

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7, as amended by Resolution VIII.13 of the Conference of the Contracting Parties.

Note for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Bureau. Compilers are strongly urged to provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of maps.

1. Name and address of the compiler of this form:

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Designation date

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Site Reference Number

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2. Date this sheet was completed/updated:

1 May 2005.

3. Country:

Portugal.

4. Name of the Ramsar site:

Bertiandos and S. Pedro of Arcos Lagoons.

5. Map of site included:

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps.

a) **hard copy** (required for inclusion of site in the Ramsar List): yes

b) **digital (electronic) format** (optional): yes

6. Geographical coordinates (latitude/longitude):

41° 45' 12" N / 8° 38' 30" W.

7. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

The Bertiandos and S. Pedro of Arcos Lagoons (LBSPA), on the EN 202, are situated in the district of Viana do Castelo, municipality of Ponte de Lima, on the right bank of the Lima River, and cover parts of the parishes of Bertiandos, São Pedro de Arcos, Estorãos, Moreira do Lima, Sá and Fontão. The nearest largest town is Ponte de Lima.

8. Elevation: (average and/or max. & min.)

8 -30 m above sea level

9. Area: (in hectares)

346

10. Overview:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The LBSPA has high biodiversity together with a good set of landscape, social, economic and cultural values, reinforcing the link with the local population. It is worth to mention the existence of an interesting habitat mosaic, occurring through the Estorãos. River course (fluvial system) and the Lagoons (lacustrine systems), i.e., little woods, riparian vegetation corridors and agricultural and pastures areas. The site landscape pattern and its natural conditions are favorable to a floristic (with 80 rare or locally in danger species) and faunistic diversity, conferring a high conservation and environmental education importance as well as a strong research potential.

11. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8

12. Justification for the application of each Criterion listed in 11. above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 1: the wetland contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

The LBSPA contains some Continental Wetlands types, where the most important are the permanent fresh water lakes (with more than 8 ha) and the temporary fresh water lakes and flood valley lakes, representing a rare natural example within the Continental Biogeographic Region. These lakes are an essentially lacustrine system, with no persistent emergent aquatic vegetation.

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

The faunistic and floristic referred inventory includes:

- a) the existence of 13 birds species included in the Birds Directive's Annex I (table 5 in section 20), like *Ixobrychus minutus*, *Ardea purpurea*, *Falco peregrinus*, *Alcedo atthis*, that possess a favorable conservation status and not restricted to the European continent, according to BirdLife International SPEC; *Sylvia undata*, *Lullula arborea* and *Caprimulgus europaeus*, that possess a favorable and restricted conservation status for the International SPEC.
- b) the existence of 2 mammals species included in the Habitats Directive's Annex II, *Galemys pyrenaicus* "an Iberian and French Pyrenees endemism" (SNPRCN, 1990) and *Lutra lutra*, also present in Annex IV of the same Directive, jointly with one other specie, *Felis silvestris*, and other species (table 6 in section 20).
- c) the existence of 1 reptile species included in the Habitats Directive's Annex, *Lacerta schreiberi*, also present in the same Directive's Annex IV with other species, *Mauremys leprosa*, both Iberian endemisms (SNPRCN, 1990);
- d) the existence of 2 amphibians species included in the Habitats Directive's Annex II, *Chioglossa lusitanica* and *Discoglossus galganoi*, species also present in Annex IV of the same Directive, jointly with others, like *Rana iberica*, that is an Iberian endemism (SNPRCN, 1990), *Hyla arborea* and *Alytes obstetricans*;

- e) the existence of 2 ichthyic species included in the Annex II of the Habitats Directive, the *Chondrostoma polylepis* and *Petromyzon marinus* ; and
- f) the existence of about 500 inventoried floristic species, resulting in about 80 considered rare species or locally in danger (Costa, 1990).

