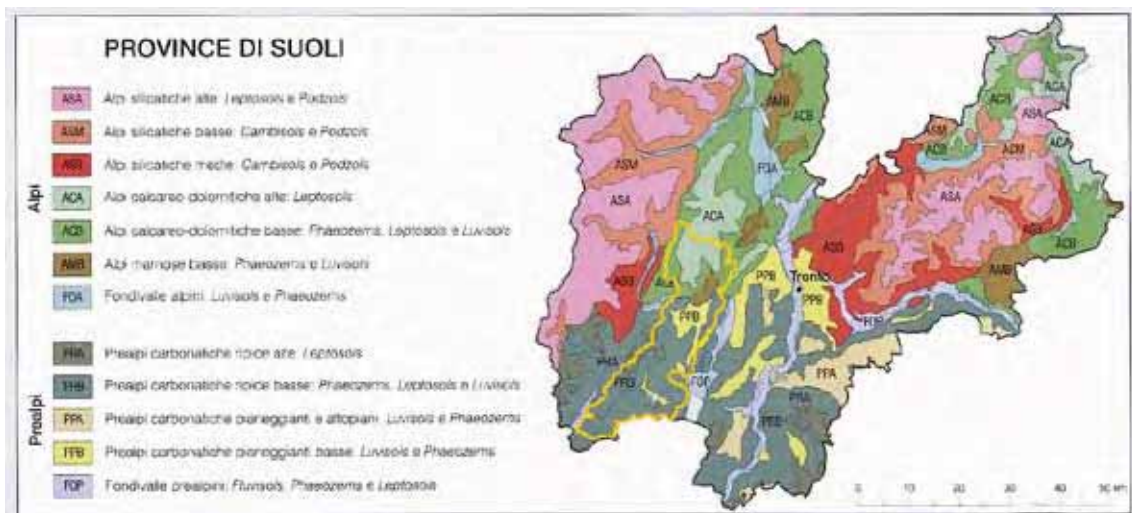


Fig. 11.1 Soil map for the Province of Trento; the outline of the proposed BR is in yellow

The area examined acts as a bridge between alpine and pre-alpine soil landscapes, being divided into the following classes:

PRB – steep craggy slopes of carbonate prealpine reliefs, mainly at medium and low altitudes (principally mountains or hills), generally covered with broad-leaved woods or mixed woods (with conifer trees)

and interrupted by pastureland or agricultural crops only locally. This represents the most widespread type in the central and southern part of the nominated area.

PRA – peaks and high steep craggy slopes of carbonate prealpine reliefs, mainly at high mountain or subalpine altitudes, characterised principally by pastureland and primary grasslands.

This category has some discontinuous patches within the previous category, along the main ridges.

PPB – valley floor of prealpine watercourses and low hills, characterised by agricultural crops and secondarily by broad-leaved or mixed woods. The category has some unconnected nuclei; the main one corresponds with the valleys of Fiauvé, the Bleggio and the Lomaso, characterised mainly by meadows and arable land; the nucleus situated on the valley floor of the Ledro is characterised by a series of grassland environments around the lake of the same name; the area around Tenno is characterised by the presence of cultivated trees (chestnuts, olives etc.).

ACB (AMB) – relatively steep or craggy slopes of carbonate (or marly AMB) alpine reliefs, mainly at medium and low altitudes (mountains or

hills), generally covered with conifer or mixed woods and less frequently meadows, pasture or occasional agricultural crops (areas given over to vine cultivation in AMB close to settlements). This represents the most widespread type in the northern part of the nominated area, fringed by pinnacles included in the following type.

ACA – peaks and high steep craggy slopes of carbonate alpine reliefs (Dolomitic pinnacles), mainly at altitudes over 1900 m a.s.l., between the subalpine level and the snow line. These are environments characterised mainly by rocky areas, pasture and primary grasslands. This category, of major value in terms of the landscape, represents a “wall” acting as a background to the proposed area and delimiting it to the north.



Dolomites of Brenta



The ridge of Mountain Cadria (Ledro Alps)

11.2 Altitudinal range

11.2.1 Highest elevation above sea level

3,173 m (Cima Tosa)



With an altitude of 3.173 m, Cima Tosa is the highest point in the PBR (and the Brenta Dolomites)

11.2.2 Lowest elevation above sea level

63 m (Lake Garda)



The bottom of Lake Garda represents the lowest point in the PBR (-185 m, in the Municipality of Ledro)

11.2.3 For coastal/marine areas, maximum depth below mean sea level

Not applicable (Lake Garda, immediately below the boundary of the proposed area arrives at a depth

of 346 metres; about 185 m in the stretch below the Val di Ledro).



Lakefront of Riva del Garda

11.3 Climate

According to the Köppen-Geiger classification, the area of the reserve falls into the following categories:

- ET – Polar Tundra climate, (no month with an average $T > + 10^{\circ}$)
- Cfb – Temperate climate without a dry season and with warm summers (with warmest month $< 22^{\circ}$).

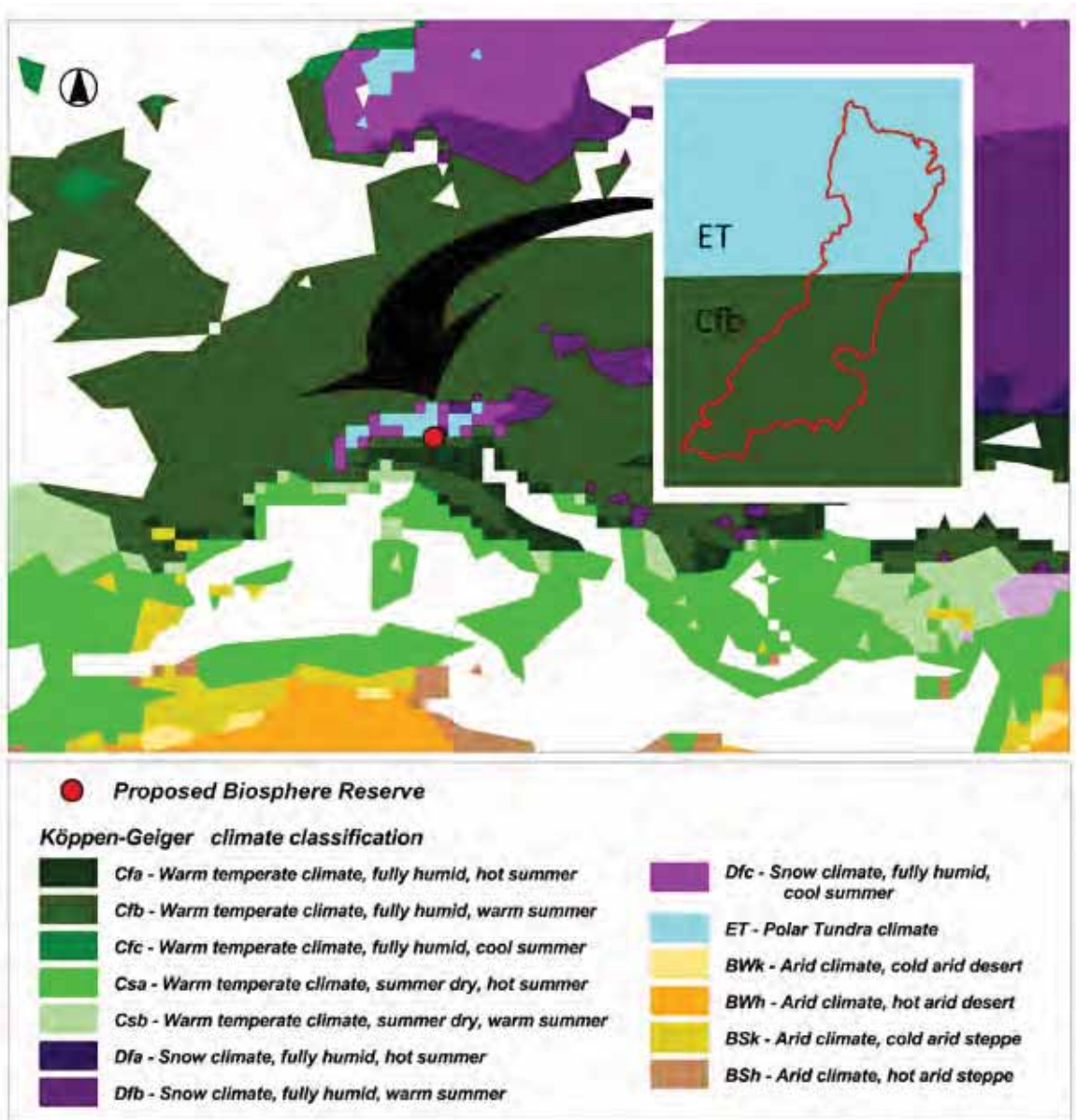


Fig. 11.2 The proposed BR in the Köppen-Geiger climate classification map

This classification, valid on a global scale, is not sufficiently well-defined for the area in question. It is therefore believed to be appropriate to analyse the climate of the proposed reserve in closer detail.

The climate of the area nominated as a Biosphere Reserve is typical of central-southern Trentino. Specifically, as regards the more southerly prealpine area opening up towards the Po valley and the Adriatic Sea, the climate is humid, temperate and oceanic; the more inland and northerly valleys have transitional characteristics, tending towards a cooler and relatively dry continental-alpine climate.

There are usually two peaks in precipitation, one in autumn (the main one) and one in spring (secondary), although in some internal areas the peak rainfall is seen in summer.

The temperatures decrease with increasing altitude, with an average of $-0.51\text{ }^{\circ}\text{C} / 100\text{m}$.

In detail, it is possible to differentiate between separate climatic zones:

- The first is sub-Mediterranean, with an average annual temperature of over 12 degrees C and 2 peaks in rainfall, in spring and autumn, more or less equivalent, and two low points, a more marked decrease in summer and another in winter. This climate characterises the upper Lake Garda area, with an altitude of up to 200-300 m a.s.l.; the vegetation is made up of olive trees, vines, holm oak and cypress trees and oleander bushes; the rainfall is around 800-1000 mm a year;
- the second is a temperate oceanic climate, without an arid season, and regards much of the



Ambiez Valley, in the Brenta Dolomites

area covered by the proposed reserve, with an average annual temperature around 10-12 degrees C, annual rainfall around (or just over) 1000 mm, distributed again around two peaks, a low point in winter and another less clear drop in summer;

- the third category is the continental alpine climate, typical of internal valleys at medium to high altitude. The average annual temperatures go down to below 8-9 degrees C, whereas there is a low point for rainfall in winter and a peak in summer, in any case tending to increase with altitude, going from 1000 mm up to more than 1500 mm.



Sheeps and lambs in Campi di Riva

For further information a fundamental point of reference is the publication “Il clima del Trentino: distribuzione spaziale delle principali variabili climatiche”, published by the Centro di Ecologia Alpina in 2004, to which the maps given below refer¹.

The area nominated represents a “bridge” between areas with a sub-Mediterranean climate, gravitating around Lake Garda, and the more internal Dolomitic areas, which have a marked continental climate. The contemporary presence of areas with relatively different climatic regimes is one of the aspects contributing towards the great value of the area, which contains natural environments representative of the different situations.

The map below shows the Amann hygrothermic index².

¹ The basic climatic data used to create the maps was recorded by the Hydrographic Office of the Autonomous Province of Trento and the Istituto Agrario di S. Michele all’Adige and relates to the period 1990-1999. By guaranteeing continuous coverage of the area, the database generated for spatial interpolation offers the opportunity to estimate the main climatic indexes for the whole Autonomous Province of Trento and thus to arrive at complete zoning of the area.

² The Amann hygrothermic index is established by the following algorithm: $H = (P \times T) / E$, where P is average annual rainfall in mm, T is the average annual temperature in °C and E is the annual temperature range. With values over 500 the climate is oceanic temperate, whereas for values lower than 300 it is continental.

The map shows clearly that the areas characterised by a temperate climate gravitate around Lake Garda, Lake Ledro and along the River Sarca.

The continental areas correspond with the highest and most northerly elevations.

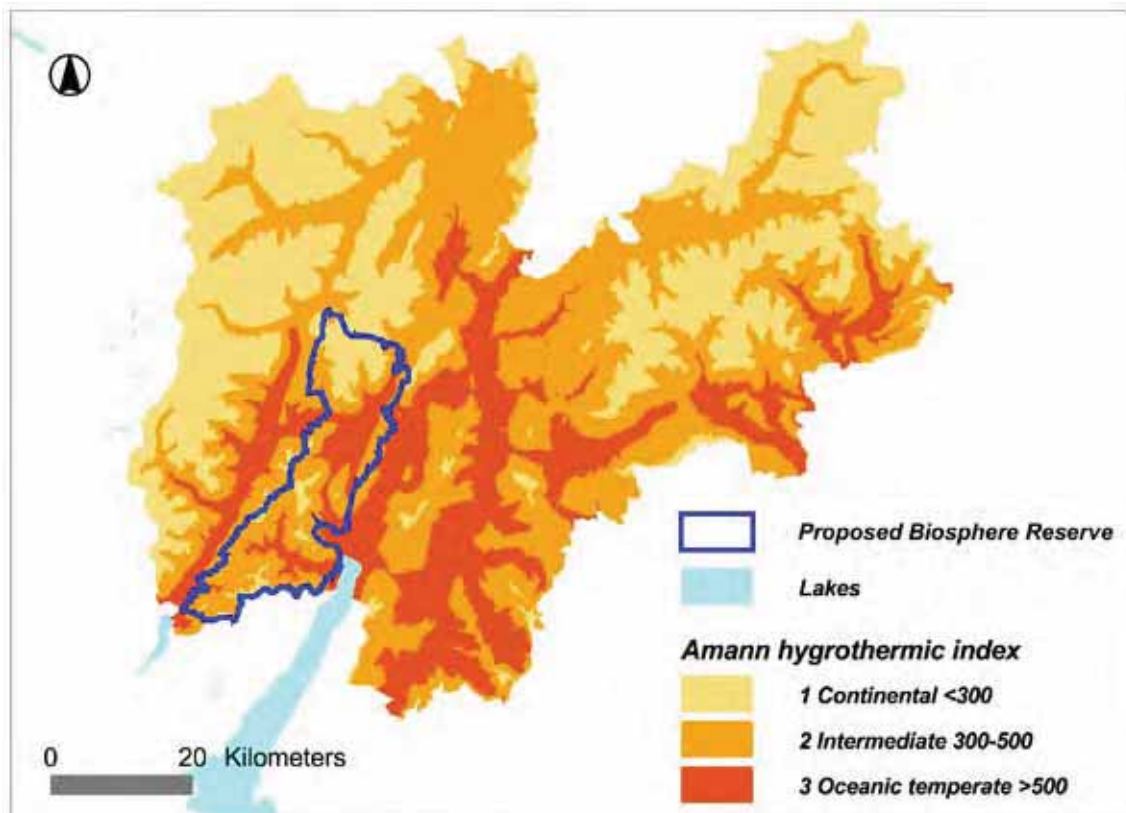


Fig. 11.3 The proposed BR in Amann's Hygrothermic Index map

The following map¹ shows that in phytogeographical terms the diversity of the climate is reflected in strongly differentiated environments, going from *Lauretum* (limited to a few areas at low altitude) to *Picetum* (dominant in the northerly part), passing through the *Castanetum* and *Fagetum*, which represent the most widespread types at low altitude and in the southern mountain area. The local climate is also influenced by progressively greater rainfall towards the SW border, as well as by the altitude factor.

¹ The map shows the correspondence between Lang's rain factor (the relationship between average annual rainfall in mm and the average annual temperature in °C) and Pavari's phytoclimatic classification. Low Lang's factor values are characteristic of arid terrain, whereas high values are characteristic of terrain with an accumulation of undecomposed organic matter in the soil.

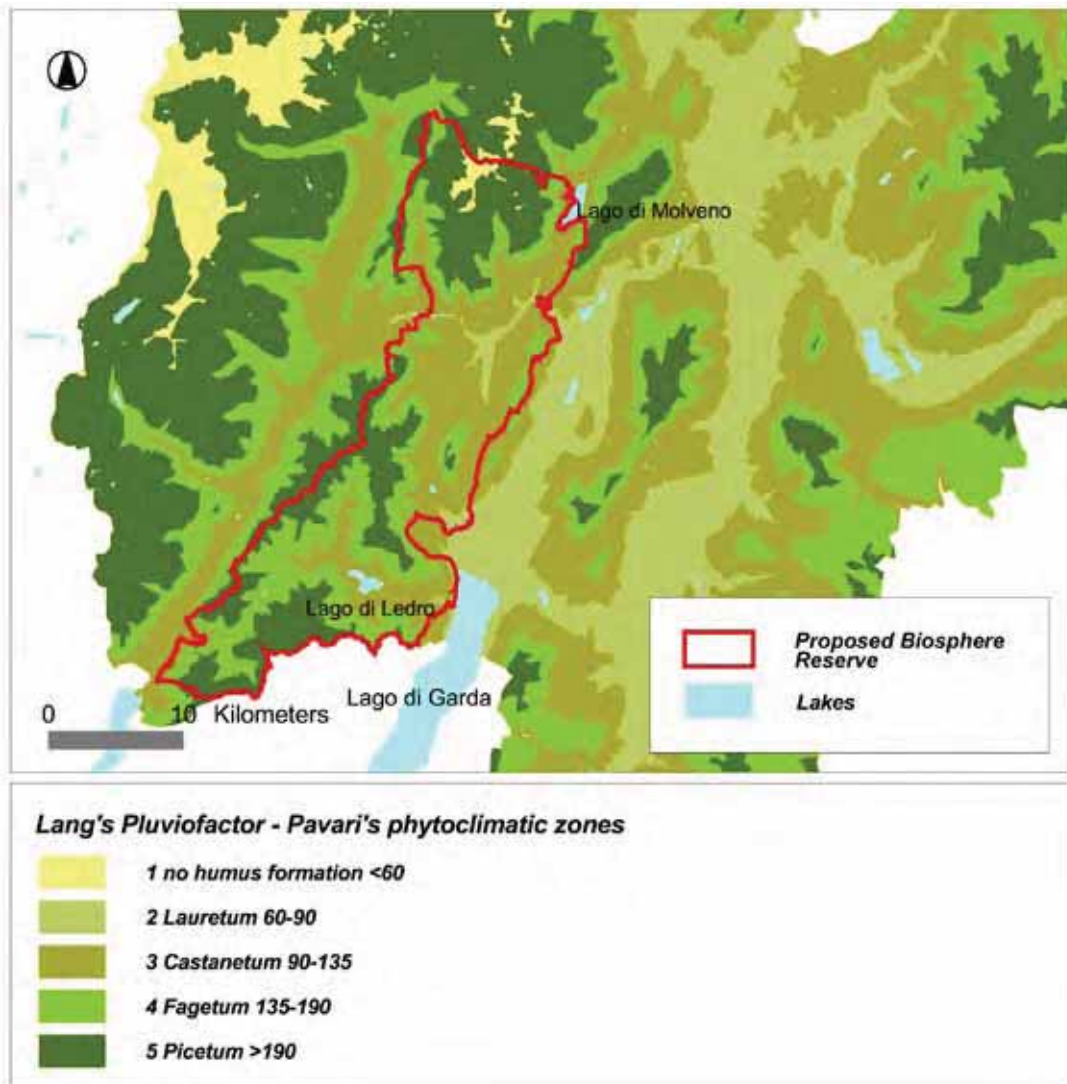


Fig. 11.4 The proposed BR in Pavari's phytoclimatic map



Further effects of the climate on the vegetation are dealt with in section 11.5 on the bioclimate. Finally, some concise data are given regarding the main meteorological stations present in or close to the nominated area. Depending on the data set available, it is possible to provide a more or less significant graphic representation.

Bikeriders in Tremalzo



Arco's arboretum



Provincia Autonoma di Trento

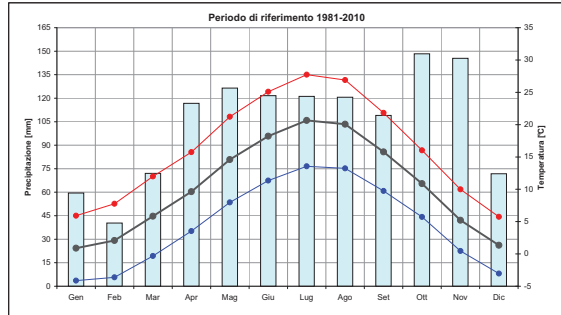
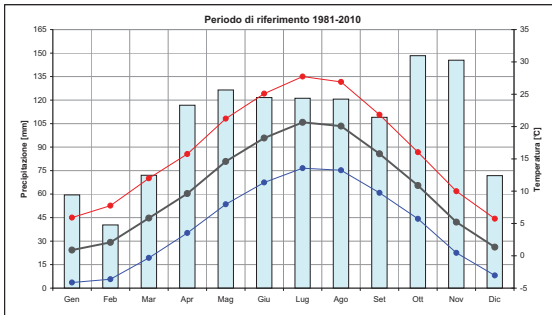
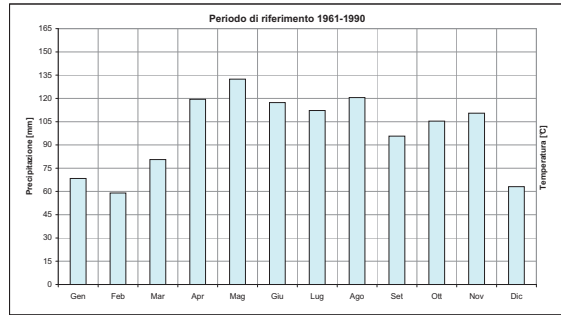
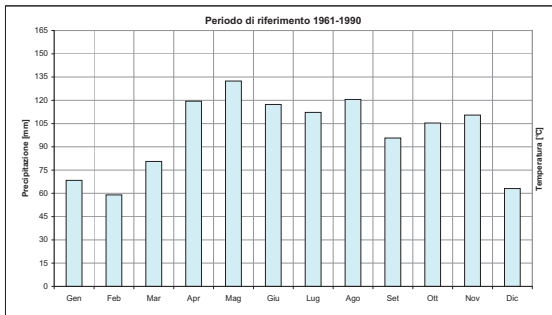


Provincia Autonoma di Trento



Bezzecca [698 m s.m.m.]

Bezzecca [698 m s.m.m.]

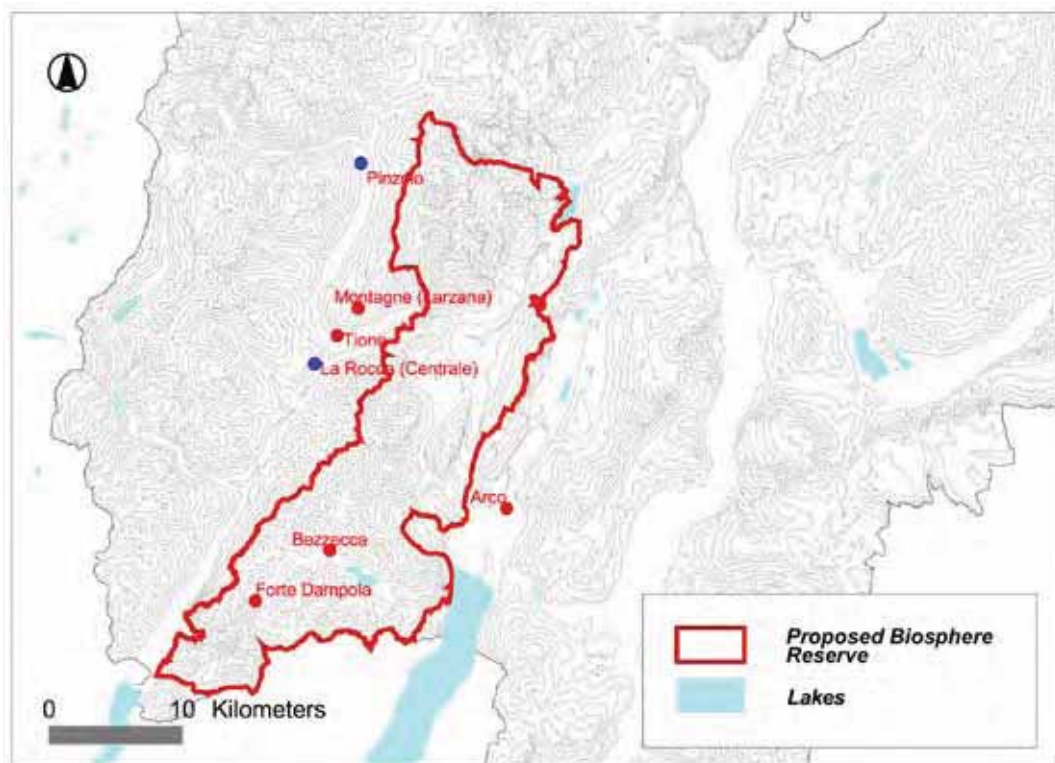


■ Precipitazione media ● Temperatura media ● Temperatura massima ● Temperatura minima □ Precipitazione media ● Temperatura media ● Temperatura massima ● Temperatura minima

Fig. 11.5 Climogram of data from the Bezzecca weather station (Ledro)

11.3.4 Is there a meteorological station in or near the proposed biosphere reserve? If so, what is its name and location and how long has it been operating?

The main meteorological stations present in the area or very close to it are:



	Location of the station	Bezzecca	Tione	Mountains	Arco	Forte d'Ampola
	Altitude: m a.s.l.	698	533	955	91	740
11.3.1	Average temperature in the warmest month (°C)	18.6	18.50	18.1	23.2	16.5
11.3.2	Average temperature in the coldest month (°C)	-1.2	-1.42	0.6	3.2	-3.1
11.3.3	Average annual rainfall (mm)	1247	1207	1171	785.4	1363

Fig. 11.6 Location of the weather stations in the proposed BR

Station ID	Name of station	Position in reserve	Long. Coord.	Lat. Coord.	State	Date of start of weather surveys	Alt.
T0203	Forte D'Ampola	Inside	627788	5080243	ACTIVE - TP	01/01/1924	740
T0204	Bezzecca	Inside	633359	5084014	DISMESSA il 06/04/2006	01/01/1921	698
T0402	Bezzecca (Spessa)	Inside	633823	5083898	ACTIVE - TP	06/06/2012	710
T0179	Tione	Outside	633926	5100074	ACTIVE	01/01/1921	533
T0178	La Rocca (Centrale)	Outside	632212	5097959	SHUT DOWN on 10/01/2012	01/01/1975	943
T0182	Montagne (Larzana)	Outside	635491	5102107	ACTIVE - TP	01/01/1925	955
T0325	Villa Rendena (frana)	Outside	633257	5102229	ACTIVE	18/12/2003	840
T0175	Pinzolo	Outside	635701	5112935	ACTIVE - MN	01/01/1921	760
T0192	Arco	Outside	646623	5087182	SHUT DOWN on 10/02/2005	18/07/1985	91
T0322	Arco (Arboreto)	Outside	646011	5087135	ACTIVE	31/05/2004	115



Old village of Canale (Tenno).

11.4 Geology, geomorphology, soils

Introduction

The area nominated as a Biosphere Reserve, between the Brenta Dolomites and Lake Garda, is situated in an area of western Trentino with high mountains and deep valleys.

From the geological point of view this area is situated in the central sector of the southern Alps, the structural band of the range situated south of the Periadriatic Seam (or Insubric Line). Geologists consider the Insubric Line,

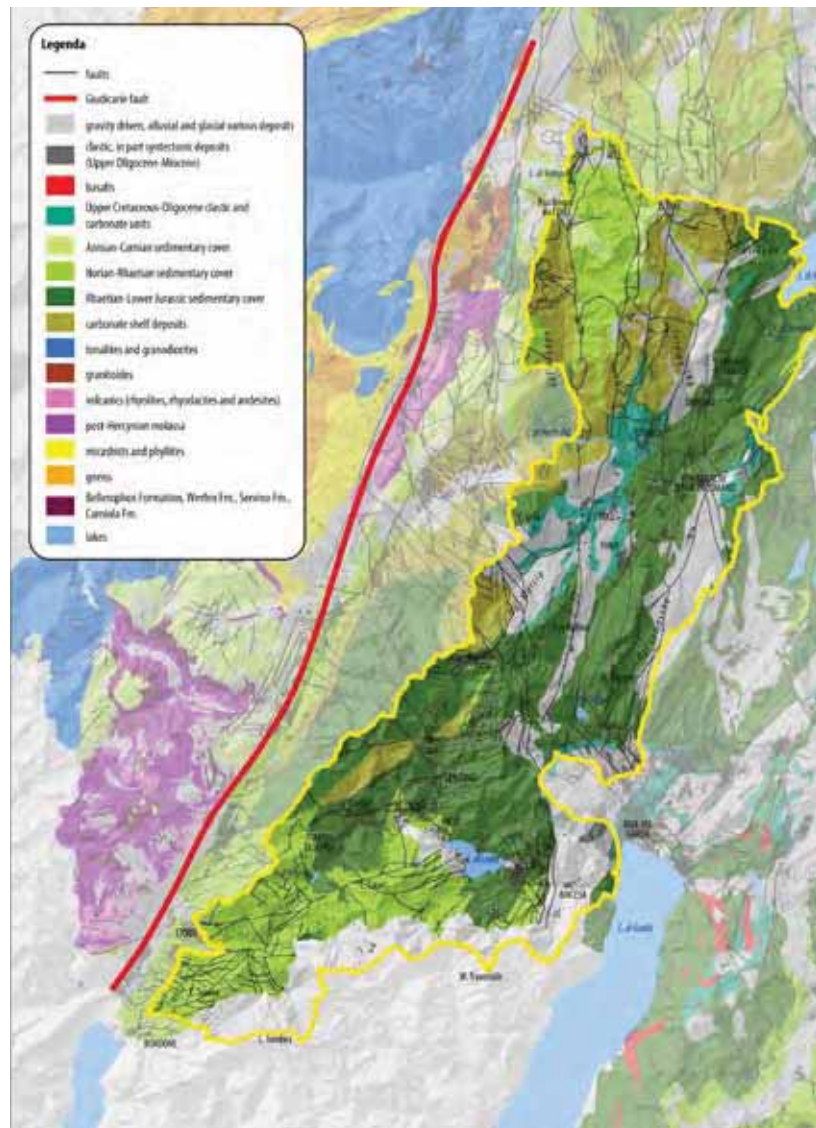


Fig. 11.7
Geological map of the
proposed BR

a major system of faults crossing the whole alpine area from West to East for hundreds of kilometres, to be the frontier between the “African plate” and the “Euroasian plate”. This system of faults has a North-South displacement represented by the Giudicarie Line.

The fault system associated with the Giudicarie Line completely pervades the mountains situated within the proposed Biosphere Reserve and subdivides this sector of the southern Alps into two blocks, characterised by contrasting rocks. In the eastern sector, at lower level, the Mesozoic strata of the Brenta Dolomites and the Cadria-Pichea-Rocchetta range are exposed; in the western sector, at higher level, the batholith of the Adamello-Presanella, the metamorphic basement, some Permian intrusions and limited evidence of the original Permian-Triassic rock emerge.

Geological history

The mountains enclosed in the area in question represent a complex archive conserving and “narrating” the geological events taking place over the course of almost 300 million years.

The area was originally very different from the landscape we see today. The variety of rocks, and the fossils enclosed within them, represent the key for understanding the geological processes that have led to the current topography of south-western Trentino. The oldest rocks belong to the pre-Permian crystalline basement and



Wall of Dolomia Principale rock, forming in the Triassic era: it is the most resistant of the Dolomitic rocks

one can walk over them on the north-westerly edge of the area. They represent the remains of a very ancient mountain chain flattened by erosion.

Around 260 million years ago, in the Permian era, the area in question was made up of a large oceanic gulf characterised by a tropical environment, called the Tethys Ocean, which pushed between Africa and Europe, at the time still joined in the Pangaea supercontinent. Thousands of metres of sediment accumulated on the bed of this immense sea.

In the Triassic period the Pangaea began to fragment and the whole of the alpine area became a coastal area. Thin layers of sand and silt

were deposited on the bed. These are now represented by limestone and Dolomitic rock, with the characteristic grey, yellow and red tones, making up the stratified rocks that hundreds of mountaineers climb to reach the highest peaks of the mountains. Over the course of millions of years, the incessant work of tiny bioconstructive organisms in this tropical sea led to the construction of imposing coral reefs that rose up for thousands of metres from the sea bed. This resulted in the creation of an archipelago, with islands and atolls separated by deep sea forks. These ancient coral reefs today make up the backbone of whole groups of mountains, such as the Brenta range, which represents a unique fossil archipelago, recognised as a World Heritage Site by UNESCO. During the Triassic period, an important tectonic phase subdivided the territory of the current province

of Trentino into a complex series of basins to the West and muddy plains to the East. The border between the high structure of the Trento Platform to the East and the area making up the low structure of the Lombard Basin to the West corresponds precisely with the area nominated as a Biosphere Reserve, controlled by large sin-sedimentary faults belonging to the Giudicarie Line and the Ballino Garda Line.

During the Jurassic period the slow dismembering of the Pangaea continued. The zones corresponding with the current area of eastern Trentino formed a vast plain covered by a shallow layer of marine water, the beds emerging for shorter or longer periods. Dinosaur footprints have also remained in the sand of these ancient beaches, along with the signs of raindrops and traces of insects. Towards the end of the Jurassic era the Trento platform began to sink.



Carbonate rock forming after the Dolomia, shaped by the alpine orogeny, in the Val di Ledro

Over the period of a few dozen million years it reached a depth of a thousand metres below the surface of the sea and was transformed into an underwater pillar, with deposits of reddish mud containing frequent ammonite fossils. This made up a characteristic red stone called Rosso Ammonitico, extensively used for construction.

In the Cretaceous the emerging lands began to take on their current appearance. The Tethys Ocean closed up and the sea beds lying between Africa and Europe were broken up, first compressed downwards and subsequently re-emerging, thrusting upwards to create a new chain of mountains.

At the same time as the growth of the Alps, which still continues today at an average speed of around 1 mm a year, the effects of erosion were magnified. The eroding materials contributed towards forming the plain

of the Po valley, the bed of the Adriatic Sea and the plains of Germany and eastern Europe.

Around 45 million years ago, in the Eocene, the south-eastern part of the current territory of Trentino saw intense volcanic activity, significant evidence of which can be found on Monte Baldo and the Monti Lessini. Almost at the same time, in the current area of western Trentino, there were intrusions of large magmatic granite masses: those today making up the imposing Adamello-Presanella massif.

While the uplifting of the Alpine chain was being completed, around 6 million years ago, in the geological period called the Messinian, the closing of the strait of Gibraltar caused the isolation of the Mediterranean, and consequentially a dramatic lowering of the sea level. It was precisely in this phase that major erosive processes led to the carving out of deep valleys,



Particular of dolomia sedimentary rock

today home to the great lakes at the foot of the mountains, such as Lake Garda.

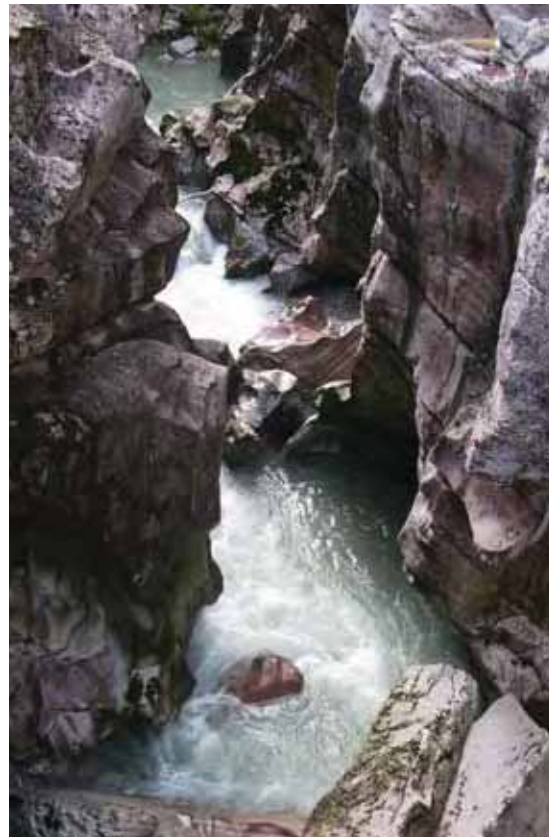
During the last 800,000 years intervals characterised by a milder climate alternated with extremely cold periods: ice ages.

South-western Trentino took on its current appearance in this period of time, particularly following the conclusion of the ice ages, when erosion and deposition processes linked to the action of water and gravity were particularly evident, resulting in gorges, alluvial plains, alluvial fans, landslides and screes. The PBR shows clear signs of glacial activity, which left a profound mark on the area. Active traces can still be seen at higher altitude, where there are still 12 glaciers, all in the Brenta mountains.

The morphogenetic action of the glaciers generally led to soft shapes, with spectacular examples of valleys with a U-shaped cross-section, such as the Val Lomasona and a lengthwise profile distinguished by wide basins and flat stretches alternating with steep rocky cliffs, up to hundreds of metres high, like those linking the Tenno area to the plain in which the towns of Riva del Garda and Arco lie.

Pronounced glacial headwalls mark the slopes at highest altitude, while jagged crests and sharply

pointed peaks surround the large glacial cirques, as in the case of the magnificent Conca dei XII Apostoli. Considering the carbonate nature of almost all the rocks emerging in the area, karst topography has played a fundamental role in morphogenetic phenomena. In the mountain ranges present in the area in question, one can encounter large karst zones characterised by karst crevices, sinkholes and dolines, often lined up along tectonic structures (faults and fractures). The Arca di Fraporte in the Val Laone, along the southern offshoot of the Brenta, and the Camerona, near Ballino, represent two spectacular examples of structures of karst origin.



The Limarò gorge, carved out by the River Sarca in the post- glacial era (last 12,000 years), highlights the layers of rock over the last 150 million years

Hypogene karst is also extensive; 44 caves have indeed been recorded in the area. There are also numerous springs of karst origin, the most picturesque undoubtedly being the Rio Bianco near Stenico.

The erosive action of water has led to the creation of deep gorges in the rock. In this context it is worth mentioning the Limarò and Ponte Pià gorges, dug out by the River Sarca, the gorge of the Varone waterfalls, carved out by the Magnone stream, and the Ponale gorge, which takes its name from the watercourse of the same name.

The area of the future Biosphere Reserve, particularly rich in water, is characterised by the presence of 11



The Rio Bianco at Stenico, an example of water circulation in karst environments

lakes. In terms of size, the main one is Lake Garda (the largest Italian lake, whose north-western banks mark the edge of the reserve), followed by Lakes Ledro and Tenno.

Anthropic geology

The information provided in previous sections illustrates the considerable significance of the geological and geomorphological peculiarities of the future Biosphere Reserve. The area in question indeed contains no less than 27 geosites¹. These document events in the past history of the earth and climate clearly and in an exemplary manner, making it possible to understand the evolution of the area in which they lie, and are of considerable geological and demethno-anthropological value.

Man has settled in the area in question since prehistoric times, as demonstrated by the archaeological sites of Fiavé and Ledro. The georesources present were undoubtedly an aspect encouraging the development of human communities. Abundant water resources represented a vital element for the community and for agriculture. Over the course of the centuries, water was exploited as a driving force for watermills, and starting from the 19th century was also used to produce

¹ Geosites, or geotopes, are places that provide particularly significant evidence of the evolution of the earth's crust or the influence that this has had on the development of human life. They therefore include rocky outcrops, soil, fluids, mineral and fossils, or even particular kinds of landscape and natural phenomena.

electrical energy.

The presence of stratified rocks with good geomechanical characteristics, relatively easy to quarry and work, has meant that there is an inexhaustible source of construction materials. The considerable quantity of loose material easily obtainable from the screes at the base of rocky slopes and on alluvial plains still makes it possible to completely satisfy the need for inert material.

In the 19th century a flourishing and renowned glass industry developed in the Giudicarie, as the area fulfilled all the requirements necessary for glass production: a subsoil rich in quartz of excellent quality, extensive woods to provide fuel for the furnaces and abundant running water to fuel the great water wheels. In the Val d'Algone, near the Rifugio Ghedina, one can still see the ruins of the chimney belonging to the old glassworks. A few kilometres uphill, the footpath to Malga Movlina also crosses the old quartz mine.

In the 19th century and the first half of the 20th century, mining activities developed near Molina di Ledro: dolomite, necessary for the production of magnesium, was extracted. The low content of this mineral meant that these activities terminated shortly after the middle of the 20th century. Inside the area in question, at Ponte Arche, a clay quarry called Prà Sarca is currently active.

A thermal spring gushing forth at a temperature of 27 °C near Comano, characterised by waters with a high concentration of bicarbonate and calcium, has been exploited for more than a century. A spa has developed around this spring, with activities expanding in particular in the last fifty years.

Starting from the 18th century, the rock faces of south-western Trentino were marked by epic feats in the history of mountaineering. From the 1970s the calcareous and Dolomitic rock of the Sarca valley saw the birth of the sports climbing discipline, which attracts thousands of sportspeople from all over the world to the area each year.



Algone Valley, ruine of an old glassmaker

11.5 Bioclimatic zone

Areas	Average annual rainfall/mm	Aridity index		Core area(s)	Buffer zone(s)	Transition area(s)
		Penman	(UNEP index)			
Hyper-arid	P<100	<0.05	<0.05			
Arid	100-400	0.05-0.28	0.05-0.20			
Semi-arid	400-600	0.28-0.43	0.21-0.50			
Dry Sub-humid	600-800	0.43-0.60	0.51-0.65			
Moist Sub-humid	800-1200	0.60-0.90	>0.65			x (northern part)
Per-humid	P>1200	>0.90		x	x	x (southern part)

Fig. 11.8 Aridity index resulting from the use of P/ETP¹.

The differences in bioclimatic² terms shown are better illustrated by the map below.

¹ Mean annual precipitation (P)/mean annual potential evapotranspiration (ETP)

² In ecology the bioclimate is the combination of climatic conditions, considered in terms of their influence on living organisms.



Autumn landscape in Ledro

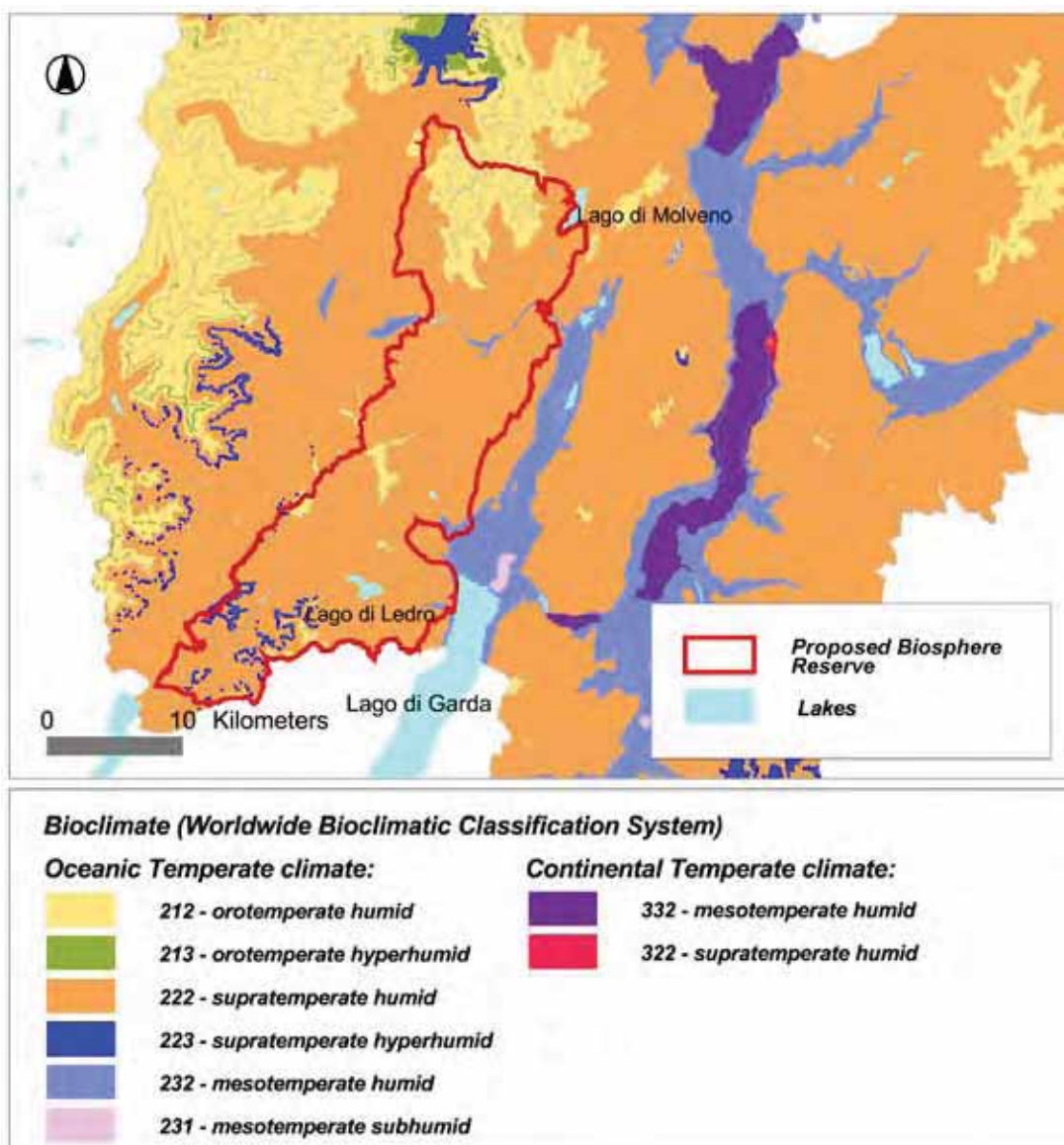


Fig. 11.9 The PBR in the Worldwide Bioclimatic Classification System

Analysis of the bioclimatic map¹ shows that the oceanic temperate climate clearly dominates, with increasing humidity towards the south-west.

As regards types of climate, only the oceanic temperate climate is present in the PBR, in its turn subdivided by thermotypes and ombrotypes into:

- orotemperate humid, mainly present

in the Adamello-Brenta Nature Park, which characterises the subalpine plain of the main mountains;

- supratemperate humid, which represents the dominant type in the mountainous band within the reserve;
- supratemperate hyperhumid, present in the area south-west of Lake Ampola

- mesotemperate humid, present along the River Sarca and near Lake Garda, which characterises hilly bands.

The types of vegetation corresponding with the climatic types listed here are dealt with in the subsequent section.

¹ In order to create this map, which shows the bioclimatic classification of the area according to the *Worldwide Bioclimatic Classification System* (Rivas Martinez 1999), three indices were analysed, specifically the simple continentality index I_c , the thermicity index I_t and the annual ombrothermic index

I_o , linked to the amount of rain available in the growing season. The “Worldwide Bioclimatic Classification System” provides for hierarchical division into:

- 5 macrobioclimates (Tropical, Mediterranean, Temperate, Boreal and Polar); each of these and the subordinated units is represented by a characteristic group of plant formations and ecosystems;
- 27 bioclimates; variations in the quantity and distribution of precipitation make it possible to distinguish bioclimatic variants, each of which is subdivided into further bands characterised by specific thermotypes and ombrotypes;
- 5 bioclimatic bands; the thermic and ombrothermic values make it possible to distinguish the different thermotypes and ombrotypes.



Protected area of Nembia Lake

11.6 Biological characteristics

The PBR area is characterised by the presence of numerous habitats, thanks to the great geo-morphological and climatic complexity of the area. The Corine Land Cover map provides a “snapshot” of the current state of land use (CLC data source – 2006). The graph below shows the percentage distribution of the CLC categories – level 1 and the cover

in hectares of the various CLC categories – level 3.

Both graphics show the clear relevance of forest coverage, accompanied by a smaller surface area dedicated to farming. Within the latter, meadow-pasture areas and heterogeneous agricultural areas dominate, generally not particularly specialised.

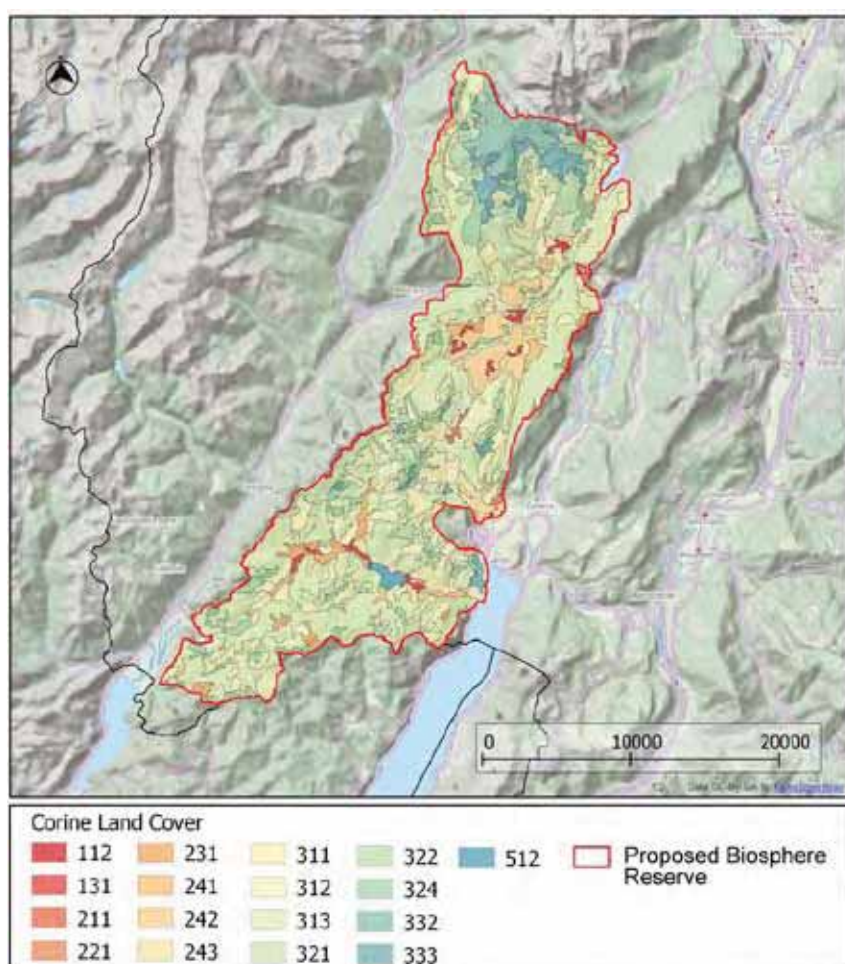
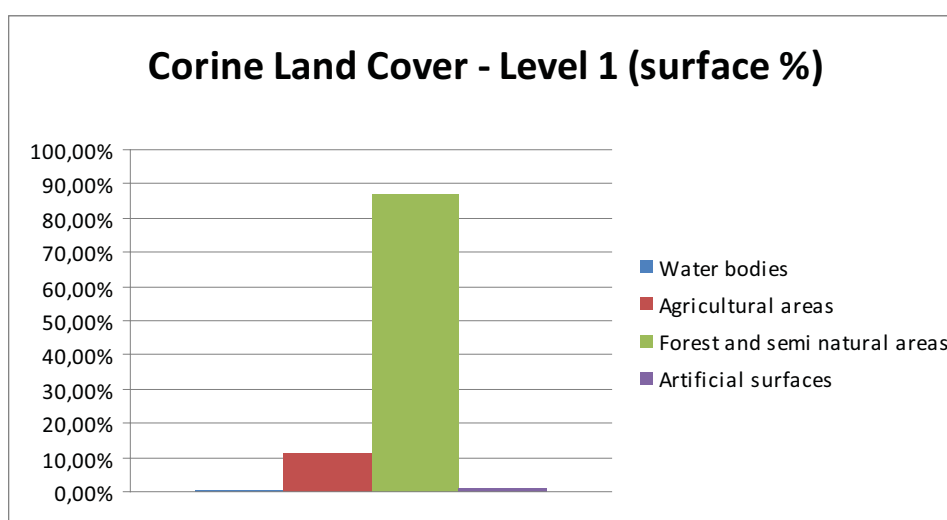


Fig. 11.10 The proposed BR in the Corine Land Cover Map

CLC – Level 3	Area (ha)
112 - Discontinuous urban fabric	467.25
131 - Mineral extraction sites	3.47
211 - Non-irrigated arable land	77.64
221 - Vineyards	40.87
231 - Pastures	1196.29
241 - Annual crops associated with permanent crops	390.26
242 - Complex cultivation patterns	1941.38
243 - Land principally occupied by agriculture, with significant areas of natural vegetation	1638.05
311 - Broad-leaved forest	6693.57
312 - Coniferous forest	5307.50
313 - Mixed forest	18289.75
321 - Natural grasslands	3291.40
322 - Moors and heathland	1789.95
324 - Transitional woodland-shrub	2482.30
332 - Bare rocks	1704.06
333 - Sparsely vegetated areas	1840.24
512 - Water bodies	246.35
Total	47400.33

Fig. 11.11 Distribution of land cover in the proposed BR: forests and semi-natural areas represent almost 90% of the overall areaCover Map



The Corine Land Cover project was developed at European level specifically to survey and monitor the characteristics of coverage and use of the land, with particular attention for environmental protection requirements, leading to the creation

of a map on a 1:100.000 scale. However, the European dimension of this project, does not make it possible to characterise the compositional characteristics of the habitats and the dynamic vegetation series present. With a detailed work on phyto-

sociological basis (Blasi C. ed., 2010) a Vegetation Series Map was produced, making it possible to obtain further in-depth dynamic characterisation of the vegetation in the reserve.

