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GUIDELINES FOR THE CONSERVATION OF SPECIES AND HABITATS IN THE NATURAL ENVIRONMENT

"QUIRINO'S CANYON"

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GUARDIAREGIA (CB) – ITALY

WP T1: CONSERVATION PLAN ON A PRIORITY SPECIES

- PARTNER: MUNICIPALY OF GUARDIAREGIA

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FINAL VERSION APRIL 2021

SUMMURY

1. INTRODUCTION

Protected areas such as the Natural Oasis of Campochiaro and Guardiaregia are a characteristic feature of the Molisano landscape and the Appenines biome, which houses surfaces with a high concentration of biodiversity. This unique feature of the landscape must be preserved and protected, for historical and social reasons and to encourage the recovery for tourism or production purposes of rural areas of Molise, which the public administration intends to carry out. The return to the community of the areas must be carried out minimizing the effects of the possible contamination connected with the reclamation activity and protecting the flora-wildlife aspects of the reference habitat.

For the past several years, the issues and challenges within the recuperation of polluted or accident-prone sites had been at the heart of the country's objectives in environmental protection. Given the wide spread of the problem (in addition to 12.00 they are the potentially contaminated sites on Italian territory), insiders and policy makers agree on the urgent need to speed up the implementation of appropriate intervention policies considering that these realities constitute a serious threat - both potential and effective - to the society and the environmental resources concerned.

In fact, the planning aims to enhance an environment of exceptional ecological value, enhancing the ecological matrix present and the tourist potential that the area offers and that the municipal administration intends to enhance. In particular, the plan provides for a study of the specific potential threats to which management actions correspond, such as ordinary reclamation operations with removal of waste classified as "[...] domestic, even bulky, coming from premises and places used for civil use" (art. 184 paragraph 2), followed by a continuous monitoring plan that will ensure timely intervention in case of disturbances.

Through the LASPEH Project, the Municipality of Guardiaregia intends to carry out an environmental reclamation of its territory in a specific site called "Quirino's canyon" of considerable landscape importance located within the WWF Guardiaregia - Campochiaro Oasis Nature Reserve, but currently exposed to environmental degradation with negative effects on environmental parameters, which determine a reduced liveability and usability of the area. The

LASPEH project, in fact, as part of the EU funding of Priority Axis 3 (Environmental protection risk management and strategies to reduce carbon emissions) of the INTERREG IPA Programme CBC Italy-Albania-Montenegro, aims to preserve biodiversity-rich areas and strengthen ecosystems to react flexibly to climate change and human activities in the territory.

This requires an in-depth knowledge of the site and the activities to be carried out, it is therefore essential to characterize the areas under intervention, to verify situations of risk to public health or the quality of the environment, and to eliminate the risk situations detected. To compete these activities, specific knowledge is needed both with regard to the habitat as a whole and with regard to the processes and practices of management of reclamation operations.

A protected area such as the Natural Oasis of Campochiaro and Guardiaregia, for its specific characteristics, differs considerably from a simple rural area, a typology on which the characterization and reclamation procedures present in environmental legislation have been elaborated. That ia why we need a different approach, which will enable us to achieve the best possible results, with adequate management of economic resources. Following the experience gained, it was necessary to combine the current environmental legislation with guidelines for the characterization and reclamation of the areas subject to intervention.

These guidelines, inspired by the principles of the regulation on the reclamation of polluted sites contained in Title V, part four, of Legislative Decree 152/2006, so called Environmental Code, with subsequent amendments and/or additions, together with the Community Directives Habitats (Dir. 92/43/ EEC) and Birds (Dir. 79/409/EEC) guide a correct and in-depth characterization of the mining area and direct towards the most appropriate reclamation interventions in relation to the environmental context in which it is inserted.

The area corresponds to an area of about 110 hectares and through a recent inspection activity the presence of waste of various kinds was found, so it is highlighted the urgent need to intervene with appropriate tools to reclash to area and promote management formulas of valorisation activities.

In particular, the following subtasks are necessary:

- Detection of existing environmental parameters;
- Inspections by definition Action Plan of intervention in collaboration with the body having the management of the area;
- Waste removal;
- Interventions with installation of safeguards, security and verification af access to the area;
- Definition of an eco friendly tourist enhancement plan in agreement with the body responsible for managing the area.

2. REGULATORY FRAMEWORK

Below are the main reference standards used for the preparation of this document. The main rules regulating both the area of interest of the project and the reclamation works will be highlighted.

The institutional framework for Natura 2000 is made up of all the rules governing the subject in question.

Two basic Community texts are in force within the overall framework of the binding rules for nature conservation and biodiversity: Directives 92/43/EEC on birds and 79/409/EEC on habitats. Both provide for the protection of natural environments and species of fauna and flora, in particular through the creation of a coordinated and coherent European network of protected sites (Natura 2000 Network).

NATURA 2000 and the Habitats and Birds Directives

"NATURA 2000" is the name that the Council of Ministers of the European Union has assigned to a coordinated and coherent system (a "network" or "network") of areas intended for the conservation of biological diversity present in the territory of the Member States and, in particular, for the protection of a series of habitats and animal and plant species indicated in Annexes I and The Delta Habitats Directive. The creation of the NATURA 2000 network is provided for in Council Directive 92/43/EEC of 21/5/1992 on the "conservation of natural and semi-natural habitats and wild fauna and flora", commonly referred to as the Habitats Directive. However, the aim of the directive is broader than the creation of the network alone, with the stated aim of helping to safeguard biodiversity through conservation activities not only within the natura 2000 network areas but also through measures for the direct protection of species whose conservation is considered to be a common interest of the whole Union. The transposition of the Directive took place in Italy in 1997 through Regulation D.P.R. No 357 of 8/9/1 997. The conservation of European biodiversity is carried out taking into account economic, social and cultural needs, as well as regional and local peculiarities. This constitutes a strong innovation in the policy of the sector in Europe. In other words, the aim is to promote the integration of the protection of animal and plant habitats and species with the economic activities and social and cultural needs of the populations living within the natura 2000 network areas. Thus, for example, the habitats directive

itself specifies the objective of preserving not only natural habitats (those less modified by man) but also semi-natural habitats (such as traditional farming areas, forests used, pastures, etc.). This recognises the value, for the conservation of biodiversity at European level, of all those areas in which the centuries-old presence of man and his traditional activities has allowed the maintenance of a balance between man and nature. Agricultural areas, for example, are linked to many animal and plant species which are now rare and threatened for the survival of which the continuation and enhancement of traditional activities, such as grazing or non-intensive agriculture, are not considered as positively as intensive and/or hyper-specialized agricultural environments which, for the conservation of biodiversity, have very little or no value. For the first time, the Habitats Directive has created a framework for nature conservation in all eu ropean states. In reality, however, it is not the first Community directive to deal with this matter. Another important directive was adopted in 1979, which remains in force and is incorporated into the provisions of the Habitats Directive, the so-called Birds Directive (79/409/EEC, on the conservation of wild birds). This also includes, on the one hand, a series of actions for the conservation of numerous species of birds, as set out in the annexes to the Directive, and, on the other hand, the identification by the Member States of the Union of areas for their conservation, the so-called Special Protection Areas (SPAs). At the time, therefore, the Birds Directive laid the foundations for the creation of a first European network of protected areas, in that case specifically designed to protect threatened species of birds and their habitats. In view of the existence of this network and its legislation, the Habitats Directive does not include birds in its annexes, but refers to the Habitats Directive, but clearly states that the Special Protection Areas are also part of the network. NATURA 2000 is therefore composed of two types of areas that may not even coincide and have different spatial relationships with each other, from total overlap to complete separation as appropriate: the Special Protection Areas provided for in the Birds Directive and the Special Areas of Conservation provided for in the Habitats Directive. It should be noted, however, that these deadlines do not take on this name until the end of the selection and designation process. Until then they are referred to as Proposed Sites of Community Importance (SICs). Natura 2000 is, in conclusion, a long-term programme that Europe has decided to tackle in order to preserve the nature of the continent for future generations, recognising the fundamental need to link this

objective to overall land management, productive and economic activities and infrastructure policy. In other words, linking conservation to the presence of man on a continent in which truly wild areas are now limited to very small areas but where biological diversity is still manifested at very high levels and of great importance, both from a scientific point of view and for the quality of life of all the citizens of the Union.

The Habitats Directive in Italy

At national level, the application of the content of the Habitats Directive has led to the enactment of a number of successive legislative documents. In particular, the following are highlighted:

• D.P.R. No 357 of 8/9/1 997;

• The D.M. of the Ministry of the Environment of 3/4/2000;

• the D.M. of the Ministry of the Environment and Land Protection 3/9/2002;

• D.P.R. No. 120 of 12/3/2003.

The DPR No 357 of 8/9/1997 regulates in our country the implementation of the Habitats Directive for the "conservation of natural and semi-natural habitats, as well as wild flora and fauna". This DPR takes up the contents of the Habitats Directive by defining the scope of the Regulation, regulates the procedures for the adoption of the measures provided for in the Directive for the protection of biodiversity through the conservation of natural habitats and the species of flora and fauna indicated in the Annexes. It also deals with the topics related to the identification of SSIs and SPAs (Articles 3 and 6); indicates the conservation measures to be taken by regional authorities for the conservation of habitats (Article 4) and animal (Article 8) and plant species (Article 9); it deals with the impact assessment to which the plans, projects and interventions to be carried out at sites of Community importance are subject (Article 5); establishes the role of the regions in ensuring the monitoring of the conservation status of species and natural habitats of Community interest (Article 7); regulates the collection and exploitation of species of wild fauna and flora (Article 10); establishes the possibility of derogations from the provisions of the Directive (Article 11); regulates procedures for authoring the reintroducing and introduction of animal species. The following articles concern: information on the implementation of the Directive (Article 13);

research and monitoring activities for the purposes of knowledge and biodiversity protection (Art. 14); the surveillance role of the State Forestry Corps Finally, Article 16 provides that annexes A, B, C, D, E, E and G form an integral part of the Regulation, while the Article 17 defines the date of entry into force of the Regulation (24/10/1997). DPR No 357 contains seven annexes; the first six take up the contents of the annexes to the Directive, while the seventh (all.G) defines the contents of the report for the Impact Assessment of plans and projects. It had to consider both (i) the description of the characteristics of plans and projects, as well as (ii) the area of influence and interference with the environmental system in question. In particular, the following should be described:

1) the characteristics of the plans and projects with reference to:

- the types of actions and/or works;
- the size and/or scope of reference;
- complementarity with other plans and/or projects;
- the use of natural resources;
- waste production;
- pollution and environmental disturbances;
- the risk of accidents with regard to the substances and technologies used.

2) interference with plans and projects with regard to the environmental system by considering:

- abiotic (physico-environmental) components;
- biotic (biological) components;
- ecological connections (relationships) between abiotic and biological components.

The interference must take into account the quality, regeneration capacity of the natural resources of the area and the carrying capacity of the natural environment, with minimal reference to the cartography of the CORINE LAND COVER Project. This is one of the four sub-programmes into which the Community's CORINE Programme is divided, the information system set up to coordinate at European level the activities of detecting, storing, processing and managing of data relating to the state of the environment. This project provided for the drafting, throughout the national territory, of a land cover map on a scale of 1:100,000. D.M. 3/4/2000 of the Ministry

of the Environment designates the Special Protection Zones and Sites of Community Importance, while with the subsequent enactment of D.M. 3/9/2002 of the Ministry of the Environment and Land Protection, guidelines for the management of NATURA 2000 sites are indicated. D.P.R. 120 of 12/3/2003 of very recent publication (G.U. Regulation No 124 of 30/5/2003) contains the "Regulation amending and supplementing Decree No 357 of the President of the Republic No 8/9/1997 on the implementation of Directive 92/43/EEC on the conservation of natural and semi-natural habitats and of wild fauna and flora". The adoption of this new decree is due to the need to adapt national legislation to Community provisions in the light of the findings and observations contained in the infringement procedure of 1999/2180 of the European Commission, and the amendments made by Council Directive 97/62/EC of 27/10/1997 ("Adaptation to technical and scientific progress of Council Directive 92/43/EEC on the conservation of natural and semi-natural habitats and wild fauna and flora"). In addition to updating and clarifying many points of the previous Regulation implementing the Habitats Directive, the new D.P.R. defines more precisely methods of evaluation and areas of interest for the preparation of studies and impact assessments that, among other things, all types of natura 2000 network sites (pSIC, SIC, SPA) must be developed and also in the case of plans and projects are affected by Environmental Impact Assessment (airs 614).

- Legislative Decree of 3 April 2006, n. 152 and subsequent amendments and additions - Environmental standards.

Regional Legislation

List of Regional Rules in relation to the protection and protection of the natural heritage of the Molise Region:

- L.R. n. 23 of 20-10-2004 - Realization and Management of Protected Natural Areas (B.U.R. Molise No. 22 of October 30, 2004);
- L.R. 18 January 2000 n. 6 - Forestry Law of the Molise Region;
- L.R. 3 March 2000 n. 12 Amendments to Regional Law No 29 of 2 September 1999, to: "Measures for the protection, development, protection and enhancement of mountain territories";

- L.R. 4 March 2000 n. 21 Regulation of the environmental impact procedure;
- L.R. 27 July 1979 No 20 Rules for the protection of fauna and the environment and for the pursuit of hunting activities;
- L.R. 1 December 1989 No 24 Regulation of territorial country-environmental plans;
- L.R. 21 February 1990 No 8 Establishment of the Technical Committee for Country Planning;
- L.R. 30 July 1998 No 8 Rules on the elimination of stubble;
- L.R. 23 February 1999 n. 9 Rules for the protection of endangered and native flora and incentives for the cultivation of plants of the undergrowth and officinal;
- L.R. 2 September 1999 No 29 Measures for the protection, development, protection and enhancement of mountain territories.

Other regional standards related to environmental protection:

- L.R. 30 May 1973 No 11, Rules on the establishment and functioning of mountain communities;
- L.R. 26 July 1973 No 14 Capital grants for the maintenance of municipal roads;
- L.R. 17 January 1975 No 7 Rules on the granting of grants to municipalities for the ordinary maintenance costs of roads classified as urban and suburban municipal;
- L.R. 21 January 1975 No 10 Rules to facilitate the execution of public works within the competence of local authorities;
- L.R. 21 January 1975 No 11 Changes in the budget for 1974, in the field of regional assistance for the construction and rehabilitation of neighbouring and interpoderal roads and for the construction of aqueducts and power lines;
- L.R. 21 January 1975 No 14 Grants for the formation of town planning plans and for the acquisition and urbanization of areas for economic and social housing;
- L.R. 17 April 1975 No 29 Assistance from the region for the construction, extension and rehabilitation of rural buildings;
- L.R. 30 May 1975 No 39 Rules on land use for tourism purposes;
- L.R. 10 May 1976 No 15 Rules for the definition of administrative procedures transferred to the region pursuant to Art. 17 of 13 August 1975, converted into Law No 492 of 16 October 1975;
- L.R. 25 June 1976 No 19 Transfer of mountain communities of functions in the field of mountain reclamation;
- L.R. 27 December 1976 No 41 Supplementary rules for the performance of public works for the region and local authorities;
- L.R. 27 December 1976 No 42 Supplementary rules for the execution of public works within the province and local authorities - Amendment to the financial rule;