Criterion 3: The wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

Appealing once more to the faunistic and floristic inventory, referred to the LBSPA, becomes easy to notice the area's importance for biodiversity conservation in terms of the Biogeographic Region where it is inserted, considering that it holds:

- a) a set of Iberian endemic species, of which examples are referred for the criterion 2 justification from the 12 point of this file, and from these at least one had the "Insufficiently Know(n) Portugal and Spain's conservation status" (table 3 in section 20) (SNPRCN, 1990);
- b) a set of aquatic avifauna species that according to the Ramsar Convention "are from Wetlands ecologically dependent", with special relevance to the migrant aquatic bird species (table 5 in section 20);
- c) a wide floristic species set that gives to LBSPA a floristic importance. The genetic value that it represents is "fundamental to the ecosystems and ever to the fauna's vitality" (Paiva, 1996 *cit.* in Pereira *et al.*, 2000).

Criterion 4: The wetland supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

The LBSPA bears aquatic avifauna species that nest in the area, like the *Anas platyrhynchos*, *Gallinula chloropus* and *Alcedo atthis*. At the same time it is a resting and feeding site to the migrant aquatic avifauna like the *Ciconia ciconia*, and during the summer period it sustains species like *Ardea purpurea* and *Caprimulgus europaeus* (table 5 in section 20).

Criterion 7: The wetland supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.

The ichthyic LBSPA's fauna, including *Chondrostoma polypelis* and *Petromyzon marinus* which are both listed in Annex II of the Habitat Directive, (table 2 in section 20) is of extreme importance to keep intact the existent food chain, contributing to the global biological diversity, and sustains the representative species interactions of the region benefits and/or values.

Criterion 8: A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

The LBSPA has in its inventory two migrant ichthyic species, *Anguilla anguilla* and *Petromyzon marinus* , that use the Estorãos River chunk during the larval age and as an ecological corridor for the spawning sites located upstream. This region reveals fundamental for the species to complete their life cycle, especially to the Eel conservation, since this species is in a regression status.

13. Biogeography: required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation): Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) **biogeographic region:** Continental Biogeographic Region

b) **biogeographic regionalisation scheme** (include reference citation): Natura 2000

14. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

From the basin's higher points, there are weakly marked convex zones, followed by strongly declivous areas and temporary water line closed valleys ending in the Estorãos River valley, that take form at the upper Estorãos parish region. This general set is interrupted by the appearance of small hills in its inner part.

From the parish, the valley opens progressively, forming a flooding plain, having a 3 m of maximum hypsometric range related to its mouth at the Lima River (2001). Geologically speaking, the LBSPA existing soil fits in a recently formed alluvial band (Quaternary Period) representative of the Lima River lower track and its tributary streams (DRAEDM, 1994), with relatively low average slopes, of thin texture and high depth. According to Hidronorte (2001), in the surrounding areas and in the upper basin section, geologically and lithologically speaking, there are Silurian formations, intensely metamorphosed by medium or thin medium pellet granite intrusion.

Relating the matrix composition with the soils features, the prevailing region soils are hidromorphic, litholic and incipient soils. By the FAO classification, the main LBSPA soil types are classified as "Fluvisolos Dútricos Órticos" in "Aluvio-colvionares" formations and small surrounding "Regossolos Dútricos" speckles. In "Lito-estratográficos" terms, according to Hidronorte (2001) the present set changes according to sedimentologic basin formation features. From the top to the bottom, according to prospecting made, there is a 7-8 m Silt-argillaceous alluvium layer with low thin sand fraction.

At the upper layers, the existing soils spatial diversity comes from the geomorphologic conditions variation, but essentially due to the different soil use. In the most flooding danger pruned areas, covered by natural vegetation, forest or pastures, appears a thick superficial mull layer (> 10 cm) and in the lower layers, on the other hand, low organic matter levels. In the farming areas, the frequent soil ploughing added to other farming practices (e.g. fertilization) resulting in soil with higher drainage capacity, and therefore with higher farming ability. In each of these zones, the soils have always low iron traces, and hydric soils characteristically colors. In the bordering Protected Landscape areas, near the surrounding hills, there are transition soils between alluvium and granitic soils due to its interluding features (Alonso *et al.*, 2001).

