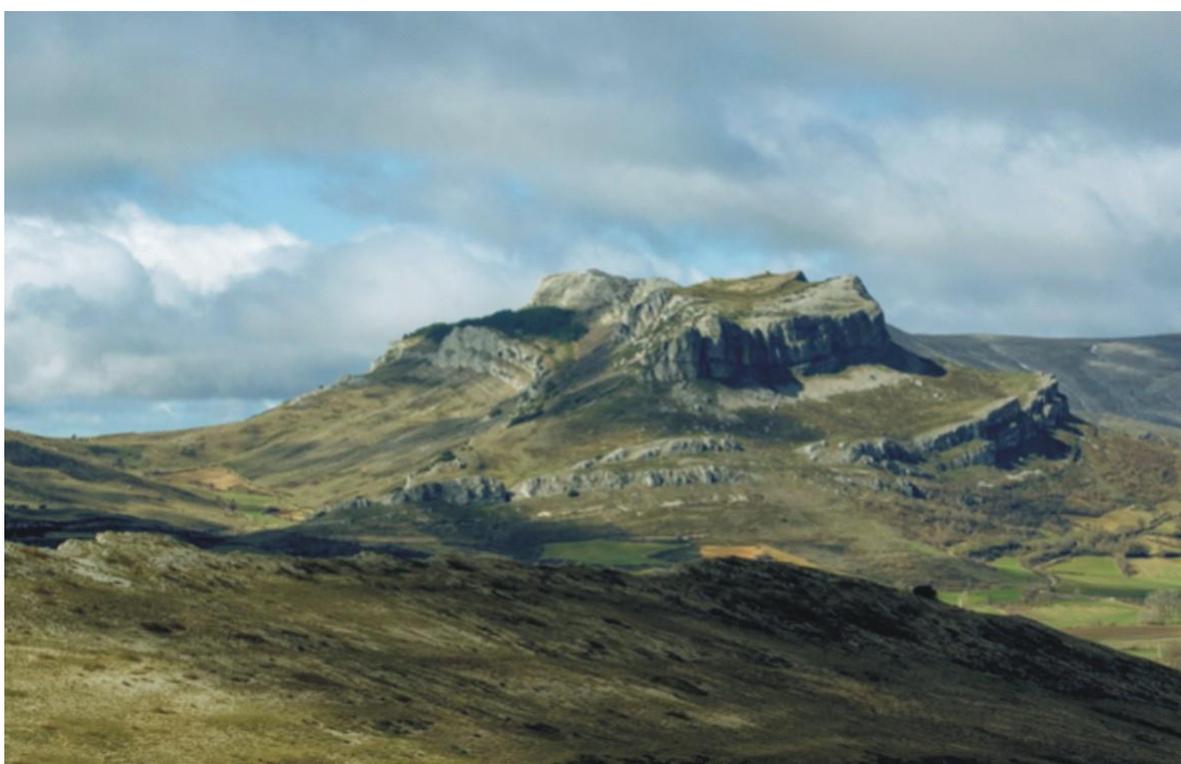


APPLICATION DOSSIER

to be a UNESCO GLOBAL GEOPARK



Editors, graphic design and layout

ARGEOL:

Karmah Salman Monte

José Ángel Sánchez Fabián

Fernando García García

Javier Basconcillos Arce

Alberto Rodríguez García

Nicolás Gallego Rojas

Mapping

Javier Basconcillos Arce

Alberto Rodríguez García



TABLE OF CONTENTS

A – IDENTIFICATION OF THE AREA

- A.1. Name of the proposed Geopark.
- A.2. Location of the proposed Geopark.
- A.3. Surface area, physical and human geography characteristics of the proposed Geopark.
- A.4. Organization in charge and management structure of the proposed Geopark.
- A.5. Application contact person.

B – GEOLOGICAL HERITAGE

- B.1. General geological description of the proposed Geopark.
- B.2. Listing and description of geological sites within the proposed Geopark.
- B.3. Details on the interest of these sites in terms of their international, national, regional or local value.
- B.4. Listing and description of other sites of natural, cultural and intangible heritage interest.

C – GEOCONSERVATION

- C.1. Current or potential pressure on the proposed Geopark.
- C.2. Current status in terms of protection of geological sites within the proposed Geopark.
- C.3. Data on the management and maintenance of all heritage site.

D – ECONOMIC ACTIVITY & BUSINESS PLAN

- D.1. Economic activity in the proposed Geopark.
- D.2. Existing and planned facilities for the proposed Geopark.
- D.3. Analysis of geo-tourism potential of the proposed Geopark.
- D.4. Overview and policies for the sustainable development.
 - D.4.1. Geo-tourism and economy
 - D.4.2. Geo-education
 - D.4.3. Geo-heritage
 - D.4.4. Examples illustrating activities in these sectors
- D.5. Policies for, and examples of, community empowerment in the proposed Geopark
- D.6. Policies for, and examples of, public and stakeholder awareness in the proposed Geopark

E – INTEREST AND ARGUMENTS FOR JOINING THE UNESCO GGN

A – IDENTIFICATION OF THE AREA

A.1. NAME OF THE PROPOSED GEOPARK

In Spanish: GEOPARQUE LAS LORAS

In English: LAS LORAS GEOPARK, UNESCO GLOBAL GEOPARK

Las Loras, a local toponym, enclose a territory with common geological, cultural and historical features which are additionally strongly interrelated.

A.2. LOCATION OF THE PROPOSED GEOPARK

The proposed area is located in Spain, specifically to the north of Castilla and León Autonomous Community, occupying a part of the northwest of Burgos' region and a part of the northeast of Palencia's region (Fig.1.)

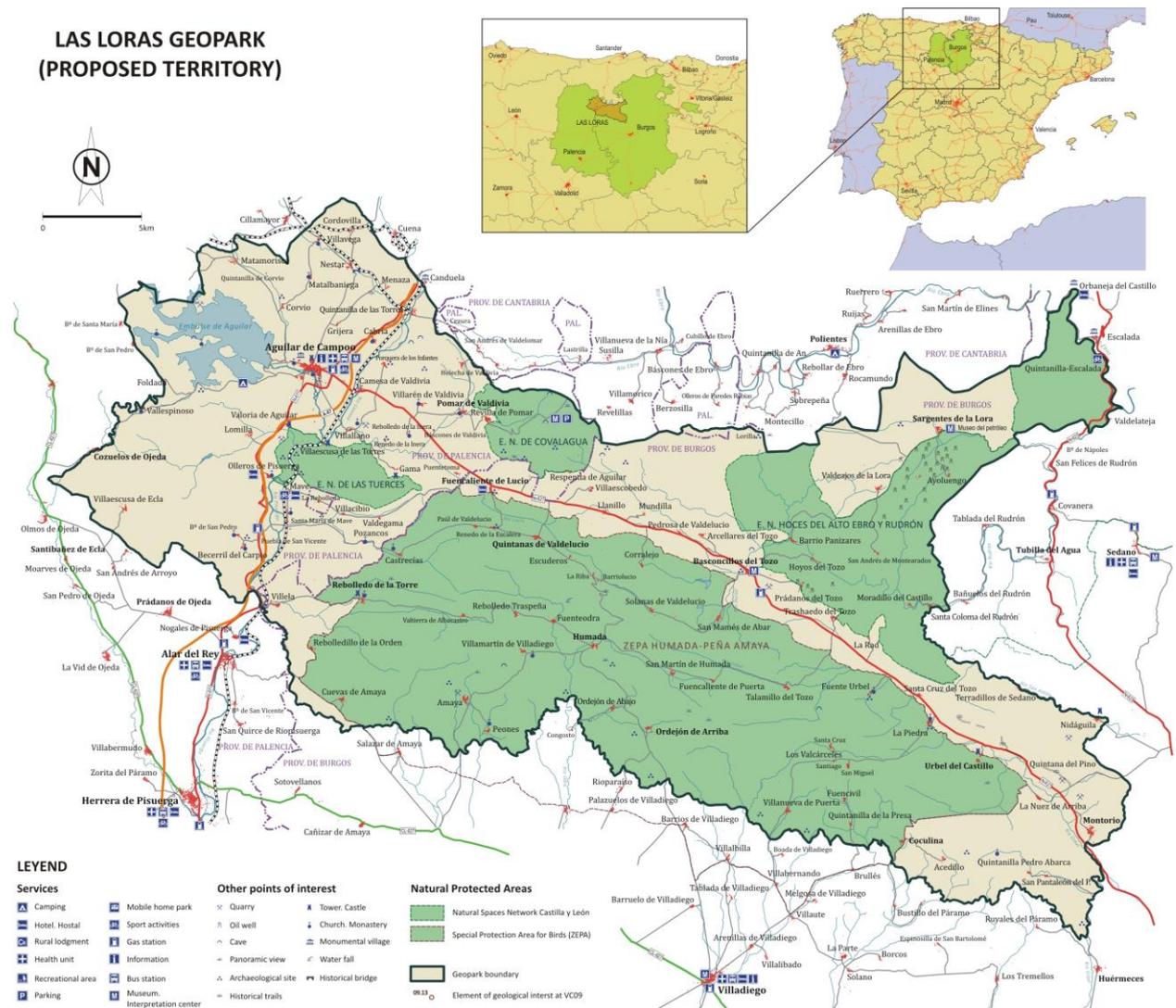


Fig.1. Location map of the Geopark proposed territory.

Demarcation: The Mesozoic moorlands or “loras” are undoubtedly the geological elements which characterize the best the region’s landscape and they are also the common feature among its whole geography. Las Loras are the spatial and physiographic frame which perfectly defines the Geopark Project territorial scope, being therefore, a space defined by its landscape. Thus, in order to establish the Geopark limits the following criteria were used:

- Geological: All materials and rocks found among the Loras Geopark Project belong to the Basque-Cantabrian region.
- Landscape-Cultural: Within the Basque-Cantabrian region in its south-western area there is a very distinctive landscape of Mesozoic moorlands, which has been traditionally named as Lora.
- The Loras present both a connecting link in its geology and landscape and cultural singularities which cannot be seen in other nearby areas. The presence of several *castros* (forts), almost one for each Lora, and the uses that humans traditionally have given to this territory throughout time, give an exceptional coherence and cohesion to this Geopark.
- Administrative: A small part of the Loras is located at the Cantabrian Community; nevertheless it was preferable to confine the Geopark strictly to the Autonomous Community of Castilla and Leon, where the largest part of this area is found.

The proposed area is located among the UTM, Datum ETRS89, Huso 30N coordinates.

X min = 383540

X max = 438390

Y min = 4709470

Y max = 4747325

A.3. SURFACE AREA, PHYSICAL AND HUMAN GEOGRAPHY CHARACTERISTICS OF THE PROPOSED GEOPARK

A.3.1. Surface area

The total area of the Loras Geopark's territory would comprise 950, 76 km².

A.3.2. Physical geography

The Loras region is an area of medium sized mountains, where the mountain folds mainly face E-W, except for the Fuente Fría-Pilones fold, to the north of Rebolledo de la Torre, which faces NE-SW. Its maximum altitude ranges between 1000m and 1377m. The lowest areas are placed at an altitude of about 620m and cover a considerable smaller area than the previous.

Biogeographically, most of the territory is framed within the Mediterranean region but the northernmost area is included in the Atlantic region. It has a strategic biogeographical position, being the contact point between the Carpetano-Ibérico-Leonesa, Castellano-Maestrazgo-Manchega and Aragonesa regions. This area comprises thermotypes from Supra-Mediterranean to Supra-mild, with ombrotypes from subhumid to hyperhumid. On the whole, this contributes to a great territorial biodiversity, where typical Atlantic species and also purely Mediterranean species are found.

Several factors determine the territory's vegetation:

- **The relief.** At the upper part of the Loras the existing vegetation usually consists of herbaceous plants and small size bushes due to the extreme weather conditions (low temperatures and strong winds). The presence of hazels and aspens at the several dolines spread along the surface of these carbonate moorlands is a curious occurrence. At lower sites a strong anthropization has been produced as a result of agricultural practices. At the higher points (Peña Amaya and Albacastro) there are high mountain habitats of great biogeographical value with numerous Pyrenean-Cantabrian endemism.
- **Substrate type.** The type of vegetation is sometimes determined by the presence of calcareous materials (limestone and marls) as well as detrital materials (sandstones and conglomerates). The colonization of heathers and brooms in acidic land, where sandstones and/or conglomerates overcome, is a clear example of this.
- **Orientation.** The slope's orientation frequently establishes the presence of holm oaks, oaks or beeches. This situation can be clearly seen at Peña Mesa, for instance. On the southern side, to Rebolledo de la Torre, there is a more or less developed holm oak wood, whereas on the northern side, to Castrecías, the oaks (gall oaks) stand out. The same occurs at the shadowed or sunny slopes of Valdivia's moorland, where beeches and gall oaks can be seen.
- The presence of **rivers** implies the emergence of riverbank woodlands lining their riverbeds.

- **Reforestation** was not a very usual practice but it has nevertheless contributed to the plantation of pinewoods, mainly at the NW edge of Valdivia's moorland, at Las Tuerces plateau and at the wetlands of Valdelucio.

FOREST FORMATIONS

- *Holm Oak Wood* (Castilian-Cantabrian and Rioja-Estella Supra-Mediterranean array, basophilic to the Holm Oak): They are preserved in some areas of the limestone moorlands and the most sunny and rocky slopes.
- *Gall Oak Wood* (Castilian-Cantabrian and Rioja-Estella Supra-Mediterranean array, basophilic to the Gall Oak): They remain in the basal slopes of the limestone moorlands, on marl and clay soil, deep and compensated, which are non-arable due to their gradient ("Head Mountains").
- *Pyrenean Oak Wood* (Supra-Mesomediterranean western Carpetana, Orense-Sanabria and Leon array, acidophil to Pyrenean Oak): They develop at the valley floor on siliceous materials.
- *Beech Wood* (Orocantábrica and Cántabroeskalduna mountain array, basophilic and xerophytic to the Beech): The scarce beech manifestations are placed in the sharpest and rockiest shadowed limestone.
- *Riverbank Woodland*: The territory's riparian forests are dominated by woodlands of Poplar and Willow, with arborescent and bush vegetation willow woods on the rocky tops. Well preserved groves of alders remain in some enclaves.
- *Forest Plantations*: The forest plantations dotted about the territory are mainly composed of conifers (above all Scots, Corsican and Stone pines), as well as willow groves in the riverside landscape of most of the main river courses.

Degradation Bushes:

- *Gorses*: The limestone areas where the forest cover has been eliminated, in general by ancient burnings, are covered by Spanish brooms on the slopes and by gorses on the deserted agricultural areas.
- *Heathers*: Extensive heathers with several species of Ericaceae have developed at the valley floors siliceous areas, highly transformed by human use.
- *Heather-Bearberry*: Singular formations of sparse scrub rush dominated by the Castilian heather and the bearberry grow in wide stretches of several of the territory's Loras, as Covalagua or Peña Amaya, where a marked edaphic indeterminacy is produced, and represent steppe biotopes of great interest.

Las Loras' district is halfway between the Castilian Plateau and the Cantabrian Mountain Range. This fact provides them a transitional trait and gives them the typical weather and environmental features of each of the regions, and it also grants a wide range of environments and therefore a distinguished biodiversity, where both Euro-Siberian sites as well as marked Mediterranean sites can be found, as well as a peculiar orography, where limestone cliffs and significant high altitude moorlands alternate with gorges and deep valleys sunk by the existing river system. The importance at both fauna and environmental levels is endorsed by the existing types of protection categories by NATURA 2000 Network in the territory. On the one hand we have the Natural Park of Hoces del Alto Ebro and Rudrón and the Natural Protected Sites of Covalagua and Las Tuerces (also declared SAC, Special Areas of Conservation-ZEC in Spanish), on the other hand a wide area, which corresponds to Humada-Peña Amaya and Hoces del Alto Ebro and Rudrón (Fig.1. and Annexe 4 and 15), has been declared as Special Protection Area for Birds (SPA-ZEPA in Spanish). Las Loras Geopark Project is envisioned as a binding element of all these sites, maintaining the geographical coherence of the territory and counting on the appropriate protection policies.

The territory's river system encloses the divide of the basins of Ebro and Duero River. Within the Duero's basin, the most important rivers are the Pisuerga and its tributaries (Camesa, Lucio, Monegro and Sauquillo). The Odra River stands out as it crosses the Humada-Peña Amaya SPA. The Ebro River borders the Loras to NE and E, along with Rudrón River. All of them are deeply embedded in the relieves, sectioning geological structures and generating amazing river canyons.

At Las Loras there are very singular fauna species. Some of them represent a scarce distribution and others can be found in a more or less delicate conservation status. Furthermore endemic species of the Iberian Peninsula inhabit the area and can be easily watched. Some of the most representative species at the Loras' district are: **Mammals**: Wild Boar, Fox, Roe Deer, Wolf, Otter, Marten, Ermine, Bats (Barbastelle, Brown Long-Eared Bat, Golden Bat, Common Bent-Wing Bat) Pyrenean Desman (*Galemys pyrenaicus*); **Birds**: Egyptian Vulture, European Short-Toed Eagle, Hen Harrier, Montagu's Harrier, Golden eagle, Peregrine Falcon, Bonelli's Eagle, Little Bustard, Eurasian Stone-Curlew, Eagle Owl, European Nightjar, Kingfisher, Ortolan Bunting; **Amphibians and Reptiles**: Iberian Painted Frog, Western Three-Toad Skink, Iberian Emerald

Lizard, Seonane’s Viper, Asp Viper, Common Midwife Toad, Natterjack Toad, Common Wall Lizard, European Smooth Snake (*Coronella Austriaca*); **Fish:** *Achondrostoma Arcasii*, Minnow, Gudgeon, *Barbus Graellsii*, South-West European Nase.

A.3.3. Socio-economic description of the area

The Geopark Project is spread throughout 16 municipalities of Burgos and Palencia regions. Some of them include the whole of their territory in the Geopark, while others only have part of it (see map). They are described below, and the provinces to which they belong are also indicated:

Administrative districts:

- Palencia’s province: Aguilar de Campoo, Pomar de Valdivia, Alar del Rey, Santibañez de Ecla and Berzosilla.
- Burgos’ province: Valle de Valdelucio, Basconcillos del Tozo, Sargentos de la Lora, Rebolledo de la Torre, Villadiago, Sotresgudo, Humada, Úrbel del Castillo, Montorio, Huérmeces and Valle de Sedano.

The area has extreme low population, as it will be later described. The total population of each municipality has been taken into account in order to balance the Geopark’s inhabitants, even if in some case part of the municipality is not included within its limits.

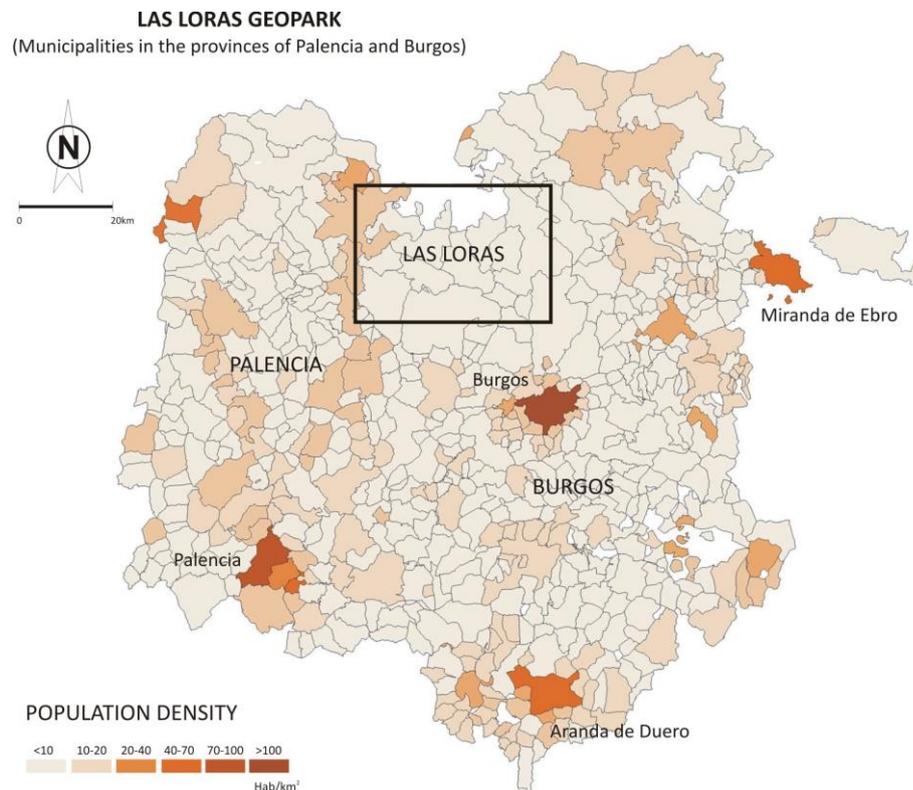


Fig.2. Population density in the municipalities of Palencia and Burgos.

Population:

- Palencia’s province: Aguilar de Campoo (7.203), Pomar de Valdivia (499), Alar del Rey (1.031), Santibañez de Ecla (75), Berzosilla (40).
- Burgos’ province: Valle de Valdelucio (347), Basconcillos del Tozo (376), Sargentos de la Lora (132), Rebolledo de la Torre (131), Villadiago (1.694), Sotresgudo (515), Humada (142), Úrbel (92), Montorio (184), Huérmeces (128), Valle de Sedano (487),

TOTAL: 13.076 inhabitants (Per Province: Palencia, 8.848; Burgos, 4.228)

Besides this administrative organization of municipalities, there are also the so-called Mancomunidades (commonwealth of municipalities), which are formed by several municipalities united in order to share expenses and minimize the costs of the services offered to the citizens. Several of them come together within the Project's limits. In Palencia 2: Aguilar-Valdivia and Boedo Ojeda; and in Burgos 3: Peña Amaya, Páramos and Valles and Tierras del Cid (Annexe 16).