- L.R. 25 March 1977 No 9 Refinancing of Regional Law No 10 of 21 January 1975 and subsequent amendments and additions - Rules to facilitate the execution of public works within the competence of local authorities;
- L.R. 13 August 1977 No 23 Contributions to the provinces for the maintenance of the road network;
- L.R. 27 January 1978 No 3 Amendment to Regional Law No 29 of 17 April 1975 concerning: "Regional assistance for the construction, extension and rehabilitation of rural buildings";
- L.R. 5 September 1978 No 24 Assistance for the development of irrigated areas and for the extension of irrigation;
- L.R. 28 December 1978 No 32 Regional development project - Financing of an extraordinary three-year programme (1978-80) for construction, completion, development and modernisation of roads classified as provincial or municipal;
- L.R. 29 December 1978 No 34 Regional development project - Financing of an extraordinary three-year programme (1978-80) of water and sewerage networks and sewage treatment plants;
- L.R. 29 December 1978 No 35 Regional development project - Financing of an extraordinary three-year programme (1978-80) of public works under the responsibility of local authorities;
- L.R. 1 February 1979 No 6 Assistance to municipalities and mountain communities for the construction of areas for production sites for craft activities or for small and medium-sized enterprises;
- L.R. 26 June 1979 No 18 Intervention plan for port works;
- L.R. 14 July 1979 No 19 Rules for the execution of works and public works of regional interest;
- L.R. 27 July 1979 No 21 Rules for the financing of the public works programme provided for in Regional Law No 9 of 25 March 1977 - fixing of commitment limits;
- L.R. 20 August 1979 No 24 Supplementary provisions of Regional Law No 5 September 1978, No. 24 concerning "Measures for the development of irrigated areas and the extensible of irrigation
- L.R. 24 January 1980 No 3 Measures in favour of agritourism;
- L.R. 4 February 1980 No 6 Rules on civic uses;
- L.R. 26 February 1980 No 7 Measures for school buildings;
- L.R. 21 May 1980 No 17 Rules for the census and land registry on the protection of water against pollution;
- L.R. 21 May 1980 n. 18 Extraordinary interventions for the archaeological enhancement of the territory of Sepino;
- L.R. 23 May 1980 No 20 Amendments and additions to Regional Law No 19 of 14 July 1979: "Rules for the execution of works and public works of regional interest";
- L.R. 2 September 1980 No 31 Establishment of the Molise Water Resources Authority;
- L.R. 25 March 1981 No 6 Regional assistance for public transport services;
- L.R. 25 March 1981, Point 6 - regional assistance for public transport services - Changes in the 1981 annual budget and the 1981-1983 multiannual budget;
- L.R. 3 August 1981 No 17 Rules on land use for tourism purposes;

- L.R. 4 January 1982 No 2 Additional operations in the fields of land reclamation and land improvement works;
- L.R. 20 January 1982 n. 6 Interventions for the service of snow clearing on provincial and municipal roads;
- L.R. 20 January 1982 No 7 Assistance in the subsidized building sector;
- L.R. 2 March 1984 No 4 Approval of the regional water rehabilitation plan pursuant to Law No 319 of 10 May 1976 and subsequent amendments and additions.
- L.R. 8 March 1984 No 6 Approval of the regional plan for the disposal of solid waste;
- L.R. 7 January 1985 No 2 Amendments to Regional Law No 12 of 20 June 1981 and further measures in favour of the craft sector;
- L.R. 14 May 1985 No 17 Regional provisions implementing Law No 47 of 28 February 1985 laying down rules on the control of town planning and construction activities, sanctions, recovery and remedial action for illegal works;
- L.R. 20 June 1988 No 15 Contributions to municipalities for the execution of geological-geotechnical surveys prior to the formation of general and implementation instruments and their variants;
- L.R. 11 May 1990 No 22 Housing measures;
- L.R. 3 July 1991 n. 10 Legislation on reclamation;
- L.R. 2 April 1993 No 9 Amendment to Regional Law No 10 "Reclamation Legislation" of 3 July 1991;
- L.R. 26 April 1993 No 12 Transitional rules for speeding up procedures in respect of works and public works of regional interest partially amending Regional Law No 19 of 14 July 1979 and subsequent amendments and additions;
- L.R. 25 January 1994 No 2 Measures in favour of agritourism;
- L.R. 12 April 1995 No 14 Urgent rules for streamlining procedures and delegations in the areas of town planning, public works and transport;
- L.R. 12 May 1995 No 25 Regional rules for the implementation of the national energy plan;
- L.R. 6 June 1996 No 20 New rules for streamlining the procedures laid down in the Law of 2 February;
- L.R. 18 March 1997 No 4 Regulation of regional functions in the field of trade in public areas;
- L.R. 11 April 1997 n. 9 Protection, enhancement and management of the tratturi state;
- L.R. 14 November 1997 No 25 Use of materials for the country restoration of sites;
- L.R. 23 December 1998 No 18 Regulation of inland waterway navigation;
- L.R. 29 December 1998 n. 20 Establishment of the basin authority of the rivers Trigno, Biferno and Minori, Saccione and Fortore;
- L.R. 3 February 1999 No 5 Rules for the implementation of Law No 36 of 5 January 1994. Provisions on water resources;
- L.R. 13 December 1999 No 38 Establishment of the Regional Agency for Environmental Protection of Molise (ARPAM);
- L.R. 12 January 2000 No 2 Repeal of Regional Law No 25 of 14 November 1997 on "Use of materials for the restoration of sites".

Other documents aimed at the management of Natura 2000 sites

- Guide to the interpretation of Art. 6 of Habitats Directive 92/43/EEC "The management of Natura 2000 network sites" by the European Commission (DGXI).
- "Guidelines for the management of Natura 2000 sites" by the Ministry of the Environment and Land Protection-Nature Conservation Service.
- "Manual of guidelines for the drafting of natura 2000 site management plans" by the Ministry of the Environment and Land Protection-Nature Conservation Service.

3. CONTEXT ANALYSIS

The area being planned falls within the municipality of Guardiaregia. In particular, the Stream Quirino's Forra, starts from the loc. Arcichiaro where there is an artificial barrier, up to loc. Santa Maria, passing through loc. Formelle where the counter-town laps. Total area of 98 Ha

The municipal territory is represented by a mountain profile. The altimetric variations are identified by the highest point Monte Mutria 1823 m above sea level, which marks the border with the Campania region, to the Rio Cupo valley south of the town with 500m above sea level which marks the border with Vinchiaturo.

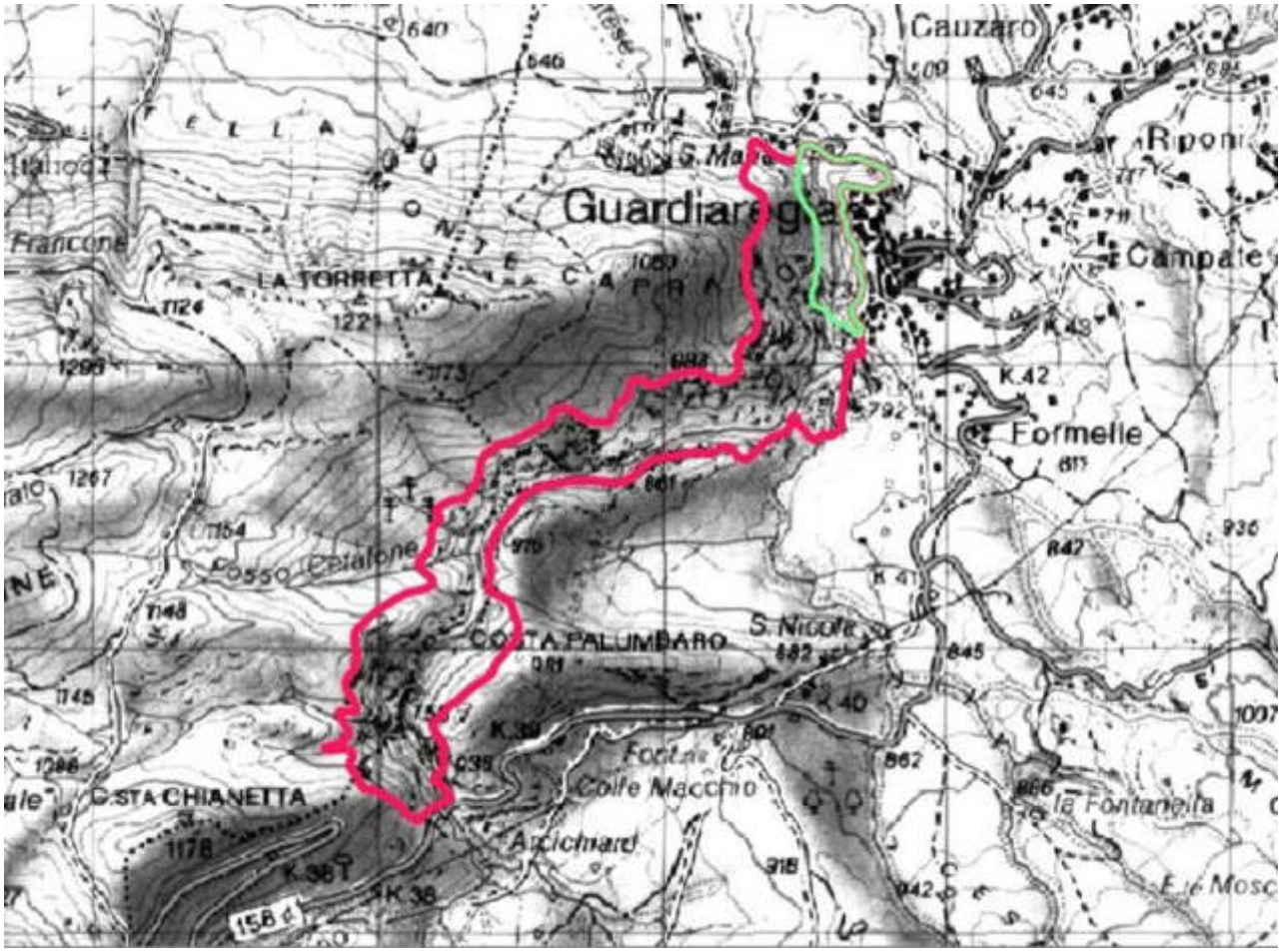


Figure 1: Quirino stream's canyon (red) Reclamation Area (green)

3.1 Geo-pedological characteristics

The Matese mountain complex consists of compact limestones of the Cretaceous, which in the intermediate areas gradually turn into eocenic marne. At the lower altitudes there are newer conglomerates and clays, belonging to the Miocene and paleocene, that the waterways have a profound impact with a considerable contribution of solid materials and phenomena of scaling of the slopes, especially where the litological substrates are clays. Soils of limestone origin generally have a single horizon rich in organic substance, with a lumpy structure, with the presence of a minute skeleton, with free drainage. The forest soils rest directly on the compact limestone, in which they occasionally deepen to form well-penetrated pockets from the roots. At times the substrate consists of debris of mixed groundwater of limestone. On the slopes the thickness of the soils varies from medium to poor, while in the floors and compluvi we find deep and fertile soils with a more advanced profile. Soil degradation phenomena occur in areas where forest cover is lacking (surface erosion) and in areas where very intense grazing is or has been exercised (constipation, feelings and erosion). Finally, it should be noted that soils of clay origin have significant physical defects, such as strong compactness, low permeability and difficult drainage, leading to surface erosion phenomena in some more or less large areas.

The ecological feature of greatest interest is the presence in the territory of Geositi that constitutes that abiotic resource that preserves and allows the conditions of development of a high index of biodiversity. The stationary characteristics of the geosite of the Quirino stream's canyon are exceptional and constitute the primary element for the conservation of the species and Habitats that are present. The Stream Quirino’s Gorges , located close to the village of Guardiaregia, form a narrow and deep engraving between the town and the heights of the Torretta with a length of about 3.5 km from 800 m above sea level in Arcichiaro up to about 600 of the church of Santa Maria ad Nives di Guardiaregia. Among the most important canyons of the Apennines, the "Quirino’s Gorges" represent the typical engraving with a double tectonic and karst origin, in fact, the fracture caused by the great events that led to the lifting of the Matese massif has been excavated and shaped over millions of years by the constant and impetuous flow of water. Near Guardiaregia, the Quirino’s canyon receives the water of the Vallone Grande stream

with the spectacular Waterfall of San Nicola which, with three jumps, has a total height of about 100 meters.

3.2 Climatic characteristics

To examine the area of investigation from the climatic point of view, reference was made to the thermo-rainfall data of the period 2004 - 2016 provided by the Guardiaregia station, located near the Serra di Campo Forest Nursery and the data of the Agrometeorological Database of the CMA – Research Unit for Climatology and Meteorology applied to agriculture at the following web address: http://cma.entecra.it/homePage.htm.

In the annual monthly precipitation table, it is shown that in the area of annual interest, an average of 1,434 mm of rain spread over about 108 days falls.

The seasonal distribution of rainfall (Fig. 1) is most affected by the Mediterranean influence, presenting a maximum of autumn-winter rainfall as opposed to the typical spring-summer low. The wettest months are November and December with average values of 237-224 mm of monthly cumulative rain. Rainfall decreases significantly from May to September with monthly values not exceeding 100 mm. Summer aridity occurs markedly in July with an average of 40 mm distributed over about 5 days, while throughout summer (June-September) an average of 250 mm of rain falls.

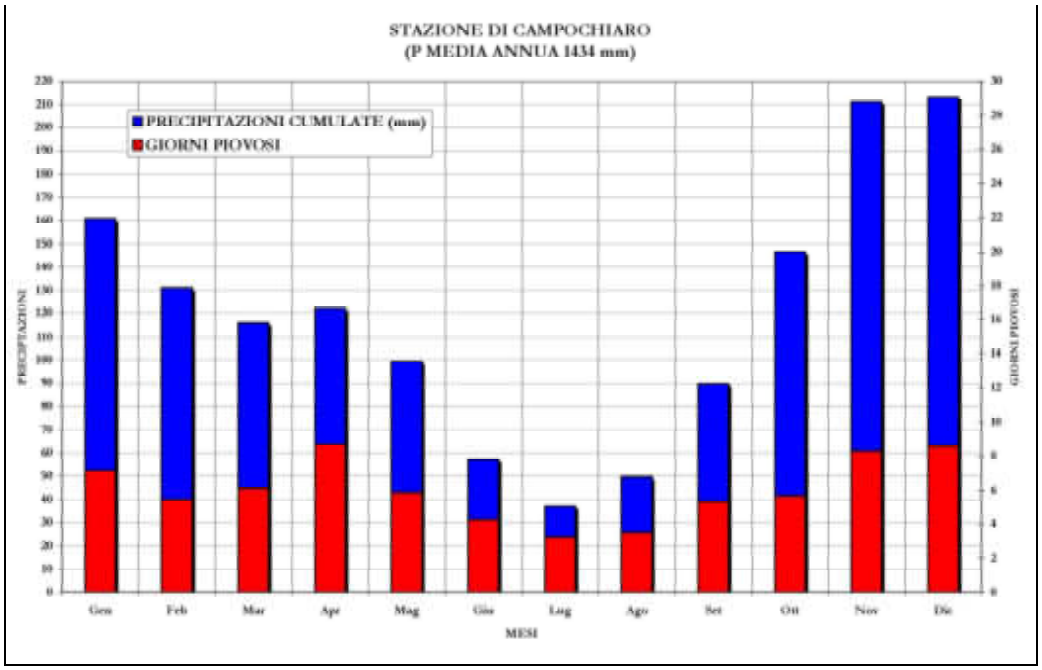


Figure 1- Annual precipitation trends

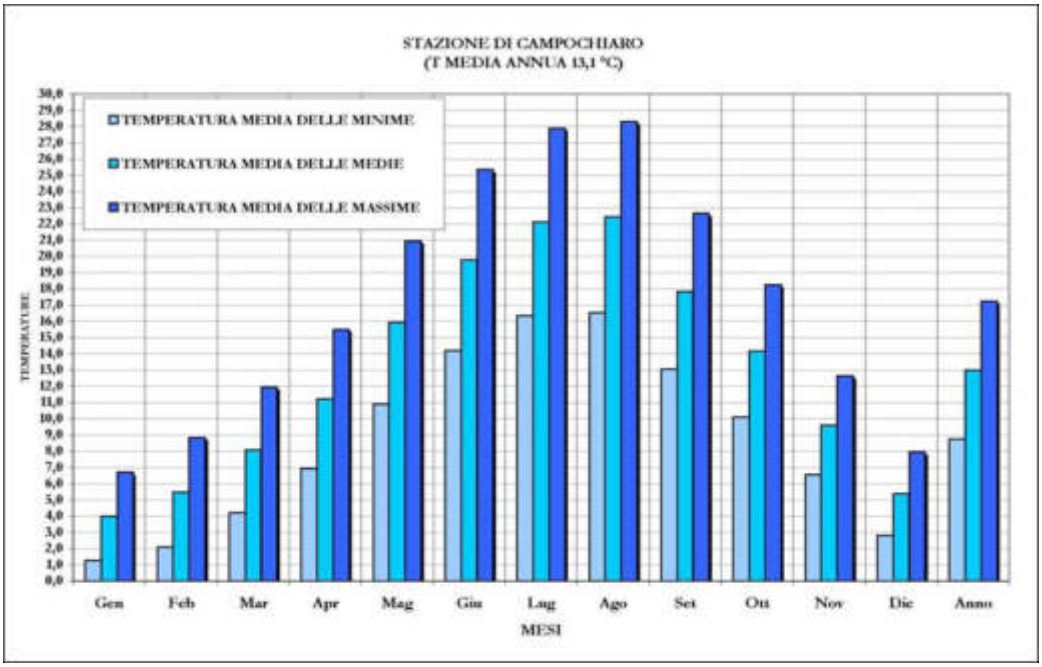


Figure 2 - Annual thermometric analysis

As regards thermometric data (Fig. 2), the average annual air temperature is 13.1 °C and the monthly averages are between 4.1 °C in January and 22.1 °C in July. The highest values, in the historical series of data, were recorded in July/August, with an average maximum value of about 28.1 °C; the lowest

values are typically found in January and February with an average minimum of 1.3 °C. As far as extreme values are concerned, the absolute minimum was recorded in January 1979 at -12 °C, the absolute maximum for the summer of 1981, in August at 38.8 °C.