According to Gomes (2001) *cit. in* Alonso *et al.* (2001) the basin physiographic features analyses, soil types and precipitation characteristics reveal certain tendency for occurring floods, with a high superficial draining on the October to February period. In an average year situation there is a water deficit period from April to September, and a water abundance situation in the remaining months (Figure 1).

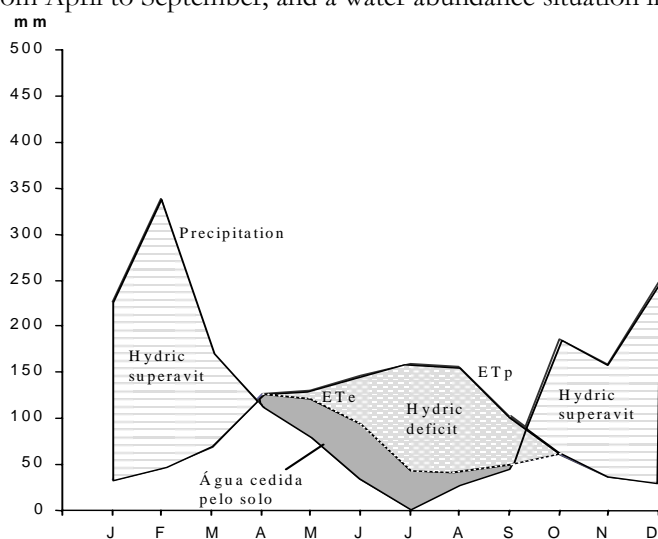


Fig. 1- Estorãos River basin's hydrologic balance, in an average year.

The LBSPA presents high hydric resources abundance, functioning as a collecting area for the all basin, enhanced by the superficial water masses quantity, either in the Estorãos River or at the lagoons, within its flood valley. The lagoons are nourished continuously by small water lines (although there is a strong seasonable discharge variation), occasionally by the Estorãos River overflow, following the surrounding groundwater level variations. At the same time, the lagoon is drained by a dense net, complemented by a uniform reticulate of small trenches that, according to records, were associated to the rice production (Pereira, 1999). In relation to the total area, the Estorãos River and the satate (draining chanel) trench are the primary draining net of the studied zone discharging directly to the Lima river.

In the remaining area, in average terms, the groundwater level is high, even in the dry seasons. Concerning the spatial variation, there is a gradual changing, from the lagoons to the river, grading from the permanent, semi-permanent, seasonal, temporary, intermittent and saturated (Alonso *et al.*, 2001).

15. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The LBSPA climate is determined by the valley location, near to the Lima River, and the basin physiographic fitting. Although there is an Atlantic influence on the region, the high slops and the “Serra de Arga e Cabração” proximity confer higher variations to the several climatic parameters throughout the year. Through the existing pluviometric data analysis, it is possible to verify an average temperature decrease with the altitude and the total precipitation increase parallel to the increasing of inter-annual temperature and precipitation variation (Alonso *et al.*, 2001).

According to Gomes (2001) *cit. in* Alonso *et al.* (2001) the basin’s precipitation values achieved by the Thiessen method, based on values of three meteorological stations (Nogueira, Arga de Baixo and Ponte de Lima), establish a 1755 mm annual average value, where, in the average year, the month with higher precipitation is December, and of the month with lower precipitation is July. According to Alonso *et al.* (2001), the precipitation is irregularly distributed through the year, with an average precipitation from June to September between 200-250 mm. The annual average temperature varies between 14-16 °C, and the temperature range of the monthly average is lower than 20 °C. The higher values occur in the Summer months, with average temperatures near 20°C, and the lower values in the Winter months (December/January) with averages between 7/9 °C (Atlas do Ambiente, Carta I.2, 1974).

The LBSPA, according to DRAEDM (1994) *cit in* Alonso *et al.* (2001) is classified as Atlantic Temperate Land/Coastal region and, based on precipitation, according to the Emberger rate, as Wetland. In phytoclimatic terms, the LBSPA is classified by Pina Manique and Albuquerque (1982) *cit. in* Alonso *et al.* (2001) as at the basal level and Atlantic*Mediterranean-Atlantic (A*MA) represented by phyto-ecologic English Oak (*Quercus robur*) domain (Rusceto*Quercetum roburis Association).

16. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The LBSPA includes several wetlands types, having a set of values like natural water storage, natural flood defense, erosion reduction and nutrients retaining, aquifer recharge, water depuration, supporting food chains and genetic diversity including flora and fauna species with a conservation national or international status.

17. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar “Classification System for Wetland Type” present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)



Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va •
 Vt • W (Xf) Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • (3) • 4 • 5 • 6 • 7 • 8 • (9) • Zk(c)

b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

O/P/ M/N/Xf/3/9.

18. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site.

The LBSPA has an habitat set from which are relevant the water lines with natural and semi-natural dynamics, where the water quality does not have significant changes; Gallery forest with *Salix* sp.; *Alnus glutinosa* alluvial forests; Wet temperate atlantic *Erica ciliaris* and *Erica tetralix* moorsand Peatmass covering of the lower lands (DRAOTN, 2001), included in the Habitat Directive's Annex I, with the last two examples classified as priority Habitats.

19. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Table 1- Main Flora Species Inventoried for the LBSPA Area (Costa, 1990).

Species
<i>Lycopodiella inundata</i> (L.) Holub in Presl.
<i>Narcissus bulbocodium</i> L. subsp. <i>masculata</i>
<i>Ilex aquifolium</i> L.
<i>Arnica montana</i> L. subsp. <i>atlantica</i> A. Bolós
<i>Pinguicula lusitanica</i> L.
<i>Utricularia australis</i> R. Br.
<i>Drosera intrermédia</i> Hayne
<i>Drosera rotundifolia</i> L.
<i>Campanula rapunculus</i> L.
<i>Nuphar lutea</i> (L.) Sibth & Sm.

20. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Table 2- Main Inventoried Fish Species for the LBSPA Area (Araújo, 2000; Araújo 1998; Mayan & Valente, in press; Rodrigues, 1999; Valente 1988 and 1990; Valente & Alexandrino, 1990; Valente & Heland, 1991).

Species	T	LV	DH2
<i>Chondrostoma polypelis</i>	DUL	NT	II
<i>Anguilla anguilla</i>	MIG	CT	
<i>Petromyzon marinus</i>	MIG	V	II
<i>Salmo trutta</i>	DUL/MIG	NT/V	
<i>Gasterosteus aculeatus</i>	DUL	K	

T- Organism type: Dul- fresh water/MIG- migrant (SNPRCN, 1991)

Lv- Portuguese Vertebrates Red Book Vol. II: V- vulnerable/NT- not threatened/CT- commercially threatened

Dh2- Annex II Habitats Directive (animal and vegetal species with communitarian interest that its conservation requires Special Zones of Conservation creation)

Table 3- Main Amphibian Inventoried Species for the LBSPA Area (CMPL, 2000; Rodrigues, 1999).

Species	LV	Be	DH2	DH4
<i>Chioglossa lusitanica</i>	K	II		IV
<i>Alytes obstetricans</i>		II		IV
<i>Discoglossus galganoi</i>	NT	II	II	IV
<i>Hyla arborea</i>	NT	II		IV
<i>Rana iberica</i>	NT	II		IV

Lv- Portuguese Vertebrates Red Book Vol. I: NT- not threatened/K- insufficiently known

Be- Annex II Berna's Convention (faunistic species strictly protected)

Dh2- Annex II Habitats Directive (animal and vegetal species with communitarian interest that its conservation requires Special Zones of Conservation creation)

Dh4- Annex IV Habitats Directive (animal and vegetal species with communitarian interest that demands a rigorous protection)

Table 4- Main Reptile Inventoried Species for the LBSPA Area (CMPL, 2000; Rodrigues, 1999).

Species	LV	Be	DH2	DH4
<i>Lacerta schreiberi</i>	NT	II	II	IV
<i>Mauremys leprosa</i>	NT	II		IV

Lv- Portuguese Vertebrates Red Book Vol. I: NT- not threatened

Be- Annex II Berna's Convention (faunistic species strictly protected)

Dh2- Annex II Habitats Directive (animal and vegetal species with communitarian interest that its conservation requires Special Zones of Conservation creation)

Dh4- Annex IV Habitats Directive (animal and vegetal species with communitarian interest that demands a rigorous protection)

Table 5- Main Birds Inventoried Species for the LBSPA Area (Gonçalves, 2000; Rodrigues, 1999).

