

Information Sheet on Ramsar Wetlands (RIS) – 2006 version

Available for download from http://www.ramsar.org/ris/key_ris_index.htm.

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX.22 of the 9th Conference of the Contracting Parties (2005).

Notes 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. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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

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Environment and Nature Protection – Via Capitan Bavastro
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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

12 June 2006

3. Country:

Italy

4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Oasi di Castelvolturno o Variconi

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

- a) Designation of a new Ramsar site ; or
b) Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

If the site boundary has changed:

- i) the boundary has been delineated more accurately ; or

- i) the boundary has been extended ; or
iii) the boundary has been restricted**

and/or

If the site area has changed:

- i) the area has been measured more accurately ; or
ii) the area has been extended ; or
iii) the area has been reduced**

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site:

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

a) A map of the site, with clearly delineated boundaries, is included as:

- i) a hard copy (required for inclusion of site in the Ramsar List): ✓;
ii) an electronic format (e.g. a JPEG or ArcView image) ✓;
iii) a GIS file providing geo-referenced site boundary vectors and attribute tables

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

N-W: Volturno river; N-E: Scatozza site, Fosso Boccone River and "La Torre" and "Pineta Grande" sites; S: Tirreno See.

8. Geographical coordinates (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

x = 15° 56' 07" Est (centroid)

y = 41° 01' 28" Nord (centroid)

9. General location:

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

South of Italy, Campania Region, Province of Caserta and municipality of Castelvoturno.

10. Elevation: (in metres: average and/or maximum & minimum)

min 0 - media 1 - max 2

11. Area: (in hectares)

195

12. General overview of the site:

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

The wetland lies within the left bank of the Volturno delta; it includes a freshwater pond and a saline lagoon separated by an artificial levee which connects the riparian strip with the mainland. The pond and the lagoon are connected by means of a series of buried canals. An underground canal connects the pond with the Volturno River itself. The site represents the last remaining wetland of a former far more extensive complex of swamps drained between the XVII and the XVIII century, which ran from Volturno River down to the Campi Flegrei area, at the outskirts of Naples. The morphology of the site and the pedogenetic sequence are characteristic of deltaic environments typical of the Mediterranean peninsular region.

In this area, some freshwater courses bear still the name of “Règi Làgni” (royal waters), as they are the result of ancient drainage schemes constructed between the XVII and the XVIII centuries, which interested the whole region comprised between the Volturno delta in the North, the Campi Flegrei and the area around the Vesuvium in the South. These streams originate from within Nola plain by the confluence of a series of torrents coming down the Appennines and Mount Somma, flowing towards WNW with a wide bow around Acerra town. After crossing the divide between the Caserta and Aversa plateau, they run down towards the Thyrrhenian Sea, slightly South-easterly in respect to the Volturno mouth.

The nature reserve “Volturno-Costa Licola Delta” is significantly larger than the wetland itself; it extends up to 1550 ha, including parts of Naples and Caserta provinces with Lake Patria, the Volturno delta and the sandy coastal strip colonised by *macchia* vegetation and by a pine forest growing on the internal side of the dune, which extends along both the northern and the southern edge of the delta. It represents one of the areas endowed with the largest number of aquatic bird species within the whole Thyrrhenian coastal area. Hundreds of species and thousands of specimen transit and/or spend winter by the ponds situated within the delta. Among these: *Podiceps* sp.pl., *Larus* sp.pl., *Sterna* sp.pl. and *Phalacrocorax carbo* are the commonest.

13. Ramsar Criteria:

Tick the box under 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). All Criteria which apply should be ticked.

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9

14. Justification for the application of each Criterion listed in 13 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 site represents a peculiar example of a residual morphologically pristine site, belonging to the last remaining portion of a far larger wetland area drained between the XVII and the XVIII century. This used to include the coastal strip going from the Volturno delta down to Campi Flegrei. The morphology of the site and the pedogenetic sequence are characteristic of deltaic environments typical of the Mediterranean peninsular region.