The population areas are scarcely inhabited. Aguilar de Campoo stands out and represents a reference point for the entire district as communication centre, owing to its services and because of its food industry. The other villages are irregularly scattered and mainly settled in the valleys.

They are rural villages where a significant decrease in inhabitants' number has occurred throughout the second half of the 20th century. Several of these villages were completely abandoned.

The depopulation of rural areas, one of the most pressing problems in the entire Autonomous Community, takes on a special meaning in this district, where the population density of many of its municipalities is under 7 inhabitants/ km², well below the limit laid down by the ONU as to define "population deserts", which is of 25 inhabitants/ km².

Arable and livestock farming are the main means of livelihood for these municipalities' inhabitants, along with the biscuit industry in Aguilar de Campoo. The oil industry is also present at the territory with its oil field in Ayoluengo, albeit symbolically. It is also important to highlight that the services connected to rural tourism are getting a greater relevance. These activities tend to be initiatives of new residents and therefore promoting and supporting them could be an important element for the district's demographic recovery.

Within the study area there are only a few important communication routes. The A67 stands out and it crosses the territory through the W edge. Other routes to be considered are the railway line Madrid-Santander, the N-627 Road Aguilar de Campoo-Burgos.

	Aguilar de Campoo	Montorio	Orbaneja del Castillo	Sargentos de la Lora	Sotresgudo	Villadiego
Burgos	80km / 1h 6min	31km / 26min	66km / 54min	62km / 53min	63km / 49min	50km / 39min
Santander	108km / 1h 8min	152km / 1h 30min	97km / 1h 37min	140km / 1h 30min	135km / 1h 26min	143km / 1h 37min
Valladolid	145km / 1h 27min	164km / 1h 39min	199km / 2h 5min	181km / 1h 54min	126km / 1h 30min	137km / 1h 28min
Madrid	353km / 3h 20min	286km / 2h 48min	321km / 3h 14min	318km / 3h 13min	301km / 3h 2min	289km / 2h 52min
Palencia	99km / 59min	127km / 1h 16min	148km / 1h 44min	135km / 1h 26min	80km / 1h 2min	91km / 1h
León	168km / 1h 39min	203km / 2h	217km / 2h 24min	204km / 2h 03min	150km / 1h 37min	160km / 1h 36min
Vitoria	188km / 2h 1min	139km / 1h 22min	174km / 1h 49min	170km / 1h 49min	174km / 1h 47min	161km / 1h 38min
Bilbao	198km / 2h 8min	180km / 2h 6min	123km / 1h 56min	135km / 2h 08min	215km / 2h 13min	203km / 2h 4min
Costa Vasca Geopark	259km / 2h 47min	210km / 2h 12min	246km / 2h 35min	243km / 2h 34min	246km / 2h 32min	233km / 2h 24min

Table 1. Distances and driving times of some of the locations of the Territory and closest capitals of province.

A.4. ORGANIZATION IN CHARGE AND MANAGEMENT STRUCTURE OF THE PROPOSED GEOPARK

A.4.1. Overview

The Loras Geopark Project started to be conceived in 2004 by two associations and one neighborhood council from three municipalities of the territory, supported by the Local Action Group País Románico. The project originated in a bottom-up approach and has been growing and evolving the same manner. In this way, in 2006 ARGEOL association (Association for the Loras Geological Reserve) was founded with the aim of giving the Project legal support and leadership. The ARGEOL association is made up of many associations and are represented many of the municipalities of the territory– neighborhood council of Villaescusa de las Torres, the association Friends of Revilla de Pomar, the association ACETRE, ADEMPA association, CLIC-cultural association, Geoscientific Association of Burgos, ACECMAPA-Espacio Tangente association, Local Development Group ADECO Camino de Santiago, País Románico association and the Association for Heritage Interpretation) – and it has been in charge of the Project's development and all the activities carried out throughout all these years. As shown in Table 2, over this time there have been many activities following the objectives and operating model of the Geoparks Network. It has been used geological heritage as a link with the rest of the natural and cultural territory to boost the socioeconomic and involve its people in protecting the same heritage (See also Annexe 9 and 10).

YEAR	ACTION	COST & SPONSOR
2004	<ul style="list-style-type: none"> Expert Consultation Day: twenty specialists in various fields (geology, history, archeology, landscaping, economic development, etc.), which corroborated the high potential of natural and scenic resources of the area and the adequacy of the proposal to enhance their management. The project design for the creation of the geological reserve of Las Loras included a series of actions undertaken by all ARGEOL Association Report on geoparks in Spain Travel training of technicians: Aliaga (Teruel) and Haute-Provence Development of a pilot study for the identification, analysis and documentation of the Geological Reserve of Las Loras. An initial diagnosis of sustainable use. 	137.912,40€ LEADER+ País Románico (80%) y Diputación Provincial de Palencia (20%).
2005-2006	<ul style="list-style-type: none"> Creation of the association ARGEOL Design and development of three geological interpretative routes Editing maps, brochures and guide of the Geological Reserve of las Loras Land art workshop sponsored by País Románico Local Group (1st Edition) 	27.470,00€ País Románico Espacio Tangente Association
2007-2008	<ul style="list-style-type: none"> Presentation of the Project in de Castilla Leon Contemporary Art Museum-MUSAC Outreach program in schools Reserve. School notebooks (2008 and 2009). 	1.500,00€ País Románico
2008	<ul style="list-style-type: none"> Course of interpretation of Natural Heritage and Ethnographic. (FORMIC Plan). 300 hours. 10 students- Piedra Abierta partner 	39.000,00€ FORMIC
2009	<ul style="list-style-type: none"> Project presentation at the X International Congress of Geological and Mining Heritage (Coria, Cáceres). 	500,00€ ARGEOL
2009	<ul style="list-style-type: none"> Course guide-interpreter of las Loras. (FORMIC Plan) 320 hours. 10 students - Piedra Abierta partner 	39.200,00€ FORMIC / FECYT
2010	<ul style="list-style-type: none"> Course of interpretation of Natural Heritage and Ethnographic. (FORMIC Plan). 300 hours. 10 students- Piedra Abierta partner 	40.800,00€ FORMIC / FECYT
2010	<ul style="list-style-type: none"> Courses guide-interpreter (FORMIC Plan) of las Loras. 10 students Geoloday 10 - Palencia: Las Tuerces. Villaescusa de las Torres. Geoloday 10 - Burgos: Mesa Peña Lora. Rebolledo de la Torre. Geological Reserve of Las Loras guided tours (student's courses guide-interpreter). Free outputs for Las Tuerces (sponsored by ACD Mountain Palentina). Participation in the Management Plan of Natural Resources of The Tuerces- Covalgua Natural protected areas: work groups and participation 	39.832,54€ FORMIC 500,00€ Fundación Española para la Ciencia y la Tecnología (FECYT).
2011	<ul style="list-style-type: none"> Geoloday 11 - Burgos: The Loras. Rebolledo de la Torre-Castrecías. 	500,00€ FECYT
2012	<ul style="list-style-type: none"> Geoloday 12 - Palencia: Lora de Valdivia (Covalagua, Cave of the French and Mirador de Valcabado). 	500,00€ FECYT
2012	<ul style="list-style-type: none"> Course Monitor Leisure and Environmental Education. (FORMIC Plan). 510 hours. 10 students - Piedra Abierta partner 	42.687,00 FORMIC
2012	<ul style="list-style-type: none"> 1st workshop on the Las Loras Geopark Project. Presentation to municipalities and local authorities of the project. Presentations by Arouca Geopark (Portugal), the Geopark "Maestrazgo" (Teruel) and the IGME. 	1.500,00€ ARGEOL ACD-ADECO Camino de Santiago
2012	<ul style="list-style-type: none"> Collaboration in Cuevatur Congress Aguilar de Campoo (Palencia) 17-20 October 1st Meeting on the Action Plan or Roadmap for the Geological Reserve of las Loras. 	ARGEOL
2013-2014	<ul style="list-style-type: none"> Geoloday 13- Palencia: Valcabado-Las Tuerces. 	700,00€

YEAR	ACTION	COST & SPONSOR
	· Geoloday 14- Palencia: Monte Bernorio.	FECYT
2013-2014	<p>Project with the Local Action Groups (ADC Mountain Palentina-ADECO Camino de Santiago):</p> <ul style="list-style-type: none"> · Tables-Work groups of participation: Working with the local population to publicize the project and gather the concerns and expectations of the project by the local population · Educational program "Meet the Loras" Free Tours for schoolchildren in the municipalities of Loras. · Development and dissemination of information paneling · Participation in the working group of the European Charter for Sustainable Tourism in the mountains of Palencia · Meetings with Natural Areas and Councils of Burgos and Palencia. · Elaboration of panels in the Monte Bernorio Route · Second Working table: to request support to nominate. A great success of call that brought together all the mayors and some councilors, deputies of Burgos and Palencia, managers of natural areas in both provinces and local action groups made a public commitment to the creation of a Project Cooperation development candidacy Geopark. Speakers: director and geologist Geopark Cabo de Gata 	<p>8.700,00€ Local Actions Groups: ADC Montaña Palentina ADECO Camino de Santiago</p>
2013-2014	<ul style="list-style-type: none"> · Environmental Volunteer Program. Three programs. Environmental Volunteer Program of the Fundación Caja de Burgos – Obra Social La Caixa. 2013-2014-2015. Recovery of traditional trails of Las Loras and improvement of geological interest points. Enhancement of the geological heritage. · Guided tours with Universities: Murcia, Madrid, Salamanca 	<p>8.280,00€ Fundación Caja de Burgos - Obra Social la Caixa ARGEOL</p>
2015	· Geoloday 15- Palencia: Geological sites around Aguilar de Campo.	<p>500,00€ FECYT</p>
2015	<ul style="list-style-type: none"> · Meetings with the two provincial councils and signed economic cooperation agreements for development the Project. · Meetings with the directors of the natural areas of Burgos and Palencia to work on the development of future agreements for the development of joint activities, collaboration and information dissemination programs do not duplicate ... · Compilation of all the letters of support and shipping needed to apply the letter of support from the Spanish Commission for Cooperation with UNESCO Geopark candidacy documentation. · 1st Week of geology in the Las Loras Geopark Project. In collaboration with the City of Aguilar de Campo, ACD Mountain Palentina-ADECO Camino de Santiago, Palencia Provincial Council, Santa María la Real High School, Fundación Santa María la Real, associations, traders and local companies as well as volunteers from the local people. · Organization of the 58th Scientific Sessions of the Geological Society of Spain. 	<p>3.500,00€ ARGEOL ADC Montaña Palentina ADECO Camino de Santiago Prov. Councils Aguilar de Campoo Town Hall Sociedad Geológica de España Asociaciones de Aguilar de Campoo Galletas Gullón Aguilar High School</p>
2015	· Realization of the museum's contents, opening and management of the Oil Museum in the village of Lora Sargentos de las Lora. The museum has a space dedicated to the Las Loras Geopark Project.	<p>100.000,00€ Fundación Museo del Petróleo Fundación Repsol Sargentos de la Lora Town Hall</p>
2015	· Audioguide: points of interest around the Cave of the French to the Provincial Council of Palencia	<p>1.300,00€ Palencia Prov. Council</p>
2015	Drone flights in las Loras https://www.youtube.com/watch?v=bxFRi3TYLOW	<p>ARGEOL Univ. of Salamanca</p>
2015	· Obtaining the Letter of support from the Spanish Commission for Cooperation with UNESCO	<p>20.700,00€ Palencia & Burgos Provincial Council</p>

YEAR	ACTION	COST & SPONSOR
	<ul style="list-style-type: none"> Completion of the dossier for candidacy Geopark and pre-assessment work 	
2015	<ul style="list-style-type: none"> Participation in the Working Group of the Integrated Strategy for Sustainable Development of the Province of Palencia 	ARGEOL Palencia Prov. Council
2015	<ul style="list-style-type: none"> Elaboration of panels in the Monte Bernorio Route Participation in the II Open Day of the Spanish Committee of Geoparks Meetings with business associations of the territory Talks on Burgos Geoscience Project Association and Congress on Fracking INTUR (International Tourism Fair of Interior)- 26-29 November- Project presentation at the stands of the Council and Junta of Castilla y Leon Teachers in the Interpretation and environmental course -education Geology (Fundación Santa María la Real) Promotion of local products 	ARGEOL

Table 2- Activities undertaken by Las Loras Geopark Project, according to the objectives and model of UNESCO GGN.



This entity relies on a multidisciplinary team formed by several geologists, biologists and rural and tourism development technicians, which are in charge of drawing the annual program, create the necessary materials for its development and carry out the activities. ARGEOL is also the entity which is leading this application to the UNESCO Global Geoparks Network.

In order to strengthen the management structure and give it budgetary stability as well as getting the complete institutional support to move this project ahead, synergies and partnerships have been sought among local, province and regional administrations as well as among private entities and companies. The outcome of these efforts has resulted in:

1. *Signing of agreements with the GAL.* The three territorial local development groups have signed a compromise for the dynamization and management of the Cooperation Project “Las Loras Geopark Project”, based on the Leader Program with a budget of 364.900 Euros over a time horizon of 42 months. (Annexe 17)
2. *Signing of agreements with Burgos and Palencia Provincial Councils.* Agreements with both provincial Councils have been signed and they established that within the frame of their competences and budgetary disponibility, they are in the position of carrying out previously agreed actions inside the Action Plan of Las Loras Geopark Project, both within own programs or specific collaboration agreements for the development of more accurate actions. A first agreement for the expenses derived from this application preparation has been already signed and each of the Provincial Councils is going to contribute with 10.350 Euros for the Project. (Annexe 17)
3. Works are being done for a protocol with the Regional Government Department of Culture and Tourism. At the same time, “specific collaboration agreements can be established for future development actions”, as reflected in the letter of support written by the General Directorate of Natural Environment. (See Annexe 3).
4. It is pending the signing of protocols with Valladolid and Burgos Universities.

5. As early as in 2004, at the beginnings of the Project, a group of experts connected to different spheres of action of the scientific world was created and acts as advisory body – Scientific Committee. In the last months the group has been reinforced and new constituents linked to the scientific world and directly connected to the territory have been included.
6. Collaboration with public and private entities. Several companies and entities have collaborated and sponsored many of the activities carried out by ARGEOL over the years: See annexe 9-10 with the detailed description of all these activities: courses, materials edition, volunteering, environmental education programs, geological week, lectures, geolodays, landscape workshops, roundtables of sectorial works, conferences, etc.
7. Due to the wide experience of the Project, it counts with a group of volunteers “Friends of the Geopark Project”, who actively collaborate in each of the activities yearly programmed.

A.4.2. Methodology, functioning and management tools

As described before, the Geopark Project presents an array of singularities and therefore its management might seem complex at a first sight. Its territory embraces two provinces. There is a Protected Natural Space in each of them besides other areas which are listed within the Natura 2000 Network. There are several small population centers spread along the area. There are municipalities whose territory is not entirely inside the Geopark Project and it also presents broad cultural heritage.

An appropriate management of the Geopark will imply, on the one hand, that all the territory’s actors are integrated in it, and on the other hand, it is necessary to give voice efficiently to all those citizens who wish to take part in decision-making. For this reason it was essential to create three groups of work (Executive Board, Scientific Advisory Committee and Advisory Committee for Social-Economic Affairs). In this way all and each of the territory’s singularities are represented in the Project.

The following is a description of each of these groups, layout and features:

Work group 1. Executive Board

This group will be formed by representatives of each of the territory’s district and regional administrations: two representatives from ARGEOL (chief scientific officer and manager of the Project), the coordinator of the Scientific Advisory Committee and two representatives of the Advisory Committee for Social-Economic Affairs. This work group forms the Geopark management body. On 3rd November 2015 this committee has met for the first time to work on and approach the new arising challenges.

EXECUTIVE BOARD.		MEMBERS
Entity	Representative	
General Directorate of Natural Environment	1 Representative	
General Directorate of Cultural Heritage	1 Representative	
General Directorate of Tourism	1 Representative	
District Council of Burgos	Ángel Carretón – Provincial Deputy	
District Council of Palencia	Luis Calderón – Vice president of the District Council	
Scientific Advisory Committee	1 Representative	
Social-Economical Committee	2 Representatives of each GAL (technician and town council)	
ARGEOL	Technicians	

FUNCTIONS OF THE EXECUTIVE BOARD

- ARGEOL, as part of this committee, it will be in charge of designing and carrying out the activities scheduled in the Plan of Action, that may be modified by the Executive and should be authorized by the same before its implementation. It will also be in charge representing Geopark in each of the activities related to the functioning of the UNESCO GGN.
- On biennial alternation basis, the representatives of the District Councils of Burgos and Palencia will be in charge of the institutional representation of the Geopark.
- Authorizing the annual report of activities (Plan of Action) and outcomes, proposing measures to correct any faults or improve the management.

- Joining efforts and optimizing the resources in the several carried out actions, through good communication and relation between the different administrations.
- Creating a reference body for the Geopark to enable the active participation of the territory's inhabitants and channel, as far as possible, the citizens' initiatives in the promotion and conservation of the Geopark.
- Boosting the coordination of private and public sectors.

Work Group 2. Scientific Advisory Committee

It will be formed by a team of researchers connected to the Geopark's territory, mainly geologists. Most of this team was formed in 2004 at the meeting of experts' consultation in Revilla de Pomar. New researchers have been later incorporated. It is directed by the Scientific Coordinator, who will be the representative of this Committee at the Executive Board.

SCIENTIFIC ADVISORY COMMITTEE.		MEMBERS
Entity	Representative	Academic training specialization
University of Basque Country	Victoriano Pujalte	Professor of Geology
Department of Geology, University of Salamanca and Member of the Institute for Science and Technology Studies	M. Dolores Pereira	Petrology
Geodynamics Area, Depart. of Geology, University of Salamanca	Gabriel Gutierrez-Alonso	Structural Geology
Palaeontology Area University of León	Esperanza Fernández Martínez	Palaeontologist
University of León	José María Redondo Vega,	Geologist
Geography Department. University of Valladolid	Alipio García de Celis.	Geographer
University of Valladolid	Germán Delibes de Castro	Professor of Pre-History of the UVA
Faculty of Humanities and Communication, University of Burgos	Miguel Ángel Moreno Gallo	Lecturer in Audiovisual Communication
Geography Department. University of Burgos	Marta Martínez	Geographer
IGME Geological and Mining Institute of Spain	Luis Carcavilla Urqui	Geologist
SGE Geological Society of Spain	Marcos Aurell	Geologist
Coordinator of Geochronology Program. CENIEH National Research Center on Human Evolution	Josep M ^a Pares Casanova	Geologist- Geochronology
Head of Cristina Enea Fundazioa	JoseM Hernandez Gomez	Geologist
Spanish Association of Geologists and Geophysicists	Pedro Cámara Rupelo	Geology and Oil Industry
Geoscientific Association of Burgos	Julián Cuesta	Geologist
IMBEAC (Institute Monte Bernorio of Cantabrian Antiquity Studies)	Jesús F. Torres Martínez	Archaeologist
GEMPA	Laurentino García Cayón	Naturalist-Ornithologist
Santa María la Real Foundation	Jaime Nuño	Archaeologist-Historian
Managers of Protected Natural Areas	Carmen Allué y Pablo Zuazua	Forestry Engineers
General Directorate of Cultural Heritage	1 Representative	
Edelweiss Group, Spanish Association of Speleology and Science of Karst and CENIEH	Ana Isabel Ortega Martínez	Geoarchaeologist
Spanish Society of Paleontology	María José Comas Rengifo	Geologist
Consultant	Luis Ismael Ortega Ruiz	Geologist
Consultant	Nicolas Gallego Rojas	Geologist

FUNCTIONS OF THE SCIENTIFIC ADVISORY COMMITTEE

- Promoting scientific studies in the area.
- Advising scientifically the Executive Board.
- Arbitrating and advising about the decisions which affect the scientific content of the Geopark.

Work Group 3. Advisory Committee for Social-Economic Affairs

This committee has been created, among other things, to enable the citizens' participation in the Geopark's decision-making. It is formed by representatives of the local administrations, Local Development Groups, associations, foundations and private companies of the region. The Committee will be coordinated by the territory's GAL representatives that will represent it at the Executive Board.

SOCIAL-ECONOMIC COMMITTEE.		MEMBERS
Entity	Position	
16 city councils from the territory	Mayors	
Associations and Foundations:		
Tourism Network of the Palentine Mountains	President	
Association of Rural Tourism Burgos - TURALBUR	President	
Association of traders, hoteliers and professionals "Aguilar te envuelve"	President	
Association for the economic development of Aguilar de Campoo	President	
Association of Traders and Hoteliers of the Hoces del Alto Ebro & Rudron Natural Park	President	
Museo del Petróleo Foundation	President	
Amigos para la Conservación del Patrimonio de Aguilar	President	
Antifracking Citizen Platform Valle de Sedano	President	
Local Action Group-rural development ADECO Camino de Santiago	Manager: Ángel Manso	
Local Action Group-rural development ACD Montaña palentina	Manager: Manuel Merino	
Local Action Group-rural development Páramos y Valles	Manager: Arturo de las Heras	
Natural Heritage Foundation - Manager of Programs of the NHF	Jesús Ángel Díez Vázquez	
Natural Heritage Foundation - Technician of NHF Palencia	Victor González Báscones	

FUNCTIONS OF THE ADVISORY COMMITTEE FOR SOCIAL-ECONOMIC AFFAIRS

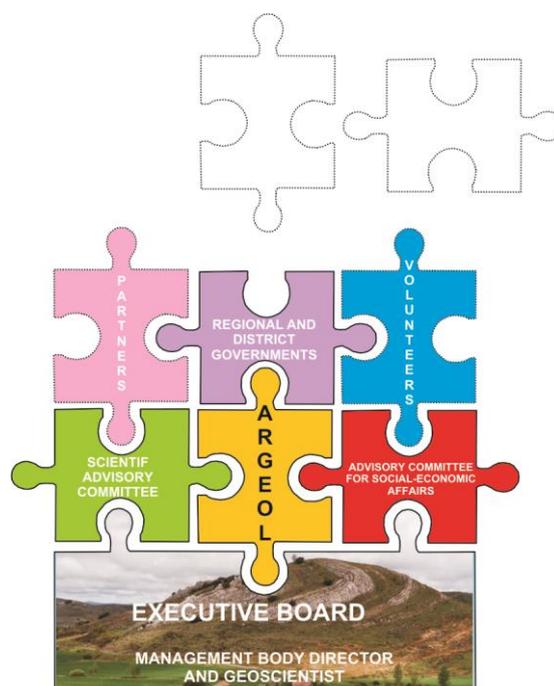
- Collecting all the improvement actions and the local population concerns about the Geopark in order to transfer them to the Executive Board so that they may be stated in the Geopark's Plan of Action.
- Representing the businesses of the region.
- Guiding about the distribution and priority of the actions.
- Collaborating in both the promotion of geo-tourism and of the Geopark's carried out actions.
- Promoting entrepreneurship education related to geo-tourism and geo-conservation.