Since the Vegetation Series Map can be used to assess both the landscape and the heterogeneity of vegetation and to compare them with land use in terms of dynamics and potential, it is an important tool for ecological land networks, ecological assessment of land cover change, potential natural vegetation and ecosystem services,

the traditional agricultural landscape and management plans for natural reserves.

The vegetation series, or sigmetum, is the basic typological unit of dynamic phytosociology. It includes not only the representative vegetation type of the mature stage but also the initial or subserial communities replacing it.

The geosigmetum is the mosaic and contiguous vegetation series occurring within a homogeneous spatial geomorphological and biogeographical unit. (enclosed 8.6)



The variety of flora in areas of carbonate rock is a valuable element of biodiversity

An even more detailed analysis is provided for in the list of Natura 2000 habitats, whose distribution is known for the areas classified as SICs and

ZPSs (Natura 2000 network sites). As compared to the vegetation series, the Natura 2000 habitats are grouped as follows:

Fig. 11.13 Natura 2000 habitats grouped for vegetation series

SERIES CODE	VEGETATION SERIES	HABITAT CODE	HABITAT NAME
5	Central-western basophilic alpine geosigmatum of primary high-mountain vegetation (<i>Sesleria varia</i> - <i>Caricetum sempervirentis</i> , <i>Caricetum firmae</i> , <i>Potentillion caulescentis</i> , <i>Thlaspion rotundifolii</i>)	6110	Rupicolous calcareous or basophilic grasslands of the <i>Alyso-Sedion albi</i>
		6150	Siliceous alpine and boreal grasslands
		6170	Alpine and subalpine calcareous grasslands
		8120	Calcareous and calcshist screes of the montane to alpine levels (<i>Thlaspietea rotundifolii</i>)
		8210	Calcareous rocky slopes with chasmophytic vegetation
		8240	Limestone pavements
		8340	Permanent glaciers
13	Central-eastern basophilic alpine series of bushes with mountain pine (<i>Rhododendro hirsuti</i> - <i>Pino prostratae sigmetum</i>) with scattered sparse forests of Swiss pine and larch (<i>Pino cembrae sigmetum</i>)	4070	Bushes with <i>Pinus mugo</i> and <i>Rhododendron hirsutum</i> (<i>Mugo-Rhododendretum hirsuti</i>)
		4080	Sub-Arctic <i>Salix</i> spp. scrub
		8130	Western Mediterranean and thermophilous scree
34	Central alpine acidophilous series of beech (<i>Calamagrostio villosae-Fago sylvaticae sigmetum</i>)	9110	Luzulo-Fagetum beech forests
51	Eastern alpine basophilic series of beech (<i>Carici albae-Fago sylvaticae sigmetum</i>)	9150	Medio-European limestone beech forests of the <i>Cephalanthero-Fagion</i>
86	Central-eastern neutrobasophilic alpine series of European ash (<i>Fraxino excelsioris sigmetum s.l.</i>)	6410	<i>Molinia</i> meadows on calcareous, peaty or clayey-siltladen soils (<i>Molinion caeruleae</i>)
		6510	Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)
		9180	<i>Tilio-Acerion</i> forests of slopes, screes and ravines
		91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)

10b	Central-western acidophilous endalpic geosigmetum of low bushes and larch-swiss pine woods	4060	Alpine and Boreal heaths
14a	Eastern basophilic alpine series of spruce (<i>Adenostylo glabrae-Piceo excelsae sigmetum</i>)	6230	Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)
		9410	Acidophilous <i>Picea</i> forests of the montane to alpine levels (<i>Vaccinio-Piceetea</i>)
		9420	Alpine <i>Larix decidua</i> and/or <i>Pinus cembra</i> forests
50a	Eastern basophilic prealpine series of beech and spruce (<i>Anemone trifoliae-Fago sylvaticae sigmetum</i>)	6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (*important orchid sites)
		6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels
		6520	Mountain hay meadows
		9130	<i>Asperulo-Fagetum</i> beech forests
		9140	Medio-European subalpine beech woods with <i>Acer</i> and <i>Rumex arifolius</i>
		91K0	Illyrian <i>Fagus sylvatica</i> forests (<i>Aremonio-Fagion</i>)
TRANSVERSAL HYGROPHILOUS VEGETATION		3130	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoëto-Nanojuncetea</i>
		3150	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> -type vegetation
		3220	Alpine rivers and the herbaceous vegetation along their banks
		3240	Alpine rivers and their ligneous vegetation with <i>Salix eleagnos</i>
TRANSVERSAL PEATLAND VEGETATION		7140	Transition mires and quaking bogs
		7230	Alkaline fens

The following tables provide information about the characteristics of the individual habitats, according to Natura 2000 codification.

For each type (regional or local) within the biogeographical region to which the proposed Biosphere Reserve belongs, the table shows the distribution, plant

species characterising it, natural processes underway and human impact on the area.

The table shows the correspondence of the series with the map for the main location; for details of location see the Natura 2000 habitat maps enclosed 2.2.

Habitat types: FRESHWATER HABITATS VEGETATION SERIES: TRANSVERSAL HYGROPHILOUS VEGETATION				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List (Lasen, 2006)
3130	Oligotrophic to mesotrophic standing waters with vegetation of <i>Littorelletea uniflorae</i> and/or <i>Isoëto-Nanojuncetea</i>	REGIONAL	no	CR
Characteristic species		Natural processes	Human impacts	
<i>Cyperus flavescens</i> (EN), <i>Cyperus fuscus</i> , <i>Juncus bufonius</i> , <i>Gnaphalium uliginosum</i> (NT), <i>Pericaria hydropiper</i> (NT).		Progressive infilling	Pollution of surface waters, removal of surface waters, damage to vegetation on the banks due to intensive frequentation by tourists and/or grazing animals, increase in trophic levels, introduction of fish fauna.	

Habitat types: FRESHWATER HABITATS VEGETATION SERIES: TRANSVERSAL HYGROPHILOUS VEGETATION				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
3150	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> -type vegetation	REGIONAL	no	EN
Characteristic species		Natural processes	Human impacts	
<i>Lemna minor</i> , <i>Nymphaea alba</i> (VU), <i>Potamogeton berchtoldii</i> (NT), <i>Groenlandia densa</i> (VU), <i>Lemna minuta</i> (VU), <i>Lemna trisulca</i> (NT), <i>Nuphar lutea</i> (VU), <i>Potamogeton crispus</i> (NT), <i>Zannichellia palustris</i> (NT).		Progressive infilling	Pollution of surface waters, removal of surface waters, damage to vegetation on the banks due to intensive frequentation by tourists and/or grazing animals, increase in trophic levels, introduction of fish fauna.	

Habitat types: FRESHWATER HABITATS VEGETATION SERIES: TRANSVERSAL HYGROPHILOUS VEGETATION				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
3220	Alpine rivers and the herbaceous vegetation along their banks	REGIONAL	no	VU
Characteristic species		Natural processes	Human impacts	
<i>Petasites paradoxus</i> , <i>Artemisia campestris</i> , <i>Erucastrum nasturtiifolium</i> , <i>Orobanche flava</i> (NT-DD).		Intrinsically precarious habitat as a result of the same types of alluvial events leading, over time, to its permanence and establishment	Extraction of sand and gravel, pollution of surface waters, changes to water conditions caused by man, presence of dams, embankments, weirs and other constructions, increase in trophic levels, diffusion of invasive allochthonous plant species, repopulation with hybrid or allochthonous forms for fishing or hunting purposes, water intakes.	

Habitat types: FRESHWATER HABITATS VEGETATION SERIES: TRANSVERSAL HYGROPHILOUS VEGETATION				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
3240	Alpine rivers and their ligneous vegetation with <i>Salix eleagnos</i>	REGIONAL	no	EN
Characteristic species		Natural processes	Human impacts	
<i>Salix eleagnos</i> , <i>Salix purpurea</i> , <i>Calamagrostis epigejos</i> .		Primitive but long-lasting stage, being conditioned by the recurrence of alluvial events slowing down the establishment of more mature hygrophilous woods	Deforestation (cutting at base, removal of all trees), extraction of sand and gravel, pollution of surface waters, changes to water conditions caused by man, increase in trophic levels, diffusion of invasive allochthonous plant species, repopulation with hybrid or allochthonous forms for fishing or hunting purposes	

Habitat types: TEMPERATE HEATH AND SCRUB VEGETATION SERIES: cod. 10b (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
4060	Alpine and Boreal heaths	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Arctostaphylos uva-ursi</i> , <i>Erica carnea</i> , <i>Genista radiata</i> (C), <i>Juniperus nana</i> , <i>Rhododendron ferrugineum</i> , <i>Rhododendron hirsutum</i> (C), <i>Vaccinium gaultherioides</i> , <i>Arctostaphylos alpinus</i> (C), <i>licheni dei generi Cetraria e Cladonia</i> .		At altitudes lower than the wood line they represent a transition towards 9410 or 9420	Erosion, evolution of biocoenosis, succession (including the advance of brushwood), bush clearing for the purpose of grazing and/or hunting, alteration of valuable vegetation/structural elements	

Habitat types: TEMPERATE HEATH AND SCRUB VEGETATION SERIES: cod. 13 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
4070	Bushes with <i>Pinus mugo</i> and <i>Rhododendron hirsutum</i> (Mugo-Rhododendretum hirsuti)	REGIONAL	YES	/
Characteristic species		Natural processes	Human impacts	
<i>Erica carnea</i> , <i>Pinus mugo</i> , <i>Rhododendron hirsutum</i> , <i>Rhododendron ferrugineum</i> , <i>Amelanchier ovalis</i> , <i>Calamagrostis varia</i> , <i>Cotoneaster tomentosus</i> , <i>Cypripedium calceolus</i> (NT), <i>Epipactis atrorubens</i> , <i>Gymnadenia odoratissima</i> , <i>Salix glabra</i> , <i>Salix waldsteiniana</i> , <i>Sorbus chamaemespilus</i> .		Rejuvenation due to natural landslides of layers of debris, in stable conditions moving towards forest coenosis	Extraction of sand and gravel, erosion, bush clearing for the purpose of grazing and/or hunting, alteration of valuable vegetation/structural elements	

Habitat types: TEMPERATE HEATH AND SCRUB VEGETATION SERIES: cod. 13 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
4080	Sub-Arctic <i>Salix</i> spp. scrub	REGIONAL	no	CR
Characteristic species		Natural processes	Human impacts	
<i>Salix glabra</i> , <i>S. hastata</i> , <i>S. waldsteiniana</i> , <i>S. appendiculata</i> .		Long-lasting stage, on mature terrain moving towards wood formations	Changes to water conditions caused by man, erosion, bush clearing for the purpose of grazing and/or hunting	

Habitat types: FRESHWATER HABITATS VEGETATION SERIES: TRANSVERSAL HYGROPHILOUS VEGETATION				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
3220	Alpine rivers and the herbaceous vegetation along their banks	REGIONAL	no	VU
Characteristic species		Natural processes	Human impacts	
<i>Petasites paradoxus</i> , <i>Artemisia campestris</i> , <i>Erucastrum nasturtiifolium</i> , <i>Orobanche flava</i> (NT-DD).		Intrinsically precarious habitat as a result of the same types of alluvial events leading, over time, to its permanence and establishment	Extraction of sand and gravel, pollution of surface waters, changes to water conditions caused by man, presence of dams, embankments, weirs and other constructions, increase in trophic levels, diffusion of invasive allochthonous plant species, repopulation with hybrid or allochthonous forms for fishing or hunting purposes, water intakes.	

Habitat types: FRESHWATER HABITATS VEGETATION SERIES: TRANSVERSAL HYGROPHILOUS VEGETATION				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
3240	Alpine rivers and their ligneous vegetation with <i>Salix eleagnos</i>	REGIONAL	no	EN
Characteristic species		Natural processes	Human impacts	
<i>Salix eleagnos</i> , <i>Salix purpurea</i> , <i>Calamagrostis epigejos</i> .		Primitive but long-lasting stage, being conditioned by the recurrence of alluvial events slowing down the establishment of more mature hygrophilous woods	Deforestation (cutting at base, removal of all trees), extraction of sand and gravel, pollution of surface waters, changes to water conditions caused by man, increase in trophic levels, diffusion of invasive allochthonous plant species, repopulation with hybrid or allochthonous forms for fishing or hunting purposes	

Habitat types: NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS VEGETATION SERIES: cod. 5 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
6170	Alpine and subalpine calcareous grasslands	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Calamagrostis varia</i> , <i>Carex ferruginea</i> , <i>Carex firma</i> , <i>Carex mucronata</i> , <i>Carex rupestris</i> , <i>Dryas octopetala</i> , <i>Elyna myosuroides</i> , <i>Festuca norica</i> , <i>Sesleria caerulea</i> , <i>Achillea clavennae</i> , <i>Antennaria carpatica</i> , <i>Astragalus australis</i> , <i>Carex capillaris</i> , <i>Crepis kernerii</i> , <i>Draba dubia</i> , <i>Gentiana clusii</i> , <i>Helianthemum alpestre</i> , <i>Pedicularis comosa</i> (NT), <i>Pedicularis rostrato-capitata</i> , <i>Salix reticulata</i> , <i>Traunsteinera globosa</i> , <i>Allium victorialis</i> (NT), <i>Anemone narcissiflora</i> (NT), <i>Astragalus depressus</i> (NT), <i>Geranium argenteum</i> (NT), <i>Hypochoeris facchiniana</i> (VU), <i>Ligusticum lucidum</i> (NT), <i>Orchis spitzelii</i> (EN), <i>Ranunculus bilobus</i> (NT), <i>Tulipa sylvestris</i> subsp. <i>australis</i> (VU).		Stable communities	Erosion, excessive or badly managed local grazing, alteration of valuable vegetation/structural elements, ceasing or changes to grazing practices or mowing, giving rise to the particular type of flora (typical at shrub level), under or overseeding carried out with selected species or non-local ecotypes	

Habitat types: NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS VEGETATION SERIES: cod. 50a (51) (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (*important orchid sites)	REGIONAL	YES	EN/CR
Characteristic species		Natural processes	Human impacts	
<i>Brachypodium rupestre</i> , <i>Bromus erectus</i> s.str., <i>Bromus condensatus</i> , <i>Festuca rupicola</i> , <i>Allium carinatum</i> subsp. <i>pulchellum</i> , <i>Anacamptis pyramidalis</i> (NT), <i>Artemisia campestris</i> , <i>Astragalus monspessulanus</i> (NT), <i>Bothriochloa ischaemum</i> , <i>Fumana procumbens</i> , <i>Globularia punctata</i> , <i>Hypochoeris maculata</i> (NT), <i>Linum tenuifolium</i> , <i>Linum viscosum</i> , <i>Ophrys insectifera</i> , <i>Ophrys sphegodes</i> (VU), <i>Orchis militaris</i> , <i>Orchis morio</i> (NT), <i>Orchis tridentata</i> , <i>Orchis ustulata</i> , <i>Potentilla arenaria</i> (VU), <i>Prunella laciniata</i> (NT), <i>Stipa pennata</i> s.l., <i>Teucrium montanum</i> , <i>Trinia glauca</i> , <i>Veronica prostrata</i> (NT).		Stable communities in primitive stations. Elsewhere they depend on management practices (mowing), which if suspended lead to recolonisation by forest and bush coenosis	Abandoning of grazing systems, absence of pasture, alteration of valuable vegetation/structural elements	

Habitat types: NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS VEGETATION SERIES: cod. 14a (10b) (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
6230	Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)	REGIONAL	YES	LR
Characteristic species		Natural processes	Human impacts	
<i>Nardus stricta</i> , <i>Agrostis tenuis</i> , <i>Anthoxanthum odoratum</i> , <i>Avenella flexuosa</i> , <i>Festuca nigrescens</i> , <i>Antennaria dioica</i> , <i>Arnica montana</i> , <i>Campanula barbata</i> , <i>Carex pallescens</i> , <i>Danthonia decumbens</i> , <i>Hieracium hoppeanum</i> , <i>Hieracium lactucella</i> , <i>Hypochoeris maculata</i> (NT), <i>Pseudorchis albida</i> , <i>Veronica officinalis</i> .		In the absence of cultivation measures: natural evolution towards heath or conifer woods	Intensive grazing, abandoning of grazing systems, absence of pasture, erosion, excessive or badly managed local grazing, alteration of valuable vegetation/structural elements	

Habitat types: NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS VEGETATION SERIES: cod. 86 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
6410	<i>Molinia</i> meadows on calcareous, peaty or clayey-siltladen soils (<i>Molinion caeruleae</i>)	REGIONAL	no	EN
Characteristic species		Natural processes	Human impacts	
<i>Caltha palustris</i> , <i>Molinia caerulea</i> , <i>Dactylorhiza incarnata</i> (VU), <i>Eleocharis uniglumis</i> (NT), <i>Festuca trichophylla</i> (NT), <i>Selinum carvifolia</i> (NT), <i>Trifolium dubium</i> (NT), <i>Trifolium patens</i> (NT), <i>Carex appropinquata</i> (EN), <i>Carex vesicaria</i> (NT), <i>Dactylorhiza traunsteineri</i> (VU), <i>Epipactis palustris</i> (VU), <i>Lysimachia nummularia</i> (NT), <i>Melilotus altissimus</i> (VU), <i>Schoenus ferrugineus</i> (NT), <i>Teucrium scordium</i> (VU).		Very delicate humid grasslands, strongly dependent on management. Invasion of shrubs if not mown. Changes in the level of the aquifer spark off a tendency towards reed beds and magnocaricetum	Changes to water conditions caused by man, reclamation and drainage activities, excessive foot traffic and the entry of nitrophilous species, excessive or badly managed local grazing, damage to the vegetation in wetland areas during wood hauling operations in neighbouring forest areas, entry of larger species over the vegetation in wetland areas	

Habitat types: NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS VEGETATION SERIES: cod. 50a (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	REGIONAL	no	LR
Characteristic species		Natural processes	Human impacts	
<p><i>Aconitum lycoctonum</i>, <i>Aconitum napellus</i> agg., <i>Adenostyles alliariae</i>, <i>Aegopodium podagraria</i>, <i>Angelica sylvestris</i>, <i>Chaerophyllum hirsutum</i>, <i>Cirsium oleraceum</i>, <i>Crepis paludosa</i>, <i>Deschampsia caespitosa</i>, <i>Epilobium angustifolium</i>, <i>Filipendula ulmaria</i>, <i>Mentha longifolia</i>, <i>Petasites hybridus</i>, <i>Rubus idaeus</i>, <i>Scirpus sylvaticus</i>, <i>Senecio cacaliaster</i>, <i>Senecio cordatus</i>, <i>Achillea macrophylla</i>, <i>Alchemilla</i> div. sp., <i>Calystegia sepium</i>, <i>Cicerbita alpina</i>, <i>Crepis pyrenaica</i>, <i>Digitalis grandiflora</i>, <i>Geranium sylvaticum</i>, <i>Peucedanum ostruthium</i>, <i>Phyteuma ovatum</i>, <i>Poa hybrida</i> (NT), <i>Lathyrus laevigatus</i> (NT), <i>Pleurospermum austriacum</i> (NT).</p>		<p>Destruction, rejuvenation due to rock falls and avalanches</p>	<p>Changes to water conditions caused by man, erosion, reclamation and drainage activities, entry of larger species over the vegetation in wetland areas, bush clearing of formations with green alder for the purpose of grazing and/or hunting</p>	

Habitat types: NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS VEGETATION SERIES: cod. 86 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
6510	Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)	REGIONAL	no	EN
Characteristic species		Natural processes	Human impacts	
<p><i>Alopecurus pratensis</i>, <i>Arrhenatherum elatius</i>, <i>Dactylis glomerata</i>, <i>Poa pratensis</i>, <i>Avenula pubescens</i>, <i>Campanula patula</i>, <i>Crepis biennis</i>, <i>Filipendula vulgaris</i>, <i>Holcus lanatus</i>, <i>Knautia arvensis</i>, <i>Myosotis sylvatica</i>, <i>Phleum pratense</i>, <i>Rumex acetosa</i>, <i>Tragopogon pratensis</i> subsp. <i>orientalis</i>, <i>Carduus carduelis</i> (NT).</p>		<p>Secondary formations maintained by management. In the absence of regular mowing, a tendency towards the formation of woods is sparked off</p>	<p>Erosion, banalisation due to excessive fertilisation (particularly sewage), intensification of crop cultivation practices, bush/wood cover as a result of ceasing or reducing use, alteration of valuable vegetation/structural elements, under or overseeding carried out with selected species or non-local ecotypes, abandoning of traditional mowing practices</p>	

Habitat types: NATURAL AND SEMI-NATURAL GRASSLAND FORMATIONS VEGETATION SERIES: cod. 50a (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
6520	Mountain hay meadows	REGIONAL	no	EN
Characteristic species		Natural processes	Human impacts	
<i>Agrostis tenuis</i> , <i>Festuca nigrescens</i> , <i>Polygonum bistorta</i> , <i>Trisetum flavescens</i> , <i>Carum carvi</i> , <i>Crepis pyrenaica</i> , <i>Geranium sylvaticum</i> , <i>Primula veris</i> , <i>Carduus carduelis</i> (NT).		Secondary formations maintained by management. In the absence of regular mowing, a tendency towards the formation of woods is sparked off	Erosion, banalisation due to excessive fertilisation (particularly sewage), intensification of crop cultivation practices, bush/wood cover as a result of ceasing or reducing use, alteration of valuable vegetation/structural elements, under or overseeding carried out with selected species or non-local ecotypes, abandoning of traditional mowing practices	

Habitat types: RAISED BOGS AND MIRES AND FENS VEGETATION SERIES: TRANSVERSAL PEATLAND VEGETATION				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
7140	Transition mires and quaking bogs	REGIONAL	no	EN
Characteristic species		Natural processes	Human impacts	
<i>Carex lasiocarpa</i> (VU), <i>Carex nigra</i> , <i>Carex rostrata</i> , <i>Sphagnum sp. div.</i> , <i>Carex appropinquata</i> (EN), <i>Carex canescens</i> , <i>Equisetum fluviatile</i> (NT), <i>Menyanthes trifoliata</i> .		Progressive infilling and consequential changing of the composition of flora, tendency to evolve towards bush thickets or woods	Pollution of surface waters, changes to water conditions caused by man, erosion, reclamation and drainage activities, excessive foot traffic and the entry of nitrophilous species, damage to the vegetation in wetland areas during wood hauling operations in neighbouring forest areas, mowing, foot traffic	

Habitat types: RAISED BOGS AND MIRES AND FENS VEGETATION SERIES: TRANSVERSAL PEATLAND VEGETATION				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
7230	Alkaline fens	REGIONAL	no	EN
Characteristic species		Natural processes	Human impacts	
<i>Carex davalliana</i> , <i>Schoenus ferrugineus</i> (NT), <i>Schoenus nigricans</i> , <i>Dactylorhiza incarnata</i> (VU), <i>Dactylorhiza traunsteineri</i> (VU), <i>Epipactis palustris</i> (VU), <i>Eriophorum latifolium</i> , <i>Liparis loeselii</i> (EN), <i>Trichophorum alpinum</i> , <i>Eleocharis uniglumis</i> (NT), <i>Equisetum fluviatile</i> (NT), <i>Festuca trichophylla</i> (NT), <i>Salix repens</i> subsp. <i>rosmarinifolia</i> (VU).		Possible natural changes in water flow spark off a trend towards molinia meadows, willow or hygrophilous woods.	Pollution of surface waters, changes to water conditions caused by man, erosion, reclamation and drainage activities, excessive foot traffic and the entry of nitrophilous species, damage to the vegetation in wetland areas during wood hauling operations in neighbouring forest areas, mowing, foot traffic	

Habitat types: ROCKY HABITATS AND CAVES VEGETATION SERIES: cod. 5 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
8120	Calcareous and calcshist screes of the montane to alpine levels (<i>Thlaspietea rotundifolii</i>)	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Adenostyles glabra</i> , <i>Petasites paradoxus</i> , <i>Saxifraga sedoides</i> , <i>Aquilegia einseleana</i> , <i>Athamanta cretensis</i> , <i>Moehringia muscosa</i> , <i>Ranunculus alpestris</i> , <i>Viola dubyana</i> (NT), <i>Scabiosa vestina</i> (NT).		Markedly pioneer vegetation but stable at length if the screes continue to be fed. Otherwise there is a tendency towards grasslands (6170) or bushwood (4060, 4070)	Quarrying, footpaths, cycle routes or forest roads, erosion, excessive foot traffic and the entry of nitrophilous species, sparking off or extension of erosion processes due to grazing, alteration of valuable vegetation/structural elements, transit off the footpaths	

Habitat types: ROCKY HABITATS AND CAVES VEGETATION SERIES: cod. 13 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
8130	Western Mediterranean and thermophilous scree	REGIONAL	no	VU
Characteristic species		Natural processes	Human impacts	
<i>Achnatherum calamagrostis</i> , <i>Calamagrostis varia</i> , <i>Saponaria ocymoides</i> , <i>Teucrium montanum</i> , <i>Hieracium staticifolium</i> , <i>Athamanta cretensis</i> , <i>Epilobium dodonaei</i> , <i>Galeopsis angustifolia</i> , <i>Gymnocarpium robertianum</i> , <i>Vincetoxicum hirundinaria</i> , <i>Acinos arvensis</i> , <i>Aethionema saxatile</i> , <i>Galium lucidum</i> , <i>Teucrium botrys</i> , <i>Calamintha nepetoides</i> , <i>Geranium robertianum</i> , <i>Hieracium glaucum</i> , <i>Origanum vulgare</i> , <i>Petasites paradoxus</i> , <i>Peucedanum verticillare</i> , <i>Reseda lutea</i> , <i>Rumex scutatus</i> , <i>Scrophularia juratensis</i> , <i>Sedum album</i> , <i>Sedum montanum</i> agg., <i>Silene vulgaris</i> subsp. <i>glareosa</i> , <i>Thesium pyrenaicum</i> (NT).		Markedly pioneer vegetation but stable at length if the screes continue to be fed. Otherwise there is a tendency towards grasslands (6170) or bushwood (4060, 4070)	Quarrying, sparking off or extension of erosion processes due to grazing, alteration of valuable vegetation/structural elements, transit off the footpaths, damage to the scree vegetation during wood hauling operations in neighbouring forest areas	

Habitat types: ROCKY HABITATS AND CAVES VEGETATION SERIES: cod. 5 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
8210	Calcareous rocky slopes with chasmophytic vegetation	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Asplenium viride</i> , <i>Cystopteris fragilis</i> , <i>Minuartia rupestris</i> , <i>Potentilla caulescens</i> , <i>Potentilla nitida</i> , <i>Asplenium lepidum</i> (VU), <i>Campanula carnica</i> , <i>Cystopteris regia</i> , <i>Daphne petraea</i> (NT), <i>Daphne reichsteinii</i> (CR), <i>Hieracium porrifolium</i> , <i>Moehringia glaucovirens</i> (NT), <i>Paederota bonarota</i> , <i>Physoplexis comosa</i> , <i>Primula spectabilis</i> (NT), <i>Saxifraga arachnoidea</i> (NT), <i>Saxifraga tombeanensis</i> (VU), <i>Aquilegia thalictrifolia</i> (NT), <i>Bupleurum petraeum</i> (NT), <i>Festuca stenantha</i> (NT), <i>Sedum hispanicum</i> (NT), <i>Silene elisabethae</i> (NT), <i>Thalictrum foetidum</i> (NT).		Stable communities	Quarrying, damage to rock flora during intervention to install or maintain protective nets, opening up of new climbing routes	

Habitat types: ROCKY HABITATS AND CAVES VEGETATION SERIES: cod. 5 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
8240	Limestone pavements	REGIONAL	YES	EN
Characteristic species		Natural processes	Human impacts	
<i>Carex firma</i> , <i>Cystopteris fragilis</i> , <i>Dryas octopetala</i> , <i>Festuca pumila</i> , <i>Salix retusa</i> , <i>Cotinus coggygria</i> , <i>Daphne alpina</i> , <i>Dryopteris villarii</i> , <i>Polystichum lonchitis</i> , <i>Scabiosa graminifolia</i> , <i>Sesleria sphaerocephala</i> .		Stable communities or sometimes subject to slow bush growth at low altitude	Extensive grazing, direct destruction	

Habitat types: ROCKY HABITATS AND CAVES VEGETATION SERIES: cod. 5 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
8340	Permanent glaciers	REGIONAL	no	LR
Characteristic species		Natural processes	Human impacts	
<i>Habitats without vegetation</i>		Habitats declining rapidly (glaciers)	Withdrawal of the last strips of glaciers in the Brenta Dolomites following global warming	

Habitat types: FORESTS VEGETATION SERIES: cod. 34 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
9110	Luzulo-Fagetum beech forests	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Abies alba</i> , <i>Fagus sylvatica</i> , <i>Picea abies</i> , <i>Vaccinium myrtillus</i> , <i>Calamagrostis arundinacea</i> , <i>Lathyrus niger</i> , <i>Luzula nivea</i> , <i>Quercus petraea</i> , <i>Viscum album subsp. abietis</i> (NT).		Stable communities but limited to a small area	Tourist activities and forest roads.	

Habitat types: FORESTS VEGETATION SERIES: cod. 50a (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
9130	Asperulo-Fagetum beech forests	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Abies alba</i> , <i>Fagus sylvatica</i> , <i>Picea abies</i> , <i>Actaea spicata</i> , <i>Allium ursinum</i> , <i>Anemone nemorosa</i> , <i>Aruncus dioicus</i> , <i>Circaea alpina</i> , <i>Dentaria enneaphyllos</i> , <i>Dentaria pentaphyllos</i> , <i>Festuca altissima</i> , <i>Galium odoratum</i> , <i>Impatiens noli-tangere</i> , <i>Lamium flavum</i> , <i>Melica uniflora</i> , <i>Petasites albus</i> .		Stable communities	Footpaths, cycle routes, forest roads, erosion.	

Habitat types: FORESTS VEGETATION SERIES: cod. 50a (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
9140	Medio-European subalpine beech woods with <i>Acer</i> and <i>Rumex arifolius</i>	REGIONAL	no	VU
Characteristic species		Natural processes	Human impacts	
<i>Fagus sylvatica</i> , <i>Adenostyles alliariae</i> , <i>Acer pseudoplatanus</i> , <i>Rumex arifolius</i> , <i>Aconitum sp.pl.</i> , <i>Adenostyles glabra</i> , <i>Alnus viridis</i> , <i>Athyrium filix-femina</i> , <i>Cicerbita alpina</i> , <i>Dryopteris filix-mas</i> , <i>Myosotis sylvatica</i> , <i>Petasites albus</i> , <i>Ranunculus plataniifolius</i> , <i>Salix appendiculata</i> , <i>Saxifraga rotundifolia</i> , <i>Stellaria nemorum</i> , <i>Veratrum album</i> .		Less snow and an improvement in climate may encourage the establishment of vegetation referring to 9130	Footpaths, cycle routes, forest roads, erosion.	

Habitat types: FORESTS VEGETATION SERIES: cod. 51 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
9150	Medio-European limestone beech forests of the Cephalanthero-Fagion	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Carex alba</i> , <i>Fagus sylvatica</i> , <i>Ostrya carpinifolia</i> , <i>Calamagrostis varia</i> , <i>Cephalanthera damasonium</i> , <i>Cephalanthera longifolia</i> , <i>Cephalanthera rubra</i> , <i>Cotoneaster tomentosus</i> , <i>Epipactis helleborine</i> , <i>Erica carnea</i> , <i>Fraxinus ornus</i> , <i>Melittis melissophyllum</i> , <i>Quercus pubescens</i> , <i>Taxus baccata</i> , <i>Sesleria caerulea</i> .		Stable communities	Footpaths, cycle routes, forest roads, erosion, infiltration by robinia.	

Habitat types: FORESTS VEGETATION SERIES: cod. 86 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
9180	Tilio-Acerion forests of slopes, screes and ravines	REGIONAL	YES	VU
Characteristic species		Natural processes	Human impacts	
<i>Acer pseudoplatanus</i> , <i>Fraxinus excelsior</i> , <i>Tilia cordata</i> , <i>Ulmus glabra</i> , <i>Acer platanoides</i> , <i>Actaea spicata</i> , <i>Aruncus dioicus</i> , <i>Asplenium scolopendrium</i> , <i>Dentaria pentaphyllos</i> , <i>Euonymus latifolia</i> , <i>Lunaria rediviva</i> , <i>Philadelphus coronarius</i> , <i>Polystichum aculeatum</i> , <i>Polystichum braunii</i> , <i>Ribes alpinum</i> , <i>Taxus baccata</i> , <i>Anthriscus nitida</i> (NT), <i>Corydalis solida</i> (NT), <i>Vicia dumetorum</i> (NT).		Azonal woods, stable so long as the same conditions remain	Simplification of ecosystem features, selective felling of valuable broad-leaved trees, introduction of conifer trees, upstream water intakes.	

Habitat types: FORESTS VEGETATION SERIES: cod. 50a (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
91K0	Illyrian <i>Fagus sylvatica</i> forests (Aremonio-Fagion)	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Fagus sylvatica</i> , <i>Ostrya carpinifolia</i> , <i>Anemone trifolia</i> , <i>Aremonia agrimonioides</i> , <i>Calamintha grandiflora</i> , <i>Cyclamen purpurascens</i> , <i>Dentaria enneaphyllos</i> , <i>Dentaria pentaphyllos</i> , <i>Euphorbia carniolica</i> , <i>Helleborus niger</i> , <i>Lamium orvala</i> , <i>Philadelphus coronarius</i> , <i>Primula vulgaris</i> .		Stable communities	Footpaths, cycle routes, forest roads, erosion, invasion by robinia	

Habitat types: FORESTS VEGETATION SERIES: cod. 86 (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)	REGIONAL	YES	VU/EN
Characteristic species		Natural processes	Human impacts	
<i>Alnus glutinosa</i> , <i>Alnus incana</i> , <i>Fraxinus excelsior</i> , <i>Populus nigra</i> , <i>Rubus caesius</i> , <i>Salix alba</i> , <i>Bromus ramosus</i> (NT), <i>Caltha palustris</i> , <i>Carex acutiformis</i> , <i>Carex remota</i> , <i>Cirsium palustre</i> , <i>Equisetum hyemale</i> , <i>Iris pseudacorus</i> , <i>Lysimachia nummularia</i> (NT), <i>Phalaris arundinacea</i> , <i>Salix triandra</i> , <i>Scutellaria galericulata</i> , <i>Thelypteris palustris</i> (NT), <i>Carex umbrosa</i> (NT), <i>Corydalis solida</i> (NT), <i>Salix apennina</i> (VU), <i>Salix pentandra</i> (VU), <i>Selinum carvifolia</i> (NT).		Azonal woods, stable so long as the same conditions remain. If flooded they can regress towards more primitive vegetation series 3220-3240. Natural modifications to the circulation of water spark off a tendency towards colonisation by ce??	Changes to water conditions caused by man, diffusion of invasive allochthonous plant species, simplification of ecosystem features, selective felling of valuable broad-leaved trees	

Habitat types: FORESTS VEGETATION SERIES: cod. 14a (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
9410	Acidophilous Picea forests of the montane to alpine levels (Vaccinio-Piceetea)	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Abies alba</i> , <i>Calamagrostis villosa</i> , <i>Luzula nivea</i> , <i>Picea abies</i> , <i>Pinus sylvestris</i> , <i>Vaccinium myrtillus</i> , <i>Vaccinium vitis-idaea</i> , <i>Listera cordata</i> , <i>Luzula luzulina</i> , <i>Lycopodium annotinum</i> , <i>Moneses uniflora</i> .		Stable communities	Footpaths, cycle routes, forest roads, erosion, avalanches, abandoning of forestry management for young formations with major structural/compositional simplification, simplification of ecosystem features	

Habitat types: FORESTS VEGETATION SERIES: cod. 14a (10b) (Rif. Map of Vegetation Series)				
Habitat code	Habitat name	Distribution	EU Priority	Local Red List
9420	Alpine Larix decidua and/or Pinus cembra forests	REGIONAL	no	/
Characteristic species		Natural processes	Human impacts	
<i>Calamagrostis villosa</i> , <i>Erica carnea</i> , <i>Larix decidua</i> , <i>Picea abies</i> , <i>Rhododendron ferrugineum</i> , <i>Rhododendron hirsutum</i> , <i>Vaccinium myrtillus</i> , <i>Vaccinium vitis-idaea</i> , <i>Luzula luzulina</i> , <i>Moneses uniflora</i> .		Stable communities	Footpaths, cycle routes, forest roads, erosion, avalanches, abandoning of forestry management for young formations with major structural/compositional simplification, simplification of ecosystem features	

Finally, it should be noted that assessment of the quality of habitats and the flora associated with them, along with other considerations regarding

the type of fauna, have determined the definition of the core areas, as briefly explained in section 4.2.

12. ECOSYSTEM SERVICES

12.1 If possible, identify the ecosystem services provided by each ecosystem of the biosphere reserve and the beneficiaries of these services.

The analysis in this section has been carried out with reference to the four main types of ecosystems present in the area of the PBR and the relative ecosystem services, making reference to the classification proposed by the Millennium Ecosystem Assessment Framework (MEA, 2003). Additionally, the Ecosystem Approach has been used to frame the Biosphere Reserves features, in accordance with the MAP action 14.1. The ecosystems present within the designated areas are as follows:

1. Inland water (these regard areas of limited size but high environmental value);

- 2. Forest** (these regard most of the overall surface area for the site);
- 3. Cultivated** (these regard most of the surface area on the valley floor);
- 4. Mountain** (high mountain ecosystems not falling within previous categories have been included in this category, including natural grasslands at high altitude and rocks and scree situated above the wood line.)

Urban ecosystems are not considered, as no towns of significant size are present. In total the urban centres within the area of the proposed Biosphere Reserve have a population of around 15,900.



The value of inland waters for the landscape and tourism; here Lake Tenno, a tourist destination of great value

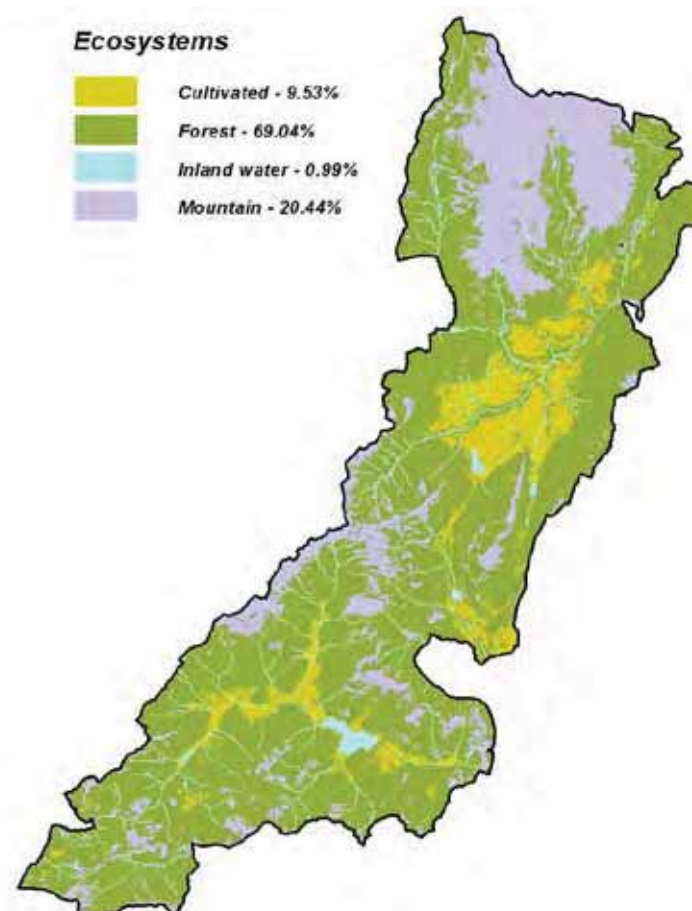


Fig. 12.1 The distribution of the main ecosystems within the proposed

The health of the ecosystems guarantees essential services, still difficult to evaluate, for the whole human community, divided into various groups. There are for example numerous regulatory and cultural services determining the quality of life for residents, or recreational services for tourists, or services linked to the production of goods for the relevant production chain. Some of the ecosystem services listed below, particularly those linked to the inland water ecosystem, regard not only local communities but also the whole of Trentino.

INLAND WATER

The humid, temperate, oceanic climate of the area in question ensures that fresh water is easily available. There are numerous springs, watercourses and lakes, which represent a precious resource in terms of supplying various ecosystem services, such as the production of hydroelectric energy, the availability of drinking and irrigation water, facilities for recreational activities and tourist appeal. In past centuries, the demand for services linked to water resources led to major transformation of the

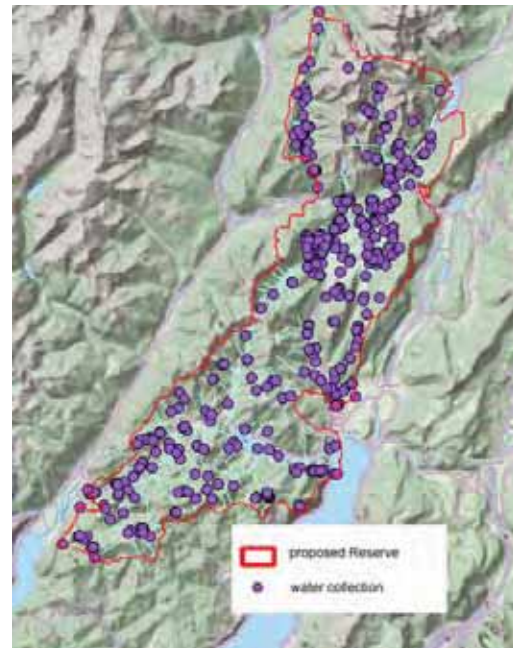
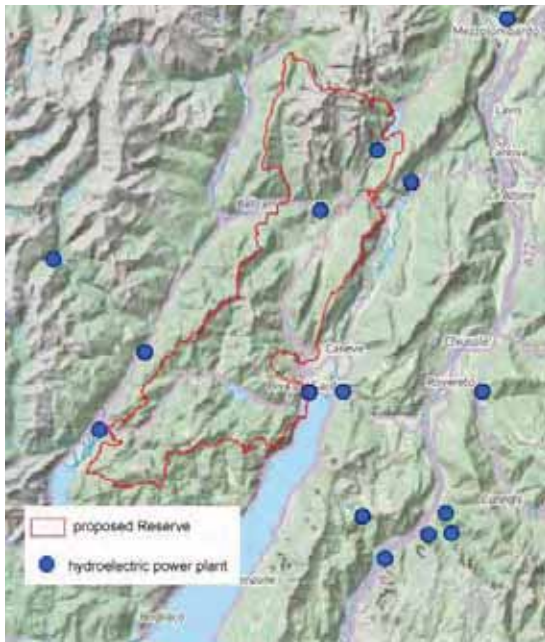


Fig. 12.2 The distribution of hydroelectric plants (left) and water intakes for various purposes (right) gives an idea of the importance of inland water for economic purposes

area, through stream management, the draining of marshy areas and the construction of hydroelectric plants. The most significant impact has been on the River Sarca, with major water intakes upstream of the area in question. In the last decade releasing of water has increased, undoubtedly improving the quality of the river ecosystem (greater sensitivity as regards the environment is giving rise to the idea of creating a river park). Overall, other lesser watercourses have remained of good quality, although there are some localised cases of pollution near agricultural areas making consistent use of animal sewage.

In general, inland waters offer numerous ecosystem services linked to recreational activities and tourism, thanks to the presence of noteworthy

peat bogs, spas, lakes, rivers and streams of considerable value in terms of natural beauty and the landscape. One characteristic feature of the area, which is of considerable interest in terms of tourism, is the presence of spas: the Comano spa is the centre of the “wellness sector”. The area marked by thermal springs extends throughout the Giudicarie Esteriori.



Cow in an alpine pasture

INLAND WATER				
Service	Sub-category	Status	Local importance	Notes
Provisioning Services				
Food	Crops	▲	High	The irrigation of cultivated areas is becoming increasingly important
	Livestock	↔	High	Intensive animal husbandry requires large quantities of water. At the moment the demand is constant, but the possible opening of new stables would increase the demand for water resources
	Aquaculture	↔	Medium	There are some trout farms, which require clear, oxygenated waters. However, trout farms are less significant in the area of the reserve
	Wild plant and animal products	↔	Low	Fishing in natural waters is linked to recreational rather than commercial activities and is regulated at provincial level
Power supply	Hydroelectric	↔	High	Fundamental for the production of renewable energy, which is one of the main sources of energy in the area. In the reserve there are two hydroelectric plants (Rio Bianco – owned by CEIS and Nembia – owned by Hydro Dolomiti Enel)
Genetic resources		↔	High	Aquatic systems and peat bogs are marked by high biodiversity, due to the good state of conservation
Fresh water		▲	High	Storage and retention of water for domestic, industrial, and agricultural use. The importance of the service is increasing, as is the efficiency of distribution networks, which are being progressively modernised and extended
Regulating Services				
Climate regulation	Global	↔	Low	The local contribution of bodies of water to regulating the climate at global level is not particularly significant
	Regional and local	↔	High	The Mediterranean microclimate near Lake Garda is regulated by the presence of the large body of water
Water regulation		↔	High	The presence of an extensive network of watercourses and some lakes guarantees groundwater recharge and discharge; storage of water for agriculture or industry

Water purification and waste treatment		↔	High	Retention, recovery and removal of excess nutrients and pollutants; deposition of suspended solids. In the area of the reserve there are numerous stations monitoring the quality of the waters, showing a good problems (see cultivated ecosystems)
Disease regulation		↔	High	The high average quality of the bodies of water guarantees the absence of health problems
Cultural Services				
Tourism		▲	High	Spas, swimming, fishing, bird-watching and panoramas are the main tourist attractions in the area
Educational values		▲	Medium	Exploratory trails in the woods, sensory trails and environmental education are currently offered and are rapidly expanding activities
Sense of place		↔	High	The local communities have always been linked to bodies of water: Lakes Tenno and Ledro, the River Sarca, peat bogs etc.
Supporting Services				
Soil formation, photosynthesis, primary production, nutrient cycling, water cycling		↔	High	Thanks to the generally good state of the waters, supporting services are still provided satisfactorily by the ecosystem. It is essential to conserve them

FORESTS

The forest ecosystem is generally natural or semi-natural, namely without groves of trees planted exclusively for timber production. For decades forestry management in Trentino has not adopted artificial systems for the renewal of forests, but has rather been based on the natural dissemination of spontaneous species. Only in more fertile areas on the valley floor or not particularly steep areas have forests been historically removed and substituted with areas for farming and mountain pasture.

The map below shows the two main categories of use for forests (source: forestry plans) in the proposed Biosphere Reserve: production (timber, wood fuel) and protection of the slopes.

The crisis in the timber market in the last few decades has further oriented management methods towards the objective of environmental sustainability. Since 2005, publicly or collectively owned forests (around 90%) in the proposed reserve have had PEFC certification (Programme for Endorsement of Forest Certification schemes - See annex 8.3), which guarantees sustainable management of the forest ecosystem and its products/services. This is a specific certification system for the forestry sector, based on decisions made in the context of the pan-European process for



Fig. 12.3 *The role of wooded areas includes various aspects of production and land protection purposes*

the implementation of Sustainable Forestry Management (SFM), namely on the resolutions of the inter-ministerial conferences in Helsinki, Lisbon and Vienna in 1993, 1998 and 2003 respectively.

In the last few decades there has been a general increase in wooded surface areas and the quality of the ecosystem, with positive repercussions on wild fauna populations spending all or part of their life cycle in the forest.

As regards wooded surface areas in Trentino, the provincial fauna plan states: *“Wooded surface areas on their own cover around 55% of the province. This figure is more than*

double than the national average and the ratio between wooded surface area and inhabitants in Trentino is 5 times higher than the average Italian figure and 6 times higher than for northern Italy. Furthermore, it should be considered that the percentage stated above rises to 59% if one also considers alder and mountain pine woods at high altitude. This situation is the result of a gradual increase in woodland at the expense of marginal

farming areas (animal husbandry) starting from the 1960s, the phenomenon mostly concerning areas at higher altitude and on the slopes, recovering part of the area which man had subtracted from the woods in the past. From the 305,370 hectares recorded in the 1977 Trentino forestry map, in 2004 we indeed arrived at 345,293 hectares, with an increase of 13%”.