Species	EST	LV	Be	DA1
<i>Ixobrychus minutus</i>	E	NT	II	I
<i>Ardea purpurea</i>	E	V	II	I
<i>Egretta garzetta</i>		NT	II	I
<i>Ciconia ciconia</i>	P	V		I
<i>Accipiter nisus</i>	R	I	II	I
<i>Circaetus gallicus</i>	I	K	II	I

<i>Falco peregrinus</i>	I	R	II	I
<i>Pluvialis apricaria</i>		NT		I
<i>Caprimulgus europaeus</i>	E	K	II	I
<i>Alcedo atthis</i>	R	NT	II	I
<i>Sterna paradisea</i>		NT	II	I
<i>Lullula arborea</i>	R	NT		I
<i>Sylvia undata</i>	R	NT	II	I

Est- Phenology : R- resident/I- wintering/E- seasonal/P- passage migrant

Lv- Portuguese Vertebrates Red Book Vol. I: NT- not threatened/K- insufficiently known/V- vulnerable/I- undetermined/R- rare

Be- Convention Annex II Berna's Convention (faunistic species strictly protected)

Dh1- Annex I Birds Directive (animal and vegetal species with communitarian interest that demands a Special Zones of Conservation creation)

Table 6- Main Mammals Inventoried Species for the LBSPA Area (Rodrigues, 1999 Gonçalves, 2000).

Specie	LV	Be	DH2	DH4
<i>Galemys pyrenaicus</i>	V	II	II	IV
<i>Mustela putorius</i>	K			
<i>Lutra lutra</i>	K	II	II	IV
<i>Felis silvestris</i>	I	II		IV
<i>Apodemus sylvaticus</i>	NT			IV

Lv- Portuguese Vertebrates Red Book Vol. I: V- vulnerable/K- insufficiently know/I- undetermined /NT not threatened

Be- Annex II Berna's Convention (faunistic species strictly protected)

Dh2- Annex II Habitats Directive (animal and vegetal species with communitarian interest that its conservation requires Special Zones of Conservation creation)

Dh4- Annex IV Habitats Directive (animal and vegetal species with communitarian interest that demands a rigorous protection) .

21. Social and cultural values:

e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

Currently, the cultural and social values inherent to LBSPA results from the strong relations between this area and the local population. However, the area potential determines an increasing seek and interest by other actors, like forestry, agriculture, water provision for agricultural use, pasturing, aesthetic patrimony, environmental education, leisure activities and outdoors recreation, tourism and scientific investigation. However, some of these activities are susceptible to influence the natural processes and the local ecological features, specially:

- the agrarian activities, with an increasing abandonment of the "Tapada" pastures areas, with shrubby vegetation and tree vegetations sucession the intensification in the "veigas" (agricultural areas), spreading exotic species plantation (*Eucalyptus globulus*);
- the entertaining, educational and scientific activities, from which currently does not result significant impacts on the environment, given the recent hunting and fishing prohibition. However the areas are increasingly seeking for the referred purposes, so there is the urgent need of planning these actions in an integrated manner.

22. Land tenure/ownership:

(a) within the Ramsar site: The LBSPA fits in a small patch of ground in a region characterized by high land property dispersion: 460 parcels with about 300 owners, mostly private, with the exception of the existing Hydric Public Domain areas. Currently, about 17% of the area (60 ha) belongs to Ponte de Lima City Hall. This managing entity is strategically acquiring land in this zone.

(b) in the surrounding area: In the surrounding areas the private property is also dominant, with the exception of the basin's upper part, where there are large uncultivated areas managed together by local institutions, Parishes or Joint parties Commission and the Institute for Forests "Direcção-Geral das Florestas".

