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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DD MM YY

Designation date

Site Reference Number

2. Date this sheet was completed/updated:

1 Mai 2006

3. Country:

Portugal

4. Name of the Ramsar site:

Mondego Estuary

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* ×-or- *no* □

b) digital (electronic) format (optional): *yes* □ -or- *no* □

6. Geographical coordinates (latitude/longitude):

40º08'N 008º50'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 site is located in the Centre region, in the mouth of the Mondego river; about 1km Southeast from Figueira da Foz and 44km West from Coimbra.

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

0 - 16m

9. Area: (in hectares)

1518

10. Overview:

This site is part of the estuary of the biggest river exclusively Portuguese, the river Mondego. The site is an area in which the river divides into two stretches surrounding an island in the intertidal estuary – the Murraceira island (Ilha da Murraceira). These two stretches merge again 1km from the mouth of the river, very close to the town of Figueira da Foz. The southern arm of the river has intertidal areas, salt marshes and reed beds. The Murraceira island and the south area from the southern arm of the river include salt marshes, salt pans, rice fields and fishfarms. The area between the southern arm and the Pranto river has salt marshes, reed beds and rice fields. In

comparison with its relatively small size, this area is representative of wetland values in the West coast of Portugal. Its importance for birds is well known but it also supports a diverse intertidal macroinvertebrate community.

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.

This site represents a rich estuarine system of a large river, the most significant of its type in the country at North from Lisboa. The Salinas represent a rich and traditional use of the wetlands, as well as constitute a valuable habitat for waterbirds.
There are 7 habitats from Annex I (Habitats Directive), one of them prioritary*: 1130 Estuaries; 1150* Coastal lagoons; 1210 Annual vegetation of drify lines; 1310 *Salicornia* and other annuals colonizing mud and sand; 1320 *Spartina* swards; 1410 Mediterranean salt meadows (*Juncetalia maritimi*) e 1420 Mediterranean and thermo-atlantic halophilous scrubs (*Sarcocornetea fruticosi*).

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

This site supports several species listed in annex I of Bird Directive or in appendix II of Bern Convention Little egret *Egretta garzetta*, purple heron *Ardea purpurea*, flamingo *Phoenicopterus ruber*, Marsh harrier *Circus aeroginosus*, osprey *Pandion haliaetus*, black-winged stilt *Himantopus himantopus*, avocet *Recurvirostra avosetta*, kentish plover *Charadrius alexandrinus*, little ringed plover *Charadrius dubius*, turnstone *Arenaria interpres*, sanderling *Calidris alba*, little stint *Calidris minuta*, curlew sandpiper *Calidris ferruginea*, dunlin *Calidris alpina schinzii*, ruff *Philomachus pugnax*, bar-tailed godwit *Limosa lapponica*, wood sandpiper *Tringa glareola*, green sandpiper *Tringa ochropus*, little tern *Sterna albifrons*, short-eared owl *Asio flammeus*, bluethroat *Luscinia svecica*).

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.

In comparison with its relatively small size, this area is representative of wetland values in the West coast of Portugal. Its importance for birds is well known but it also supports a diverse intertidal macroinvertebrate community.

During the breeding season the site is regionally important for waterbird species that breed in very localised conditions, especially the black-winged stilt *Himantopus himantopus,* kentish plover *Charadrius alexandrinus* and the little tern *Sterna albifrons*.

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

Due to the shortage of suitable habitats for migrant waterbirds in the north western coast of Portugal, this site constitutes one of the main stop-over and refuge areas in the region. This is particularly important for waders, especially the avocet *Recurvirostra avosetta* and the flamingo *Phoenicopterus ruber.*

During the breeding season the site is regionally important for waterbird species that breed in very localised conditions, especially the black-winged stilt *Himantopus himantopus,* kentish plover *Charadrius alexandrinus*, little tern *Sterna albifrons* and redshank *Tringa totanus*..

During winter, this site is used as wintering site by several waterbird species, including the oystercatcher *Haematopus ostralegus*, avocet *Recurvirostra avosetta*, ringed plover *Charadrius hiaticula*, grey plover *Pluvialis squatarola*, lapwing *Vanellus vanellus*, knot *Calidris canutus*, sanderling *Calidris alba*, little stint *Calidris minuta*, curlew sandpiper *Calidris ferruginea*, dunlin *Calidris alpina*, snipe *Gallinago gallinago*, black-tailed godwit *Limosa limosa*, bar-tailed godwit *Limosa lapponica*, whimbrel *Numenius phaeopus*, curlew *Numenius arquata*, green sandpiper *Tringa ochropus*, redshank *Tringa totanus*, greenshank *Tringa nebularia*, common sandpiper *Actitis hypoleucos*, turnstone *Arenaria interpres*.