Each of the groups will have two regular meetings per year. Extraordinary meetings to deal with specific issues may be called by the coordinator of each group.

Each committee will have an on-line platform to enable communication and participation.

There are also two essential elements in the management plan, which are: the sponsors-partners that collaborate economically in the development of specific activities and the group of Volunteers that participates and helps in them.

In view of the above, the management structure could be seen according to the following diagram:



HUMAN RESOURCES

ARGEOL:

- Management body director and Geoscientist (Geologists) in full-time
- 1 Tourism and rural development technician, 2 geologists and 2 biologists in part-time.

PROVINCIAL COUNCILS:

- 2 technicians who assign part of their time to the Project, taking part in the different committees but not exclusively.

REGIONAL GOVERNMENT OF CASTILLA Y LEÓN:

- 4 technicians who assign part of their time to the Project, taking part in the different committees but not exclusively.



Working with volunteers, routes, lectures and Geolodays

A.5. APPLICATION CONTACT PERSON

Karmah Salman Monte

Responsible of Las Loras Geopark Project
0034 659 046 747
karmah3@yahoo.com
geoloras@gmail.com

B – GEOLOGICAL HERITAGE

B.1. GENERAL GEOLOGICAL DESCRIPTION OF THE PROPOSED GEOPARK

B.1.1. Regional geological frame

The territory of Las Loras is located southeast Paleozoic Asturian Massif. Specifically it is the most southern sector of the Basque Cantabrian Basin. The materials appearing in the area are Mesozoic, except for the Quaternary deposits next to the rivers, and a small outcrop of Tertiary materials that are at the core of the Villaescusa de Ecla syncline. In Fig.3 the area's situation regarding regional geology is appreciated.

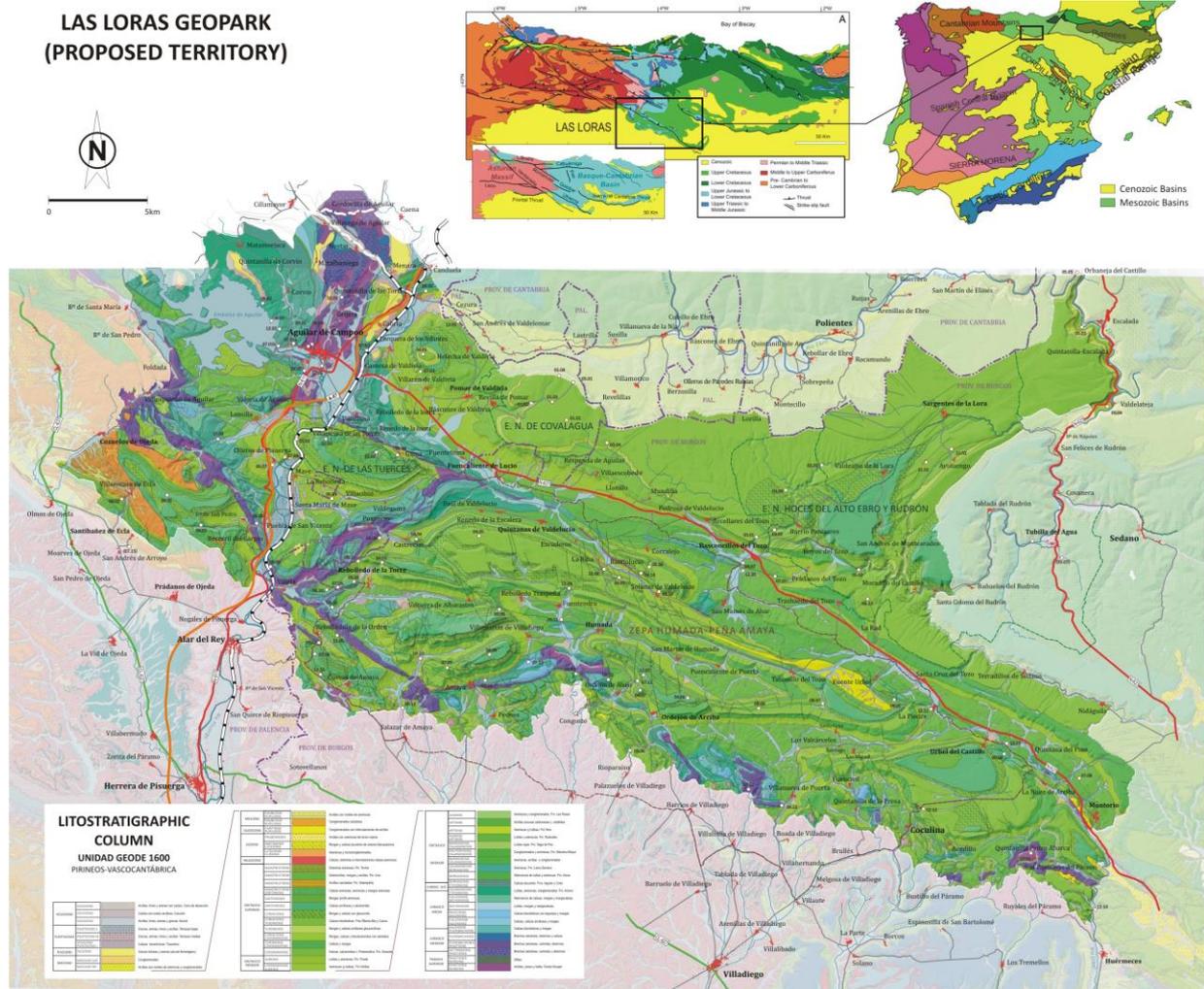


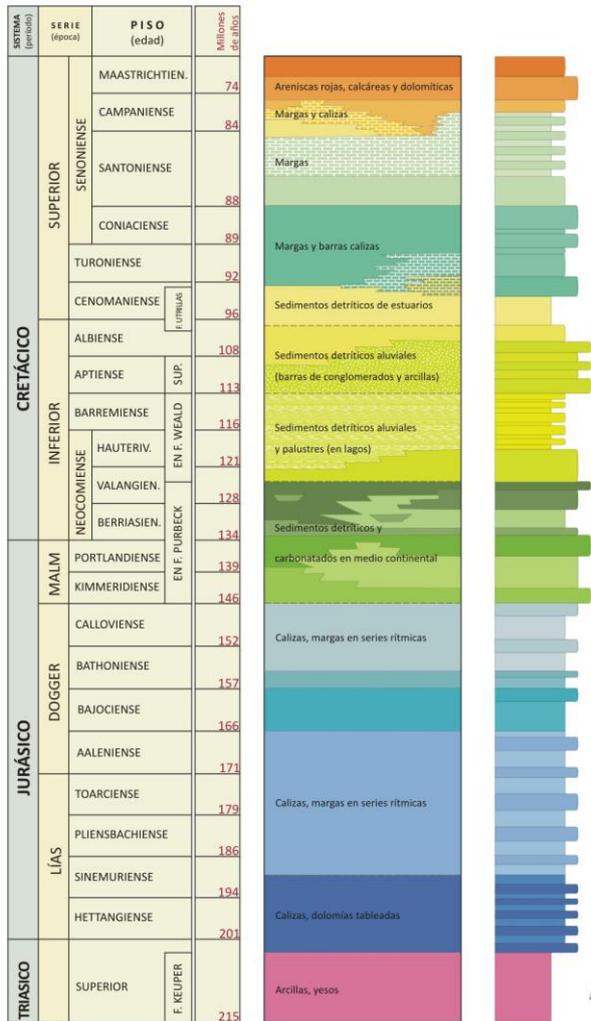
Fig.3. Geological Frame

B.1.2. Lithostratigraphy

The territory specified in the Geopark project is located in a prime position for acquaintance and understanding of the stratigraphy and sedimentary evolution of the Mesozoic deposits in this sector of the Basque-Cantabrian basin. There is an almost complete record from the Late Triassic to Paleogene with exceptional outcrop conditions. A brief summary of the lithostratigraphy of the territory is made below (more in Annexe 5, 6, 15 and 23, maps, listings and bibliography):

Triassic: The oldest materials appearing are represented by red clay and Keuper gypsum (Upper Triassic). These are usually associated with major faults and thrusts seen in the area (Vilella Fault, Ubierna .Fault...) because its plastic behaviour over a tectonic stress regime, acts as "horizons or flat off" of those thrusts.

LITOSTRATIGRAPHIC COLUMN
(Basque-Cantabrian Basin. Simplified)



Upper Triassic- marine Jurassic. Lias and Dogger: The Upper Triassic carbonate deposits - marine Jurassic (Lias-Dogger) - appear, in stratigraphic continuity on the Triassic materials. In general, sediments are formed in the context of marine carbonate platform. Broadly speaking these sediments may be divided into two. First the lower assembly characterized by terms calc-dolomite with a particular tablet appearance which are deposited between the Upper Triassic and Lower Lias (Sinemurian) whose interruption is observed in the sedimentation. The second block corresponds to the rest of the Lias and Dogger. They are characterized by rhythmic facies of marine deposits of alternating limestone and marl.

Upper Jurassic (Malm) - Lower Cretaceous (Neocomian: Berriasian-Valanginian-Hauterivian): On top of these last Jurassic units, with marine character, detrital and carbonate units are deposited in marked unconformity, under continental conditions, with occasional marine connection. Within these materials is the "Aguilar Limestone- Calizas de Aguilar", with a great interest for its powerful thickness. The sedimentary context of this Formation is a lake basin influenced by alluvial systems at its limit. To the hanging wall of this formation, units are deposited in fluvial-lacustrine and fluvial-tidal environments, these latter ones of Lower Valanginian age (Lower Cretaceous). These materials testify the last marine episode affecting the area to the Cenomanian (Upper Cretaceous) transgression.

Lower Cretaceous. Weald facies: Detrital terms (which may be likened to the Weald facies) are located unconformably on top of these Lower Cretaceous units. Their age is between the Lower-middle Valanginian and Barremian, and in some point to Lower Aptian. The sedimentary environment in which these materials are

deposited is part of an alluvial and palustric-marsh context.

Lower Cretaceous. Aptian-Albian: After the Weald facies detrital sedimentation, the region is affected by the detrital episodes and marine invasion of the base of the Aptian. In this area the most representative materials are clearly of continental origin (alluvial and fluvial systems "braided" or anastomosing, with marsh and lake episodes) being the carbonated terms (marine sedimentation) further north. The reddish-brown sandstone and conglomerate deposits are typical of this area.

Upper Cretaceous. Albian: From this moment begins a major transgressive cycle, in which the carbonate sedimentation is taking importance just to the last sediments deposited in the Maastrichtian. This unit begins its deposit above other major unconformity and does so with characteristic detrital Facies Utrillas, Albian-Cenomanian age. These have been deposited by fluvial systems, from the vertical to transitional facies associated with an estuary complex of Cenomanian age. On top of this transition all other Upper Cretaceous materials are deposited. They are characteristic of shallow shelf sediments with carbonated bars development. These levels are associated with carbonate loamy material interspersed at different heights in the stratigraphic column, noteworthy an important loamy set of Santonian age, which represents the maximum Upper Cretaceous transgressive moment. Red and green clay materials (continental affinity) with characteristics of Garum Facies and probable Maatrichtiense age are placed on top of these levels.

Paleogene: On top of Upper Cretaceous materials appear sediments with eminently continental origin formed by conglomerates and quartzite sandstone and red shale. This fluvial cycle represents the transition to Tertiary by the very late Cretaceous deposits.

Quaternary deposits are the latest result of fluvial drag, the evolution of slope materials, clogging of potholes and sinkholes.

B.1.3. Paleontology

Several scientific papers attest to the importance of the paleontological heritage of the area for the interpretation of the geological history of not only this part of the Basque Cantabrian area but also of southwestern Europe. So Dieguez *et al.* (2009) found Upper Jurassic macrofloral fossil. Therefore, "Late Jurassic macrofloras are globally scarce and have not previously been reported in Spain. Hence, the Aguilar Formation macroflora provides valuable information on the coeval phytogeography and palaeoclimate of southwestern Europe. Furthermore, the lack of floras observed so far in palaeotravertine deposits older than Pliocene in age makes this macroflora exceptional".

Pereda Suberbiola *et al.* (2006) describe the skeletal remains of an ornithomimid dinosaur found in Arcera Formation (Cabuérniga group). These remains support the presence of *Camptosaurus* in the basal Cretaceous of the Iberian Peninsula and represent one of the few citations from this ornithomimid group in European formations of this age.

There are other important places of paleontological interest in Las Loras. Very notable the Bajocian sponge reefs, the Jurassic fossil site in Rebolledo de la Torre and Camesa station of Aguilar de Campo, the fossil site at basic operation of lignite (Cenomanian) in Rebolledo de la Torre and all spectacular reef limestones of the Upper Cretaceous, where you can observe clearly large rudist and corals colonies.

B.1.4. Structural Geology

Pujalte Navarro, V. (2001) emphasizes the high structural attractiveness of the territory as it is possible to reconstruct in detail the fracturing ("rift") processes occurred during the Lower Cretaceous and also the inversion of the structures during the Alpine orogeny.

The area is affected and characterized by geodynamic events of the Alpine cycle. However during extensional synsedimentary stage it is affected by other deformation phases. The most important are the Kimmeric and Neokimmeric phases during the Upper Jurassic and the Austriac one that developed in the end of Albian.

These rocks have suffered, during the Pyrenean compression stages, a tangential tectonic enhanced by the existence of a significant detachment level, favoured by the plastic materials of the Upper Triassic.

Strike-Slip phenomena have been very important in both extensional stages and orogenic activity. Also an important tectonic inversion that affects, during the Alpine evolution, both accidents: strike slip systems and sub-vertical faults.

Within the proposed area they are part of two different units established for Mesozoic materials in Basque-Cantabrian Region (Feuille and Rat, 1971). The Burgalesa Platform (Cantabro-Navarro Domain) that occupies the northern part, and The Folded Band (Peri-Asturian Domain) to the south. Both are separated by a major geological fracture system, called the Ubierna accident.

Burgalesa platform

This Cantabro-Navarro Domain unit is structured as a broad syncline, almost subhorizontal, and at surface is mainly made up of Upper Cretaceous carbonate materials. It spans an area about 50 km long and 25 km wide. It is located on the border of the provinces of Burgos and Santander and has a WNW-ESE orientation. NE limited to the folded unit of Montes Obarenes and S, SO and O with The Folded band. This unit is also known as The Structural Platform of the "Páramos (Mesozoic) de la Lora".

As already mentioned, the northern part of the Project territory is within this structural unit, ie from the border N, NE (Valderredible Valley) to the Ubierna fault.

Ubierna accident or Ubierna Fault System

It is a major fracturing system with WNW-ESE and NW-SE. It has a length of over 80 km. And it is the boundary between the Burgalesa Platform and the Folded Band.

The surface trace of this fracture zone is the result of the brittle deformation induced by the Late -Hercynian accident of the basement. The movements of this area begin during the Alpine extensional stage, with movements in the vertical direction and with a sinistral character.

During most of the Alpine compression stages, this incident reflects the efforts of Pyrenean origin NS and NW-SE in the form of thrusts and reverse faults with S and SO vergences. The last stages of Alpine

deformation manifest efforts with NW-SE components. This causes the tectonic inversion, with dextral direction movements and kilometric displacement.

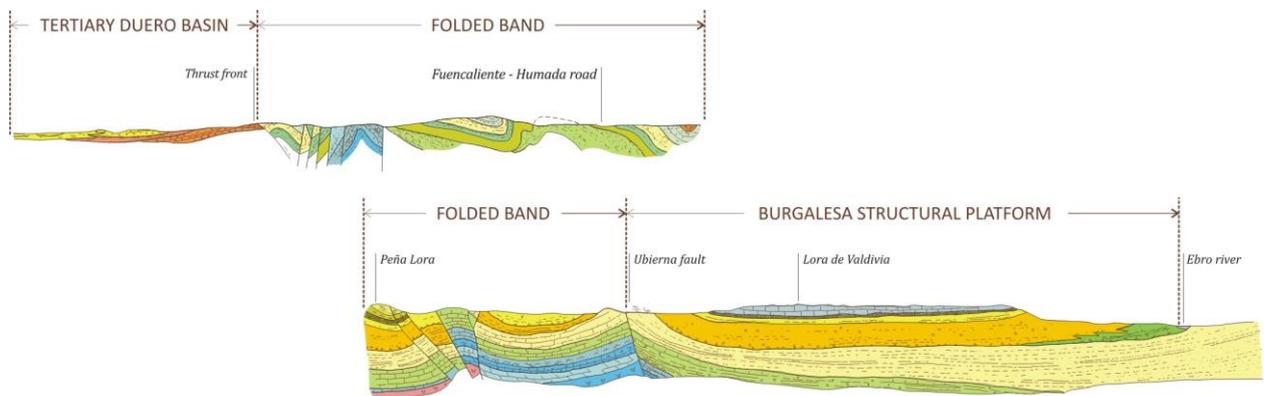
This Ubierna Fault system occurs south of the river Lucio with a complex thrust of S to SSO convergence on the large syncline of La Mesa de la Tuerces.

Folded Band

Within this structural unit two distinct structural zones can be distinguish: the Ojeda and Pisuerga Zone, divided by a major geological feature (Becerril del Carpio fault system). However, within the territory of Las Loras Geopark Project only Pisuerga Zone is represented. This limits the northeast with the Burgalesa Platform and west by the Becerril del Carpio accident, that makes Pisuerga Zone thrust on the Ojeda Zone.

The main structures in this area are folds with kilometric dimensions with two very different directions in their axial traces: NE-SW and WNW-ESE.

NE-SW Structures as the Aguilar anticline, the Villela syncline, the Pozancos anticline, etc. were formed during the Austric phase, before the deposit of the Facies Utrillas. The WNW-ESE axial traces orientation is due to the Alpine stages that are responsible for the final structuring of the Upper Cretaceous in the Burgalesa Platform and the Folded Band. This is the reason why sometimes we can see folds interference producing complicated cartographic figures (see Tavani *et al.*, 2011).



B.1.5. Geomorphology

Geomorphology is one of the most important aspects of the Geological Heritage in Las Loras Geopark Project. There are many important examples of morphogenetic systems scattered throughout the territory. One of the most spectacular is the Karst landscape. Martin Duque *et al.* (2010) emphasize the importance and uniqueness, of national significance, of the Street Karst (Ruiform Karst) of Las Tuerces and the aligned doline field of Lora de Valdivia.

In general, one can say that all this territory has a morphology controlled by the different hardness from the Mesozoic substrate materials, as well as by the geological structures of sedimentary rocks layers. In this sense, the limestones and dolomites are the competent materials compared to loams and sands, which are more easily eroded.

The resulting relief is manifested as inverted reliefs (Monte Bernorio, Las Tuerces, Mesa Peña, Peña Amaya, etc. "hanging synclines" or synclinal uplands), crests (in moorland edges and cornices formed by the competent materials on the thrust fronts) and structural planes (in all Burgalesa Platform).

Briefly, the different morphologies resulting from the action of external agents that can be found are:

- **River-Fluvial Forms.** The most significant are the fluvial terraces (especially the Pisuerga River, near Aguilar de Campoo) and gullies and ravines, like those found north of Basconcillos the Tozo.
- **Hillslope Forms.** Coluvial deposits, caused by the action of gravity and the flow of water on the slopes. The region has numerous screes at the bottom of the Mesozoic reliefs.

- **Lacustrine Forms** are observed as small ponds, related, in most cases, with the presence of impermeable materials, such as clays.
- **Karstic Forms.** Its dimensions and geometry are determined by the thickness of carbonate sediments, the lithological composition and the structural arrangement of the layers and mainly by fracturing and jointing affecting these layers. You can recognize a variety of karst forms, the most notable: sinkholes, uvala, carbonated pavement, karst valleys, travertine and tufa buildings, springs, sinkholes, potholes, caves and galleries with all their endokarstic geomorphology.
- **Structural Forms.** Forms due to different hardness of these materials and the structures that affect them: inverted relief, crest and structural planes.

B.1.6. Geological history

The portion of history that the rocks of Las Loras Geopark Project tell us begins 215 My ago, during the Upper Triassic. This is the age of the oldest sediments appearing in the area. They are predominantly shaly-clay materials with gypsum levels, comparable to the Keuper facies. They were formed in supratidal environments in arid coastlines- sabkhas, under arid climate conditions.