The site hosts remarkable examples of arborescent halophilous vegetation. This area is mostly covered by tidal rivers, estuaries, mud flats, sand bars, lagoons (66%), with habitats corresponding to Directive Habitats 1130 and 1310; salt marshes, salt pastures, salt steppes (12%) corresponding to priority habitat *1510, heath, scrub, maquis and garrigue, *Phryganea* (8%) corresponding to 9320; other arable land (6%) and other land (8%).

Criterion 2: the area supports populations of species mentioned in Annex II and III of Directive 79/409/CEE and habitats mentioned in Annex I and II of Directive 92/43/CEE.

Species listed in Annexes II of the Habitat Directive and observed in the site include: *Rhinolophus hipposideros*, *Rhinolophus ferrumequinum*, the threatened species (D’Antoni *et al.*, 2003) *Emys orbicularis*, *Elaphe quatuorlineata*, *Lampetra fluviatilis*, *Petromyzon marinus*, *Alosa fallax* and *Melanargia arge*.

Remarkable is the presence of *Coluber viridiflavus*, *Lacerta viridis*, *Lacerta sicula*, *Sympecma fusca*, *Lestes dryas*, *Scarites buparius*, *Leuciscus cephalus* and *Barbus barbus plebejus*.):

Scarites buparius and *Lestes barbarus*:: Mediterranean species, in Italy N, S, Si and Sa.

Leuciscus cephalus:: in Italy N, S, Si, Sa.

Barbus barbus plebejus:: in Italy N, S.

Coluber (Hierophis) viridiflavus ssp. Carbonarius: in Italy N, S, Si and Sa.

Lacerta viridis/ bilineata complex: In Italy N, S and Si.

Lacerta (Podarcis) sicula: in Italy N, S, Si, Sa.

Species listed in Annex I of the “Wild Birds” Directive and observed in the site: *Alcedo atthis*, *Ardea purpurea* (1-5 individuals), *Ardeola ralloides*, *Asio flammeus*, *Aythya nyroca*, *Botaurus stellaris* (1-5 individuals), *Burhinus Voedienemus*, *Chlidonias chybridus*, *Chlidonias niger*, *Ciconia ciconia*, *Circus aeruginosus* (1-5 individuals), *Circus pygargus*, *Egretta alba*, *Egretta garzetta* (6-10 individuals), *Falco columbarius*, *Gelochelidon nilotica*, *Glareola pratincola*, *Grus grus*, *Himantopus himantopus*, *Ixobrychus minutus*, *Lanius collurio* (1-5 couples), *Larus melanocephalus*, *Luscinia svecica* (1-5 individuals), *Melanocorypha calandra*, *Milvus migrans*, *Nycticorax nycticorax*, *Pandion haliaetus*, *Philomachus pugnax*, *Platalea leucorodia*, *Plegadis falcinellus*, *Pluvialis apricaria*, *Recurvirostra avosetta*, *Sterna albifrons*, *Sterna caspia*, *Sterna hirundo*, *Sterna sandvicensis*, *Tringa glareola*, *Ciconia nigra*, *Circus cyaneus*, *Phoenicopterus ruber*, *Alauda arvensis*, *Anas acuta*, *Anas clypeata*, *Anas crecca*, *Anas Penelope*, *Anas querquedula*, *Anas strepera*, *Aythya ferina*, *Aythya fuligula*, *Calidris canutus*, *Coturnix coturnix*, *Fulica atra* (11-50 couples, 501-1000 individuals), *Gallinago gallinago*, *Gallinula chloropus* (6-10 couples), *Haematopus ostralegus*, *Larus argentatus*, *Larus canus*, *Larus cuscus*, *Larus ridibundus*, *Limosa limosa*, *Lymnocyptes minimus*, *Mergus serrator*, *Numenius arquata*, *Numenius phaeopus*, *Pluvialis squatarola* (6-10 individuals), *Rallus aquaticus*, *Tringa erythropus*, *Tringa nebularia*, *Tringa totanus*, *Turdus merula* (1-5 couples), *Turdus philomelos*, *Anser albifrons albifrons*, *Larus marinus*, *Vanellus vanellus*, *Phalacrocorax carbo sinensis*.