Timber production represents a significant source of income and keeps the chain of activities linked to management of the local area active

FOREST				
Service	Sub-category	Status	Local importance	Notes
Provisioning Services				
Food	Crops	▼	Low	Patch dynamics of hay meadows and small crops (potatoes, soft fruits, vegetable gardens). A progressive decline in forest glades is underway due to abandon. A study started up in 2002 by the Forestry and Fauna Department of APT has shown that in a period of around 30 years the expansion in newly formed woods has regarded around 3% of the total surface area of the province
	Livestock	▼	Medium	Patch dynamics: summer pastures under the wood line. A progressive decline in the use of pasture at medium altitudes and in woods is underway due to a gradual polarisation of alpine pasture activities high in the mountains and intensive animal husbandry in stables on the valley floor. Within the ABNP in the last 70 years: 42% of alpine pasture has been abandoned; more than 10% of pastureland has been recolonised by woods
	Wild plant and animal products	↔	Medium	Hunting (deer, roe deer), mushrooms. Hunting is a sporting rather than commercial activity, regulated at provincial level. In some areas mushroom picking has a significant economic value
Timber		▲	High	Lumber and plywood for homes and buildings, wood furniture. Construction timber contributes significantly to the local economy (around 15,000 m ³ felled annually, see Chapter 15)
Power supply	Wood fuel	↔	High	Locally the traditional use of wood-burning stoves for home heating is still very widespread (around 5,000 tons/year taken from within the area, see Chapter 15).
Genetic resources		↔	High	High biodiversity in natural and semi-natural ecosystems. In terms of quantity and quality, forest cover is in an excellent state; in some cases it even menaces the biodiversity of open semi-natural habitats
Biochemicals, natural medicines, pharmaceuticals		↔	Low	Traditional use of some plants for home remedies (see Chapter 14). Not commercial. Locally there is traditional pharmacy (Farmacia Folletto, Ledro in the ReLed system, MUSE) with production based on products collected in the local mountains

Regulating Services				
Air quality regulation		↔	High	The large forests in the reserve absorb or trap particulate matter (soot), nitrogen oxides and other pollutants released by cars, power plants and factories
Climate regulation	Global	▲	Medium	Global carbon sequestration, Carbon store: 81,000 Tons C/Year (estimated value)
	Regional and local	↔	High	Microclimate regulation. Through transpiration forests impact regional rainfall levels. Forests provide shade, creating cooler microclimates in adjacent areas, on the forest floor and in nearby streams.
Water regulation		▲	High	The forest system is improving in quantitative and qualitative terms. Permeable soil in forests facilitates aquifer recharge, river flood plains and wetland forests retain water, reducing the risk of flooding during runoff peaks. The extent and continuity of forest coverage guarantees a high level in terms of this function.
Erosion and natural hazard regulation		▲	High	Vegetation prevents soil loss due to wind and rain. Forests on slopes hold soil in place, thereby helping to prevent landslides. 16% of the forest coverage in the proposed Biosphere Reserve has been attributed a priority "protective" role, while the remaining "productive" part is also managed in such a way as to guarantee this role
Water purification and waste treatment		↔	High	Strips of forest in cultivated areas play an important role as filters. Forests remove excess nutrients and pollutants, preventing them from entering waterways. Very important in a few specific spots, where cattle dung and urine (sewage) is used to fertilise crops.
Pest regulation and pollination		↔	Medium	The woods encourage the presence of useful insects, with positive spin-offs on biodiversity and the health of crops. The area of the proposed reserve is characterised by extensive forests, in close contact with cultivated zones. This ensures the good quality of the ecosystem service

Cultural Services				
Tourism		▲	Medium	The landscape and inland woods and pastures represent a fundamental element for tourism. In certain situations the increase in woods may be unfavourable in terms of the landscape and for around 10 years action has been taken to limit the invasion of open spaces, above all high in the mountains
Educational values		▲	Medium	Exploratory trails in the woods, sensory trails and environmental education are currently offered and are rapidly expanding activities. See Chapter 16: activities of ABNP, APPA and tourist offices.
Social relations		▼	Medium	Until a short time ago activities in the woods were family/community practices which created opportunities for social relations during collective wood clearing work and activities to prepare firewood. Now these activities – around 50% of volume - are increasingly entrusted to woodcutting companies, reducing the opportunities for relations between different families
Sense of place		▼	High	The woods are very important in terms of defining the identity of less anthropized areas, but are increasingly perceived as “invading” traditionally open spaces
Supporting Services				
Soil formation, photosynthesis, primary production, nutrient cycling, water cycling		↔	High	Supporting services are fully satisfied by the forest ecosystem and the extent of forest areas (around 70%) also determines the level of these services

CULTIVATED AREAS

The area of the proposed Biosphere Reserve is characterised by the alternation of small towns, arable crops, stable grasslands, woods and hedges. As already stated in section 11.3, the area has a humid, temperate, oceanic climate which guarantees a water supply superior to demand for the purposes of agricultural cultivation (sustainable withdrawals for irrigation: supply>demand).

According to the classification adopted by MA assessment, the area of the proposed Biosphere Reserve belongs overall to a “rain-fed, low external input” farming system in a temperate humid/subhumid climate, with “mixed crop-livestock systems”. However locally, in some areas of the Fiavé and Lomaso plain, one can see major intensification, with a local increase of “external input” and a move towards specialist maize cultivation.



Harvest hay

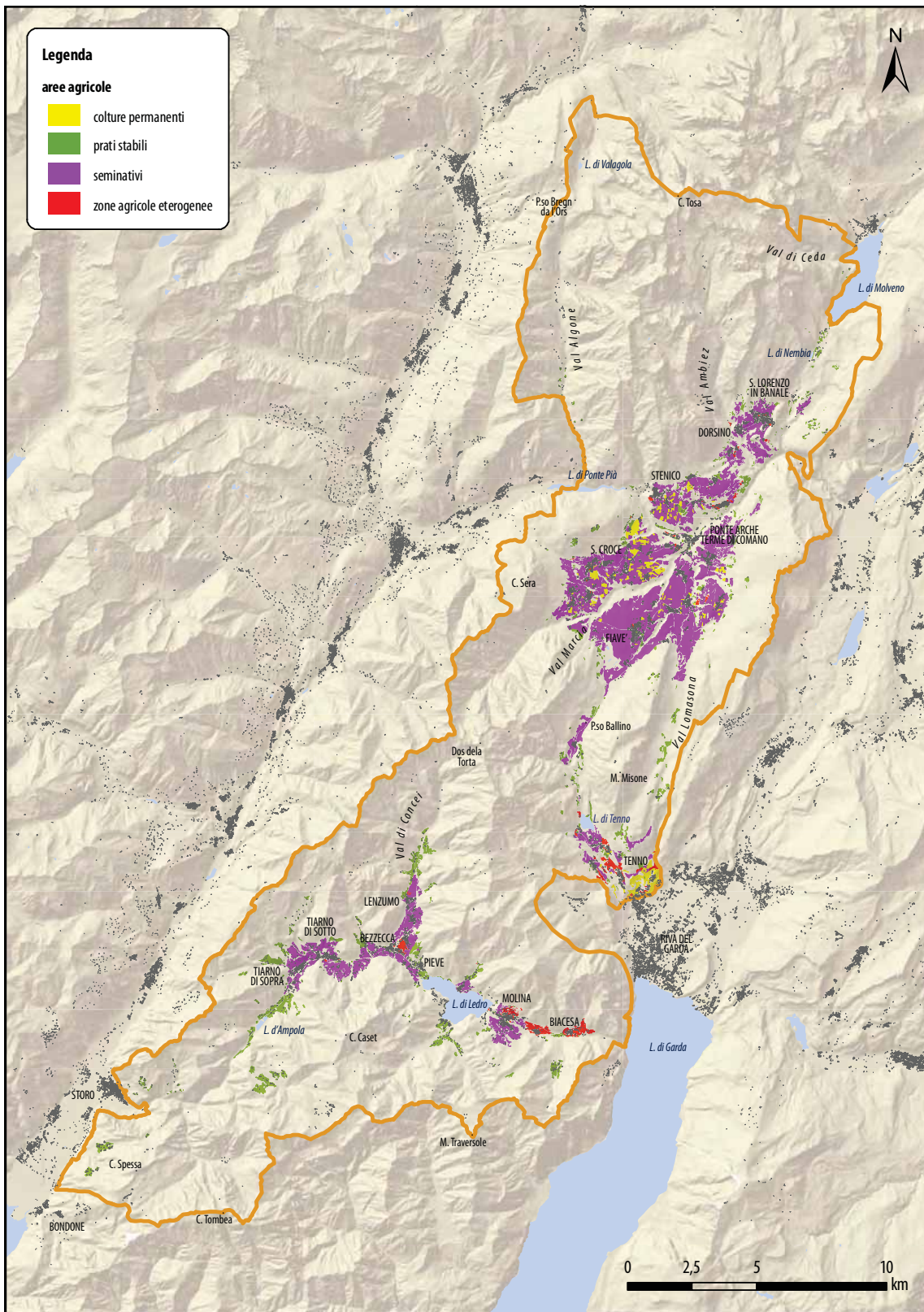


Fig. 12.4 Cultivated areas, with a prevalence of arable crops in the Giudicarie Esteriori and permanent meadows around Ledro

Table 26.1. Global Typology of Cultivated Systems with Examples

Farming System*	Tropical and Sub-tropical (62%)			Temperate (38%)	
	Warm Humid/Subhumid (26%)	Warm Semiarid/Arid (12%)	Cool/Cold (Highland/Montane) (24%)	Humid/Subhumid (22%)	Semiarid/Arid (16%)
Irrigated	(10%) rice (e.g., East, Southeast Asia) rice-wheat (e.g., Pakistan, India, Nepal)	rice (e.g., Egypt, Peru)			cotton
Rain-fed—high external input (crops, livestock, tree crops)	rice-wheat (e.g., Pakistan, India, Nepal)		tea, coffee plantations (e.g., East Africa, Sri Lanka)	maize and soybean—Argentinian pampas, U.S. corn belt small grains (wheat, barley, rye), sunflower, oats) and mixed crop-livestock systems (e.g., West and North Central Europe)	
Rain-fed—low external input (crops, livestock, tree crops)	staple tropical crops in humid tropics (e.g., yam, cassava, bananas in SSA)	mixed crop-livestock (e.g., Sahel, Australia)	conifers/decid. (e.g., High Andes)	mixed crop-livestock systems (e.g., Europe)	wheat-fallow systems (e.g., Central Asia, Canada, United States, Australia)
Shifting cultivation	NA	e.g., Amazon Basin, Southeast Asia			
Industrial confined livestock	NA	"intensive" livestock systems, e.g., out and early systems, mixed low-intensity livestock/crop systems, beef finishing lots, broiler and pig houses			
Freshwater aquaculture	NA	e.g., artisanal ponds, industrial cages			

*High-level aggregations of the global farming systems typology developed by Dixon et al. 2001.
 Notes: Agroecological characterization according to FAO Global Agroecological Zones (FAO/IASA 2001). Total arable shares shown in parentheses are for settled agriculture (e.g., excluding shifting cultivation areas). Derived from FAOSTAT 2004. Breakdown of cropland by agroecological zones from Wood et al. 2000. The MA cultivated systems do not encompass marine and coastal aquaculture (Chapter 19) and extensive grazing systems (Chapter 22).

Global Typology of cultivated Systems with Examples

The pressure to move towards intensive agriculture is however modest overall, as compared to the regional and supraregional context, thanks to the characteristics of the terrain and a cultural background strongly linked to traditional agricultural production. There are nevertheless some situations (Fiavé, Lomaso), with a high concentration of livestock as compared to the carrying capacity of the area, which have a significant impact on the environmental system. The desire to offer an alternative to a model based on crop intensification is not an isolated attempt which regards only these areas. There has been a considerable expansion in

organic farmland areas around the world (a threefold increase between 1999 and 2006), chiefly in developed countries. The demand for healthy and environmentally-friendly food, and subsidies for producers of organic food and fibre, has encouraged this process. The benefits of organic farming for the environment have been well-described, and include less contamination by fertilisers, herbicides and pesticides, an increase in biodiversity, enhancement of soil carbon sequestration and nutrients, enhancement of natural pest control and conservation of the genetic diversity of local varieties of domestic plants and animals. Importantly, in

addition to benefits related to the environment and human health, it has been demonstrated that organic farming usually produces similar or higher quantities of agricultural products and with higher market prices than conventional farming, which can make it extremely profitable.

Large areas of the proposed Biosphere Reserve (Val di Ledro, Lomasona etc.) would appear to be particularly suitable for general conversion to organic farming. Collective reflection is underway regarding the possibility of making

these areas into an “agricultural park”, incentivising their transformation.

In Ledro a debate is underway with players in the political and agricultural field as regards ways of implementing a local agricultural park, whereas in the context of Lomasona a master plan is being prepared for the planning of sustainable actions, with agriculture (production, farm guesthouses and landscape) having a key role. The setting up of the reserve would facilitate the process of exchanging ideas between stakeholders and the development of this kind of policy.



Ledro valley view (on the left); Molina di Ledro pile dwelling (above right); 1st World War military settlements on Ledro Alps

CULTIVATED AREAS				
Service	Sub-category	Status	Local importance	Notes
Provisioning Services				
Food	Crops	↔	High	Locally there are crops of potatoes, maize, grapes, hay, olives, apples, walnuts and cherries, in addition to family vegetable patches. See http://www.trentinoagricoltura.it/filesroot/Documents/560_rapp_agricoltura09_pdf/rapp_agricoltura09.pdf
	Livestock	↔	High	Milk and its derivatives are produced in the area – one of the major centres in the province- along with meat. There is an increase in production as compared to the past, the current trend being constant
Genetic resources		↔	High	Active genetic protection, with conservation of species from semi-natural stable grassland environments (in Ledro and marginal areas)
Biochemicals, natural medicines, pharmaceuticals		▲	Low	Over and beyond traditional uses, there is “new” cultivation of species used for cosmetics in relation to the spa sector (two businesses cultivating medicinal herbs and one traditional pharmacy)
Regulating Services				
Climate and air quality regulation	Global	↔	Low	The reserve’s significance in terms of carbon dioxide production (fossil fuels in field operations) at world level is relatively modest, given the local extent of the farming area
	Regional and local	▼	Medium	Intensive animal husbandry tends to produce a significant quantity of methane and nitrogen residues. There is instead increasing conflict as a result of problems related to smells (See Section 15.3)
Water regulation		↔	Medium	Situation of medium efficacy: there are no surface irrigation systems, but there are sprinkler systems (in areas dedicated to animal husbandry). Currently the water supply is adequate, but due to competition for use (e.g. hydroelectric plants, increase in environmental flows) availability could become a problem
Erosion regulation		↔	Medium	Soil erosion in traditional local agricultural systems is under control. The most intensive crops tend to be located in areas with gentle slopes

Water purification and waste treatment		▼	High	In the area in question it is efficient overall, given the traditional type of crops. Some areas (Fiavè and Lomaso) are subject to excessive fertilisation and a consequential increase in organic matter in surface waters. It is necessary to avoid the problem becoming more widespread
Pest regulation and pollination		↔	Medium	Mowing meadows and semi-natural environments with a high level of biodiversity, still extensively present, make a positive contribution to pollination and pest control
Cultural Services				
Tourism		▲	High	The traditional rural-forestry landscape is the basis of the appeal of the area. Furthermore, it supports typical products and farm guesthouses. There are some situations of conflict that need to be dealt with (animal husbandry in Fiavè and Lomaso)
Educational values		▲	Medium	Environmental education, experiences of traditional working of milk and farm products are currently carried out and are rapidly expanding
Social relations		▼	Low	Traditional activities carried out through collaboration between families, such as hay-making, have almost disappeared
Sense of place		↔	High	The farming-forest mosaic is very important in determining the identity of areas with a medium level of anthropization and with more marginal farming (hilly areas)
Supporting Services				
Soil formation, photosynthesis, primary production, nutrient cycling, water cycling		↔	Medium	Supporting services are still satisfied by the agricultural ecosystem and it is essential to conserve them, also by encouraging the diffusion of organic farming; more intensive farming is problematical

MOUNTAIN SYSTEMS

The mountain ecosystem is characterised by a high level of biodiversity, due to the compression of climatic bands and the diversified morphology, which gives rise to a detailed mosaic of small habitats. These are very dynamic environments, as a result of natural events such as landslides, avalanches, flooding and fires taking place there.

The geographical separation resulting from mountain chains also leads to a high level of ethnocultural diversity, along with spectacular landscapes of great aesthetic and spiritual value. These are particularly important in terms of tourism and recreational activities.

One of the most important services of mountain ecosystems is the provision

of clean water, while the ecological integrity of the mountains is crucial for the safety of settlements and transport routes. They harbour rich biodiversity and contribute substantially to global plant and animal production. All these services depend on slope stability and erosion control provided by healthy vegetative cover.

From the economic point of view, most of the spin-offs are applicable not only to the resident population, but also influence the economies below the mountains.

On the other hand, the mountain environment is also affected by economic repercussions linked mainly to tourism, attracted by the high level of naturalness and the biodiversity of mountain systems.

Table 24.4. Ecosystem Services in Mountains

Mountain Type		Downslope Safety		Water		Food		Fiber		Medicinal		Cultural (Recreational, etc.)
		Safety	Dams	Fresh water	Energy	Grazing	Crop	Fuel	Timber	Wild	Cultivars	
Alpine	terrestrial	+++	+++	+++	+++	++	●	●	●	+++	●	++
	aquatic	●	+	+++	+++	●	●	●	●	●	●	+
Montane	terrestrial	+++	+	+++	+++	+++	+++	++	++	+++	+++	++
	aquatic	●	+	+++	+++	●	+	●	●	●	●	++
Hills and plateaus	terrestrial	+	+	+	+	+++	○	++	++	+	+	+++
	aquatic	●	●	+	+	●	++	●	●	●	●	+

Key: ● not relevant; + relevant; ++ important; +++ very important

Fig. 12.5 Ecosystem Services in Mountains

The table above provides an overview of services in mountain areas (Millennium Ecosystems Assessment, 2005); at local level the picture is as follows:

MOUNTAIN				
Service	Sub-category	Status	Local importance	Notes
Provisioning Services				
Food	Livestock	▼	High	Summer pastures have traditionally been extremely important in the area. Their importance is decreasing slightly while remaining high. Inside the ABNP in the last 70 years: 42% of alpine pastureland has been abandoned; more than 10% of pastureland has been recolonised by woods: the trend as regards the use of alpine pasture has stabilised in the last 10 years
Power supply	Hydroelectric	↔	High	See: inland water ecosystem
Genetic resources		↔	High	High biodiversity in natural grasslands and the presence of highly specialised endemic and pioneering species in habitats high in the mountains; the expansion of bushes menaces the habitat
Biochemicals, natural medicines, pharmaceuticals		↔	Low	Traditional use of some plants for home remedies (see Chapter 14). Not commercial. Locally there is traditional pharmacy (Farmacia Folletto, Ledro in the ReLed system, MUSE) with production based on products collected in the local mountains
Fresh water		▲	High	The glaciers and springs are concentrated at high altitude in mountainous areas and feed the network of watercourses below

Regulating Services				
Climate regulation	Global	↔	Low	The local contribution to regulating the climate at global level is not particularly significant
	Regional and local	↔	High	The vertical upthrust of mountains captures precipitation. At local level the microclimate is very different, depending on exposure and continentality
Water regulation		↔	High	Seasonal snowpack melting is a critical source of water for agriculture as well as for drinking water. The extent, continuity and natural state of these surfaces in any case guarantees a good level of services
Erosion regulation		↔	High	The permanence of plant cover at high altitude is fundamental in order to protect against erosion by wind and water. The extent, continuity and natural state of these surfaces in any case guarantees a good level of services
Water purification and waste treatment		↔	Medium	Water at high altitude is generally free of pollutants. However, the reduction in stream flow following water intakes reduces the purification capacity along the watercourse
Pest regulation and pollination		↔	Medium	In mountainous areas there are highly specialised plant-pollinating coevolution mechanisms
Natural hazard regulation		↔	High	The stability of the slopes is fundamental for the safety of areas downhill. The extent, continuity and natural state of these surfaces in any case guarantees a good level of services

Cultural Services				
Tourism		▲	High	Footpaths high in the mountains and mountain peaks are the main appeal for tourists in the area. The extent, continuity and natural state of these surfaces in any case guarantees a good level of services
Educational values		▲	High	Survival mechanisms and the interaction between animals and plants at high altitude are some of the most interesting environmental education topics in mountain parks. See Chapter 16: activities of ABNP, APPA and tourist offices.
Social relations		▼	Medium	The collective management of alpine pasture leads to collaborative relations between farmers. Once each family had a few cows, which were entrusted to the manager of the alpine pasture in exchange for a share of the products coming from milk. Modern farming techniques, with a large number of animals managed by a few families, have reduced the importance of alpine pasture for social relations
Sense of place		▼	High	Mountain populations have emotional ties with the peaks above them, on which their safety and the resources necessary for their survival depend. The extent, continuity and natural state of these surfaces in any case guarantees a good level of services
Cultural heritage values		↔	High	The Dolomites are included in the list of World Heritage Sites
Supporting Services				
Soil formation, photosynthesis, primary production, nutrient cycling, water cycling		↔	High	Supporting services are still satisfied by the ecosystem, which remains efficient overall



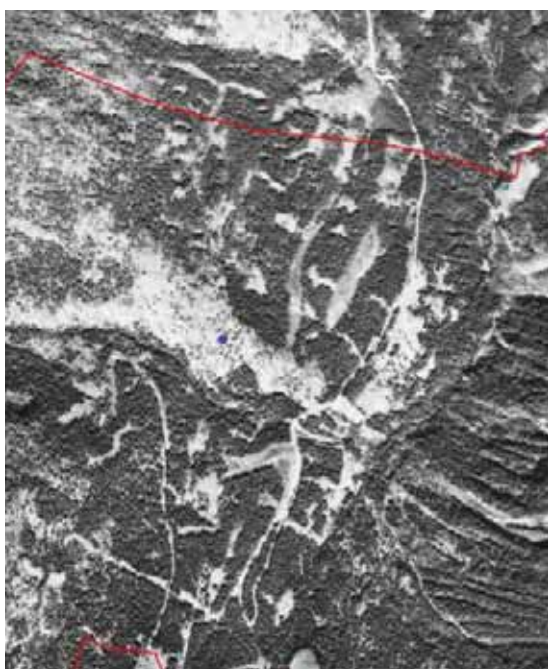
Pile-dwelling of Fiavé

12.2 Specify whether indicators of ecosystem services are used to evaluate the three functions (conservation, development and logistic) of biosphere reserves. If yes, which ones and give details.

At the moment, also in the literature, there is no single system of direct, reliable and simple indicators. It is indeed particularly difficult to find significant and relevant data. It is even more difficult to convert this into economic terms. One important exception is water resources, which can be analysed in both qualitative and quantitative terms. The TEEB Study Report gives some “types of indicators” useful for evaluating the possible consequences of changes to ecosystems and biodiversity (also in economic terms). Many of these indicators, although not currently included in a system to

assess ecosystem services, make reference to basic data already available for the area in question. Their reinterpretation in the context proposed here could be the object of future research in the area of the reserve. (For more details see chapt. 14,15 and 16)

- Measures of diversity (species diversity, richness and endemism): there are some partial surveys in the area in question which make it possible to appreciate the high level of biodiversity present, however they cannot be easily related to the relative ecosystem services. A high level of biodiversity is useful



The dynamics of vegetation can often be quantified, as in the comparison between these situations in the 1950s and today

for evaluating the resilience of the system and hence of the relative ecosystem services.

- Measures of quantity: the distribution of habitats is known in SIC and ZPS areas, for which a periodically updated map has been drawn up on a 1:10,000 scale. Measurement of status and trends for ecosystems and species (medicinal plants, food) which have clear links to provisioning services have been used to measure stocks and flows of ecosystem services. These are of some use in measuring regulating services which rely on biomass or a particular habitat/vegetation cover (e.g. carbon sequestration, pollination, erosion control, water flow regulation).
- Measures of condition: there are Red Lists of threatened habitats and species for the area in question, with various evaluation scales. While providing an indication of the status and trend of ecosystems and their services, these indicators are seldom linked to quantified changes in ecosystem service levels. They are however useful indicators of sustainability, thresholds and the scale of human impact on ecosystems, particularly when clear and demonstrable links exist.
- Measures of pressures (land cover change): in Chapter 9 an initial comparison between historic and current land use for the area in question has been given; the availability of historic documents would allow closer examination. When linked to particular species or ecosystems (e.g. wetlands) which provide or support ecosystem services, these measures are useful indicators of ecosystem service levels and decline. They are also used to indicate the sustainability of ecosystem service use and supply.
- Provisioning service measures: timber, fuel and livestock production are known for the area in question and represent a direct measurement of the ecosystem service. When calculated in terms of sustainable production, measures can be used as indicators for monitoring and managing ecosystem services, contrasting sustainable production with actual production. Most indicators are expressed as biophysical units, which can be converted into monetary values when markets exist. As regards the wood fuel and timber ecosystem service it is possible to carry out quantitative assessment of the timber produced and the relative economic impact, which is however limited to use by man and does not take into account relations with other ecosystem services of the forest ecosystem overall (carbon sequestration, scenic values, watershed protection, cultural services etc.). The data on timber production is available for the area in question in the periodic updates of the Piani di Assestamento Forestale (PAFs - forestry management plans) and in

reports on the state of forests.

- Regulation service measures: carbon sequestration, water flow regulation and production and air quality regulation are direct measurements of ecosystem service levels and changes. Although not systematic, there is a range of data regarding air quality.
- Cultural service measures: in the area in question there is no known data on the presence of tourists with reference to ecosystem services.

The table below summarises how the groups of indicators listed above may contribute towards one or more of the three functions of the proposed Biosphere Reserve



Harvested timber

Indicators	Three function evaluation
Measures of diversity	Conservation. The measurement and monitoring of biodiversity present contributes towards conservation
Measures of quantity	Conservation, development. Stocks and flows of ecosystem services.
Measures of condition	Conservation, development. Indicators of sustainability
Measures of pressures	Conservation, development. Indicators of sustainability
Provisioning service measures	Conservation, development. Indicators of sustainability
Regulation service measures	Development
Cultural service measures	Development, logistics

12.3 Describe biodiversity involved in the provision of ecosystems services in the biosphere reserve (e.g. species or groups of species involved).

The table below summarises the most significant ecosystem services provided by each ecosystem and the biodiversity involved:

Ecosystem	Services	Biodiversity involved
Inland water	Food (crops), power supply (Hydroelectric), fresh water, water purification and waste treatment, erosion regulation	Riverside species and peat bog vegetation. Aquatic birdlife, see MUSE census of birdlife
Forest	Timber, power supply (wood fuel production), genetic resources, regulating services	Forest species, their stability and their widespread distribution are indispensable for all the “regulating services” and for timber and wood fuel production
Cultivated	Food (crops, livestock), genetic resources, tourism	Cultivated species (autochthonous and traditional varieties). See Chapter 13, typical products. Spontaneous species in hay meadows and secondary grasslands depending on crop management. The maintenance of the traditional agricultural-forest landscape is indispensable for tourism
Mountain	Genetic resources, tourism	Endemic and rare species high in the mountains and in natural grasslands. (Census of fauna by the Museo Civico in Rovereto enclosed).

Given the high level of biodiversity in the proposed area it is not possible to deal with each individual species, but it is possible to briefly summarise which groups of species are

particularly significant for providing the main ecosystem services. The main species belonging to the individual groups are listed in the descriptive tables for the habitats in section 11.6

European spruce grazing areas, used both for timber production and animal husbandry



and Chapter 14.

The extensive group of endemic and rare species represents the true genetic heritage for the area of the proposed Biosphere Reserve, to be conserved due to its uniqueness and great variability in terms of adaptation. The species characterising riverside vegetation, seriously threatened by widespread water intake and management works, and by the threat of competition with allochthonous invasive species, represent the basis of the “water purification and waste treatment” and “erosion regulation” ecosystem services.

The variety of forest species and their widespread distribution is indispensable for all the “regulating services” and for timber and wood fuel production. In addition to providing an important “genetic resources” service, species related to permanent hay meadows and secondary grasslands, closely dependent on traditional farming methods, are of fundamental importance for ecologically sustainable animal husbandry

(with the production of high quality cheese) and in order to maintain the agricultural-forest landscape, of undoubted value for tourism.

Cultivated species, especially autochthonous or traditionally used varieties, are indispensable for the “food production” service, with a high quality, short and ecologically sustainable production chain. The maintaining of a certain share of local food production helps to avoid one of the main risks related to the economy of mountain ecosystems, represented by increasingly greater dependence on valley and city areas, which causes a loss of identity and depopulation.

The species of fauna with most appeal (large carnivores, ungulates, birds of prey) are fundamental for ecosystem services linked to tourism and environmental education.

For ecosystem services linked to the conservation of biodiversity see Chapter 14, which deals in detail with groups of species in relation to the relevant conservation problems.

12.4 Specify whether any ecosystem services assessment has been done for the proposed biosphere reserve. If yes, is this assessment used to develop the management plan?

At the moment no documents specifically directed at ecosystem services for the area of the proposed Biosphere Reserve have been drawn up, but there are various studies analysing the state of ecosystems and establishing policy for their correct management.

In the context of the OPENLOC project a specific study was dedicated to economic assessment of ecosystem services on a national scale, with application on a local scale to the Municipality of Ledro, part of the proposed Biosphere Reserve. The approach developed is based on a technique used in the absence of direct economic evaluation, the so-called “benefit transfer” approach. Through “benefit transfer” it is attempted to apply general evaluations available for certain areas to new areas in a controlled way. The result is an approximate estimate of

the potential value of “new” areas. In this specific case it was done for all the Italian provinces.

Clearly this estimate is usually very approximate and underestimated, but it may be particularly useful in monitoring changes in the value of the area following modifications in land use.

Application of this method, designed for provinces, to Ledro on a local scale, using data for 2000 is debateable, but provides interesting indications at least as regards the size of the figures in play.

The method was indeed designed to compare planning scenarios, on the basis of the few items of data available, and to observe the consequences in terms of gains and losses of ecosystem services¹.

¹ The complete report is available at the address: <http://www.spazioftp.it/ledro/comunitas/n18s.pdf>.



Educational activities in the field of experimental archaeology, carried out by MUSE in Ledro

Potential monetary value of Ledro ecosystem services

Climate regulation	Ability of biotic and abiotic processes to maintain the chemical and climatic balance in the atmosphere, e.g. CO ₂ /O ₂ , maintenance of O ₃ layer, regulation of SO _x levels	1.417.755 euro
Mitigation of damaging events	Blocking and protective role in the case of destructive events, e.g. mitigation of intense rain, flooding, erosion and landslides	1.600.856 euro
Regulation of waters	Purifying role, regulation of waters, recharging of aquifers, avoiding costs of processing drinking water, maintaining water availability throughout the year as compared to sudden withdrawal of water from the body of water	47.870.576 euro
Assimilation of residues	Filtering role and reduction of residues from human activities, e.g. pathogens (such as Escherichia) and eutrophic nutrients (nitrogen and phosphates) in water, particulate matter and toxic compounds in air	773.290 euro
Regulation of nutrients	Regenerating (and absorbing) role for nutrients removed by plants and animals (or introduced by farming)	3.537.933 euro
Habitats and biodiversity	The continuity and functional role of natural areas provides sites offering refuge, food and reproductive sites for animals and plants	6.600.558 euro
Recreational value	Natural areas attract people for recreational activities (hunting, fishing, excursions, canoeing, cycling etc.) which provide benefits in terms of the health of the population and in economic terms (tourist spending)	1.299.675 euro
Aesthetic value	Aesthetic and spiritual role, this value is related to non-use, to the willingness to pay to maintain the intact nature and quality of a site	103.273 euro
Regenerating soil fertility	The soil has several roles: filtering and maintaining the stratum, absorbing residues. Natural systems create and enrich the soil and prevent erosion during rainfall	582.110 euro
Pollination	Pollination by animal pollinators is very valuable for human activities. For example 80% of edible plants depend on pollinators	3.668.495 euro
Total		67.454.521

Fig. 12.6 Monetary quantification of ecosystem services in Ledro, carried out by the Openloc project

The Autonomous Province of Trento, specifically the Forestry and Fauna Department, publishes a two-yearly “Report on the State of Forests and Fauna”, accompanied by quantitative and qualitative analysis, alongside an overview of the most appropriate planning tools for good conservation of habitat functions.

Forestry planning provides for the drawing up of area planning policy (PFM: Piano Forestale Montano/ Forestry Management Plans) which increasingly adopt a multidisciplinary approach designed to conserve the functions of the ecosystem, instead of the simple productive approach on which planning was based in the past. The PFM for the Ledro, Riva and Tenno area is currently being

completed, whereas in the next few years the plan for the Giudicarie Esteriori will be finalised.

The Adamello-Brenta Nature Park has a “Park Plan” which includes territorial, fauna, socioeconomic and environmental aspects and strategies for action within the area contained in the Adamello-Brenta Park, part of which falls within the proposed Biosphere Reserve (enclosed in 4.2).

Existing sector plans provide a basis on which it will be possible to carry out more specific assessment of ecosystem services and their beneficiaries in the future.

The data coming from the documents mentioned above was used to draw up this nomination proposal.



Beech woods in autumn; they also represent a “landscape service”

13. MAIN OBJECTIVES FOR THE BIOSPHERE RESERVE'S DESIGNATION

13.1 Describe the main objectives of the proposed biosphere reserve, integrating the three functions (conservation, development and logistic), presented below (sections 14 to 16), including components of biological and cultural diversity. Please specify the indirect pressures and/or organizational issues.



The Fiaavè peat bog area, a site of naturalistic and cultural importance (WHS Prehistoric Pile-Dwelling), lying between cultivated areas and urban contexts: an example of the need to integrate different area promotion objectives

The main scope of the proposed Biosphere Reserve is to consolidate the existing model for sustainable use of the mountain area, strongly based on the many relations between man and environment in the context of a fragile and delicate equilibrium. This is

a model which has led to landscapes of great socioeconomic value and precious ecosystems in past centuries, reflected in cultural identity and social organisation.

The objectives of the proposed PDR, which also represent the guidelines

for drawing up the future Management Plan for the reserve, have been established with reference to the most recent strategic documents prepared by the MaB secretariat, in particular the 'Seville Strategy for the World Network of Biosphere Reserves' and the 'Madrid Action Plan for Biosphere Reserves 2008-2013', in addition to the Alpine Convention, the European Landscape Convention and the Statue of Autonomy for the Trentino Alto Adige region. At local level (Province of Trento, valley communities, municipalities, nature park) the framework includes a detailed combination of planning instruments and laws which establish very similar objectives to those of the MaB programme.

Specifically, the Reserve will contribute to maintaining biodiversity, not only by reinforcing protection for some significant species (such as the bear, lynx, various species of birdlife with particular reference to migrating birds, endemic flora etc.), but also by focusing on the conservation of their habitats (alternation between woodland with a high level of naturalness and open grassland-pasture environments, with the presence of diversified farming areas). Confirming the profound and consolidated integration between man and biosphere, many valuable species and ecosystems are linked to semi-natural environments, namely to secondary ecosystems favoured by traditional human activities. Thus

in terms of the various measures favouring these ecosystems, the implementation of active conservation measures is a priority, in addition to passive protection. It is a question of encouraging the continuation of farming-forestry-pasture activities compatible with the environment, but which are by now no longer sustainable in socioeconomic terms in their traditional form, encouraging their introduction within the context of more general integration of social, cultural and economic activities (tourism above all).

Given the importance of the latter, it follows that the focus of the whole process is on the creation of a human system based on integration between the local community, the environment and tourism, taking concrete form in sustainable activities related to energy balance (in terms of sustainable mobility, reduced emissions and mitigation of greenhouse gases); the conservation of natural resources and water (direct and indirect protection measures for the ecological network, limitation of discordant planning processes); social inclusion and enhancing cultural resources (cooperation networks, the ecomuseum, museum networks etc.).

All these activities are in line with the history of the proposed area, also thanks to the support of a range of legislative and planning tools, in recent years interacting with various social and naturalistic

research programmes. The inclusion of the area in the World Network of Biosphere Reserves will allow the coordination and restructuring of the different protection measures, including them within an effective system centring on human activities compatible with and necessary for active conservation of biodiversity. Research and dissemination activities will also be reinforced, giving rise to a demonstrative role and a “testing ground for sustainable development” for many marginal alpine areas. As regards the socio-cultural and

historic aspects of the proposed area, within the World Network of Biosphere Reserves it will represent an example of virtuous and century-old experience of collective management of environmental assets (see Section 9), through individual responsibility and participation in management of the area. Historically this related to the correct management of water, forests and high mountain zones, with consequences that can still be seen today in terms of combating climate change and promoting sustainable management of energy resources.

13.2 Describe the sustainable development objectives of the biosphere reserve.

The development objectives are in line with the history of the area of the proposed reserve. Specifically, the nomination process was started up following an initiative of the Judicaria Ecomuseum, set up essentially by following the model of a local Agenda 21 process. Subsequently, the municipalities involved in the Ecomuseum were joined by other neighbouring municipalities with similar development objectives. The signing of a Memorandum of Understanding (see section 4.7) between the municipalities concerned officially confirmed the intention to proceed with the nomination process and established policy guidelines. By signing the Memorandum of Understanding the municipal authorities undertook:

<<... to provide for proposals regarding local socioeconomic development in the content of the future Management Plan and Programme Agreement, specifically as regards:

- the safeguarding and enhancement of the cultural and environmental heritage and landscape;
- better compatibility between farming and tourist activities;
- the development of tourism with a low environmental impact,

according to the principles of the European Charter for Sustainable Tourism;

- promotion of local products;
 - the extension of the good management practice developed by the Adamello-Brenta Nature Park and the more virtuous Municipalities, such as EMAS registration for example, to the whole area;
 - continuing improvement in the collective management of environmental assets;
 - correct management of water resources;
 - the search for sustainable solutions for the production, distribution and consumption of energy, with the scope of combating climate change;
 - training and lifelong learning in relation to sustainable development, directed in particular at younger generations;
- along with any other activities identified within the context of the work of the Steering Committee and Working Group ...>>.

The points listed above are the result of efforts to include the indications coming from the local community within the strategic framework mentioned in the previous section (MaB secretariat, European and

national documents). These indications were collected during specific participatory processes to prepare the following documents: the Plan and CETS of the Adamello-Brenta Nature Park, the area plans currently being drawn up for the valley communities of Giudicarie and upper Lake Garda and Ledro, the general planning schemes of the Municipalities, the agreements for the setting up of the Networks of Reserves and the tourism development plans for the relevant areas.

18 significant themes and objectives were identified in the preliminary stage, in relation to which one or more activities may be started up or concluded in the context of the expected Management Plan for the reserve, which will be submitted to the institutions and other bodies involved for analysis and approval.

A. ENVIRONMENT

	Themes and Objectives	Examples of activities for the Management Plan
1	Safeguarding of the climate	Participation of the area in the Covenant of Mayors and SEAP Definition of carbon storage programme provided by forest resources
2	Environmental management of the area	Extension of EMAS registration
3	Safeguarding of waters	Setting up of "Sarca River Park" network of reserves Water resources balance sheet for the reserve
4	Conservation of biodiversity	Upper Lake Garda-PNAB green corridor Setting up of Ledro Alps Network of Reserves Putting into effect of PNAB's RS/API2 Management Plan
5	Safeguarding of the landscape	Map of the landscape: PNAB CdG and CAGL

B. SOCIETY

	Themes and Objectives	Examples of activities for the Management Plan
7	Cultural heritage network	Coordination of cultural activities starting from the ecomuseums and Ledro museum network Local network of traditions and folklore Centro Studi Judicaria
8	Environmental education	Education on sustainable development, footprint
9	Communication	Social media, meetings, traditional media
10	Network	Partnership in the context of the MAB network and the Euregio
11	Cooperation	Cooperative and Co-operators network – Fond. Guetti
12	Solidarity	International cooperation projects – e.g. EC with Bosnia, Congo "Open/barrier-free" reserve

C. ECONOMY

	Themes and Objectives	Examples of activities for the Management Plan
13	Sustainable tourism	Extension of the ECST to the reserve (provided for in the programme agreement of the Ledro Alps NR) Extension of the "Family in Trentino" trademark
14	Energy from renewable sources	"Solar Reserve" – autonomy in terms of energy
15	High quality agriculture	PSR – agronomic use plans Alpine pasture plan Ledro agricultural park provided for in the programme agreement of the Ledro Alps NR
16	Local products	Extension of 'Qualità Parco' project actions
17	Sustainable (and "slow") mobility	Alternative fuels, electric vehicles Network of footpaths, MTB, cycle-pedestrian routes, bridleways
18	Technology and IT	SMART Reserve web valley, GIS, open data, monitoring



Field education with school children, by PNAB

In the table below there are further indications regarding methods and priorities for implementing the themes listed above. Clearly these are a series of preliminary proposals, to be confirmed when the Management Plan for the PBR will drawn up. Each theme proposed for the Management Plan corresponds with a series of directly involved parties, who will identify an internal coordinator. Analysing the proposed themes and objectives, it is possible to establish a level of implementation throughout the area before the

nomination and an expected level in the first years following possible recognition, according to the following classification:

- 0 = inactive
- * = low level
- ** = medium level
- *** = high level
- e = excellent level

As regards implementation priorities, the indications initially provided are as follows:

- H = high priority
- M = medium priority
- L = low priority

Theme	Implementation to date	Implementation provided for	Priority	Organisation/lead partner
1	**	e	H	PAT/C
2	**	***	H	C/PAT
3	**	***	M	C/PAT/PNAB+BIM/CdG/CAGL
4	0	***	M	PAT/PNAB/C+CdG/CAGL
5	**	***	M	C/PAT+CdG/CAGL
7	0	***	M	C/ EdJ
8	0	**	M	C/ EdJ
9	*	e	H	PAT/PNAB/ EdJ /C+ATC/IG/CTL
10	0	**	M	PAT/C/ EdJ /PNAB
11	***	e	M	C/ EdJ +/CAGL
12	**	***	M	C/ EdJ /PNAB/PAT+/CAGL
13	**	e	H	PNAB/C/PAT/CDG/EdJ +ATC/IG/CTL
14	***	e	M	C/PAT+BIM/CdG/CAGL
15	**	***	H	C/PAT+CdG/CAGL
16	*	***	M	EdJ /PNAB+ATC/IG/CTL
17	*	***	M	C/PAT/CDG/PNAB+ATC/IG/CTL
18	*	***	H	PAT/CdG/C+ EdJ /CAGL/ATC/IG/CTL

Organisational/lead partner per theme (see legend above)

PAT=Autonomous Province of Trento; EdJ = Judicaria Ecomuseum; PNAB=Adamello-Brenta Nature Park; M=Municipalities; CdG=Comunità delle Giudicarie; CAGL=Comunità Alto Garda and Ledro; BIM=Consortium of Municipalities of the River Sarca; ATC= Comano tourist agency; IG=InGarda; CTL=Consortium for tourism in Ledro

Thus some priority themes and actions have emerged in relation to studies and proposals, specifically (list is not in order of priority):

- Cooperation network between the UNESCO World Heritage Sites in western Trentino, all within the proposed area (Brenta Dolomites, Fiavé and Ledro pile-dwellings);
- The participation of all institutional bodies in the Covenant of Mayors, starting up a climate protection plan that could represent an example of excellence at international level;
- The extension of EMAS registration to all the municipalities in the PBR;
- The extension of the European Charter for Sustainable Tourism to all the municipalities in the area;
- The adoption of PSR measures to ensure that farming and animal husbandry practices are in harmony with the local area;
- The adoption of the Family Plan, particularly through the action of the Districts already operating in this context;
- The creation of a 'SMART RESERVE', using the most advanced ICT.



Experimental archaeology activities in Ledro: a way of promoting scientific knowledge and the values of the local area

13.3 Indicate the main stakeholders involved in the management of the biosphere reserve.

The first beneficiaries of the reserve are the local inhabitants. Furthermore, use of the area for tourism leads to the presence of a large number of visitors, lower overall than the number of residents, but more or less equal in the summer.

This consideration makes it possible to understand the background as regards the main stakeholders in the area:

- on the one hand residents, the most representative groups being those involved in service industries (mainly in tourism), followed by tradesmen and those employed in industry (mainly construction and timber), farmers etc.;
- on the other hand tourists, who can in turn be grouped into certain main categories, depending on their origin (Italy, Germany, Netherlands, Austria etc.), age group, motivation (spa, nature, food and wine, family/waterside holidays etc.).

Thanks to the liveliness of civil society, most of the local stakeholders are already grouped into associations (cultural, sports, hunting, mountaineering/naturalistic, religious, volunteer workers, business categories etc.), of which there are several hundred in the municipalities involved in the proposed reserve. Furthermore, there are certain

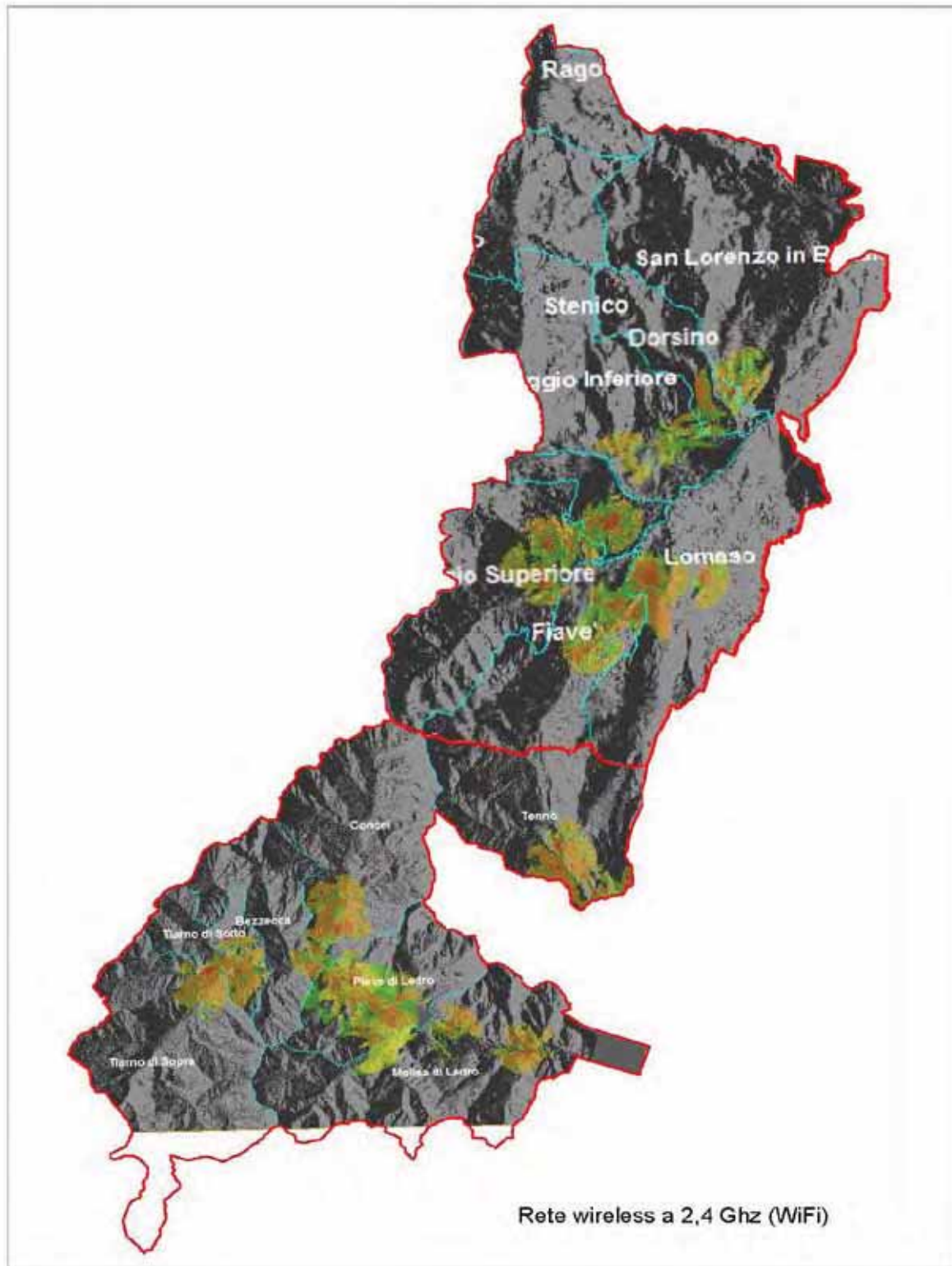
organisations with a broad social base and various other bodies operating in the area which represent important partners in a participatory decision-making process such as the one on which this nomination proposal is based.

All the bodies and organisations operating locally, in addition to the main businesses and all associations recorded in the area, were contacted during the preparatory phase of the nomination process.

The main parties playing a significant role in determining the decisions leading to definition of the objectives of the PBR are listed below. Many of them have an institutional role in the management of the area, while others have acted as go-betweens, bringing their experience in previous participatory processes related to similar planning programmes.

- the PNAB, with experience of participation in relation to the adoption of its own Park Plan, the CETS, the EMAS certification and the Geopark;
- the RR of the Ledro Alps, recently set up with a similar process to that of the MaB;
- the Dolomite and pile-dwelling sites included in the World Heritage List;
- the CdG: with experience of participation in relation to the

- with experience of participation in relation to the drawing up and adoption of the area plan, CETS, EMAS certification and Family Audit, with numerous EMAS certified municipalities and bodies (40%), with 2 of the most beautiful villages in Italy (San Lorenzo and Rango), with two sites recognised by UNESCO (Brenta Dolomites and the Fiavé pile-dwellings) and one TCI orange flag certified municipality (Tenno);
- the CAGL with its initiatives to raise awareness on environmental issues directed above all at schools, with experience of participation in order to set up an agricultural park recognised at provincial level, with the experience related to the Networks of Reserves present in the area (Lower Sarca, Ledro Alps, Monte Baldo), with participatory processes for the creation of an area plan and a social plan for the community, along with the Green Line community project for promotion of the area between the lake and the mountains (project partners: the Veneto and Lombardia regions);
 - tourist offices, with drawing up of strategic plans for tourist promotion;
 - the Judicaria Ecomuseum, which has a cultural and development role;
 - the ASUCs, which collectively manage most of the forests and mountain huts, including pastureland and relative structures (and hence most of the area);
 - the Comano spa, publicly owned, which represents the largest company and source of employment in the Giudicarie Esteriori;
 - the Consorzio Elettrico Industriale in Stenico (CEIS), whose members/beneficiaries are almost all the heads of households in the Giudicarie Esteriori;
- Within the context described above, the role of PNAB and tourist promotion offices is particularly interesting. In order to fulfil their mandate they have carried out surveys into the expectations and perception of the area by the main categories of tourist users as well as local operators.



Distribution of the WIFI network in the proposed BR; the improvement of this aspect, with projects such as the SMART RESERVE, is one of the operational objectives

13.4 What consultation procedure was used for designing the biosphere reserve?

As explained in previous sections, forms of participatory management are a part of the background and customs of the communities living in the area of the proposed reserve. The nomination as a Biosphere Reserve has indeed emerged from previous processes of participatory management in relation to sustainable development projects, which culminate naturally in the MAB

programme.

Below there is a list of players whose activities provide for structured participatory action from the beginning, with informative meetings and participation in agreements or understandings. The roles and areas (C=core, B=buffer, T=transition) in which the activities they carry out are particularly important is specified for each party.