In the shadow-thermal diagram Bagnolus-Gaussen (Fig. 3), which summarizes in graphic form the distributions of rainfall and average annual temperatures referring to the time interval considered, the comparison shows the existence of a dryness period referring only to July. Campochiaro station reports a minimum of precipitation in July (37 mm in just 3 days of rain), as regards the temperature value the maximum corresponds between late July (27.9 °C) and early August (28.3 °C).

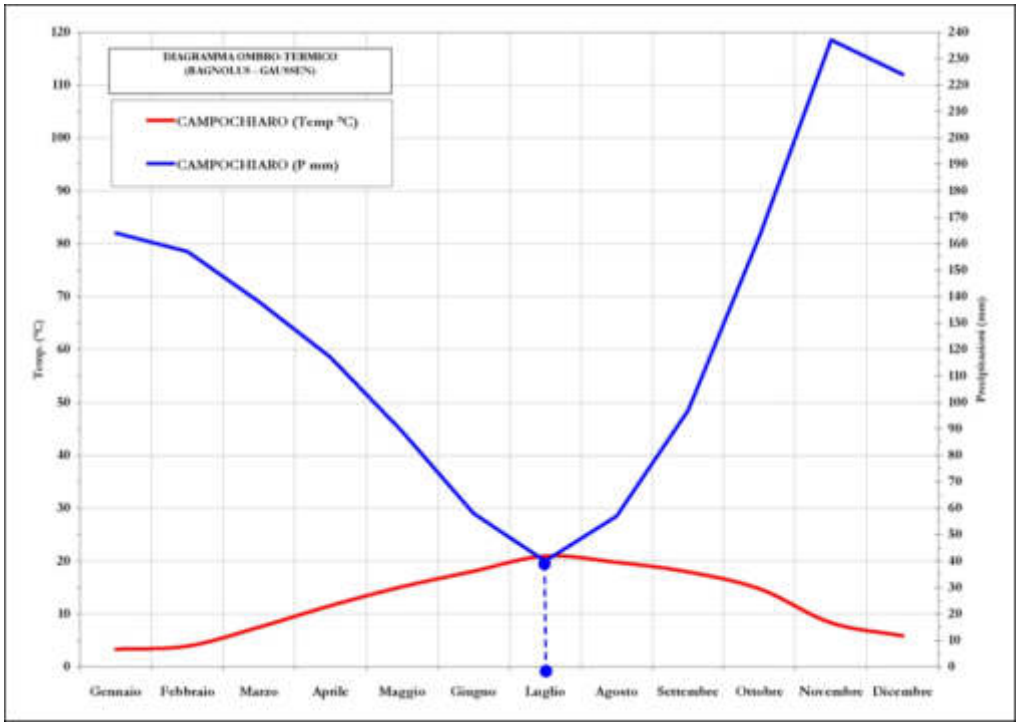


Figure 3 - Shadow-thermal diagram (Bagnolus - Gaussen)

On the basis of all the information available, it can be inferred that the climate in general and, with regard to temperatures, is due to the Apennine mountain regime, with cold winters and hot summers; on the other hand, considering that the area under consideration is at higher altitudes than the survey station, the area is mainly part of a temperate-cold climatic band, characterized by a marked winter (five months with an average temperature below 10 °C) and a temperate and dry summer. In addition, it must be taken into account, that as the altitude increases winters become noticeably colder and summers more temperate and cool.

Snowfall occurs, in principle, from the end of November to the beginning of April, with sporadic snowfall going into early May, with significant differences, from one year to the next, both in the height reaching the snowcover and in the frequency of events.

4. CARTOGRAPHIC STUDY

The cartographic study is of central importance for the implementation of this planning. In particular, various technologies have been used to support the management of the site that are offered by supports held by the Eden Technical Studio and the Ministry of the Environment and Protection of the Territory and the Sea.

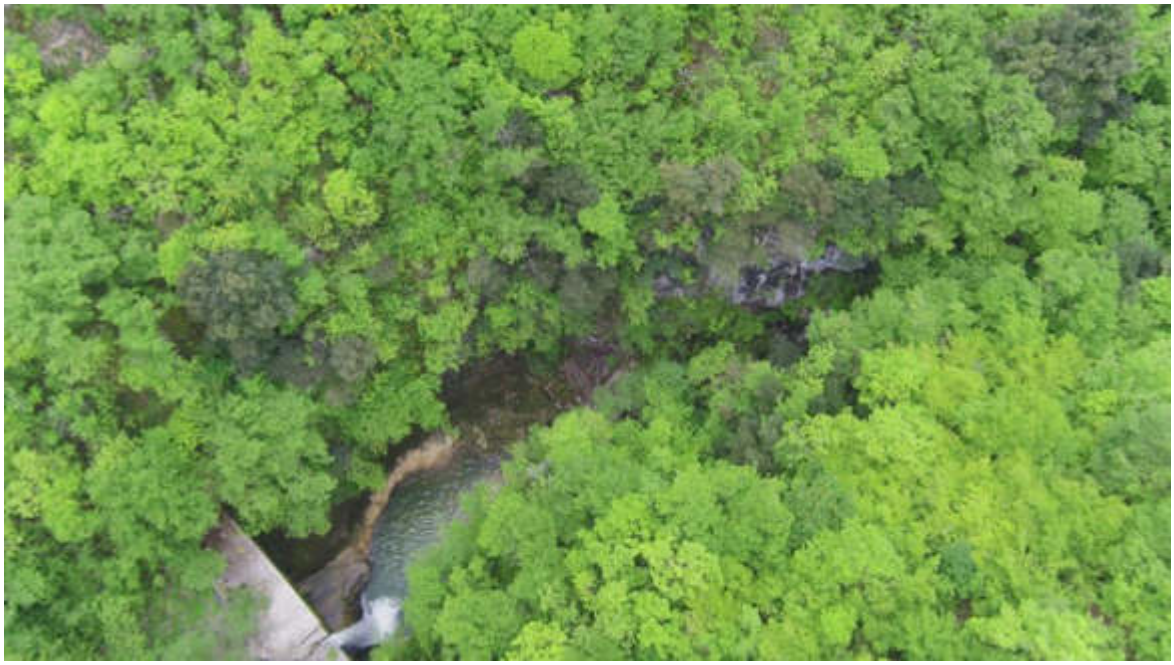
The study area consists completely of difficult surveys at the journey without the help of mountaineering and climbing techniques and skills, for this reason the use of auxiliary technology becomes fundamental. For the survery works and the cartographic study have been used Data from:

- **SATELLITE flights**
  - **LIDAR** - (Light Detection and Ranging) is an "active" remote sensing technique for performing high-resolution topographic surveys. The survey is carried out by aerial means on which a laser scanner consisting of a transmitter (essentially a laser), a receiver (consisting of a telescope) and a data acquisition system. The peculiarity of the system is the very high speed of data acquisition combined with a high resolution. LIDAR data for this study were provided by the Ministry of the Environment and Land and Sea Protection, upon request from the study group.
  - **SENTINEL 2** - a mission developed by ESA under the Copernicus programme to monitor green areas of the planet and provide support in the management of natural disasters. The images captured by sentinel 2 are 13-band multispectral with 10m ground resolution. The use of this technology has made it possible to replace some images for environmental investigations that could not be recovered with SAPR coli
- **Flights from SAPR** - Drone inspection was conditioned by climatic factors in 2019 and COVID-19-related emergencies for 2020. In particular, it was possible to make flights in a small positive weather window in the late spring period and in June 2019 and September 2020, excluding the month of May - June which would have been the best period for this type of analysis. After the adverse weather conditions in May it was possible to make flights even in the most inaccessible areas but the vegetative recovery with its new leaf cover was an obstacle to inspecting the soil. Two machines were used for this type of inspection:
  - MATRICE DJI 200
  - DJI Mavic 2 Pro

The first machine is equipped with very high resolution optical instrumentation; it was only possible to use it in July flights due to the strong upward currents found in the period of April.

The second was equipped with multispectral optics, equipment necessary for the evaluation of the NDIV index.

- Figure 2- May Flight - North wall of the Canyon ing cover



· Figure 3- May flight over habitat Tilio- acerion

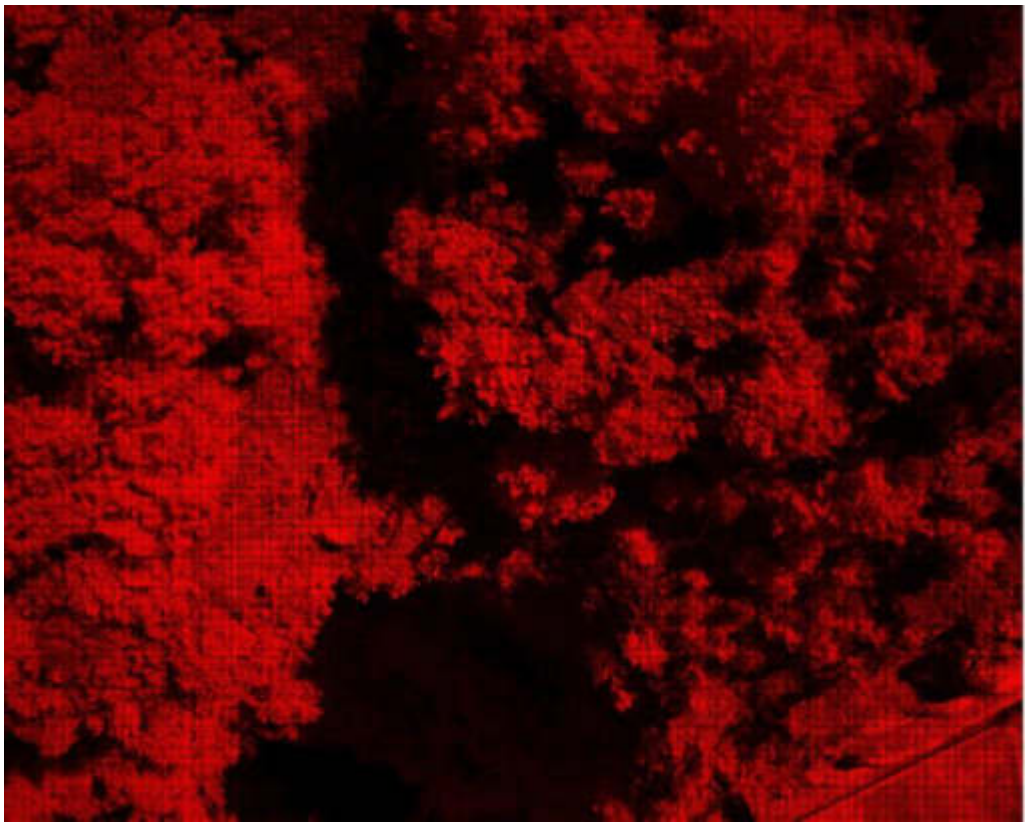


Figure 4: Photo of The Multispettrale

4.1 LIDAR Data Analysis

The data provided by the Ministry of the Italian Republic are in DTM (Digital Terrain model) format, and represents the trend of the soil surface without the anthropogenic and vegetation elements.