23. Current land (including water) use:

(a) within the Ramsar site: The LBSPA is in the basin's lower part (5-40 m), bordered by a high demographic density zone (Table 7) due to the natural (e.g. good soils and the Lima river) and social-economics (e.g. roads and other social-economics infrastructures) elements presence.

Table 7. Socioeconomic indicators from the regions around the Estorãos river basin.

Administrative region	Altitude (m)	Population census		Population increase		Total area (km ²)	Pop./area (n ^o ./km ²)
		1981	1991	(Number)	(%)		
Bertiandos	0-30	404	440	36	8,2	2,3	194,7
Sá	20-50	367	391	24	6,1	2,9	133,9
Estorãos	30-150	655	547	-108	-19,7	17,1	32,0
Arcos	30-100	687	647	-40	-6,2	14,4	44,8
Moreira do Lima	40-100	1131	1168	37	3,2	10,2	114,9
Cabração	150-350	230	180	-50	-27,8	16,4	10,9
Total	0-800	3474	3733	-101	-3,0	63,3	53,3

Source: Censo Geral da população (1981) and Censo Geral da População (1991).

The flooding area sets in the Estorãos River water line borders, at about 2 km of the Lima river mouth, surrounding two lagoons located in natural depressions. In these areas dominate the "tapadas" pastures (areas where the parcels are divided by natural edges/fences, resulting in a "bocage" landscape type). The increasing land abandonment leads to the appearance of small groves and very dense floristic formations.

The agriculture develops basically in two zones, the Bertiandos fertile valley and the Sobreiro fertile valley with a main soil use of annual corn/rye-grass succession. Autumn/Winter produces a cutting fodder/forage, with an October sowing and a final cut in May. Following the primary ploughing, the corn is set until the Summer end.

In the contiguous regions to these areas and in the populations' proximity, occur parcels occupied by horticulture for self-consumption, eventually with vine, fruit and olive tree border. The forest area is mainly characterized by autochthonous vegetation, like small *Quercus robur* woods and all the bordering water lines and the lagoons vegetation, such as *Alnus glutinosus*, *Fraxinus angustifolia* and *Salix* spp.. By the other hand, it is also possible to find exotic species settlements, such as the *Pinus pinaster* and the *Eucalyptus globulus*, this last introduced voluntarily by man, as opposite to others exotic species.

(b) in the surroundings/catchment: To the hydrographical basin level, the heterogeneity and the innumerable possible combinations between social-economics and natural features make it relatively difficult to zone these areas. According to Barbosa (2001) and Morais (2001) it is possible to identify four distinct zones:

- a valleys zone, with alluvium soils, altitudes lower than 50m, where the LBSPA are fit;

- a half hillside zone, with rural urban array, densely populated, with transition and granite soils, with altitudes mainly between 50 m to 100 m but that can be stretched to upper altitudes following the population settlements; 5-15% slopes occupied by cultural systems and complex parceled out, with arborous/shrubby cultures and annual irrigated cultures, resulting in a high agrarian and landscape fragmentation due to the parcels small area;
- a forest feature slope zone, mainly with schist soil, altitudes between 100-400 m, the average slope between 15-35% and covered specially by coniferous spots and mixed deciduous/coniferous settlements; in the last years there is an Eucalyptus area increase and fire potential risk and therefore susceptible to deep, extensive and fast landscape changes, where individual private and collective areas (uncultivated) coexist;
- altitude zone or mountain areas with low human presence, above 500 m, until the “Serra de Arga” location (> 800 m) with average slopes above 35%, with very homogeneous landscape and occupation stability.

24. Factors (past, present or potential) adversely affecting the site’s ecological character, including changes in land (including water) use and development projects:

(a) within the Ramsar site: The adverse factors that bring, according to Rodrigues (2000), undesirable effects to the LBSPA local ecosystems, are associated to human activities such as:

