**Additional material**

* + 1. **Bibliographical references**

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**Physical features of the Site:**

Historically, the Pateira must be considered an ancient wide sea-arm where the rivers Cértima, Águeda, and Vouga flowed separately into before the Ria de Aveiro was formed. That sea-arm closed by the silting of the three rivers caused the appearance of a single water course – the river Vouga -, therefore the mouth of the river moved much farther northwest, just like nowadays (Almeida, 2006). Pinho *et al*. (1988) cit Gomes Andrade writes about the Pateira, that the Certoma valley at that point used to be firm land, covered by thick woods, amongst which the river flowed carelessly.

Moreover, according to Pinho *et al*, 1988, it seems admissible to suppose the area would have been extremely rich both in terms of fauna and flora, though the references to these are scarce.

The Pateira would have started taking shape at the end of the XVth century, probably even during the Middle Age, because of the recurrent floods on the rivers Certoma and Águeda and their surrounding meadows. Nowadays, the Pateira corresponds to the silting and spreading of the river Cértima, near the point where it meets the river Águeda.

The largest natural fresh water lake in the Iberian Peninsula presently takes variable areas and assumes different depths, according to the season an average of 2 meters depth with permanent water which, at its maximum extent, encompasses more than 5 km2. These extend on their vast majority over the municipality of Águeda, but they also include the municipalities of Oliveira do Bairro and Aveiro. Hydrographically, the lake is part of the drainage area of the river Cértima, which in its turn is inserted in hydrographical basin of the Águeda, which is part of the hydrographical basin of the river Vouga. The lake is maintained by the river Cértima (upstream), by the Pano brook (to the west), occasionally by other streams, and underground sources (the Aveiro Cretacic aquifer), with the Cértima as the main water course conditioning the lake’s hydrology and physical chemical properties.

On what pertains to the relief of the terrain, the environs of the Pateira features an easy relief to the west, registering the highest altitude area at 50 meters in Fermentelos (municipality of Águeda). To the west, in the Espinhel civil parish, there is an elevation reaching 78 meters high, also revealing slopes with some impact, considering the features of the surrounding area. To the northwest, approximately between Oliveirinha and Requeixo (municipality of Aveiro), there is an extent of territory with an altitude between 50 and 70 meters and soft slopes rolling towards the Pateira. To the southwest, the smooth relief of low altitude harvest fields on the left bank of the river Cértima and Perrães run along the Pateira.

Pateira is surrounded by outcrops of detrital sedimentary rocks, mainly continental, of Cretaceous age in the West, North and South, from the Triassic at East. At the top of the flattened Mesozoic outcrop occur Neogene terraces. The fund is mostly covered by alluvial mud and silt-clay which, in the valley of Cértima display areas with sand and grit well calibrated. The shape and position of the lagoon are related to an elongated depression, 12 km, stretching from Aguada de Baixo to Eirol. It reveals a strong structural control, conditioning, particularly for structures NW-SE and NE-SW, which intersect roughly N-S.

The Pateira of Fermentelos water quality seems to reflect the Cértima river quality and, in a smaller extent, the drained phreatic aquifers and the Pano stream contribution. On the other hand, hydrobiogeochemical processes that take place in the lagoon and control elements speciation influence the lagoon’s water quality. Regarding the chemical and biotic characteristics of elements speciation may be plant uptake, clay adsorption, organic matter complexation, carbonate, sulphate and iron oxyhydroxides co-precipitation. The water quality of the phreatic and semi-confined aquifers seems to be the result of rainwater interaction with soil components and the aquifer matrix.

In what concerns to the main general climate characteristics, the area is influenced by a Temperate and Mediterranean climate that, due to its location between the coast and mountain first set (Serra do Caramulo) which opposes the progress of maritime air masses into the interior, is strongly influenced by the Atlantic Ocean (maritime-type climate). Summers are mild type, with an average maximum temperature of the warmest month (August) of about 28° C. The winters are kind of cool with average minimum temperature of the coldest month (January) to around 4° C, strong winds in the winter are also felt.

**Physical features of the catchment area:**

As mentioned earlier, Pateira and surrounding areas are built into Cértima River watershed, a tributary of the left bank of the river Agueda, in the area immediately downstream of the lagoon of Pateira and before the confluence of the Agueda with the Vouga river.

River Cértima, with a length of 40 km, corresponding to the last five km to Pateira de Fermentelos, has a catchment area of 545 km2, with a dendrite type network. The route of Cértima river is almost straight, oriented N-S, parallel to the contact of the Massif Hesperic with the Mesocenozoic formations of the Lusitanica Basin. The bottom of the valley Cértima present in most of its length, an extensive floodplain, often inundated by floods and used by Oliveira do Bairro for growing rice.

Águeda river has a length of 55 km, where the to last 2,5 km are downstream of Cértima confluence, and it as a river basin of 458 km2, with a dendritic river system also.