On top of the Keuper facies, predominantly carbonate sediments, that are associated with an offshore platform sedimentation, are deposited. This sedimentation extends to the Upper Jurassic (Upper Malm). However during this period of time (215 to 150 My), the conditions of sedimentation on that platform were changing. For example marl-limestone rhythmic Lias-Dogger sediments were deposited in an open platform with low energy, without influence of currents or waves (presence of dark materials such as black shales and marls rich in bitumen, typical environments with no oxygen), unlike the bioclastic limestone appearing immediately above, which were deposited in a medium with high energy, with significant episodes of colonization of sponges that with other organic remains are fundamentally reworked by storm influence currents. The age of this unit is within the Bajocian.

From the Dogger-Malm limit and especially at the beginning of this last period, it begins to take shape, northwest of the Iberian Plate, the episode of the Bay of Biscay opening, from a triple junction with the Atlantic Ridge. The impact of this event were manifested progressively eastward (Kimmeric and Neo-kimmeric deformations and sedimentary cycles).

Because these processes of deformation, caused by the opening of the Bay of Biscay, are created in what until then had been an offshore platform, a series of inland lakes where lacustrine carbonate sedimentation occurs (Aguilar Formation limestones). These lacustrine carbonates are of great importance for the Project because they probably constitute the thicker accumulation of fossil lacustrine carbonate deposits worldwide.

From then until early Upper Cretaceous (Cenomanian-Turonian) a regime of continental sedimentation in alternating fluvial and lacustrine environments it is established in the region.

During the interval of the Upper Cretaceous, between the Cenomanian and the Campanian, the Project area is affected by new episodes of marine sedimentation. That is, the sea invades the territory in which they had placed all river and lake sediments. This new sedimentary megacycle is related to the moments of maximum expansion of the marine environment of the Bay of Biscay. Thus, on top of the Cenomanian fluvial sediment we found typical estuary deposits, with intertidal-subtidal characteristics, sometimes interspersed carbon levels.

This is the first evidence of the sea invasion process onto emerged land. The marine transgression continues and becomes more evident with the presence of a predominantly carbonated episode, consisting of complex high-energy bar, sometimes with rudist buildings.

During Santonian the peak of marine influence occurs throughout the area. From that moment begins the gradual retreat of the sea and on materials of Santonian, the Upper Cretaceous bar complex is deposited. It is more dolomitic than the lower and less rich in fauna. The context of their formation is a rough average energy platform. The age falls within the Campanian. On top of these material, the Cretaceous terminal units are deposited, which could be placed unconformably on this late Mesozoic marine sedimentation.

In the late Cretaceous, during the Campanian and especially during the Maastrichtian begins in the region a different regime, respect this marine one, which characterized the late Upper Cretaceous. In the whole Project territory it seems that there was no sedimentation during the Tertiary. Most modern sediments that appear are the terraces of Pleistocene and Holocene alluvial sediments. However, through the study of

materials of Villaescusa de Ecla Syncline it has been established that in the early Paleogene a continental environment is definitely installed in the region and this will be the general trend that characterize the whole area along Tertiary. During these early Tertiary periods, the Cantabrian region is affected by the partial closure of the Bay of Biscay, and the result is an asymmetric behavior of margins.

The relative motion between the African plate and the Eurasian changes and begins a convergence between these two plates. This episode ends with the onset of continental collisions.

There is then a compression regime that causes deformation on a large scale. Possibly at the beginning of Lower Miocene the most important phases of this deformation occur. This causes converging folds and thrusts to the South and Southwest, in the materials deposited during the Mesozoic. During the Pleistocene and the Quaternary, the formation of the current fluvial system begins.

B.1.7. Ayoluengo oil field

We make special mention of the oil Ayoluengo field because within the territory of the Las Loras Geopark Project, it is the only oil onshore field of the Iberian Peninsula.

The investigation of hydrocarbons in all this area has been very important. Since the late nineteenth century northern Burgos was known for signs of oil and asphalt impregnated sands (Huidobro). In the 1920s, the first drillings took place in the province (county of Treviño), Cubillo del Rojo, Basconillos delf Tozo and Robredo-Ahedo, but it was not until 1964 June 6, when the well Ayoluengo-1 produced oil at about 1.350m deep. It was the 149 drill all made so far.



Currently, only 11-14 wells are working and the daily output is around 80 barrels.

The characteristics of the reservoir and the high quality of the outcrops make this area a great field school in this discipline. Proof of this are the numerous visits, practices and labour camps that different entities held annually, in which geologists from around the world come to know about this territory.

B.2. LISTING AND DESCRIPTION OF GEOLOGICAL SITES WITHIN THE PROPOSED GEOPARK

VC001 - La Lora de Valdivia karst

VC001.01	Las Hoyas de la Lora de Valdivia (Aligned doline field)	Revilla de Pomar	Sinkholes field aligned along the main directions of jointing of Coniaciense limestone. Lapiaces, torcas y uvalas (Rinnenkarren, sinkholes and uvalas)
VC001.02	Covalagua Spring and travertine systems	Revilla de Pomar	Travertine building in the Ivia river spring, with waterfalls and terraced tuff formations.
VC001.03	Los Franceses Cave	Revilla de Pomar	Cave with speleothems variety (Natural Monument) Sightseeing to the cave and interpretation center. The part of infiltrated water flows through a Upper Cretaceous sandy limestones, oolitic and rudiste.
VC001.04	El Toro cave	Revilla de Pomar	Large cavity in the upper levels of karst, archaeological sites and biospeleologic.

VC002 - Las Tuerces karst

VC002.01	Las Tuerces ruiniform landscape	Villaescusa de las Torres	Ruiniform and street karst. Erosive resulting from the Santonian karst limestone.
VC002.02	Recuevas Valley Poldjé	Gama	Karst Plateau for emptying the anticlinal core limestones and dolomites of the Campanian
VC002.03	Horadada Canyon	Mave	6.5 km canyon, carved by the river Pisuegra-Turonian-Coniacian marl and limestone (stratigraphic sequence). Caves of archaeological interest.

VC003 - La Lora de Pata del Cid karst

VC003.01	Cueva del Agua sinkhole	Basconillos del Tozo	Valle and the sink of Huron and Mundilla streams. Water Cave: 3.3 Km partially flooded galleries.
VC003.02	Puente del Diablo –Cueva del Moro spring	Barrio-Panizares	Natural bridge. Rocky pavement with geometric pattern by jointing on the great sinkhole.
VC003.03	Pozo La Torca spring	Barrio-Panizares	Huron River karst spring Torcas aligned along the Ayoluengo fault system.
VC003.04	Fuente de La Cueva tufa limestone	Villaescobedo	Temporary active spring karst in times of heavy rainfall or snowmelt, with formation of travertine deposits in the vicinity.
VC003.05	Pozo Corvera spring	Valdeajos	Dolina permanently flooded overflowing in times of heavy rainfall. Set deep cracks and cavities aligned along the Ayoluengo fault system.

VC004 - Las Loras structural reliefs

VC004.01	Monte Bemorio synclinal upland “ <i>hanging syncline</i> ”	Villarán de Valdivia	Cretaceous syncline upland in which one can recognize the Upper Cretaceous stratigraphic units, regardless of interesting modeling of these materials.
VC004.02	Peña Los Campos Cluse	Becerril del Carpio	Spectacular waterfall on a limestone of the Upper Cretaceous
VC004.03	Structural plane, sinclinal upland and Peña Mesa ‘cluse’	Rebolledo de la Torre	Cluse in materials of the southern flank of the syncline of Peña Mesa. Differential erosion of the strata of Turonian limestones form spectacular steep steps.
VC004.04	Castillo del Moro synclinal upland	Castrecias	Anticlinal depression and synclinal upland (inverted relief) in Castrecias
VC004.05	Peña Lora synclinal upland	Quintanas de Valdelucio	Syncline upland affected at the top by an erosional surface.
VC004.06	Peña Ulaña synclinal upland and cluse	San Martín de Humada	Syncline with a broad erosional surface at the top, occupied by an extensive Iron Age settlement of the Iron Age.
VC004.07	Peña Castillo synclinal upland	Ordejón de Abajo	Small suncline upland forming a “muela”
VC004.08	Peña Amaya structural plane and synclinal upland	Amaya	Syncline upland, affected by an erosional surface at the top, and with a structural surface in the middle, inhabited by different peoples throughout the ages

VC005 - Rudrón and Hight Ebro canyons

VC005.01	Valcabado view point	Revilla de Pomar	Lookout over the valley of Valderredible where monoclinical relief on the sandstones and clays of the Aptian-Albian is observed.
VC005.02	Rudrón canyons	Hoyos del Tozo	River canyon originated by the Rudrón river passing through the Mesozoic carbonate sediments (Coniacian-Santonian-Campanian) of la Lora structural platform
VC005.03	Ebro canyons	Escalada	Canyon excavated by the Ebro river in Cretaceous limestone and marl, with a depth of about 200 m. and a width of 200-500 m. where numerous karst phenomena (natural bridge, caves, shelters, terraces of tufa, etc.) are observed
VC005.04	Oxbow	Valdelateja	Meander embedded and abandoned of Rudrón river.
VC005.05	Orbaneja waterfall and tufa limestone building	Orbaneja del Castillo	Travertínico building and spring and development of tuff terraced.

VC006 - Mesozoic sedimentary paleoenvironment

VC006.01	Quintanilla de las Torres Lower Cretaceous section	Quintanilla de las Torres	Recognition and observation of the Lower Cretaceous clastic facies in this area of the Cantabrian Mountains.
VC006.02	Ornithópod fossil	Aguilar de Campoo	Ornithopod vertebral remains of Lower Cretaceous (Berriasian) in the red sandstones of fluvial origin of Fm Arcera (Cabuérniga Group).
VC006.03	Fossil trees Aguilar swamp	Aguilar de Campoo	Cycadal tree fossil trunks in Lower Cretaceous materials
VC006.04	Mártires de Aguilar Triassic section-Jurassic. Aguilar de Campoo	Aguilar de Campoo	Stratigraphic section where you can see the lithological and sedimentological characteristics of the higher terms of the Triassic (f. Keuper) and Lower Jurassic (Lias).
VC006.05	Peña La Parte	Aguilar de Campoo	Enclave of Jurassic limestones in the Triassic red clays in the Aguilar de Campo diapiric anticline
VC006.06	A fern-bennettitalean floral assemblage in Tithonian-Berriasian travertine deposits	Villela	Macrofloral fossil assemblage discovered in travertine deposits of the Tithonian-Berriasian Aguilar Formation. The assemblage includes megaremaines of a single species of Filicales and of eleven taxa identified as Bennettitales

VC006.07	Utrillas Formation in the road slope	Olleros de Pisuerga	Clastic sequences outcrop Aptian - Albian and Albian - Cenomanian Utrillas facies where conglomerates, sandstones and shales deposited versicolor average rate on a fluvial braided evolving transition to a medium associated with a complex estuary are observed.
VC006.08	Jurassic section- Facies "Purbeck"	Becerril del Carpio	Jurassic full cross section in which both the carbonate facies known Lias - Dogger and the Purbeck facies.
VC006.09	Utrillas Formation in San Pelayo hermitage	Villacibio	Partially cemented sandstones with cross rolling logs and debris liminotic tree trunks deposited in continental during middle Albian-Cenomanian
VC006.10	Fossil area in Rebolledo de la Torre	Rebolledo de la Torre	Gray bioclastic limestone and marl of Bajocian sponges in life position, with cephalopods, echinoderms, bivalves, gastropods, and corals.
VC006.11	Basic operation of lignite	Rebolledo de la Torre	Old mine workings for the exploitation of lignite in the Lower Cretaceous detrital levels.
VC006.12	Jurassic section- Facies "Purbeck"	Ordejón de Abajo	Purbeck basal conglomerates, with boulders of flushing limestone. Lacustrine limestones and calcareous oncolytic and swamp facies.
VC006.13	Tozo Fossil area (Upper Cretaceous)	La Rad – Hoyos del Tozo	Area with abundant marine fossils from the Upper Cretaceous.
VC006.14	Santonian Rudistas	Solanas de Valdelucio	Bioconstruction limestone with rudists in life position of the upper Cretaceous.

VC007 - Stratigraphic sequences from the occidental margin of the Basque-Cantabrian Basin

VC007.01	Aguilar limestone Formation (a) and Corvio Member (b)	Aguilar de Campoo	The Campoo Group is the oldest of several tectonosatigraphic units that made up the Upper Jurassic-Lower Cretaceous syn-rift succession. They are lacustrine sediments that constitute the infilling of an asymmetric and complex semigraben.
VC007.02	Middle-Upper Jurassic section	Camesa de Valdivia	Stratigraphic cross section ranging from the rithmite of Lias - Dogger at the top to the hanging wall Purbeck facies.
VC007.03	Monte Bemorio Upper Cretaceous section	Villarén de Valdivia	Upper Cretaceous stratigraphic sequence.
VC007.04	Transgressive-regressive parasequences	Olleros de Pisuerga	Parasequences indicative of smaller scale transgressive-regressive episodes superimposed on the overall transgressive trend.
VC007.05	Jurassic section (Toarcian-Malm)	Rebolledo de la Torre	Stratigraphic cross section - sedimentological Jurassic (Toarcian - Malm) of reduced thickness.
VC007.06	Rebolledillo Upper Cretaceous section	Rebolledillo de la Orden	Stratigraphic sequence of the upper Cretaceous marginal, with significant sedimentary hiatuses
VC007.07	Utrillas Formation in quarry	Basconillos del Tozo	Stratigraphic cross section of Utrillas facies with layers of tar sands and kaolin sands.
VC007.08	Utrillas Formation in quarry	Montorio	Utrillas facies stratigraphic cross section with sand and sedimentary conglomerates that show microstructures
VC007.09	Peña Amaya Cretaceous section	Amaya	Full sequence from Utrillas facies of the Upper Cretaceous limestones. Estuarine fluvial facies, coal and limestone shallow shelf bars.
VC007.10	Mesa de Albacastro & Salazar de Amaya Valley	Salazar de Amaya	Recognition of the upper and lower Cretaceous in this area as well as detrital material Neogene the northern edge of the Duero river.
VC007.11	Molino de Bernabé Cretaceous section	Ordejón de Abajo	Syncline in the Cenomanian limestones. Shallowing cycles. Neritic abundant fauna. Source.
VC007.12	Hornicedo Marine Jurassic section	Villalbilla de Villadiego	Complete Series marine Jurassic, with abundant fauna. Dolomitic lower Lias, rhythmic series marl-calcareous Upper Lias and Dogger with abundant macrofauna
VC007.13	Lias & Dogger rhythmic series in Fuentesnaldo Stream	Villamartin de Villadiego	Rhythmic series of Lias and Dogger with abundant fauna
VC007.14	Amaya Lower Cretaceous series	Amaya	Detrital series, Weald and Utrillas facies

VC008 - Alpine structures from the Basque-Cantabrian Belt

VC008.01	Villaescusa de Ecla Anticline	Villaescusa de Ecla	Anticlinal structure which can follow the contour of the fold due to the inversion of the relief. Loamy in its core and a carbonated flanks, with a good part of the Upper Cretaceous series.
VC008.02	Cretaceous-Tertiary Contact	Villaescusa de Ecla	Contact between materials of the Upper Cretaceous and Tertiary in the core of the syncline Villaescusa de Ecla
VC008.03	Knee fold	Rebolledo de la Torre	Picturesque natural selection of a knee fold
VC008.04	Subvertical layers and thrust fold	Gama	Steep ridges and reliefs subvertical layers N flank of the syncline of Las Tuerces

VC008.05	Fold in Jurassic materials	Villela-Castrecías	Alpine folding pattern in the Jurassic materials 'Folded Band'
VC008.06	Corralejo syncline	Corralejo de Valdelucio	Synclinal fold, with the southern flank beveled by the of Ubierna Fault
VC008.07	Fold enclosure in Humada anticline	Talamillo del Tozo	Fold enclosure of Humada anticline
VC008.08	Syncline excavated in Valderrique	Villanueva de Puerta	Synclinal fold excavated to the Coniacian carbonate levels forming a "val".

VC009 - Ubierna Fault and associated structures

VC009.01	Aguilar Fault in Los Mártires de Aguilar quarry	Aguilar de Campoo	Fault scarp in Jurassic limestones, where the gap fault, mirror, stretch marks, steps and iron oxides failure is observed.
VC009.02	Villela Fault	Rebolledillo de la Orden	The Villela Fault System is located between the Ubierna and Ventaniella Faults and represents an intriguing structure that is divided in different segments. Those oriented WNW-ESE strike parallel to the Ubierna Fault and represent right-lateral faults with a reverse component. The WSW-ENE striking segment represents the contractional horsetail termination of the fault.
VC009.03	Solanas de Valdelucio extensional duplex	Solanas de Valdelucio	R1 echelon faults associated with shearing movements of Ubierna fault
VC009.04	Ubierna Fault in Úrbel	Úrbel del Castillo	The Ubierna Fault System is an WNW-ESE elongated highly deformed overstep area between the Ubierna and the Ventaniella faults. It divides the Upper Jurassic to Lower Cretaceous Basque-Cantabrian Basin to the north, and the Cenozoic Duero Basin to the south
VC009.05	Ubierna Fault in Valdehayas	La Piedra – Fuente Úrbel	Transect fracturing system that forms the boundary between the morfostructural units 'Burgalesa Platform' and 'folded Band' is shown.
VC009.06	Thrust front and gorge of Paraíso river	Rioparaíso	Paraíso river course wedged in Mesozoic and Tertiary limestone conglomerates that over-ride .
VC009.07	Basconcillos Fault	Basconcillos del Tozo	Structure associated with Ubierna-Humada-Villela system faults
VC009.08	Thrust front in Peña Mesa	Castrecías	Front thrust outcrop of Triassic materials
VC009.09	Strike slip faults in Villamartín	Villamartín de Villadiego	Falla "strike slip" dextral, which moves the syncline Peña Castro
VC009.10	Ubierna Fault in Solanas	Solanas de Valdelucio	Transect where is observed Ubierna Fault cutting structures of 'Folded Band'.
VC009.11	Humada Fault	Humada	Fractur area associated to the Ubierna system
VC009.12	Thrust front in Salazar de Amaya	Salazar de Amaya	Front thrust of Cretaceous materials over Tertiary conglomerates.
VC009.13	Thrust front in Villanueva de Puerta	Villanueva de Puerta	Thrust of Jurassic deposits on Cretaceous

VC010 - Diapiric structures

VC10.01	Diapiric outcrop- ophites	Quintanilla Pedro Abarca	Diapiric structure with very weathered outcrop ophites.
VC10.02	Diapiric structure in Aguilar	Grijera	Diapiric Triassic outcrops in the valley of Aguilar de Campo.

VC011 - Ayoluengo Oil Field

VC11.01	Ayoluengo oil field	Ayoluengo	The Ayoluengo acreage, located in the La Lora concession area, has a long history of oil production, going back to the 1960s. A total of 54 wells were drilled within the field boundary north of Burgos, targeting reserves in Purbeck aged sandstone formations at between 900 and 1400 metres below surface.
VC11.02	Ayoluengo Fault and associated structures	Ayoluengo	NNE - SSW striking left-lateral Ayoluengo Fault System

VC012 - Active geological processes

VC12.01	Headward erosion-river capture- Pisuerga river	Aguilar de Campoo	Catch a river retrogressive erosion.
VC12.02	Quarry millstones	Aguilar de Campoo	Old quarry on sandstones and conglomerates of Cretaceous where rocks were extracted to manufacture millstones
VC12.03	El Cuevátón hermitage	Cezura	Rock hermitage dug in Cretaceous sandstones- Utrillas facies

VC12.04	Vegetable macro-remains of Holocene	Lomilla	Site with abundant fossil plant material (wood, bark, fruits of the genus Pinus) Holocene
VC12.05	Arroyo Pastruela waterfall	Rebolledillo de la Orden	Waterfalls temporary active at times of heavy rainfall or snowmelt.
VC12.06	Source of the Odra river (Yeguamea warterfall)	Fuenteodra	Waterfalls and seasonal spring in the south of Peña Lora where the Odra River rises slope.
VC12.07	Cueva del Gato spring	Ordejón de Abajo	Spring temporary source of the river The Ordejones.
VC12.08	Travertine and waterfalls of Molino del diablo	Barriolucio	Travertine waterfalls near the source of the river Lucio, Peña Lora North Slope.
VC12.09	Peat explotation	Basconillos del Tozo	Background bog valley of the Lower Cretaceous detrital levels. Flora Microreserve.
VC12.10	Peatbog	Úrbel del Castillo	Background bog valley on Lower Cretaceous detrital levels.
VC12.11	Peatbog	La Piedra	Background bog valley on Lower Cretaceous detrital levels.
VC12.12	Cuesta de la Nava Structural plane	Coculina	Lower than correlated with structural surface on the moor Turonian limestone.
VC12.13	Los Piscárdanos	Congosto	Odra River Canyon embedded in Mesozoic limestone formations over thrusting tertiary conglomerates
VC12.14	Úrbel river canyon and Valdegoba Cave	Huérmece	Urbel river canyon encased in Cretaceous carbonate with significant levels karst processes. Valdegoba cave fossils of Neanderthals.
VC12.15	Iron mining	Rebolledillo de la Orden	Supergene iron, associated with a fracture zone in Jurassic limestone
VC12.16	Brullés river capture by Hormazueta one	Hormazueta	Hormazueta river capture by the retrogressive erosion of the river Brulles



Geologic landscapes of Las Loras (left to right): sink of Huron and Mundilla streams; Orbaneja del Castillo tufa limestones, Lora de Valdivia, Puente del Diablo natural bridge.