Scientific name	Status	IUCN categ.	L.n.157 92	709/409 CEE	Cites	Bonn	Berna
<i>Phalacrocorax carbo sinensis</i>	M-W	LR/nt	x				x
<i>Ardea purpurea</i>	M (1-5 i.)	LC	x	x			x
<i>Ardeola ralloides</i>	M	LC	x	x			x
<i>Botaurus stellaris</i>	M, W (1-5 i)	LC	x	x			x
<i>Ixobrychus minutus</i>	N-M	LC	x	x			x
<i>Nycticorax nycticorax</i>	M	EX	x	x			x
<i>Ciconia ciconia</i>	M	LC	x	x			x
<i>Ciconia nigra</i>	M	LC	x	x	x	x	x
<i>Platalea leucorodia</i>	M	LC	x	x	x	x	x
<i>Plegadis falcinellus</i>	M	LC	x	x			x
<i>Egretta alba</i>	W	LC	x	x			x
<i>Egretta garzetta</i>	M-W (6-10 i)	LC	x	x			x
<i>Phoenicopterus ruber roseus</i>	M-W	LC	x	x	x	x	x
<i>Anser albifrons albifrons</i>	M	LC	x	x		x	x
<i>Anas acuta</i>	M-W	LC		x		x	x
<i>Anas clypeata</i>	M-W	LC		x		x	x
<i>Anas crecca</i>	M-W	LC		x		x	x
<i>Anas penelope</i>	M-W	LC		x		x	x
<i>Anas querquedula</i>	M-W	LC		x		x	x
<i>Anas strepera</i>	M-W	LC		x		x	x
<i>Aythya nyroca</i>	N?	NT	x	x		x	x
<i>Aythya ferina</i>	M-W	LC		x		x	x
<i>Aythya fuligula</i>	M-W	LC		x		x	x
<i>Mergus serrator</i>	M-W	LC	x	x		x	x
<i>Circus aeruginosus</i>	M-W (1-5 i)	LC	x	x	x	x	x
<i>Circus pygargus</i>	N?-M	LC	x	x	x	x	x
<i>Circus cyaneus</i>	M-W	LC	x	x	x	x	x

Milvus migrans	M	LC	x	x	x	x	x
Falco colombarius	M	LC	x	x	x	x	x
Pandion haliaetus	M	LC	x	x	x	x	x
Coturnix coturnix	N-M	LC		x		x	x
Grus grus	M	LC	x	x	x	x	x
Fulica atra	N (11-50 c) - W 501-1000 i)	LC		x		x	x
Gallinula chloropus	N (6-10 c)-M- W	LC		x			x
Rallus aquaticus	M-W	LC		x			x
Gelochelidon nilotica	M		x	x			x
Sterna albifrons	M-N?	NT	x	x		x	x
Sterna caspia	M	RE	x	x			x
Sterna hirundo	N-M	LC	x	x			x
Sterna sandvicensis	M	LC	x	x			x
Chlidonias hybridus	M	LC	x	x			x
Chlidonias niger	M	LC	x	x			x
Larus marinus	A	LC	x	x			
Larus argentatus	N-M-W	LC	x	x			
Larus melanocephalus	M-W	NA	x	x		x	x
Larus canus	M-W	LC	x	x			x
Larus fuscus	M-W	LC	x	x			
Larus ridibundus	M-W	LC	x	x			x
Burhinus oedicephalus	N-M	LC	x	x		x	x
Glaucopis trichas	M	LC	x	x		x	x
Himantopus himantopus	N-M	LC	x	x		x	x
Recurvirostra avosetta	M	LC	x	x		x	x
Haematopus ostralegus	M	LC	x	x			x
Tringa glareola	M	VU	x	x		x	x
Tringa erythropus	M	LC	x	x		x	x
Tringa nebularia	M	LC	x	x		x	x
Tringa totanus	M	LC	x	x		x	x
Numenius arquata	M	NT	x	x		x	x
Numenius phaeopus	M	LC	x	x		x	x
Limosa limosa	M	NT	x	x		x	x
Pluvialis apricaria	M	LC	x	x		x	x
Pluvialis squatarola	M-W (6-10 i)	LC	x	x		x	x
Gallinago gallinago	M-W	LC					
Lymnocyptes minimus	M	LC		x		x	x
Vanellus vanellus	M-W	LC		x		x	x
Philomachus pugnax	M	LC		x		x	x
Calidris canutus	M	LC	x	x		x	x
Asio flammeus	M-W	LC	x	x	x		x
Alcedo atthis	N-M-W	LC	x	x			x
Lanius collurio	N (1-5-c)-M	LC	x	x			x
Luscinia svecica	M-W (1-5- i)	LC	x	x			x
Melanocorypha calandra	N-M	LC	x	x			x
Alauda arvensis	N-M	LC		x			x
Turdus merula	N (1-5-c)-M- W	LC		x			x
Turdus philomelos	M-W	LC		x			x