The sub-basin of the river Cértima is divided into two parts, the part East of the rougher relief, which develops partially over granites and schist, and the western slope, more flattened, develops on the Mesocenozoic sediment of the Lusitânica. These sediments, mainly due to their detrital composition, often crude and poorly consolidated, are more permeable than the schists and granites, facilitating infiltration and slowing the peak flood in the river Cértima.

In what concerns to Águeda sub-basin, the river extends across most of its area in igneous and metamorphic rocks, which typically low permeability depends on the state of fracturing and alteration of the massif, thus contributing to a greater volume of runoff, which increases the peak flooding of river Agueda at the point of confluence with the river Cértima, near Pateira. It’s important to refer that the Águeda’s catchment area is occupied with undifferentiated occupied by forests (76,4%), followed by annual crops (17,7%) and sparse vegetation (2,4%). The urban areas, industry and trade, represent about 1,3%. In relation to the areas occupied by different land uses for the sub-basin of the river Cértima 47,3% is occupied by forests undifferentiated, 26,2% for annual crops and undifferentiated. Urban areas, industries and trade account for 6% of the total. Note also that in this basin occur rice crops (0,6%), important for the delimited area proposal. The data relate to 2005, Corine Land Cover 2000 map. Other occupations in the catchment area are detailed further below.

In what concerns to the main general climate characteristics, the river basin Cértima, a classification of Daveau (1980) cit. Almeida (1988), is part of "the maritime type climate region of the Atlantic seaboard," featuring a "thermal atmosphere still very smooth, but with some very hot days or cold-sensitive (...) relatively rainy and characterized by strong and persistent cloudiness (Almeida, 1988). the cumulative monthly rainfall data show that in the period of 74 years analyzed, there are a lot of rain in three months - November, December and January, with cumulative monthly rainfall averages 140-158 mm, in contrast to the months of June, July and August, with average cumulative monthly rainfall values below 40 mm. the peaks of precipitation occur in the months of November and December, where there was rainfall of 480 and 540 mm respectively. Precipitation is the result of air masses from the Atlantic and Mediterranean, but given the orientation of the basin, it is expected that the portion of precipitation that contributes most to runoff is the Atlantic. The basin is classified as a moderately wet region, with an average annual rainfall between 1000-1500 mm, with more than 70% of the total annual rainfall falling between October and April. Summers are mild type, with an average maximum temperature of the warmest month (August) of about 28° C. The winters are kind of cool with average minimum temperature of the coldest month (January) to around 4° C, strong winds in the winter are also felt.

**Social and cultural values:**

The local population has a long history of activities connected to the lagoon and surrounded areas, as there are historic records that document activities in the XVth century. Morais in Sousa Baptista (1945) also quotes from of a letter of the royal treasurer of Aveiro to King D. Manuel I (ruled from 1495 to 1521) where he discusses about the Forest of Perrães (probably between Perrães and the front of the Fermentelos civil parish), saying that this had always been hunting-grounds where wild-hogs (probably boars) and deer were game, also mentioning that it was marshy.

It’s unquestionable the value of the area to the local populations not only for the historic importance already mentioned, but also because the goods that the population took and take from the lagoon and surrounding areas: water supply, food, religious, aesthetic values and, in a recent past, the tradition of harvesting freshwater seaweeds from the lagoon to use in the contiguous agricultural fields as fertilizers, nowadays this tradition is been recovered but just for recreational and tourist purposes and to pass on to the recent generations one of the most ancient and typical activity that took place in the area.

Several activities still occur nowadays in the area, namely non-consumptive recreation as people are also engaged in traditional fishing practices with good history of respect for nature, as sport/recreational fishing has gained wide acceptance at the expense of professional fishing. Within the wetland and surrounding areas the cultivation of cereals represent the main agriculture activity: rice fields along the river Cértima and maize in the Águeda floodplain. Other aspect quite representative of the social and cultural value of the area to the local population is related to sport. Daily the local canoeing team trains in the lagoon and from this area has already gone out national champions and Olympic athletes.

Tourism is not well developed at this point, but has good perspective in future, namely the activities related with sustainable tourism namely hiking, bird-watching, among others. The Municipality Authority of Águeda promotes several activities of environmental education/interpretation, as well as some activities and events to promote the scientific research, and the communication between the scientific communities and local population. With regard to the archaeological component is worth mentioning that some studies indicate that the ancient village of Gocha has occurred in this area.

**Recreation and tourism**

The site is used frequently for recreation/tourism activities, not very intense. Along some areas of the site in the Municipalities of Águeda, Oliveira do Bairro and Aveiro, there are different structures that support the visitation and the tourist activities that take place such as leisure parks, avifauna observatories, pedestrian and cycling trails, children's playgrounds, landscape observatories, places to rest, support facilities for the practice of sports. The interest for the area has been rising over the past years.

The marked hiking trails and bike implemented are searched for an increasing number of visitors (in two month’s more than 2000 people register. Is estimated that many more as visited the area). There are more visitors in the summer; however it’s well used throughout the year by walkers and bird watchers.

These activities are mostly well regulated and signed and at current levels are not considered to threaten the site natural values.