	Conservation role			Development role			Logistical role (research & education)		
	C	B	T		B	T	C	B	T
NR of the Ledro Alps	C	B	T		B	T	C	B	T
Dolomites and pile-dwelling sites included in the World Heritage List					B	T	C	B	T
ABNP Plan	C	B			B	T	C	B	
ECST (ABNP)					B	T	C	B	T
Geopark (ABNP)	C				B	T	C	B	
Tourist offices strategic plans					B	T		B	T
EMAS (CdG, Ledro, Tenno, Fivé and ABNP)					B	T			T
Area Plans for the community (Giudicarie): preliminary document approved on 9/07/2013	C	B	T		B	T		B	T
EC					B	T			T
ASUCs(collective management)					B	T			
Family trademark in Trentino (Giudicarie district)						T			

The “Memorandum of Understanding¹ for the proposed Biosphere Reserve” reinforces and brings together all these different forms of participatory management within a single

framework. With a view to signing the agreement, a series of coordination meetings was organised with the local bodies signing the agreement:

¹ The Memorandum of Understanding is a joint legal document between bodies establishing principles, guidelines, activity programmes and roles; it may regard the development of joint future programmes, as in this case.

Place	Subject	Date
Municipality of Comano Terme	Information regarding the proposed nomination for Mayors and local authorities in the Giudicarie	February-March 2013
Terme di Comano	Introduction of proposed MAB nomination to Municipalities and local bodies	16 April 2013
Trento, APT	Joint meeting between Mayors and the President of APT	20 May 2013
Trento, APT	Joint meeting between Mayors and APT Directorate-General for the Environment	19 June 2013
Trento APT	Joint meeting between Mayors and APT Directorate-General for the Environment	8 July 2013
Trento APT	Joint meeting between Mayors and APT Directorate-General for the Environment	8 July 2013
Municipality of Comano Terme	Joint meeting between Mayors and APT Directorate-General for the Environment	30 July 2013
Municipality of Comano Terme	Meeting between Mayors and signatories to decide on the name and governance	29 August 2013
Municipality of Comano Terme	Final meeting for presentation of the nomination	10 September 2013

Furthermore, in the context of the participatory process linked to the drawing up of the Area Plan for the Comunità delle Giudicarie a series of meetings was organised dedicated to the ‘Ledro Alps -Judicaria UNESCO Biosphere Reserve’, in order to inform and involve stakeholders (present at the round table for consultation on the area plan, made up of 39

representatives of social, economic, cultural and environmental players in the area) and the administrators of the Giudicarie (present at the Conference of 39 Mayors and the Assembly of the Community, made up of 99 members). Specifically, moments dedicated to the Biosphere project were organised at the following meetings:

Place	Subject	Date
Casa delle Comunità delle Giudicarie, Tione	Round table for the area plan of the community (with provincial councillor R. Bombarda presenting the Biosphere Reserve project in detail)	11 March 2013
Casa della Comunità delle Giudicarie, Tione	Round table for the area plan of the community (exchanging ideas on the section 'Networks of Reserves' in the context of the Preliminary Area Planning Document and hence focusing on the Biosphere Reserve)	20 May 2013
Casa della Comunità delle Giudicarie, Tione	Conference of Mayors (to present and discuss the revised draft of the Preliminary Area Planning Document for the Community, also focusing on the Biosphere Reserve)	10 June 2013
Casa della Comunità delle Giudicarie, Tione	Informal assembly of the CdG dedicated to presentation and discussion of the revised draft of the Preliminary Area Planning Document for the Community, also focusing on the Biosphere Reserve)	18 June 2013
Casa della Comunità delle Giudicarie, Tione	Assembly of the CdG (discussion and approval of the Preliminary Area Planning Document for the Community, also focusing on the Biosphere Reserve)	9 July 2013

Various informative and consultation meetings open to the public and/or

the main stakeholder categories were also organised.

Place	Subject	Date
Municipality of Comano Terme	Open meeting with the population and local associations	20 May 2013
Municipality of Tenno	Open meeting with the population and local associations	21 May 2013
Municipality of Ledro	Open meeting with the population and local associations	22 May 2013
Municipality of Fivavé	Open meeting with the population and local associations	1 July 2013
Municipality of S.Lorenzo in Banale	Open meeting with the population and local associations	5 July 2013
Municipality of Stenico	Open meeting with the population and local associations	19 July 2013
Municipality of Bleggio Superiore	Open meeting with the population and local associations	22 July 2013
Municipality of Dorsino	Open meeting with the population and local associations	24 July 2013
Municipality of Fivavé	Open meeting with ASUCs	8 August 2013
Municipality of Ledro	Open meeting with the population and local associations	22 August 2013
Municipality of Stenico	Open meeting with local enterprises	23 August 2013
Comunità di valle dell'Alto Garda e Ledro	Meeting with the assembly of the CAGL	30 August 2013
Municipality of Ledro	Meeting with the municipal council	3 September 2013
Municipality of Tenno	Meeting for municipal councillors from the municipalities in the reserve	3 September 2013
Municipality of Comano	Meeting with representatives of hunting associations	13 September 2013

To conclude, the framework of informative and participatory activities also involved the following initiatives:

- preparation and sending of a newsletter regarding MAB topics and another one regarding the content of the dossier, given to all those living in the area (Annex II);
- presentation of the initiative in the regional TV news programme (RAI3) on 8 May 2013;
- preparation of a special section within the EdJ web site¹ and

activation of links within the web sites of each municipality;

- page on MAB on the magazine of the CdG, sent to all the families in the Giudicarie Valley at the end of August 2013, 16.000 copies distributed, available on the web site²;
- gathering of information regarding interest in the initiative from bodies and parties who may be involved in the future activities of the reserve.

¹ <http://www.dolomiti-garda.it/>, <https://it-it.facebook.com/EcomuseoDellaJudicaria>

² www.comunitadellegiudicarie.it



One of the information evenings at the Municipality of Ledro

In addition to these opportunities for participation, over the last few years the population in the proposed BR has been involved in various participatory processes linked to sustainable local development projects, with objectives very much in line with those pursued by UNESCO's MAB programme. These have been linked to procedures promoted by some of the same bodies proposing the nomination, such as PNAB, for the CETS and the new Park Plan, the Ecomuseum for its various cultural projects, the CdG for its community plan and the Municipality of Ledro in order to set up the Network of Reserves and for the Openloc project. We can undoubtedly affirm that this long phase of participation and cultural growth - which has led these communities to develop mature and aware choices in the

field of sustainable development and management paying attention to biodiversity - prepared the decision to nominate the area as a Biosphere Reserve today. Indeed, considering that this phase has transmitted values and outlined objectives fully compliant with those of the MAB programme, we believe that they represent a preliminary and integral part of the nomination itself.

The tables which follow show how widespread and extensive the consultation of the resident population has been in the last few years.

1) In relation to the new Park Plan, PNAB has organised numerous opportunities for participatory planning, mainly as regards the protection of biodiversity, as summarised briefly below :

Date	Parties involved
07.05.2009	Management Committee
12.05.2009	Staff of the Park
12.05.2009	Administrators of the Park
13.05.2009	Directors of Italian parks: Abruzzo National Park, Prealpi Giulie Nature Park, Beigua Geopark, Regional Park of the Po Delta, Maritime Alps Nature Park
22.06.2009	Former administrators of the Park
06.07.2009	Environmental Associations
06.07.2009	Administrators of the Giudicarie
24.08.2009	ASUCs
25.08.2009	SAT
17-18.09.2009	Socioeconomic players in the area
8-9.10.2009	Administrators of the Val di Non, Val di Sole, Giudicarie tableland, Regole of Spinale and Manez

Park Open Week 19-24.10.2009	<p>Population of "The future park"</p> <ul style="list-style-type: none"> • Tuenno • Caderzone Terme • Ponte Arche • Spormaggiore <p>Special meeting for young people "The park you would like to see"</p> <ul style="list-style-type: none"> • Cles • Spiazzo • Spormaggiore
22.09.2010	Professional categories involved
27. 06.2011	Protectionist associations
31.01.2011	Municipality of Caderzone Terme
02.02.2011	Municipality of Pinzolo
09.02.2011	Municipality of Carisolo
10.02.2011	Municipality of Spiazzo and A.S.U.C.s of Fisto, Borzago, Mortaso
15.02.2011	Municipality of Dorsino, Municipality of Strembo
16.02.2011	Municipality of S. Lorenzo in Banale
22.02.2011	Municipality of Giustino
25.02.2011	Municipality of Bocenago
03.03.2011	Municipality of Molveno
04.03.2011	Municipality of Stenico, Municipality of Comano Terme, A.S.U.C. of Stenico
09.03.2011	Municipality of Ragoli, Municipality of Montagne, Regole of Spinale and Manez

2) For the revalidation of the CETS, the PNAB also set up a participatory process through specific area forums to plan the development of sustainable tourism in the park area.

The calendar of area forums is given below:

Area	Working dinner	1 st Forum	2 nd Forum	3 rd Forum
Val di Non area	23/06/2010	14/07/2010	28/07/2010	06/09/2010
Val di Sole, Val Rendena, Giudicarie Centrali and Val del Chiese areas	05/05/2011	27/05/2011	08/06/2011	23/06/2011
Giudicarie Esteriori area	06/05/2011	26/05/2011	10/06/2011	22/06/2011

3) In addition to meetings dealing with the specific subject of the Biosphere Reserve, already mentioned above, in the context of the participatory process for the PTC of the CdG numerous other meetings took place

with the population, discussing subjects similar to those regarding the Biosphere Reserve, in relation to sustainable local development, the landscape and the Network of Reserves.

DATE	THEMES
01.09.2011 to 30.11.2011	Consultation with the area by Unitn DISA to draw up the "Analysis to support the Preliminary Document for the Area Plan of the Community"
17.01.2012	Presentation of the results of the Unitn "Analysis to support the Preliminary Document for the Area Plan of the Community" to the Conference of Mayors of the CdG
19.01.2012	Presentation of the results of the Unitn "Analysis to support the Preliminary Document for the Area Plan of the Community" to the assembly of the CdG (item 4 on the agenda)
10.12.2012	Meeting of Network of Reserves (CdG, Sarca BIM)
21.12.2012	Conference of Mayors on the Network of Reserves
14.01.2013	Meeting of the Network of Reserves (CdG, Sarca BIM)
21.01.2013 to 26.01.2013	Seminar/Workshop on "rejected landscapes", organised in collaboration with Unitn, Tall and GreentrenDesign
04.02.2013	Meeting with Mayors on operational proposals for the creation of the Sarca River Park
11.03.2013	Second meeting of the PTC Giudicarie board (presentation by Bombarda)
21.03.2013	Meeting with municipalities, reps. of municipalities and the council of the CdG on the DP draft
28.03.2013	Meeting of the Network of Reserves
08.04.2013	Meeting of the Network of Reserves (CdG, Sarca BIM)
19.04.2013	Conference on tourism with Prof. Umberto Martini from Unitn
23.04.2013	Meeting of the Network of Reserves (CdG, ABNP, Sarca BIM)
09.05.2013	Meeting with neighbouring CdVs on our invitation to discuss DP policy
20.05.2013	Seventh meeting of the PTC Giudicarie board + presentation of the section on the Network of Reserves
03.06.2013	Meeting of the Network of Reserves with Mayors representing the Sarca valley



The Giudicarie Esteriori represent the home of cooperative activities in the region; the cooperative itinerary is an initiative of the Associazione Pro Ecomuseo

4) The Judicaria Ecomuseum organised numerous initiatives involving active participation and training on aspects relating to the landscape and cultural identity:

Date	Event	Description
Apr-July 2010 5 meetings and trip	Participatory landscape project	training programme for young people in the valley concluding with a 2 day trip to Strasbourg last September
March-May 2010 6 meetings	Community School	a course directed at young people to construct the area community of the future together. The objective is the involvement of young people in the valley, with a view to seeking new opportunities to be developed subsequently, both in economic terms and as regards employment
Nov-Dec 2010 7 meetings	Community maps	an instrument with which local inhabitants represent their heritage, landscape, knowledge and local flavours, with a new concept of the area as a place conserving the history of the people who have lived there and transformed it in the past
19/11/2011	Public meeting on the subject of the landscape	Teatro don Bosco in P.Arche
2011 3 meetings	Environmental project for sustainable development	Itineraries accompanied by local guides from the area, to get to know the most interesting naturalistic and cultural aspects of the Ecomuseum
Feb-March 2012 3 meetings	Joining and participation at various meetings on the Sy-Cultour European project	Synergy between agriculture and rural tourism promoted by PAT
May-June 2012 3 meetings	Promotion of itineraries to get to know the area, landscape and local products	
Feb-May 2013 5 meetings	Map of the landscape and the agricultural products of the Ecomuseum	To inform residents, visitors and tourists about the wealth of our rural landscape and the variety of agricultural products from our area

5) In the context of the setting up of the Network of Reserves, the Municipality of Ledro organised numerous meetings with associations and residents, along with

technical meetings with the public administration.

The table below gives the calendar of the main meetings held.

Date	Parties present	Scope
23 July 2012	Ledro Hunters' Association	Preliminary information, gathering of observations
30 July 2012	Local associations from Ledro	Preliminary information, gathering of observations
3 August 2012	Storo and Bondone Hunters' Association	Preliminary information, gathering of observations
3 August 2012	Local associations from Storo and Bondone	Preliminary information, gathering of observations
15 November 2012	Local associations from Ledro	Information on the final draft
7 December 2012	Public ownership bodies, CAGL and BIM	Discussion of the final document

6) Finally, numerous meetings were held in the context of the Openloc

project, promoted by APT and the Municipality of Ledro:

Date	Activities
From 01.10.2008 to 30.09.2011	Series of 5 meetings with the population
2010	Interviews and questionnaires regarding the services offered by the landscape with around 300 people
16 / 17.12.2011	"Ledro in the future" conference – using "Open Space Technology"

13.5 How will stakeholder involvement in implementing and managing the biosphere reserve be fostered?

Participatory activities will not cease with presentation of the nomination. The cycle of meetings is expected to continue, according to the following schedule:

- Autumn 2013: public meetings at municipal level to provide information about the content of the nomination dossier and other cultural events;
- Autumn 2013 – Winter 2014: meetings with representative associations (farming, tourism, forestry associations) to begin to establish sector programmes aimed at drawing up a Management Plan for the Biosphere Reserve;
- Autumn 2013 – Winter 2014: meetings with local bodies (ASUCs, BIM, RR, EdJ) to begin to establish sector programmes aimed at drawing up a Management Plan for the Biosphere Reserve;
- Autumn 2013 – Winter 2014: meetings with local authorities to begin to establish sector programmes aimed at a MAB Management Plan, also in relation to new and existing sector funding instruments (PSR, PAT funds for sustainable development);
- Summer 2014: meetings with local authorities to provide information

on the result of the nomination procedure.

Furthermore, the previously mentioned Memorandum of Understanding encourages the continuation of participatory management activities in the context of the future Biosphere Reserve. To ensure the participation of stakeholders in decision-making processes in the phases of drawing up and subsequently implementing the future Management Plan for the reserve, the setting up of one or more permanent area forums has been provided for, to support a working group (organs of governance with a consultative role – see section 4.7). Furthermore, forums may be set up before the starting up of specific programmes, on the lines of those implemented by CETS and RR. These specific forums are aimed at providing information about initiatives underway, raising awareness and actively involving the participants in gathering ideas. The meetings will be held in the area by organisations specialized in the implementation of participatory processes and are organised for segments of society on the basis of their characteristics. They generally organize an introductory meeting followed by 1-2 meetings to exchange ideas and gather requests.

13.6 What are the expected main sources of resources (financial, material and human) to implement the objectives of the biosphere reserve and projects within it?

The budget can cover three types of expenditure:

1. Ordinary expenditure for the running of the Biosphere Reserve (see section 17.4.11 - joint funding by all the signatories is provided for);
2. Extraordinary expenditure for the management plan and special projects, such as implementation of the management plan (e.g. EMAS, CETS, conservation action outside the SIC, creation of infrastructures, dissemination). These costs will be funded using special funds (community, national or provincial funds). As regards this, it will be proposed that the new PSR gives precedence and a majority of incentives to action falling within the Biosphere Reserve. The division of joint funding will be decided according to the rules to be established in the Programme Agreement. A specific formal reference to joint funding can be found in article 2 of the Memorandum of Understanding, signed by all the proposers on 6 September 2013 (Annex 3.01), which also provides for a Programme Agreement, which must establish, among other things, the programme of activities

for the first three years and the financial commitment, with the relative division of expenditure.

3. In addition to these two main types of expenditure, it is believed that resources related to activities already provided for by different signatories (PAT, valley communities, PNAB, tourist offices, RR, BIM), which are particularly relevant to the scope of the reserve activities, can also be included among the resources (human, material and financial) aimed at implementing the objectives of the Biosphere Reserve and can therefore be attributed to the budget of the Biosphere Reserve. For example, the sustainable mobility projects promoted by Comano tourist office, projects supporting alternative forms of energy promoted by the BIM, or sustainable tourism projects planned in the context of PNAB's CETS, undoubtedly in line with the objectives of the proposed Biosphere Reserve, on the one hand contribute towards implementing the strategy of the MAB programme and at the same time can benefit in promotional terms from being publicised as coherent with the strategy of the

proposed Biosphere Reserve. This is also valid for environmental education, an area in which the reserve can play a coordinating/ managing role for activities normally carried out by PNAB, APPA, RR and the Ecomuseum. As regards scientific research activities, the Biosphere Reserve will orient activities normally undertaken by PNAB, MUSE, APPA and other research institutes and already directed at objectives in line with those of the Biosphere Reserve, seeking to direct them

towards the objectives established by the plan. Other activities in the sector may be funded specifically through the provincial fund for research and by PSR funds in the case of areas included within SICs. Finally, tourist promotion within the reserve will also make use of the instruments available through tourist offices and the tourist consortium in the Val di Ledro, organisations which will clearly have every interest in highlighting the fact that the area is a Biosphere Reserve.



14. CONSERVATION FUNCTION

14.1. At the level of landscapes and ecosystems (including soils, water and climate)

14.1.1 Describe and give the location of ecosystems and/or land cover types of the biosphere reserve

The distribution of the vegetation series characterising the area is shown in the map in section 11.6, which also gives a description of the corresponding vegetation units. For SICs the distribution of

Natura 2000 habitats is known cartographically with a precision of over 1:10.000.

It is pointed out that there is a considerable diversity of environments within the proposed Biosphere Reserve, with 32 Natura 2000 habitats, of which 7 classified as priorities and no less than 15 present in the Trentino Red List.

32 Habitat types (*sensu* Natura 2000)

22% of habitats are classified as priorities
(4070*, 6210*, 6230*, 8240*, 9180*, 91E0*, 6110*)

47% of habitats are listed (CR, EN, VU) in the Trentino Red List of Habitats

The inclusion of the individual habitats in the list of priorities for conservation or the European, national or regional Red Lists (EU Directive 92/43/CEE,

Ministry of Environment & WWF 2005, Lasen 2006) is an indication of the level of the threat to which the habitats are subjected.

Habitat		Nat.2000 priority	Trentino Red List	National Red List
4070	Bushes with <i>Pinus mugo</i> and <i>Rhododendron hirsutum</i> (<i>Mugo-Rhododendretum hirsuti</i>)	yes	/	low
6110	Rupicolous calcareous or basophilic grasslands of the <i>Alyso-Sedion albi</i>	yes	CR	low
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>)	yes	EN/CR	low
6230	Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)	yes	LR	low
8240	Limestone pavements	yes	EN	low
9180	<i>Tilio-Acerion</i> forests of slopes, screes and ravines	yes	VU	low
91E0	Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)	yes	VU/EN	high

3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	no	CR	high
4080	Sub-Arctic Salix spp. scrub	no	CR	/
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation	no	EN	medium
3240	Alpine rivers and their ligneous vegetation with Salix eleagnos	no	EN	low
6410	Molinia meadows on calcareous, peaty or clayey-siltladen soils (Molinion caeruleae)	no	EN	high
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	no	EN	medium
6520	Mountain hay meadows	no	EN	low
7140	Transition mires and quaking bogs	no	EN	medium-high
7230	Alkaline fens	no	EN	high



The Ampola peat bog near Ledro: a concentration of mountain grasslands, wooded slopes, low peat bog and eutrophic lakes

At local level the threat can be further assessed by comparing the actual diffusion of the habitat with its potential diffusion, by cross-referencing the vegetation map with the land use map.

It may be noted that of forestry type vegetation, only mesophile and hygrophilous broad-leaved trees typical of cool valley floors have seen a marked reduction, due to their substitution with relatively extensive or intensive farming areas (fertile arable zones).

Semi-natural habitats, of great interest for the purposes of conserving biodiversity, instead involve lowland/ dry grasslands or marginal agricultural areas, in the context of forestry formations widespread on the slopes.

14.1.2 Describe the state and trends of the ecosystems and/or land cover types described above and the natural and human drivers of the trends

The following table shows the current

trend for ecosystems (vegetation series) and the main “drivers” that will be taken into consideration in preparing the Management Plan for the Reserve.

SERIE S CODE	VEGETATION SERIES	TREND	HUMAN DRIVERS	NATURAL DRIVERS
5	Central-western basophilic alpine geosigmetum of primary high-mountain vegetation	Generally stable (negative for former mowing meadows at high altitude)	Changes in traditional practices, abandoning of mowing high in the mountains and limited or badly distributed grazing, entry of nitrophilous species	Climate change, with effects extending to all types of vegetation, but particularly clear in vegetation at high altitude
13	Central-eastern basophilic alpine series of bushes with mountain pine with scattered sparse forests of Swiss pine and larch	Stable	Ecosystem not subject to significant pressure, except for local bush clearing for grazing and/or hunting purposes	In stable conditions, natural trend towards forest coenosis
34	Central alpine acidophilous series of beech	Stable	Ecosystem not subject to significant pressure	Stable communities but limited to a small area
51	Eastern alpine basophilic series of beech	Stable (positive)	Ecosystem subject to progressive improvement in management (structure and composition)	Stable communities
86	Central-eastern neutrobasophilic alpine series of European ash (<i>Fraxino excelsioris sigmetum s.l.</i>) Also includes humid valley floor grasslands	Negative	Historic substitution of woods with crop cultivation areas, selective felling of valuable broad-leaved trees, introduction of conifer trees, diffusion of invasive allochthonous species, changes to water conditions caused by man, banalisation due to intensive fertilisation (particularly sewage), intensification of crop cultivation practices, bush/wood cover as a result of ceasing or reducing use, under or overseeding carried out with selected species or non-local ecotypes	Azonal woods, stable when conditions remain the same; very delicate humid grasslands, strongly dependent on management. Variations in the level of the aquifer

10b	Central-western acidophilous endalpic geosigmetum of low bushes and larch-Swiss pine woods	Positive	evolution of biocoenosis due to the abandoning of traditional practices, bush clearing for grazing and/or hunting purposes	Natural trend towards forest, at altitudes below the wood line
14a	Eastern basophilic alpine series of spruce. Also includes secondary grasslands and pasture	Essentially stable, slightly negative for secondary grasslands	Alteration of the secondary wood/grassland mosaic due to the abandoning of grazing systems, limited or poorly distributed grazing	Forests are stable ecosystems. In the absence of management practices, secondary grasslands naturally evolve into woods
50a	Eastern basophilic prealpine series of beech and spruce. Also includes mountain hay meadows and dry meadows	Essentially stable, ma negative for secondary grasslands	Alteration of the secondary wood/grassland mosaic due to the abandoning of grazing systems. Bush/wood cover as a result of ceasing or reducing use, abandoning of traditional mowing practices. Banalisation of valley floor grasslands due to intensive fertilisation (particularly sewage), under or overseeding carried out with selected species or non-local ecotypes. Invasion of allochthonous species in marginal wooded areas	Forests are stable ecosystems. Climate change can lead to compositional changes in woods. In the absence of management practices, secondary grasslands naturally evolve into woods
TRANSVERSAL HYGROPHILOUS VEGETATION		Historically negative, currently recovering. Some critical aspects remain	Pollution/removal of surface waters, increase in trophic levels, introduction of fish fauna, presence of dams, embankments, weirs and other constructions, diffusion of invasive allochthonous plant species	Progressive infilling of lakes, flooding
TRANSVERSAL PEATLAND VEGETATION		Historically negative, currently subject rigorous protection	Changes to water conditions caused by man with reclamation and drainage activities, pollution of surface waters, entry of nitrophilous species	Progressive infilling and consequential trend towards forestation

The PBR area includes a mosaic of habitats with different levels of conservation; from perfectly intact natural habitats at high altitude (culminating in the rocky pinnacles and peaks of the Brenta Dolomites, reaching a maximum altitude of 3,173 m a.s.l.), to semi-natural habitats with traditional management by man (lowland meadows and pasture), agricultural areas and human settlements.

Dolomitic environments at high altitude are generally very well conserved, given their extremely natural nature. The factors most influencing their state of conservation are considered to be natural catastrophes (landslides, avalanches etc) and climate change at global level, which leads to “shifting altitudes” for bands of vegetation, to the detriment of habitats on mountain

peaks.

The central and most dynamic “junction” for ecosystems is represented by semi-natural habitats, created and shaped by traditional usage and which require active management to conserve their essential characteristics. The crisis in the traditional socioeconomic model often leads to the disappearance of semi-natural habitats, which precisely for this reason are of primary conservation interest. Some areas experience abandonment and spontaneous reforestation. Other areas are converted to more intensive management methods. The ecosystems most strongly influenced by the intervention of man are therefore subject to various forms of deterioration, which result from changing methods for managing the area.



Limestone pavement on carbonate rock in the Ledro area, a priority habitat according to the EU

14.1.3 What kind of protection regimes (including customary and traditional) exist for the core area(s) and the buffer zone(s)?

The whole of the Judicaria and Ledro Reserve is subject to provincial or municipal planning restrictions:

- The Piano Urbanistico Provinciale (PUP, provincial planning scheme) determines aspects relating to landscape, hydrogeological, land use and cultivation restrictions, with maps and regulations;
- The plans of the valley communities (currently being drawn up) and general regulatory plans of the municipalities refer to the PUP, providing detailed indications at municipal level in relation to planning and development;
- Management of forests and

mountains, watercourses and protected areas (Provincial law no. 11 of 23-05-2007), framework law on forestry management and protected areas.

The central and southern buffer zones, when not included within protected areas, are also partially included in the “Network of Reserves of the Ledro Alps”, with the implementation of the regulatory instrument introduced with the provincial law on forests and nature protection (LP. 11/2007).

There are also several protected areas at various points in the proposed reserve (set up according to local or national laws or European directives), distributed within the zones as shown in the following tables:



The Fiavè peat bog, an example of active protection with intervention to keep surfaces open and water free, otherwise tending to evolve towards woodland

NORTHERN CORE AREA		
BRENTA DOLOMITES		
<p>This is one of the most majestic Dolomitic mountain ranges, with a flora rich in endemic species and differentiated vegetation in the individual valleys.</p> <p>The Brenta Dolomites are the ninth and last of the Dolomitic ranges to be recognised for inclusion in the UNESCO World Heritage Site. Significant presence of differences in vertical level, peaks over 3000 m and bare rock. (aesthetic-landscape criterion). High level of intrinsic and extrinsic geodiversity: typical Dolomitic landscape shaped by the climate and tectonic and structural movement. Extensive karst phenomena. (Geological-geomorphological criteria)</p>		
Zoning inclusion	Protection regimes	Legislation
Core area totally included in the protected site	SCI IT3120177; SPA IT3120159; Provincial Nature Park (PNAB)	Council Directive 92/43/EEC Council Directive 79/409/EEC L.P. 11/07

CENTRAL CORE AREA		
PICHEA-ROCCETTA RIDGE		
<p>Extensive and valuable presence of endemic plant species; it is significant that many plants with a distribution area centring on the Lombard alpine foothills here reach their eastern distribution limit. The central growing area of <i>Hypochoeris facchiniana</i> is found within the site. Pass of international interest for the medium-long range transit of migrating birdlife in the late summer and autumn (post-reproductive migration).</p>		
Zoning inclusion	Protection regimes	Legislation
Core area totally included in the protected site	SCI/SPA IT3120093	Council Directive 92/43/EEC Council Directive 79/409/EEC

SOUTHERN CORE AREA		
BOCCA DI CASET		
<p>The effects of the peak and deforestation in the past have allowed the establishment of grasslands (Sesleria), partly rocky, rich in endemic westerly-based plant species. Bocca di Caset represents the most important pass in the Trentino alpine foothills in relation to the passage of migrating birds.</p>		
Zoning inclusion	Protection regimes	Legislation
Core area totally included in the protected site	SCI/SPA IT3120096	Council Directive 92/43/EEC Council Directive 79/409/EEC

NORTHERN BUFFER ZONE		
BRENTA DOLOMITES		
This is one of the most majestic Dolomitic mountain ranges, with flora rich in endemic species and differentiated vegetation in the individual valleys.		
Zoning inclusion	Protection regimes	Legislation
Much of the buffer zone is included in the protected site; a smaller part is outside the park area (and the relative SIC/ZPSs)	SIC IT3120177; ZPS IT3120159; Provincial Nature Park (PNAB)	Council Directive 92/43/EEC Council Directive 79/409/EEC L.P. 11/07

CENTRAL BUFFER ZONE		
SLOPES AROUND THE PICHEA-ROCCHETTA RIDGE		
Zoning inclusion	Protection regimes	Legislation
Buffer zone included in the NR of the Ledro Alps	Provincial legislation	LP. 11/2007

SOUTHERN BUFFER ZONE		
TREMALZO AND TOMBEA MOUNTAINS		
Site of extraordinary interest in terms of flora, due to the exceptional concentration of endemic species, known throughout Europe and a compulsory destination for botanical excursions. Wild environments little affected by man are still frequent. The site is of considerable national and/or provincial interest due to the presence and reproduction of animal species at threat of extinction and important glacial relicts, exclusive to and/or typical of the Alps.		
Zoning inclusion	Protection regimes	Legislation
Much of the buffer zone is included in the protected site; a smaller part is included in the NR of the Ledro Alps	SCI IT3120127	Council Directive 92/43/EEC
STORO AND BONDONE ALPS		
Area of international interest for the medium-long range transit of many migrating species in the late summer and autumn (post-reproductive migration).		
Zoning inclusion	Protection regimes	Legislation
Buffer zone totally included in the protected site	SCI/SPA IT3120094	Council Directive 92/43/EEC Council Directive 79/409/EEC

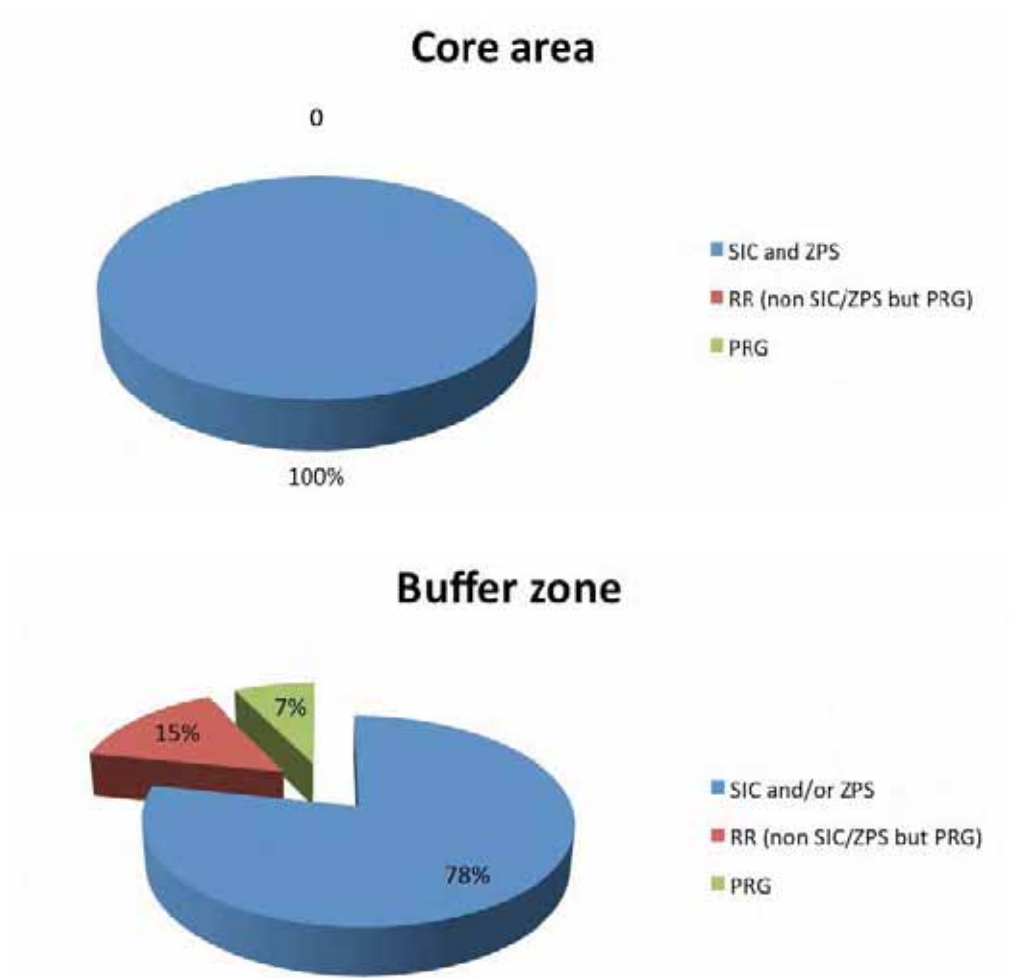
Finally, we highlight other forms of protection/recognition for sub-areas

present in the Transition Zone of the reserve:

TRANSITION ZONE		
FAIVÉ		
A large, precious peatland area, it is also renowned for its important archaeological heritage, in addition to natural aspects. Indeed, significant pile-dwellings settlements have been found here, making this area an archaeological site of international importance.		
Zoning inclusion	Protection regimes	Legislation
Transition zone partially included in the protected site	SCI IT3120068; Provincial Nature Reserve.	Council Directive 92/43/EEC L.P. 11/07
LOMASONA		
Large wetland area covering almost the whole valley floor of Val Lomasone, a glacial valley that opens out onto the plain of Campo Lomaso. It is a large humid grassland area, interrupted here and there by small channels and occasional pools.		
Zoning inclusion	Protection regimes	Legislation
Transition zone partially included in the protected site	SCI IT3120069; Provincial Nature Reserve; Local reserve.	Council Directive 92/43/EEC L.P. 11/07
LAKE AMPOLA		
Exceptional lake environment, with the complete vegetation series, situated in a gorge. The site is also of considerable importance for the nesting, stopping off and/or overwintering of protected or rapidly declining species of bird, and/or birdlife with local distribution in the Alps. Presence of invertebrates in Annex II indicating a high level of naturalness for running waters.		
Zoning inclusion	Protection regimes	Legislation
Transition zone partially included in the protected site	SCI IT3120076; Provincial Nature Reserve	Council Directive 92/43/EEC L.P. 11/07

To summarise, the core areas are entirely included within protected areas classified as SIC/ZPSs, subject to Council Directives 92/43/EEC and 79/409/EEC. Inclusion in an SIC/ZPS offers a strong guarantee that an adequate state of conservation for the habitats in the core areas will

be maintained. Around 78% of the Buffer Zones are included in SIC areas or SIC/ZPSs, subject to Council Directives, 15% are included in the Network of Reserves of the Ledro Alps and only the remaining 7% are subject exclusively to provincial laws, covering the whole of PAT's territory.



The distribution of “forms of protection” within the core areas and buffer zones

14.1.4 Which indicators or data are used to assess the efficiency of the actions/ strategy used?

At the beginning of the new millennium an extensive project for the mapping of habitats (according to Natura 2000) was started up within SIC and ZPS areas throughout Trentino. The project provided for the detailed location of habitats on a 1:10.000 scale, and assessment of their state of conservation and the main pressures underway for each habitat and site. The monitoring provides for periodic comparison of surface areas and state of conservation.

Forestry habitats are also subject to management planning (forest systems) with periodic inventories which establish the state and evolution of various parameters including composition, biomass, structure and the effect of management practices.

Since the beginning of the millennium numerous species have been the object of detailed investigative surveys and subsequent monitoring by PAT's Biotope Office, complying with European directives regarding the Natura 2000 network. These studies include:

- periodic monitoring of birdlife linked to the Fiavé, Lomasona and Ampola peat bog;
- monitoring of spring migration of amphibians in the Fiavé peat bog
- survey of the presence of the white-clawed crayfish;

- annual census of high mountain galliformes (rock partridge, black grouse, wood grouse).

Inside the PNAB, following the detailed inventory and mapping of a series of species in the Red List, periodic monitoring was started up (1-5-10 years depending on the species) with reference to the location and size of the populations initially subjected to the census.

As regards birdlife, the Bocca di Caset ZPS site (core area in the south of the reserve) is the headquarters for ringing and census activities for migrating species in the post-reproductive period; since around 20 years this survey has been carried out by MUSE in a continuative manner from 20 August to 20 October every year.

Another initiative is annual surveying of the state of the glaciers present, in terms of area, length of the terminal tongues and thickness of the ice, carried out by the SAT Glaciological Commission; the first systematic surveys of all the glaciers in the area date back to 1989.



Bocca di Caset migratory pass



***Physophlexis comosa*,
a showy species
growing on carbonate
and Dolomitic rock**

14.2 At the level of species and ecosystem diversity

14.2.1 Identify main groups of species or species of particular interest for the conservation objectives, especially those that are endemic to this biosphere reserve, and provide a brief description of the communities in which they occur

Widespread environmental quality and the permeability of the ecological network, still well conserved, are the basis of the reappearance in the area of large carnivores, already extinct elsewhere. This is linked to the extensive and essentially intact environments in the area. In this context one needs only consider frequentation of the area by the brown bear (this zone representing an important area of expansion from the PNAB towards the south), the ascertained presence of the lynx and the very recent reappearance (albeit not systematic for the moment) of the wolf.

Similarly, the role of the area as an open “door” between the Alps and the sub-Mediterranean environment is proved by the high level of diversity in terms of flora, of great importance above all as regards the number of local endemic species, making the Giudicarie and Ledro area one of the richest in the Alps in terms of valuable flora. There are exclusive



Saxifraga tombeanensis, an endemic species in the Ledro area, takes its name from Monte Tombea, situated along the southern frontier of the proposed BR

and very precious species, some of which are “famous”, such as *Saxifraga tombeanensis* (clearly named with reference to Monte Tombea, present at the southern edge of the area), *Daphne petraea* (both in Annex II, Dir. 92/43/CEE) or *Gentiana brentae* (a new species for science, described by the researchers of the Museo Civico in Rovereto in 2008).

Below we deal with the main species of flora and fauna of interest in terms of conservation. For further details see the annexes 5.1 and 5.2.

FLORA

The position of the PBR, close to the southern edge of the Alps, straddling the Po plain, makes it particularly interesting in terms of flora. Indeed, the peak in stenoendemic species is reached in the central alpine foothills, in the area on the frontier between Lombardia and Trentino.

The area of the proposed Judicaria and Ledro Reserve can boast the presence of no less than 34 steno-endemic species, listed in the following table. Only those indicated in at least

10 alpine provinces, according to Flora Alpina (Aeschimann et al. 2004 and subsequent findings) were taken into consideration in the steno-endemic category.

Specie	Distribution
<i>Nigritella buschmanniae</i>	Trentino
<i>Gentiana brentae</i>	Trentino
<i>Festuca austrodolomitica</i>	Trentino
<i>Erysimum sylvestre</i> subsp. <i>aurantiacum</i>	Trentino
<i>Aquilegia thalictrifolia</i>	Trentino, Lombardia
<i>Centaurea rhaetica</i>	Trentino, Lombardia
<i>Daphne petraea</i>	Trentino, Lombardia
<i>Daphne reichsteinii</i>	Trentino, Lombardia
<i>Euphorbia variabilis</i>	Trentino, Lombardia
<i>Gentianella engadinensis</i>	Trentino, Lombardia
<i>Laserpitium nitidum</i>	Trentino, Lombardia
<i>Ranunculus bilobus</i>	Trentino, Lombardia
<i>Saxifraga arachnoidea</i>	Trentino, Lombardia
<i>Scabiosa vestina</i>	Trentino, Lombardia
<i>Silene elisabethae</i>	Trentino, Lombardia
<i>Telekia speciosissima</i>	Trentino, Lombardia
<i>Viola dubyana</i>	Trentino, Lombardia
<i>Carex baldensis</i>	Central-Eastern Alps
<i>Crepis froelichiana</i>	Central-Eastern Alps
<i>Dianthus monspessulanus</i> subsp. <i>waldsteinii</i>	Central-Eastern Alps
<i>Draba dolomitica</i>	Central-Eastern Alps
<i>Euphrasia tricuspidata</i>	Central-Eastern Alps
<i>Festuca alpestris</i>	Central-Eastern Alps
<i>Galium baldense</i>	Central-Eastern Alps
<i>Hypochoeris facchiniana</i>	Central-Eastern Alps
<i>Knautia baldensis</i>	Central-Eastern Alps
<i>Knautia persicina</i>	Central-Eastern Alps
<i>Knautia velutina</i>	Central-Eastern Alps
<i>Moehringia glaucovirens</i>	Central-Eastern Alps
<i>Primula spectabilis</i>	Central-Eastern Alps
<i>Ranunculus venetus</i>	Central-Eastern Alps
<i>Saxifraga tombeanensis</i>	Central-Eastern Alps
<i>Achillea oxyloba</i>	Alps
<i>Androsace vitaliana</i>	Alps

Fig. 14.2 The European freshwater crayfish (*Austropotamobius pallipes italicus*), is one of the species with the greatest need for conservation

FAUNA

Invertebrates

There are numerous species of invertebrates of interest in terms of conservation due to their rarity and inclusion in international directives, among which we can cite the *Austropotamobius pallipes* and the *Vertigo angustior*.

The white-clawed crayfish (*Austropotamobius pallipes italicus*) is an endemic species whose preferred habitat includes small hollows with clear, running, fresh, well-oxygenated waters of good quality, with beds of rock, gravel, sand and leaves and branches, preferably in the hills and mountains. The area of the reserve offers various zones suitable for the white-clawed crayfish, and there

are several population groups at the springs or along the initial stretches of the watercourses.

This species, present in Annex II of Dir. 92/43/CEE, is of considerable importance as a bio-indicator and is considered to be at risk of extinction (IUCN – EN). The considerable reduction in its population in the last few decades can be attributed mainly to pollution and alteration of the waters, along with direct persecution by man, as it is an edible species. The accidental introduction of the spiny cheek crayfish (*Orconectes limosus*), an exotic species of American origin, has recently led to a further reduction in the population of the local crayfish, due to strong competition between the two species.



Austropotamobius pallipes

Herpetofauna

In the Judicaria and Ledro reserve there is a relatively significant presence of herpetofauna: the most widespread species of amphibians are the common toad (*Bufo bufo*), edible frog (*Rana esculenta*), common frog (*Rana temporaria*), fire salamander (*Salamandra salamandra*) and the agile frog (*Rana dalmatina*), present in Annex IV of the Habitat Directive. The European green toad (*Bufo viridis*), a typical lowland species, also present in Annex IV of the Habitat Directive, the alpine newt (*Triturus alpestris*) and the yellow-bellied toad (*Bombina variegata*) are also less frequently present.

Three sub-species of alpine newt (*Triturus alpestris*) are present in Italy. It is widespread throughout the alpine

area, but its distribution is continuous only in the eastern part, whereas it is very fragmentary in the west. Although at national level this species is considered to be at low risk of extinction, there are specific situations with isolated populations and extremely localised distribution. The alpine newt is generally considered to be the most aquatic of the Italian newts and is capable of occupying varied types of aquatic environments of modest size, also at relatively high altitude.

Of the reptiles, the common wall lizard (*Podarcis muralis*) is common in wooded areas, while the viviparous lizard (*Zootoca vivipara*) is rarely found in subalpine areas. The striking western green lizard (*Lacerta bilineata*), found in the west, here reaches the



Triturus alpestris

The alpine newt (*Triturus alpestris*), found in the Fiavé peat bog

eastern edge of its distribution area and usually frequents open and sunny habitats. In the glades and on the edge of woods the slow worm (*Anguis fragilis*), a limbless snake-like reptile, can sometimes be seen. Of the snakes, the most frequently present are the green whip snake (*Coluber viridiflavus*), which preys on lizards, the Aesculapian snake (*Elaphe longissima*) and the grass snake (*Natrix natrix*); the dice snake (*Natrix tessellata*), a strictly aquatic species, and the asp viper (*Vipera aspis*) are found less frequently. There are four species of reptiles listed in Annex IV of the Habitat Directive in the reserve: *Coluber viridiflavus*, *Natrix tessellata*, *Elaphe longissima* and *Coronella austriaca*.

Mammals

Of the mammals, the most significant species found within the reserve is certainly the bear (*Ursus arctos*). Persecuted with every means for centuries, the bear was confined to a restricted area of western Trentino,

which became the Adamello Brenta Nature Park also in order to protect the species.

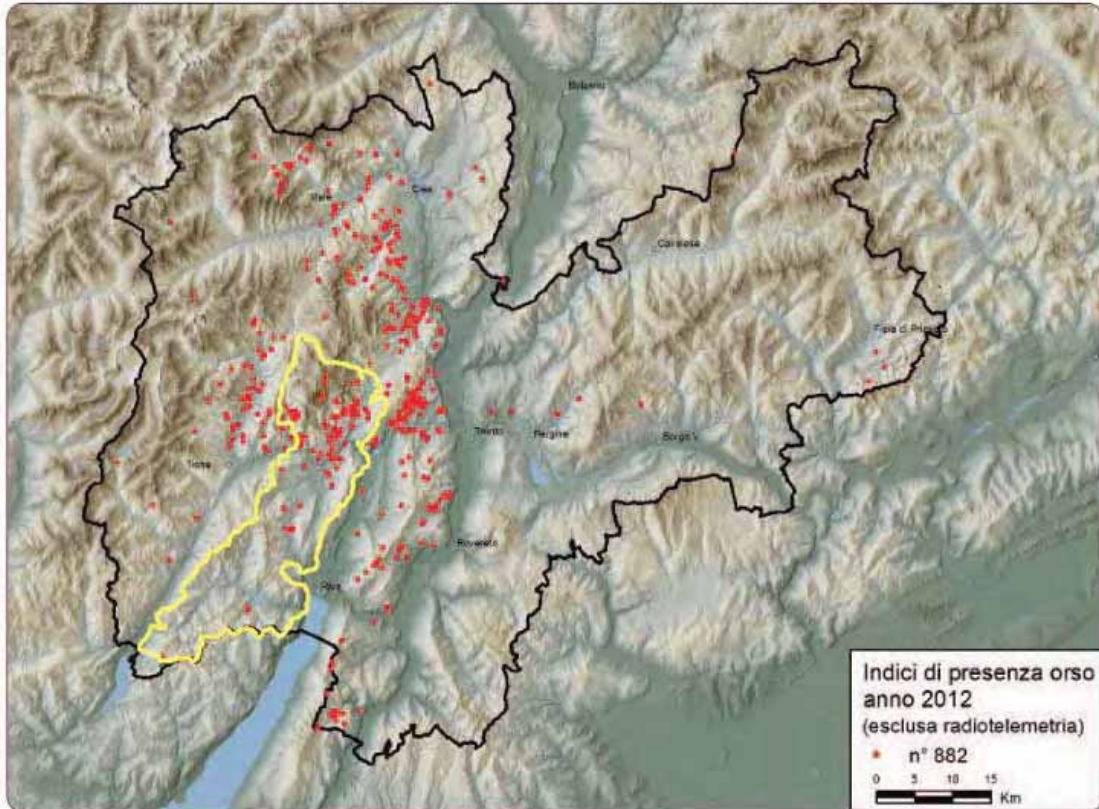
In order to avoid the imminent extinction of the bear, in 1996 the park started up the "Life Ursus" project for its reintroduction. Between 1999 and 2002 10 brown bears were released, adapting well to their new environment and giving rise to a population of over 30 bears today in the Central Alps.

The area of the reserve represents a possible expansion corridor for the bear towards the south.

The only lynx (*Lynx linx*) certainly present in the province of Trento starting from 2008 (the male known as B132) comes from the small Swiss population in the S. Gallo canton. The following figure shows its movements in 2012, mainly within the reserve area. B132 is currently the only animal whose presence has been ascertained in Trentino.



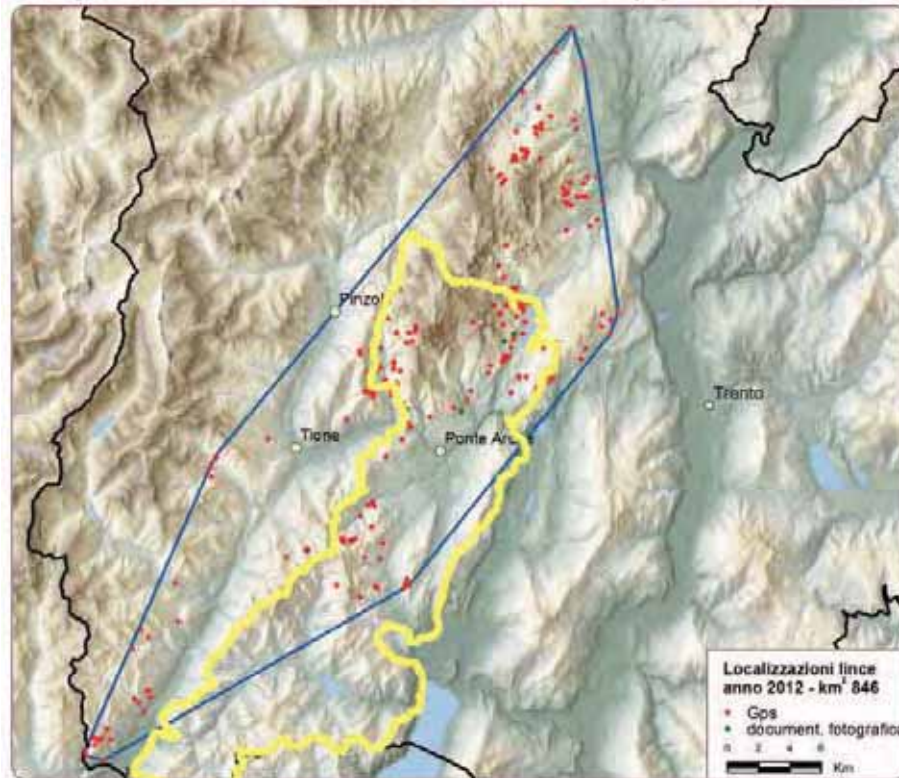
Barbastella barbastellus, a bat which is strictly protected



*Watch out for bear (*Ursus arctos*) in 2012 year*



*The brown bear of the Alps (*Ursus arctos*), a species symbolising the ABNP*



*Watch out for linx (*Lynx lynx*) in 2012 year*



*The lynx (*Lynx lynx*), one of the large carnivores in the Alps*

Birdlife

The area defined by the confines of the reserve is home to a large number of protected non-migratory (14) and migratory (93) species, giving rise to the setting up of the different Special Protection Areas.