LAS LORAS GEOPARK
(ELEMENT OF GEOLOGICAL INTEREST)

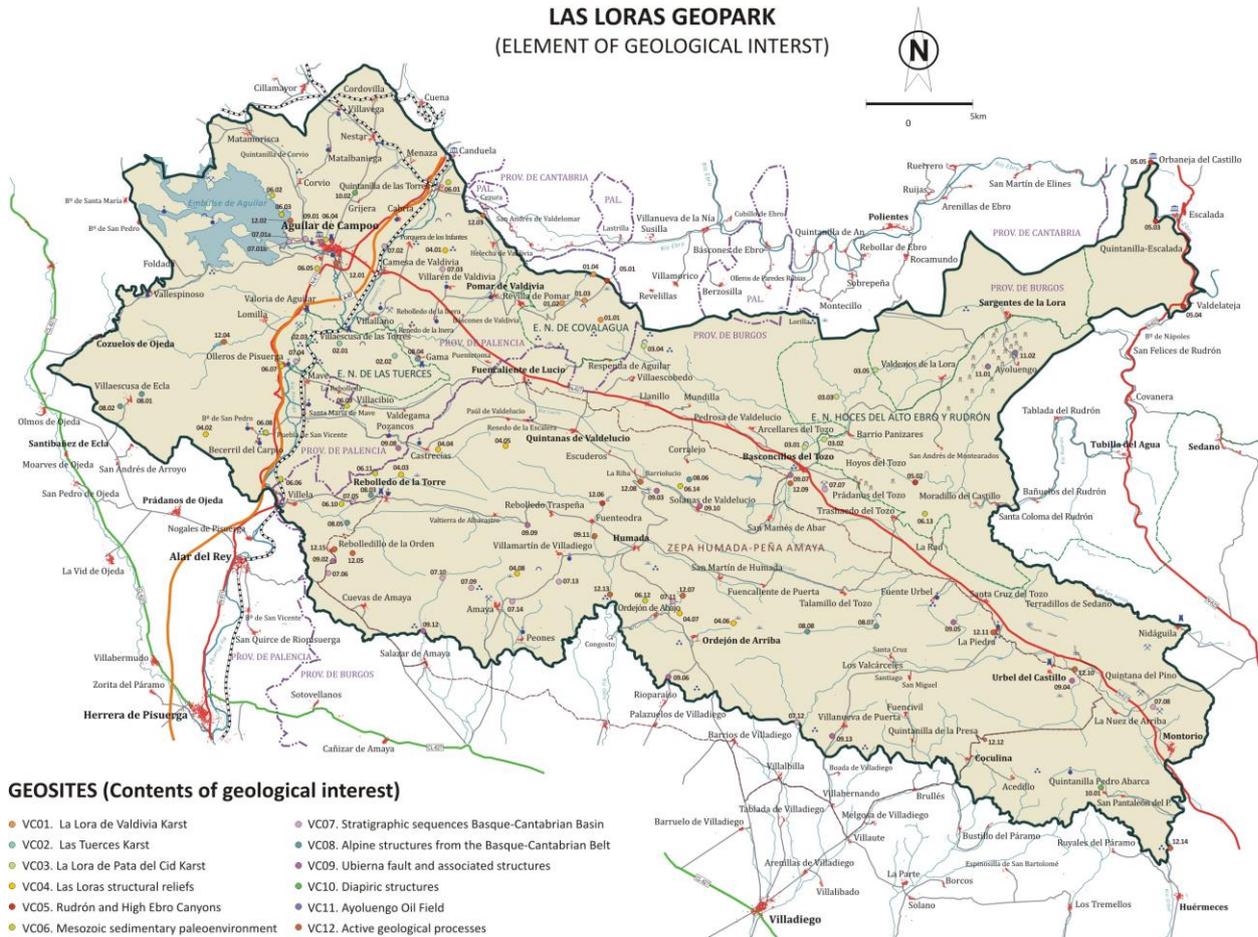


Fig. 4. Elements of geological interest

B.3. DETAILS ON THE INTEREST IN TERMS OF THEIR INTERNATIONAL, NATIONAL, REGIONAL OR LOCAL VALUE

INTEREST: (Str) Stratigraphy, (Sed) sedimentology, (Gm) Geomorphology, (Pal) Paleontological, (Tec) Tectonic, (Pet) Petrologic-geochemical, (Min) Minero-metallogenic, (Cri) Mineralogic-chrystallographic, (Hyd) Hydrogeology, (Ed) Edaphologic, (Ar) Archeology

MAIN USE: (C) Scientific, (D) Didactic/educational, (E) Environmental, (H) Historic-artistic, (L) Landscape, (S) Sport, (G) Geoturistic.

VALUE: (1) International, (2) National, (3) Regional, (4) Local

PROTECTION: Degree of protection. (RN2000) Nature Network, (NP) Natural space, (NP*) Natural space in process, (ZEC=SAC) Special Conservation Areas, (ZEPA=SPA) Areas of Special Protection for the Birds, (LIG) Place of geological interest cataloged

COD.	SITES	INTEREST	MAIN USE	VALUE	UTMX	UTMY	PUBLIC	PROTECTION
VC01.01	Las Hoyas de la Lora de Valdivia	Gm, Hyd	D, L, G	1	409300	4735300	Panels, leaflets, trail	RN2000, ZEC, NP*
VC01.02	Covalagua travertine system	Gm Hyd	D, E, G	1	407600	4736000	Panels, leaflets, trail	RN2000, ZEC, NP*
VC01.03	Los Franceses Cave	Gm	L, G, H	2	408730	4736095	Panels, leaflets, trail, web	RN2000, ZEC, NP*, LIG N°20134001
VC01.04	El Toro Cave	Gm, Ar	H	4	409120	4737530		RN2000, ZEC, NP*
VC02.01	Las Tuercos ruiniform landscape	Gm	D, E, L, G	1	397000	4734300	Panels, leaflets, trail, web	RN2000, ZEC, NP*, LIG N°20133006
VC02.02	Recuevas Valley Poldjé	Gm, Tec	D, E, L, S, G	1	400100	4733750	Leaflets, trail	RN2000, ZEC, NP*
VC02.03	Horadada Canyon	Gm, Sed	D, E, L, G	1	395800	4734150	Leaflets, trail	RN2000, ZEC, NP*

COD.	SITES	INTEREST	MAIN USE	VALUE	UTMX	UTMY	PUBLIC	PROTECTION
VC03.01	Cueva del Agua sinkhole	Gm, Hyd	D, L, S, G	2	419110	4729200	Leaflets, trail	NP, RN2000, ZEC, ZEPA
VC03.02	Puente del Diablo—Cueva del Moro spring	Gm, Hyd	L, G	4	419960	4729530	Leaflets	NP, RN2000, ZEC, ZEPA
VC03.03	Pozo La Torca spring	Hyd	L, S	4	420525	4731640	Web	NP, RN2000, ZEC, ZEPA
VC03.04	Fuente de La Cueva tufa limestone	Gm, Hyd	E, L	2	411510	4734060	Web	RN2000, ZEC, ZEPA
VC03.05	Pozo Corvera spring	Gm, Hyd	L, S	4	422400	4732920	Web	RN2000, ZEC, ZEPA
VC04.01	Monte Bemorio synclinal upland	Gm, Str, Ar	C, D, H, G	2	402242	4738744	Panels, leaflets, trail, web	LIG N°133005
VC04.02	Peña Los Campos Cluse	Gm	G	3	391805	4729795	Leaflets	
VC04.03	Structural plane, sinclinal upland and Peña Mesa 'cluse'	Gm, Tec	D, L, E, G	3	400125	4727945	Panels, leaflets, trail	RN2000, ZEC, ZEPA
VC04.04	Castillo del Moro synclinal upland	Gm, Tec	C, D, L	4	401865	4729130	Leaflets	RN2000, ZEC, ZEPA
VC04.05	Peña Lora synclinal upland	Gm, Tec	C, E, L	3	404935	4729420		NP, RN2000, ZEC, ZEPA
VC04.06	Peña Ulaña synclinal upland and cluse	Tec, Str, Gm, Ar	C, E, H, L, G	2	415892	4720893	Leaflets, web	NP, RN2000, ZEC, ZEPA, LIG N°166007
VC04.07	Peña Castillo synclinal upland	Gm, Tec	D, E, L	4	413185	4721460		NP, RN2000, ZEC, ZEPA
VC04.08	Peña Amaya structural plane and synclinal upland	Gm, Tec, Ar	D, E, H, L, G	3	405570	4723285	Leaflets, trail	NP, RN2000, ZEC, ZEPA
VC05.01	Valcabado view point	Gm, Tec	D, E, L, G	3	409870	4737130	Panels, leaflets	RN2000, ZEC, NP*
VC05.02	Rudrón canyons	Gm	D, E, L, G	2	424225	4727590	Panels, leaflets, trail, web	NP, RN2000, ZEC, ZEPA, LIG N°20135001
VC05.03	Ebro canyons	Gm, Str, Hyd	D, E, L, S, G	2	435480	4740015	Panels, leaflets, trail, web	NP, RN2000, ZEC, ZEPA, LIG N°135001
VC05.04	Oxbow	Gm	D, E, L	4	436915	4735860		NP, RN2000, ZEC, ZEPA
VC05.05	Orbaneja waterfall and tufa limestone building	Gm, Hyd	D, E, L, G	2	435365	4742860	Panels, leaflets, trail, web	NP, RN2000, ZEC, ZEPA
VC06.01	Quintanilla de las Torres Lower Cretaceous section	Sed, Str	C	2	402392	4741694	Leaflets, web	LIG N°133002
VC06.02	Ornithópod fossil	Pal	C	2	394125	4741150		
VC06.03	Fossil trees Aguilar swamp	Pal	C	4	394595	4740220		
VC06.04	Mártires de Aguilar Triassic section- Jurassic. Aguilar de Campoo	Str, Sed	C, D, G	2	396642	4738994	Leaflets, web	LIG N°133003
VC06.05	Peña La Parte	Sed, Gm	C, D, L	4	396115	4737765		
VC06.06	Fern-Bennettitalean floral assemblage	Pal	C	2	394537	4727783		
VC06.07	Utrillas Formation in the road slope	Sed, Str	C	2	394492	4733143	Leaflets, web	LIG N°133007
VC06.08	Jurassic section- Facies "Purbeck"	Str, Sed	C	2	393792	4729893	Web	LIG N°133009
VC06.09	Utrillas Formation in San Pelayo hermitage	Sed, Str	C, D, L, H	3	397590	4731205	Leaflets	
VC06.10	Fossil area in Rebolledo de la Torre	Pal	C	3	397815	4726685		RN2000, ZEPA, ZEC
VC06.11	Basic operation of lignite	Sed, Min	C, D, G	4	399005	4728055	Panels, leaflets	RN2000, ZEPA, ZEC
VC06.12	Jurassic section- Facies "Purbeck"	Str, Sed	C	2	411592	4721943	Web	RN2000, ZEPA, ZEC, LIG N°166006
VC06.13	Tozo Fossil area (Upper Cretaceous)	Pal	C	4	424620	4725940	Leaflets	NP, RN2000, ZEC, ZEPA
VC06.14	Santonian Rudistas	Sed, Pal	C	3	413240	4727395		RN2000, ZEC, ZEPA
VC07.01	Aguilar limestone Formation (a) and Corvio Member (b)	Str, Sed	C, D, G	1	395689	4739112	Leaflets	
VC07.02	Middle-Upper Jurassic section	Str, Sed	C, G	2	399342	4738594	Leaflets, web	LIG N°133004
VC07.03	Monte Bemorio Upper Cretaceous section	Str, Sed	C	4	402260	4737580	Panels	
VC07.04	Transgressive-regressive parasequences	Str, Sed	C	3	394700	4733500	Leaflets	

COD.	SITES	INTEREST	MAIN USE	VALUE	UTMX	UTMY	PUBLIC	PROTECTION
VC07.05	Jusassic section (Toarcian-Malm)	Str	C	2	397792	4726593	Leaflets, web	RN2000, ZEC, ZEPA, LIG N°133010
VC07.06	Rebolledo Upper Cretaceous section	Str, Sed	C	2	396662	4723443	Web	RN2000, ZEC, ZEPA, LIG N°165002
VC07.07	Utrillas Formation in quarry	Str, Sed, Min	C	3	419950	4727140		NP, RN2000, ZEC, ZEPA
VC07.08	Utrillas Formation in quarry	Str, Sed	C	4	435375	4717085		
VC07.09	Peña Amaya Cretaceous section	Str, Sed, Min, Gm, Pal	C	2	404342	4722743		RN2000, ZEC, ZEPA, LIG N°166001
VC07.10	Mesa de Albacastro and Salazar de Amaya Valley	Str, Sed	C	2	402072	4722993		RN2000, ZEC, ZEPA, LIG N°165001
VC07.11	Molino de Bernabé Cretaceous section	Str, Sed, Pal, Gm, Tec	C, G	2	412842	4721893		RN2000, ZEC, ZEPA, LIG N°166002
VC07.12	Hornicedo Marine Jurassic section	Sed, Gm	C	2	418742	4716043		RN2000, ZEC, ZEPA, LIG N°166008
VC07.13	Lías & Dogger rhythmic series in Fuentesnaldo Stream	Str, Pal	C	2	407442	4722893		RN2000, ZEC, ZEPA, LIG N°166005
VC07.14	Amaya Lower Cretaceous series	Str	C	3	405335	4722030		RN2000, ZEC, ZEPA
VC08.01	Villaescusa de Ecla Anticline	Tec, Str, Hyd	C, G	2	387892	4731793		LIG N°133008
VC08.02	Cretaceous-Tertiary Contact	Tec	C	3	387030	4731185		
VC08.03	Knee fold	Tec	C, L	3	398745	4727000	Leaflets	NP, RN2000, ZEC, ZEPA
VC08.04	Subvertical layers and thrust fold	Tec	C	3	400920	4733435	Panel, Leaflets	RN2000, ZEC, NP*
VC08.05	Fold in Jurassic materials	Tec	C	3	397635	4725660		RN2000, ZEC, ZEPA
VC08.06	Corralejo syncline	Tec	C	3	413665	4727710		RN2000, ZEC, ZEPA
VC08.07	Fold enclosure in Humada anticline	Tec	C, D, L	2	422500	4720800		RN2000, ZEC, ZEPA
VC08.08	Syncline excavated in Valderique	Tec, Gm	C, D, L	3	419250	4720500		RN2000, ZEC, ZEPA
VC09.01	Aguilar Fault Los Mártires de Aguilar quarry	Tec, Gm	C	2	396214	4739097		LIG N°133001
VC09.02	Villela Fault	Tec	C	2	397025	4723825		RN2000, ZEC, ZEPA
VC09.03	Solanas de Valdelucio extensional duplex	Tec	C	2	412180	4727190		RN2000, ZEC, ZEPA
VC09.04	Ubierna Fault in Úrbel	Tec	C	1	431780	4718190		RN2000, ZEC, ZEPA
VC09.05	Ubierna Fault in Valdehayas	Tec	C	2	426110	4720670		RN2000, ZEC, ZEPA
VC09.06	Thrust front and gorge of Paraiso river	Tec, Gm	C	2	412710	4718420		RN2000, ZEC, ZEPA
VC09.07	Basconillos Fault	Tec	C	3	418390	4727900		NP, RN2000, ZEC, ZEPA
VC09.08	Thrust front in Peña Mesa	Tec	C	3	400085	4729165		NP, RN2000, ZEC, ZEPA
VC09.09	Strike slip faults in Villamartín	Tec	C	3	406095	4725590		RN2000, ZEC, ZEPA
VC09.10	Ubierna Fault in Solanas	Tec	C	1	414090	4726500		RN2000, ZEC, ZEPA
VC09.11	Humada Fault	Tec	C	3	409240	4725015		RN2000, ZEC, ZEPA
VC09.12	Thrust front in Salazar de Amaya	Tec	C	2	401210	4720540		RN2000, ZEC, ZEPA
VC09.13	Thrust front in Villanueva de Puerta	Tec	C	2	420450	4715580		RN2000, ZEC, ZEPA
VC10.01	Diapiric outcrop- ophites	Tec, Pet	C	2	433070	4713325		RN2000, ZEC
VC10.02	Diapiric structure in Aguilar dip area	Tec, Gm	C	3	398045	4741425		
VC11.01	Ayoluengo oil field	Min	C, G	1	427640	4733145	Panels, leaflets	NP, RN2000, ZEC, ZEPA
VC11.02	Ayoluengo Fault and associated structures	Tec	C	2	428925	4733690		NP, RN2000, ZEC, ZEPA
VC12.01	Headward erosion-river capture- Pisuerga river	Gm	D, G	4	397090	4738045		
VC12.02	Quarry millstones	Min	D, H, G	4	394985	4739955	Leaflets	
VC12.03	El Cuevátón hermitage	Sed, Gm, Ar	D, H, L, G	3	404030	4740220		

COD.	SITES	INTEREST	MAIN USE	VALUE	UTMX	UTMY	PUBLIC	PROTECTION
VC12.04	Vegetable macro-remains of Holocene	Pal, Ar	D, H	3	392165	4734135		
VC12.05	Arroyo Pastruela waterfall	Gm, Hyd	D, L	4	397840	4724255		RN2000, ZEC, ZEPA
VC12.06	Source of the Odra river (Yeguamea waterfall)	Gm, Hyd	D, L, G	3	407340	4727285	Leaflets	
VC12.07	Cueva del Gato spring	Gm, Hyd	D, P, G	4	413390	4722195		RN2000, ZEC, ZEPA
VC12.08	Travertine and waterfalls of Molino del diablo	Gm, Hyd	D, H, L, G	3	411370	4727495		RN2000, ZEC, ZEPA
VC12.09	Peat exploitation	Ed, Min	D, G	4	418470	4727615		NP, RN2000, ZEC, ZEPA
VC12.10	Peatbog	Ed	D, E, G	4	431560	4718780		RN2000, ZEC, ZEPA
VC12.11	Peatbog	Ed, Ar	C, H, A	2	428000	4720545		RN2000, ZEC, ZEPA
VC12.12	Cuesta de la Nava Structural plane	Gm	D, L, G	2	427492	4715393		RN2000, ZEC, ZEPA, LIG N°166009
VC12.13	Los Piscárdanos	Gm	D, L, G	3	409925	4722275		RN2000, ZEC, ZEPA
VC12.14	Úrbel canyon and Valdegoba Cave	Ar, Gm	C, L, G	4	436200	4710270	Panel	
VC12.15	Iron mining	Min	D	4	397000	4724400		
VC12.16	Brulles river capture by Hormazueta	Gm	D	4	426015	4713275		RN2000, ZEC, ZEPA

B.4. LISTING AND DESCRIPTION OF OTHER SITES OF NATURAL, CULTURAL AND INTANGIBLE HERITAGE INTEREST

ARGEOL has also listed the several natural areas of interest (biological), as well as the cultural and intangible heritage throughout 10 years of research and field work. ARGEOL has designed several routes on foot and by car, which have been published in both physical (Bookguide of Las Loras Geological Reserve) and digital (WEB- see Annexe 9 and 11) support.

B.4.1. Sites of Natural Interest (landscape, environmental, biological)

There are several points of natural interest classified within the material published over the years. Furthermore those which have been recently considered of special interest, due to their singularity or their beauty, are listed below with special emphasis on the need for their protection. (See Annexe 8 for the details of the 16 sites: description, pressures, threats, protection figures, localization, enlarged map and bibliographic references in Annexes 22 and 24).

COD.	NATURAL SITE	MUNICIPALITY	ENVIRONMENTAL VALUES
1	Aguilar Reservoir and Monte Royal	Aguilar de Campoo	The reservoir of Aguilar de Campo is a large body of water with bird communities of interest (migration and wintering) and unique peatlands in the emerged surfaces. In the north a series of rocky sleeve (Peña Cutral) is located with bird reproduction rupicola-rock interest. In the area surrounding the reservoir, extensive oak planted with conifers naturalized, among which Mount Royal, an excellent representation of roledales mesophylous mature pines, with a remarkable diversity of forest wildlife, great value for such iconic and endangered species as they develop brown bear (<i>Ursus arctos</i>).
2	Peña Pico area	Santibañez de Ecla Alar del Rey Prádanos de Ojeda Aguilar de Campoo	The small mountain of Pico Peña is the westernmost formation of Las Loras and has significant altitude and a sharp shade. Unique high mountain Cantabrian meadow formations are presented. It houses extensive and mature oaks on the gentle southern slopes, which have a high diversity of flora and fauna. To the north of this mountain a number of karst valleys are developed with well-preserved gall oak woods and a multitude of great limestone walls where rupicola nourished bird communities are maintained
3	Las Tuerces site	Pomar de Valdivia Aguilar de Campoo Rebolledo de la Torre Valle de Valdelucio	The unique karst complex condition of Las Tuerces keeping scarce habitats, with special interest in the nemoral and rupicola-rock vegetation of the limestone rock crevice cracks and alleys. The great walls of the southern flank of this space harbor large rupicola-rock populations of birds, with oak at the top of the moor and header mature and well maintained gall oak woods. The Pisuerga River at the western end, has carved the Canyon of Horadada and its unique system of caves, where interesting cave communities of birds and bats are located.