Criterion 3: the area supports populations of plant and animal species important for maintaining the biological diversity of the Mediterranean Region.

There is the presence of many species of reptiles (*Emys orbicularis*, *Elaphe quatuorlineata*, *Coluber viridiflavus*, *Lacerta viridis/bilineata* complex, *Lacerta sicula*), fishes (*Lampetra fluviatilis*, *Petromyzon marinus*, *Alosa fallax*, *Leuciscus cephalus* and *Barbus barbus plebejus*) and entomofauna (*Melanargia arge*, *Sympecma fusca*, *Lester dryas*, *Scarites buparius*, ecc) that show the importance of the site for the Mediterranean (particularly Tirrenian Area) Region.

Criterion 4: the area supports populations of animal species during the wintering period, in particular wildfowl.

Hundreds of specimens of *Himantopus himantopus*, *Philomachus pugnax*, *Tringa glareola*, *Calidris minuta*, *C. ferruginea*, *C. alpina*, as well as dense flocks of *Tringa stagnatilis*, *Numenius arquata*, *Numenius phaeopus*, *Limosa limosa*, *T. nebularia*, *T. totanus*, *T. erythropus*, congregate to feed during the migration period.

The area is an important roosting site during winter months for *Circus aeruginosus* which is regularly present in this area and has a wintering population (roost with 16 ex) corresponding to more than 1% of overall estimated number of specimens present within the country as a whole (ref.: dr. Claudio Mancuso, Naples) .

(see also species list for criterion 2)

15. 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 Region

b) biogeographic regionalisation scheme (include reference citation):

European Councils Habitat Directive 92/43/EEC

16. 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.

During the last 60 years, the middle and lower course of the Volturno river stretch flowing through Caserta Province underwent profound morphological and hydrological changes. These caused significant impacts onto the riverine, estuarine and coastal fish fauna. In the past, the Volturno used to flow forming wide meander bows between Capua and Castelvoturno close to the delta; these extensive wetlands, traditionally called “parks”, used to remain inundated during several months after the floods and favoured the development of fishes typical of lentic eutrophic waters. The ecological health of these wetlands used to progressively degrade during the summer months. Malaria was endemic in the area downstream from Capua; its population used to be given access to state-distributed malarial treatment.

Climate informations of the site

Temperature (C°):

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
6,7	8,4	9,5	11	15,4	18,7	21	21,2	19,2	14,7	10	8,1	13,6

Rain (mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
72,8	57,3	61,1	57,2	48,9	23	3,2	42,6	60,9	117,3	98,7	118,3	761,3

17. Physical features of the catchment area:

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

In early times, the Volturno Delta used to extend out into the sea; between 1616 and 1876 this outward extension, on the basis of ancient cartography, used to reach as much as 2 km, sustained by the provision of sand and detritus contributed by marine currents. A sand bar formed in parallel to the coastline, giving origin to a little coastal gulf. This last feature, thanks to the progressive accumulation of material, evolved into a first lagoon still partially connected to the sea, then into brackish ponds. These coastal ponds represent the last remaining estuarine wetland in Campania Region. In particular, the Variconi ponds, represent the residue of a vast complex of wetlands that used to extend continuously up to the Garigliano in the North and beyond, and that persisted until large scale drainage works carried out in the 1930s.