Also during migration it provides staging conditions to several bird species mentioned above and also to little ringed plover *Charadrius dubius*, ruff *Philomachus pugnax*, spotted redshank *Tringa erythropus*, golden plover *Pluvialis apricaria* and wood sandpiper *Tringa glareola*.

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 Mondego estuary holds an important fish community and it is especially important as a migration path for diadromous (migratory) species and nursery ground for several marine species (60% of the total fish abundance). Three main species use the estuary as nursery ground: Sea bass (*Dicentrarchus labrax*), Flounder (*Platichthys flesus*) and Sole (*Solea solea*). They occur mainly on Summer and Autumn and its importance has been increasing due to the increase of prey (macroinvertebrates) productivity in the last years. One of the most abundant species in the estuary is a diadromous species, the Mullet (*Liza ramada*).

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: Mediterranean

b) biogeographic regionalisation scheme (include reference citation): Nature 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.

The Mondego estuary is on the Portuguese Atlantic coast and it is located in a warm temperate region with a continental temperate climate. It consists of two arms (North and south) separated by an island (Murraceira island). The two arms become separated in the estuarine upstream area, about 7km from the sea, and join again near the mouth. These two arms differ in their hydrographical characteristics. The north arm is deeper (5 to 10 m during high tide, tidal range about 2 to 3 m), while the south arm (2 to 4 m deep during high tide) is shallow and due to siltation in its upstream section the water circulation is dependent on tides and fresh water input from a tributary, the Pranto river, that represents an important inorganic nutrient input (mainly nitrogen and phosphorous). Therefore, most of the freshwater of Mondego river flows essentially by the north arm. In addition, due to differences in depth, the penetration of the tide is faster in the north arm, causing daily changes in salinity to be much stronger, whereas daily water temperature changes are higher in the south arm. The estuary location is fixed just to south of an uplifted relief, the Serra da Boa Viagem. Despite the significant fluvial and tidal flows, the strong southwards alongshore current built an important spit, and therefore the estuary is morphologically classified as bar-built. Before the construction of several dams during the decade of 1970, the fluvial regime was directly controlled by the seasonal precipitation in the catchment basin, with a large bed-load inflow to the estuary. However, with the construction of several large dams, the fluvial regime was smoothed, reducing slightly the water discharge, but most of the bed-load remains trapped. The solid inflow to the estuary from the Mondego tributaries downstream of Coimbra is about 26,500 m^3/year.

The tidal regime, coupled with the fluvial inflow controls the shape and sedimentary dynamics of the Mondego estuary. It is affected by a mesotidal regime, with semi-diurnal tides tides and small diurnal inequality.

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 Mondego river has a catchment basin of 6.671 km^2, draining granitoids, metamorphic and sedimentary rocks. Downstream of Coimbra the river flows in a floodplain up to 4km wide. The lower Mondego valley, from Coimbra

downstream, is plain and is mainly used for agriculture (corn and rice mainly) while the higher Mondego valley is used mainly for forestry.

16. Hydrological values:

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

Salt is extracted manually from estuarine water.

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.

G, H, F, 5, 3, 2, 1, 6, 4, 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 environmental variability of Mondego estuary is reflected on the flora present. Sand and mudflats are dominated by the seagrass (*Zoostera nolti* (Zoosteretum noltii)). This community was estimated in 15ha in 1986 but decreased due to eutrophication (1997: 0,02 ha). In 2002 was estimated in 1.6 ha. Channels are colonized by the community Ruppietum maritimae, dominated by *Ruppia maritima*. Saltmarshes are colonized by annual species *Puccinellia maritima* and *Salicornia ramosissima* (Pucccinellio maritimae – Salicornetum ramosissimae). These are also present on abandoned salines. Intertidal mudflats are colonized in sucession according to the distance to the margins, by Spartinetum maritimae (*Spartina maritima*), *Arthrocnemum fruticosum* and *Halimione portulacoides*. They are substituted in several higher areas by Limonio vulgaris – Juncetum maritimae. The transition to lower salinity areas is characterized by *Scirpus maritimus*.

The site holds an important intertidal benthic macroinvertebrate community dominated by the gastropod *Hydrobia ulvae*.

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*.

There are no flora species with special conservation status. There are however 7 habitats from Annex I (Habitats Directive), one of them prioritary*: 1130 Estuaries; 1150* Coastal lagoons; 1210 Annual vegetation of drify lines; 1310 *Salicornia* and other annuals colonizing mud and sand; 1320 *Spartina* swards; 1410 Mediterranean salt meadows (*Juncetalia maritimi*) e 1420 Mediterranean and thermo-atlantic halophilous scrubs (*Sarcocornetea fruticosi*).

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.*

It is important for many waterbirds during migration and winter. Flamingo *Phoenicopterus rubber* and white egret *Egretta garzetta* are common. The most common wader species are dunlin *Calidris alpina*, avocet *Recurvirostra avosetta*, grey plover *Pluvialis squatarola*, ringed plover *Charadrius hiaticula*, and Kentish plover *Charadrius alexandrinus*. During breeding season the most common species are black-winged stilt *Himantopus himantopus*, kentish plover *Charadrius alexandrinus* and the little tern *Sterna albifrons*.