COD.	NATURAL SITE	MUNICIPALITY	ENVIRONMENTAL VALUES
4	Monte Bernorio site	Pomar de Valdivia	Monte Bernorio houses in the northern area a well-preserved forestry and forest system, with interesting old oaks on its steep slopes with several caves. The Lora platform, where once was located a famous Celtiberian castro- Fort, has extensive calcareous crio-peat grasslands with a remarkable floristic diversity.
5	Covalagua site	Pomar de Valdivia Valle de Valdelucio	The Lora of Covalagua represents one of the best demonstrations of steppe habitats in this geographical context, with extensive summit platform on which sparse scrub and crio-peat meadows, dotted with many sinkholes with hazel and aspen develop. It constitutes a singular and little biotope with a remarkable diversity of flora and fauna. In its northern steep slopes limestone beech forests are maintained and mature yew Pyrenean oak woods are also very well preserved. In the valley of Covalagua a spring has developed a large tufa building, which is a very unique and scarce habitat. In addition to the Cave of the French, this Lora houses several highly developed caves not exploited for tourism.
6	Lora of la Pata del Cid	Valle de Valdelucio Basconillos del Tozo Sargentos de la Lora Berzosilla	The Pata del Cid Lora has slick extensive and well-preserved calcicolous mature oaks. In the southern part of the Lora there is a unique complex of rock sinuous channels representing calcic enclaves of thermophilic vegetation with numerous species of flora and fauna. It is home for rupícola ó stone/rock raptors reproduction and it is a habitat of great importance for the steppe flora and fauna.
7	Lora of Sargentos	Sargentos de la Lora Valle de Sedano	The Lora of Sargentos has an extensive moorland bounded by the great walls of the gorges of the Ebro. It is almost entirely dominated by mature oak and it is well preserved, with a remarkable diversity of flora and fauna. It also represents a biotope of great importance for the steppe flora and fauna.
8	Ebro River Gorges	Valle de Sedano	It presents great walls with nurtured and diverse communities of rupícolas birds and bats interest, under which dense oak and gall oak woods develop. The bed of the Ebro river remains well preserved riparian forests, and it is a fluvial habitat of great interest.
9	Rudrón River Gorges	Sargentos de la Lora Basconillos del Tozo	Rudrón Gorges keeps mature oak and well preserved gall oak woods and remarkable forest river development. It is also presents large walls with rupícolas birds and bats reproduction.
10	Peatbog of Las Loras	Basconillos del Tozo Villadiego Valle de Valdelucio Humada	In several low sandy areas of Valdelucio Valley several enclaves with the presence of acidic peat bogs are located, with considerable interest from the floristic and vegetation point of view, as well as for invertebrates and amphibians. In some of these areas, peat extraction produced in past decades has favoured the establishment of pioneering own peatland habitats of great singularity in this geographical context.
11	Peña Mesa and Peña Lora site	Rebolledo de la Torre Valle de Valdelucio Humada	This area covers a set of Loras and intermediate ribs with deep valleys. It has large areas of sparse scrub in platforms with interesting header forests among which the beech shadier exposures. In the common walls we found rock birds communities of interest and it is a habitat of great importance for the steppe flora and fauna.
12	Peña Amaya and Albacastro site	Rebolledo de la Torre Sotresgudo Humada	Peña Amaya and Albacastro Loras are the higher elevations of the region, maintaining interesting disjunct high mountain plant communities. It presents many big walls that host rock birds communities, under which well-preserved header forests develop, among which the limestone beech forests of exposures shadier are present. It also implies a biotope of great importance for the steppe flora and fauna.
13	Peña Ulaña site	Humada Basconillos del Tozo Villadiego	Ulaña Pena is surrounded by walls that hold large rock populations of birds.
14	Rafts of Las Loras	Basconillos del Tozo Valle de Valdelucio	In the low-lying valley Valdelucio several rafts of different sizes are located, with interest for birds and other wildlife groups linked to wetlands.
15	Mesa de Úrbel site	Úrbel del Castillo Villadiego Basconillos del Tozo	The Mesa de Úrbel is another smaller Lora of the territory, located in the southeast corner. It presents an extensive plane dominated by sparse scrub and cereal crops and it is a habitat of interest to the steppe flora and fauna. It also houses some walls with rock bird reproduction interest.
16	Riparian forest of Pisuerga river and Peña Cuervo site	Alar del Rey Aguilar de Campoo	Fluvial environment notably of forestry and conservation interest set by the Pisuerga river at its point of contact with the railway line south of Santa Maria de Mave. This section keeps interesting formations of natural poplar and willow-thin. The slope of the railway has cut the old meander of the Pisuerga generating a large standing at the foot of the rock formations of Peña Cuervo, densely covered with pine reforestation and regeneration of Pyrenean oak woods, very polifites tree formations and unique lagoon. This location presents considerable interest for wildlife connected to a very few well-preserved river and lagoon media in this geographical context.

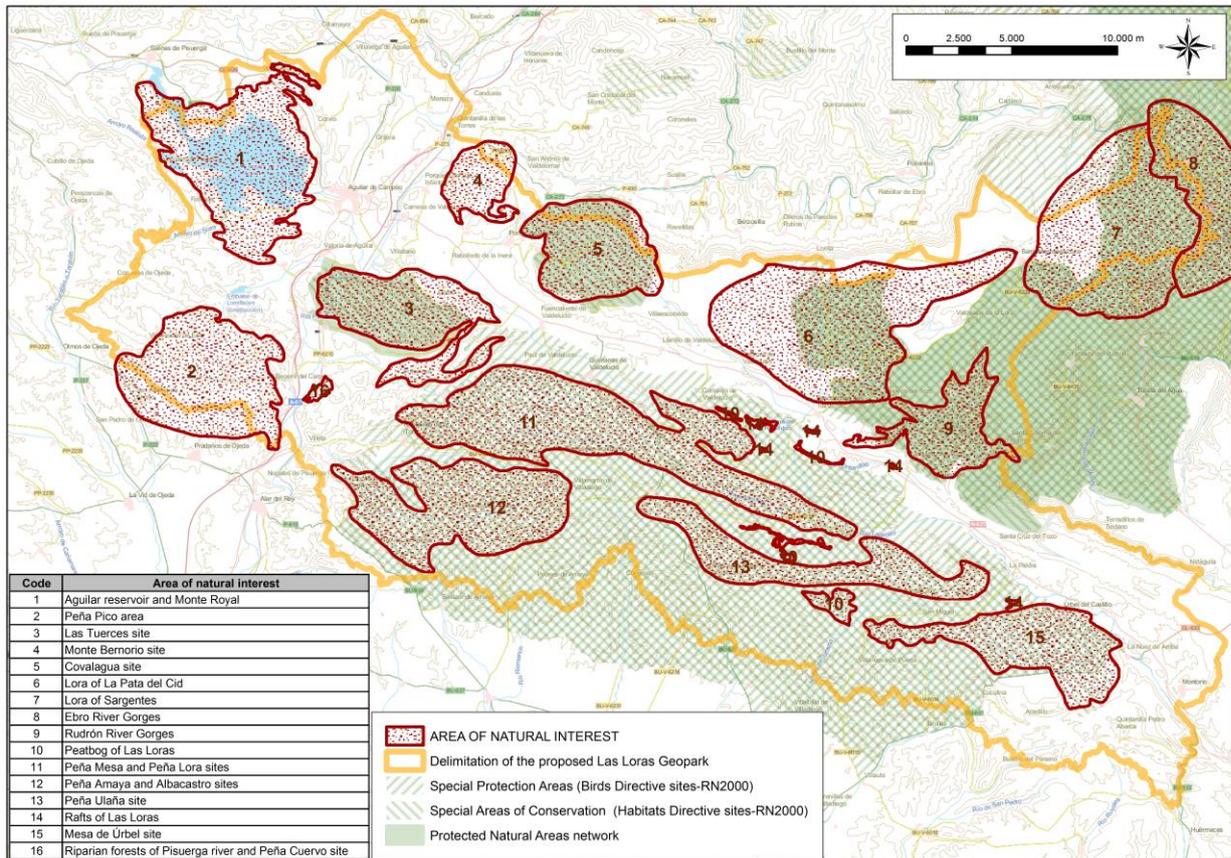


Fig.5. Map of Protected Natural Areas (also Annexes 7 and 15)

B.4.2. Cultural interest sites

From the Paleolithic to our days many people have passed through our territory leaving its mark. In Annexe 8 are also marked those sites nearby the limits of the proposed Geopark. (More in Annexes 15, 22 and 25).

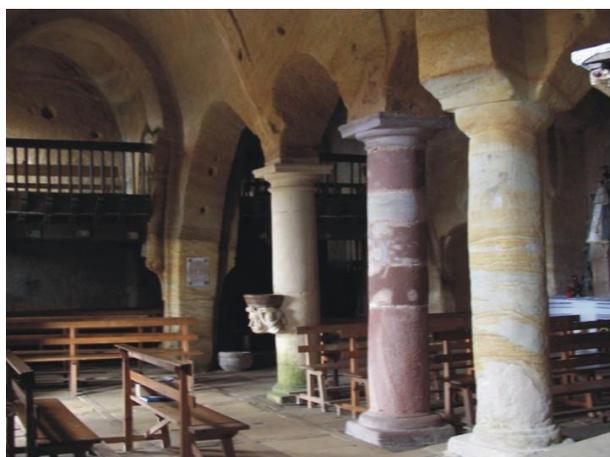
INTEREST (INT.): (his) historical, (arc) archeological, (mon) artistic, architectural, monumental.

PROTECTION (PROTECT.): Degree of protection. (BIC) Assets of Cultural Interest, (SCH) Spanish Cultural Heritage, (MH) Historical memory law.

COD.	SITES	PLACE	DESCRIPTION	INT	PROTECT.
H-001	La Ulaña Site	Humada (Burgos)	Archaeological site (Copper-Iron). Castro (Fort) and Wall	his, arc	BIC, SCH
H-002	Rebolledo Castle	Rebolledo de la Torre (Burgos)	Medieval Castle	his, mon	BIC
H-003	San Julián y Santa Basilisa Church	Rebolledo de la Torre (Burgos)	Arcaded Romanesque Church	mon	BIC, SCH
H-004	Archaeological Site "Dolmen la Cabaña"	Sargentés de la Lora (Burgos)	Megalithic Gravesite with restored corridor (Neolithic). BIC refers to the group of dolmens	arc	BIC, SCH
H-005	Abandoned Village of Peña Amaya	Amaya (Burgos)	Archaeological site (Copper-Iron)	arc	BIC, SCH
H-006	Úrbel Castle	Úrbel del Castillo (Burgos)	Medieval Castle	his, mon	BIC
H-007	Escalada Village	Escalada (Burgos)	Monumental complex of architectural interest	mon	BIC, SCH
H-008	Gallo Tower	Escalada (Burgos)	Fortified Building, 16 th century	his, mon	BIC
H-009	Fresno de Nidáguila Turret	Nidáguila (Burgos)	Late Middle Age Tower. Very ruined.	his	BIC
H-010	Azar Cave	Orbaneja del Castillo (Burgos)	Rock Art	mon	BIC
H-011	Orbaneja Village	Orbaneja del Castillo (Burgos)	Monumental complex of architectural interest	mon	BIC, SCH
H-012	Front Line of the Civil War	Lorilla (Burgos)	Battle Trenches and machine guns hiding places of the northern front.	his	MH
H-013	Amillas Dolmen	Moradillo de Sedano (Burgos)	Megalithic Gravesite with restored corridor (Neolithic).	arc	BIC

COD.	SITES	PLACE	DESCRIPTION	INT	PROTECT.
H-014	Fuencaliente Site	Fuencaliente de Valdelucio (Burgos)	Archaeological site (Copper Age)	arc	
H-015	Renedo de la Escalera Site	Renedo de la Escalera (Burgos)	Archaeological site (Copper Age)	arc	
H-016	Nava de las Hoyas Tombs	Villaescobedo (Burgos)	Gravesites (Neolithic)	arc	BIC
H-017	Cuesta del Molino Dolmen	Villaescobedo (Burgos)	Gravesite and menhir (Neolithic)	arc	BIC
H-018	La Lastrona Dolmen	Villaescobedo (Burgos)	Archaeological site (Neolithic)	arc	BIC
H-019	Terrazas de Basconillos	Basconillos del Tozo (Burgos)	Archaeological site (Palaeolithic)	arc	
H-020	Fuente Úrbel Site	Fuente Úrbel (Burgos)	Archaeological site (Copper Age)	arc	
H-021	La Piedra Site	La Piedra (Burgos)	Archaeological site (Copper Age)	arc	
H-022	Valdecastro	Villanueva de Puerta (Burgos)	Archaeological site (Iron Age)	arc	
H-023	Perul Fort	Acedillo (Burgos)	Archaeological site. Fort. (Iron Age)	arc	
H-024	Valdegoba Cave	Huércemes (Burgos)	Cave with archaeological remains (Palaeolithic-Neolithic)	arc	
H-025	San Miguel (Fort)	Hormicedo	Archaeological site (Iron Age). Castro (Fort)	arc	
H-026	Peña Redonda (Fort)	Rioparaiso	Archaeological site (Iron Age). Castro (Fort)	arc	
H-027	Peña Santa Cruz (Fort)	Ordejon de Abajo	Archaeological site (Iron Age). Castro (Fort)	arc	
H-028	San Quirce (Fort)	Congosto	Archaeological site (Iron Age). Castro (Fort)	arc	
H-029	Cuesta Castillo (Fort)	Salazar de Amaya	Archaeological site (Iron Age). Castro (Fort)	arc	
H-030	Cañada Real	Quintana del Pino (Burgos)	Stretch of historic cattle track. Mesta transhumance	his, arc	Ley 3/95
H-031	Cañada Real	Úrbel del Castillo (Burgos)	Stretch of historic cattle track. Mesta transhumance	his, arc	Ley 3/95
H-032	Cañada Real	La Piedra (Burgos)	Stretch of historic cattle track. Mesta transhumance	his, arc	Ley 3/95
H-201	Rectory House	Aguilar de Campoo (Palencia)	Gothic building of the nineteenth century mountain-style. Historic monument	mon	BIC, SCH
H-202	Aguilar Castle	Aguilar de Campoo (Palencia)	Medieval castle. Set of Romanesque art.	his, mon	BIC
H-203	San Miguel Collegiate	Aguilar de Campoo (Palencia)	Gothic church	mon	BIC
H-204	Santa Clara Convent	Aguilar de Campoo (Palencia)	Franciscan monastery s. 16 th c.	mon	BIC, SCH
H-205	Santa Cecilia Chapel	Aguilar de Campoo (Palencia)	Romanesque church 12-13 th c.	mon	BIC, SCH
H-206	Aguilar de Campoo Town	Aguilar de Campoo (Palencia)	Monumental Complex	his, mon	BIC, SCH
H-207	Monastery of Santa Maria la Real	Aguilar de Campoo (Palencia)	Premonstratense Abbey s. 12-13 th c. Artistic Historical Monument	mon	BIC
H-208	Reinosa Door, Pointed arch door	Aguilar de Campoo (Palencia)	Gothic arched entrance to the city	mon	BIC, SCH
H-209	Santa Eulalia Chapel	Bº de Santa Maria, Aguilar de Campoo (Palencia)	Romanesque church s. 12 th c. with murals 14 th c.	mon	BIC, SCH
H-210	Asuncion Church	Bº de Santa Maria, Aguilar de Campoo (Palencia)	Romanesque church	mon	BIC, SCH
H-211	San Andrés Church	Cabria (Palencia)	Romanesque church consecrated in 1222	mon	BIC
H-212	Canduela Village	Canduela (Palencia)	Monumental Complex	his, mon	BIC
H-213	San Pedro Chapel	Canduela (Palencia)	Monumental Complex	mon	BIC
H-214	Gama Castle	Gama (Palencia)	Medieval Tower and Chapel	his, mon	BIC
H-215	San Martin Church	Matalbaniega (Palencia)	Romanesque Church	mon	BIC, SCH
H-216	Las Tuerces Shelter	Mave (Palencia)	Pre-Historic Rock Art	arc	BIC
H-217	Santa Maria Church	Santa María de Mave (Palencia)	Romanesque Church	mon	BIC, SCH
H-218	Santos Justo and Pastor Church	Olleros de Pisuerga (Palencia)	High Medieval Rupestrian Church	mon	BIC
H-219	Monte Cildá Hill	Olleros de Pisuerga (Palencia)	Archaeological site (Copper-Iron). Castro (Fort) and Wall	arc	BIC, SCH
H-220	San Salvador Church	Pozancos (Palencia)	Romanesque church of the late 12 th c.	mon	BIC, SCH
H-221	Santa Cecilia Chapel	Vallespinoso de Aguilar (Palencia)	Romanesque Church, end of the 12 th c. Historical-artistic Monument	his, mon	BIC, SCH
H-222	Fortified House	Valoria de Aguilar (Palencia)	Tower house 17 th c.	his, mon	BIC

COD.	SITES	PLACE	DESCRIPTION	INT	PROTECT.
H-223	San Juan Bautista Church	Villavega de Aguilar (Palencia)	Romanesque church	mon	BIC, SCH
H-224	San Pedro Church	Becerril del Carpio (Palencia)	Romanesque church	mon	BIC
H-225	San Vicente Church	Becerril del Carpio (Palencia)	Romanesque church	mon	BIC
H-226	Santa Maria Church	Becerril del Carpio (Palencia)	Romanesque church	mon	BIC, SCH
H-227	Roll of Justice	Becerril del Carpio (Palencia)	Gothic column topped by a pinnacle	mon	BIC, SCH
H-228	Peña Caldera	Berzosilla (Palencia)	Rock art paintings	arc	BIC
H-229	Santiago Church	Cezura (Palencia)	Cave with engravings and medieval ceramic rest	mon	BIC, SCH
H-230	Santa Cruz Church	Pomar de Valdivia (Palencia)	Romanesque church	mon	BIC, SCH
H-231	Monte Bernorio Hill	Pomar de Valdivia (Palencia)	Celtiberian Fort and archaeological remains of Roman Camps.	his, arc	BIC, SCH
H-232	San Miguel Church	Rebolledo de la Inera (Palencia)		mon	BIC, SCH
H-233	Fortified House	Villaescusa de las Torres (Palencia)	Medieval Tower	mon	BIC
H-234	Horadada Canyon. Corazón Cave	Villaescusa de las Torres (Palencia)	Archaeological Site (Palaeolithic)	arc	BIC, SCH
H-235	Tino Cave	Mave (Palencia)	Archaeological Site (Copper Age)	arc	
H-236	Portal Ancho Dolmen	Revilla de Pomar (Palencia)	Megalithic Burial (Neolithic)	arc	
H-237	Cantorreal Dolmen	Revilla de Pomar (Palencia)	Burial in Dolmen of Corridor (Neolithic)	arc	
H-238	Cascarronas Cave	Becerril del Carpio (Palencia)	Antropomorphic schematic cave paintings (Neolithic)	arc	
H-239	San Martín Rupestrian Necropolis	Foldada (Palencia)	High Medieval anthropomorphic tombs	arc, mon	
H-240	Perdiz Bridge	Nestar (Palencia)	Medieval Bridge over Roman road	mon	
H-241	San Adrián Rock Necropolis	Canduela (Palencia)	High Medieval anthropomorphic tombs	arc, mon	BIC, SCH
H-242	San Millán Rock Necropolis	Porquera de los Infantes (Palencia)	High Medieval anthropomorphic tombs	arc, mon	
H-243	Santiuste Rock Necropolis	Corvio (Palencia)	High Medieval anthropomorphic tombs 18 th -19 th centuries	arc, mon	
H-244	San Pelayo Rock Hermitage	Villacibio (Palencia)	High Medieval Rock Chapel 17 th century	mon	
H-245	San Martín Rock Chapel	Villarén (Palencia)	High Medieval Rock Chapel 18 th century	mon	
H-246	San Roque Rock Chapel	Renedo de la Inera (Palencia)	High Medieval Rock Chapel and Necropolis	arc, mon	
H-247	Roman Road	Mave (Palencia)	Part of the Roman Road from Pisoraca to Iuliobriga (Herrera de Pisuerga-Retortillo)	arc	
H-248	Roman Road	Menaza (Palencia)	Part of the Roman Road from Pisoraca to Iuliobriga (Herrera de Pisuerga-Retortillo)	arc	
H-249	Perdiz Bridge	Nestar (Palencia)	Medieval Bridge over Roman road	arc	



Medieval Rupestrian Church (Olleros de Pisuerga) and megalithic dolmen (Sargentos de la Lora)

B.4.3. Intangible Heritage

This area also has an intangible heritage remarkable and unique. The geographical location of Loras, straddling two provinces and bordering Cantabria, makes many customs and practices move from side to side, intermingle and the result is a wealth of knowledge that has been passed along the years. (More in Annexe 22).

DESIGNATION	TYPES
Oral transmission: Music and Dance	<ul style="list-style-type: none"> · Rabeladas: herdsmen singing · Marzas: Greetings to Spring, Fertility singing · Pandereteras (Tambourine female players) · Dancing singing: Epiphany singing, wedding congratulations, and “ligero” and “pesado” (joyful and slow) dances. · Instruments: rebec, dulzaina, drum, mortar, clappers, tambourine and anise bottle. · Campo de energía. Proyecto Ayoluengo. La loras 1 and 2 (sounds of the pumps) 2001 · Romances
Oral transmission: Stories	<ul style="list-style-type: none"> · Tales and legends: at the spinners
Oral transmission: Dances	<ul style="list-style-type: none"> · “Ligero” and “pesado” (joyful and slow) dances, “agarraos”, wedding dances
Oral transmission: Speech	<ul style="list-style-type: none"> · Book: The speech of Burgos Loras and their surroundings, José María and Desiderio Fernández Manjón
Work and Traditional Uses	<ul style="list-style-type: none"> · Grazing since the Neolithic: sheepfolds and wolf traps, Cañada Real (Royal Glen), old Camino de Santiago · Millstones quarries, masonry, construction · Work: community work: firewood, construction, repair of the village’s common properties. · Traditional farming work: potato and cereal crop.
Etnography	<ul style="list-style-type: none"> · Museum: Etnographic Museum of Villadiego and Basconcillos del Tozo, Ursi Museum.
Traditional festivities	<ul style="list-style-type: none"> · Valle de Sedano: Pentecost and Virgen Morenita Virgin. Villadiego- Judas



Rabel (herdsmen singing), millstones, folds of shepherds and farmland

The project has always tried to jointly integrate natural and cultural values. On routes (marked or not) explain and interpret all assets, relating geology to the uses that man has given the territory over the years. An example is the Guide itself and routes in Revilla de Pomar and Olleros de Pisuerga.