The ponds are delimited by the river in the North, by a NATO base to the East, by the coast to the West and by a maritime pine forest to the South. The ponds are not permanently connected to the sea, but there are canals which connect them to among each other and link them to the delta. The waters are brackish; they are partly supplied by seawater infiltration, partly by meteoric water. The Variconi biotope represents a site of remarkable ecological relevance due to the functions that it fulfils in relation to the biological cycle of a large number of migrant birds. Its flora includes rare plants and habitats such as *Aster tripolium* and several *Limonium* species (*L. vulgare*, etc.). The surface of the area extends up to 195 ha, of which 60 ha are wetlands *sensu stricto*. In 1978 Caserta Province instituted a faunal conservation reserve; after 1993 the whole area was included in the Volturno delta and Licola Coast Nature Reserve.

18. Hydrological values:

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

The Volturno river stems from Mount Rocchetta (952 m a.s.l.) from Capo Volturno or Capo d'Acqua spring (568 m) and flows into the Tyrrhenian Sea, 175 km below. Its catchment extends over 5558 km², not including the stretch connecting Capua to the coast where the river flows are contained between artificial levees and receive very little contribution from the surrounding catchment. The Volturno is characterised by a brisk flow, a deep channel and turbid waters. Its average discharge is 82,7 m³ s⁻¹. Floods are infrequent but can be severe, especially when the Scirocco wind melts the upper catchment snows and restrains the flow from exiting outward into the sea. The river flows across the provinces of Campobasso, Benevento and Caserta. In Campobasso Province its left bank receives Colle Alto stream, Lorda torrent, il Rio torrent, San Vito stream, Sava di Gallo river, Cavaliere river, Vandra torrent; the right bank receives Acquoso stream, Chiaro stream, La Rava torrent, Rava di Pozzilli torrent, Rocchetta stream. In Benevento Province it receives, from the left, Alimenta torrent, Calore Irpino river, Iscler river, Prata torrent, Titerno torrent.

The Volturno enters the region of Campania in proximity of Piana di Capriati in Caserta Province. The main river course evolves from the source down to the valley, flowing from the highly natural habitats which characterise the first stretch, characterised by forest and by an extensive riparian woodland, to the lower hilly pastures and then further to progressively more intensively cultivated soils, with a progressive thinning of the riparian strip, and with the appearance of artificial embankments.

The confluence of the Calore Irpino tributary into the main river and the stretch influenced by the numerous residential centres of the Caserta conurbation cause a dramatic alteration of the condition of the fluvial ecosystem, with an increase of anthropogenic contamination, carried by the river down to the estuary to the proximity of Castel Volturno. The progressive worsening of the riverine ecosystem described above is confirmed by the progression of the LIM physico-chemical index along its course from the upper catchment downwards. The score is high in the first monitoring stations before it rapidly decreases in its middle course and then once more after the confluence of the Calore Irpino. The contribution of the Titerno does not improve significantly its status; the water borne by this torrent is of high quality but it is severely affected by water diversion and by the karstic nature of its catchment which tends to naturally reduce its flow. Biotic indices based on macroinvertebrate monitoring represent a picture which is coherent with the chemical monitoring data, with decreasing biotic index scores from the upper towards the lower catchment, going from the first to the third quality score, characterised by a reduced biodiversity, the absence of contamination sensitive taxa, habitat degradation, discharge reduction, anaerobiosis, presence of decomposing organic matter reflecting a highly significant bacterial

activity. Overall, the ecological condition of the Volturno varies along its entire course keeping within classes 2 and 3, while habitat quality ranges from good to sufficient.