- a small rural project in the 50/60 decade: negative impacts made to the fauna and flora by trenches destruction and quickset hedges cut and the harmonization resulting from the agriculture landscape reorganization;
- forest settlement: exotic introduction such as *Eucalyptus globulus* and *Pinus pinaster*, and the development of invading species such as the *Aquiu* sp.;
- the bovine cattle’s grazing decrease in the “tapadas” zones: profound changes on floristic composition due to the loss of the balance maintained by animal grazing and stepping and hedges cut;
- the corn and horticulture intensification production: increasing herbicides and pesticides application, with direct negative impacts on the herbaceous flora and insects, and indirectly on the insectivorous birds. The use of nitrogen fertilizers and their lixiviation, aggravated by the lack of traditional ‘labaças’ (*Rumex conglomeratus*) cleaning made by farmers in the lagoons (Rodrigues, 2000), may justify a greater primary productivity of the aquatic vegetation (Pereira, 1999; Gonçalves, 2000 *cit. in* Rodrigues, 2000) and the decrease of free water surface and water oxygen levels, with indirect impacts to the fauna, i.e. the ecosystem biodiversity and quality (Rodrigues, 2000);

Other practices with direct impact on the resources are:

- hunting and fishing: although forbidden, it is important to be aware of these activities and make the necessary surveys in order to control illegal hunting and fishing;
- the wild plants harvest: negative impacts directly to the floristic diversity and genetic abundance;
- the forest fires: made annually from February to April by shepherds, with the aim of achieving good pastures (Gonçalves, 2000 *cit. in* Rodrigues 2000), aid some exotic species development and increase the soil erosion.
- the Estorãos River cleanness: negative impacts on the riparian and aquatic flora, resulted in the river shore degradation, river bed and sedimentary process change, and the ichthyofauna and aquatic avifauna adaptation to these new conditions;
- opening and cleaning of drainage trenches in the flooded space: the average groundwater level of the surrounding area becomes lower and the dry season may extend to a period of 2-3 months.

(b) in the surrounding area: At the basin level, the main impacts on this space are related with action of different nature, such as:

- the soil occupation changing, namely a Eucalyptus plantation at a 100-200 m belt: a continuous speckle appearance with impacts over the hydrologic regime, fire potential increase and the agricultural and pastures area abandonment at the basins upper section leading to ecological instability due to the human departure, specially in the terrace areas;
- substructures construction (e.g. IC28) with regional importance: impacts over the corridors from the valley to the mountain zones and over all biotic and landscape environment, specially during the construction period; the urban areas or the population density may increase at the parishes located at the basin East section, leading to a growing LBSPA isolation level.
- industrial and inert matter extraction units in the area proximity with water and air quality direct impacts, eventually reduced by the construction of suitable treatment stations and the settlement of quick set hedges;
- in the last years there is a saline intrusion advance inwards to the Lima River, as well as water quality degradation (Ferreira, 2000), with impacts over the LBSPA upstream area.

25. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

The LBSPA area is included and protected by several ordination instruments and plans, such as:

- the 2000 Natura Net, inserted in the Lima River n.º 3 site (PTCON 00020);
- the Ponte de Lima City Hall Guiding/Managing Plan (PDM), including LBSPA area into the National Ecological Reserve (REN) and the remaining as part in National Agricultural Reserve (RAN). In the new PDM, the LBSPA area will be classified as Biotope Reserve Protection Area;
- the Lima River's Hydrographic Basin Managing Plan (POBHRL);
- recently this area was classified as Bertíandos and S. Pedro of Arcos Lagoons Protected Landscape (PPLBSPA) (Dec. Reg. N.º 19/2000 of 11 of December);
- the Bertíandos and S. Pedro of Arcos Lagoons Protected Landscape Managing and Guiding Plan Motion (Costa et al., 2001), that, legally speaking, has to be approved during the three years after the area's classification, i.e., until 2003 December, 11.

At the same time, all the activities that related to hunting and fishery were recently forbidden, due to the fact that the Institute for Forests has considered this area as a shelters area.

The meantime conservation/preservation adopted measures are related to the action and disposals implementation set on this issue exhibited plans, namely by the in force legislation set, the control/inspection reinforcement and cleanliness punctual actions and signing placing.

26. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc

The Bertíandos and S. Pedro of Arcos Lagoons Protected Landscape Managing and Guiding Plan Motion (in elaboration).

27. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

This area has deserved the attention for research by several entities (Superior Education, research and Environmental Defense organizations and institutes), public institutes and individualities. So there are several studies that cover the physical characterization, social-economic activities dynamics, either related to the area either to the hydrographic basin, fauna and flora.

With the aim of increasing the knowledge about this area, the following protocols were set: 1) between the Ponte de Lima City Hall and the Trás-os-Montes and Alto Douro University, where the second signing

entity will design a measures set in order to the Estorãos River rehabilitation; 2) between Ponte de Lima City Hall and the Minho University, where the second signing will elaborate a set of studies with the aim of the existing vegetation speckles floristic characterization and delimitation, the potential natural vegetation estimation, the terrestrial vertebrates inventory, determinate the fauna and the different landscape units association and the LBSPA potentiality evaluation for the reported fauna; 3) between Ponte de Lima City Hall and the “Faculdade do Porto” Science Faculty Development Association, where the second signing will develop a study named as “The LBSPA Fishponds Inventory”; 4) between Ponte de Lima City Hall and the Ponte de Lima Agrarian Upper DERTA/School, where the second signing will develop studies for the Hydric Resources Managing at the LBSPA and Patrimony Preservation and the Rural Activities at the LBSPA, and also Thematic Digital Cartography elaboration and a Geographic Information System.

Concerning the substructures, the LBSPA has one Environmental Interpretation Centre, where it is possible to find all the information available on the Protected Landscape and find out about the activities carried out on the area - particularly those related to the network of 5 walking tracks and 3 historical-cultural routes, as well as about how to participate in information and training sessions. Complementing the LBSPA is the Quinta de Pentieiros, where the facilities include: Visitor's Centre, Camping site, Hostel, Plant Nursery, Barns and Stables, which allow for accommodation as well as leisure activities associated with its rural environment.

28. Current conservation education:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

This type of area allows excellent environmental education conditions in a direct contact with nature, increasing the public awareness for the conservation and preservation of these spaces. There is a wide activities range that may be developed by the basic and professional schools, associations; tourists and mainly with the local population that has a direct concern on the area.

From the activities already in place, it is worthy to mention the elaboration and edition of many publications, the implementation of pedestrians paths, the promotion of environment cleaning activities and educational activities in schools with the aim of introducing the LBSPA, an activities set performance by the “Tree's Day”, the “World-wide Environment Day”, the “Wetlands International Day”, among others.

It has been a priority to involve the local population directly in the resources preservation, conservation and sustainable use, and on the constant vigilance made in this area. In order to achieve a better promotion of these activities a three-monthly Bulletin is in place. This Bulletin has a 500 copies edition and has been sent to all the City Hall area schools, to the children that take part in the activities and to the resident population of the surrounding area parishes.

29. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

The LBSPA has been an attractive site for some associations and schools, and for recreation purposes such as bicycle tourism and pedestrians paths. However, as in all the Lima Valley, in the surrounding parishes there is a Rural Space's Tourism (T.E.R) expansion and high dynamics. The Nature Tourism development, with the LBSPA creation, allows for the tourism increase and define complementary projects between these two modalities. The Ponte de Lima's City Hall is planning to set some pedestrians paths and observation points, selecting carefully the passage seasons and sites and supported by small substructures and information, either at the reception office, either during the path. The same institution acquired a LBSPA's near by real state, the "Quinta de Pentieiros" with the aim of setting some substructures and to develop complementary actions to those made inside the LBSPA area.

The LBSPA has been equipped with infrastructure and facilities that allow an accurate interpretation of its values, offering at the same time a better understanding from both educational and recreational perspectives.

30. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectorial, e.g. Dept of Agriculture/Dept. of Environment, etc.

The LBSPA belongs to the Ponte de Lima City Hall territory and under the Regional Development and Territory's Management Ministry managing jurisdiction.

31. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

The Ponte de Lima City Hall is in charge of the LBSPA management, where a member of the Institute for Nature Conservation takes part on the board of direction.

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32. Bibliographical references:

scientific/technical references only. If biogeographic regionalisation scheme applied (see 13 above), list full reference citation for the scheme.

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