Around 37 species included in Annex I of the 79/409/CEE Birds Directive have been recorded in the area, of which 9 non-migratory, including: the eagle (*Aquila chrysaetos*), bearded vulture (*Gypaetus barbatus*), rock partridge (*Alectoris graeca saxatilis*), black grouse (*Tetrao tetrix tetrix*), wood grouse (*Tetrao urogallus*), rock ptarmigan (*Lagopus mutus helveticus*), hazel grouse (*Bonasa bonasia*), black woodpecker (*Dryocopus martius*), grey-headed woodpecker (*Picus canus*) and Eurasian pygmy owl (*Glaucidium passerinum*).

The alpine rock partridge is a subspecies of *Alectoris graeca*, but in contrast to this it lives only in the Alps and is larger, with darker feathers. The species is declining in the Alps both due to hunting and disturbance by man, and as a result of the disappearance of suitable habitats, following changes to farming practices and natural reforestation of open areas.

As illustrated in section 4.2 (see maps with the routes of migrating birdlife) the reserve coincides with one of the most important corridors in the Alps for migrating birdlife in autumn. This importance is confirmed by the presence of the permanent migration



The rock partridge (*Alectoris graeca saxatilis*), a bird in the galliformes order, can be found in grasslands high in the mountains

survey station (managed by MTSN) at Bocca di Caset. Overall, from 1996 to 2011 more than 398,000 birds belonging to 174 species have been captured. Among the numerous birds captured (almost 44,000 birds ringed) intra-palaearctic migratory species dominate, in particular fringillidae (Eurasian siskin and chaffinch), followed by the robin, goldcrest and coal tit. The

European pied flycatcher and the willow warbler are instead the most abundant trans-Saharan migrating species, however the common redstart and the tree pipit are also well represented.

The monitoring of recapture involves this centre in a transnational network of ornithological stations.

14.2.2 What are the pressures on key species? In other words: what are the threats (example unsustainable management of forest), their immediate causes (drivers of change like forest change or habitat change), their underlying causes (example overgrazing, fire, pollution), and the main driving forces (example: economic, political, social, external, etc.) and the area(s) concerned?

Flora

The autochthonous flora can be considered as a nucleus of key species with which to measure pressures underway. These pressures have varying effects on different groups of species and must be opportunely assessed when drawing up the future Management Plan for the reserve.

The group of dry grasslands/lowland dry meadows, in which the *Erysimum sylvestre* subsp. *aurantiacum*, *Hypochoeris facchiniana*, *Achillea oxyloba* and *Scabiosa vestina* stand out, is closely linked to maintaining adequate conservation of dry

grassland habitats.

The group of particularly renowned or showy endemic species, such as *Saxifraga tombeanensis*, *Nigritella buschmanniae*, *Telekia speciosissima* and *Aquilegia thalictrifolia*, is particularly at risk of being picked directly by collectors.

The group of species linked to rocky or high mountain environments, among which *Gentiana brentae*, *Saxifraga arachnoidea* and *Daphne petraea* stand out, would not currently appear to have any management problems. Careful evaluation of sports activities, such rock climbing practice grounds, will need to adequately taken into consideration.



Tulipa australis, a showy species in the Ledro Alps

Fauna

With reference to threats and dynamics underway already mentioned in the previous sections, it is possible to identify some groups of key species which are subject to specific pressures.

The group of species living in running waters, such as the white-clawed crayfish, is strongly linked to the quality of the aquatic habitat; the greatest pressure is therefore represented by pollution of the waters and by competition with allochthonous invasive species such as the spiny

cheek crayfish.

The group of species living in standing water environments, such as amphibians, is closely linked to the quantitative and qualitative maintenance of the habitat; the greatest pressure is therefore represented by direct destruction or a reduction in the extent/quality of the habitat.

Large carnivores such as the lynx and bear represent the top of the food chain and are therefore indicators of overall environmental quality, however at the same time they are strongly influenced by changes to the fragile trophic chain. The pressures which have the greatest effect on them are thus the fragmentation of the territory, possible scarcity of prey and more in general interference with human activities.

The group represented by bats, reptiles, small mammals and lesser birds is closely linked to maintenance



Alpine brown bear

of the traditional agricultural landscape, with a mosaic made up of alternating hedges, dry stone walls, meadows, pools of water, isolated trees and woods. The pressures are therefore represented by the passage from traditional to intensive agriculture, the banalisation of valley floor habitats and the decrease in care of marginal areas, traditionally mown by local farmers.

The rock partridge is found in dry meadows and areas cultivated with cereal crops at low altitude, which represent wintering stations. For centuries mountain agriculture and grazing provided artificial environments particularly favourable for the species (terraced fields, pastures due to deforestation) and the recent decline in these activities is without doubt negative for this phasianidae, precisely due to the reduction in its habitat: indeed ungrazed grasslands covered by a layer of dry grass and abandoned fields invaded by trees and bushes are avoided by the rock partridge, which has seen a marked reduction in its distribution area in the Alps in the last few decades.

The migratory species, which have one of their most important migration routes across the proposed Biosphere Reserve, collectively represent an indicator of environmental quality, not only for the area in question, but more in general as a quality indicator at continental and intercontinental level (between northern Europe and Africa south of the Mediterranean).

14.2.3 What kind of measures and indicators are currently used, or planned to be used to assess both species groups and the pressures on them? Who undertakes this work, or will do so in the future?

Flora

In the Adamello-Brenta Park the main endemic species are already the object of monitoring by the Museo Civico in Rovereto, with periodic monitoring at sites of particular importance or along sample itineraries, at varying intervals according to the rarity/threat for the species (1, 5 or 10 years).

All the SIC and ZPS areas in the Natura 2000 network are subject to monitoring (not currently standardised/systematic) of the flora present, with particular reference to protected and endemic species.

The rest of the proposed Biosphere Reserve is surveyed extensively but not in a programmed manner. The setting up of the Biosphere Reserve will offer the chance to extend systematic surveys and programmed monitoring to the whole of the area in question, coordinating the work of the various operational bodies.

Fauna

Some species at the top of the trophic chain, such as the bear and lynx, are the object of constant monitoring throughout the area of the Autonomous Province of Trento.

In the Adamello-Brenta Park constant monitoring is carried out for the most significant species, such as the rock partridge, bearded vulture, eagle and

alpine galliformes.

At the ringing station at Bocca di Caset constant monitoring of migratory species is carried out. All the SIC and ZPS areas in the Natura 2000 network are subject to periodic monitoring for all groups of fauna species.

Fauna of interest to hunters (red deer, roe deer, alpine chamois etc.) is subject to programmed censuses, on the basis of which the hunting quotas are established.

The setting up of the Biosphere Reserve would offer the opportunity to extend the surveys and programmed systematic monitoring to the whole area in question, coordinating the work of the various operational bodies.



*The alpine chamois (*Rupicapra rupicapra*), an inhabitant of high mountain areas*

Ecological network

Currently, conservation strategies are more and more focused on the species' habitats protection and on the maintenance of an efficient ecological network. The Provincial Ecological Network, set up through the innovative approach of the LIFE+ T.E.N. project, is based on the Networks of Reserves, which are identified by the Provincial Law 11/2007 and allow the valorization of biodiversity in Trentino through a de-centralized management, involving local communities according to the principle of responsible subsidiarity. The progressive territorial anthropization often divides and isolates the natural areas, thus reducing their value in terms of ecological connectivity and sometimes totally deleting it. Safeguarding the so called "ecological connection of the territory" indirectly allows the protection of huge amount of species. The man plays a central role in this network, as an important element for management and protection; thanks to planning strategies he has the opportunity to choose whether to preserve or limit the ecological functionality of a territory. These choices often have repercussions on human communities living in the same territory, because the Ecological Network is multi-purpose, as it not only benefits the nature, but also produces "ecosystem services" for people. The ecological network of Trentino is by its nature "open" to the surrounding

areas and therefore represents an important part of the alpine ecological network (see Annex 8.7).

14.2.4 What actions are currently undertaken to reduce these pressures?

The picking and collection of plant species is regulated by the Provincial law of 23 May 2007, no. 11 (Provincial law on forests and nature protection and subsequent regulations) which lists protected species that it is absolutely forbidden to pick, species of flowers for which picking is limited to 5 flowers and exceptions provided for in the case of species traditionally used as food (around 50 species including mountain radicchio, asparagus, Good King Henry and frogs and snails), effectively recognising the use of these species as part of a very significant cultural identity linked to traditional use of the local area.

The pressure created by the deterioration of habitats influences the populations of both plant and animal species. These pressures are limited by the passive and active



The alpine chamois (Rupicapra rupicapra), an inhabitant of high mountain areas

measures taken to protect habitats by parks, provincial reserves, the Natura 2000 network etc. In addition to passive protection, actions directed at the improvement of habitats are incentivised (with in-house resources or by making recourse to specific measures provided for in the Rural Development Plan (PSR), by the Adamello-Brenta Park, within the SIC and ZPS and also in areas not specifically protected. Actions have been taken to recover wetland environments, incentivise traditional animal husbandry activities, maintain open environments and remove structures with a negative impact. The main types of fauna that can be hunted are subject to regulations, basing the hunting quotas on constant monitoring of the population of the main species. Hunters and ASUC provide for regular implementation of measures to improve habitats for fauna. Coordination and management instruments have been approved for the Val di Ledro and Adamello-Brenta Parks areas. The Park Plan is indeed a detailed planning and management policy instrument. The Val di Ledro has equipped itself with technical planning tools regarding various sectors; forest roads, alpine pasture and environmental improvement for the purpose of fauna. These same tools have been provided for in the implementation programme of the Network of Reserves of the Ledro Alps. The other areas in the proposed Biosphere Reserve require coordination of individual actions.

14.2.5 What actions do you intend to take to reduce these

Many actions have already been taken to reduce pressure and threats to plant and animal species, however the setting up of the Biosphere Reserve would offer the chance to extend the application of various virtuous practices already underway in the local area, such as:

- Planning of intervention in sectors such as mountain huts, environmental improvement for the purposes of fauna at high altitude;
- Integrated development of area enhancement and promotion projects funded by the PSR;
- Extension of the Network of Reserves of the Ledro Alps to other mountain areas to the north (Giudicarie), including conservation programmes such as those developed in the context of the EU LIFE+ “Trentino Ecological network” project.



The cultivation of medicinal plants, a limited activity with good prospects, also in relation to Comano spa

14.3. At the level of genetic diversity

14.3.1 Indicate species or varieties that are of importance (e.g. for conservation, medicine, food production, agrobiodiversity, cultural practices etc)

The importance of rare or endemic species for conservation, also in genetic terms, has already been discussed in previous sections, so the picture will now be completed in relation to common species.

Many plants have traditionally been used to supplement the “poor” diet of mountain populations. However, their use is still largely limited to the family environment. Many of these species were also used in traditional medicine. Vegetables were cultivated in Trentino over a considerable length of time, above all in family vegetable patches, and used by the farmer and his relatives. The variety of products was relatively limited and oriented towards the cultivation of crops suitable for conserving over the winter (potatoes, beans, turnips etc.). However, there is also documentation of the cultivation of different vegetables, such as asparagus and cardoons in the Val Rendena.

The potato was the main product sold from the 19th century, representing a significant part of the local economy. Only in the 1950s did the cultivation of other vegetables destined for sale begin, the main crops being: potatoes, cabbage (including cauliflower and Savoy cabbage), radicchio, various types of lettuce, celery and celeriac, carrots, beans, courgettes and



“Carne salada”, a traditional product from the upper Lake Garda and Tenno areas, particularly valuable for tourism



The Bleggio walnut (Juglans regia, var. bleggiana), a local variety produced in limited quantities

asparagus.

Around the second half of the 20th century, the cultivation of berry fruits such as strawberries, raspberries, blackberries, red, white and blackcurrants, gooseberries and blueberries began in Trentino. Today these represent a valid instrument for overcoming, at least partly, one of the main limitations of mountain agriculture, namely the scarcity and fragmentation of areas suitable for cultivation.

Along with polenta, the potato has effectively represented the historic basis of the local diet (in the last two centuries).

The Lomaso and Fiv  areas represent the main production centre in the province (3-4,000 tons/year) and has also been an important site for scientific experimentation.

It is worth mentioning the historic role of maize as a crop in Trentino, where it was only introduced in the second half of the 17th century, being received

enthusiastically by peasants, to the extent that up to a few decades ago, polenta was a fundamental part of the diet. Currently the crop is widely cultivated for animal feed, while the “Marano di Storo” variety should also be mentioned.

This is a traditional quality product used to make polenta flour, cultivated in the Giudicarie area.

Chestnuts, Bleggio walnuts, Dro plums (a local variety) and Lake Garda olives are other traditional products which have represented precious, if not fundamental foods for the mountain populations, for their survival and more recently for sale.

Although deriving from species common to other areas, they represent specific ecotypes, thanks to their presence in Trentino for centuries, with consequential natural selection taking place due to the influence and soil and climatic conditions of the environment, giving rise to specific sensory characteristics.



“Ciuga” del Banale, a variety of pork sausage developing out of the need to make use of the less appreciated parts of the animal

Map of the main typical products in the upper Lake Garda and Giudicarie areas



PLANTS						
Wild plant	Cultivated plant	Species	Use	Traditional importance	Economic importance	Typical products
x		<i>Asparagus tenuifolius</i>	Wild edible	x		Homemade oil preserves
x		<i>Aruncus dioicus</i>	Wild edible	x		Homemade oil preserves
x		<i>Cicerbita alpina</i>	Wild edible	x		Homemade oil preserves
x		<i>Cichorium intybus</i>	Wild edible	x		Home cooked
x		<i>Humulus lupulus</i>	Wild edible	x		Home cooked
x		<i>Mentha acquatica</i>	Wild edible	x		Home cooked
x		<i>Plantago lanceolata</i>	Wild edible	x		Home cooked
x		<i>Salvia pratensis</i>	Wild edible	x		Home cooked
x		<i>Silene vulgaris</i>	Wild edible	x		Home cooked
x		<i>Tragopogon pratensis</i>	Wild edible	x		Home cooked
x		<i>Chenopodium bonus-henricus</i>	Wild edible	x		Home cooked
x		<i>Rubus caesius</i>	Wild edible	x		Homemade fruit jam
x		<i>Rosa canina</i>	Wild edible	x		Homemade fruit jam
x		<i>Vaccinium myrtillus</i>	Wild edible	x		Homemade fruit jam
x		<i>Ribes petraeum</i>	Wild edible	x		Conserva de <i>ua spinèla</i>
x		<i>Vaccinium vitis-idaea</i>	Wild edible, medicinal	x		Conserva de <i>garnètòle</i>
x	x	<i>Rubus idaeus</i>	Wild edible, medicinal	x	x	<i>Picco rosso</i> , fresh fruit

x		<i>Rosa canina</i>	Wild edible	x		Homemade fruit jam
x		<i>Vaccinium myrtillus</i>	Wild edible	x		Homemade fruit jam
x		<i>Ribes petraeum</i>	Wild edible	x		<i>Conserva de ùa spinèla</i>
x		<i>Vaccinium vitis-idaea</i>	Wild edible, medicinal	x		<i>Conserva de garnètòle</i>
x	x	<i>Rubus idaeus</i>	Wild edible, medicinal	x	x	<i>Picco rosso</i> , fresh fruit
x	x	<i>Fragaria vesca</i>	Wild edible, medicinal	x	x	<i>Picco rosso</i> , fresh fruit
x		<i>Sambucus nigra</i>	Wild edible, medicinal	x		<i>Conserva de sambùc</i>
x		<i>Arctium lappa</i>	Wild edible, medicinal	x		Home cooked
x		<i>Urtica dioica</i>	Wild edible, medicinal, domestic, veterinary	x		Home cooked
x		<i>Rhododendron ferrugineum</i>	Bee-keeping	x	x	<i>Miel di rasabèch</i>
x		<i>Artemisia absinthium</i>	Medicinal, ritual, domestic	x		Assenzio (homemade liqueur)
x		<i>Artemisia genipi</i>	Medicinal	x		Genepi (homemade liqueur)
x		<i>Artemisia umbelliformis</i>	Medicinal	x		Genepi (homemade liqueur)
x		<i>Juniperus communis</i>	Wild edible, medicinal, domestic	x		<i>Acquavite di ginepro</i> , Aromatic herbs
x		<i>Carum carvi</i>	Wild edible, medicinal	x		Aromatic herbs
x		<i>Thymus serpyllum</i>	Wild edible, medicinal	x		Aromatic herbs, Thyme oil
x		<i>Pinus mugo</i>	Medicinal, domestic	x		<i>Scioppo di mugo</i>
x		<i>Gentiana punctata</i>	Medicinal	x	x	<i>Amaro Valle di Ledro</i> , <i>Acquavite di genziana</i>
x		<i>Gentiana lutea</i>	Medicinal	x	x	<i>Amaro Valle di Ledro</i> , <i>Acquavite di genziana</i>
x		<i>Peucedanum ostruthium</i>	Medicinal	x		<i>Acquavite di imperatoria</i>
x		<i>Arnica montana</i>	Medicinal	x		Arnica oil
x		<i>Hypericum perforatum</i>	Medicinal	x		Hypericum oil
x		<i>Achillea millefolium</i>	Medicinal	x		Herb tea
x		<i>Fagus sylvatica</i>	Domestic (wood)	x	x	
x		<i>Ostrya carpinifolia</i>	Domestic (wood)	x	x	
x		<i>Fraxinus ornus</i>	Domestic (wood)	x	x	
x		<i>Quercus pubescens</i>	Domestic (wood)	x	x	
x		<i>Pinus sylvestris</i>	Domestic (wood)	x	x	
x		<i>Larix decidua</i>	Domestic (wood), medicinal	x	x	
x		<i>Picea excelsa</i>	Domestic (wood), medicinal	x	x	
x		<i>Corylus avellana</i>	Edible, domestic (wood)	x	x	
x		<i>Juglans regia</i>	Edible, domestic (wood)	x	x	Bleggio walnut
x		<i>Castanea sativa</i>	Edible, domestic (wood)	x	x	Pranzo chestnut
x		<i>Vitis vinifera</i>	Edible		x	Wine
x		<i>Olea europaea</i>	Edible		x	Olio del Garda Trentino DOP
x		<i>Brassica oleracea</i>	Edible	x	x	Trentino sauerkraut
x		<i>Brassica rapa</i>	Edible	x	x	Trentino sauerkraut, Ciuga del Banale
x		<i>Solanum tuberosum</i>	Edible	x	x	Lomoso potato
x		<i>Zea mais</i>	Edible		x	<i>Mais Nostrano di Storo (Polenta)</i>
x		<i>Mais "ceroso" (specie, varietà?)</i>	Animal feed		x	
x		<i>Secale cereale</i>	Edible, Animal feed	x	x	
x		<i>Medicago sativa</i>	Animal feed	x	x	
x		<i>Ribes nigrum</i>	Edible	x	x	Fruit syrup
x		<i>Triticum aestivum subsp. aestivum</i>	Edible	x	x	

List of the main flora species and their traditional uses

As regards animal species, there are no species or races of particular value at local level, (except Rendena, a typical race of cattle from the neighbouring Val Rendena – hence the name – to the North West of the proposed Biosphere Reserve.

Traditional animal husbandry has instead given rise to high quality food products, some of which are very typical, such as:

- Spressa delle Giudicarie, a DOP ripened, semi-skimmed cheese;
- Ciuiga del Banale, a “poor” type pork sausage made with the most

perishable materials resulting from the production of salami (Slow Food project);

- Carne Salada, beef conserved in brine in autumn and winter.

Currently only some traditional products have genuine production rules. Regulatory provisions and the obtaining of a trademark for the area of the proposed Biosphere Reserve will offer a chance to encourage sustainable business activities and support the maintaining of the traditional agricultural landscape.



“Spessa delle Giudicarie”, a traditional cheese made by cow milk nourished only with hay

14.3.2 What ecological, economic or social pressures or changes may threaten these species or varieties?

The long process of domestication undertaken over the centuries by generations of farmers has created a certain number of varieties ideally suited to the environmental conditions present in the area of the proposed reserve. This biodiversity, of enormous genetic and cultural importance, has been progressively menaced by changing cultivation

techniques and animal husbandry on an industrial scale. The diffusion of races of animals and highly productive plant species has led to the gradual abandoning of less profitable species and varieties, with a consequential loss of genetic diversity.

Certain policy decisions linked to funding or respect for health regulations, which have promoted

the development of large-scale production systems to the detriment of the small family-sized businesses characterising agricultural production in the mountains for centuries, have also contributed to this phenomenon. As regards plant species, traditional cultivars have unique sensory characteristics, are particularly suitable for the environment and traditional cultivation techniques and have greater resistance to pathogens. Competition with Eastern European countries, capable of producing large quantities of raw materials at lower cost, has also led to a decline in small, locally based crop cultivation for the production of typical products. One example of this is represented by the traditional cultivation of blackcurrants to produce syrup, the crop practically disappearing in the last few decades, precisely due to competition.

Recently, the action of various public and private sector organisations (PAT, PNAB, tourist offices, EdJ, farms etc.) has encouraged the production and promotion of typical products. We can cite some recent experiences in this context:

- the application for the IGP trademark for the Trentino potato, undertaken by COPAG;
- the obtaining of the DOP trademark by the Consorzio Sprezza delle Giudicarie;
- the obtaining of the DOP trademark by the Consorzio Olio di Oliva del Garda Trentino;
- the programme to promote the Pranzo chestnut by a local

committee;

- the programme to promote local products (wine and olive oil) by the Consorzio Tutela dei Prodotti Agricoli Tennesi;
- making of local wines (including Kerner, a dry white wine), by the Toblino winery;
- cultivation and production of medicinal herbs by some local farms, also in connection with the marketing of cosmetics by the local Comano spa;
- production regulations for honey and mountain cheese developed by PNAB within the 'Quality Parco' project;
- the proposal (underway) to create an agricultural park in the Ledro area;
- in general the PSR and PAT's Agriculture and Tourism Department.

Furthermore, some ethnobotanical studies have been carried out, showing that knowledge of the traditional use of wild species is progressively disappearing. The prospect of new production potential, through the cultivation of wild species for nutritional or medicinal purposes, appears more topical than ever in the context of mountain areas. The demand for traditional products made using wild herbs is indeed increasing, although their removal from the natural landscape cannot be considered sustainable, given the limited availability of these species. Their picking is indeed regulated in order to avoid them becoming extinct due to excessive picking.

14.3.3 What indicators, at the level of the species, are used, or will be used, to assess the evolution of population status and associated use?

The volume, varieties and problems related to products of the most significant economic interest (potatoes, nuts, maize, vines, animal

products) are monitored constantly by the relative promotional organs and by PAT.

In this context see:

- the annual reports of the various consortia mentioned above;
- PAT's annual report on the State of Trentina Agriculture¹;
- the technical publication produced by PAT's agriculture department, Terra Trentina².

¹ http://www.trentinoagricoltura.it/filesroot/Documents/801_rapp_agricoltura09_pdf/rapp_agricoltura09.pdf

² www.ufficiostampa.provincia.tn.it/terra_trentina

14.3.4 What measures will be used to conserve genetic diversity and practices associated with their conservation?

The promotion of quality trademarks, supported by rigid production regulations, and the reinforcement of the link between production and consumption at local level are measures of great importance for the PNAB promotion of sustainable economic activities capable of maintaining local biodiversity. Summer 2003 saw the starting up of the "Quality Parco" project, a quality trademark issued by the Adamello-Brenta Park to tourist-hotel facilities, schools, food industry companies and other typical structures that can demonstrate that they respect certain environmental quality requisites and a link with the local area. The park intends to make use of its trademark as an area marketing tool capable of encouraging sustainable tourism and enhancing the local identity. In particular, the food industry sector



The "Qualità Parco", trademark, an ABNP project logo to promote local farms linked to the area

has the objective of promoting high quality traditional products from within the protected area, with particular attention for healthiness and environmental protection. Specific regulations have been developed by PNAB for honey and mountain cheese.

The setting up of a Biosphere Reserve would offer the chance to extend these practices to the whole area in question, with the inclusion of local products of very high quality, currently not present within the PNAB.

15. DEVELOPMENT FUNCTION

15.1. Potential for fostering economic and human development which is socio-culturally and ecologically

15.1.1 Describe how and why the area has potential to serve as a site of excellence/ model region for promoting sustainable development.

There are excellent reasons for assuming that the proposed area can act as a model region for promoting sustainable development in other areas:

- the area is representative of a relatively widespread situation in mountain environments in the Alps and similar mountain ranges;
- within the area there are natural characteristics of great value in terms of biodiversity, and precious historic and cultural features; however it is not so much a case of an unrepeatable situation, as of a combination of values around which development can be constructed and which – with appropriate modifications – have similarities with other zones and can therefore be exported;
- the historic, social and administrative background back up the assumption that development can be oriented in the direction desired; indeed the process has already been started up autonomously, as demonstrated by the many initiatives (and relative framework programme) aimed at environmental protection and

integrated development.

From the environmental point of view the area thus has a role as a representative site for the southern slopes of the central and eastern Alps within the MAB network, acting as a bridge between Mediterranean ecosystems and periglacial alpine tundra environments (3108 metres difference in level in less than 30 km). As regards historic, social and cultural aspects, within the World Network the proposed area represents a consolidated example of the collective management of environmental assets, made possible by a long and significant tradition of cooperation.

On the basis of these premises, the area hopes to represent a model:

- for the collective management of waters, forests and areas high in the mountains;
- for the sustainable management of energy resources with indirect spin-offs in the fight against climate change;
- for the management of the ecological network and protected areas, also through the setting up of the “network of reserves”;
- for tourist activities inspired by the principles of the CETS and the relationship between tourism and agriculture, also making use of

- local products;
- for education on sustainable development, also through visitors centres at the environmental and cultural sites;
- for a cooperative approach in various fields of business and social activities, which combines individual responsibility with participation in the management of the area.

The inclusion of the area in the World Network of Biosphere Reserves would recognise the efforts done so far and offer new opportunities for openness and collaboration at national and international level. In this context, for example, there is the chance of exchanging ideas with the World Network of Biosphere Reserves as regards development problems, such as the compatibility between animal husbandry and tourism, or the encouragement of increasingly sustainable forms of tourist development, with the promotion of local products in order to support farmers.

At the same time it would offer increasing opportunities to access programmes and funds to enhance the rich cultural and environmental heritage and for development, with the participation of the local community and particularly young people.

All the planning documents of the main supra-municipal bodies (PNAB,

CdG and RR) link sustainable development with the promotion of tourism as one of their main objectives; in this context, see the PNAB Park Plan, the Preliminary Document of the area plan for the CdG and the project for the implementation of the Ledro Alps Network of Reserves enclosed. In concrete terms, at the moment there are various cultural activities, along with activities related to conservation, promotion, support and encouragement for forms of sustainable tourism and mobility, among the actions designed to support development.

Sustainable tourism and mobility are regularly promoted within the PNAB (and in the Geopark and UNESCO WHS areas included within it), in the CdG and in some municipalities:

- Mobility Plan of the Val Ambiez and Val Algone;
- CETS and meetings in the area for the development of participatory programmes;
- Itineraries on a theme (Brenta Bike Dolomites and Brenta Trek Dolomites);
- Educational activities in local schools guided by the Trentino Network of Environmental Education;
- Educational activities at the visitors centres in Stenico and S. Lorenzo and management of the botany trail.



Intervention to conserve grazing meadow habitats from the invasion of the woods by the Associazione Forestale Monte Valandro in the Val Ambiez (Brenta Dolomites) Intervention to conserve grazing meadow habitats from the invasion of the woods by the Forestry Association Monte Valandro in the Val Ambiez (Brenta Dolomites)

Other activities relate to the Ledro and Fiavé Pile-Dwelling Museums and the relative UNESCO sites:

- the RELED project, coordinated by MUSE, includes training and informative activities at the Ampola Centre, the Mons. Ferrari Museum in Tremalzo and the Ledro Pile-Dwelling Museum (more than 30,000 visitors a year);
- the Fiavé Pile-Dwelling Museum represents the central nucleus of the Fiavé Archaeological Park (currently being set up). The Museum counts more than 20.000 visitors a year, that will probably increase thanks to the future opening of the Archaeological

Park. In this area various educational activities are carried on by PAT.

The project for the implementation of the Ledro Alps Network of reserves (including a programme agreement between 6 municipalities and definition of governance) provides for the carrying out of conservation and area promotion activities based on values linked to the natural environment (Annex 4.3).

Tourist promotion activities based on exploiting the natural environment are carried out by tourist offices (Comano and Ingarda) and by the Consorzio Pro Loco in Ledro, with programmes

of visits and informative activities¹.
The main cultural activities carried out by the Judicaria Ecomuseum include:

- drawing up a map of local products;
- recovering “Maso al pont”: a traditional building with straw roof;
- setting up and activities in the literary park of the poet Giovanni Prati;
- creation of a cooperative itinerary at the sites of the first cooperative businesses in the region;
- organisation of annual Landscape Days;
- participatory programme and drawing up of a community map.

Other initiatives are organised at municipal level:

- for around a decade the Forest Associations present in the area (Valle di Ledro, Monte Valandro, Pievi di Bleggio and Lomaso, Porte del Gal, Storo and Bondone) have promoted activities to promote and enhance the area funded by the PSR: informative publications, footpaths, action to improve habitats etc.;
- master plan to promote the Lomasona area (Comano Terme) funded by PAT funds for sustainable development.

¹ See the web sites: www.vallediledro.com; <http://www.visitacomano.it>

The policy of CEIS (Electrical Industrial Consortium of Stenico) is of considerable importance. This aims to increase the production of energy using local and renewable resources, solar energy first of all, with production currently standing at 4 million kWh.

Finally, reference is made to some relevant activities carried out by the private sector:

- Azienda Agricola Il Campo (farm): training courses on organic farming and organisation of days selling local products at Castelcampo;
- Educational farms (2 in the Municipality of Comano)
- Farm guesthouses and B&Bs linked to the Brenta Bike Dolomites itinerary.

To provide the framework as regards certain specific aspects of society, a range of data is provided below regarding:

- the extent of different business sectors in the area concerned;
- the extent of commuting;
- the extent of the cooperative movement;
- the extent and number of local associations.

An approximate picture of certain economic aspects is given in Table 15.1 and Fig. 15.2.

Municipality	Data	Industry	Construction	Commerce	Services (accommodation and restaurants)	Services (transport)	Services (others)	Agriculture	Total
Bleggio Superiore	Local units	8	28	14	13	1	25	52	141
	Workers	52	57	23	24	1	69		227
Bondone	Local units	3	8	7	5	4	8	3	38
	Workers	27	25	13	15	22	9		111
Dorsino	Local units	2	20	3	3	2	6	9	45
	Workers	5	67	11	7	4	7		101
Fiavè	Local units	6	9	15	8	4	11	31	84
	Workers	61	44	50	32	27	16		229
Riva del Garda	Local units	78	153	393	238	42	684	197	1,785
	Workers	1,076	496	1,184	1,508	237	1,704		6,205
San Lorenzo in Banale	Local units	6	24	10	18	7	24	23	112
	Workers	18	86	29	53	13	37		236
Stenico	Local units	13	18	9	6	4	20	41	111
	Workers	64	60	11	30	6	122		292
Storo	Local units	83	72	99	23	17	119	76	489
	Workers	590	238	241	59	53	289		1,470
Tenno	Local units	8	17	17	20	4	28	143	237
	Workers	28	26	27	75	4	32		192
Comano Terme	Local units	23	44	74	24	10	90	98	363
	Workers	239	165	190	148	46	160		948
Ledro	Local units	41	81	63	68	18	93	139	503
	Workers	438	184	167	230	66	221		1,304
Totale	Local units	271	474	704	426	113	1,108	812	3,908
	Workers	2,598	1,448	1,944	2,179	480	2,667		11,316

15.1 Extent of business activities in the different municipalities, in terms of units and workers

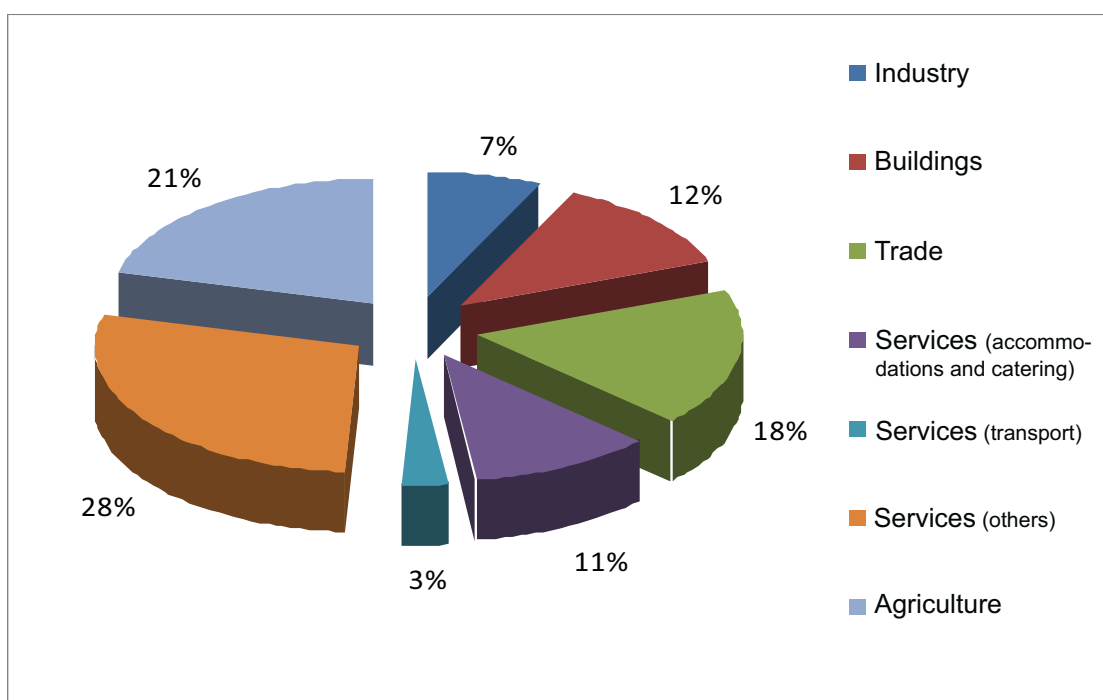


Fig. 15.2 distribution of companies in the various sectorsworkers

Commuting represents a relatively widespread phenomenon in the area, demonstrating that the local situation

does not allow complete absorption of the available workforce. The data is shown in Table 15.2

	Incoming	Outgoing
Municipalities in the area (excluding Riva del Garda, Storo and Bondone)	726	3,147
Comunità delle Giudicarie	487	1,046
Comunità Alto Garda and Ledro	1,669	1,862

Fig. 15.3

Table 15.3: the extent of daily commuting within the proposed Biosphere Reserve. Overall, one can also note that in the wider CdG the phenomenon is nevertheless equally evident.

The presence of the cooperative movement is of great importance in terms of extent and historical importance. As recalled in section 9, the Giudicarie Esteriori are the birthplace of the first forms of cooperation at regional and perhaps national level, starting from the end of the 19th century. The cooperative

movement is present in various sectors of economic and social life and includes banks, food distribution, the sale of agricultural products, the production of electrical energy, industrial production and tourist promotion.

Table 15.4 gives a summary of the cooperatives present within the

proposed Biosphere Reserve. One can note that in the area of the Giudicarie Esteriori alone the number of members is higher than the number of inhabitants (10,846 members vs 8,380 inhabitants), demonstrating the widespread nature of the cooperative movement in the area.

Sector	No. of COOPs	No. of members
AGRICULTURE	1	101
CONSUMER GOODS	5	5,822
CREDIT	2	3,688
EMPLOYMENT	4	38
SERVICES	3	3,789
WELFARE - (social-carers)	1	165
Total	16	13,603

Fig. 15.4 Type and number of cooperatives in the proposed Biosphere Reserve



Stretch of footpath equipped by PNAB for tourist purposes, using local materials

In terms of local associations the proposed Biosphere Reserve is characterised by its “vitality”; there are a large number of associations present, also in individual towns, in a wide range of sectors. The overall number of members also demonstrates how important this phenomenon is, above all in terms of the vitality of small communities and opportunities for social life. The main areas of interest range from sport, youth culture and music to health, tourism and local history. Table 15.5 provides a summary of the data.

Municipality	Associations
dorsino	4
s. lorenzo in banale	16
comano terme	49
bleggio superiore	16
ledro	44
stenico	21
tenno	21
fiavè	32
Total	203

Fig. 15.5 Number of local associations within the proposed Biosphere Reserve

15.1.2 How do you assess changes and successes (which objectives and by which indicator)?

As recalled several times, the sustainable development strategies identified by local and regional instruments are perfectly in line with those on which the Biosphere Reserves are based. This is also valid for verification and monitoring systems in relation to the achievement of objectives.

In this context, the monitoring framework provided for by the PUP can be described in the following paragraph (for more details see annex 3.4)

Measuring the effects of strategies on the area

The periodic measurement of effects is an essential aspect of planning activities, as it regards all plans related to the area. In the case of

the PUP, this essentially involves measuring overall effects in relation to the provisions of the strategies stated, and is followed directly through the relevant regulations and their application in the area plans of the communities, and consequently in planning schemes.

In general, the strategic dimension of area planning instruments requires:

- compliance, with the regulations of the PUP and respect for the provisions of the law;
- coherence, with the approach and the objectives of area planning;
- compatibility, with other strategies, in the sense that it does not hinder the effects, operating synergistically or possibly with compensatory intervention.

The framework of provincial indicators

The monitoring of general phenomena to be subjected to verification assumes the use of a set of indicators, relevant to the trends underway in the province of Trentino. For the purposes of evaluation, the PUP proposes to monitor the following phenomena, deferring integration with different or further measurement parameters and the relative impact to the area plans of the communities:

1. Safety of recoverable settled areas subject to hydrogeological risk (surface area);
2. Areas with ecologically controlled systems (hectares of protected river, lake areas etc.);
3. Grazing and meadow areas restored or destined for niche crops (surface area)
4. Inter-municipal projects related to sports and tourist services and the integration of production systems for related services (number);
5. Relationships between services and the tertiary sector and inhabited areas in the municipalities, valley communities and province;
6. Areas destined for protected and controlled crops (surface area);
7. General consumption of land;
8. Consumption of valuable agricultural land;
9. Light and heavy industry situated in specifically equipped areas;
10. Environmental indicators for the quality of water, air and soil;
11. Structures for ecological tourism (number);
12. Percentage of goods transported by rail;
13. Average times for crossing the province in the context of corridors;
14. Energy-saving buildings;
15. Quantity of energy produced from alternative sources of energy;
16. Production of solid urban waste for disposal.

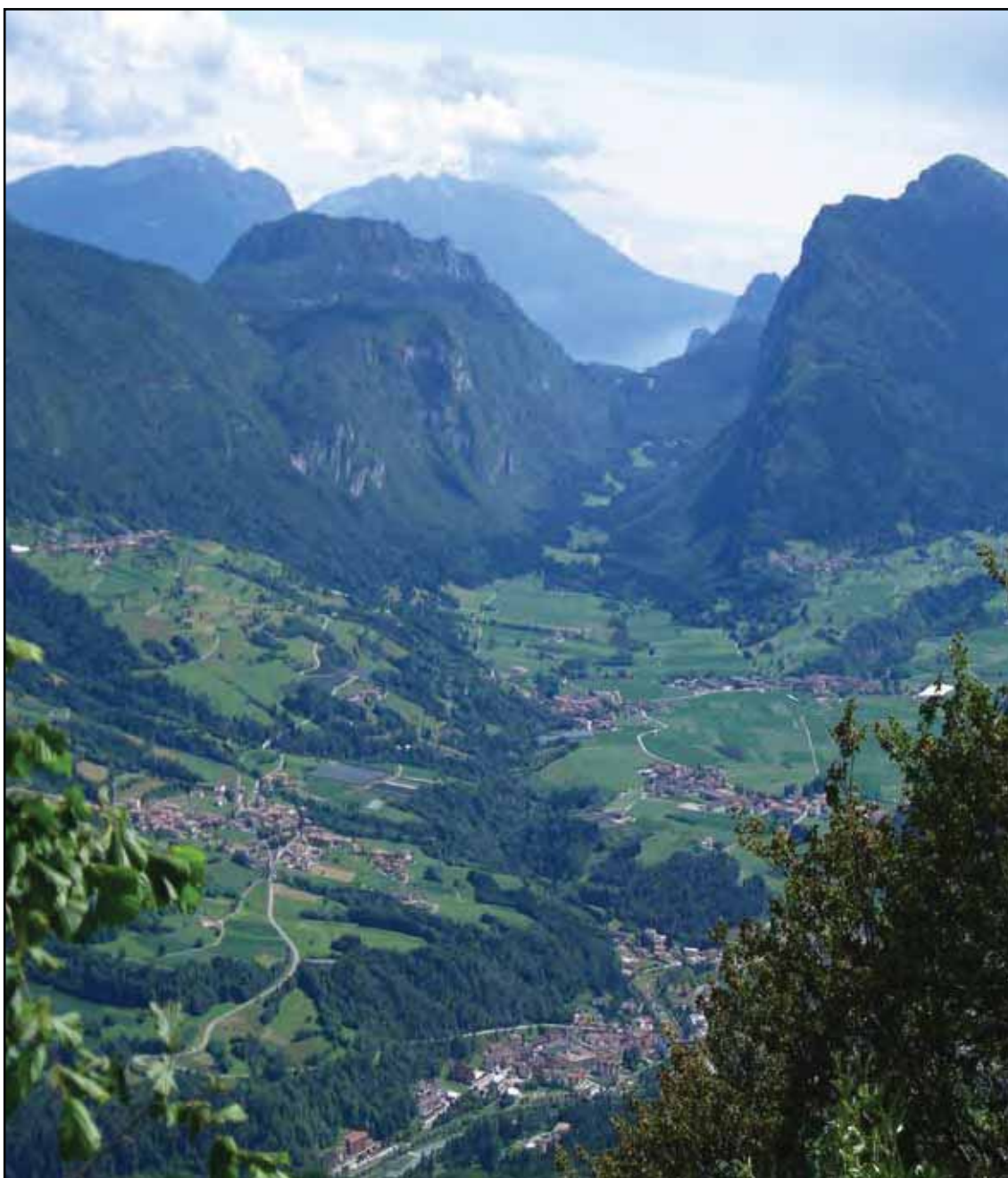
In particular, certain indicators representing various sectors of development are considered as an example (see Table xxx). Annex 3.4 gives a complete list of the indicators contained in the PUP; in this context further evaluation tools for the dynamics promoted may possibly be identified.

Strategies	Indicators
I. To promote the identity of the area and innovative and responsible management of the landscape	N° of renovations and recovery of valuable buildings in terms of the landscape N° of area improvement programmes carried out Hectares in the area historically used for meadows and grazing, recovered or destined for niche crops Satisfaction of 50% of building requirements by reusing current buildings, intensifying the use of settled areas
II. To encourage tourist development based on the principle of sustainability, making the most of cultural, environmental and landscape resources	N° of local agricultural products introduced organically into the Trentino tourist circuits N° of mountain huts operating as farm guesthouses
III. To guarantee the safety of the area and settlements	Index of overall quality of running water Air quality health index
IV. To pursue balanced, prudent and lasting development of settlements	N° of inter-municipal projects related to sports and tourist services Hectares of pedestrian areas and number of projects to restore and renovate spaces and commercial buildings and service facilities in already built-up areas
V. To pursue the sustainable use of forest, mountain and environmental resources	Number of functional links between naturalistic elements in the environmental networks Ecological diversity index Hectares of traditional crops reintroduced or revitalised Number of innovative agricultural-forestry projects and eco-tourism facilities projects
VI. To pursue the permanent presence and development of valuable agricultural areas and to promote mountain agriculture	Surface area destined for protected and controlled crops Annual consumption of agricultural land of primary interest
VII. To pursue the responsible use of non renewable environmental energy resources, promoting the saving of resources and the use of renewable forms of energy	N° of renewable energy systems planned or installed N° of kW of renewable energy produced N° of buildings with a high level of energy saving

Fig. 15.6 Series of indicators to evaluate the application of sustainability policy (source: PAT's PUP)

Following on from the policy of the del PUP, in line with the provisions and in the light of the recent phase of dialogue and analysis, the Community planning policies were drawn up, through the Preliminary Document

for the PTC (Annex 4.1), which represents the point of reference for the Giudicarie. The draft summary is enclosed (which also regards the Giudicarie Esteriori directly).



The “green” landscape of the Giudicarie Esteriori: the use of the land is a fundamental element in protecting the traditional landscape

15.2. If tourism is a major activity:

15.2.1 Describe the type(s) of tourism and the touristic facilities available. Summarize the main touristic attractions in the proposed biosphere reserve and their location(s).

The tourist sector is present throughout the area of the proposed reserve and is marked by nature-based tourism, revolving mainly around:

- activities in the open-air, linked to agriculture and the forests, directed mainly at families;
- active holidays dedicated to health, sport and physical fitness;
- stays linked to spa holidays.

From the north to the south, the main natural features attracting tourists can be summarised as follows: in the north the Adamello-Brenta Nature Park, with the southern slopes of the Brenta Dolomites and the River Sarca; in the central area the Comano spa with the villages straddling the Passo del Ballino; further south, Lake Tenno and the agricultural terraces of villages overlooking Lake Garda. In the southern area, Lake Ledro and the Ledro Alps.

Adamello-Brenta Nature Park:

tourism here is mainly linked to the summer, excursions and naturalistic features. The park has obtained the CETS (European Charter for Sustainable Tourism) award for its valleys and the municipalities in the park¹. Various facilities have received the “Qualità Parco” trademark (regulations enclosed), which ensures a reduced environmental impact, rational use of energy and the use of local products. The itineraries of the Brenta Bike Dolomites² and the Brenta Trek Dolomites³ are infrastructures by now recognised at international level. In the core areas some alpine refuges of Club Alpino Italiano operate in the summer only.

Comano spa: spa tourism has continued for 150 years and is based on the unique characteristics of the thermal waters of Comano, which come from a depth of more than 800 metres and are rich in the mineral salts of the Dolomitic mountains, particularly useful for treating skin complaints⁴. The area offers natural treatments in an environment helping people to conserve and improve their health⁵. The springs are situated

¹ www.PNAB.it

² <http://www.dolomitibrentabike.it>

³ <http://www.dolomitibrentatrek.it>

⁴ www.termecomano.it

⁵ Comano Valle Salus, <http://www.visitacomano.it>

within a large spa park, along the banks of the River Sarca (river park). Programmes for families, and recreational activities such as walks and MTB trails, make up most of the proposals offered by the Terme di Comano- Brenta Dolomites tourist office.

Lake Tenno – Varone waterfalls:

here tourism is based on natural resources and the agricultural landscape. Picturesque terraces in the Tenno area have been dedicated to different crops for centuries and are placed one above another along the slopes. The old villages in the Tenno area (Canale, Calvola) look out over Lake Garda. There are also numerous very popular MTB itineraries.

Lake Ledro and the Ledro Alps:

from spring to autumn Lake Ledro represents the main attraction in the valley, with numerous open-air facilities. The characteristics of the lake combine with the environmental richness of the Ledro Alps and the Val di Concei at Tremalzo, offering a particularly area suitable for sports activities such as MTB, canyoning and sailing⁶. There is also an extensive programme of “nature weeks” with an educational-informative scope. Tourism based on nature and the landscape is completed by the appeal of cultural sites (the Ecomuseum, pile-dwellings, castles, churches, places of historic interest – described in section 10.6) and natural sites. In particular

⁶ www.vallediledro.com, www.visitchiese.it

we can recall:

- the Brenta Dolomites WH sites;
- the Fiavé and Ledro pile-dwelling WH sites;
- 6 castles, some of which well-conserved and open to the public;
- some churches of Romanesque origin;
- the gorges of Limarò (on the River Sarca) and Palvico (Ledro)
- the peat bog of Fiavé and the Val Lomasona.

The area of the PBR is fully integrated within the “Food and Wine Route”¹, as it is able to offer various local products that are increasingly used in the tourist sector, also thanks to the awarding of trademarks and the establishing of quality regulations. There are all kinds of accommodation facilities in the proposed Biosphere Reserve: different categories of hotels, rented accommodation and camp sites. In particular, in the last ten years one can note the growth of businesses strongly linked to ‘soft’ use of the area, such as farm guesthouses and bed & breakfast accommodation. The visitors are mostly of Italian origin in the northern and central part of the reserve, with foreign visitors frequenting the footpaths in the Dolomites. The closer one comes to Lake Garda the greater the presence of international visitors, both in the Tenno area and the Valle di Ledro, where facilities for open-air-tourism welcome thousands of guests from central and northern Europe.

¹ www.stradedelvinodeltrentino.it - www.gardadolomiti.it



Winter landscape at Fivè: the variety of environments and landscapes over the seasons is a valuable element for the promotion of tourism linked to the local area

15.2.2 How many visitors come to the proposed biosphere reserve each year? (Distinguish between single-day visitors and overnight guests, visitors only visiting the proposed biosphere reserve or only passing on the way to another place). Is there an upward or downward trend, or a particular target?

The extent of tourism in terms of arrivals (A) and presence (P – number of overnight stays), excluding certain centres such as Riva del Garda, Storo and Bondone (outside the proposed area) is shown in Fig. 15.7:

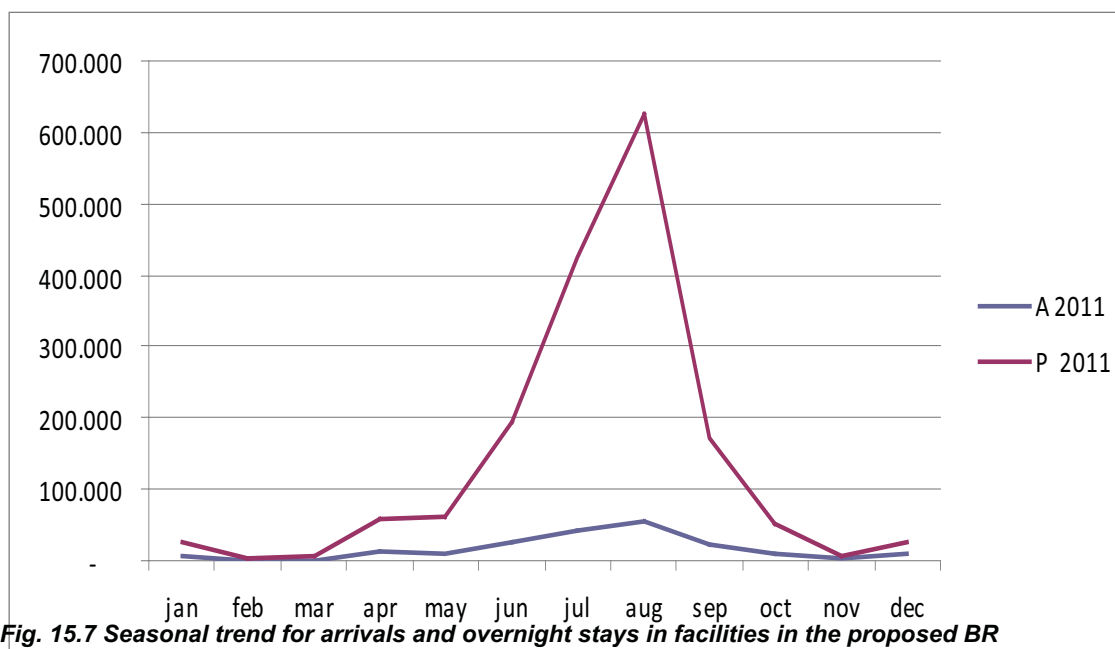


Fig. 15.7 Seasonal trend for arrivals and overnight stays in facilities in the proposed BR

The arrivals are mostly concentrated in the summer. The average stay is around 8 days, exceeding the duration of more famous locations nearby, which are however characterised by a rapid turnover (around 4-5 days' stay).