Changes incurred over the centuries have profoundly affected the infrastructure posed by the early drainage works. Several have been partly covered with concrete, none of them is being maintained.

The delta of the Volturno can be described as a symmetrical delta. The estuarine plain is comprised between sea level and 3 m and has undergone significant drainage with a progressive reduction of water availability during the last 2 centuries. Especially in the Regi Lagni area, wetlands are still present, such as in the area between the river and the canal Agnena. Drainage is operated by means of pumping stations. The undulated deltaic plain is covered by coastal vegetation (Castel Volturno pine forest) interspersed with small ponds, many of which are aligned along the coast.

19. 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: E • F • G • H • I • J •

Human-made: • 2 • 3 • 9 •

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.

E (dune systems and humid dune slacks):	5%
F (permanent water of estuaries and estuarine systems of deltas):	5%
G (intertidal mud, sand or salt flats):	5%
H (salt marshes, tidal brackish and freshwater marshes):	30%
I (tidal/freshwater swamp forests):	5%
J (brackish to saline lagoons with at least one relatively narrow connection to the sea):	15%
2 (includes farm ponds, stock ponds, small tanks):	30%
3 (irrigation channels):	3%
9 (drainage channels):	2%

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The area situated South of Volturno River is interested by the hydrological network known as the “Regi Lagni”, which, together with the main roads and cultivated fields, defines the recognisable structure of urban development up to our days. The Regi Lagni are constituted by an imposing complex of canals built under Bourbon domination when the Spanish government offered a rare demonstration of efficiency by giving Domenico Fontana the task of designing one of the most remarkable catchment management schemes of his time. The entire drainage basin of the Regi Lagni extends up to a surface of 1300 km²; the area is partly flat, delimited at its northern end by the Domitian coastline and by the Liri-Garigliano-Volturno basin; at its South-eastern end it joins the Province of Caserta, Nola and the northern flanks of the Vesuvium; at its South-western end it meets the Campi Flegrei.

The project was conceived with a precise design which took due notice of geographical and morphological conditions. Its main purpose was to favour the establishment of a novel hydraulic balance and provide flood containment structures which would have increased the surface available for agriculture along Clanio river. The hydraulic network collects the spring flow in the wide plain situated North of Naples and transfers water from Nola to Acerra and then to a coastal outlet between the Volturno delta and Patria Lake.

Three main ecological zones can be described to characterise emerging botanical patterns:

- a. the lacustrine zone (central portion of the ponds)

- b. the palustrine zone (where plants have permanently submerged roots, even during summer months) is characterised by botanical associations amenable to the “*Phragmitetalia* W. Koch, 1926 (*Phragmitetum communis*, *Scirpetum maritimi*)” and by *Juncus compressus* Jacq. dominated communities.
- c. the partially emerged zone (flooded during the winter period and entirely dry during spring-summer months) characterised by botanical associations amenable to the “*Salicornietalia* Br.-Bl., 1931 (*Salicornietum fruticosae*), *Juncetalia maritimi* Br.Bl., 1931” (*Caricetum divisae*, *Juncetum maritimi*).

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, 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.*

The site hosts remarkable examples of arborescent halophilous vegetation. This area is mostly covered by tidal rivers, estuaries, mud flats, sand bars, lagoons (66%), with habitats corresponding to Directive Habitats 1130 and 1310; salt marshes, salt pastures, salt steppes (12%) corresponding to priority habitat *1510, heath, scrub, maquis and garrigue, *Phrygana* (8%) corresponding to 9320; other arable land (6%) and other land (8%).