In the following pages will be published the map models generated by Lidar Data

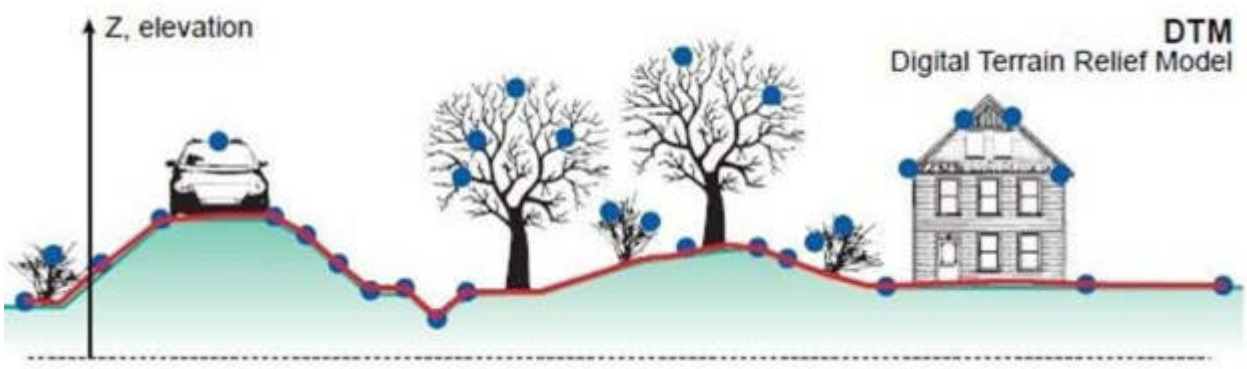


Figure 5: Shares taken over by DTM

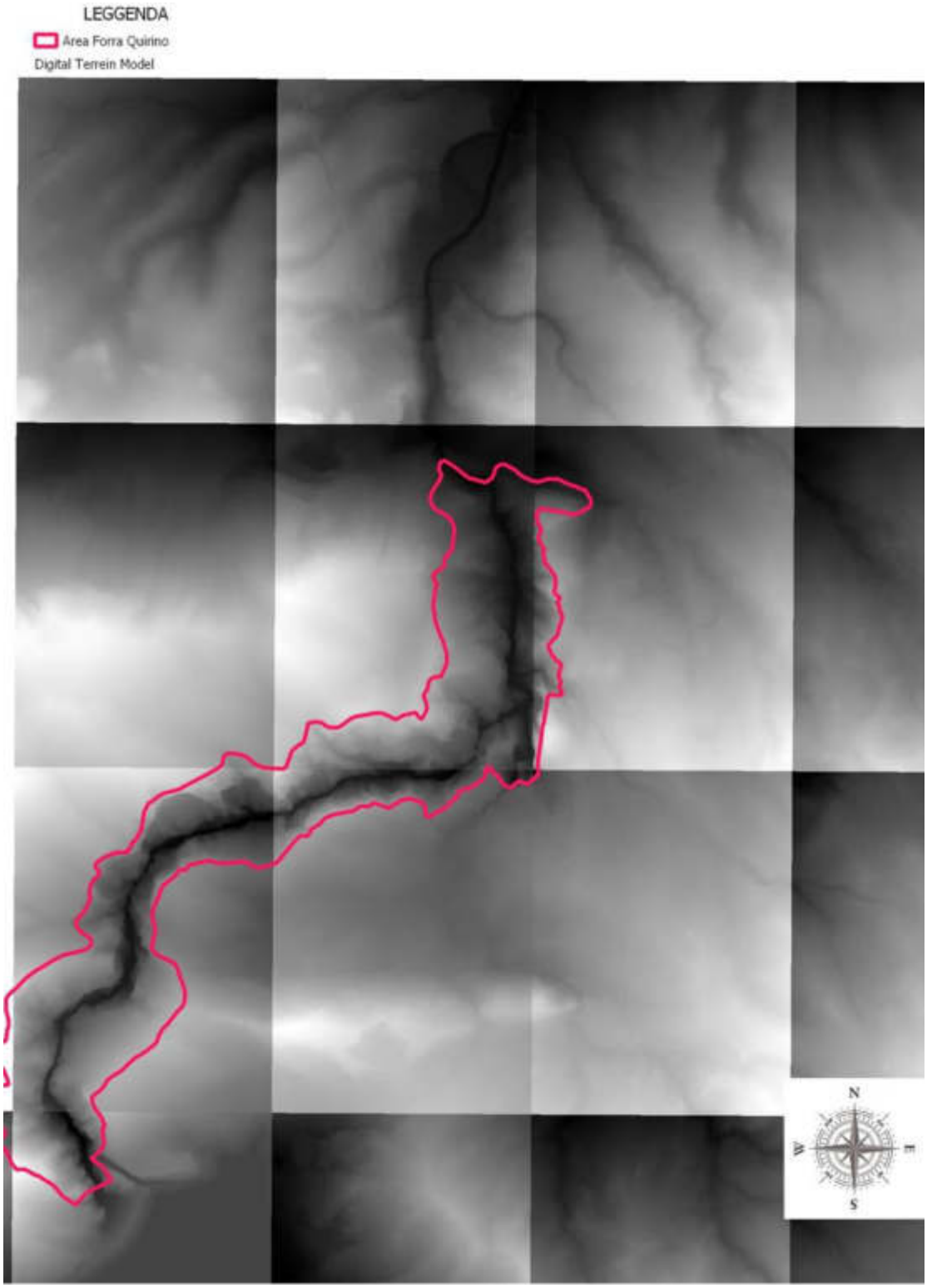


Figure 6: Digital Model of the Terrain

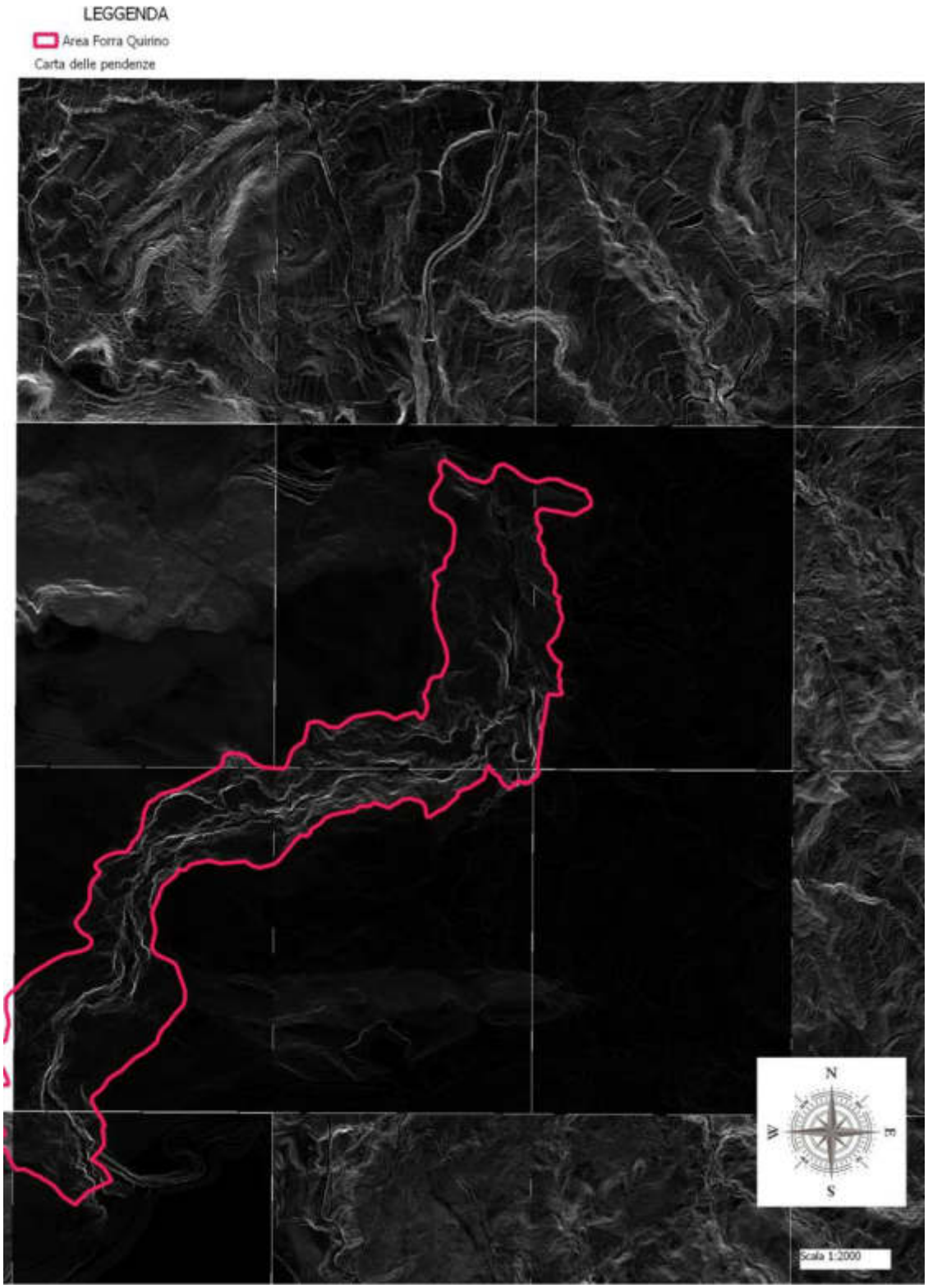


Figure 7: Map of Slopes

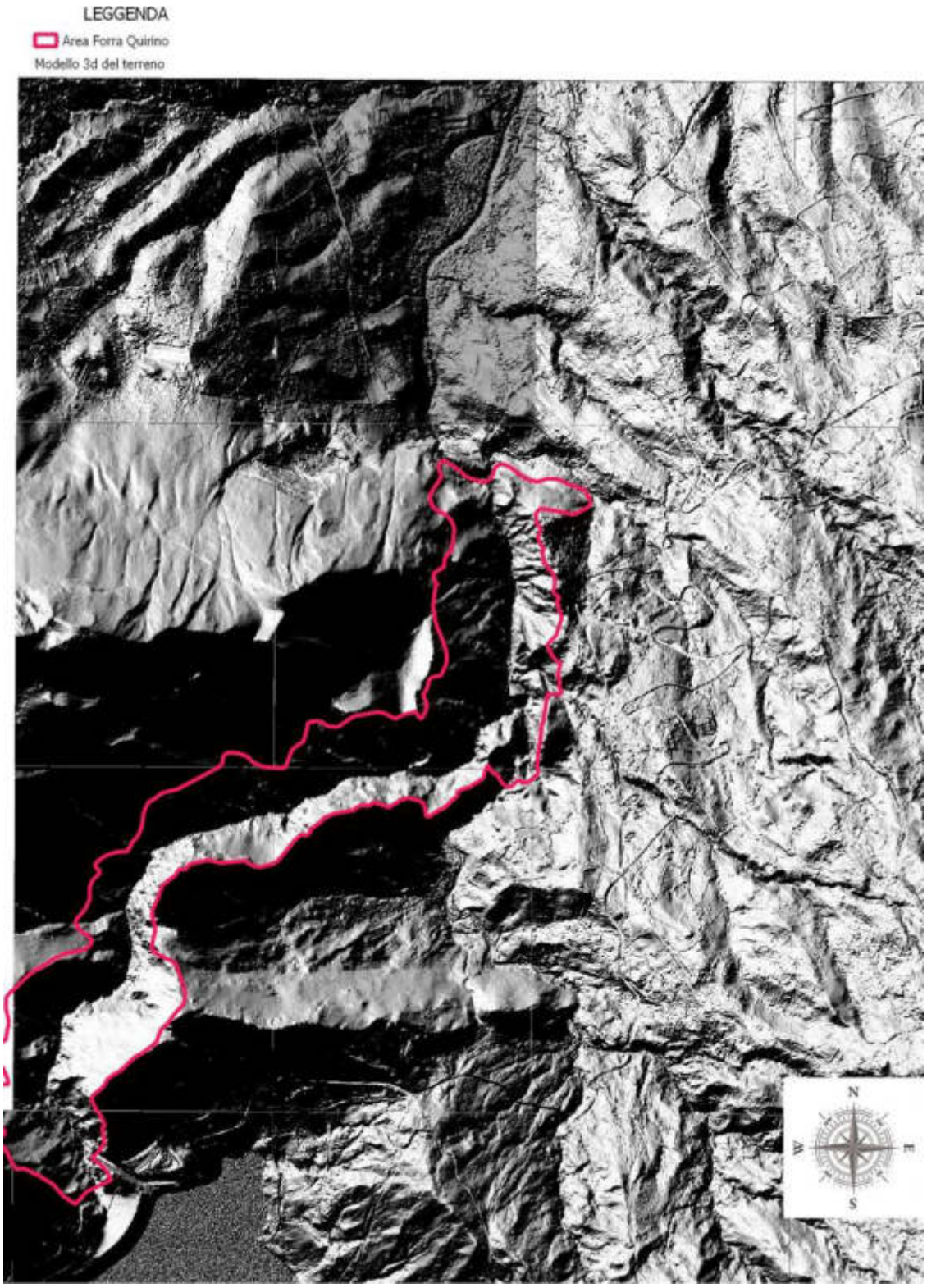


Figure 8: 3d model of the terrain

4.2 SAPR (DRONE) and SENTINEL 2 Data Analysis

With flights from SAPR and subsequently with the acquisition of images from the Sentinel-2 satellite it was possible to work with multispectral images.

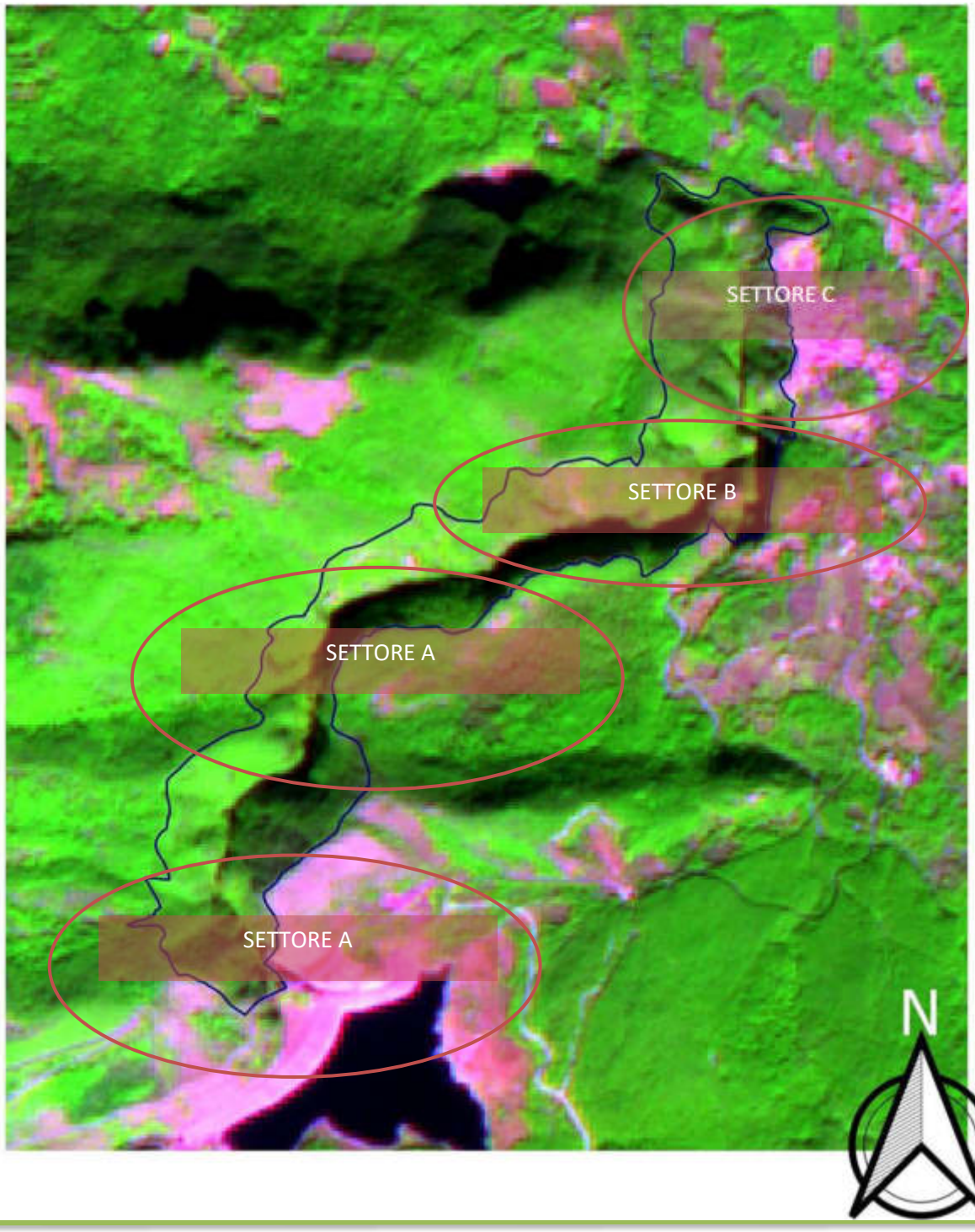
The multispectral images taken with a ground resolution of 10m allowed to obtain a qualitative analysis thanks to which it was possible to assign a NDVI (Normalized Difference Vegetation Index). This index is related to the state of development and health of vegetation, which is calculated starting from the reflection of red and infrared. Plants absorb and reflect solar radiation differently in different wavelengths: in particular, the leaves reflect little visible red light and reflect much more the near infrared (invisible to the human eye). The way in which such wavelengths are reflected, and therefore the NDVI, vary during the plant development cycle. The NDVI index returns the vigour level of a given plant cover and is calculated as the ratio of the difference to the sum of the radiation reflected in near infrared and red, like (NIR-RED)/(NIR+RED).

The images of the passage of 19/09/2020 were downloaded, broken down in its spectra and rebuilt with evidence of the NDVI index.

The final image is inserted on the next page.

CARTA DELLA VIGORIA DEGLI HABITAT DELLA FORRA DEL QUIRINO

IMMAGINI DA SENTINEL 2
SCALA 1:10.000

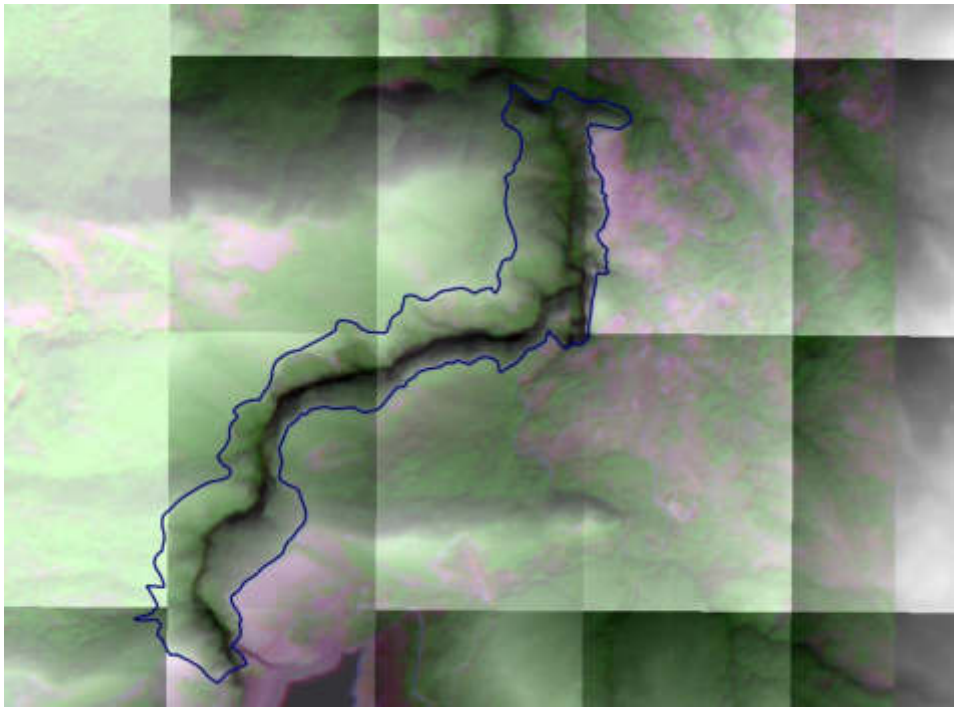


The previous image allows to reconstruct the degree of vigour of the habitats present in the hole.

As specified above, the areas in green turn out to be those with greater vigour and therefore a phytosanitary and vegetative state of the best habitat (from light green to dark). While in a red-tinted areas have a lower vigour state.