In summer the stays lengthen up to around 10 days, but in winter they are less than 5. Overall there is room for improving the seasonal distribution of arrivals and stays.

The trend over the last two years essentially shows a relatively constant level in terms of the presence of tourists in the area.

Year	2011	2012
Arrivals	198,415	204,240
Overnight stays	1,653,076	1,665,783

In terms of real use, the number of visitors is considerably higher, above all in the Ledro area, due to the effect of day trips by tourists based in

important tourist areas with a higher capacity (such as Riva del Garda and to a lesser extent the Val Rendena). Tourists are largely accommodated in second homes and private accommodation.

Any increase in numbers would need to be based both on hotels or other accommodation facilities and on more extensive use of private accommodation, limiting the consumption of land which characterised the first phases of development – albeit to a relatively limited extent.

Municipality	Hotels		Other accomm. facilities		Total		Private accommodation		Second homes		Overall no.	
	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds
Bleggio Superiore	3	44	5	62	8	106	42	168	291	1,164	341	1,438
Dorsino	0	0	0	0	0	0	25	112	76	315	101	427
Fiavè	5	338	0	0	5	338	98	476	138	592	241	1,406
San Lorenzo in Banale	8	459	9	470	17	929	167	680	128	555	312	2,164
Stenico	5	445	11	576	16	1,021	90	265	270	780	376	2,066
Tenno	6	257	11	380	17	637	126	493	285	1,266	428	2,396
Comano Terme	12	832	15	350	27	1,182	206	809	185	760	418	2,751
Ledro	28	979	31	3,228	59	4,207	1,509	7,430	852	4,238	2,420	15,875
Total	67	3,354	82	5,066	149	8,420	2,263	10,433	2,225	9,670	4,637	28,523

Fig. 15.8 Distribution of tourist facilities and accommodation available within the proposed BR

As shown in the various documents that follow, the main targets of the tourist policy underway are:

- families, both in connection to the characteristics of the area and medical-spa aspects;
- participants in sporting disciplines (climbing, trekking and above all MTB);
- users interested in the “soft” aspects of the area (lakes, hills, products of the earth, nature walks).

15.2.3 How are tourism activities currently managed?

The management of tourist activities is carried out by both the public and private sector, the latter mostly in relation to accommodation and restaurants. The public authorities provide the facilities, organisation and contribute towards organising events, within a planning framework whose main elements at local level are:

- the preliminary document of the Area Plan of the CdG (approved on 9/07/2013);
- the preliminary document of the Area Plan of the CAGL (being prepared);
- the “strategic guidelines for tourist development in the valley” report adopted by the tourist office of Terme di Comano-Brenta Dolomites (cooperative organisation);
- the proposed Strategic Plan of “InGarda Trentino Azienda per il Turismo SpA”.

Examination of the documents stated above gives an idea of the current organisational framework, the problems and the objectives of the tourist sector.

Preliminary document of the Area Plan of the Comunità delle Giudicarie

<<In the Giudicarie Esteriori the economy is particularly influenced by the presence of Comano spa (...). The Giudicarie area offers pleasant trails, cycle routes and road circuits where traffic is limited, where enthusiastic cyclists can ride their bikes far from the traffic congestion and danger of city streets >>.

The preliminary document for the plan (Annex 4.1) is entirely in line with MAB policy in relation to socioeconomic development in the area concerned. For further details see the relevant document.

As regards problems, it is highlighted that <<in terms of economic competitiveness, it is necessary to create new employment opportunities for young people, bearing in mind that today many of them are obliged to leave the area because they cannot find appropriate job opportunities in line with their studies. Likewise, it is necessary to intervene in schools in order to encourage young people to follow educational programmes capable of increasing human capital. This is particularly true for women, who indeed suffer from the lack of responsible and specialist jobs available to them. They currently fulfil operational roles, many of them being absorbed by the tourist sector to carry out manual tasks with a low level of technical specialisation >>..

Preliminary document of the Area Plan of the CAGL (currently in the process of approval)

The objectives include:

- lengthening the summer season and supplementing the services offered in the winter, from the beginning of December to the end of January;
- internationalisation and differentiation of the markets of reference (45% of tourists present come from the foreign market, 55% from the Italian market);
- increase of family and individual tourism;
- development and maintenance of area capital.

The intervention planned includes:

- expanding the network of footpaths and MTB itineraries;
- promoting the activities of the Tremalzo and Caset centres.

Strategic guidelines for tourist development, Terme di Comano-Brenta Dolomites tourist office

To quote some extracts from the document:

«The core tourist business in our area is the spa, ... we must succeed in characterising the context with specific reference to the area, in order not to be defined as a “half-way house” between more important locations such as Lake Garda and the Dolomites (...).

Visitors stay for longer periods in accommodation outside hotels, as compared to hotels; furthermore the

figures speak clearly as regards the strategic role of other accommodation facilities for tourism and particular attention should therefore be reserved for this sector (...)

Our tourism is of national origin and mostly concerns the regions in northern Italy: 39% Lombardia – 20% Veneto – 13% Emilia Romagna – 5% Piemonte – 13% of visitors to the spa come from the Trentino Alto Adige region (...).

International visitors represent 17%, with Germans making up 63% of these ... it is necessary to start looking across the frontier»

In relation to development the following areas are indicated as fundamental:

- Children and families: 24% of new guests are children (aged 0-11), with family holidays representing more than 47% of stays, data which highlights how the environment is particularly suitable for family holidays;
- Sports activities: sports – biking –trekking – climbing;
- Culture: art – history – religious itineraries;
- Food and wine;
- Nature.

The general objective is described as the development of an integrated relationship between community and area resources, pursuing widespread quality and paying attention to the human factor, the natural heritage of the area and an improvement in facilities.

Proposed Strategic Plan of InGarda, Trentino Azienda per il Tourism SpA

<<The Valle di Ledro is an environment that mostly sees family tourism. The annual number of overnight stays, with a total of 790,681, represents 2.8% of stays at provincial level. Pieve di Ledro, which faces directly onto the lake, is the municipality in which the influence of tourism is greatest and which therefore has the most significant presence of accommodation facilities and second homes. Bezzecca also has greater accommodation potential than the other municipalities, however the number of visitors does not appear to be particularly high in comparison with other locations. (...).For the Tremalzo area, in the Municipality of Ledro, the idea of reviving winter sports has been discussed in the last few years. This would require the renovation of certain accommodation facilities and the creation of small lift systems and cross-country skiing tracks. (...). The availability of residential accommodation would appear to average, except for Bezzecca and Pieve di Ledro, where there is an excess of accommodation as compared to the needs of the resident population>>.

The plan also emphasises the need to develop tourist facilities on the basis of various underlying factors, differentiated depending on the area (the difference between the Lake Garda and Lake Ledro environments is noted).

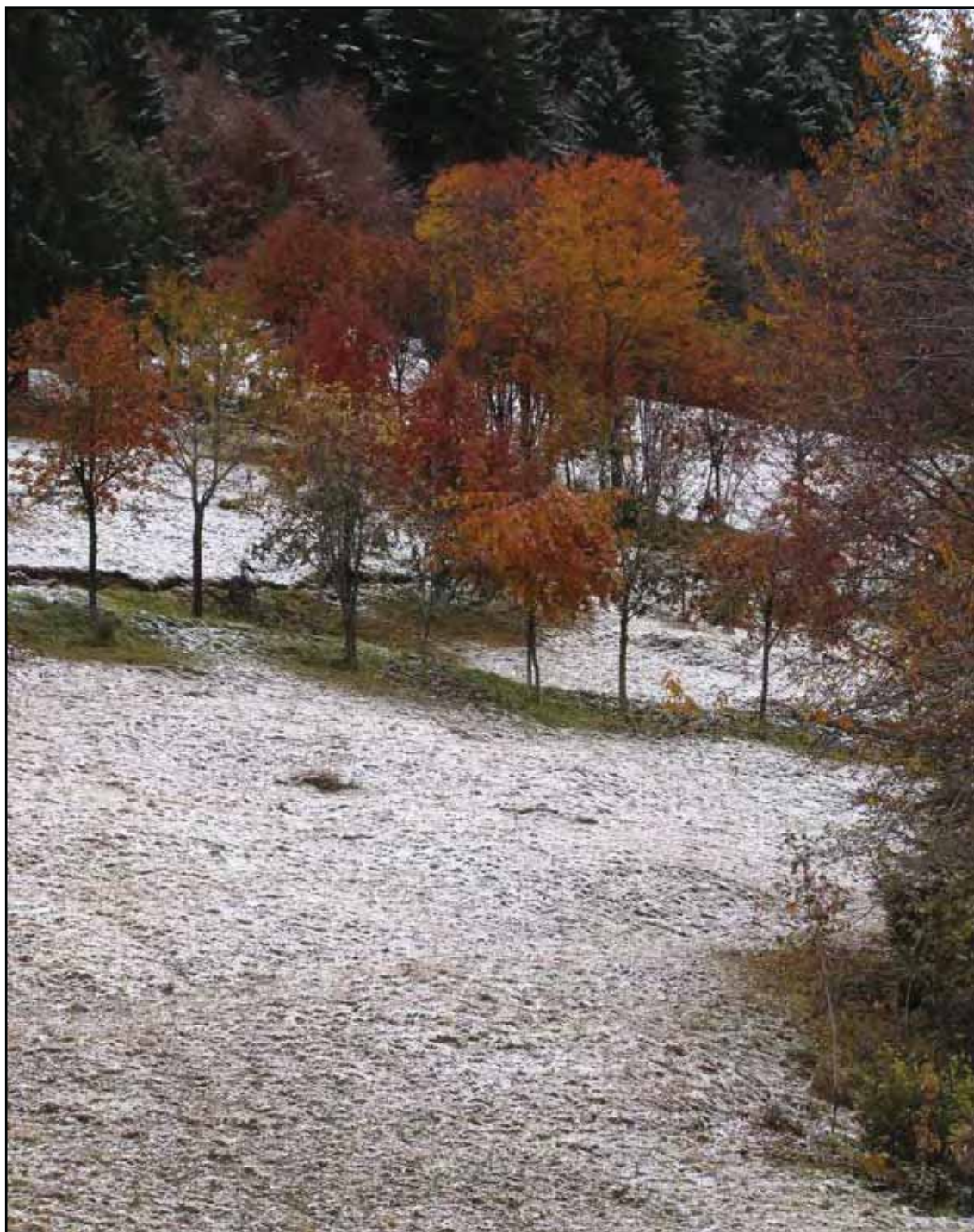
The Ledro area is particularly suitable for the following types of tourism:

- sporting holidays, including various disciplines and combinations of complimentary activities;
- family holidays, meeting the needs of the clientele, according to different customs in the countries and cultures of origin, given the substantial number of foreign tourists in this area;
- holidays for 'best agers', with reference to the over 50s, with a strong demand for sports and wellness and good spending capacity;
- holidays for young people, not always welcomed by businesses and public administrations, but with the potential to open up further prospects in the international context;
- holidays linked to local gastronomic traditions, customs and culture (a transversal proposal as compared to the other types of holidays), related not only to food and wine, but also to the discovery of typical high quality products, both in terms of food and crafts, the cultural heritage and local history, little-known views and panoramas, visits to museums and temporary exhibitions.

Overall the objective is to develop area capital, understood as the combination of material, immaterial and human resources, public and private sector assets. With this scope in mind, relations with the

cultural, agricultural and productive environments need to be intensified in order to initiate a decisive

improvement in the appearance of the landscape and the integration of business sectors.



Autumn landscape in Val di Ledro: the extending of tourist and environmental proposals to less popular periods represents a development objective

15.2.4 Indicate possible positive and/or negative impacts of tourism at present or foreseen and how they will be assessed (linked to section 14)

In relation to conservation aspects (section 14) there are no significant cases of negative impact of tourist activities on the environment. It can however be affirmed that the sustainability policy implemented in the last few years has guaranteed a good relationship between tourism and natural resources in the current situation. On the basis of area management decisions designed to protect valuable environments in the area, a situation has been created in which:

- most tourism is concentrated in urban environments or on the valley floor;
- flows of visitors involved in excursions or sporting tourism are linked to specific infrastructures, subject to continuous monitoring and maintenance;
- areas of extreme value/rarity are situated in rarely frequented areas which are not subject to risks in terms of alteration.

The areas in which there is greater tourist pressure and which for this reason must be subjected to greater attention and monitoring (section 15.2.5) are:

- the banks of the most popular lakes;

- some very popular mountain areas such as the Val Algone and Tremalzo;
- some stretches of the main roads during the spring migration of amphibians (Fiavé and Ampola);
- peri-urban areas concerned by the possible expansion of second homes;
- some stretches of MTB trails in the mountains (risk of damaging footpaths, interference with walkers).

However, overall nature-based tourism could have a range of positive impact in the context of the proposed Biosphere Reserve:

- by improving the number and quality of facilities and service infrastructures (trails, signs, information and multimedia services);
- by increasing the level of awareness of the community as regards the value of environmental promotion policy and high quality local products;
- by making a significant contribution to the local economy in terms of employment and links with the values of the area.

The parameters described in section 15.1.2 can be used for evaluation of monitoring in this sector.

15.2.5 How will these impacts be managed, and by whom?

As regards to the points of potential interference mentioned above it is possible to say that:

- the whole area is subject to direct management by various levels of administration or ownership; management takes place through approved planning tools;
- the mountains in general are constantly managed (through Forestry Management Plans) and controlled by the presence of forestry staff (PAT Forestry Department, forest rangers) and by the staff of PNAB (in their area of jurisdiction);
- the migration of amphibians and the movement of bears are the object of specific programmes providing respectively for the installation of tunnels under roads (amphibians, PAT Conservation Department) or supervision and monitoring operations (PAT Forest and Fauna Department);
- the expansion in urban development is managed through area plans which are integrated within a hierarchy on the basis of the principle of subsidiarity (provincial PUP, valley community PTCs and PRGs at municipal level) and can be easily measured (15.1.2);
- as regards to tourist or educational trips and visits to museums, historic artefacts and nature information centres, the number and type of users is known, with a trend that it is expected to increase (many of these initiatives have been recently inaugurated, so a progressive consolidation is expected);
- there are also consolidated monitoring programmes in relation to the specific sectors of research, tourism, agriculture etc.. For more information see the relevant sections.

15.3. Agricultural (including grazing) and other activities (including traditional and customary)

15.3.1 Describe the type of agricultural (including grazing) and other activities, area concerned and people involved (including men and women).

Once again this section makes reference in particular to the preliminary documents prepared for the Area Plans of the Valley Communities.

In the area there all the most representative sectors of Trentino agriculture, albeit with different forms of development and qualitative and quantitative characteristics; from crops on the plains to cultivation half-way up the slopes and high in the mountains, from more intensive crops and animal husbandry to scattered crops and livestock. The main agricultural sectors are animal husbandry, vegetable growing, fruit growing, viticulture, olive growing, beekeeping and the cultivation of berry fruits. The main sectors are described in the following paragraphs.

Animal husbandry: the rearing of cattle is the main agricultural activity in the Giudicarie and Ledro areas. Centring mainly on the production of milk and dairy products, it is directly linked to the cultivation of stable meadows (Ledro) or grasslands and maize fields (Giudicarie). In the Giudicarie the rearing of dairy cattle is

based mainly on the Friesian breed, whereas in the Ledro area the rearing of brown and dappled red breeds predominates. There is more limited rearing of cattle for meat and rearing of goats. The livestock is mainly kept in large structures (over 100 livestock units), representing a high load in relation to the areas of land used. In addition to being an important element in the local economy, the widespread presence of livestock is a fundamental aspect in maintaining and enhancing the landscape, by continuously maintaining the meadows, pastureland and associated buildings. The extensive network of alpine grazing at high altitude, which is maintained through the grazing of cattle, is also of high value in terms of the conservation of habitats and tourism.

Vegetable growing: this sector is distinguished by the growing of potatoes, a crop with a long-standing local tradition, to the extent that Lomaso is the main production centre in the region; it is largely carried out by farms rearing animals, as a supplementary crop, as well as by numerous other small private farms.

Viticulture: this mainly concerns the Tenno area and to a lesser extent the Giudicarie. It is a sector of limited

size in terms of production but with a high quality level. It characterises the landscape in the southern part of the area, creating a spectacular landscape made up of stone terraces of ancient origin. It is currently carried out mainly by small producers, who rely on cooperative organisations for transformation and sale of the product.

Olive growing: this is also limited to the “Mediterranean” part of the area, in the Municipality of Tenno, representing a typical and unique feature of the landscape – again making use of terraces – within the area. It is currently mainly carried out by small producers who rely on cooperative organisations for the

transformation and eventual sale of the product.

Fruit growing mainly concerns the cultivation of apples and cherries in the Giudicarie; smaller niche crops, particularly valuable in terms of their typical nature and local traditions, include Bleggio walnuts (a local variety) and Pranzo chestnuts (Tenno).

Beekeeping is another widespread sector, covering a reasonably extensive area, but mostly made up of small bee-keepers.

The cultivation of berry fruits and medicinal herbs takes place on a very limited scale in terms



Cultivated areas in the autumn in the Bleggio area

of production, although it offers great potential for producing quality products linked to the local area.

Fish farms: there are some farms for trout and rainbow trout, as well as for reproduction and the production of fertilised eggs, however the main activity is the rearing of rainbow trout for consumption. A cooperative organisation (ASTRO) deals with the transformation and sale of products for most of the producers.

The transformation of agricultural products is very important in the agricultural economy and in general terms in relation to promoting the area and its traditions. Below we list some high quality traditional products, typical and sometimes unique, deriving from local products, which in some cases have also become renowned at national level:

- Spessa delle Giudicarie, DOP cheese;
- yellow Storo flour (from the Marano variety of maize);
- Ciuga of Banale (slow food project);
- Bleggio walnuts (local Juglans regia variety and traditional product);
- carne salada (traditional product);
- Pranzo chestnuts (traditional

Trentino product);

- Garda Trentino DOP olive oil;
- various types of Trentino DOC wines;
- Trentino honey, with the PNAB 'Qualità Parco' trademark.

Farm guesthouses: in the last decade various farms in the Giudicarie have combined tourism with their main farming activities, creating new accommodation and restaurant facilities, managed directly and making use principally of their own products. The farm guesthouses usually merge well into the environment and respond to an increasing demand for peaceful natural areas, rediscovering the values, traditions and genuine products of the local area. They also represent a way of increasing income for farmers.

Silviculture represents another form of primary production. Managed almost exclusively by public or collective owners through management plans, it involves more than 60% of the area in a more or less direct manner, with around ten forestry companies. This activity produces around 12,000 cubic metres of timber annually, along with 5,000 tons of wood for use as fuel.

15.3.2 Indicate the possible positive and/or negative impacts of these activities on biosphere reserve objectives (section 14).

The main strong points of this sector are the characteristics of the products themselves and the value that they have in relation to other aspects such as landscape and tourism. Primary production, in addition to representing a part of the local economy, can represent a cornerstone in the context of tourism linked to exploitation of the local area. In this context we note:

- the variety of products linked to cultivated zones in the area;
- the maintenance of the landscape with many traditional elements (terraces, stable grasslands, bocage landscape);
- the presence of small farms with

high quality products with official certification of various kinds (DOP, Bio, Qualità Parco etc.);

- the availability of an extensive network of alpine pasture high in the mountains;
- the potential of some areas (Ledro first of all) to extend organic farming to the whole area (with the idea of a “bio valley”) and in any case a direct link for all products with the local market linked to tourism;
- the presence of some biogas systems at farm level;
- PEFC certification (Pan European Forest Certification Council) for all timber production.

The weak points and negative impact could include components of a structural nature for some sectors or the need to further enhance some characteristics. In this case the



Bike routes: very promising infrastructure

negative effect could regards the future economy, but also and above all conservation of the area and the relationship with tourism. The following factors have a significant impact:

- the size of animal husbandry farms in the Giudicarie, out of proportion in relation to the surface area of the farms, leading to an industrial type of activity which is not competitive with similar farms on the Po plain;
- the concentrated presence of livestock leads to serious problems in terms of the effects of disposing of dung (with a high level of nitrogen) on the soil, water and atmosphere;
- the integration of agriculture and tourism, despite the presence of various farm guesthouses, must extend to the production chain, including phases from the production of agricultural raw materials to the consumption of agricultural and food products (“from the field to the table”), namely agricultural production, the transformation of agricultural products, the sale and consumption of local agricultural and food products;
- the poor protection of semi-natural habitats related to marginal agriculture (e.g. permanent grasslands), which are of great value in naturalistic terms and for conservation of the landscape.



Habitat conservation may need an “active approach”

15.3.3 Which indicators are, or will be used to assess the state and its trends?

Some of the possible indicators as regards primary production are given in section 15.1.2 and specifically those linked to Strategies II, V and VI:

- N° of agricultural products from the area organically introduced into Trentino tourist circuits;
- N° of mountain huts operating as farm guesthouses;
- N° of functional links between naturalistic elements in the environmental networks;
- Ecological diversity index;
- Hectares of traditional crops reintroduced or revitalised;
- N° of innovative agricultural-forestry projects and eco-tourism facilities projects;
- Surface area destined for protected and controlled crops;
- Annual consumption of agricultural land of primary interest.

This data could also easily be integrated with other parameters such as:

- The ABU/ha (animal husbandry livestock in relation to the cultivated surface area);
- Situations with an effective load over 2.5 ABU/ha (EU parameter);
- The ratio of food of local origin/ external origin.

15.3.4 What actions are currently undertaken, and which measures will be applied to strengthen positive impacts or reduce negative impacts on the biosphere reserve objectives?

As general rule, current agricultural and environmental policy is moving towards forms of nature protection and conservation on the one hand and the promotion of agricultural products linked to the area and tourism on the other. The system of funding and supporting for farming activities is making a significant move in the direction indicated and there will therefore be changes in this context.

Specifically:

- the “greening” of the CAP (Community Agricultural Policy) imposes increasingly more restrictive measures in terms of safeguarding the environment and the landscape;
- the PSR (currently being drawn up for the period 2014-2020) provides specific measures to conserve semi-natural habitats (pastureland, permanent grasslands and polyphyte meadows), to protect the traditional landscape and to set up area plans linking agricultural production to tourism and limiting livestock loads;
- the PNAB Park Plan, within the ZPS (Special Protection Area), provides action to safeguard all the traditional activities that make it possible to conserve valuable habitats and species

(grazing, mowing, environmental improvement);

- starting from next year, the implementation plan of the Ledro Alps RR will provide for intervention (already funded) in the field of conservation and the promotion of policy linked to the CETS;
- this year the Life+TEN project started up a participatory process aimed at reinforcing awareness of the value of the natural area within local communities and its use in

the context of the CETS. Other aspects on which direct improvement action could be considered regard:

- the application of the Nitrates Directive (EC) to control nitrate emissions in water;
- a process of reconsidering the animal husbandry model in the Giudicarie, with a view to providing a better balance with the natural area and with the quality of milk and dairy products.



CAP/PSR financed pasture conservation intervention in Ledro



PNAB activity with school children

15.4 Other types of activities positively or negatively contributing to local sustainable development, including impact/influence of the biosphere reserve outside its

15.4.1 Describe the type of activities, area concerned and people involved (including men and women).

There are a series of activities that could have a positive influence on sustainable development at local level. These are based on existing and deep-rooted factors or on new technology. The most significant activities in this context are represented by:

- further development of high quality agricultural production chains;
- traditional and artistic crafts.

The **presence of certified high quality agricultural products** linked to an area of high environmental value has been stated in previous sections. There is still ample room for improvement in terms of promoting and marketing products and links with tourist facilities present in the area. The development of this sector can therefore significantly contribute to improving nature-based tourist facilities and also to agricultural management improving on the current situation.

There are some **traditional craft activities** that have distinguished the history of certain environments. One of these is the production of “broche”, namely iron nails used reinforce the

soles of mountain shoes in the past. The smiths who produced then (called “cioaroi”) in the Val di Ledro were even exempted from military service in order to allow them to continue to produce this material. There is also a background of producing tar, again in the Ledro area, recognised by the Venetian Republic. It was a historic activity linked to the area and future cultural development in this context could represent a positive aspect.

There are also some activities which can be mentioned due to their influence outside the confines of the area. In general, the quality of stays that an area offers influences the quality of life of those benefiting from it. In this context, the quality of tourist facilities linked to environments of high naturalistic value represents a positive influence. In particular, the presence of thermal waters and the “Comano valle salus” policy of tourist promotion is based on the development of physical and spiritual wellbeing.

Another sector which can also have positive effects outside the area is represented by **energy production** and in particular by the development of local policy linked to the production of carbon-free energy by CEIS (diffuse and centralised solar energy systems).

15.4.2 Indicate the possible positive and/or negative impacts of these activities on biosphere reserve objectives (section 14). Have some results already been achieved?

In this context no negative impact is expected, given the nature of the initiatives described.

There may be positive impacts in relation to:

- an increase in jobs linked to the development of new activities;
- a reduction in commuting due to a possible increase in employment locally;
- an improvement in the balance between energy consumption from renewable sources as compared to energy from fossil fuels (as in the Solar Reserve Project described in section 13.2).

15.4.3 What indicators are, or will be used to assess the state and its trends?

Some of the possible indicators in relation to primary production are stated in section 15.1.2, particularly those linked to Strategy VII:

- N° of renewable energy systems planned or installed;
- N° of kW of renewable energy produced;
- N° of buildings with high energy savings.

15.4.4 What actions are currently undertaken, and which measures will be applied to strengthen positive impacts or reducing negative ones on the biosphere reserve objectives?

The actions described above refer to the current system of planning policy (described in section 15.1.1), in which various bodies share common elements aimed at achieving sustainability.

15.5 Benefits of economic activities to local people

15.5.1 For the activities described above, what income or benefits do local communities (including men and women) derive directly from the site proposed as a biosphere reserve and how?

As described in section 13.1, the objective of this nomination is to reinforce the current planning system; the nomination can act as a further stimulus to reinforce the development of the activities described above. In this context, the main benefits which people may obtain can be represented by:

- an improvement in job opportunities;
- an improvement in guarantees and future prospects;

- an improvement in environmental quality and therefore in the healthiness of the area;
- a reduction in commuting;
- overall economic improvement.

15.5.2 What indicators are used to measure such income or other benefits?

Some of the possible indicators related to primary production are given in section 15.1.2.

It is also possible to provide for monitoring from:

- surveys with tourists regarding their reasons for choosing the area (due to the MAB), as done in the past by PNAB;
- quantification of visitors to the web sites available, with a link to the MAB.

Life based significantly on the primary resources of the local area is an aspect of the collective memory



15.6 Spiritual and cultural values and customary practices

15.6.1 Describe any cultural and spiritual values and customary practices including languages, rituals, and traditional livelihoods. Are any of these endangered or declining?

The most important aspect in this context is probably the link with the local area in terms of:

- its role as a primary resource for the economy;
- the cultural and historic identity.

As in many other alpine communities, the almost complete dependence on the resources of the local area over the centuries, along with limited exchanges with the outside world, has created a specific system of cultural and social references. The mountains in general, and forests and pasture in particular, still represent an important point of reference for middle-aged and older generations. Work in the woods (the collection of firewood as a right), local place names and the memories of past times represent a close link with the area.

In this context, the relationship with agricultural land is declining, the concentration of farms effectively having distanced most people from the land as a source of production. This value remains in some areas more than others (such as Tenno for

example).

The relationship with the cooperative movement, which has been present in a widespread manner since the end of the 19th century, is instead stronger. Cooperative businesses in the production, employment or services sectors still represent a fundamental element in the local economy.

15.6.2 Indicate activities aimed at identifying, safeguarding, promoting and/or revitalising such values and practices.

Indirectly, various activities can contribute towards revitalising the aspects in question:

- the putting into effect of active protection measures for habitats effectively requires greater efforts in terms of farming practices in marginal areas, in zones once cultivated and now marginal;
- the training and information activities mentioned in section 15.1.1. are also aimed at greater knowledge of the local area and the resources present;
- the activities to promote local products will lead to an increase in awareness of the value of the local identity.

15.6.3 How should cultural values be integrated in the development process: elements of identity, traditional knowledge, social organizations, etc.?

The activities described in the previous section are moving towards the inclusion of elements of identity within a process of development. Other activities mentioned in sections 13-16 pursue the promotion of the local culture:

- the development of agriculture based on traditional products and its formalisation for commercial purposes;
- the development of cattle breeding systems based on animal welfare, with less impacts on the environment (particularly addressing the problems of slurry treatment and old wheel tires disposal)
- the link between agriculture and tourism and local population;
- promotion of traditional and collective management of the natural area as a model;
- the consolidation of models of collective management of resources.

15.6.4 Specify whether any indicators are used to evaluate these activities. If yes, which ones and give details.

The activities described in the (Examples of indicators: presence and number of formal and non-formal education programmes that transmit these values and practices, number of revitalisation programmes in place, number of speakers of an endangered or minority language).

Some evaluation indicators can be represented by:

- the number of active conservation/ protection activities implemented by public bodies or private owners as compared to the past;
- the quantity of traditional agricultural products sold;
- the number of courses organised focusing on knowledge of the area and its management (and the n° of participants).

16. LOGISTIC SUPPORT FUNCTION

16.1 Research and monitoring

16.1.1 Describe existing and planned research programmes and projects as well as monitoring activities and the area(s) in which they are (will be) undertaken in order to address specific questions related to biosphere reserve management and for the implementation of the management plan (please refer to variables in Annex I).

Different players operate in the area in the field of research and dissemination at local, national and international level, often structured in permanent collaborative networks or networks activated for specific projects. The main research and monitoring projects carried out by the different bodies operating in the area are described below.

ADAMELLO-BRENTA NATURE PARK

For a number of years the Adamello-Brenta Nature Park has promoted (a) research and monitoring projects on different biotic and abiotic components related to species and ecosystems, (b) dissemination projects regarding environmental conservation and the use of sustainable resources.

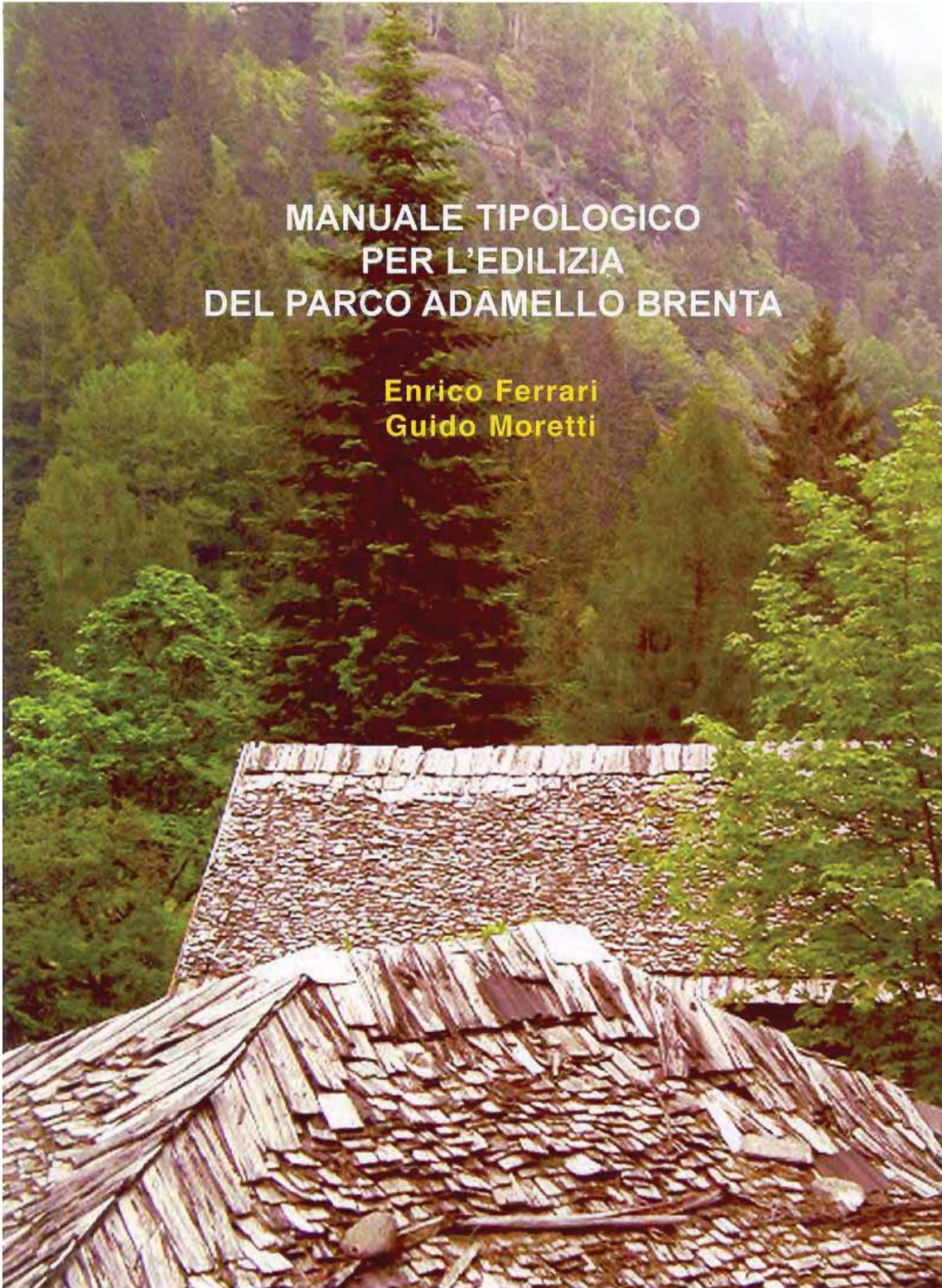
For research activities carried out autonomously the park makes use of the following internal staff:

- 5 – Fauna Office (2 members of staff, 2 scholarship holders + 1 thesis student/trainee);
- 2 – Environmental Office (2 members of staff).

Furthermore, the park gives research assignments to qualified parties, such as museums, universities, freelance professionals, research institutes and provincial administration offices. The overall framework of monitoring and research activities is shown in Annex 8.5.

The Adamello-Brenta Nature Park has stipulated an agreement with the Adamello Regional Park in Lombardia. The agreement is aimed at safeguarding and enhancing the mountain environment.

The Adamello-Brenta Nature Park participates in the LIFE+ “Arctos” project (2010/2014) for the conservation of the brown bear: coordinated action for the Alpine and Apennine areas. The project is implemented in the context of the European Commission LIFE + Natura funding programme. This project also regards the area of the proposed Biosphere Reserve. The Adamello-Brenta Nature Park has three international cooperation projects underway with similar organisations in Argentina, the Balkans and Taiwan. Details are given in Annex 8.5.



**MANUALE TIPOLOGICO
PER L'EDILIZIA
DEL PARCO ADAMELLO BRENTA**

**Enrico Ferrari
Guido Moretti**

The activities of the PNAB also involve promoting the characteristics of traditional buildings; here the title page of a manual

TRENTO NATURAL SCIENCE MUSEUM AND THE SCIENCE MUSEUM (MUSE)

Since 1964, MUSE (formerly MTSN) has operated in the field of dissemination and scientific research, by setting up exhibitions, organising educational activities, issuing publications and carrying out research activities (in the fields of Botany, Geology, Zoology, Hydrobiology, Limnology and Prehistory).

Since 1993 a study of birdlife migration has taken place, through scientific ringing at Bocca di Caset. At the ornithological station of the Science Museum post-reproductive migration is monitored from the middle of August until the end of October. Since 1997 the station has been included in the 'Progetto Alpi', a national project coordinated by ISPRA and MUSE, which has seen the participation of more than 37 stations scattered throughout the Italian Alps. More than 70 species have been recorded and almost 100,000 birds logged, demonstrating the significance of this pass as a very valuable conservation area.

The data is recorded annually in technical reports, at coordination meetings and in publications and scientific articles. In addition to birds, the site is also known to be used by bats and a variety of invertebrates, to date little investigated.

The station is a training centre. It has been used by natural history students, for degree theses, practical courses for forest wardens and technical staff

and aspiring bird-ringers, and as an educational centre for informative activities directed at local schools and tourists in the summer. Its activities take place in close collaboration with the Pile-Dwelling Museum, a separate branch of MUSE, and the Network of Protected Areas of PAT's Conservation Department, here represented by the "Lake Ampola" reserve in the Val di Ledro and the Fiavé reserve in the Giudicarie Esteriori.

As in the rest of the province of Trento, for more than twenty years the area has seen monitoring of vertebrate fauna. Nesting birdlife in particular has been studied, in the context of the Atlante degli Uccelli del Trentino (Pedrini et al 2005), the M.I.T.O. project and the Farmland Bird Index (2001-ongoing) and Ornitho. it (Atlante nazionale 2010-2014), along with amphibians and reptiles (Caldonazzi et al. 2001), and a more recent publication due to come out shortly dedicated to mammals (AAVV, MUSE, currently being prepared). The data has collected and will shortly be available in detail in the webGIS produced in the context of the LIFE + T.E.N. project, which started up in 2012 and will conclude in 2015.

From 1980 to 2005 intensive research was carried out on Falconiformes and Strigiformes, with particular reference to the southern sector of the Adamello-Brenta Park and the Cadria and Tremalzo mountains. The data, published in national and international magazines, has been the

object of further scientific study in the BIODIVERSITY project (http://www.mtsn.tn.it/sito_biodiv/), supported by PAT (2001-2005) and Trento Natural Science Museum (now MUSE). (See annex 8.5)

The Museum Network of the Valle di Ledro (ReLED) is of particular interest in terms of content and methods. ReLED was set up in 2012 as a link between various museums in the Valle di Ledro, with the scope of reinforcing cultural, educational, scientific and tourist services, bringing them under a single umbrella. The network is entrusted to Trento Natural Science Museum (MTSN - now MUSE), and specifically to the headquarters of the Lake Ledro Pile-Dwelling Museum, as regards management, dissemination and scientific research. The 6 museums in the network are

distributed throughout an area acting as a bridge between Lakes Garda and Idro and are dedicated to themes of archaeological, naturalistic and historical interest.

MUSEO CIVICO IN ROVERETO

This is structured into various sections (Archaeology, Coins, Earth Science, History and Art, Zoology and Botany) and carries out numerous dissemination and research activities in the area. Specifically, for more than twenty years the botanical section of the Museo Civico in Rovereto has been involved in a census of flora in Trentino, acting as the organisation of reference in a project to draw up a map of flora on the European model. More than a million records have been collected. Annex 8.5 contains details of the activities.



Archaeology dramas by MUSE



Viola dubyana; flora research is one of the main activity conducted by MCR

AUTONOMOUS PROVINCE OF TRENTO (PAT)

The “OPENLOC project: Public policies and local development: innovation policy and its effects on locally embedded global dynamics”. www.openloc.eu

This project was funded by PAT between 2009 and 2011, with the collaboration of various research institutes including the University of Trento, University of Manchester, University of Bologna, Trento Natural Science Museum and the Fondazione Edmund Mach. An extract of the project’s final report is given below: “The project has a multi-disciplinary nature and it aims at defining a new institutional and economic architecture which will enable Italian local systems, in particular the Autonomous Province of Trento, to face the new global dynamics and formulate appropriate public policies.

The project starts from the analysis of the local outcomes of the changes occurring in the international economic context. On the one side, the international fragmentation of production reconfigures local systems, i.e. systems of firms and organizations whose relationships are organized within delimited portions of the territory, engaging them into global networks. On the other side, the emergence of new economic powers fuels global imbalances among countries in different development stages, whose real and financial implications redesign local system

competitive scenarios.

The international dimension entwines with the local one: productive specialisations, socio-cultural and environmental specificities, particularly when based in mountain areas, generate global dynamics outcomes that differ locally.

The present project aims at defining an institutional set-up for enabling local systems to deal with system failures (the shortage of linkages, if not even of nodes, in the relative networks; lock-in effects in sub-efficient system configurations; second-best solutions to the trade-off between exploitation of existing configurations and exploration of new ones; cognitive traps to the imagination of the latter) with suitable strategies and policies. Such an institutional architecture, developed with a general worthiness, will be used to examine, in a positioning analysis, the characteristics of the PAT and, in a comparative view, of other local systems with similar features such as: financial autonomy, dominance of small and medium enterprises, strong productive diversification, local control of capital and strong propensity to export.

In line with this objective, the methodology is centred around the notion of network, essential in fostering research, supporting knowledge exchange and the generation of innovation. The main research questions come from a multidisciplinary rethink of this approach.

The OPENLOC project is structured in five activities:

Activity 1 – Global dynamics and local implications: interpretative models and policy scenarios: this activity is functional to the development of a “frame”, shared among all the participants, on the degree, modalities and internationalisation policies of local systems, and of the PAT in particular. Although in cooperation with the other subjects, and with the University of Trento in particular, the University of Bologna (UNIBO) is in charge of this activity.

Activity 2 – Configuration, functioning and performance of local networks in global contexts: the importance of knowledge networks: this is the core activity and is dedicated to the empirical and theoretical analysis of the various networks characterising the local systems, and the PAT in particular, and of the relationships through which these networks become “networks of networks”, by entering in global contexts. A group of the University of Trento (UNITN) researchers, benefiting from an important cooperation with the LEED-OECD of Trento, is carrying out this activity in a synergetic relationship with the University of Bologna (UNIBO) and the Manchester Institute of Innovation Research (MIOIR) group.

Activity 3 – Innovation ecologies in local systems: policy and governance

implications: it is the OPENLOC “think-tank” policy and governance activity. The interaction with other activities occurs on several levels: on the one side, with respect to the formulation of a cognitive and evolutionary original approach to public policies, especially those on science and innovation; on the other hand, with respect to its practical application to the development and competitiveness of the local systems, meant as innovative ecologies, and of the PAT in particular. This activity is performed mainly by the MIOIR group, in cooperation with University of Bologna.

Activity 4 – Social capital and environmental capital: the possible contribution to local development in a global context: it represents the contextualization and geo-referencing activity of OPENLOC and is dedicated to collect and provide to the other activities elements of analysis and policy implications on the environmental and socio-cultural context of the economic networks formed by local systems. In particular, these elements refer to the twofold role - of constraint and opportunity - that the socio-cultural heritage, on the one side, and the morphological traits, on the other, play with respect to the local systems entrance into global networks. This activity is performed by a group of UNITN researchers, as coordinator, the Fondazione Edmund Mach and the Trento Natural Science Museum.

Activity 5 – International PhD Program on Local Development and Global Dynamics: the creation of the Doctoral School in “Local Development and Global Dynamics”. The school the institutional synthesis of OPENLOC, because: i) it uses the research and development results achieved with the other activities through their organisation for teaching and research purposes; ii) it creates competences and professional profiles that incorporate that knowledge; iii) it integrates academic activities and operating activities in the institutional, administrative and associative field; iv) it develops the competences and the potential that the PAT has to become an attractive hub, able to realise important initiatives on local development. All the OPENLOC partners are actively involved in the school. In particular, the three academic partners are responsible for the definition and management of the academic activities, while the two public subjects of research promptly transfer the results achieved through research while providing applicative activities.”

The OPENLOC project concerned the Valle di Ledro area, the heart of the proposed Biosphere Reserve, and led to the production of a document on the socioeconomic values of the area, with analysis of future prospects, also dealing with the question of ecosystem services. The documentation is available in more detail at the address <http://www.spazioftp.it/ledro/comunitas/n18s.pdf>



Traditional agriculture



Ancient view of Stenico Castle



Production and trading of charcoal, in an old picture

UNIVERSITIES

The most active universities in the area are the University of Trento, the University of Padova and the University of Ferrara, however it is likely that other bodies carry out research on site, although an exhaustive list is not currently

available, given the difficulty of accessing the databases of national universities.

A list of research projects, theses and known publications regarding research carried out in the area of the proposed Biosphere Reserve is given below:

Subject of the research	Number of projects	Type	Period
Archaeology & History	4	Research projects	2008-2012
	12	Degree theses	2006-2012
	23	Publications	2000-2013
Environment, landscape & the geographical area	1	Research projects	2012-2013
	16	Degree theses	2000-2013



The trees school fest in a 1920 picture: a way to teach environment care



Birdwatching

16.1.2 Summarize past research and monitoring activities related to biosphere reserve management (please refer to variables in Annex I).

Much of the research undertaken in the last few years has been carried out in a continuing manner, with research and monitoring activities currently underway. The overall picture is given in the previous section, whereas a detailed description of the projects – with reference to the period in which they were carried out – is given in Annex 8.5.

16.1.3 Indicate what research infrastructure is available in the proposed biosphere reserve, and what role the biosphere reserve will play in supporting such infrastructure.

The proposed Biosphere Reserve benefits from an extensive network of bodies based in neighbouring areas, which carry out research activities in various fields within the area of the reserve. The centres dealing with research and those dealing with environmental education, some of which within the area of the proposed reserve, are shown in separate tables.

RESEARCH – INFRASTRUCTURES			
Centre	Description	Municipality	In reserve
ABNP Headquarters	- The park authorities carry out their activities making use of technical and administrative offices situated at the Strembo offices	Strembo	NO
MUSE	Headquarters in Trento, in a futuristic building designed by Renzo Piano. Satellite branches located in the area, in places of great naturalistic or tourist interest (see subsequent entries)	Trento	NO
Lake Ledro Pile-Dwelling Museum	Separate branch of MUSE (see above), operating in the field of prehistoric archaeology (Ledro pile-dwellings and surveys on Mesolithic hunter-gatherers in the Ledro mountains). It manages MNLED, the Ledro museum network (described in section 16.1.1)	Ledro	YES
Monsignor Ferrari Centre	Former mountain hut and dairy renovated for educational purposes within the Tremalzo and Monti Tombea SCI (Ledro). Currently managed by MUSE within the context of MNLED	Ledro	YES
Casèt ringing station	A structure formerly used as a hunting blind within the Bocca di Caset core area. Adopted for annual ringing campaigns managed by MUSE for the purposes of research and education (see section 16.1.1)	Ledro	YES
Museo Civico in Rovereto	The Museo Civico in Rovereto has adopted a strategy of diffuse museum development which has led it to extend effectively throughout the area, going beyond the institutional confines of official museums	Rovereto	NO

Fig. 16.1 Main research infrastructures

EDUCATION AND PUBLIC AWARENESS - INFRASTRUCTURES			
Centre	Description	Municipality	In reserve
ABNP - Villa Santi	The centre, neighbouring on the northern part of the area, has 24 beds, laboratories demonstrating the working of milk and honey-making and spaces equipped for conferences and research. It is an example of the use of green building techniques	Mountains	NO
ABNP - "Flora" Park Centre	Water and plantlife are the two main subjects dealt with at this visitors centre, which includes an accompanying open-air educational itinerary touching on the rumbling waterfalls of the Rio Bianco and passing over the gorge carved out by the stream	Stenico	YES
ABNP - "C'era una volta" Park Centre	Permanent ethnographic exhibition set up at San Lorenzo in Banale, in an 18 th century building recently acquired and restored by the local authority. It contains items linked to the peasant culture, with tools and objects linked to traditional activities	San Lorenzo in Banale	YES
Villino Campi	A 19 th century villa situated on the banks of the lake, dedicated to promoting and disseminating the scientific culture in relation to Lake Garda and the surrounding area. Environmental education activities and exhibitions directed at both residents and tourists take place there	Riva del Garda	NO
Lake Ledro Pile-Dwelling Museum	The museum offers very successful educational activities, with imitative archaeology workshops for schools and a programme of summer activities	Ledro	YES
Ledro Network of Reserves	Starting from 2014, the project (enclosed), provides for various environmental education activities. It has its own budget and therefore effectively offers itself as an infrastructure in this context	Ledro, Tenno, Riva, Storo and Bondone	YES

Fig. 16.2 Main education and public awareness infrastructures

In relation to these bodies the Biosphere Reserve will represent:

- A tool for enhancing research underway and gaining further in-depth scientific knowledge and basic materials for the

development of promotional/ educational programmes;

- A chance to exchange and share research within the MAB network;
- A chance to increase visibility at extra provincial level.



Nets put up at the Bocca di Caset centre to monitor the autumn migration of birdlife; it is managed by MUSE

16.2 Education for sustainable development and public awareness

16.2.1 Describe existing and planned activities, indicating the target group(s) and numbers of people involved (as “teachers” and “students”) and the area concerned.

The main activities are described, with reference to the different bodies operating in the area: APPA, Museo Civico in Rovereto, PNAB, Biotopes Office, PAT, EdJ.

APPA

Since 2000, the information and monitoring division of the Agenzia provinciale per la protezione dell'ambiente (APPA: provincial agency for environmental protection) has carried out initiatives in the

field of information, training and environmental education (INFEA) through the Trentino network of environmental education for sustainable development.

The table below gives the data for the most significant activities held both inside and outside schools in the period 2011 – 2012 by the Agenzia provinciale per la protezione dell'ambiente (APPA), information and monitoring division, in the area of the proposed Biosphere Reserve. For convenience the data has been divided by geographical area.

One can note a clear increase in participation in the last year, showing the success of the initiatives, with increasing interest and participation by residents and local authorities.



MUSE study of bird migrations






EDUCATION AND PUBLIC AWARENESS - ACTIVITIES				
Giudicarie Esteriori area. Falls within the jurisdiction of the Environmental Education Workshop of the Giudicarie				
Activities	Area	Target group	Numbers of people involved	Period
Educational programmes on the subject of: water, biodiversity, sustainable consumption, land, air, sustainable energy, sustainable mobility	Municipalities of Bleggio superiore, Comano Terme, Fiavé, S.Lorenzo in Banale	Students	176 	2011-12 school year
Environmental workshops, information evenings and guided tours on the subject of: sustainable consumption, zooanthropology, waste, biodiversity	Municipalities of Comano Terme and Fiavé	Adults: tourists and residents	163 	2011
TOTAL number of people involved in 2011			339	
Educational programmes on the subject of: biodiversity, sustainable consumption, waste, land, sustainable mobility	Municipalities of Bleggio superiore, Comano Terme, Fiavé, S.Lorenzo in Banale, Stenico	Students	958 	2012-13 school year
Environmental workshops, information evenings and guided tours on the subject of: water, sustainable consumption, zooanthropology, waste, biodiversity, sustainable mobility, sustainable energy	Municipalities of Comano Terme, Fiavé, S.Lorenzo in Banale, Stenico	Adults: tourists and residents	684 	2012
TOTAL number of people involved in 2012			1642	

Fig. 16.3 Main education and public awareness activities, by PNAB

EDUCATION AND PUBLIC AWARENESS - ACTIVITIES				
Municipalities of Ledro, Canale di Tenno and Riva del Garda. Falls within the jurisdiction of the Upper Lake Garda and Ledro area workshop, at APPA's Villino Campi centre in Riva del Garda				
Activities	Area	Target group	Numbers of people involved	Period
"Gramodaya, per vivere in armonia": travelling exhibition on the subject of environmental sustainability.	Villino Campi and neighbouring areas	Visitors	3369 	2011
"Gramodaya" exhibition – associated events	Villino Campi and neighbouring areas	Adults: tourists and residents	740	2011
APPA exhibitions, various subjects	Villino Campi and neighbouring areas	Visitors	383	2011
Educational environmental workshops	Villino Campi and neighbouring areas	Students	1188	2011
"Eulakes" project: climate change and European lakes	Villino Campi and neighbouring areas	Adults: tourists and residents	103	2011
TOTAL number of people involved in 2011			5783	
"Gramodaya" exhibition	Municipality di Canale di Tenno	Visitors	5020	2012
"Gramodaya" exhibition	Villino Campi and neighbouring areas	Visitors	601	2012
"Velambiente" exhibition	Villino Campi and neighbouring areas	Visitors	1745	2012
Educational environmental workshops	Villino Campi and neighbouring areas	Students	1239	2012
Environmental workshops on the subject of: macrophytes, environmental aspects linked to the planning of public works	Villino Campi and neighbouring areas	Professionals	137	2012
TOTAL number of people involved in 2012			8742	

The main activities mentioned in the table and organised at Villino Campi are described below.