C – GEOCONSERVATION

C.1. CURRENT OR POTENTIAL THREATS OF GEOLOGICAL ATTRACTIONS

The main threats, inside the territory limits are:

Extractive activities – Mining:

- Quarries: there are various quarries in important geological outcrops like the marine Jurassic in the Camesa area (Palencia) where well conserved fossils have ended up in private collections.
- Fracking: permits have been issued to probe the area but there is an important public backlash against any activity related to this practise.

New infrastructure projects such as the AVE train or the Aguilar-Burgos motorway. At the moment these projects are paralysed due to the country's economic situation but if they are taken up again great caution should be shown when they cross the territory.

Wind farms around the Geopark could produce strong impacts. There are some existing installations, especially in the Burgos province, but the necessary infrastructure for implanting more aerogenerators outside Natural Spaces (as inside they are not permitted by law) would mean radically altering the landscape. The difficulty lies in marrying this clean energy with geoconservation.

Tufa and travertine areas. There are various places of geological interest which are very sensitive, both to human action (building and tourism) as well as natural action (particularly fragile areas can be partially destroyed during adverse climatic conditions).

Chasms and caves. All those containing speleothems, rock paintings or other archaeological elements are very vulnerable to vandalism.

Waterfalls. Along with tufa and travertine they are particularly fragile, due to the effect of differing sources of contamination and possible alterations in the hydrological dynamics caused by an increase in visitors.

Fossil deposits. The hobby of fossil collection is a big problem. National law prohibits removal of fossils but even in Natural Parks it continues to happen sporadically.

Potential excess of public in some sensitive areas. Although tourist access to the places of interest is yet to cause problems there has been a significant increase in the number of people coming to visit them, especially the Karst areas. This is reflected in the (*Plan básico de Gestión del Espacio Protegido RN2000*) Basic management plan for Protected Area RN 2000.

Decrease in extensive cattle farming. As stated in the Basic management plan for Protected Area RN 2000 the disappearance of traditional methods which were a formative factor in the landscape means that the tree stratum becomes denser especially in the Karst systems. This leads to deterioration in environmental quality and conservation of natural values and the problem of managing public use.

C.2. CURRENT STATUS IN TERMS OF PROTECTION OF GEOLOGICAL SITES WITHIN THE PROPOSED GEOPARK

A large part of the project's territory is of exceptional geological and geomorphic value which alongside other biological features have made them worthy of protection both regionally, nationally and also at a European level.

Thus, within the limits of the proposed Geopark we have two Protected Natural Areas which are accountable to the Autonomous Community of Castilla and Leon and which come under the protection of the (*Plan de Espacios Naturales Protegidos*) Plan for Protected Natural Areas, established as part of the 8/1991 legislation for Natural Areas, which forms the (*Red de Espacios Naturales de Castilla y Leon*) Network of Natural Areas in Castilla and Leon.

These Areas (14.93% of the Project's territory) are the Tuerces y Covalagua Natural Areas and the Hoces del Alto Ebro y Rudron Natural Park. The latter also has its own management plan which includes a series of guidelines for management of hydrogeology, geology and geomorphology as well as fauna, flora, soil and air quality, with a special emphasis on the protection of some of the areas of special interest such as the Hoces del Ebro, Orbaneja and the resurgence of the River Huron (headwaters of the River Rudron in Basconillos) and establishing a zoning of the park as far as use is concerned (VC0005 Geological sites).

They are also included in the Natura 2000 network (51% of the Project's territory): the Covalagua SAC (Special Area of Conservation), the Tuerces SAC, parts of the Hoces de Alto Ebro y Rudrón SAC and SPA (Special Protection Area), and the Humada-Peña Amaya SAC and SPA.

As far as the SAC are concerned the protection and conservation of the lithological and geomorphological features (limestone plateaus, river gorges, structural valleys or all the karst systems) imply the conservation of their natural habitats and populations of flora and fauna. As for the SPAs, as far as geology is concerned, in order to maintain its preservation the directives opt for trying to avoid extractive activities such as quarries and fracking.

Additionally, 4.15% of the territory is, since 2015, subject to the European Charter for Sustainable Tourism in Protected Areas or CETS (Europarc) and both the Autonomous government of Castille and Leon and the County-Provincial Council have a commitment to protect and maintain the natural heritage which includes its geology.

All these categories constitute tools for geoconservation although 33.89% of the territory does not have any concrete protective status. It comes under National law: law 33/2015 (which modifies Law 42/2007 for Natural Heritage and Biodiversity). One of its priorities being the conservation and restauration of Biodiversity and Geodiversity and natural resources, with special emphasis on the karst systems and the fossils and ichnofossils of the continental Mesozoic era.

Studies realized over the years in the area have identified a series of places of interest which need special geoprotection. This is one of the future lines of work. Via the scientific advisory committee measures of protection will be determined and proposed for these areas. However, we have also done works to protect geological heritage: dissemination of geological values of the territory, panels indicating the importance of preserving the heritage, participation in working groups of the management plans of Natural Spaces Covalagua and Tuerces for include and extend protection to certain geological attractions of the area, developing alternative routes to minimize the impact of visitors to places of geological interest frequently visited, etc (See Annexe 10).

C.3. DATA ON THE MANAGEMENT AND MAINTENANCE OF ALL HERITAGE SITES

In the Community of Castille and Leon and therefore inside the Project boundary the administrative body in charge of maintenance and administration of Natural Heritage (Biological and Geological) as well as Cultural Heritage is the Junta of Castille and Leon through two of its Councils: that of Development and Environment and that of Culture and Tourism. These furthermore have their own organizational bodies: the Council for Development and the Environment through central administration consists of The Directorate General for Natural Environment, Natural Spaces Section and their Territorial Agencies for the Environment in Palencia and Burgos (see Annexe 18 for Natural Spaces developmen budget).

The Council for Culture and Tourism through central administration consists of The Directorate General for Culture and Tourism and its Territorial Agencies for Cultural Heritage and Tourism in Palencia and Burgos.

The Hoces del Alto Ebro y Rudron Natural Park has at its disposal a Conservation Director, a park Forestry technician who is also Board secretary and four forest wardens. There is also, for a limited period, a geologist who is the Public Works engineer.

The planning and management work for the Tuerces y Covalagua Natural Areas is the responsibility of the Council for Development and the Environment. There are no personnel exclusively dedicated to these Natural Areas. In the County Council Agency for the Environment in Palencia the following people participate in activities relating to its management:

The Head of the Agency, the Head of Unit for Management and Improvement of the Environment, Personnel of the Natural Spaces and Protected Areas Section of Palencia, with one person in charge and three technicians dedicated to the planning and management of the County's natural spaces, one Legal expert, the Forest and Park Wardens of the parish of Aguilar (one Area Chief and seven agents) and the permanent Workteam of Cervera and Aguilar, with five employees.

Apart from this the Natural Heritage Foundation for Castille and Leon has a Technician in Palencia and another in Burgos, who are responsible for work commissioned by the Council, and particularly projects which affect the province's natural areas.

The two County-Provincial Councils, of Burgos and Palencia, through their sections and departments, carry out and support activities related to the maintenance of public utility infrastructures as well as promoting the

area for its touristic, cultural and environmental qualities via different programmes and publications (see Annexe 19 for County-Provincial councils developmen budget).

Through the European Charter for Sustainable Tourism all the entities mentioned have also acquired or reiterated a commitment to manage and maintain the geological and non geological heritage of the territory within the boundaries of the Project (Annexe 20).

Through the Project's scientific advisory committee (see above) the aim will be to identify, catalogue and propose protective and preventative measures against the threats and pressures to the different geological and non geological points of interest which need them in collaboration with the technicians of the Protected Natural Areas and the Natura 2000 Network.



Actions for the conservation of geological heritage (Left to right): Oil Museum; documentaries; schoolvisits, plans management of natural resources.

D.1. ECONOMIC ACTIVITY IN THE PROPOSED GEOPARK

Economic structure and socio-spatial evolution

Observation of the Loras landscape permits us to distinguish three basic aspects of this low mountain area: the protagonism of a powerfully rugged relief, the slowness of transformations in an area of low intensity occupation and use and the agricultural dominance of its economical background.

The stamp of *agriculture* is the principal human sign of occupation and productive organization in the territory and it is also the oldest, but not the only one. Other signs of occupation and exploitation are notably present: *the agroalimentary industry in Aguilar de Campoo, the oilfield of Ayoluengo, the aggregate extraction industry and the production of wind power present in various areas of the territory, along with touristic activities* centred on Aguilar de Campoo and the Ebro Canyon (Orbaneja del Castillo and Sedano). On the other hand, the towns closest to Burgos, especially those belonging to the area of influence of the proposed Geopark, in the Merindad de Rio Ubierna, have taken on a residential nature and a certain business and services dynamic, which exerts an influence on this part of the territory. However, in general, the small number of non agricultural firms is coupled with little diversification and an unequal distribution.

Low population density and unequal distribution

The majority of the population is concentrated in the west, with more than 10,000 inhabitants, mainly centred in Aguilar de Campoo, which has a population density of around 19 inhabitants / km². The economic and population growth rate both in the western and eastern zones and closer to Burgos is in direct relation to geographic site which corresponds respectively to better communications (A-67 motorway and Madrid - Santander railway) in the case of Aguilar de Campoo and the proximity to large conurbations in the case of the villages of Las Loras closer to Burgos.

Analysis of the sector and the working population

In general the predominant type of agriculture is medium sized family-based and within other sectors the majority are small companies and self-employed professionals both in terms of turnover and number of employees. The exception is the agroalimentary industry of Aguilar de Campoo, centred on two large companies: Gullon and the Siro Group, dedicated to the biscuit industry and other confectionery.

Between the years 2000 and 2008 the unemployment levels remained stable: around 5%, then rising to 12% in the first months of 2013. Although this is well below the national and regional average it is serious in an economic region characterised by stagnation and slow growth, where diversification and setting up new business initiatives is difficult. The estimated unemployment figures for the economic sectors are: primary sector 3.5%; secondary sector 16.5% and tertiary sector 35.5%.

A primary sector in decline

Only 30% of the land is cultivated, without implying the predominance of forest more typical of mountainous regions, as most of the land is barren wasteland dedicated to grazing. The main pillars of agricultural production are *wheat and potato*.

The high average altitude, around 1000m, is a double factor of limitation and singularity which determines the tendency for the cultivation of cereal and especially for wheat in the area. Above 1000m the crops tends to disappear, substituted largely by an overall presence of rough pasture, with *livestock (sheep)*, and low mountains. The altitude has been a determining factor in the specialisation of certified production of **seed potato**. The most appreciated growing areas are in the depressions, about 100 or 200 metres below the moorland, where seed potatoes are cultivated. This middle attitude is a positive factor for the planting and maintenance of well-adapted forest mass, something which has been insufficiently developed in the area. At present the forest occupies an area of 22.8% of the total land cover, with very notable spatial differences.

Scarce diversification of the industrial sector

With the notable exception of the two large agrofood companies in Aguilar de Campoo, who employ between them a workforce of two thousand, most other industries have a reduced repercussion on employment, as is the case with aggregate extraction and windfarms.

In the border town of Merindad de Río Ubierna there is a small industrial park which provides diversity and work opportunities for the nearby population in Las Loras.

The only industrial park of importance in the area is that of the forementioned Aguilar de Campoo. Overall there is a specialization in quarrying in the eastern area and in agrofood in the west, and the singular case of Sargentos de la Lora stands out as the only town in Spain where there is land extraction of petroleum and natural gas.

A basic and poorly diversified tertiary sector

Jobs in the Hotel and Catering trade stand out (37.6%), followed at a long distance by Public Administration (13.3%) and small scale Retail (12.7%), according to information from the Treasury of the Social Security (2010).

The services industries, which in the county absorb 22.5% of the workforce, gain relative weight in towns where the primary and secondary sectors are barely significant, as in those which are situated in and around the canyons of the Ebro and Rudron. Although small, the services offered are focused on the external demand related to tourism.

The largest concentration of this kind of business is found in the more touristic towns of Aguilar de Campoo and Valle del Sedano. Specialised service jobs and companies are to be found in centres with the highest business concentration and closest to the cities of Burgos and Aguilar de Campoo. The Fundación Santa Maria la Real in Aguilar de Campoo stands out with around one hundred employees and a wide range of activities, based on its specialisation in the promotion and restauration of historical and monumental heritage.

The areas considered ‘unproductive’ – which allow neither farming nor industry- add up to 2326 hectares, 1.6% of all the land surface and which have their largest extension in the centre-west sector of Las Loras and in the canyons of the principal rivers.

These spaces have great *touristic potential*, and the quality of their environment and landscape make them especially appropriate for geotourism, having already in place a large infrastructure of accommodation and tourism services, the most firmly established being within the Natural Spaces of Covalagua y Las Tuerces, the Natural Park of Hoces del Alto Ebro y Rudron, and around the Romanesque buildings present in all the territory. This area also lends itself to hunting and fishing tourism, an added attraction being the trout fishing in the Pisuerga, Ebro and Rudron rivers.

D.2. EXISTING AND PLANNED FACILITIES FOR THE PROPOSED GEOPARK

GEOTURISM, INSTALLATIONS –EQUIPMENTS (Equ.): (E) Existing, (P) Planned (Annexe 21, 10 and 11).

Centres outside the limits of the proposed Geopark (but belonging to the member towns-municipalities) have been included here because they are entry gates to the territory which provide services to the population and visitors to Las Loras.

Equ.	Educational centres, sports and recreational facilities
(E)	4 CEP / Primary Education Centres (Aguilar de Campoo, Alar del Rey, Villadiego, Escalada)
(E)	2 ESO / Obligatory Secondary Education Centres (Aguilar de Campoo, Villadiego)
(E)	2 High Schools (Aguilar de Campoo, Villadiego)
(E)	1 UNED / National University of Education at a Distance Centres (Aguilar de Campoo)
Total: 9 Education centres	
(E)	3 Sports centres (Aguilar de Campoo, Villadiego, Alar del Rey)
(E)	4 Sports grounds (Pomar de Valdivia, Alar del Rey, Sedano)
(E)	1 Scating arena (Alar del Rey)
(E)	3 Tennis courts (Aguilar de Campoo, Sedano)
(E)	2 Padel courts (Aguilar de Campoo)
(E)	2 Outdoor Basketball courts (Aguilar de Campoo, Pomar de Valdivia)
(E)	5 Football pitches (Aguilar de Campoo, Villadiego, Alar del Rey, Sedano)
(E)	1 Climatized swimming pool (Aguilar de Campoo)

Equ.	Educational centres, sports and recreational facilities
(E)	3 open-air swimming pools (Aguilar de Campoo, Villadiego, Sedano)
(E)	1 Bowling and boules facilities (Sedano)
Total: 25 Sports facilities	
(E)	1 Recreational area. Monte Royal (Aguilar de Campoo)
Total: 1 Recreational area	
Equ.	Geotourism visitor centres
(E)	Cueva de los Franceses Cave, in Revilla de Pomar
(E)	Petroleum Museum, in Sargentos de la Lora
(E)	Palaeontology Room, in the Municipal Museum of Villadiego (to be extended as future museum of Geology and Palaeontology in Las Loras)
(P)	Park Visitor centre for Hoces del Alto Ebro y Rudron Natural Park, in Quintanilla Escalada
(P)	Art and Territory Space Espacio Arte y Territorio-ESPAYT, en Aguilar de Campoo
Total: 6 centres, 4 existing and 2 projected	
Equ.	Geotourism information points
(E)	3 Tourist Information Offices
(E)	Cueva de los Franceses Cave, in Revilla de Pomar
(E)	Petroleum Museum, in Sargentos de la Lora
(E)	Museum of the Romanesque, ROM, in Aguilar de Campoo
(E)	Museum of Geology and Palaeontology, in Villadiego
(P)	Network of Collaborating Establishments (30 approx.)
(P)	Service areas in two principal entries (Sotopalacios/Burgos y Becerril del Carpio/Palencia)
(P)	Art and Territory Space -ESPAYT, in Aguilar de Campoo
(P)	Park Visitor centre for Hoces del Alto Ebro y Rudron Natural Park
Total: 41 geotourism information points: 7 existing and 34 projected	
Equ.	Geotourism signs and routes
(E)	5 Self-guided Geological Interpretation Routes (+3 planned + 1 in progress)
(E)	1 Audioguided route
(P)	10 Access signs to Geopark on motorway and main roads
(P)	30 Signposts in towns close to areas of geological interest
Total: 49 interventions (5 existing, 43 planned and 1 in progress)	
Equ.	Tourist Visitor Centres (museums and interpretation centres)
(E)	Cueva de los Franceses Cave, in Revilla de Pomar
(E)	Palaeontology Room, in the Municipal Museum of Villadiego(to be extended as future museum of Geology)
(E)	Museum of Petroleum, in Sargentos de la Lora
(E)	Museum of the Romanesque, ROM, en Aguilar de Campoo
(E)	Museum URSI of Sculpture, in Aguilar de Campoo
(E)	Museum de of Sacred Art, en Aguilar de Campoo and Villadiego
(E)	Museum of the comic in Villadiego
(E)	Municipal Museum (Ethnography and Painting), in Villadiego
(E)	"Miguel Delibes" Interpretation Centre of Valle de Sedano, in Sedano
(E)	Archaeology Centre, in Sedano
(P)	Park Visitor centre for Hoces del Alto Ebro y Rudron Natural Park
(P)	Art and Territory Space -ESPAYT, in Aguilar de Campoo
Total: 11 centres (11 existing + 2 projected)	

Equ. Accommodation, catering, active tourism companies and complementary services.

- (E) Summary of accommodation
- (E) 45 sites with tourist accommodation
- (E) 107 establishments (2.350 beds):
Hotels-10, Economic Hotels-7, Rural Cottages-72, Rural Hotels-6, Camping-1, Hostels-2, Guest Houses-2, (conjuntos) Apartaments-3. Inns-4
- (E) Restaurants and Eating Taverns: 48
- (E) Caravan parking: 3
- (E) Active tourism companies: 11
- (E) Travel agencies: 2 (Aguilar de Campoo)
- (E) Bus hire companies: 4 (Aguilar de Campoo, Villadiego)

Equ. Business associations

- (E) Tourism Network of the Palentine mountains
- (E) Association of Rural Tourism Burgos (TURALBUR)
- (E) Traders, Innkeepers and Professionals Association of "Aguilar te envuelve"
- (E) Association for the economic development of Aguilar de Campoo
- (E) Traders and Innkeepers Association of Hoces del Alto Ebro y Rudron Natural Park
- (E) Innkeepers Association of Villadiego
- (E) Society for the Development of the Province of Burgos (SODEBUR)

Equ. Dissemination, promotion and distribution of touristic products

- (E) Web site, blog and social media
- (E) Publications and leaflets
- (E) (P) Media presence
- (P) Participation in tourism fairs
- (P) Receptive Tour Operator

Equ. Geopark Management Offices

- (E) Aguilar de Campoo, Villadiego
- (P) Sedano

Georoutes: see annexe11

- A) **Geological interpretation** (published and downloadable on the web):
 - (E) 1. "Places of Geological interest" Route
 - (E) 2. Self-guided Geological Interpretation Routes (walking)
 - (E) 3. Driving routes "Discover the geological landscapes"
 - (E) 4. Panoramic Viewpoint Route
- B) **Nature and Sport** (published and downloadable on the web):
 - (E) 1. Walking Routes
 - (E) 2. BTT Routes
 - (E) 3. Mountaineering and climbing Routes
 - (E) 4. Caves, Chasms and Springs Route
 - (E) 5. Nautical Activities Route
 - (P) 6. Geocaching Route
 - (E) 7. Mountain Pass Route
 - (P) 8. Muleteer Route (Polientes-Villadiego)
- C) **Themed routes of Cultural and Historical Heritage**
 - (E) 1. Romanesque Art Routes
 - (E) 2. Cave Painting Routes

Georoutes: see annexe11

(published and downloadable on the web):	(E)	3. Preroman Settlement Route
	(E)	4. Neolithic Route
D) Land-Art Route	(E)	Landscape Workshop with the Universidad of Fine Art of Madrid
	(P)	Ephemeral and Permanent Land Art Route

Equ. Programme of organised activities

(E)	1. Guided routes and visits of 1 day or more
(P)	2. Tourist package deals (geoactivity+accommodation+complementary services)
(E) (P)	3. Schools environment education programme(1,2 and 5 days residential), during term-time and holidays
(E) (P)	4. University programme / geosciences departments (visits and residentials of 1 or more days, for scientific and local geological field trips. Postgraduates.
(E) (P)	5. Field school for senior technicians of Repsol
(E)	6. Geoloday, day trip to study a particular place of geological interest
(E) (P)	7. Geological week (intensive programme of activities for the dissemination of Earth Sciences
(P)	8. Earth Sciences Documentary Section in the International Festival of Short Films in Aguilar de Campoo

Equipment

Room and projector	(E)	Aguilar de Campoo and Villadiego (council owned)
Video-documentary	(E)	“A Bird’s Eye view of Las Loras” (“Las Loras a vista de pajar”), in downloadable digital edition
	(E)	“A Bird’s Eye view of Las Loras” (“Las Loras a vista de pajar”), in downloadable printed edition
	(P)	“Las Loras, geological landscape: natural and cultural heritage”
Publications	(E)	Guide to the Geological Reserve of Las Loras
	(E)	Walking in Las Loras (walking routes)
	(E)	Geological map
	(P)	Printed map-guide of road routes and in downloadable digital version (E)
	(P)	Printed map-guide of nature and sports routes and in downloadable digital version (E)
	(E)	Map-guide of themed routes of Cultural and Historical Heritage in downloadable digital version and in print edition (P)
	(E)	Schools environmental fieldguide

Equ. Promotion incentives

(P)	Geoloras card for visitor loyalty
(P)	GeoLoras Club and for the local population
(P)	Volunteer Group, with discounts and other privileges.