Distinguishing the forra according to this interpretation, it is possible to affirm how in sector A (previous page) we find a strong stress where cattle and equine grazing activities insist. The same considerations can be made in Sector C where the most anthropized area insists.

In areas A and B it is necessary to take another interpretative photo step. In fact, if you overlap the NDVI image with the digital model of the terrain, it can be seen that the red areas of the above sectors, have less vigour due to the excessive orographic slope. In fact, in those areas there are strong ridges and stone walls until you reach almost vertical walls overlooking the waterway.



The final consideration to be made is that for the steep slopes of the territory, the analysis of vigour has a greater margin of error for the areas close to the waterway, as shadows play an important role in the interpretation.

5. BIOLOGY AND STATE OF THE SPECIES O HABITAT – RTHEEVATION OF EXISTING ENVIRONMENTAL PARAMETERS –

The WWF Natural Oasis of Guardiaregia – Campochiaro, is located entirely in the territory of the municipalities of Guardiaregia and Campochiaro on the eastern side of the imposing Matese Massif, from 550 m above sea level of Santa Maria ad Nives until 1823 m above sea level of Monte Mutria. The strong altimetric difference is a fundamental aspect of this territory that, together with the geo-morphological characteristics of the gorge area and the mountain, helps to identify two natural environments that precisely because of their diversity make the visit to the entire protected area really interesting. Inside the oasis there is a fracture that gave rise to the Quirino's Gorge, deepened more and more by the erosion of the limestones and shaped over time by the rushing flow of meteoric waters. The Oasis consists of two distinct areas: the area of the gorges of the Quirino Stream, of 128 hectares, located close to the village and characterized by a long, narrow and deep engraving between the town and the heights of the Capraio and Torretta mountains and the area of Monte Mutria, of 928 hectares, entirely covered with a dense beech forest, and characterized by several gullies , including the most spectacular, the Cusano gully. "Rave", gullies, streams, springs and rivule represent one of the most important features of the whole area that is rich in small streams, including the Rio Vivo and Quirino streams and the spectacular Waterfall of San Nicola, which has a total jump of about 100 meters.

The geosite, in fact, is located within the Matese-Conca di Boiano-Sepino area and falls within the largest SIC-SPA protected area in the Molise region called "La Gallinola - M. Miletto - M. del Matese". The area of relevance of the geosite is of considerable village and naturalistic interest and is known and frequented above all for the presence of the WWF Oasis of Guardiaregia Campochiaro, established in 1997. The gorge, in fact, falls right inside the oasis where the gorges wind along paths enriched by the most varied botanical species.

6. Vegetation Analysis

In the Natural Oasis of Guardiaregia-Campochiaro you can find different types of vegetation. In particular, there are two habitats considered priority in the Community research projects Bioitaly and Habitat, "the forests of the Tilio-Acerion valleys" of the Quirino Stream Gorges and "the beech forests of Taxus baccata and Ilex aquifolium" of Monte Mutria and the Montagna di Campochiaro. The vegetation of the Quirino Gorges shows two very interesting species, such as the Leccio, which is one of the rare matesine locations, and the Corbezzolo, marked on the eastern side of the Matese Massif. On the slopes of Mutria, as well as on the Mountain of Campochiaro, there is the Beech, which forms spectacular fustaie: in the locality "Tre Frati" there are some imposing specimens from the estimated age of about 500 years. At the lowest elevations and also on the slopes exposed to S-OS, other plant formations are identified such as Black Hornbeam, Cerro, Orniello, Lobelius Maple, Maggiociondolo and Corniolo. In the spring season, on Mount Mutria you can admire the blooms of croco, wild carnation, androsace villosa, soldanella alpina and primula auricola. In addition, in different areas of the Oasis it is possible to observe other beautiful blooms such as the Lily of St. John, the Aquilegia vulgaris, the Anemone of the Apennines, the Hepatica nobilis and the Belladonna. Apart from that, orchids deserve to be found: 34 species have been recorded in the Oasis area, some of them of considerable interest.

The plant cover of the Oasis, despite its limited area extent, represents an emblematic strip of apennine forest landscape proper to an alignment of secondary peaks. The forest vegetation covers, in fact, almost the entire area of the area, reaching and bypassing the ridge of the regional border, which is therefore below the upper climatic limit of the forests at that latitude. Within the boundaries of the oasis dominates the beech forests, enriched with holly populations and, subject to it, badger, species that however tend to become rarefied proceeding towards the top of the relief. The most representative portion (56Ha) is of wood mixed with black hornbeam (*Ostrya carpinifolia*), ornello (*Fraxinus ornus*), opal maple (*Acer obtusatum*) and subordinately cerro (*Quercus cerris*) and oak (*Q. pubescens* s.l.), is included within the boundaries of the oasis at the northeastern end of the oasis, at altitudes lower than those to which the beech head stands, with which it makes contact going up the topographic gradient along the sequence of rock sporades scattered on the steep eastern slopes of the relief. It is the mixed forest belt dominated by Quercus cerris of the Molise slopes facing north, in

which are unmistakable the traits of caucasian temperate communities with a tingle (*Tilia platiphyllos*) and greater din *(Fraxinus excelsior*), to which is associated an unusually large rate of maples (*Acer obtusatum, A. pseudoplatanus, A. platanoides, A. lobelii*). At the eastern limits of the area, near the holes etched by the Quirino riverbank, the beech forest comes into contact with evergreen Mediterranean vegetation forms, enriching itself with populations of lyceum (*Quercus ilex*) and red juniper (*Juniperus oxycedrus*) that go up the cliffs and rock slopes above the artificial lake of Quirino. The latter has submerged part of a lowland in turn populated, upstream of the town of Guardiaregia, by one of the last imposing tall cerretes of the surrounding region. This relictal character can only be traced back to events of the postglacial plant population that have involved a rapid ascent by the forest vegetation towards the orometric summit bands, with the complete colonization of the slopes and peaks previously occupied by subalpine bushes and grasslands of a steppe-continental character. Quick as the presence of *Acer cappadocicum ssp*. *lobelii and Alnus cordata*, especially with Caucasian-Himalajana gravitation, present both in the beech forest and in the woods of the lowest altitudes, lead to admit the proximity or even the persistence during the last local pleniglacial, of conspicuous forest shelters. That these cores are responsible for a rapid and massive upward ascent of forest vegetation already in the immediate postglacial, carried out even before the relatively hot-humid climatic optimum of the Middle Holocene (around the fifth millennium A.C), it is witnessed by the ascent to altitudes above 1000 m above sea level of black hornbeam bush (relatively thermophilic and tolerant of more arid climatic conditions than those of beech forest and temperate deciduous forest) , along the steep slopes of the northern portion of the area, which can be interpreted today as a real remnant of an old forest vegetation of the immediately postglacial epoch that thus finished on the ridge the remains of the steppe grasslands and extraforestary bushes microtermi to R. fallax.

The beech forest itself, where it constitutes a monospecific tree cover, would therefore seem to be the result of a sub-recent purification of the forest cover in favor of the most competitive beech, in the conditions of summit oceanicity of the harshest climate of recent millennia.

The basal and hilly plan (completely outside the area under study) is occupied by cerro (*Quercus cerris*) and farnetto (*Quercus frainetto*) formations that are mostly set on soils, originating from clay-limosis myocenic sediments or markedly clays.

The lower altitudes of the area, which characterize the northernmost and easternmost portions of the area, are home to populations of mixed forest dominated by cerro and chestnut, in which other

deciduous broadleaves come to characterize with different degrees of dominance depending on local topographic conditions or exposure.

In the upper part of the Quirino valley is the Bosco Montagna, between 1100 and 1300 m above sea level, with a mainly north-east exposure. The soils on which it insists are calcareous, deep and fresh. The accliivity of the slopes is particularly accentuated in the lower part, to a greater extent where the Quirino and La Valle stream meet. On the gorge sides of the Quirino Gorges, in sites not very sunny, fresh and with high atmospheric humidity, with more or less accentuated accliivity, traces of Atlantic forest are found in the presence of individuals of Tilia platyphyllos (Habitat Natura 2000: 9180).

In the formation of the forest formations and above these open and extend clearings occupied by arid grasslands belonging to the Festuco-Brometea class (Habitat Natura 2000: 6210). Where the stems are more superficial, the species *Scylla bifolia, Asphodeline lutea, Viola calcarata* take over.

Inside the beech forest there are two karst wells (Cul di Bove and Pozzo della Neve) whose walls are characterized by a rich pteridophytic flora, dominated by *Polypodium vulgare, Adianthus, Athyrium*) and around which is concentrated a rich consortium of nemorals of humid environments (genera *Cardamine, Viola, Cyclamen, Polygonatum*).

Some areas within the area are occupied by coniferous afforestation (*Picea abies, Abies alba, Pinus nigra*).

Below are the areas divided by habitat

Habitat	**Tilio-Acerion**	**Quercus ilex**	**Quercus cerris**	**Forest a Ostria carpinifolia**	**Thicket Fraxinus ornus**
Surface Ha	17,80	19,0 Ha	2,65	56,22	2,0

6.1 Vegetation analysis of the "forra"

Special and valuable habitats falling within the classification under the EU HABITATS Directive are found in the area of specific interest:

- **– Tilio-Acerion 17.8 Ha slopes, scree and valleys.**

At the northern limits of the area are, in continuity with the badger and holly beech forest, forms of forest vegetation with accentuated floristic richness in wood of a temperate deciduous type, among which particular importance take on populations of tiglio (Tilia platiphyllos), maples (Acer obtusatum, A. pseudoplatanus, A. platanoides, A. lobelii) and, locally, major ash (Fraxinus excelsior). These aggregations are part of the dynamism of a larger community of forest in cerro, black hornbeam, oak and, very rarely, white hornbeam (Carpinus betulus) that incorporates them, but which makes us assume phases dominated by oaks and / or maples during those silvigenetic processes of alternating dominance that are characteristic of forests with high floristic richness in medium-short times. It is to be expected that the disturbance caused by the divestment in long shifts carried out to date has led to a stationary coexistence of numerous woody species, while the maturation of the consortium and the triggering of seed renewal tend over time, as observed in similar forests in Central and Eastern Europe, to segregate nuclei dominated by one species or another. In these it is then possible to recognize the characteristic traits of the consortia of the Tilio-Acerion alliance, to which the corresponding Habitat should be referred. Within the Beech Tree of the Oasis, populations of lily, Maple of Lobel and curly maple characteristic of this community penetrate. On the contrary, there is no explicit provision for them on steep slopes, scree gravel and holes, which characterizes the Habitat in many other districts of Europe and which in the area is limited to individuals located within the bush of rock sporades and black hornbeam (Quirino). This phenomenon, which would apparently affect the current connotation of Tilio-Acerion excluding the Habitat from the area of the area is on the contrary precisely in the conditions of the local topography of the northern slopes of the Oasis, extremely fitting according to the spirit of the original formulation, probably equivocated in recent times. According to this diagnosis, similar consortia can be representative of mature forest, in stationary conditions that, however, European forests, subjected to anthropogenic disturbance since time immemorial, no longer present. The tilies are extremely long-lived, late-succession species, persistent through very long stages of development and collapse of a temperate forest. Capable of re-couping from buried branches, they

survive on scree and manage to colonize rock steeps for animal transport. And so the maples that mostly connote dynamic aspects of a temperate forest, sutured over time with fall glades. Tingles and maples thus coexist on the edge of high-diversity temperate mixed forests now annihilated, where they would survive only on steep, mobile substrate sites. It is therefore appropriate to identify in the area nuclei of these forests because populations of lily and maple of Lobel not necessarily set aside only in the holes, but also on slopes attenuated in the dynamism of the forest mixed with cerro on contact with the beech forest, acquiring the value of primary consortia all at most degraded, with almost relittual value for conditions of fine-natured heritage (they are common in the Caucasus). This is indirectly supported by the presence of shell casing stations (Staphylea pinnata), a sapling wreck of mild weather conditions , (see holly and badger) located at the foot of the relief, north of the boundaries of the area. The Habitat in the hole finds here a focal location that reveals an unexpected value of first-rate historical-biogeographical document.

- **– Forest in Ostrya carpinifolia 56.2 Ha**

Habitat formed by mixed forests mainly of native mesophilic and mesothermophilic broadleaves such as maple-din, black hornbeam-orniello. There are communities in the Ostryo-Tilienion association characterized by the presence of species with south-eastern European distribution (e.g. Acer obtusatum, e.g. Ruscus hypoglossum, Viola alba, Quercus cerris).

- **– Quercus ilex and Quercus rotundifolia 19.0 Ha**

At the eastern limits of the area, near the holes etched by the Quirino riverbank, the beech forest comes into contact with evergreen Mediterranean vegetation forms, enriching itself with populations of lyceum (*Quercus ilex*) and red juniper (*Juniperus oxycedrus*) that go up the cliffs and rock slopes above the artificial lake of Quirino. The latter submerged part of a lowland in turn populated, upstream of the town of Guardiaregia, by one of the last towering tall towers of the surrounding region. The tree layer of these forest formations is generally dominated by lyceum, almost always accompanied by deciduous species that contribute to the floristic characterization of phytocenosis both in the tree layer and in the rare shrub layer, among which are Fraxinus ornus and the typical species of the Mediterranean formations of sclerophyll (*Phyllirea latifolia, Viburnum tinus, Arbutus unedo*). The reference association is Fraxino orni-Quercetum ilicis. In Molise they are found in a fragmentary way

depending on particular edaphic conditions (presence of limestone outcrops) and mesoclimatic (climates of the Mediterranean or Mediterranean region of Transition). The best examples of this habitat are found in the "Tyrrhenian" sector and at the low altitudes (300-500 mslm) of the western slopes of the Matese Massif (agro of Monteroduni and S. Agapito). On the Adriatic side, the lyceum enters instead as an accessory species of oak oaks and only in rare cases (M.te Peloso in agro di Guardialfiera) tends to form pure woods.

Predominant species belonging to the genus *Quercus pubescens, Phillyrea latifolia, Viburnum tinus, Smilax aspera, Carpinus* orientalis have been found for habitat characterization.

6.2 Wildlife Analysis

The dense vegetation cover of much of the territory of the Oasis and the particular orography of Mount Mutria and the Quirino Gorge, with long stretches inaccessible to humans, mean that the Oasis of Guardiaregia – Campochiaro is, among the areas of the eastern side of matese, the richest of animal species. Very important is the presence of the Wolf, which is periodically sighted; other mammals are wildcat, badger, squirrel and wild boar. Given the richness of water in the spring period, amphibians are a fundamental presence in the Oasis, and it is very interesting to observe a rare Italian endemism such as the spectacled Salamander, symbol of the Oasis, but also the yellow-bellied Howl and the Dalmatic Frog, all present in spring, both on the Rio Vivo stream and on the San Nicola, while on humid autumn days, in the beech tree , it is not difficult to observe the great saltmandra. Among the reptiles is the Collared Natrice. As for birds of prey it is possible to observe them especially in the area of gorges, where the very rare Lanario nests; also present are the Peregrine Falcon, the Royal Kite and the Poiana. Other birds include the Alpine Gracchio, on the ribs of Mutria and throughout the area, the Greater Red Woodpecker, the Green Woodpecker and the Mason Woodpecker; in the vicinity of the San Nicola and Rio Vivo streams it is possible to come across specimens of the characteristic Acquaiolo Merlo. Finally, about 200 species of nocturnal and daytime butterflies have been recorded in the Oasis, among the latter being the rare Zerynthia polyxena, Parnassius mnemosine and Nymphalis antiopa.

7. Plans and Conservation Measures of the Forra del Quirino

The area of the Quirino forra has always been interested in several conservative measures, in particular the area of the forra falls within the borders:

- Natural Oasis of Guardiaregia and Campochiaro of the WWF.
- SIC - NATURA 2000 network - , called "la Gallinola - Monte Miletto - Monti del Matese".

In this oment, however, two paths are underway that can increase the protection of the area:

- The sitealso falls within the boundaries of the new Matese NationalPark, a body that is experiencing the last phase before its operation.

8. Restoring and conserving the forra environment

Within the Interreg Albania – Montenegro - Italy laspeh projectprogramme, the concrete action chosen by the municipal administration as a concrete action is the environmental reclamation of one of the most suggestive places of the municipal heritage of Guardiaregia: La fora del Quirino.

The pre-reclamation operations consisted ofan inspectionusing SAPR.

Figure 3- April 2019 flight

In the photograph above, carried out in April you can well see the presence of unnatural material along the flyover crevasse.