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.

Traditional fishing, collection of intertidal macroinvertebrates, rice cultivation, hunting and salt production have deep cultural roots. Nowadays, aquaculture and fishing are the most rentable activities. Fishing activities are particularly focused on three migratory (Diadromous) species of high economic value, the Sea lamprey (*Petromizon marinus*), Allis shad (*Alosa alosa*) and Twaite shad (*Alosa fallax*). This activity is usually more active from January until May although its presence has been decreasing in the last years, probably due to the incorrect management of water discharges on upstream dams.

22. Land tenure/ownership:

(a) within the Ramsar site:

Most of the intertidal areas are public and managed by the local public administration. The wetlands, Salinas, aquacultures and agricultural areas are privately owned.

(b) in the surrounding area:

Most of the agricultural fields are privately owned.

23. Current land (including water) use:

(a) within the Ramsar site: Agriculture, forestry, fishing, intertidal macroinvertebrate collection, salt production, aquaculture and hunting. Education.

(b) in the surroundings/catchment: Agriculture, forestry, fishing and hunting.

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:

Traditional salt production has been gradually decreasing during the last decades. Salinas have been abandoned or transformed in aquacultures, which are more profitable. This resulted in loss of suitable habitats for waders and other waterbirds. Illegal hunting and fishing also occur, but has been gradually reduced.

(b) in the surrounding area:

The input of nutrients (mainly nitrates and phosphates) from the agricultural fields (mainly rice) has encouraged the eutrophication of the estuary and the subsequent occurrence of macro-algae blooms on the south arm. From 1998 onwards several mitigation measures improved the hydraulic regime reducing the nutrient loading in the south arm. However, in the future this may not be sufficient if the nutrient loading from the catchment area increase as expected.
The site is also adjacent to an important harbour that has been expanding, and an industrial region. These activities may have a long term impact on the site.

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.

This site has been proposed and selected for IBA (Important Bird Area) in 2003. Part of the area is included in the National Ecological Reserve. An INTERREG project (S.A.L. – Sal do Atlântico) is currently (2005-2007) promoting salinas revitalization and biodiversity monitoring and management.

26. Conservation measures proposed but not yet implemented:

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

A management plan is under development. A report was made by several specialists in order to provide scientific basis for the inclusion of Mondego Estuary on Natura 2000 network.

27. Current scientific research and facilities:

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

The Institute of Marine Research (IMAR) – University of Coimbra, carries out an ongoing project of monitoring from late 80's till now. This comprises intensive monitoring of several compartments of the ecosystem, namely, birds, subtidal and intertidal macroinvertebrates, macroalgae, seagrass, plankton and nutrients. Several other small scale research studies have been performed by other scientific institutions.

28. Current conservation education:

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

The Figueira da Foz City Museum has bought a Salina and restored the existing facilities to operate as a Museum of the Salt (inaugurated in 2003) and provides facilities for school visits and information booklets about the salt production. The permanent building of the museum will be finished in 2005. There are nature trails connecting the museum with the salinas around and observation sites have been placed in strategic points.
Some published guides already provide walking tracks to observe the wetlands and Salinas.
Public awareness actions are performed during summer since 2001 to promote the importance of intertidal areas to wetlands. These actions are yearly publicized in national and regional journals.

29. Current recreation and tourism:

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

Recreational use by tourists during weekends and practice of sailing and motor boating on the north arm of Mondego river.

30. Jurisdiction:

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

MADRP (Ministry of Agriculture and Fisheries) – National Agricultural Reserve; MAOTDR (Ministry of Environment) – National Ecological Reserve; IPTM (Institute of Harbours and Sea Transports) – Public Hydric Domain.

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.

No single management authority. Several agencies share the management of this site.

Main responsible authority:

Comissão de Coordenação e Desenvolvimento Regional do Centro
Rua Bernardim Ribeiro, 80
3000-069 Coimbra
Telefone: 239 400 100
Fax: 239 400 115
e-mail: geral@ccdrc.pt

32. Bibliographical references:

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

Costa L, Nunes M, Geraldes P, Costa H (2003) *Zonas Importantes para as Aves em Portugal*. Sociedade Portuguesa para o Estudo das Aves, Lisboa.

European Commission (1996) *Interpretation Manual of European Union Habitats*. DG XI – Environment, Nuclear Safety and Civil Protection. Nature Protection, Coastal Zones and Tourism.

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Leitão R (2005) *Ecologia da Ictiofauna do estuário do Mondego: Variação na composição e estrutura ao longo da última década*. Dissertação de Mestrado, Departamento de Zoologia, Universidade de Coimbra.

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