Travelling exhibition: “Gramodaya, per vivere in armonia” (Gramodaya, living in harmony), at Villino Campi from 28 May to 28 October 2011

The exhibition was created in India by the Natural Resource Development Project (NARDEP), a cultural organisation operating in southern India in the field of technological innovation, paying particular attention to enhancing traditional culture and its role in ecologically sustainable development. In the local exhibition the contribution of APE (Agenzia provinciale per l'energia: Provincial Energy Agency) and the Organic Farming Office provided additional information and acted as a starting point for reflection on the theme of environmental sustainability, with many concrete examples of projects undertaken in Trentino. The exhibition was an innovative example of the influence of distant cultures, in the search for an innovative model and a sustainable way of life. It was accompanied by a series of events held at Villino Campi and in the local area.

EULAKES project – 8 September 2011

A seminar on the EULAKES project held at Villino Campi on “The effects of climate change on great European lakes”, aimed to promote an integrated approach to

improving processes of sustainable management of lake areas, by adopting a strategy of participatory planning and management, designed to respond to climate change and other environmental stress factors.

Travelling exhibition: “Velambiente. Virata verso un mondo più sostenibile” (Sailing environment. Changing tack towards a more sustainable world): at Villino Campi from 12 July to 29 November 2012

The exhibition offered an unusual vision of sailing, not just as a magnificent sport, widely practiced and popular on the waters of Lake Garda, but also as an opportunity to pay closer attention to the environment.

Activities of the Trentino Network of Environmental Education for Sustainable Development at Villino Campi

Villino Campi houses the Centre and Area Workshop of the Upper Lake Garda Trentino Environmental Education Network, which carries out extensive educational and informative activities throughout the year, directed mainly at schools in Trentino, but also at schools in neighbouring provinces and at summer visitors.



Activity demonstrating traditional working: the production of coal by “carboneri” from Bondone

ADAMELLO-BRENTA NATURE PARK

The Adamello-Brenta Nature Park organises a specific programme of environmental education and information programmes directed at a wide range of users:

- pupils and students from all kinds and levels of schools;
- visitors/tourists in the protected area;
- residents in municipalities within the park;
- stakeholders (farms, tourist and business operators, associations);
- institutions and area bodies with which the park interacts.

From the operational point of view, the park describes all the educational initiatives involving environmental education programmes directed at schools as “Park and School” activities. Its “Informative Activities” instead include all the environmental education programmes directed at other users through different environmental education activities (such as the “Summer in the Park” initiatives in the summer and cultural initiatives directed at residents).

To summarise, the table below gives a list of activities within the park in the relevant municipalities in the reserve (San Lorenzo in Banale, Dorsino, Stenico and Comano Terme):

EDUCATION AND PUBLIC AWARENESS - ACTIVITIES				
Area of the Giudicarie Esteriori – ABNP activities				
Activities	Area	Target group	Numbers of people involved	Period
“Park and School” activities	Giudicarie Esteriori	Students	1003	2011-2012 school year
Activities at the Flora Park Centre	Stenico	Visitors	197	2012
Activities at the S. Lorenzo Centre	S.Lorenzo in Banale	Visitors	83	2012
Information initiatives	Giudicarie Esteriori	Adults: tourists and residents	715	2012

Fig. 16.4 Main education and public awareness activities, by PNAB

More generally, PNAB promotes many educational activities in its area (on the subject of the “UNESCO Dolomites”, energy saving, the park in winter, the quality of local products), of which only a few relate to the area of the proposed Biosphere Reserve. However, it offers an interesting framework which could potentially

be extended to areas of the reserve outside the park.

The initiatives are mainly directed at school students, but also at teaching staff, as an opportunity for professional training.

The graphs below give an idea of the extent of the educational programmes offered overall by PNAB:

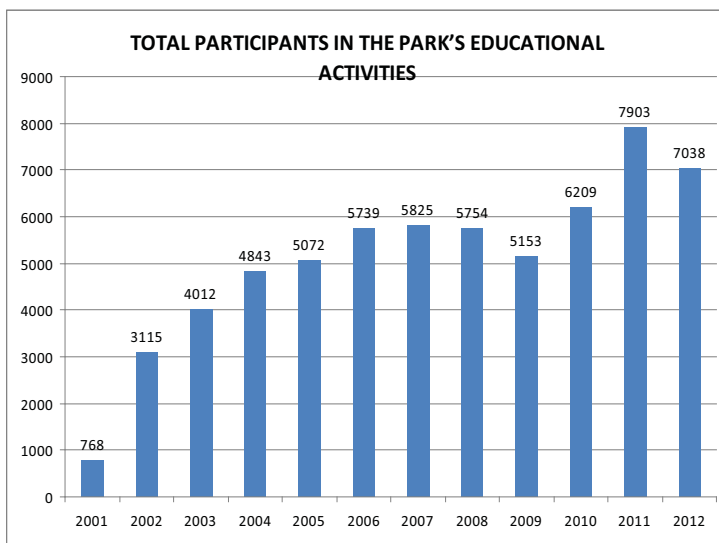


Fig. 16.5 Total participants in the Park's Educational Activities

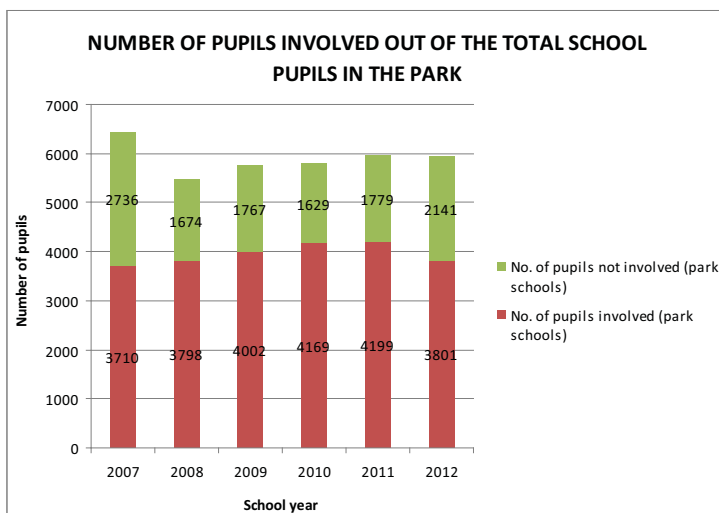


Fig. 16.6 Number of pupils involved out of the total school pupils in the park

Title	Date	Description
Seminar on "Park values stretching beyond the park".	Friday 16 November 2012 in Caderzone	Exploring the role that areas with a high level of biological and landscape diversity can play in processes of sustainable local development, directed at those working in the field, inhabitants and users of the protected area.
2 nd Geoparks Workshop	18 and 19 February 2010, at the "Villa Santi" nature centre	Organised to consolidate relations between Italian geoparks and share experience and projects, starting up collaboration with Italian parks that are about to enter the European and World network of UNESCO geoparks and discussing the management of the geological heritage.
"Open Park"	From 19 to 24 October 2009 in various municipalities in the park	Meeting-exchange of ideas between the park and local people, to get to know, listen to and understand each other, dispelling clichés based on prejudice, which have no justification for existence, and constructing the future park together. Intended to support the review of the ultimate management tool promoting the excellence of the protected area: the Park Plan.
20 years of evolution in the Alps. The parks: players or spectators in change?	Caderzone, Palazzo Lodron Bertelli. Friday 23 May 2008	The park celebrated the first twenty years of its existence with 3 days of events, initiatives, activities and meetings recalling what has been done to date and confirming the park's commitment to safeguarding nature in the future, but also to promoting sustainable development of the area.
1 st national workshop on the ECST	Caderzone Terme – 14 May	An exchange of ideas on the European Charter for Sustainable Tourism with the park.
'LA VIA GEOALPINA' CONFERENCE	24 July 2009 in Caderzone Terme	UNESCO Dolomites, Geopark, the Geo-alpine route: not just protection, but also business opportunities.
4 th Geopark week (European Network of Geoparks)	22 to 28 July 2012	Guided trips accompanied by geologists, nature evenings on geological subjects and excursions along the stretch of the geo-alpine route within the park.

Fig. 16.7 Main educational programmes by PNAB

MUSEO CIVICO IN ROVERETO

The Museo Civico di Rovereto participates in the TERECOP international educational project, which has developed a support structure for teacher training courses, helping them to carry out constructivist training activities with the use of robotics and giving them the chance to share their experience through this structure.

BIOTOPES OFFICE OF THE AUTONOMOUS PROVINCE OF TRENTO

The Biotopes Office of the Autonomous Province of Trento plans and carries out intervention directed at educational and cultural enhancement and social use of biotopes, reserves and areas in the Natura 2000 network, including the production of educational and informative material. It is also responsible for identifying the presence of particularly valuable natural flora and fauna and providing for appropriate safeguarding measures. Furthermore, it deals with initiatives related to research, training and the updating of materials and knowledge. It operates within the area with a permanent centre at the Ampola SIC (in Ledro) and at the Fiavé pile-dwelling museum.

JUDICARIA ECOMUSEUM

Since 1999 the EdJ has carried out various initiatives related to sustainable development, as specified in section 15.

LEDRO NETWORK OF RESERVES

The project underway, to be implemented from 2014, provides for numerous activities related to education, promotion and raising awareness of subjects and content linked to environmental sustainability. It has its own budget and therefore effectively offers itself as an infrastructure in this context.

16.2.2 What facilities and financial resources are (or will be) available for these activities?

The research and dissemination activities are all funded by the public sector and are handled by the relevant bodies. As regards educational activities, there is a wide range of possibilities, going from school activities mostly offered by public bodies, to training activities outside schools paid for by users. The availability of resources therefore depends on the programmes of the bodies described above. In this context, the following is underlined:

- the history of activities carried out, mentioned above, is relatively significant in terms of awareness of the question of sustainability and the past commitment of the bodies involved;
- it can be presumed that these activities are also likely to continue in the future, as they are by now consolidated programmes, albeit using different methods and structures;

- the development of the project to implement the Ledro Network of Reserves is of great interest, also at provincial level. This is directed at conservation and social awareness of environmental

topics, being equipped with its own budget (already funded for the next three years – see Annex 4.3) and representing an innovative experience of this kind at provincial level.



Tourist path on Ampola Pond

16.3 Contribution to the World Network of Biosphere Reserves

16.3.1 How will the proposed biosphere reserve contribute to the World Network of Biosphere Reserves, its Regional and Thematic Networks?

The knowledge gained to date in the field of environmental research, the historic or current environmental policy implemented over the years and the network of relations developed with bodies outside the province represent assets for the proposed reserve and a starting point for future initiatives.

There are a series of specific areas in which the proposed reserve can make a contribution of great value and interest for the MAB Network of Reserves, due to the nature of the activities carried out or the environmental characteristics present:

- knowledge of birdlife migration, based on long-term analysis of one of the main migratory flows across the Alps (as described in section 4.2)
- knowledge regarding flora in the historic Insubria region (the lakes area between Italy and Switzerland) and in particular the more than 30 endemic species in the area in question (described in

section 4.2);

- consolidated experience gained over several centuries in the management of primary resources (forests, pasture, waters) based on public or collective ownership;
- cooperative methods and systems in the field of agriculture, credit and town services, developed over more than a century of activity.

There are also another series of areas in which the development of research and future activities could lead to interesting experience and results for the MAB Network of Reserves, due to the interest demonstrated by the bodies involved:

- sustainable development policy in mountain areas, including action in the field of mobility, fossil free energy and application of the CETS;
- the relationship between agriculture and tourism, both in relation to reducing the impact of the former on tourism, and – in the opposite sense – of possible forms of interaction and reciprocal promotion;
- the synergistic promotion of WH sites (Brenta Dolomites and the Ledro and Fivè pile-dwellings).

16.3.2 What are the expected benefits of international cooperation for the biosphere reserve?

The UNESCO MAB network provides interesting examples of policy and problem-solving in situations similar to those present in the proposed reserve. In particular, the approach to the environmental question – conservation and sustainable management – can represent a transversal element in international collaboration with other MAB sites. The network of contacts with the bodies involved in the various

activities described represents a good starting point, just as the relations started up with agencies at alpine level are strong points, as stated in the letters of support (see Annexes: Alpine Convention, CIPRA etc.)

The following aspects are of particular interest in terms of exchanging ideas:

- collaboration in the alpine context, through INTERREG and the EUREGIO (Tyrol, South Tyrol Trentino Euro region, included in the EU GECT programme);
- collaboration with other MAB sites on questions linked to climate change in the alpine environment.

16.4 Internal and external communication channels and media used by the biosphere reserve

16.4.1 Is (will) there (be) a biosphere reserve website? If yes, what is its URL?

There is not currently a specific site, however a special section has been prepared – dedicated exclusively to the nomination proposal and subjects linked to it – within the site of the Judicaria Ecomuseum¹ and on the Protected Areas of PAT web site².

16.4.2 Is (will) there (be) an electronic newsletter? If yes, how often will it be published?

Yes, the site of the Judicaria Ecomuseum currently allows visitors

¹ <http://www.dolomiti-garda.it/riserva-biosfera-dell-unesco>

² www.areeprotette.provincia.tn.it

to register to receive the newsletter, which will also contain news about the nomination procedure for the proposed Biosphere Reserve. The newsletter will come out at approximately monthly intervals.

16.4.3 Does (will) the biosphere reserve belong to a social network (Facebook, Twitter, etc.)?

Yes, the proposed Biosphere Reserve currently has a page on facebook: <https://www.facebook.com/EcomuseoDellaJudicaria>

www.archeo.it

ARCHEO

ATTUALITÀ DEL PASSATO

IL MUSEO DELLE PALAFITTE DI FIAVÉ



PROVINCIA AUTONOMA DI TRENTO
Soprintendenza per i Beni librari, archivistici e archeologici
Ufficio Beni archeologici
Via Aosta, 1 - Trento - tel. 0461 492161
sopr.librariarchivisticiarcheologici@provincia.tn.it
www.trentinocultura.net/archeologia.asp



**Museo
Palafitte
Fiavé**

MUSEO DELLE PALAFITTE DI FIAVÉ
Via 3 Novembre, 53 – Fiavé (Trento)
tel. 0465 735019

Technical report on Pile Dwelling Fiavé Museum

17. GOVERNANCE, BIOSPHERE RESERVE MANAGEMENT AND COORDINATION

17.1 Management and coordination structure

17.1.1 What is the legal status of the biosphere reserve?

Italian law does not provide for a specific legal status for biosphere reserves, as takes place in other countries.

17.1.2 What is the legal status of the core area(s) and the buffer zone(s)?

The current regulatory framework for the different areas included within the reserve is given below:

The legal status of the core areas makes reference to two European directives: the “Birds” Directive (2009/147/CE), which identifies ZPSs, and the previously mentioned “Habitat” Directive (92/43/CEE), which identifies SICs. The combinations of ZPSs and SICs make up the European Union Natura 2000¹ network, the largest ecological network in the world.

The two community directives were implemented at provincial level by Provincial Law 11/07, together with a number of implementation measures passed by the provincial government and decrees of the President of the

Province².

Within the zones of the proposed Biosphere Reserve, ZPSs are superimposed on SICs in the core areas, therefore affording a dual level of protection at community level.

Furthermore, the northern core area also falls partly within the PNAB and is hence subject to the additional protection of L.P. 11/2007 and the Park Plan (Annex 4.02).

What is more, the buffer areas also fall mostly within the Natura 2000 network (83%). The remaining parts fall within areas protected by the provincial planning scheme according to L.P. 5/2008, as specified below.

Specifically:

- the northern buffer zone falls mostly within the SIC area. The remaining part is classified by the PUP as a grazing and woodland area, and as such is protected

¹ The Natura 2000 network covers 20% of EU territory. The percentage rises to 30% in the context of the Province of Trento and 37% in the area of the Biosphere Reserve.

² D.G.P. of 30 December 2005, no. 2956 – Adoption of measures for general safeguarding of SICs;
D.G.P. of 27 October 2006, no. 2279 - Adoption of conservation measures for ZPSs;
D.G.P. of 22 February 2007, no. 328 – Identification of ZPSs;
D.P.P. of 3 November 2008, no. 50-157/leg – Regulation of protected areas;
D.G.P. of 5 August 2010, no. 1799 and subsequent amendments – Identification of provincial ZPSs;
D.G.P. of 22 October 2010 no. 2378 and subsequent DGP of 12/4/13 no. 632 - Conservation measures for ZPSs.

respectively by articles 39 and 40, which do not allow construction or any radical transformation in land use (see Annex 3.4). It is compulsory for these restrictions to be carried forward to plans subordinated to the PUP, namely community plans and municipal PRGs (general planning schemes), in this case the Stenico PRG¹.

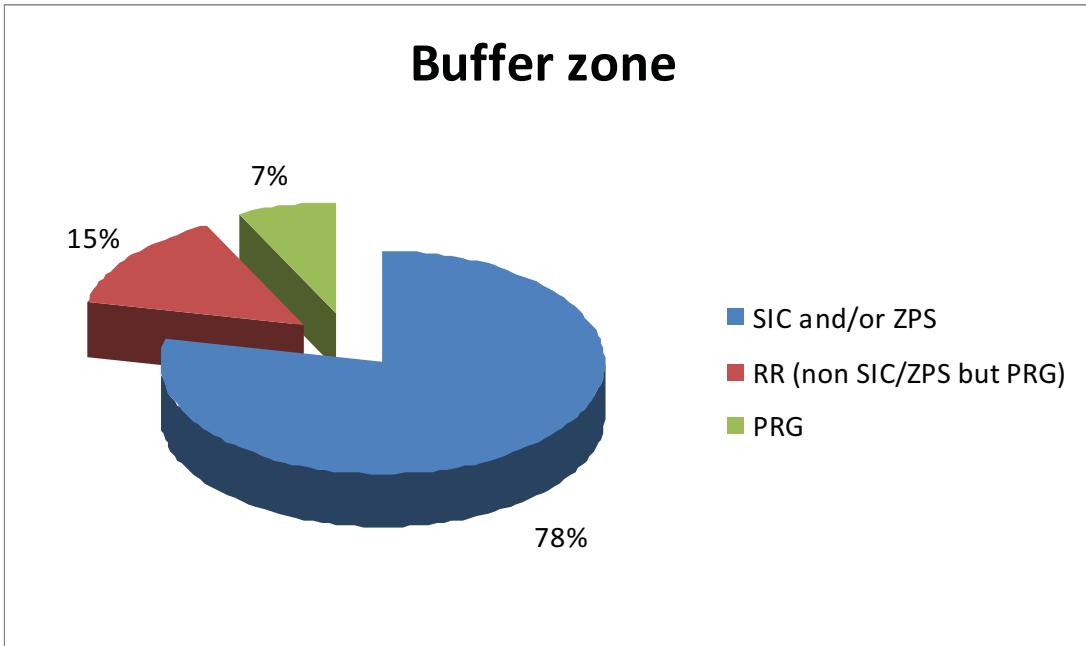
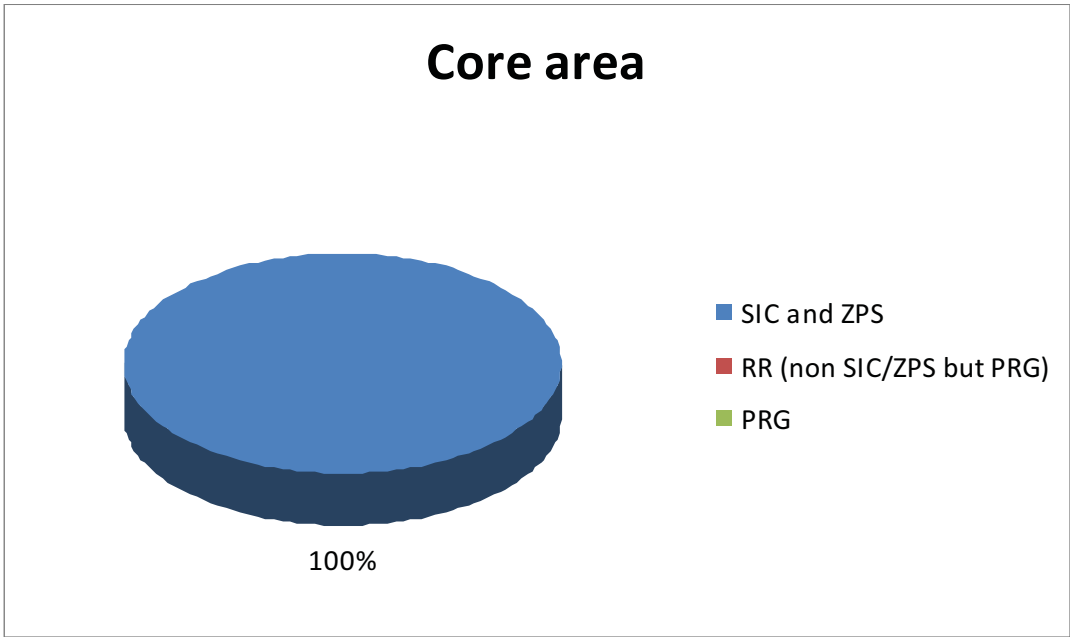
- the central buffer zone falls entirely outside the context of the Natura 2000 network and is regulated by the PUP, again

¹ PRG of the Municipality of Stenico (provincial government resolution no. 299 of 24/02/2012);

according to articles 39 and 40 (grazing and woodland areas), in addition to article 28, which regulates unspoilt environmental areas (see Annex 3.4). These provisions have also been implemented within the PRGs of the Municipalities of Tenno, Ledro and Riva del Garda².

- the southern buffer zone falls entirely within the SIC and is therefore protected according to

² PRG of the Municipality of Tenno (provincial government resolution no. 901 of 06/05/2011); PRG of the Municipality of Ledro (provincial government resolution no. 1966 of 16/09/2011); PRG of the Municipality of Riva del Garda (provincial government resolution no. 1902 of 07/09/2012)



17.1 Distribution of the different types of legal status within the core areas and buffer zones (in terms of surface areas concerned)

17.1.3 Which administrative authorities have competence for each zone of the biosphere reserve (core area(s), buffer zone(s), transition area(s))?

A list of administrative authorities with competence in the various areas is given in the next Table. For further details, see also section 14.1.3.

Core Areas	Buffer areas	Transition Areas
PAT	PAT	PAT
CAGL, CdG	CAGL, CdG	CAGL, CdG
PNAB	PNAB	
Municipalities of Ledro, Tenno, Stenico, S. Lorenzo in Banale, Dorsino, Riva del Garda, Comano Terme	Municipalities of Bondone., Storo, Ledro, Tenno, Stenico, S. Lorenzo in Banale, Dorsino, Riva del Garda, Comano Terme	Municipalities of Bleggio Superiore, Storo, Ledro, Tenno, Stenico, S. Lorenzo in Banale, Dorsino, Fiavè, Comano Terme

17.2 Jurisdiction of the various administrative bodies in relation to the MaB zones

17.1.4. Clarify the respective competence of each of these authorities. Make a distinction between each zone if necessary and mention any decentralized authority.

It should be pointed out that the Autonomous Province of Trento has particular autonomy of jurisdiction in relation to the Italian State, and that on the basis of the Special Statute of Autonomy, in accordance with DPR no. 670 of 31.8.72, it has primary competence as regards numerous sectors, including the management and protection of the area.

The Autonomous Province of Trento regulates the management of the area and establishes binding policy for

local authorities through legislation in the sector and the Piano Urbanistico Provinciale (provincial planning scheme), approved with L.P. 5/2008. As stated in section 17.1.2, within the proposed Biosphere Reserve the PUP regulations are relevant above all outside the protected areas, by establishing a system of planning restrictions which must necessarily be adopted by subordinate plans, namely the Area Plan of the CdG and the Area Plan of the CAGL, both being drawn up, and by municipal PRGs, which cannot modify the essential content of forest and mountain planning provisions. Within the protected areas, whose perimeters are established by the



One of the various meetings between administrators to determine the content of the nomination dossier; Comano Terme, August 2013

PUP, there is special legislation, also resulting from the Habitat and Birds community directives, which give competence for management of these areas to the PNAB or municipalities through the Networks of Reserves (the RR in the proposed Biosphere Reserve). The SICs outside the protected areas (in the proposed Biosphere Reserve the SICs of Fiauvé, Lomasona and Ampola) are instead managed directly by the Province.

17.1.5 Indicate the main land tenure (ownership) for each zone.

The distribution of the type of ownership in the various areas is conditioned by the long history of collective management of natural resources characterising the proposed Biosphere Reserve (for a detailed description see section 9).

Within the core areas almost all land (99%) is publicly owned (by

municipalities or collectives). Within the buffer zones around 95% of land is publicly owned, being largely made up of woods and grazing land high in the mountains. The transition area has a equal distribution between public and private ownership, with around 50% of the area, including all agricultural land and the urban areas – being privately owned.

17.1.6 Is there a single manager/coordinator of the biosphere reserve or are several people in charge of managing it? If one manager/coordinator, who designates and employs him/her (national authorities, environmental administrative agency, local authorities)?

The model of governance proposed in the Memorandum of Understanding signed on 6 September 2013 by the 20 promoting organisations (see Annex no. 3.1) provides for identification of a Biosphere Reserve Coordinator at local level, with the task of implementing the strategic guidelines decided by the political organs of the reserve.

The Coordinator, who will be nominated by the Steering Committee, according to article 2, par. 1, section b), will also carry out other important tasks:

- acting as an area coordination worker, capable of maintaining relations with the stakeholders, and having the role of proposing

projects;

- acting as a link between the numerous bodies supporting the Biosphere Reserve project.

It is likely that the local Coordinator will be flanked by a liaison officer identified by the Autonomous Province of Trento, with the task of linking the activities of the Biosphere Reserve with policy for protected areas at provincial level, the activities of the MAB Committee in the national context and with the World Network of Biosphere Reserves at international level.

17.1.7 Are there consultative advisory or decision-making bodies (e.g., scientific council, general assembly of inhabitants of the reserve) for each zone or for the whole biosphere reserve?

If yes, describe their composition, role and competence, and the frequency of their meetings.

One of the main objectives of the Programme Agreement provided for in article 2, par. 1, section b) of the Memorandum of Understanding is definition of the system of governance.

The model of reference is the one implemented in the Networks of Reserves, which have represented an experience of streamlined and effective management of small protected areas in the Province of Trento in the last few years. This model provides for the setting

up of certain organs, whose composition and competence are briefly described hereafter, with a consultative or decision-making role, which are entrusted with the overall management of the Biosphere Reserve.

These organs are:

- a Steering Committee;
- the President of the reserve;
- an Executive Committee (or Working Group);
- an Area Forum;
- a possible technical /scientific committee.

Furthermore the Programme Agreement must identify the Lead Partner for the Biosphere Reserve. The consultative organs provided for include the following:



Barriers to protect spring migration by amphibians along roads, at the Fiaavè peat bog

AREA FORUM

The Area Forum is an instrument allowing the participation of inhabitants, associations, businesses and all local players in the management of the Biosphere Reserve. Particular attention will be paid to involving women and young people's associations.

The Area Forum does not provide for selection of participants on the basis of representativeness, but is rather based on inclusive participation designed to promote ideas and the search for shared solutions, also between different interest groups. Drawing together ideas and final validation of proposals remains the task of the Steering Committee, whereas the necessary verification in terms of technical, administrative and economic feasibility is delegated to the Executive Committee. The Steering Committee undertakes to present its decisions to the Area Forum, explaining its reasons should these decisions not correspond with the proposals drawn up through the work of the Area Forum.

The Area Forum shall be called by the President of the reserve on any occasion deemed necessary, and at least twice a year.

In order to encourage the greatest possible participation, it is expected to set up two separate forums, one for the Giudicarie Esteriori area and one for the Val di Ledro, also with the scope of avoiding the duplication of organs, given that a similar forum is also provided for in the case of the

Ledro Alps Network of Reserves, and is currently being set up.

TECHNICAL-SCIENTIFIC COMMITTEE

In order to avoid superfluous action, contain the costs of running the Biosphere Reserve and encourage integration of the management of the Biosphere Reserve within the provincial system for protected areas, for technical and scientific consultancy recourse will be made to the specific scientific committee for protected areas. This was set up according to article 52 of the L.P. of 11/07 to provide technical and scientific consultancy within the province, and has the task of expressing its opinion as regards:

- a) the draft plan for each park;
- b) the draft management plans for the reserves;
- c) projects for the setting up and modification of protected areas in the province and the "Natura 2000" network;
- d) any other questions regarding parks, reserves and the "Natura 2000" network which are submitted to its attention by the provincial government, the management of protected areas or the management bodies of parks, reserves and the network of reserves.

The committee shall be nominated by the provincial government and shall be made up of a manager from the Province and four experts in the field of environmental management and

nature conservation, chosen from graduates in natural, ecological and biological science.

17.1.8 Has a coordination structure been established specifically for the biosphere reserve?

If yes, describe in detail its functioning, composition and the relative proportion of each group in this structure, its role and competence.

THE STEERING COMMITTEE OF THE RESERVE

The Steering Committee of the proposed Biosphere Reserve shall be made up of:

- a) the President of the reserve;
- b) the Mayor of each municipality belonging to the Biosphere Reserve or his/her delegate in the role of councillor;
- c) the Presidents of the Comunità delle Giudicarie and the Comunità dell'Alto Garda e Ledro or their delegates in the role of councillors;
- d) the President of the Adamello Brenta Nature Park or his/her delegate in the role of councillor;
- e) the Presidents of the Sarca and Chiese BIMs, or their delegates;
- f) the Presidents of the Comano and Ingarda tourist offices and the tourist consortium of the Val di Ledro, or their delegates;
- g) the Autonomous Province of Trento's Councillor for the Environment, or his/her delegate.

The role of Chairman of the Steering Committee shall be taken by the representative of the Lead Partner, who shall also be President of the proposed Biosphere Reserve.

The Steering Committee shall have the following roles:

- a) identifying the Lead Partner
- b) nominating the Executive Committee for the reserve;
- c) nominating the Coordinator of the reserve;
- d) deciding policy for the plan of action;
- e) adopting an initial draft of the Management Plan to be submitted to all the signatories of the Programme Agreement, in order to arrive at the second draft of the plan, to be presented to the reserve's promoting organisations for definitive approval;
- f) approving the three-year programme, as an instrument for deciding the conservation and sustainable development activities and participatory and informative activities linked to them;
- g) deciding on the coordination of projects within the area of the reserve, on the basis of the non-binding opinion expressed by the reserve's Executive Committee;
- h) approving the annual report on the progress of the reserve;
- i) deciding and establishing any other aspects related to governance of the reserve.

The Steering Committee shall take the proposals emerging from the Area Forum as a privileged point

of reference for decisions and shall undertake to explain the reasoning behind its decisions, in the event that these move away from the proposals of the Forum.

The Steering Committee shall be called at least three times a year by the President and on any occasion in which this is requested by at least seven members of the Steering Committee.

PRESIDENT OF THE BIOSPHERE RESERVE

The representative of the Lead Partner shall have the role of President of the Biosphere Reserve and Chairman of the Steering Committee.

The President shall have the following roles:

- a) chairing the Executive Committee of the reserve, preparing the agenda;
- b) calling and chairing the Steering Committee, preparing the agenda;
- c) calling the Area Forum and the Executive Committee of the reserve;
- d) supervising the general progress of the reserve;
- e) guaranteeing the transparency of decisions and information for the management organs of the reserve;
- f) presenting the Steering Committee with an annual report on the progress of implementation of the reserve and the activities carried out;
- g) presenting the Executive

- Committee of the reserve and/or the Area Forum with the proposals of the Steering Committee not included in the plan of action;
- h) acting as spokesperson for the Biosphere Reserve on institutional and public occasions and promoting it at all levels.

EXECUTIVE COMMITTEE (OR WORKING GROUP) OF THE BIOSPHERE RESERVE

The Executive Committee of the Biosphere Reserve, chaired by the President, shall be made up of approximately 9 representatives from the following bodies:

- a) municipalities and communities;
 - b) Autonomous Province of Trento;
 - c) Adamello-Brenta Nature Park;
 - d) local tourist offices or tourist consortia present in the reserve;
 - e) BIMs
- guaranteeing a good representational balance between the two areas into which the reserve is divided: Giudicarie Esteriori and Ledro.

The Executive Committee shall have the following roles:

During the phase to draw up the Management Plan and until its approval:

- a) supervising the drawing up of the Management Plan, in line with the policy of the Steering Committee;
- b) preparing the proposals of the Area Forum in terms of their technical, administrative and financial feasibility, in order to present them to the Steering Committee.

After the approval of the Management

Plan:

- c) coordinating administration, staff and financial management;
- d) verifying the progress of implementation of the Management Plan;
- e) structuring the three-year plan of action on the basis of the policy of the Steering Committee and the financial resources available;
- f) examining and deciding as regards implementation aspects of the actions included in the three-year plan of action;
- g) monitoring the progress of the three-year plan of action;
- h) preparing the proposals of the Area Forum in terms of their technical, administrative and financial feasibility, in order to present them to the Steering Committee;
- i) drawing up any proposals not included in the plan of action to present to the Steering Committee.
- j) preparing an annual report on the progress of implementation of the reserve, along with a financial statement for the intervention carried out.

The Executive Committee shall be called and chaired by the President and shall meet at least every three months.

LEAD PARTNER

The Lead Partner, the coordinating organisation for the Biosphere Reserve, will be identified in the Programme Agreement, according to article 2, par. 1, section d) of the Memorandum of Understanding, from

among the signatories representing the area: a municipality, community or BIM.

The choice of the Autonomous Province of Trento not to take on the role of Lead Partner for the reserve directly is in line with the principle of responsible subsidiarity, also confirmed by the provincial planning scheme.

The Lead Partner will be figure of reference for the promoters of the reserve in relation to financial aspects and the fulfilment of all the necessary obligations related to the reserve.

In particular, the Lead Partner will be responsible for:

- a) administrative management, taking appropriate action and preparing and adopting all official provisions and measures necessary for the running of the reserve;
- b) financial aspects and account management, specifically including the funding necessary in its budget on the basis of the financial plan approved by the Steering Committee of the reserve;
- c) making offices available for the operational headquarters free of charge. Out-of-pocket expenses will be attributed to the ordinary budget of the reserve under the item "running costs".

Is this coordination structure autonomous or is it under the authority of local or central government, or of the manager/coordinator of the biosphere reserve?

This coordination structure is closely linked to local governments, both because it is effectively a direct expression of the promoting bodies of the Biosphere Reserve, and because the representatives of these bodies within the organs of the reserve correspond with the highest level of responsibility for the same area authorities (their Mayors or Presidents).

17.1.9 How is the management/coordination adapted to the local situation?

The management organs of the reserve are all an expression of local institutions, in their turn elected democratically, either directly (in the case of municipalities and the communities) or indirectly (the park, BIMs and PAT).

17.1.10 Is there a procedure for evaluating and monitoring the effectiveness of the management?

No procedure for evaluating and monitoring the effectiveness of the management has been prepared yet. Indicators for the monitoring of environmental and socioeconomic factors, chosen from those stated in section 15.1.2 will be established in the Programme Agreement.

17.2 Conflicts within the biosphere reserve

17.2.1 Describe any important conflicts regarding the access or the use of natural resources in the area considered (and precise period if accurate). If the biosphere reserve has contributed to preventing or resolving some of these conflicts, explain what has been resolved or prevented, and how this was achieved for each zone.

As regards limiting access to the use of the natural resources present in the proposed Biosphere Reserve, it should be underlined that in Trentino protected areas cover nearly 30% of the territory, well over the national and European average. PAT's environmental policy is moving towards a new approach to nature conservation, intended to show the possible advantages of active protection and economic development, rather than towards bureaucratic action to designate new protected areas.

With this scope, the strategy of the Autonomous Province of Trento is to overturn the traditional top-down approach, moving towards real involvement/convincing/orchestration with local communities.

In short, it is intended to adopt a genuinely bottom-up approach,

which can encourage the maturing of cultural processes of awareness and responsibility, alongside an intensive campaign to raise social awareness, in order to guarantee more lasting and effective results.

The proposed Biosphere Reserve is therefore also oriented towards ensuring that the public understands that balanced area management represents an opportunity in terms of sustainable development and the competitiveness of the area.

In this context it is worth recalling that the setting up of the proposed Biosphere Reserve will not lead to the imposition of any new restrictions as regards the use of natural resources, as compared to the provisions of existing legislation.

The main conflicts which emerged during the phases to prepare the nomination concerned:

- some aspects of intensive animal husbandry, described in the preliminary document of the Community Plan (described in section 15.3.2. and Annex 4.1), regarding nitrogen emissions in the environment and having consequences in terms of use of the area (in some periods of the year) and public health (air quality and waste water);
- some hunters/hunting

associations, due to the fear, albeit unfounded, that the setting up of the proposed Biosphere Reserve would lead to new limitations on hunting as compared to the current situation.

In line with the above, the

communication and information activities were particularly intense in the period defining the proposed nomination, as explained in section 4.6.1 and illustrated in Table 17.3, giving a list of the public meetings held on the subject.

Place	Subject	Date
Municipality of Comano Terme	Open meeting with the population and local associations	20 May 2013
Municipality of Tenno	Open meeting with the population and local associations	21 May 2013
Municipality of Ledro	Open meeting with the population and local associations	22 May 2013
Municipality of Fivè	Open meeting with the population and local associations	1 July 2013
Municipality of S.Lorenzo in Banale	Open meeting with the population and local associations	5 July 2013
Municipality of Stenico	Open meeting with the population and local associations	19 July 2013
Municipality of Bleggio Superiore	Open meeting with the population and local associations	22 July 2013
Municipality of Dorsino	Open meeting with the population and local associations	24 July 2013
Municipality of Fivè	Open meeting with ASUCs	8 August 2013
Municipality of Ledro	Open meeting with the population and local associations	22 August 2013
Municipality of Stenico	Open meeting with businesses	23 August 2013
Comunità di valle dell'Alto Garda e Ledro	Meeting with the assembly of the Comunità	30 August 2013
Municipality of Ledro	Meeting with the municipal council	3 September. 2013
Municipality of Tenno	Meeting for municipal councillors from the municipalities in the reserve	3 September. 2013
Municipality of Comano	Meeting with representatives of hunting associations	13 September. 2013

Fig. 17.3 List of meetings organised to discuss the proposed Biosphere Reserve



Tunnels under roads to encourage the migration of amphibians, at the Fiaavè peat bog



**TUTTA LA POPOLAZIONE È INVITATA AD INIZIARE UN
PERCORSO PARTECIPATO E A RIFLETTERE SUL TEMA:**



VERSO UN "PATRIMONIO DELLA BIOSFERA UNESCO"?

Il territorio comprendente le Giudicarie esteriori, il Tennesse e la Val di Ledro, si sta candidando per un riconoscimento di rilievo mondiale per l'eccezionale presenza di valori naturali e culturali.

**CHE COS'È UNA
"RISERVA DELLA BIOSFERA"?**

**L'USO DEL TERMINE "RISERVA"
È OBBLIGATORIO?**

**PERCHÉ CANDIDARE LA ZONA DI
LEDRO E L'AREA DELL'ECOMUSEO
"DALLE DOLOMITI AL GARDA"?**

**QUALI BENEFICI PUÒ PORTARE
IL RICONOSCIMENTO
DELL'UNESCO?**

INTERVERRANNO:

Achille Brigà

Sindaco di Ledro

Sandro De Guelmi

Assessore Comunità di Valle

Luca Bronzini

Studio Pan Associati

Roberto Bombarda

Consigliere provinciale

**MERCOLEDI' 22 MAGGIO
ORE 20.30
CENTRO SOCIALE MOLINA**



Informative flier for public meeting in Ledro

It is however noted that even before the process to set up the proposed Biosphere Reserve, activities were carried out to provide information and raise awareness regarding initiatives that could give rise to fears or suspicions as regards further limitations to the use of resources linked to the setting up of protected areas.

In some fields (such as the setting up of the RR, described in Annex 4.3) differentiated meetings were held for representative associations, dealing with the content involved in setting up a process of delocalization and empowerment for the management of natural resources.

The meetings organised by PNAB (Annex 8.1) in the process to implement the CETS were also part of the same series of initiatives.

17.2.2 If there are any conflicts in competence among the different administrative authorities in the management of the biosphere reserve, describe these.

No conflict of this kind has arisen during the process to define the proposed Biosphere Reserve. Roles

and competence are currently defined in detail by existing legislation. In terms of governance, (according to the content of sections 17.1.7/8) the various organs were mutually agreed, while the choice of the Lead Partner from among the local bodies involved will also be decided by mutual agreement in the context of the Programme Agreement.

17.2.3 Explain the means used to resolve these conflicts, and their effectiveness.

As described in detail in section 17.2.1, the implementation of provincial policy to decentralise certain decisions and responsibilities, contrasting free choice in terms of utility with a system based simply on restrictions, represents a fundamental element. Furthermore, in the case of this specific process, communication, information and transparency have been the main means used to manage any conflict that might arise. In the case of hunting associations, which were the most explicit in manifesting their diffidence as regards the initiative, specific informative initiatives were organised (as shown in Table xxx, and with a specific article in the specialist press).

17.3 Representation, participation and consultation of local communities

17.3.1 At what stages in the existence of a biosphere reserve have local people been involved: design of the biosphere reserve, drawing up of the management/cooperation plan, implementation of the plan, day to day management of the biosphere reserve? Give some specific examples.

As pointed out in other parts of the document (e.g. section 15), numerous processes started up in the last few years have had similar objectives to the MAB reserve, namely the implementation of sustainable development projects based on the exploitation of existing local resources linked to the area:

- unification of the Municipality of Ledro, bringing together six previously existing municipalities;
 - the setting up of the Ledro Alps RR;
 - processes of EMAS certification;
 - the reinforcement of the PNAB through projects such as the CETS, Qualità Parco, mobility;
 - processes to discuss and implement the main planning documents, such as the PUP and community plans;
 - the Judicaria Ecomuseum project.
- Therefore numerous activities to raise awareness on the subject have taken

place in the area in the last few years. The specific process to set up the proposed Biosphere Reserve began in February 2013, as stated in section 4.6.1. Consultation began immediately with the administrations that could potentially be involved, administrations that promptly joined the initiative, starting with PAT (Annex 3.2, minutes of MAB meeting in March 2013).

Subsequently, activities in the area were initiated through public meetings, visits and concrete case studies (Ticino and Cilento), information through the press and television (Sections 4.6.1 and 17.2.1), involving a considerable number of citizens. The meetings concerned in particular:

- initially, the general concept of the MAB reserve, methods involved in setting up, consequences and concrete examples;
 - later, more concrete aspects regarding governance, problems noted and subsequent activation.
- In the future numerous instruments are provided for (see Annex 3.1, Memorandum of Understanding) to guarantee the involvement of the local community:
- direct management, including the Lead Partner, headed by local authorities in the area;
 - a permanent forum of citizens



The mountain dairy, a traditional element in the alpine environment, offers major potential for combining historic activities with new initiatives; here at Malga Nambi (Brenta Dolomites)

from various backgrounds and associations is provided for.

17.3.2 Describe how the local people (including women and indigenous communities) have been, and/or are represented in the planning and management of the biosphere reserve (e.g., assembly of representatives, consultative groups).

Sections 4.6, 17.2 and 17.3.1 summarise the ways in which consultation and involvement of the

local communities took place. All the initiatives and meetings were conducted by representatives of the local communities and all the municipal administrations. There were several open meetings at which the public was able to interact directly with the planning team, headed by the representatives of the Mayors involved.

The Steering Committee, with representatives of all the local authorities involved, dealt with the formulation and definition of the nomination dossier in detail.

17.3.3 Describe the specific situation of young people in the proposed biosphere reserve (e.g., potential impacts of the biosphere reserve on youth, consideration of their interests and needs, incentives to encourage them to participate actively in the governance system of the biosphere reserve).

Young people are involved in various ways.

From the beginning, the Comano Valley 2.0 association supported the information process, participating directly in the meetings and creating a link to the MAB project at their site. Furthermore, at the public meetings it was repeatedly emphasised that the whole project regarding the proposed Biosphere Reserve is aimed at:

- sustainable promotion of the area, and hence the creation of better conditions of life for future generations;
- better opportunities in terms of employment, quality of the living environment and possibilities for activities related to other situations;
- the creation of activities in the field of farm guesthouses, crafts, dissemination and the direct management of area resources.

17.3.4 What form does this representation take (e.g., companies, associations, environmental associations, trade unions)?

Representation takes various forms:

- the local communities are represented by their elected administrative organs. The administrative organs are made up of various organisations: municipalities, valley communities, the province, the park and tourist offices;
- an Area Forum is provided for, as specified in section 17.1.8;
- there are numerous supporting letters for the initiative, coming from various kinds of bodies and local associations (Annex 8.11).

17.3.5 Are there procedures for integrating the representative body of local communities (e.g., financial, election of representatives, traditional authorities)?

The system of governance proposed is based on representatives of the local communities, elected directly or nominated on the basis of technical aspects (section 17.1.8). The procedure for informing, communicating and exchanging ideas with the various components has been managed by representative bodies of the local communities from the very beginning. An important secondary role has also been played by PAT.

17.3.6 How long-lived are consultation mechanisms (permanent assembly, consultation on specific projects)? Make a complete description of this consultation. What are the roles of involved stakeholders compared to the role of the biosphere reserve?

Previous sections 17.3.1-5 describe in detail the consultation methods and mechanisms. It is recalled once again that:

- before the nomination process in

relation to the proposed Biosphere Reserve began, numerous other processes took place using similar mechanisms and with similar objectives to those in question, to a certain extent extending the process underway and encouraging the maintenance of participatory conditions for the project;

- for the future the foundations have been laid for involvement through the prioritising of local representation in management and through a permanent consultation forum open to all those interested.



Educational activities in Pile Dwelling Ledro Museum by ReLED

17.3.7 What consultation mechanisms have been used, and who has been involved? Are they for specific purposes or long-term? What impacts have they had on decision-making processes (decisional, consultative or merely to inform the population)?

As described in sections 17.3.1-6 and 4.6, the process is based on numerous communication tools: informative meetings, information via the press, social networks, television, specialist press, specific information and meetings between administrators in various locations in order to define the characteristics of the proposal (see also Annex II, press releases).

At the numerous meetings local administrators have had the chance to inform citizens of the content of the proposal and receive any feedback. This feedback, and associated initiatives, has contributed towards defining the details of this proposal.

17.3.8 Do women participate in community organizations and decision-making processes? Are their interests and needs given equal consideration? What incentives or programmes are in place to encourage their representation and participation (e.g.: was(were) a “gender impact



Cultural activities to promote traditional crops: here at an olive grove in Tenno with an agricultural expert

assessment(s)” carried out)?

As pointed out in section 9.4, the presence of women within management organs is generally lower as compared to the number of male representatives. The following table shows the presence of women (%) within local administrations: The local data is essentially in line with the provincial and national situation as regards municipal councillors, whereas the presence of women Mayors is significantly higher than average. Recently there has also been an

alternation in terms of the gender of those in certain top positions, and some women have been nominated or elected to head certain institutions. This is the case of:

- the President of the CdG;
- the President of Comano tourist office and Consorzio Proloco Ledro;
- the managers of Comano tourist office, Ingarda and the Consorzio Ledro.

This aspect is relatively unique and not common within the regional context.

Area	Mayors	Municipal councillors
Giudicarie and Ledro municipalities	18.2	22.8
Province of Trento	12.0	24.8
Italy	11.4	20.5

Presence of women (%) within local administrations



Cultural activity to promote the agricultural heritage and landscape for the purposes of tourism, managed by the tourist office of Comano Terme

17.4. The management/cooperation plan/policy:

17.4.1 Is there a management/cooperation plan/policy for the biosphere reserve as a whole?

There is not yet a Management Plan for the Biosphere Reserve. However, the creation of such a management tool for the reserve is provided for as soon as it has been set up.

What is more, given the point of departure, already equipped with a wealth of planning tools and strategic documents, it would make no sense for the Management Plan of the reserve to represent the umpteenth level of planning within the area. The Management Plan should rather be understood as a framework document serving to coordinate actions already underway or planned by the different bodies participating in the management of the designated areas in an overall vision, on the basis of the three fundamental functions of the Biosphere Reserve.

In relation to conservation, the Management Plan of the Biosphere Reserve will therefore make reference as relevant (1) to the Implementation Plan of the Ledro Alps Network of Reserves (Annex no. 4.3), the Adamello Brenta Park Plan (Annex no. 4.2) and the conservation measures of Natura 2000 sites (Annex no 3.3) in addition to forestry planning instruments, the PGUAP¹

¹ PGUAP, general Plan for Public Water Use

and the plan for the safeguarding of waters.

As regards development (2), the plan will interact with the plans of the valley communities, PNAB's CETS (Annex 8.1), the policy documents of the tourist offices and the Fondazione Dolomiti UNESCO, and in future also with the Management Plan of the Ledro Network of Reserves (which will also need to deal with processes of sustainable local development). Finally, as regards logistical aspects linked to training, research and education on sustainable development (3), reference will be made to PNAB's environmental plan (Annex 4.2), and the reserve will also be able to interact with various public institutions which implement environmental education policy and research statutorily, such as PNAB and the Ledro Alps Network of Reserves (RR), along with MUSE in Trento - which coordinates the Ledro museum network (ReLED) - the Architectural and Archaeological Heritage Office, the Museo Civico in Rovereto, APPA and the Judicaria Ecomuseum.

Efforts have been made to network aspects related to research, dissemination and sustainable development in the Ledro area through the OPENLOC project, and more efforts towards the definition of an integrated development plan are

being made within the LIFE+ TEN project, Action C19¹.

Letters of support for the nomination received from MUSE, FBK and the Fondazione Mach show the interest of the main provincial research institutes in this area, which will offer the opportunity for research in the field of social sciences, agrotechnology and new technologies, acting as an “open space laboratory” (Annex 8.11)

A final fundamental aspect regards the fact that the plan will need to be accompanied by a phase of intensive information and participatory activities for the local population and stakeholders. As already provided for in the case of the Management Plans for the Park and the Network of Reserves, participation is a fundamental requisite for concrete implementation.