Figure 4- April 2019 flight

Drone inspections have detected a considerable amount of material to be reclaimed in the valleys close to the town. In addition to observing the presence of a sheet metal body near the torrent.

The second survey, on the other hand, consisted of a direct field inspection in the areas most covered by vegetation. These surveys have found a large accumulation of waste from production and consumption residues. These are present especially in the areas of impluvio close to the town and with forest formations on cover.

Figure 6- Waste under forest cover

Thanks to this first phase of study, it was possible to identify, among all the data determined, those considered most significant, for which it is planned to carry out the reclamation operations.

The reclamation operations required highly specialized professional figures belonging to the category "Rope work" according to decree n°81 all. 21 "Rope access and positioning systems" and in canyoning techniques. In particular specialized access works requiring climbing skills and the use of appropriate equipment, that is height work on high structures.

Reclamation operations do not involve the use of light and heavy machines. The reclamation work will be carried out by hand or with the use of portable support equipment. In addition, there will be no removal/felling of plant parts of any species in order not to remove any type of habitat.

Below are the phases carried out for the reclamation:

- Collection of material to be remedied through bags of Polypropylene 150 gsm (or similar) for small objects, through appropriate anchors to the others. Bags filled with material to be disposed of, will be suitably closed and transported downstream via ropes / winches system.
- Downstream accumulation of waste located in area 14ha.
- Concentration in n°6 stations of material to be removed; The areas selected for concentration are devoid of vegetation, so the material will be concentrated on rock.
- Transport in a free zone by helicopter in vertical parking.
- Transport to authorized landfill. Transport is governed by Art. 212 of Legislative Decree 152/2006 and legislative decree .M 120 of 2014.

The reclamation works were delivered on 25/10/2019.

8.1 Type of material to remove from the hole

The waste that emerged as a result of the work carried out belongs to the category: "Household waste, even bulky, coming from premises and places used for civil use" (art. 184 paragraph 2). All waste collected in inspection operations falls into the category OF SIMILAR to waste abandoned in urban areas. In detail, the waste found in the surveys carried out is derived from the domestic activity of the town, plastics, metal objects, sheets.

According to the European Waste Catalogue (ERC codes) the following wastes can be listed in the hole:

Cod. 200140 Metals	Sheets and plates of car parts, carcases of washing machines or small household appliances without electrical equipment, knives, pots, etc.
Cod. 150102	Plastic packaging
Cod. 150106	Mixed packaging
Cod. 150103	Wood packaging
Cod. 200136	Quadrielectrics of any household appliances
Cod. 200138	Wood other than that indicated under heading No 200137 (contaminated wood)
Cod. 020300	Food oils
Cod. 160103	Disu sed tires

9. ANALYSIS OF THREATS AND LIMITING FACTORS FOR HABITAT CONSERVATION (FOR SPECIES)

The analysis of threats to conservation targets and the formulation of management guidelines is a particularly delicate phase of the investigation that leads to the conservation plan, since custody interventions will be directed above all to mitigate their effect. The analysis of threats and limiting factors, therefore, are the starting point for the drafting of this paper. The list classified all threats that can interact with habitats in the Quirino's Forra.

Table 1-List of specific threats

	Specific Threat
MS1	Excessive grazing
MS2	Incorrect forestry or agricultural practices
MS3	Waste abandonment
MS4	Fire
MS5	Destruction and disruption of bat shelters
MS6	Hunting disorder
MS7	Poaching
MS8	Trails, paths and bike paths
MS9	Better access to natural areas
MS10	Water pollution
MS11	Erosion
MS12	Invasion of alien species
MS13	Predation of nests and eggs by rats, dogs, cats

9.1 Grazing activities

Grazing is not a threat but, on the contrary, its disappearance can be regarded as a real threat to maintaining the ecological balance of species of fauna and flora.

Grazing in the woods, except in cases where grazing areas are identified and circumscribed, ensuring the protection of areas in renewal, and where it is useful for the conservation of non-forest habitats of Community interest or conservation associated with the forest, or for the fight against invasive alien

species, based on the provisions of the management plan, or the Company Pastoral Plan , or specific projects approved by the operator.

The cessation of mowing even for a few years reduces the richness of plant species of hay grasslands. Abandoned pastures may initially show an increase in the abundance of important plant species from the point of view of conservation, but the overall richness of species, especially rosette species and with spring blooms, is affected. If abandoned for long periods, habitats often leave room for shrub and forest communities. Bush and moorland habitats also depend on low-intensive grazing to prevent ecological succession and preserve species diversity.

For proper conservation it is important to determine the maximum livestock load – LU-, calibrated mainly according to the surface size of the habitats suitable for this activity. As you can see cartographically the area subject to intervention is affected by lean hay grasslands and semi-natural dry herbaceous formations. The right load of livestock will prevent the high pressure of grazing, even in the forest, from disfiguring the habitats concerned.

In addition, the system of water points acting as watering cans for livestock must be maintained every two years and a first accommodation operation must be carried out to improve the collection system and the water distribution system for drinking tingers.

In the figure are shown in yellow the water points present inside the oasis and that are used for breeding.

For the conservation of fauna, the high grazing pressure, even in the forest, the presence of livestock without constant control and/or the possible presence of cows that breed without adequate protection from predators (i.e. in stables) is a clear threat. Particular attention must also be paid to the management of water resources for the fauna, avoiding collection and transformation of water.

9.2 Incorrect agricultural and forestry activities

Many semi-natural grasslands are managed with mowing and cutting hay. Non-selective mowing promotes the growth of low-growth grasses and plants by reducing tall grasses and eliminating woody plants. The removal of cut grass allows to maintain low levels of nutrients, and therefore a high diversity of both plants and associated invertebrate communities. The practice of mowing however requires evaluating appropriate times and frequencies, for example after the plants have scattered and hatched the eggs of nesting birds, the use of appropriate equipment and machinery and, depending on the type of habitat, the removal or not of the cut hay. In addition, a rotating grassland management program allows you to maintain different stages of succession, increasing species diversity. In a number of habitats, grazing is used in combination with mowing.

Almost none of the types of arid grasslands tolerate fertilizer intake, either on site or in adjacent areas. The management of these habitats should give priority to the prevention of the entry of nutrients from fertilization, run-down of agricultural origin, etc. Fertilization of meadows is not generally

recommended, especially in areas that have not been fertilized previously. Nowadays, many meadows are affected by eutrophication, and fertilization must be strictly controlled or banned.

Some of the key measures for the conservation of agricultural habitats are:

- low use of fertilizers, none or poor irrigation, use of varieties suitable for low productivity environments,
- no application of pesticides,
- summer cultivation of cereals keeping stubble for a long time and leaving uncultivated areas,
- combine and alternate arable land with prairie areas,
- adapt crop harvesting methods to the needs of species, for example, leave uncut strips or patches as shelters, use a bar blade mower, use a bar in front of the mower to warn animals, avoid hay conditioning (crushing freshly cut grass to make it dry faster)
- create nesting areas or shelter strips.

In areas where agricultural habitats have been abandoned or degraded as a result of intensive agriculture, restoration measures may be necessary to ensure the conservation of the main Natura 2000 habitats and species. Recovery actions may involve:

- reverse the process of enrichment into soil nutrients, stopping fertilization and, in some cases, removing nutrients, and reintroducing less demanding species
- restore the floristic diversity of species, through their sowing or spreading of hay from suitable grasslands;
- remove and control shrubby vegetation,
- remove and control weeds and invasive alien species,
- restore hydrological management, for example by removing or blocking drainage channels, restoring groundwater levels, regulating floods and river regime.

In the area was foundthe practice of "cercinatura", a type of incision made on a live trunk, which damages the change and necessarily leads to the death of the individual on whom it was practiced. After the event, the "robbery" cutting is carried out with the removal of the entire tree biomass. The practice is normally carried out on larger tree individuals, whose felling had not been authorized by the current Settling Plan (OASI Management Plan).

9.3 Hunting activity

Excessive hunting sampling and use of hunting hounds in areas with high wildlife sensitivity.

An hunting planning must therefore be provided which reduces the pressure of sampling, the disturbance due to the presence of bloodhounds and defines larger areas with hunting silence.

The instruments envisaged for this purpose are as follows:

- prohibition or reduction, for certain periods, of hunting for species of wild fauna, for important and justified reasons related to fauna and fauna or for special environmental, seasonal or climatic conditions or for diseases or other disasters;
- control of the species of wildlife also in areas prohibited from hunting for reasons related to the better management of livestock, soil protection, health reasons, biological selection

9.4 Waste abandonment

The abandonment of waste is the first of the threats to the ecological stability of the Quirino area. Waste is one of the thorniest environmental problems of our time and our forests, because abandoning it can really compromise fragile and valuable ecosystems. Greater awareness and some simple behaviors, can help us preserve the environment, safeguarding fauna and flora of specific habitats.

The cacuminal position of the town near the forra has always facilitated the unconditional abandonment of waste of all kinds: from compostable to bulky domestic servants, especially in the days behind when ecological awareness was lacking in the cultural scenario.

Since the past the forra has always been exploited by the inhabitants of the village, due to the availability of vegetation always present, even in the cold winter months, thanks to the presence of lyre, and for the disposal of organic waste of a domestic nature.

From the surveys carried out all the waste found can be classified according to Legislative Decree n°152/2016 as "Household waste, even bulky, coming from premises and places used for civil use" (art. 184 paragraph 2). All waste collected in inspection operations falls into the category OF SIMILAR to waste abandoned in urban areas. In detail, the waste found in the surveys carried out is derived from the domestic activity of the town, plastics, metal objects, sheets.

Information and control measures must necessarily be developed for waste abandonment aspects, obviously consequential to waste remediation operations.

The problem of waste abandonment must be addressed actively and continuously by the competent administrations, using an integrated approach, that is, operating both in preventive terms (through the tool of information and education towards citizens) and repressive (through the application of the sanctions provided for by the law), but also by proactively using the most advanced waste management systems.

9.5 Fires

The areas traveled by fire on the side of the forra adjacent to the town are not uncommon. The steep slope that characterizes the orography of the relief in that area amplifies its events.

The causes of the fires have been natural and human, in fact, the strong proximity of the town, the areas regularly frequented by tourists and the massive presence of residual vegetation amplifies its phenomena.

Natural fires have occurred very rarely and have been caused by natural and therefore inevitable events.

Fires of human origin may have been caused by irresponsible and reckless human behaviour, often in violation of norms and behaviour. Not intended to cause harm voluntarily.

The causes can be:

- Agricultural and forestry activities. Fire is used to burn stubble, destroy plant waste from agricultural and forestry processing, and to renew pastures and uncultivated pastures. Often these operations are carried out in areas adjacent to woods and uncultivated, easy prey for fire, especially in periods of greatest risk.
- Abandonment of cigarette butts and matches. Cerini and cigarette butts abandoned or thrown along the paths, forest tracks, and railway lines can fall on dry grass or other plant residues and trigger a fire, also as a result of air movements caused by vehicles or wind.
- Recreational and tourist activities (barbecues not turned off well), firecracker launches, waste burned in illegal landfills, poor maintenance of power lines.

The damage caused by fires affects vegetation, fauna, soil, atmosphere and landscape. The extent of the damage depends both on the behaviour and characteristics of the flame front (speed, feed, height and flame length, depth of the front), and on the characteristics of the environment affected by the fire.

The damage caused by the passage of fire can be measured in temporal and spatial terms: the former can occur immediately or in the longer term, the latter can have repercussions within the area traveled or in the neighboring areas.

From a time point of view, damage can be classified into:

- First-order damage: Occurs at the time of the event or immediately after the event. They are the direct result of the combustion process (damage and death of plants, fuel consumption, smoke production and soil heating);
- second-order damage: they occur in a much longer period of time, from days, months and even decades after the event (the eroded phenomena, the dispersion of smoke and the vegetation succession).

10. THE SETTING OF GENERAL AND SPECIFIC OBJECTIVES TO ENSURE THE CONSERVATION OFTHEHABITAT

The main character selected for this management plan is represented by the enhancement of the functionality of habitats and natural systems with an evaluation, in addition to the current quality of the site, also of the potential that habitats have to reach a level of greater complexity. In particular, a coherent network must be built, i.e. functional to the conservation of all the habitats and species that characterize the furnace, safeguarding the efficiency and ecological functionality of the habitats and/or species to which the site is dedicated.

The aim is, therefore, to maintain in a "satisfactory state of conservation", the heritage of biodiversity resources, represented by the habitats and species present.

A key step is to translate the concept of the satisfactory conservation status of the habitat/species at the network scale into site-scale detectable parameters, which provide guidance on the conservation conditions of the resource of interest.

Specifically, it is necessary to:

- Define criticality thresholds against which to consider acceptable changes in indicators for the conservation of habitats/species on the site, in order to use the monitoring of indicators to verify the success of management.
- To promote and support the conservation of natural and semi-natural habitats considered to be of Community interest, priority or threatened, present in the SIC/SPA, and those linked to the survival of wildlife species of Community interest;
- Preventing foreign species from adverseing from ing adverse effects on ecosystems and species of Community interest and on those habitats and species on which they depend, through risk control, management and elimination measures;
- Maintain ecological and evolutionary processes.

11. THE INTRODUCTION OF A NUMBER OF ACTIONS BETWEEN THEM TO INTEGRATE INTO THE CORRECT SUIT AND HABITAT MANAGEMENT

11.1 Management of botanical heritage

The network of SIC and SPA areas represents the most up-to-date, realistic and most rigorous selection of biotopes representative of the natural heritage conditions of the continent undertaken so far by the authorities of European governments. The areas of the SICs are samples, segments of ecosystem structures linked to a natural determinism settled over time, often under the heavy influence of a human induction that, for the values still preserved in them and highlighted by extensive scientific documentation, have an inalienable documentary value. All this implies that the value of these areas is in the same way as that relating to an emergency of historical-cultural or archaeological heritage. Its integrity and safeguard must be preserved by the insertion of typologically foreign elements, even in restoration operations. This in turn means that the area to be preserved must not be an experimental field for the manipulation of biotic communities, nor of the environmental and physical scenario, nor fields of experimentation, breeding, cultivation, restocking, "reconstitution" active through plantings, forms of vegetation considered minority or subject to previous degradation. Interventions of "environmental restoration", "recreation of biotopes" even in the captivating statement, hide elements of danger to the integrity of the botanical heritage of a protected area as they involve tampering, albeit oriented, with unpredictable results on the conditions of acquired stabilization of the system. These interventions in fact have in common the introduction of populations or individuals who, although genetically similar to those of the site, will never be located in situ where they would have rooted as a result of the free conduct of the processes of natural determinism (competitiveness, propagation strategy, density, choice of niche). In addition, the genetic compatibility of planting material (for herbaceous, bushy and woody) is almost never a criterion that can be fulfilled, as the commercial nursery network cannot guarantee this requirement. Apennine Italy is in fact a territory characterized by a flora whose plant species have an extremely accentuated genetic variability depending on the complex climatic events of the Upper Quaternary. This is even more topical at the medium-high altitudes of the Apennine chain, where phenomena of relittuality, isolation and active speciation are entering. Therefore, every intervention would and degrade the structure of natural biodiversity by threatening not only genetic dilution of the populations of species of the complex

regional phytogeographic structure, but also destroying the value of a scientific document of the protected area, as it no longer shows adaptive responses of species to a natural determinism but rather of the subjective as far as a skilled intervention of an operator. The similarity with the archaeological heritage that cannot be "oriented", "enriched" to document at will the remains of one culture rather than another applies. Thanks to the Community system of disbursement of funds for forest improvement or renaturalization, naturalistic engineering, etc., such interventions are now unfortunately dramatically numerous, with the presence in the national territory of millions of individuals of nominally native species but derived from propagation material of extranational origin, genetically and often taxonomically (at sub-specific level) incompatible, now established "in situ". The biogeographical structure of the peninsula, biodiversity in terms of genomic wealth is dramatically threatened by the same intervention measures that paradoxically would have the task of preserving it.