Equ. Distribution-commercialization

(E)	Direct: tourism establishments and Geopark offices
(E)	Intermediaries: receptive operator (agreement with local travel agency open to tender)

Equ. Interpretation of local heritage

(E) (P)	Official Geopark Guides Service (belonging to the managing body and authorised companies)
(E)	Information packs (printed and audiovisual publications)

CETS European Charter for Sustainable Tourism – part of the territory has been awarded this distinction which entails a commitment to carry out actions that ensure sustainable development. These actions concerning both the environment and culture will favour the local population and its economic growth. The

Geopark Project, this candidature and the development of the actual Project is one of the actions of the CETS and for this reason it is desirable and necessary to work towards not only the territory fulfilling its commitments, but also all the towns involved. (Annexe 20).



D.3. ANALYSIS OF GEOTOURISM POTENTIAL OF THE PROPOSED GEOPARK

We started out with an existing touristic offer –although spread out both spatially and in terms of promotion– with a low profile in the tourism market, despite the intervention of public entities (autonomous and regional governments and local councils) as well as rural development groups and the tourist establishments already in the area, either on an individual level or in association.

Its potential is based on the following resources and circumstances:

1. The spectacular geological landscape.
2. The natural heritage of the Protected Areas of Castille and Leon, the Natura 2000 network.
3. The large number of Romanesque buildings (probably the largest concentration in Europe).
4. The presence of Iron Age archaeological sites.
5. The large amount of hermit rock dwellings.
6. The abundant remains of prehistoric settlements (Neolithic tumuli and dolmens, archaeological sites in terraces, shelters and caves).
7. The traditional architecture, which is well conserved both in individual examples and in urban settings.
8. A large network of museums and information centres.
9. National and international cultural events centred in Aguilar de Campoo (International Cinema Week, International Festival of Street Artists, Theatre Festival, Carnival of the Biscuit, Galleta-Rock Festival, International Music Day), Villadiego (Fiesta of Judas), Montorio (Rock Festival).
10. An extensive network of tourism establishments and facilities, providing both accommodation activities and complementary services.
11. An extensive network of sporting facilities, both in rural and urban areas.
12. A large offering of leisure, shopping and tourism services, despite an uneven distribution.
13. A range of active tourism companies (walking, birding, canoeing, horse riding etc.).
14. Optimal location and accessibility: by road; the motorway from Madrid- Valladolid- Palencia and Santander, the National Burgos-Santander road; two railway lines (Madrid-Santander and Leon Bilbao) with stations within the territory and nearby; the proximity of the city of Burgos (less than 20km from the Geopark limit); two easily accessible and nearby international airports (Santander y Valladolid).

Based on this potential, we propose three fundamental objectives, focused on visitors, local businesses and entrepreneurs and the residents of the area:

- The **design, promotion and distribution of an integrated tourism offer**, built around the territorial mark “Las Loras” and the “Geoturismo” product.
- The **synergy of investments and actions** along with the coordination of all social and economic agents implied, both public and private.
- A **maximum of information** to, and participation by local residents, in all aspects and phases of the project.

In order to reach these objectives and to finance the necessary investments the managing body ARGEOL has, as well as agreements signed with the local action groups (GAL) and the provincial government, a Strategic Plan which foresees the financial sustainability of an annual Plan of Action, and its implementation through a Plan to Promote Touristic Products which will be developed over three years and cofinanced by the Ministry of Industry, Tourism and Commerce, the autonomous Community of Castilla and Leon, local entities (local and provincial governments of Burgos and Palencia) and local businesses (Annexe 13).

D.4. OVERVIEW AND POLICIES FOR THE SUSTAINABLE DEVELOPMENT OF

D.4.1. Geo-tourism and the local economy

We understand sustainable rural development to mean the process of mobilising the territory's resources in order to find a balance between the use of natural resources (environmental sustainability), economic development (economic sustainability) and securing the permanence of the social fabric (social sustainability), within a territorial base at a local level. Sustainable rural development presupposes the multifunctionality of a place and its resources, as well as the diversification of jobs needed for its all-round promotion.

Structures for sustainable development

A network of Groups for Rural Development which are active in the proposed Geopark territory (ADECO Camino de Santiago, Montaña Palentina and Páramos y Valles). In addition to signing the Cooperation Programme (Las Loras Geopark Project based on the Leader Programme with a budget of 364,900 euros and a time-scale of 42 months), these entities manage their own programmes in their area of action and within the framework of the Programme of Rural Development (PRD) of Castilla and León 2014-2020, which is managed by the Secretariat General of the Council of Agriculture and Livestock Farming of the Junta of Castilla and León.

In 1991 a programme of new activities was launched with a view to revitalising rural areas through Local Action Groups. These are made up of both public and private sector representatives of the local civil society where they are active. The whole of the territory of the proposed Geopark is included in the PRD of Castilla and León. The European Union suggested this form of action so that the inhabitants of the rural areas would define for themselves the measures needed for growth within their areas and to secure the population via development projects. The initiatives to be developed by the groups are of a diverse nature and consist of exploiting the natural, cultural and social resources of the area of activity. All this has the aim to strengthen and ensure the establishment of the rural population through job creation.

The general objectives of the PRD are:

1. The diversification of rural economy towards non-agricultural activities, assistance in the creation of microcompanies with a view to encouraging entrepreneurship and the development of the economic structure, as well as promoting tourist activities.
2. The improvement of quality of life in rural areas through the provision of basic services for the economy and the rural population, the renovation and development of the rural populations and the conservation and improvement of rural heritage.

Financing. For the development of the projects, the Local Action Groups have at their disposal funds from the European Agricultural Fund for Rural Development (FEADER), through the Ministry of Agriculture, Food and Environment and the Council of Agriculture and Livestock Farming with the possibility of being added to by the different local councils. The regional programme has funds of 130 million euros which, along with private funding may reach up to 300 million euros in investment. The managing body of the Geopark can apply for funding for their own projects to the corresponding group or for collaborative projects to the various local action groups. It will be these local action groups who approve, via a committee, the projects to be carried out. Those projects which generate employment will be given priority. In the evaluation criteria the complementarity with other policies of rural development will be taken into account.

Rural Development and heritage. There were five specific measures put forward at the 2000 Agenda in relation to territory: a) improvement of infrastructures; b) renovation of villages; c) encouragement of pluriactivity to increase income; d) seeing the recreational use of rural areas as a viable and not marginal alternative; e) environmental sustainability as a horizontal measure. The first stated reference made to rural heritage in European legislation is in the Regulation of 2005 on the articulation of rural development funding through the FEADER programme. It makes reference to the conservation and improvement of rural heritage, including the very original idea that heritage encompasses natural resources as well as cultural ones.

Rural heritage in the strategic planning of rural development in Castilla y León. Following European directives and those laid out in the Strategic National Plan, the Autonomous Community of Castilla and León drew up the Programme of Rural Development for Castilla and León which makes an emphasis in the rich natural heritage of the region and the vast diversity of habitats of their flora and fauna. Furthermore, the rich historical, cultural, architectural and artistic heritage, coupled with the touristic potential this rural heritage

offers, is fundamental to rural development. This is seen by the province's being the leader in rural tourism in the region. The options for development, job creation and economic diversification in relation to rural heritage do not only involve tourism, however, without a doubt, linked to an increasing urban demand for nature and cultural heritage, it is its primary motor.

The landscapes of the proposed Geopark form part of our geological heritage, which is an important aspect of the natural heritage, and as such is protected by both Spanish and European law. If we define geological heritage as "a combination of natural geological resources of scientific, cultural and/or educational value, be they geological structures and formations, reliefs, minerals, rocks, fossils, rock surface and other geological manifestations, which permit the knowledge, study and interpretation of the origins of the Earth and the processes which have formed it", we find that numerous places and landscapes of Las Loras belong without a doubt to this heritage for its singularity, quality and scientific-educational potential.

A natural space, declared regional Natural Park (Hoces del Alto Ebro y Rudron), two Special Protection Area for birds (Humada-Amaya and Hoces del Alto Ebro y Rudron, also SAC), two natural monuments (Covalagua and Las Tuerces, also SAC) and a total of 50 Assets of Cultural Interest are to be found, respectively, amongst the Network of Natural Spaces of Castille and Leon and in the regional catalogue of Assets of Cultural Interest (BIC), and 26 belongs to the Spanish Cultural Heritage, although each element needs to be put in context in order to understand them as a whole.

A model based upon the identification of the most interesting resources and in the construction of an attractive and structured interpretation of them, capable of attracting visitors and investment, might prosper and place the territory in a condition to initiate a new impulse for social and economic growth starting with a cohesion of these resources and a synergy of actions.

Integrated Strategy for Sustainable Development in the Province of Palencia.

Agenda 21 in the territory: Agenda 21 of Aguilar de Campoo.

Status: the Document – Summary of Environmental Analysis of the municipality (2005) has been created.

Download: www.palencia21rural.com/doc/diagnostico%20amb_agenda21_aguilar.pdf

Sponsors (E) Existing, (P) Planned

There is already a network of sponsors due to the work over the past years, however we include other bodies which may provide either economic support or collaboration and common aims.

Companies: Galletas Gullon (**E**- Geology Week, Geoparks Committee Day); Piedra Abierta (**E**- Courses, Audioguide,-El Perro de San Roque (**E**- Expositions).

Financial institutions: Caja Burgos Foundation; Obra Social La Caixa (**E**- Volunteers) (**P**- volunteers and other activities)

Public Bodies: Local Councils (**P**); Palencia Provincial Council (**E**) 10.350€ in 2015-2016; Burgos Provincial Council (**E**) 10.000€ in 2016; Junta of Castille and Leon (Councils for Culture and Tourism and Development and the Environment) (**P**); Rural Development Groups ACD-ADECO Camino de Santiago, ACD Montaña Palentina and ACD-Paramos y Valles (**E**) 364.900€ for 42 months; Universities of Valladolid and Burgos (**P**) and the University of Salamanca (**E**).

D.4.2. Geo-education

Both over the last few years and in the Plan of Action (Annexe 13 and 10) for future Geo-education has been considered a pillar of the Project. Because of this, school and other didactic material has been designed, there have been fieldtrips and talks in almost all the schools in the region and there have also been fieldtrips with University students. For this forthcoming stage we have forecast the following activities:

Formative Activities

Informative days and seminars. Their main mission will be to bring together groups of professionals to debate, reflect and seek solutions around different subjects related to the Project. They will be based on a particular theme (*Technical seminars for experts*) or be open (*Professional seminars*). They can also unite exclusively professionals directly related to the world of geology, or, on the other hand, those who belong to other camps and can contribute interesting information.

Courses. The level of these courses can go from a traditional seminar for the layperson to university academics, with their corresponding accreditations, through agreement with the Universities. The theme of these courses can be developed around three fundamental themes: Geology and Mining, Environment, Natural, Landscape and Cultural Heritage.

Support for teachers: this is one of the pending tasks of the previous stage. Either reinforcing geology within the curriculum of the Educational Centres through direct talks or supporting and forming the teachers who request it.

Workshops and workcamps. With which the aim is to introduce the public to the local geology. In the workshops destined for adults the following themes could be dealt with: Field geology, Landscape interpretation, Artistic interventions.

However without a doubt an essential element in the programming of activities will be constituted by workshops directed at students in primary and secondary education; in which more general themes could be dealt with such as: Initiation to geology; Environmental education; Geography and the history of the region.

Fieldtrips. For all levels. From seminars with students to the now traditional Geolodays to which every year more people subscribe. Outings of variable length are also being considered for a minimum number of people.

Study camps for university students. Other types of more specialised activities could be study trips for different academic levels (high school or undergraduate students from Geology or Biology departments, Mining College etc.), as part of the academic programmes in the corresponding subjects. A similar thing exists with fieldtrips organised by associations and collectives dedicated to speleology, walking, climbing, etc.

Promotion and information

Exhibitions. In some villages there are private collections of fossils and minerals, as well as small museums directly related to geology such as the Museum of Petroleum. A plan could be devised to bring together and exhibit some of these items, together with the resulting works from different types of competition. Among the possible exhibitions which could be organised could be: Fossil collections; minerals; Photography; Sculpture and Painting.

Seasons of talks and conferences. A fresh round of conferences to talk about the Project and different themes related to natural and cultural heritage. Furthermore, in order to emphasise certain aspects of the Project periodic conferences could be organised aimed at tourism professionals, local development agents, teachers, etc.

Video season / Cinema-forum. With the same intention as the workshops, courses and conferences we propose a series of video or film projections which illustrate different aspects of geology.

Calls for Competitions. Again, the the desire to reach out and involve the public leads to the idea of programming different competitions of Photography, painting and drawing, or whichever other artistic expression on the theme of the area, landscape and reality of the Geopark.

Grants. The awarding of study grants for different activities could be interesting and would contribute to knowledge and promotion of the Geopark.

- *Grants for studies within the Geopark:* of a scientific nature, on geomorphological structures, archaeological sites, fossil studies, etc.
- *Grants for artistic creations:* for the creation of works of art which could be installed in the territory, there would be various different bursaries to cover the costs or the living costs of the artists in the area whilst the work is made.
- *Course and workshop bursaries:* for those who would like to attend different formative events and have economic problems.

Promotional Campaigns. A new edition of guidebooks, leaflets and different articles which promote and propagate the Project.

Depending on funds, use could be made of the different promotional media: radio; press; television; internet... The message needs to be consistent with the aims of protecting the natural heritage and scientific education.

Despite not being a programmable activity, we've included in this section the possibility of selling branded 'Geopark' products. These articles could be of a very diverse nature, according to the traditions of the area and the local artisans; we suggest a brief list of products seen in other Geoparks: sweets and confectionery; maquettes and reproductions; reproductions of Romanesque period musical instruments in Rebolledo; reproductions of fossils present in the territory (in papier maché, plastic, plaster...), ceramic objects with ornamental or landscape motifs; other products typical of merchandising (teeshirts, keyrings, booklets, etc.), on sale in the information centres.

See master and marketing plan, Annexe 13

Artistic interventions in the territory. Artistic trends such as *Land-Art* consider the actual territory as a canvas for works of art. The outcome of this kind of intervention would be determined by the rules of the possible competitions and not only the aesthetic aspects but environmental and social acceptability would have to be considered. As was made clear in the open information days of the Libre de Paisaje Workshop (Aguilar de Campoo, 2005 and 2009), interest between artists for this form of expression is growing.

Training of guides and designing guided visits to the Geopark. On two levels: a basic training for the workers at the tourist information centres and a more specific and specialised training for the future Guides of the Geopark. To that effect courses have already taken place for 10 persons and there is provision for more so that an integrated workpool is created for those who may be interested in exercising this profession.

D.4.3. Geo-heritage

Throughout this time a series of controls and inventories of places of interest have been made but cataloguing their state or devising methods of protection has yet to be done. In this sense the following is foreseen, using as a starting point the Inventory of places of geological (and non-geological) interest and through the work of the Scientific Advisory Committee, that is to say working hand in hand with the Universities and the Investigation Centres (see Annexe 13 and 10):

Geoconservation

- Completion of catalogue of points of interest
- Catalogueing new points, study of the pressures and threats they face
- Proposal of measures of control and prevention for these places
- Putting in practise of these measures: preventive signing and information, protection and isolation of sensitive areas, etc.

Supporting investigations

- Through the Scientific Advisory Committee the necessary synergies will be created between the different disciplines to continue investigations in the territory.
- Residential grants similar to the study ones but for these particular cases and support for publications

Difusion

- Difusion of printed and digital matterial for information, promotion, popularisation of geological and non-geological heritage and codes of good conduct.

D.5 - POLICIES FOR, AND EXAMPLES OF, COMMUNITY EMPOWERMENT IN THE PROPOSED GEOPARK

Over the last years the ARGEOL Association has enabled and carried out various promotional acts at different levels and in collaboration with local associations, private entities, public administration and the local and regional government.

The result has been an increase in interest by the population for its natural heritage and more especially for the geology. The promotion has led to an active participation and an increase in the various activities carried out and work will continue in this direction.

Among the most notable examples the following stand out:

- **Volunteer programme.** These have been going on for three years and in the last two, paths have been restored, signage placed and specific talks given which were decided upon by the local people in previous meetings. It is a clear example of community empowerment, communal decisions made for the protection and maintenance of their territory.
- **Discussions and debates,** both to explain what Geoparks are and talks on geology. Over the years the number of persons assisting and participating actively has increased. At these discussions people have voiced doubts about management figures, worries about how a Geopark would affect the territory, how it would affect them in their own use of it, how this is compatible with other declarations of Protection, the benefits that may be gained and the compromises that may come with them. Talks have been given in almost all the towns and villages; the result has been the widespread support of and adherence to the project. This relationship will be maintained in the future in the same way and across the different consulting and advisory committees where all the social strata is represented.
- **Fieldtrips.** Especially with the Geodays a sharp increase in participation has been observed, especially by the local people, demonstrating a growing interest by them for their territory.
- **Diffusion in the media and social networks.** Newspapers, radio and television have brought the project to the local population. Also, since the Facebook channel was opened there has been a much greater diffusion of the Project and above an interaction with the public which was not there before. A large number of followers interact and share news and documentation related to their territory and the protection of the same. (Annexe 12)

Additionally work continues with other sectors of the community. **(E) Existing, (P) Planned**

- **Educational Community:** 1. Information days and geological excursions for schools **(E)**. 2. Fieldguide, printed and downloadable **(E, P)**. 3. Visits and residencies for Universities. 4. Seminars on geological heritage **(E, P)**.
- **Business Community:** 1. Participation by business associations in the management and direction of the Project **(E, P)**. 2. Creation of a network of collaborating businesses and establishments **(P)**. 3. Tourism training directed at businesses and professionals **(P)**.
- **Local Community:** 1. Creation of a Volunteer Group **(E)**; Promotion and information days on the proposed Geopark **(E)**.

D.6 - POLICIES FOR, AND EXAMPLES OF, PUBLIC AND STAKEHOLDER AWARENESS IN THE PROPOSED GEOPARK

Within the Project's Plan of Action (Annexe 13) a series of specific actions have been foreseen (some of which have also been developed over the last few years) to create public awareness:

In the elaboration of this Plan of Action, (through sectorial meetings and working sessions) all parts involved in the Project have been taken into account. The different committees that administer the Project include all the sectors of our territory.

Organized and projected activities:

A) For businesses:

- Meetings: for training **(P)**, for monitoring **(P)** informative **(E)**.

B) For the local population:

- Activities for Social Volunteers (Volunteer Group) **(E)**.
- Geoloday, outing for the scientific knowledge of a particular area of geological interest **(E)**.
- Geological Week (intensive programme of activities for the popularisation of Earth Sciences) **(E, P)**.
- Documentary Earth Sciences Section at International Festival of Short Films in Aguilar de Campoo **(P)**.

C) For the general public:

- Geoloday, outing for the scientific knowledge of a particular area of geological interest **(E)**.
- Geological Week (intensive programme of activities for the popularisation of Earth Sciences) **(E, P)**.
- Documentary Earth Sciences Section at International Festival of Short Films Aguilar de Campoo **(P)**.
- Improvement and maintenance of Web, FB and blog **(E, P)**.
- Competitions - exhibitions: 1. Of Land Art projects **(E, P)**. 2. Of video and photography Geological Landscapes **(E, P)**. 3. Of ideas for new local products which refer to geological heritage (bakery, cakes, decorative craft and gifts) **(P)**.



Examples of community empowerment: meetings, volunteer programs, custody of geological sites...

E – INTEREST AND ARGUMENTS FOR JOINING THE UNESCO GGN

Las Loras Geopark Project came about in 2004 out of the interest on the part of some local inhabitants to make the most of the rich geological heritage which exists in the territory with the aim of socio-economically revitalizing this very depopulated zone. Over the last years numerous activities have been carried out and initiatives begun with a view to encourage sustainable development which would help to revert this depopulation, as well as to disseminate, protect and promote the Geological Heritage, with the ultimate aim of joining the GGN when the conditions were appropriate. The interest in belonging to the UNESCO Global Geopark Network is related to the availability of a tool which contributes to the protection of the Geological Heritage, permits implanting a model of sustainable development for the region based in nature tourism and encourages participation both by citizens and the scientific community in the management of the territory. The arguments for joining the UNESCO GGN could be summarised in the following points:

- It would give a strong impulse to the project, due to the UNESCO GGN's international importance.
- It would help us to secure in terms of environmental policies the idea of the importance of Natural Heritage as a development model in this kind of region.
- It would make it clearer both in the region and in our Autonomous Community that Natural Heritage is a fundamental part of the natural riches of our planet and that used in a rational form it can become an important motor for sustainable development.
- Being backed by an international body like UNESCO GGN would give us much more powerful and reinforced management tools.
- We could extend the benefits of the management of geological heritage within our Protected Natural Spaces to other territories which have no such protection, guaranteeing the conservation of their Geological Heritage.
- Being part of the UNESCO GGN would be an exceptional showcase for this region and would boost quality sustainable tourism based on natural and cultural heritage.
- It would be an important stimulus to reinforce scientific activity in the territory and so create synergies between administrations, universities, foundations, associations and citizens.
- We firmly believe that the status of Geopark can enable us to harness and coordinate the actions which different institutions carry out in the region. In this way resources could be optimized and the negative image a part of society has of the management of the Protected Natural Space would improve.
- Due to the international renown of the Network, belonging to it would help us to reinforce and empower citizen participation in the management of the territory.
- Belonging to the Network would facilitate the possibility of work online with other Geoparks both on a national and international level, which would undoubtedly enrich the administration currently being carried out in the Las Loras Geopark Project.
- If the Las Loras Geopark Project were to be included in the Network it would contribute a territory with an outstanding Geological Heritage, in which the quality of the outcrops and their characteristics permit a clear explanation of the geological history, not only of this part of the Basque Cantabrian area but of the southwest of Europe.
- It would be the first Geopark in Castille and Leon and this would have a very important positive impact on the Autonomous Community.