It is therefore possible to aspire to an agreed and streamlined plan, not costly in financial terms, capable of bringing together all the public and private sector players participating in the sustainable development of the Reserve area, in a relatively brief time (expected to be around a year).

17.4.2 Which actors are involved in preparing the management/cooperation plan? How are they involved?

The technical responsibility for

¹ Within Action C19 of the LIFE+ TEN Project a participatory process within the area of Ledro Valley is being carried on. The goal of this process is to define a shared strategy for local development, aiming at putting together agricultural issues, tourism and citizens.

preparing the plan is with the Working Group/Executive Committee, as stated in article 6 of the Memorandum of Understanding (Annex 3.1) , whereas the Steering Committee, which has the task of approving the proposal document, has responsibility for policy.

According to the provisions of article 6, the plan will follow a participatory approach, through the involvement of “representative of local authorities, young people and other stakeholders” and naturally the Area Forum.

In addition to this it should be recalled, as stated in the previous section, that the plan will refer to other planning instruments, in their turn drawn up using a participatory approach (e.g. PNAB’s CETS and Park Plan, the preliminary planning document of the CdG etc.).

17.4.3 Do local authorities formally adopt the management/cooperation plan? Are local authorities making reference to it in other policies and/or plans? If so, please provide details.

The plan, which also involves financial planning directly involving the promoters of the reserve, will necessarily be formally approved by all the bodies concerned in the area. As regards links with local planning, as stated in section 17.4.1, the Management Plan will be strongly rooted in existing planning instruments, many of which have

underlying objectives which are very coherent with those of the Biosphere Reserve, albeit in a fragmentary manner.

It goes without saying that when reviews take place, the planning instruments and programmes of the promoting organisations (municipalities, communities, PNAB, tourist offices) will make reference to the Biosphere Reserve, the coordinating opportunities that it offers and the active protection and sustainable development initiatives that may be identified by the Management Plan of the reserve.

17.4.4 What is the duration of the management/cooperation plan? How often is it revised or renegotiated?

The Plan will have a duration of 10 years, with three-yearly updates aimed at periodic financial planning.

17.4.5 Describe the contents of the management/cooperation plan. Does it consist of detailed measures or detailed guidelines? Give some examples of measures or guidelines advocated by the plan? (Enclose a copy).

As regards nature conservation, the plan will refer to conservation measures provided for in the case of Natura 2000 sites, the protection measures in the Park Plan and the actions contained in the project for

the implementation of the Ledro Alps Network of Reserves – (Annexes 4.3 and 4.3), which are very detailed. As regards socioeconomic development activities, in addition to investigating activities already carried out by different parties and identifying the ways in which they can be coordinated, the plan will provide detailed indications of other actions in line with the policy contained in the Memorandum of Understanding and more clearly explained in section 13 of the Nomination Dossier. It can therefore be affirmed that the plan will also represent a useful coordinating instrument for development policy in the area of the reserve. It will also contain specific measures coherent with the development objectives of the reserve, also with reference to projects underway, as in the case of the previously cited TEN project, action 19.

17.4.6 Indicate how this management/cooperation addresses the objectives of the proposed biosphere reserve (as described in section 13.1).

Section 13.2 provides a broad outline with examples of activities for the Management Plan, establishing a series of themes/objectives. These include a series of projects belonging to initiatives which are similar in terms of their underlying objectives, such as:

- the setting up of the RR (Annex 4.3, Programme Agreement and

- implementation project);
- the putting into effect of the PNAB's API2¹ (Annex 4.2, Park Plan underway);
- the activities of ReLed;
- the 'Qualità Parco' project.

Other possible specific projects could be represented by:

- the creation of an area EMAS protocol, referred to the whole of the proposed Biosphere Reserve;
- the extension of the CETS (Annex 8.1, CETS) to the whole of the proposed Biosphere Reserve;
- the participation of all the municipalities in the Covenant of Mayors;
- the development of internal partnerships within the MAB network;
- the setting up of a Smart Biosphere Reserve.

17.4.7 Is the plan binding? Is it based on a consensus?

Due to the participatory methods with which the plan will be drawn up, it will automatically be based on the consensus of a majority of the local population.

In the absence of regulatory restrictions, this aspect will guarantee the establishment of a strong tie between policy and the implementation of the plan.

¹ API: areas of particular interest

17.4.8 Which authorities are in charge of the implementation of the plan, especially in the buffer zone(s) and the transition area(s)? Please provide evidence of the role of these authorities.

The Management Plan will coordinate the responsibilities of the following authorities in their areas of jurisdiction:

In the buffer zones :

- northern buffer zone:
 - o the PNAB in the park area;
 - o outside the park, the Municipality of Stenico will manage the area through its PRG, which will be coordinated by the community plan, in its turn following the policy of the PUP;
- central buffer zone:
 - o the Municipalities of Ledro, Tenno and Riva del Garda, which manage their areas through their own PRGs, which will be coordinated by the community plan, in its turn following the policy of the PUP;
- southern buffer zone: the RR, which will act in accordance with the conservation measures of SICs until a specific Management Plan has been drawn up;

in the transition area:

- the municipalities, which act according to their own PRGs, coordinated by the community plan, in its turn following the policy of the PUP.

17.4.9 Which factors impede or help its implementation (e.g.: reluctance of local people, conflicts between different levels of decision-making).

With the exceptions of the points raised in section 17.2.1, regarding problems of conflict in terms of the use of natural resources, the main problem emerging during the information process was represented by the opposition of hunting associations. The reason for this opposition was linked to the fear that the setting up of the proposed Biosphere Reserve could lead to a limitation of hunting activities.

On the other hand there are a series of factors which essentially encourage the initiative underway:

- the existence of projects started up in the last few years which share many of the viewpoints of this initiative;
- the nomination process has created a consensus between numerous different administrative bodies of different kinds (11 municipalities, two valley communities), through a series of meetings, debates and discussions (Annex 3.1, Memorandum of Understanding);
- the participation and appreciation recorded during the public meetings;
- external support manifested by numerous bodies of different kinds (Annex, letters of support 8.9).

Overall, there are therefore a series of positive factors in relation to reception

of the proposal and a consensus as regards the initiative on a wider scale.

17.4.10 Is the biosphere reserve integrated in regional/national strategies? Vice versa, how are the local/municipal plans integrated in the planning of the biosphere reserve?

The Biosphere Reserve is included within a broad and complex range of strategies aimed at safeguarding natural resources and encouraging balanced socioeconomic development. At national level one cannot fail to cite the National Strategy for Biodiversity, thanks to which “biodiversity and ecosystem services, our natural capital, are conserved, evaluated and, in so far as this is possible, restored, due to their intrinsic value and so that they can continue to support economic prosperity and human wellbeing in a lasting manner, despite the profound changes underway at global and local level”.

This is in turn structured around the Communication of the European Commission “Our life insurance, our natural capital: an EU Biodiversity Strategy to 2020”, which describes a strategy for protecting European biodiversity, while highlighting its importance for the development of the human communities who survive thanks to this very biodiversity.

At supranational level it is also appropriate to mention the Alpine

Convention, and in particular the 2013 document with the 4th report on the state of Alps: “Sustainable tourism in the Alps”. This focuses on the main problems generated by uncontrolled tourist development, also suggesting which challenges need to be faced. These objectives are entirely in line with those of the Biosphere Reserve project.

Furthermore, at provincial level it is necessary to cite the “PASSO”, namely the Pact for Sustainable Development in Trentino, approved in 2013, which has the task of describing and specifying principles and methods of application for sustainable development in the Province, including the cultural and environmental dimension, above all from an environmental point of view. Vice versa, local and municipal plans will be coordinated with the Management Plan, as already illustrated in the previous section 17.4.1. Furthermore, the MAB project will be able to take advantage of past experience and a long process of sharing values and visions which led to the setting up of the Network of Reserves, and which will become a part of the future planning of the area.

17.4.11 Indicate the main source of the funding and the estimated yearly budget.

The principle of responsible subsidiarity and participation provides for duties in addition to rights. It is therefore neither plausible nor coherent for PAT to bear the whole financial commitment resulting from

the running of the reserve.

The Programme Agreement stated in article 2 of the Memorandum of Understanding will therefore establish “ the programme of activities for the first three years and the financial commitments, with the relative division of costs”.

All the promoting organisations with financial autonomy will contribute partially to running costs, specifically: PAT, the valley communities, the municipalities, presumably also by making use of funds coming from fees for hydroelectric energy plans managed partly by the communities and partly by the BIM.

As regards the division of costs among the municipalities, for those whose territory is entirely within the reserve, the agreed criteria regards the proportional number of inhabitants. For the municipalities only partially involved (Storo, Bondone and Riva del Garda) a lower share is surmised, linked to the surface area included within the proposed Biosphere Reserve.

As repeated several times, the objective is to create a system of management for the reserve with limited costs, drawing on the operational skills of the various bodies already operating there.

The running costs will therefore be limited to expenditure for the Coordinator and for communication (management of the web site, specific material on paper etc.), with an expected annual budget of around 50,000 €. It is indeed necessary

to consider that the presence of a number of promoting organisations with objectives very similar to those of the reserve (PNAB, municipalities, through the RR, and the ecomuseum) makes considerable economies of scale possible: in other words, the management of the Biosphere Reserve can in some ways also be supported by bodies that are already

structured and specialised. The costs of the operational headquarters will also be very limited, given that use will be made of the offices of the Lead Partner, as stated in section 13.6. Similarly, in the case of the representative office – which it has been suggested could be at Castel Stenico – the costs will be borne by PAT.



Stenico Castle

17.5 Conclusions

17.5.1 In your opinion, what will ensure that both the functioning of the biosphere reserve and the structures in place will be satisfactory? Explain why and how, especially regarding the fulfillment of the three functions of biosphere reserves (conservation, development, logistic) and the participation of local communities.

The wealth of biological and cultural diversity in the areas included in the proposed Biosphere Reserve distinguishes a local environment that has been enhanced by the sensitivity of local populations and the administrative foresight of local and provincial governments over the years. All this represents a consolidated and appropriate background, guaranteeing a sustainable future for the Biosphere Reserve.

The area nominated has a consolidated and widespread awareness of the need to guarantee the conservation of biodiversity and cultural values for future generations. The proof lies in ancient cultural institutions, such as the collective rights and municipal statutes. From the second half of the 20th century the Province of Trento has been at

the forefront in the management of local areas and the landscape, with the approval of the Piano urbanistico provinciale (provincial planning scheme), the last version of which (2008) contains methods for participatory management and effective subsidiarity at different institutional levels, in particular with the area plans of the valley communities, the Park Plan and the planning schemes of the municipalities.

The presence of the Adamello-Brenta Nature Park, the Ledro Alps Network of Reserves, the Judicaria Ecomuseum and the Ledro museum network, along with all the cultural and natural sites managed by various bodies and scientific institutions, ensures that management complies with the conservation and development objectives of the reserve.

Environmental and sustainable development education is ensured by the network made up of APPA, the Adamello-Brenta park and MUSE, with their respective visitors centres. There is also active collaboration with research institutes, including the Mach and Kessler foundations and the Museo Civico in Rovereto.

For several years the area nominated has seen the integrated action of players operating in a coordinated manner in the field of tourism, the main local business sector, through the tourist offices and Pro Loco associations, encouraging the relationship with the farming sector

and promoting the use of local products.
The extensive presence of associations (particularly volunteer organisations) and cooperatives,

scattered extensively throughout the proposed area, ensures that all citizens have the chance to participate in the management of social and economic activities.



Gorg Abiss (Tiarno di Sotto, Val di Ledro)

18. SPECIAL DESIGNATIONS

It is recognized the importance of the following sites:

a) UNESCO World Heritage Site

The proposed Biosphere Reserve includes two different WH sites (see following map)

- The Dolomites,
- Prehistoric Pile dwellings around the Alps

The Dolomites, a site of great naturalistic value, included in the WHS list in 2009 (33COM 8B.6), is only present in the proposed Biosphere Reserve with a section of the Brenta Dolomites. As stated at the site <http://whc.unesco.org/en/list/1237/> “The site of the Dolomites comprises a mountain range in the northern Italian Alps, numbering 18 peaks which rise to above 3,000 metres and cover 141,903 ha. It features some of the most beautiful mountain landscapes anywhere, with vertical walls, sheer cliffs and a high density of narrow, deep and long valleys. A serial property of nine areas that present a diversity of spectacular landscapes of international significance for geomorphology marked by steeples, pinnacles and rock walls, the site also contains glacial landforms and

karst systems. It is characterized by dynamic processes with frequent landslides, floods and avalanches. The property also features one of the best examples of the preservation of Mesozoic carbonate platform systems, with fossil records.”

The pile-dwellings, of great cultural interest, were included in the WHS list in 2011 (35COM 8B.35). In the proposed Biosphere Reserve they are present at Fiavé – Lake Carera and Molina di Ledro). As stated at the site <http://whc.unesco.org/en/list/1363/>, “This serial property of 111 small individual sites encompasses the remains of prehistoric pile-dwelling (or stilt house) settlements in and around the Alps built from around 5000 to 500 B.C. on the edges of lakes, rivers or wetlands. Excavations, only conducted in some of the sites, have yielded evidence that provides insight into life in prehistoric times during the Neolithic and Bronze Age in Alpine Europe and the way communities interacted with their environment(...). The settlements are a unique group of exceptionally well-preserved and culturally rich archaeological sites, which constitute one of the most important sources for the study of early agrarian societies in the region.

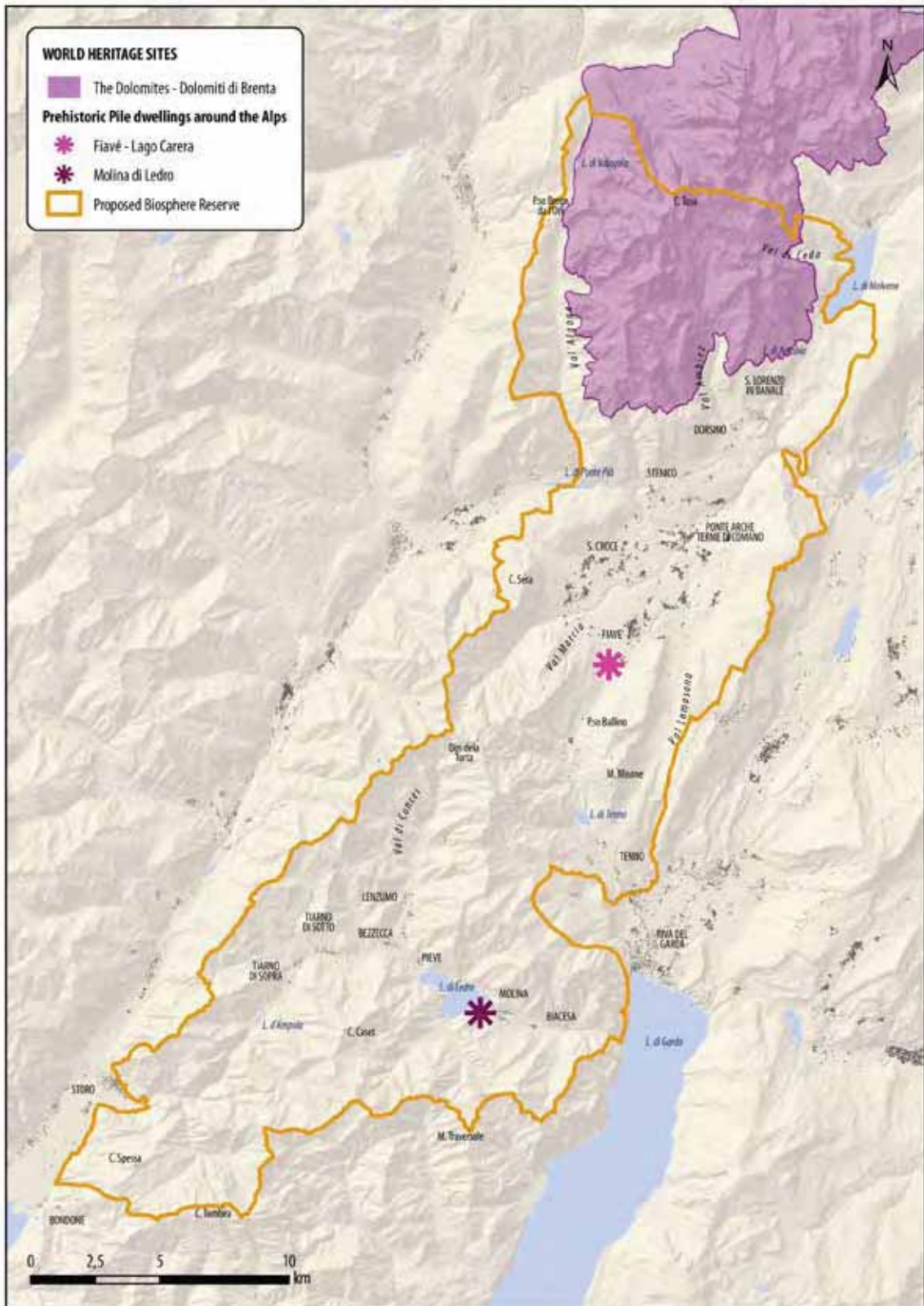


fig. 18.1 Location of the WH sites within the proposed Biosphere Reserve

b) RAMSAR Wetland Convention Site

No sites are present.

c) Other international/regional conservation conventions/directives (specify)

36% of the surface area of the proposed Biosphere Reserve is covered by a system of areas falling within the Natura 2000 European network, specifically in SCI/SPA sites

IT3120177, IT3120159, IT3120068, IT3120069, IT3120127, IT3120076, IT3120093, IT3120096, IT3120094, IT3120133 and IT3120140. As stated in section 4.2, the Natura 2000 network is the largest ecological network in the world. The protected areas it identifies cover 20% of EU territory. The percentage rises to 30% at local level in the Province of Trento. The network is based on two European directives: the “Birds”



fig. 18.2 Sites of European Importance

directive (2009/147/CEE) and the “Habitats” directive (92/43/CEE). The “Birds” directive protects all wild birds in Europe and is designed to conserve the main habitats of rare, vulnerable or threatened species. The “Habitats” directive extends the field of application of protection measures to other threatened habitats, plants and animals, rare or endemic, for a total of more than 1000 species.

d) Long term monitoring site (specify)

There are two monitoring sites of great interest in terms of fauna and the forest ecosystem:

- the Bocca di Caset site (Ledro);
- the Ludrin site (Stenico).

The Bocca di Caset site is a pass of the greatest importance at alpine level in terms of post-reproductive migration of birdlife. The site, already protected



fig. 18.3 Location of the monitoring sites

by the EU (see the ZPS directive stated in the previous section) is in the core area of the proposed Biosphere Reserve (see sections 4.1 and 4.5). As mentioned in section 16.1.1, since 1993 the site has been involved in a study programme of migration through scientific ringing carried out by MUSE. At the ornithological station post-reproductive migration is monitored from the middle of August until the end of October. Since 1997 the station has been included in the 'Progetto Alpi', a national project coordinated by ISPRA and MUSE, which has seen the participation of more than 37 stations scattered throughout the Italian Alps. More than 70 species have been recorded and almost 100,000 birds logged, demonstrating the significance of this pass as a very valuable conservation area (Negra et al. 2006).

The Ludrin site regards a forest ecosystem not subject to intervention or use for more than 50 years. In collaboration with the University of

Turin, for more than 10 years PAT has provided for a series of permanent sampling areas, with the scope of monitoring populations. The site is the object of permanent research by the University of Turin (as stated in section 16.1). (Motta, R. et. al. 2008).

e) Long Term Ecological Research (LTER site)

No sites are present.

f) Other (specify)

The Fiavé peat bog is a protected area in the Natura 2000 network, according to the EU Habitat Directive (mentioned in the previous section). It is the site of large-scale seasonal migration of amphibians and since 2000 has been a monitoring site for this migration (see section 17.2). The surveys are carried out by the Associazione Pro Ecomuseo and PAT's Nature Conservation Department (Cisaro Martinoli G., Bronzini L. 2006, Bonardi A. 2011).

19. SUPPORTING DOCUMENTS (TO BE SUBMITTED WITH NOMINATION FORM)

1. Location and zonation map with coordinates

1.1	Location and zonation map (1:50.000)
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2. Vegetation map or land cover map

2.1	Land cover map (1:50.000)
2.2	Natura 2000 Habitats map (1:50.000)

3. List of legal documents

3.1	Memorandum of Understanding	<ul style="list-style-type: none"> a. English version (ENG) b. Signed original copy (ITA) c. Original resolutions of approval (ITA) <ul style="list-style-type: none"> c.1 PAT c.2 Comano terme c.3 Bleggio Superiore c.4 Bondone c.5 Dorsino c.6 Fiavé c.7 Ledro c.8 San Lorenzo in Banale c.9 Stenico c.10 Storo c.11 Tenno c.12 Riva del Garda c.13 Upper-Garda and Ledro Community of Valley c.14 Giudicarie Community of Valley c.15 PNAB c.16 BIM Sarca-Mincio-Garda c.17 BIM Chiese c.18 APT Comano c.19 InGarda Trentino c.20 Turistic Consortium Ledro Valley
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3.2	Policy directive no. 411 of the Provincial Council – March 2013	a. English version (ENG) b. Signed original copy (ITA)
3.3	Natura 2000 conservation measures	a. Identification of SCI's and conservative measures (ENG) b. Resolution on conservation measures DGP 632/2013 (ITA) b.1 Resolution 1799/2010 b.2 Resolution 2378/2010
3.4	PUP (provincial planning scheme)	a. Table of PUP content and policy in relation to the PBR (ENG) b. Maps b.1 Map of PBR area b.2 Zoom northern buffer zone b.3 Zoom central buffer zone c. Provincial Law 5/2008 (ITA)
3.5	Provincial Law 11/2007	a. Policy chart, Provincial Law 11/07 (ENG) b. Text of Provincial Law 11/07 (ITA)

4. List of land use and management/cooperation plans

4.1	CdG preliminary PTC document	a. Chart with objectives of the PTC (ENG)
4.2	PNAB park plan	a. Description sheet of PP and API2 objectives (ENG) b. Original copy of resolution to adopt the PP by the management committee (ITA)
4.3	Ledro Alps Network of Reserves	a. Project implementation sheet (ENG) b. Project implementation sheet (ITA) c. Pdf signed programme agreement (ITA)

5. Species list (to be annexed)

5.1	Lists of flora	List of protected flora, LR or endemic flora
5.2	Lists of fauna	List of species of interest

6. List of main bibliographic references

6.1	Bibliography
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7. Original Endorsement letters according to Chapter 5

7.1	Signatures	See Chapter 5
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8. Further supporting documents

8.1	PNAB's CETS (European Charter for Sustainable Tourism)	a. CETS principles (ENG) b. PNAB's CETS certificate (ENG)
8.2	EMAS certification	a. Illustrative EMAS sheet (ENG) b. EMAS certificates (ITA) b.1 Comunità delle Giudicarie b.2 Fiavé b.3 Ledro b.4 Tenno b.5 PNAB
8.3	PEFC certification	a. Description sheet (ENG) b. Cumulative PEFC certification (ITA)
8.4	Judicaria Ecomuseum	a. Description sheet (ENG) b. Convention 511 (ITA)
8.5	Research and monitoring activities sheets	a. List of PNAB, MUSE and MCR research activities (ITA-ENG)

8.6	Vegetation series (geosigma)	a. Geosigma sheets (ITA-ENG)
8.7	LIFE+ T.E.N.	a. TEN project summary (ENG) b. Ecological network maps b.1 Ecological network map of Trentino b.2 Ecological network map of PBR
8.8	Stenico Castle	a. Description sheet (ENG)
8.9	Letters of support	a. Explanatory note on the institutions signing (ENG) b. Copy of original letters signed (ITA) b.1 ASUC Comano Terme b.2 ASUC Stenico b.3 ASUC Favrio b.4 ASUC Fiavé b.5 ASUC Storo b.6 ASUC Stumiaga b.7 ASUC Villa del Monte b.8 Centro Studi Judicaria b.9 CIPRA Italia b.10 Mach Foundation b.11 Dolomiti Foundation b.12 MUSE b.13 Upper-Garda Bresciano Park b.14 Civic Museum of Rovereto b.15 SAT b.16 Alpine Convention b.17 FBK Foundation b.18 Museo Usi e Costumi della Gente Trentina

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Web site: <http://www.comune.storo.tn.it/>

Name: **Comune di Tenno**
Street or P.O. Box: Via Dante Alighieri,
n° 18
City with postal code: Tenno (TN) -
38060
Country: Italia
Telephone: +39 0464 500624
E-mail: info@comune.tenno.tn.it
Web site: <http://www.comune.tenno.tn.it/it/>

Name: **Comunità di Valle Alto Garda e Ledro**
Street or P.O. Box: Via Rosmini, n° 5/b
City with postal code: Riva del Garda (TN) - 38066
Country: Italia

Telephone: +39 0464 571701
E-mail: segreteria@altogardaeledro.tn.it
Web site: <http://www.altogardaeledro.tn.it/>

Name: **Comunità di Valle delle Giudicarie**
Street or P.O. Box: Via P. Gnesotti, n° 2
City with postal code: Tione (TN) -
38079
Country: Italia
Telephone: +39 0465 339555
E-mail: info@comunitadellegiudicarie.it
Web site: <http://www.comunitadellegiudicarie.it/>

Name: **Parco Naturale Adamello Brenta**
Street or P.O. Box: Via Nazionale, n°
24
City with postal code: Strembo (TN) -
38080
Country: Italia
Telephone: +39 0465 806666
E-mail: info@pnab.it
Web site: <http://www.pnab.it/>

20.4. Enti amministrativi delle transition area(s)

Name: **Provincia Autonoma di Trento** – I.D. per la Valorizzazione della Rete delle Aree Protette
Street or P.O. Box: Piazza Dante, n° 5
City with postal code: Trento - 38122
Country: Italia
Telephone: +39 0461 495111
E-mail: presidente@provincia.tn.it
Web site: <http://www.provincia.tn.it/>

Name: **Comune di Comano Terme**
Street or P.O. Box: Fraz. Ponte Arche – Via G. Prati, n° 1
City with postal code: Comano Terme (TN) - 38077
Country: Italia
Telephone: +39 0465 701434
E-mail: protocollo@comune.comanoterme.tn.it
Web site: <http://www.comune.comanoterme.tn.it/>

Name: **Comune di Bleggio Superiore**
Street or P.O. Box: Fraz. Santa Croce, n° 40
City with postal code: Bleggio Superiore (TN) - 38071
Country: Italia
Telephone: +39 0465 779550
E-mail: info@comune.bleggiosuperiore.tn.it
Web site: <http://www.comune.bleggiosuperiore.tn.it/>

Name: **Comune di Dorsino**
Street or P.O. Box: Fraz. Di Dorsino, n° 3
City with postal code: Dorsino (TN) - 38070

Country: Italia
Telephone: +39 0465 734021
E-mail: comune@pec.comune.dorsino.tn.it
Web site: <http://www.comunedorsino.it/>

Name: **Comune di Fivavé**
Street or P.O. Box: Piazza S. Sebastiano, n° 24
City with postal code: Fivavé (TN) - 38075
Country: Italia
Telephone: +39 0465 735029
E-mail: info@comune.fivave.tn.it
Web site: <http://comuniinrete.comunitrentini.it/fivave/>

Name: **Comune di Ledro**
Street or P.O. Box: Via Vittoria, n° 5
City with postal code: Pieve di Ledro (TN) - 38067
Country: Italia
Telephone: +39 0464 592711
E-mail: comune@comune.ledro.tn.it
Web site: <http://www.comune.ledro.tn.it/>

Name: **Comune di San Lorenzo in Banale**
Street or P.O. Box: Piazza delle Sette Ville, n° 4
City with postal code: San Lorenzo in Banale (TN) - 38078
Country: Italia
Telephone: +390465 734023
E-mail: segreteria@comune.sanlorenzoinbanale.tn.it
Web site: <http://www.comune.sanlorenzoinbanale.tn.it/>

Name: **Comune di Stenico**
Street or P.O. Box: Via G. Garibaldi, n° 2
City with postal code: Stenico (TN) -
38070
Country: Italia
Telephone: +39 0465 771024
E-mail: segreteria@comune.stenico.tn.it
Web site: <http://www.comune.stenico.tn.it/>

Name: **Comune di Storo**
Street or P.O. Box: Piazza Europa, n° 5
City with postal code: Storo (TN) -
38089
Country: Italia
Telephone: +39 0465 681200
E-mail: comune@comune.storo.tn.it
Web site: <http://www.comune.storo.tn.it/>

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n° 18
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38060
Country: Italia

Telephone: +39 0464 500624
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Country: Italia
Telephone: +39 0464 571701
E-mail: segreteria@altogardaeledro.tn.it
Web site: <http://www.altogardaeledro.tn.it/>

Name: **Comunità di Valle delle Giudicarie**
Street or P.O. Box: Via P. Gnesotti, n° 2
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38079
Country: Italia
Telephone: +39 0465 339555
E-mail: info@comunitadellegiudicarie.it
Web site: <http://www.comunitadellegiudicarie.it/>

ANNEX I

Annex I

Annex I to the Biosphere Reserve Nomination Form, January 2013

MABnet Directory of Biosphere Reserves

Biosphere Reserve Description¹

ADMINISTRATIVE DETAILS

Country:

ITALY

Name of BR:

Ledro Alps and Judicaria UNESCO Biosphere: from the Dolomites to Lake Garda

Year designated: (to be completed by MAB Secretariat)

¹ To be posted on the MABnet once the nomination has been approved. The numbers refer to the relevant sections of the nomination form.

Administrative authorities: (17.1.3)

The administrative authorities with jurisdiction in the various areas are the following:

Core Areas	Buffer zones	Transition Areas
APT	APT	APT
CAGL, CdG	CAGL, CdG	CAGL, CdG
ABNP	ABNP	
Municipalities of Ledro, Tenno, Stenico, S. Lorenzo in Banale, Dorsino, Riva del Garda, Comano Terme	Municipalities of Bondone., Storo, Ledro, Tenno, Stenico, S. Lorenzo in Banale, Dorsino, Riva del Garda, Comano Terme	Municipalities of Bleggio Superiore, Storo, Ledro, Tenno, Stenico, S. Lorenzo in Banale, Dorsino, Fivè, Comano Terme

Name Contact: (20.1)

- 1) Claudio Ferrari – Provincia Autonoma di Trento – I.D. per la Valorizzazione della Rete delle Aree Protette

Contact address: (Including phone number, postal and email addresses) (20.1)

- 1) Provincia Autonoma di Trento – I.D. per la Valorizzazione della Rete delle Aree Protette

Address: Via Gardini, 75

City and postcode: Trento - 38122

Nation: Italy

Telephone: +39 0461 497885

E-mail: claudio.ferrari@provincia.tn.it; reteareeprotette@provincia.tn.it

Related links: (web sites)

- 1) <http://www.areeprotette.provincia.tn.it/>
 - 2) <http://www.dolomiti-garda.it/riserva-biosfera-dell-unesco>.
-

Social networks: (16.4.3)

<https://www.facebook.com/EcomuseoDellaJudicaria>

DESCRIPTION

General description: (Site characteristics in 11.1; human population in 10)

Approximately 25 lines

The area of the Biosphere Reserve is representative of the southern slopes of the carbonate central-eastern Alps and represents an imaginary transect of environments leading from the Mediterranean to the alpine tundra, passing through a wide pre-alpine band with a mantle of spruce and beech woods, alternating with traditional crops.

The central and southern part of the proposed area is characterised by the presence of steep rocky mountain slopes, mostly covered with broad-leaved or mixed woods and interrupted by pastureland or agricultural crops. Open areas predominate in the higher band (primary grasslands on ridges, rich in endemic flora) or on the valley floor (hay meadows, arable crops, vineyards, walnut, chestnut and olive orchards etc.). The southern part is characterised by the presence of higher mountains, with conifer woods, above which the extensive grasslands and the rocky pinnacles of the Dolomites offer spectacular scenery (included within the UNESCO Dolomites WHS).

On the valley floors and lower slopes there are dozens of small villages, many of which of considerable historic and architectural value (almost all the settlements are situated in the transition area). The resident population amounts to around 16,000 (with a density which is markedly lower than in the rest of the Province), but this doubles in the summer due to the presence of seasonal tourists.

In socioeconomic terms, in the past the area was characterised by the rearing of cattle, based on a model of vertical transfer to pasture. The use of pastureland and the forests has always been based on collective ownership of resources. The propensity of the population for cooperation and volunteer work still remains today.

The presence of tourists and walkers in summer is today encouraged by the network of mountain dairies, refuges and small guest houses (or restaurants). The relative isolation (there area has its own identity which can be recognised starting from the Roman or Medieval era), the magnificent natural landscape and the numerous architectural, historic and prehistoric remains (two lake-dwelling settlements recognised as UNESCO WH sites) represent the capital on which the area wishes to base its future development.

Major ecosystem type: (14.1)

The area of the proposed Biosphere Reserve includes a mosaic of habitats with different levels of conservation; from perfectly intact natural habitats at high altitude (culminating in the rocky pinnacles and peaks of the Brenta Dolomites, reaching a maximum altitude of 3,173 m a.s.l.), to semi-natural habitats with traditional management by man (lowland meadows and pasture), agricultural areas and human settlements.

The main ecosystems present in the proposed Biosphere Reserve can be referred to the following vegetation series (geosigmeta):

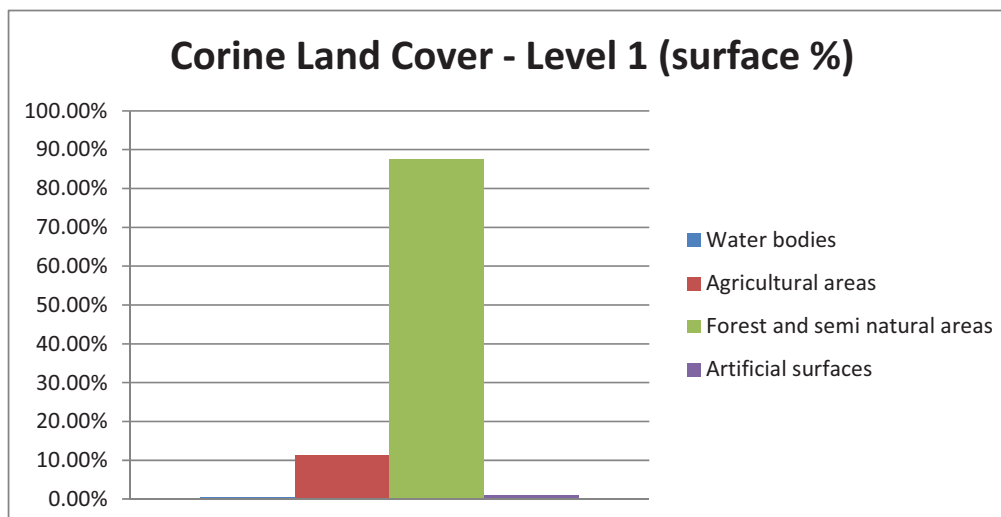
- Central-western alpine basophilic geosigmetum of primary high-mountain vegetation;
- Central-eastern basophilic alpine series of bushes with mountain pine with scattered sparse forests of Swiss pine and larch;
- Central alpine acidophilous series of beech;
- Eastern alpine basophilic series of beech;
- Central-eastern neutrobasophilic alpine series of European ash (*Fraxino excelsioris sigmetum s.l.*). Also includes humid valley floor grasslands;
- Central-western acidophilous endalpic geosigmetum of low bushes and larch-Swiss pine woods;
- Eastern basophilic alpine series of spruce. Also includes secondary grasslands and pasture;
- Eastern basophilic prealpine series of beech and spruce. Also includes mountain hay meadows and dry meadows;
- Transversal hygrophilous vegetation;
- Transversal peatland vegetation.

Dolomitic environments at high altitude are generally very well conserved, given their extremely natural characteristics. The factors most influencing their state of conservation are considered to be natural catastrophes (landslides, avalanches etc) and climate change at global level, which leads to "shifting altitudes" for bands of vegetation, to the detriment of habitats on mountain peaks.

The central and most dynamic "junction" for ecosystems is represented by semi-natural habitats, created and shaped by traditional usage and which require active management to conserve their essential characteristics. The crisis in the traditional socioeconomic model often leads to the disappearance of semi-natural habitats, which precisely for this reason are of primary conservation interest. Some areas experience abandonment and spontaneous reforestation. Other areas are converted to more intensive management methods. The ecosystems most strongly influenced by the intervention of man are therefore subject to various forms of deterioration, which result from changing methods for managing the area.

Major habitats & land cover types: (11.6)

The area is characterised by extensive (semi)natural landscapes (around 90%) or agricultural landscapes and limited urban areas.



Natural and semi-natural environments make up 32 Natura 2000 habitats, including 7 priority habitats, with no less than 15 present in the Red List for Trentino. Of the most important habitats in terms of conservation, the following are noted:

Habitat		Nat.2000 priority	Trentino red list	National red list
4070	Bushes with <i>Pinus mugo</i> and <i>Rhododendron hirsutum</i>	yes	/	low
6110	Rupicolous calcareous or basophilic grasslands of the <i>Alyso-Sedion albi</i>	yes	CR	low
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>)	yes	EN/CR	low
6230	Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)	yes	LR	low
8240	Limestone pavements	yes	EN	low
9180	<i>Tilio-Acerion</i> forests of slopes, screes and ravines	yes	VU	low
91E0	Alluvial forests with <i>Alnus glutinosa</i> and	yes	VU/EN	high

Habitat		Nat.2000 priority	Trentino red list	National red list
	<i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)			
3130	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i>	no	CR	high
4080	Sub-Arctic <i>Salix</i> spp. scrub	no	CR	/
3150	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation	no	EN	medium
3240	Alpine rivers and their ligneous vegetation with <i>Salix elaeagnos</i>	no	EN	low
6410	<i>Molinia</i> meadows on calcareous, peaty or clayey-siltladen soils (<i>Molinion caeruleae</i>)	no	EN	high
6510	Lowland hay meadows (<i>Alopecurus pratensis</i> , <i>Sanguisorba officinalis</i>)	no	EN	medium
6520	Mountain hay meadows	no	EN	low
7140	Transition mires and quaking bogs	no	EN	medium-high
7230	Alkaline fens	no	EN	high

Bioclimatic zone (11.5)

The area falls mainly within the «Per-humid» bioclimatic zone, with a temperate oceanic climate and a humidity gradient decreasing towards the North-East (Moist Sub-humid).

Location (latitude & longitude): (6.1)

The geographical coordinates are given in the table below.

Cardinal points:	Latitude	Longitude
Most central point:	5093290.705299	638713.932255
Northernmost point:	5116737.322389	640987.094532
Southernmost point:	5073238.573482	624292.45002

		3
Westernmost point:	5074642.354106	620342.487918
Easternmost point:	5107245.633999	652126.091077

Total Area (ha): (7)

The surface areas of each of the areas identified are given below.

	Terrestrial	Marine (if applicable)	Total
7.1 Core Area(s):	4786 ha	-	4786 ha
7.2 Buffer Zone(s):	15.774 ha	-	15.774 ha
7.3 Transition Zone(s):	26.867 ha	-	26.867 ha
TOTAL:	47,427 ha	-	47427 ha

Different existing zonation: (7.4)

The core areas lie entirely within Natura 2000 sites classified both as SCIs and SPAs and are thus equipped with a full set of conservation measures for habitats and species. Furthermore, the northern nucleus coincides with a Special Reserve provided for by ABNP's new Park Plan.

Around four fifths of the buffer zones (c. 79%) lie in Natura 2000 areas which are peripheral or less sensitive from the naturalistic point of view, or are not equipped with the dual designation of SCI + SPA or – in the case of the ABNP – not identified as RS/APIs. Hence they are areas of less overall interest in terms of conservation.

The remaining 21% are covered by the hydrogeological and landscape restrictions provided for by the PUP, which protect them from changes in land use not compatible with the objectives of the Biosphere Reserve.

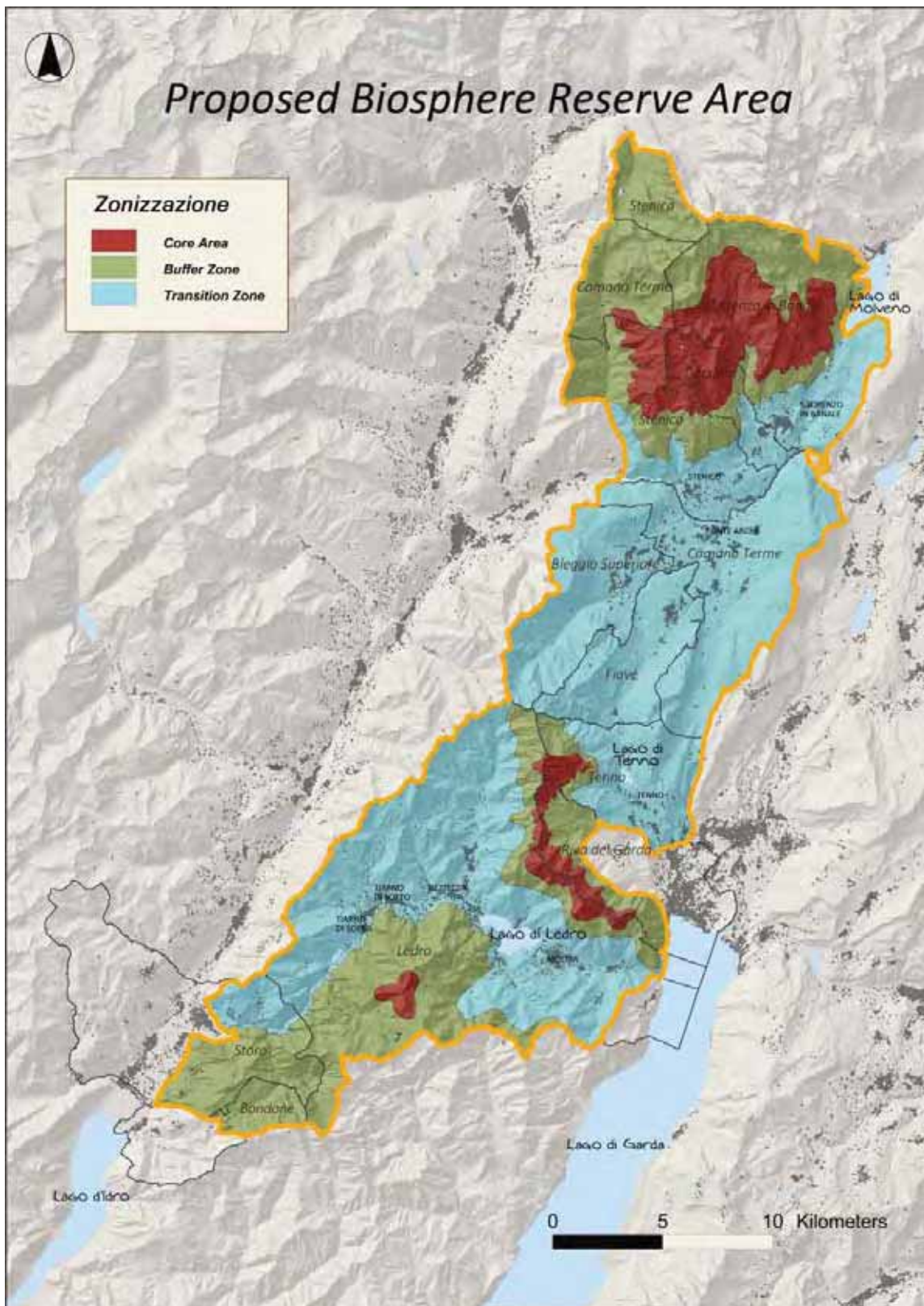
The provisions of the PUP and local planning instruments are applied throughout the area, also in the transition area.

Altitudinal range (metres above sea level): (11.2)

Highest elevation above sea level: 3.173 m (Cima Tosa)

Lowest elevation above sea level: 63 m (Lake Garda)

Zonation map(s): (6.2)



Main objectives of the biosphere reserve

Brief description (13.1)

The main scope of the proposed Biosphere Reserve is to consolidate the existing model of sustainable use of the mountain environment. The reserve will contribute to maintaining biodiversity through different natural and cultural structures in order to safeguard the balance of ecosystems. The implementation of active conservation measures is a priority, in addition to passive protection. It is a question of encouraging the continuation of farming-forestry-pasture activities compatible with the environment, but which are by now no longer sustainable in socioeconomic terms in their traditional form, encouraging their introduction within the context of more general integration of social, cultural and economic activities (tourism above all).

Research

Brief description (16.1.1)

Various organisations operate in the field of research within the area. The Adamello-Brenta Nature Park has various research projects underway, including three international cooperation projects with similar organisations in Argentina, the Balkans and Taiwan. It also participates in the LIFE+ "Arctos" project (2010/2014) for the conservation of the brown bear. Since 1993 MUSE has carried out a study of migration, through scientific ringing of birdlife at Bocca di Caset. Other research, also in social and historic fields, has been carried out by APT and various universities.

Monitoring

Brief description (16.1.1)

The Autonomous Province of Trento promotes regular monitoring of habitats and species in the areas included in the Natura 2000 network. For a number of years ABNP has promoted research and monitoring projects on different biotic and abiotic components related to species and ecosystems. Monitoring is entrusted to freelance professionals, MUSE (see above) and the Museo Civico in Rovereto. The MCR deals with the monitoring of flora in Trentino, representing the figure of reference for the flora map project on the European model. The Museum Network of the Valle di Ledro (MNLED) initiative is of particular interest, with the scope of reinforcing cultural, educational, scientific and tourist services, bringing them under a single umbrella.

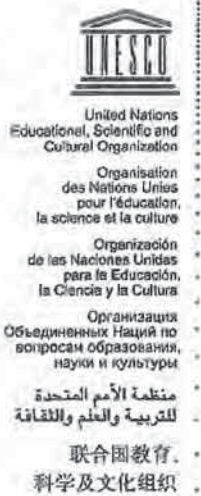
Specific variables (fill in the table below and tick the relevant parameters)

Abiotic		Biodiversity	
Abiotic factors	X	Afforestation/Reforestation	X
Acidic deposition/Atmospheric factors		Algae	X
Air quality	X	Alien and/or invasive species	X
Air temperature	X	Amphibians	X
Climate, climatology	X	Arid and semi-arid systems	
Contaminants		Autoecology	
Drought		Beach/soft bottom systems	
Erosion		Benthos	X
Geology	X	Biodiversity aspects	X
Geomorphology	X	Biogeography	X
Geophysics		Biology	X
Glaciology	X	Biotechnology	
Global change	X	Birds	X
Groundwater	X	Boreal forest systems	X
Habitat issues	X	Breeding	
Heavy metals		Coastal/marine systems	
Hydrology	X	Community studies	X
Indicators	X	Conservation	X
Meteorology	X	Coral reefs	
Modeling	X	Degraded areas	
Monitoring/methodologies	X	Desertification	
Nutrients		Dune systems	
Physical oceanography		Ecology	X
Pollution, pollutants	X	Ecosystem assessment	X
Siltation/sedimentation		Ecosystem functioning/structure	X
Soil	X	Ecosystem services	X
Speleology	X	Ecotones	X
Topography		Endemic species	X
Toxicology		Ethology	
UV radiation		Evapotranspiration	
		Evolutionary studies/Palaeoecology	X
		Fauna	X
		Fires/fire ecology	
		Fishes	X
		Flora	X
		Forest systems	X
		Freshwater systems	X
		Fungi	X
		Genetic resources	
		Genetically modified organisms	
		Home gardens	
		Indicators	X
		Invertebrates	X
		Island systems/studies	

	Lagoon systems	
	Lichens	X
	Mammals	X
	Mangrove systems	
	Mediterranean type systems	
	Microorganisms	
	Migrating populations	X
	Modeling	X
	Monitoring/methodologies	X
	Mountain and highland systems	X
	Natural and other resources	X
	Natural medicinal products	X
	Perturbations and resilience	
	Pests/Diseases	
	Phenology	
	Phytosociology/Succession	X
	Plankton	
	Plants	X
	Polar systems	
	Pollination	
	Population genetics/dynamics	X
	Productivity	
	Rare/Endangered species	X
	Reptiles	X
	Restoration/Rehabilitation	
	Species (re) introduction	X
	Species inventoring	X
	Sub-tropical and temperate	
	Taxonomy	
	Temperate forest systems	X
	Temperate grassland systems	X
	Tropical dry forest systems	
	Tropical grassland and savannah	
	Tropical humid forest systems	
	Tundra systems	
	Vegetation studies	X
	Volcanic/Geothermal systems	
	Wetland systems	X
	Wildlife	X

Socio-economic		Integrated monitoring	
Agriculture/Other production systems	X	Biogeochemical studies	
Agroforestry		Carrying capacity	
Anthropological studies		Climate change	X
Aquaculture		Conflict analysis/resolution	
Archaeology	X	Ecosystem approach	
Bioprospecting		Education and public awareness	X
Capacity building		Environmental changes	X
Cottage (home-based) industry		Geographic Information System	
Cultural aspects	X	Impact and risk studies	
Demography		Indicators	
Economic studies	X	Indicators of environmental quality	
Economically important species		Infrastructure development	X
Energy production systems	X	Institutional and legal aspects	
Ethnology/traditional	X	Integrated studies	
Firewood cutting	X	Interdisciplinary studies	
Fishery		Land tenure	X
Forestry	X	Land use/Land cover	X
Human health	X	Landscape inventorying/monitoring	
Human migration		Management issues	
Hunting		Mapping	X
Indicators		Modelling	
Indicators of sustainability	X	Monitoring/methodologies	X
Indigenous people's issues		Planning and zoning measures	X
Industry		Policy issues	X
Livelihood measures		Remote sensing	
Livestock and related impacts	X	Rural systems	
Local participation	X	Sustainable development/use	X
Micro-credits		Transboundary issues/measures	
Mining		Urban systems	
Modelling		Watershed studies/monitoring	
Monitoring/methodologies			
Natural hazards			
Non-timber forest products	X		
Pastoralism	X		
People-Nature relations	X		
Poverty			
Quality economies/marketing			
Recreation			
Resource use	X		
Role of women			
Sacred sites			
Small business initiatives			
Social/Socio-economic aspects	X		
Stakeholders' interests	X		
Tourism	X		
Transports	X		

ANNEX II



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Bureau of Public Information

Photothèque de l'UNESCO
Bureau de l'Information du Public

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23 SET. 2013

Name and Address :

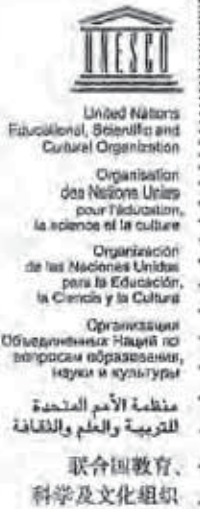
Date :

Signature :



Il Responsabile dell'Ufficio Stampa
-dott. Gianpaolo Pedrotti-

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TRENTO



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b) The photos are in no way whatever a violation or an infringement of any existing copyright or licence, and contains nothing obscene, libellous or defamatory.

Name and Address :

MURIZIO ODASSO
STUDIO ASSOCIATO PAN
VIA TESSERA 2
39052 CANTOLINO I. PERGINE (TN)
ITALY

Date : 23 settembre 2013

Signature :