It may be argued that the interventions carried out so far comply with the obligation to certify propagating material, but the certification is a guarantee of a phytosanitary nature which, as regards the origin, merely declares it without this entailing the link with a specific district, that is, which does not oblige a source of planting material from areas adjacent to the intervention area and therefore from seeds of populations likely identical to those of natural populations (pre-) existing on the ground, as would be necessary to fulfil the obligation to safeguard genetic biodiversity. This is in order to adapt to the rules in force to date on the collection and marketing of forest propagation material, which makes biological choices (coming from populations from genetically homogeneous districts to those in the intervention area) subject to the free movement of goods on European territory, through the instrument of the Community tender. As there are no longer any customs barriers, suppliers of plant equipment from all associated countries can compete by proposing their own material.

The numerous conventions on biodiversity have so far been frustrated by this trade mechanism. Furthermore, they have no application value because they do not represent any legal constraint as legislation.

Until 2003, this legislation was still valid. Today, fortunately, it has been amended and refers to the need for planting material for forest woody species to come from specific districts appropriate to biological needs. However, the division of the national territory into these districts biogeographically

appropriate to the eco-morphological and genetic variability of the various species is not yet established and in any case the new legislation has not yet been transposed by the regions.

Unfortunately, for herbaceous species, on the contrary, there is no regulation, nothing to guarantee the origin of the seed. Considering the vastness of the grassing measures carried out to date for the improvement of pastureland in high-altitude finite areas of the central Apennines, of the grassings on loose paths in the orometric belt of the Altomontan grasslands, considering the richness of endemic herbaceous, entities of a disjointed nature of residual populations from isolation at all levels of systematics present in these grasslands, the threat of ecosystem integrity that today weighs on these forms of vegetation is extremely more alarming and dramatic than that derived from the tourist urbanization (roads, infrastructure, settlements) of past decades.

- However, interventions, mostly of a point nature, are allowed to restore the vegetation structure of the natural and agricultural system that involved the elimination of a road path, an installation or artifact, an excavation. And above all that the reconstruction from *ex novo*, design and professionally correct of flaps of ecosystems in areas without a natural or extremely degraded plant cover, but not belonging to the network of areas established specifically for the documentary value of what is still there today (SIC and SPAs), is on the contrary technically possible and desirable.

However, this does not give rise to a programmatic recommendation of inaction with regard to the need for active conservation of the vegetation heritage of SIC and SPAs. Far from it, it is to know the mechanisms, phenomena, course and speed of the natural dynamism of the vegetation, its stages and needs, to which the operator must refer in order to drive the

reconstitution of plant cover of degraded areas, simply by triggering processes of renaturalization, reconstitution of biotopes etc.

reconstitution of the plant cover of degraded surfaces, simply by triggering processes of renaturalization, reconstitution of biotopes etc. and in this regard it should be referred to the body of scientific documentation on the speed of evolution of abandoned pastures, quickly colonized by bushes and initial trees of succession, capable in half a decade in our climates of rebuilding the basis of a forest cover simply by eiling fences and eliminating grazing, trampling, fire disturbance. As for the wounds and wear and tear induced on a

grassy skin, consolidation by means of racks and decomposable nets of the escarpment or landslide is the only technically possible and biogeographically compatible solution. Such gimmicks invite spontaneous rooting to a local flora "naturally" adapted to the colonization of empty spaces, and specialized for any environment and orometric band or biogeographical district, without having to resort to sowing that absolutely cannot meet any of the genetic compatibility requirements for the reasons set out (commercial seed mixtures, for which different versions are provided depending on stationary needs, are horticultural cultivars of subspecies originating in Central and Western Europe of the native nominal species in Italy)

Action	Specific reference threat
A1 – Management of botanical heritage	– MS1 Excessive Grazing – MS2 Incorrect forestry and agricultural practices – MS11 Erosion – MS12 Invasion of alien species

11.2 Pasture management

Pastures - The management of pastures must provide for the maintenance of adequate pressure and the widespread, extensive character that inherits from local customs, without the disadvantages of excessive concentration in some areas and the abandonment of the practice in others, typical of modern transhumance in the phase of active "technological dissolution" with respect to traditional methods, linked as it is to transfers by vehicles according to the lines of a tourist-settlement road.

The following must therefore be respected:

- a - the persistence of traditional forms of sheep and goat farming in arid grasslands and bushland at all altitudes and of cattle breeding and wild equine at the pasture on the karst plateaus of the high altitudes.

- b - the conservation of grazing grasslands. Since there are mainly grasslands Semi-natural dry grass formations and facies covered with bushes on limestone substrate (Festuco- Brometea)
of secondary origin, actions aimed at the management of this habitat must concern both the maintenance of pasture, which in the past has created the conditions for its development, and the regulation of its own load, so as not to trigger processes of floristic impoverishment. Grazing, in particular, must be closely monitored (rationed grazing) by a balanced distribution of pressure, including through the adaptation of the watering net and natural water points, and the construction of fences around the most degraded areas, with the aim of dispersing the livestock load on larger territorial units. This is to avoid the dangerous destructive effects of the concentration of livestock in small areas.

It is to be expected in some significant sites the construction of permanent squares (as described in the chapter on Monitoring) in order to be able to carry out the control of floristic variations caused by noise pressures including that derived from the load of pasture, so as to be able to intervene if a clear impoverishment indicates the presence of an excessive load.

Where possible, and where a natural process of recolonization is already clearly underway, the recovery of these nuclei of native and spontaneous tree and shrub vegetation belonging to the most mature stages of the series must still be encouraged.

All management interventions must necessarily be formulated in harmony with the results of the monitoring activities, without which it is not possible to implement actions that have a meaning consistently adapted to the actual state of health of the vegetation.

c - the exclusion of actions and interventions proposed by bodies or groups of professionals involved the planting (planting) of populations of plant species still considered indigenous in the district and the surrounding region, although with the tempting aim of reducing the degree of "existing fragmentation" at the expense of forest cover, operating for the purpose of "environmental restoration" or a "redevelopment" of existing forms of natural vegetation or landscapes considered to be in conditions of degradation. The plants of "construction nurseries" are to be favoured, i.e. specifically built on the side of the works to be carried out aimed at the repropagation of native plant species and taken in situ in order to have sufficient specimens to be planted at the end of the interventions.

- (d) refusal to carry out land redevelopment operations involved spieling and grassing in order to improve the yield of pastureland. In fact, all this implies a tampering of secondary origin, actions aimed at the management of this habitat must concern both the maintenance of pasture, which in the past has created the conditions for its development, and the regulation of its own load, so as not to trigger processes of floristic impoverishment. Grazing, in particular, must be closely monitored (rationed grazing) by a balanced distribution of pressure, including through the adaptation of the watering net and natural water points, and the construction of fences around the most degraded areas, with the aim of dispersing the livestock load on larger territorial units. This is to avoid the dangerous destructive effects of the concentration of livestock in small areas.

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- (d) - refusal to carry out land redevelopment operations involved spieling and grassing in order to improve the yield of pastureland. In fact, all this implies a tampering .

- e - the elimination of illegal landfills. Particular attention should be paid to the very serious problem of illegal landfills, which connote certain sectors of rural roads in the peripheral parts of the area, with particular reference to the southern sector.

Action	Specific reference threat
A2 – Pasture management	– MS1 Excessive Grazing – MS3 Waste abandonment – MS4 Fire – MS7 Poaching – MS8 Maintaining trails or tracks – MS9 Better access to natural areas – MS11 Erosion – MS12 Invasion of alien speciesInvasion of alien species

11.3 Forest Management Guidelines - Conservation Management Strategies

For all types of public and private forests, the following requirements are indicated:

- a - prohibition of cutting dead plants - For the protection of trophic, reproductive and wildlife refuge niches, as well as for phytopathological purposes, the cutting of dead, perishable and/or rotting plants from a diameter of 30 cm to human breast is not allowed. In any case, at least 3 standing dead trees of any size, those with a larger diameter, shall be released for each hectare of forest for the purpose of safeguarding trophic, reproductive and refuge niches of the fauna. However, at least 2 trees felled for natural causes are released for each hectare of forest, always for the protection of trophic, reproductive and fauna refuge niches. These trees must be the largest of those felled on site;

- b - compulsory forestry measures - In the forest formations present in the area of forra, and in order to protect the diversity of the overall forest system, all forestry interventions must be carried out in compliance with these requirements:

- Release all species other than beech (predominant), even in the shrubby state, in order to favor the specific composition;

- Plants present on rocky outcrops are excluded from cutting into wooded formations because they are important microhabitats and wildlife refuge areas;
- Prohibit cutting a 100 m band from areas marking the upper limit of tree vegetation;
- Prohibit cutting plants with a human-breast diameter greater than or equal to cm. 50 and in any case to ensure that the areas intended for cutting are supplied with at least 300 plants in good vegetative condition, per hectare with a diameter of man's breast between cm. 30 and cm. 50, equally distributed both horizontally and by diametric classes (cm. 30-40; 40-50) without prejudice to compliance with other criteria that suggest the release of a higher number of plants with such diameters, except in the case of specific interventions aimed at the structural diversification of the forest, previously identified and approved by the managing body;
- Limited areas close to water sources and places of refuge for domestic livestock should be spared from cutting as ecosystems which are particularly overloaded and difficult to exclude from grazing as a result of cutting.
- Release, in cases where the edge of the forest does not mark the limit of the tree vegetation, a protection belt of at least 20 m at pastures or clearings inside the wooded above at least 3000 square meters wide as well as 30 m from the ridges and main impluves;
- The area limit is not provided for forestry operations (thinning, high-stemted start-ups) which are carried out with a maximum utilisation rate of 30%;
- Preserve from cutting all trees of any species with monumental bearing and in any case all individuals with a diameter greater than 60 cm in human chest;
- Areas with a lyse presence and in a situation of high slope should be reserved by cutting;
- An absolute prohibition is made on cutting and damaging specimens of the species of Taxus baccata and Ilex aquifolium, also in the shrubby state, as well as specimens of mountain sorb and sorb of the fowlers.
- In coppice forests, cut-offs of final use which, alone or in continuity with the cut-outs made in the previous two years, give rise to an area exceeding:
- or 20 ha for chestnut coppice;
- or 10 ha for coppices of other species.

End-shift utilization measures for coppice are permitted between 1 October and 15 April of the following year, as indicated in Art. 20 of Forest Regulation No 7/2005.

For forestry interventions it is possible to prohibit cutting between 1 March and 31 July, so as not to interfere with the reproductive cycle of wildlife species in the Directive.

The most important are prohibited:

- the cutting of scattered or isolated plants present on meadows, pastures, crops and ex-crops, with a diameter of more than 20 cm. For such situations, interventions of:

  - pruning only if the incompatibility of the development of the plant with any neighboring activities has been demonstrated;
  - cutting for perishable or dead plants with a diameter of up to 20 cm, for plants with larger diameters there is a request for authorization from the managing body and/or the competent body;
  - perishable or dead plants with a diameter of more than 20 cm in the areas considered to be growing.

Any practice involving the death of the tree individual (e.g. cercenitura) is prohibited and in such cases the felling of plants, even perishable or dead with diameters of less than 20 cm, showing signs of such practices must be prevented. Such practices may be carried out only in execution of specific scientific projects previously approved by the Managing Body or in the event that they constitute an objective danger to public safety.

- c - Requirements for fauna in the cutting project - Requirements for the protection and protection of wildlife and flora should also take into account all floro-fauna emergencies present. In particular, in the evaluation of the cutting project, the following points should be highlighted and taken into account, referring to the possible presence in the area subject to cutting of signs, traces and particular habitats of shelter and feeding:

- Large nests on developed trees with branched foliage (birds of prey);
- Holes on tree trunk (peaks);
- Cavities in the basal or lower part of tree trunks (carnivorous mammals);

- Rocky areas or with hidden and sheltered ravines with possible burrows where traces of the presence of fauna are highlight;
- Large trees dead and still standing;
- Trees with particular radical apparatuses above ground especially if settled on rocky outcrops.

The discovery of these situations at the stage of the cognitive inspections of the characteristics of the station must be communicated promptly to the Managing Body of the SPAs.

- d - preservation from pasture at the time of renewal - In addition to the provisions of the grazing regulation, when implementing the interventions provided for in the Forest Management and Settlement Plan or by cutting projects, municipalities and/or individuals, where necessary depending on the type of use, must ensure by direct (e.g. fences) or indirect methods (e.g. municipal grazing management plan), permanent or temporary removal of livestock from the parcels affected by forestry and/or afforestation interventions, in order to preserve the renewal in progress or in the future in the case of fustaie, or young people fall back into the case of the coppice.

Action	Specific reference threat
A3 – Forest management	– MS2 Incorrect forestry and agricultural practices – MS11 Erosion – MS12 Invasion of alien species

11.4 Strategies for conservation and wildlife management

Extremely important for the effectiveness of the Management Plan is the identification of the fauna management strategies to be implemented for the conservation of biodiversity of Community interest and to make compatible with it the human activities that affect the site. The strategies identified concern the protection of habitats (sustainability of livestock activities; protection of water (collection and fontanil arrangements); the protection of animal species (restrictions on hunting activity; reintroduction and restocking of species of high ecological significance); the management of agroecosystems and forest areas (sustainability of wood collection); ordinary management and use of the site (regulating access to caves); the management of the structures and infrastructures present on the site (avoiding new non-isolated voltage media lines and isolating the existing ones); the identification of guidelines and models for sustainable development (favoring quality productions

sustainable from the environment, favoring quality livestock production made with standard supply chains).

The operational management objectives also tend to provide hunting planning that reduces sampling pressure, disturbance due to the presence of bloodhounds and to the establishment of wider areas of hunting silence. Other measures should aim to spread grazing planning, based on sustainability criteria; the marketing of quality livestock products from companies in accordance with the redevelopment of the livestock sector favors the marketing of quality products that raises the general level of quality of the production chain and therefore also interactions with the wildlife environment; to prevent new water collection and to spread the maintenance practice of fountains and rainwater storage facilities.

Specifically, the following requirements apply:

a – Reduction of potential conflicts between predators and animal husbandry – It is necessary to prepare the regulation of animal husbandry and the establishment of forest police rules aimed at the protection of the forest heritage, which prevent cows and mares from giving birth on the territory of the SIC in areas not protected from predators, in fact the calving of cows and especially horses in areas without guardianship expose young born to predation especially by the wolf; it is also necessary to carry out the verification of the livestock present in relation to the quotas provided for in the reliance of pastures.

b - protection of microfauna – Grazing in the forest is undesirable because of the damage that can be done to the microfauna. It is therefore considered appropriate to provide for a process of gradual verification of compliance by livestock activities in the area with the current legislation on grazing in the forest.

Avoid excessive grazing pressures. To ascertain the correspondence between what is provided for in the reliance of pastures and real uses.

c - measures against straying – A desirable support action by the ASL (and other competent bodies) for livestock activities in accordance with the registration of dogs used by breeders in the canine registry, to sterilize them if breeders so request; support the canine population of breeders with periodic vaccination campaigns; to ensure that sheep farmers operating in the mountains have properly trained

Abruzzo mastiffs; necessary investigation procedures when dogs are found to have been killed with poison.

d - protection of amphibians - The amphibian population of the area, with particular reference to salamander and salamander, is one of the most important valuable elements of the natural territory of the area. For their protection it is necessary:

- avoid new pick-ups;
- carry out the maintenance of the fountains only between August and October;
- avoid cutting trees close to streams.

New collection of springs is prohibited to avoid the loss of water bodies, even temporary ones, important for the reproduction of species.

The maintenance of the fontanili must be carried out between August and October minimizing the risk of elimination of existing specimens of anfini, in this regard it is mandatory to prepare at the same time as the works a container full of water in which to temporarily store the animal organisms present (also macroinvertebrates), which are re-returned to the fontanile at the end of the maintenance work.

e - reintroductions and restocking – It is possible to carry out any reintroductions after feasibility studies have been carried out and the provision of specific certifications and authorizations by the competent bodies. As a mere example, reintroductions of ungulates, coturnice and royal owls can be carried out. Reintroduction areas must be subject to hunting bans. The reintroduced specimens must, if possible, be locally sourced or from subspecific forms similar to those already used in other reintroductions in the Central Apennines.

f – infrastructure mitigation works – Medium-voltage lines become traps for birdlife and specifically for the royal owl, as has been demonstrated by a wide international case studies. The medium voltage power lines present in the territory of the Municipality of Guardiaregia-Campochiaro present a high danger to have shelves mounted on the poles that conduct electricity on the ground (reinforced concrete with iron) and conductors placed on insulating systems placed above the shelves. Animals rest on insulating by touching the conductors, then opening the wings touch the iron shelf attached to the concrete pole and act as a post for a discharge to the ground that electrocutes them. Killings of wildlife specimens occur on the roads. It is important to know the location of these sites at risk in order

to verify the possibility of carrying out appropriate works of protection on road structures in order to avoid killings.

The protective measures require the following measures:

- burial or insulation of medium voltage power lines to reduce electrocution;
- safety and insulation of cable sections near the pole shelf of existing medium voltage power lines;
- identification of crypt points of road crossing, with particular reference to amphibians, with a view to setting up systems for the protection of the transit of animals and for the reduction of accidental killings;
- preparation of bars or stone boulders or palisade on forest tracks that prevent transit and circumvention by off-road vehicles.
- obligation to prepare protective measures in the construction of new power lines;
- obligation to provide protective measures in the construction or renovation of public roads.
- obligation to affix danger signs for the crossing of fauna and the speed limit in order to facilitate the spontaneous return of native species and characteristics of the territory (e.m. roe deer).

g – protection of chiroptrons

- prevent unauthorised access to caves and swallowed;
- study the species of chiroptrons present.

The protection is obtained forest management is important because it determines the actual availability of cavities for nesting / refuge of valuable wildlife species, with particular reference to chiropters. Woodpeckers can participate in the production of shelters by also digging in live wood.

It is important that the diversified structure of forests is protected, both in terms of species and in terms of age group. A very important element is the conservation of perishable plants, where they are medium-large in size and dead plants standing. Plants with woodpecker holes or other cavities should not be felled.

In spring, the felling of trees with hollows or nests on the branches can result in the direct killing of wildlife specimens, including species with conservation priorities. Consequently, the spring cutting of

forests must provide for an explicit ban on the felling of trees with nests on branches, woodpecker nests, hollows and other visible and obvious nesting sites and refuge of animal species.

Action	Specific reference threat
A4 –Wildelife management	– MS1 Excessive Grazing – MS5 Distruzione e perpetuazione rifugi per pipistreli – MS6 Hunting disorder – MS7 Poaching – MS14 Predation of nests by rats, dogs and cats

11.5 Hunting (general measures)

Hunting interferes with the full achievement of the objectives of protecting sic species.

The culling of hares leads to a possible killing of endemic Italian hares, and on a general level, reduces the densities available for hunting large predators.

On the territory of the SIC, on the other hand, it is necessary to place restrictions on the hunting levy. These limitations, which should be contained in the Province's Hunting Wildlife Plan, should include:

- restrictions on hunts with wild boar dogs (allowing turning, but not hunting);
- restrict the access of hunters from municipalities outside the Matese area, providing for one or more ATCs exclusively limited to the municipalities of Matese;
- limit the levying of hare by introducing a ban on the use of hounds in certain areas of matese (leaving the possibility of culling at the occasional disjour);
- identify the Matese mountain passes important for migratory birds and introduce specific hunting bans, in accordance with the provisions of L 157/92;
- prevent dog training areas or hunting farms (or wildlife companies- hunting companies managed in fact as if they were agritourism) from being located in the territory of Matese (in hunting farms and dog training areas, restocking of resident game is carried out using farm animals, which produce undesirable imbalances in the systems, as well as allowing a constant and intense hunting presence);

- Wildlife and Hunting Holdings are preferable only where they are really managed without the use of continuous release of farm animals.

11.6 Hunting (specific measures)

The Boar Hunt

The wild boar has been affected by phenomena of rapid expansion in several European countries, including Italy. In our country the area of distribution of the species in the last thirty years has increased fivefold; the causes of the expansion are the environmental changes that have taken place in land use and in the numerous manipulations made by man on the species. At the beginning of the last century the distribution of wild boar in Italy extended from the Mouth of the Arno to Calabria, while spontaneous immigration was detected on the border French. Since the Second World War, the massive hunting repopulations carried out with Central European wild boars and /or bred in promiscuity with pork, have led to the geographical expansion of the species and hybridization with the breeds present in our country. Specific surveys have found a low degree of genetic divergence between the Maremma subspecies (majors) originally widespread in central and southern Italy and The European subspecies (sow), although locally adapted phenotypes are distinguishable to ecological conditions. The Sardinian population (described as subspecies meridionalis) appears to have originated from later reinselvatichite domestic forms.

Proposed measures:

- anti-poaching surveillance with targeted stakeouts to be carried out in the most critical periods and at night, at points particularly at risk (presence of corn or cereal crops, water points, etc.).
- To encourage the dissemination of techniques for the passive defense of small cultivated areas included in naturalistic areas (electric fences).
- Control of dogs used by hunting teams operating in the territory of the SPA and in the vicinity to be carried out with verification actions on the territory, or the verification of the actual registration in the dog registry of the specimens used.

- Control of the conditions of maintenance of dogs used in hunts and stabulates in the territory of the SIC with verification of the effective compliance with the current rules on the maintenance of domestic animal species.
- In the areas of greatest value, hunting with the techniques of turning, searching and mail should be favored, discourating until the progressive elimination of hunting with dogs (hunted)

The Hare Hunt

The species validity of the Italian hare has been confirmed in recent times, while an initial description of the taxon dates back to 1898 (W.E. De Winton); the distribution of the species is apparently fragmentary in the Peninsula, where it is generally in sympathy with the European hare, while in Sicily, despite significant inputs of L. europaeus, only the endemic Italian species is present. The range of the species has regressed from historical distributions, but a better definition of distribution in the continental sector of the range is desirable. The causes of decline are related to intense hunting pressure, transformations in agro-forestry- pastoral and the introduction of high numbers of European hares, with potential effects of competition and transmission of pathologies. Proper hunting management is undoubtedly a major objective in the conservation of taxon. The cessation of european hare entries should at least cover areas of sympatria with L. corsicanus.

Proposed measures:

- Prohibition of the restocking of hares in the territory of the SIC in question.
- Provide areas where the use of hare hound is prohibited.
- Control of the dogs used to be carried out with verification actions in the territory, or the verification of the actual registration in the canine registry of the specimens used.

The hunt for migration

The hunting of migratory game in the area has an area of excellence in the collection of turdids, with particular reference to the thrush bottaccio and secondly to the sassello thrush. The hunt for migration is carried out mainly in the areas of pedemonte, in the river valleys. Sensitive areas are often involved in this activity, not only because of preferential migration lines for many ornithic species, but also because of the presence of rock areas of importance for nesting species of daytime birds of prey.

Proposed measures:

- Increased surveillance with checks on meat producers.
- Launch of a study for the detailed identification of migration routes and mountain *passes, in order to update the areas in which hunting should be banned, according to current legislation.*

Hunting surveillance

A strengthening of hunting supervision in the Terminillo area is to be considered strategic for the conservation of the reported species. In this respect, it should be noted that supervision could be directed in the following directions:

Increase in patrols and stakeouts, with particular reference to the night hours and the locations most at risk (water bodies in summer). In this respect, it should be noted that the personnel involved should be suitably equipped with appropriate night vision equipment.

Increase in the verification and control of carnieri and the administrative positions of dogs possibly used in hunting exercise (as well as control of the housing areas of wild boar dogs).

Action	**Specific reference threat**
A5 – Management of hunting activities	– MS5 Destruction and perpetuation of bat shelters – MS6 Hunting disorder – MS7 Poaching

11.7 Strategies for the control of pollutants from anthropogenic actions

The most damaging anthropogenic actions in the habitats of species with conservation priorities in the SIC area are as follows:

- cutting of tree-lined supersoles;
- reclamation and tampering with wetlands;
- water collection;
- dissolution of stable lawns;
- construction of new roads and dirt tracks;
- use of biocides.

- Fire trigger
- Illegal landfills

The effect of direct actions is less than the destruction or alteration of habitats. Anthropogenic actions involving direct damage to populations of species with conservation priorities in the area are as follows:

- voluntary killing;
- collection of live specimens.

Action	**Specific reference threat**
A6 – Strategies for the control of pollutants from human activities	– MS3 Waste abandonment – MS4 Fire – MS5 Destruction and perpetuation of shelters for Bats – MS6 Hunting disorder – MS7 Poaching – MS9Regulation of accessibility of natural areas – MS10 Water pollution – MS13 Predation of nests by rats, dogs and cats

12. MONITORING PROGRAMME FOR THE VERIFICATION OF THE EFFECTIVENESS

guy	Action name	Indicators
MR1	Bird monitoring: nesting, with particular attention to the sites located on the rocky slopes; Migratory and wintering.	Periodic census for sightings detecting species, number of specimens, sex
MR2	Water monitoring	Chemical-physical parameters
MR3	Habitat monitoring	Surface control through periodic flights with SAPR
MR 4	Monitoring of forestry and pastoral activities	Control of cut surfaces Transepts for periodic phytosociological analysis
MR 5	Monitoring of hunting activities	Slaughtered fauna control
MR 6	Monitoring of alien species	Absence presence survey

Action	Specific reference threat	Monitoring
A1 – Management of botanical heritage	• MS1 Excessive Grazing	**- MR3 Habitat Monitoring**
	• MS2 Incorrect forestry and agricultural practices	**- MR4 Monitoring forestry-pastoral practices**
	• MS12 Erosion	**- MR6 Monitoring alien species**
	• MS13 Invasion of alien species	
A2 – Pasture management	• MS1 Excessive Grazing	**-MR3 Habitat Monitoring**
	• MS3 Waste abandonment	**-MR4 Monitoring forestry practices- pastoral**
	• MS4 Fire	**- MR5 Monitoring hunting activity**
	• MS7 Poaching	**-MR6 Monitoring alien species**
	• MS8 Maintaining trails or tracks	

	• MS9 Better access to natural areas	
	• MS12 Erosion	
	• MS13 Invasion of alien species	
A3 – Forest management	• MS2 Incorrect forestry and agricultural practices	**- MR3 Habitat Monitoring**
	• MS12 Erosion	**- MR4 Monitoring forestry-pastoral practices**
	• MS13 Invasion of alien species	**- MR6 Monitoraggio specie alloctone**
A4 – Wildlife management	• MS1 Excessive Grazing	**-MR3 Monitoring alien species**
	• MS5 Destruction and perpetuation of shelters for bats	**-MR1 Bird monitoring**
	• MS6 Hunting disorder	**- MR5 Monitoring hunting activity**
	• MS7 Poaching	**-MR6 Monitoring alien species**
	• MS14 Predation of nests by rats, dogs and cats	
A5 – Management of hunting activities	• MS5 Destruction and perpetuation of shelters for bats	**-MR1 Bird monitoring**
	• MS6 Hunting disorder	**- MR5 Monitoring hunting activity**
	• MS7 Poaching	

A6 – Strategies for the control **of pollutants from human** **activities**	– MS3 Waste abandonment – MS4 Fire – MS5 Destruction and perpetuation of bat shelters – MS6 Hunting disorder – MS7 Poaching – MS9Regulation of accessibility of natural areas – MS10 Water pollution – MS13 Predation of nests by rats, dogs and cats	– **MR2 Water Monitoring** – **MR3 Habitat Monitoring**

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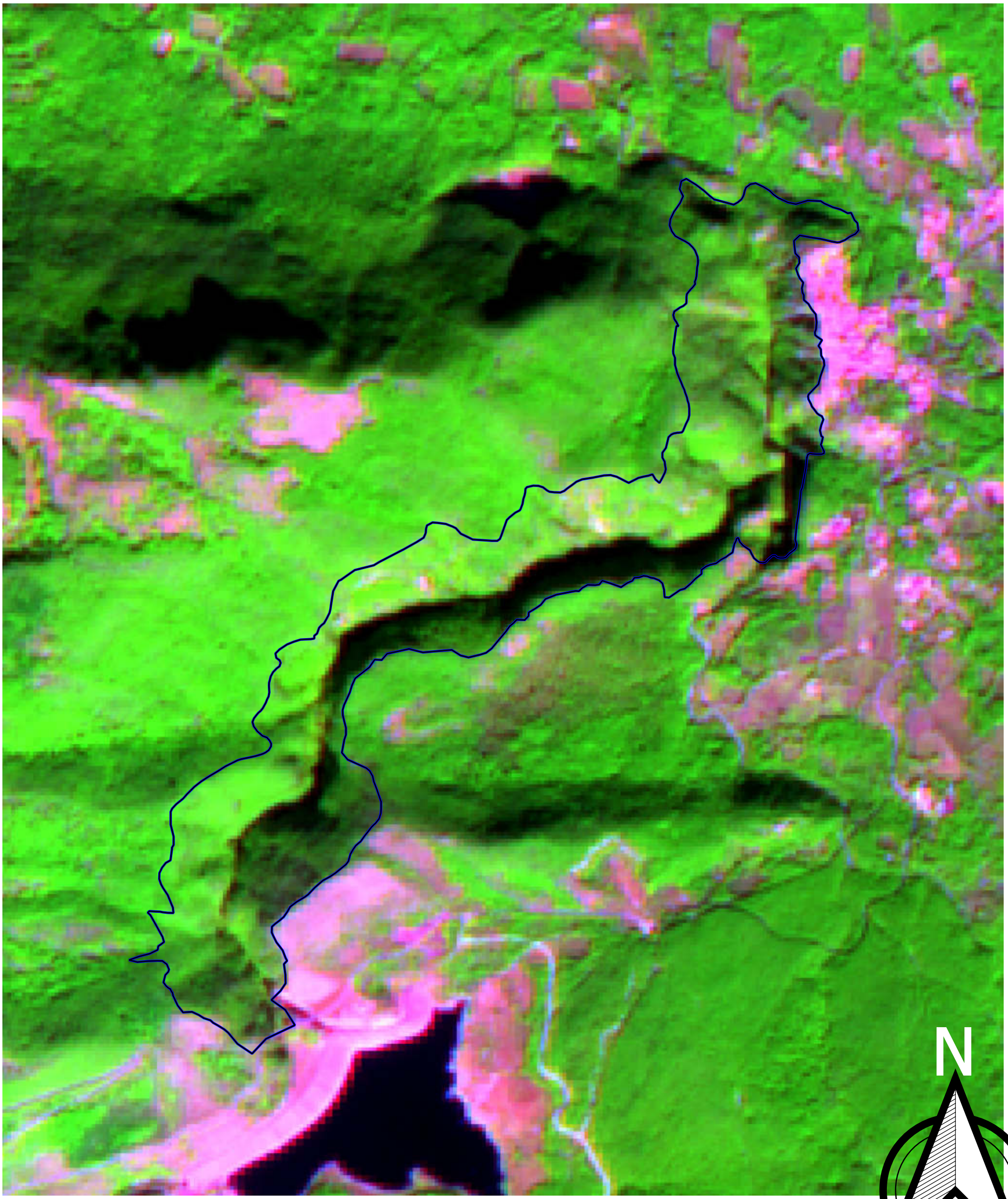
CARTA DELLA VIGORIA DEGLI HABITAT DELLA FORRA DEL QUIRINO

IMMAGINI DA SENTINEL 2
SCALA 1:10.000



CARTA DEGLI HABITAT
SCALA 1:10.000

LEGGENDA

Area Forra Quirino

habitat

- Aree agricole
- Aree artificiali
- Boscaglia a Fraxinus ornus, Ulmus minor e Acer sp.pl.
- Bosco a Castanea sativa (Daphno laureolae-Quercetum cerridis castanetosum sativae)
- Bosco a Fagus sylvatica (Anemono apenninae-Fagetum sylvaticae)
- Bosco a Ostrya carpinifolia (Melitto melissophylli-Ostryetum carpinifoliae)
- Bosco a Quercus cerris e Quercus pubescens (Daphno laureolae-Quercetum cerridis)
- Bosco a Quercus ilex (Festuco exaltatae-Quercetum ilicis)
- Bosco a Tilia plathyphyllos e Acer sp.pl. (Aro lucani-Aceretum lobelii)
- Cespuglieto a Rosa sp.pl., Prunus spinosa e/o Spartium junceum (Cytision sessilifolii, Pruno spinosae-Rubion ulmifolii)
- Prateria a Brachypodium rupestre e Bromus erectus (Phleo ambigui-Bromion erecti)
- Prateria a Bromus erectus e Phleum hirsutum subsp. ambiguum (Phleo ambigui-Bromion erecti)
- Prateria a Festuca arundinacea, Arrhenatherum elatius e Cynosurus cristatus (Arrhenatherion alationis, Cynosurion cristati)
- Rimboschimento di conifere a Pinus sp.pl.

Scala 1:2000