- 1130. Estuaries. Downstream part of a river valley, subject to the tide and extending from the limit of brackish waters. River estuaries are coastal inlets where, unlike 'large shallow inlets and bays' there is generally a substantial freshwater influence. The mixing of freshwater and sea water and the reduced current flows in the shelter of the estuary lead to deposition of fine sediments, often forming extensive intertidal sand and mud flats. Sediment deposition tends to form a delta at the mouth of the estuary where the tidal currents are faster than flood tides.
- 1310. Salicornia and other annuals colonising mud and sand. Formations composed mostly or predominantly of annuals, in particular *Chenopodiaceae* of the genus *Salicornia* or grasses, colonising periodically inundated muds and sands of marine or interior salt marshes. *Thero-Salicornietea*, *Frankenietea pulverulenta*, *Saginetea maritima*. Sub-types Mediterranean halo-nitrophilous pioneer communities (*Frankenion pulverulenta*): formations of halo-nitrophilous annuals (*Frankenia pulverulenta*, *Suaeda splendens*, *Salsola soda*, *Cressa cretica*, *Parapholis incurva*, *P. strigosa*, *Hordeum marinum*, *Sphenopus divaricatus*) colonising salt muds of the Mediterranean region, susceptible to temporary inundation and extreme drying;
- 1510 * Mediterranean salt steppes (*Limonietalia*). Associations rich in perennial, rosette-forming (*Limonium* spp.) or esparto grass (*Lygeum spartum*), occupying soils temporarily permeated (though not inundated) by saline water and subject to extreme summer drying, with formation of salt efflorescence. Characteristic syntaxa are *Limonietalia*, *Arthrocnemetalia*, *Thero-Salicornietalia* and *Saginetalia maritima*.
- 9320. *Olea* and *Ceratonia* forests. Thermo-Mediterranean woodland dominated by arborescent *Olea europaea* ssp. *silvestris*, *Ceratonia siliqua*, *Pistacia lentiscus*, *Myrtus communis*.

22. 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.*

The site serves an important refuge function in respect of a varied aquatic bird fauna. *Himantopus himantopus*, *Charadrius dubius*, *C. alexandrinus* and *Glarola praticola* reproduce regularly within the inland wetlands and in the pans which dry during the summer months.

Hundreds of specimens of *Himantopus himantopus*, *Philomachus pugnax*, *Tringa glareola*, *Calidris minuta*, *C. ferruginea*, *C. alpina*, as well as dense flocks of *Tringa stagnatilis*, *Numenius arquata*, *Numenius phaeopus*, *Limosa limosa*, *T. nebularia*, *T. totanus*, *T. erythropus*, congregate to feed during the migration period.

Additional remarkable species include: *Phoenicopterus ruber*, *Ardea cinerea*, *Bubulcus ibis*, *Egretta garzetta*, *Ardeola ralloides*, *Egretta alba*, *Circus aeruginosus* and *Anas* spp. common in temporary ponds. *Phalaropus lobatus* and *Anthus petrosus* were recently (2004) spotted in the area, the sighting of the latter species represents only the eighth time in the whole country (O.Janni, 01.02.2004).

The area is an important roosting site during winter months for *Circus aeruginosus* which is regularly present in this area and has a population corresponding to more than 1% of overall estimated number of specimens present within the country as a whole.

During the last century the site used to host *Acipenser sturio*.

23. Social and cultural values:

a) Describe if the site has any general social and/or 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:

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box and describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

a) within the Ramsar site: public / private

Ownership category	On-Site	Off-Site
Non governmental organisation	+	+
National, regional and local authority, municipality	+	+
Private	+	+

b) in the surrounding area: public / private

25. Current land (including water) use:

a) within the Ramsar site:

- Permanently irrigated land
- Coniferous forest
- Beaches, dunes, sand bars
- Coastal lagoons

(b) in the surroundings/catchment:

- Permanently irrigated land
- Coniferous forest
- Beaches, dunes, sand bars

Coastal lagoons
 Fishing and hunting: recreational/sport
 Coastal tourism and recreation

26. 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: anthropogenic change, illegal urbanisation and poaching
 During the last 60 years, the middle and lower course of the Volturno river stretch flowing through Caserta Province underwent profound morphological and hydrological changes. These caused significant impacts onto the riverine, estuarine and coastal fish fauna.
 The progressive drainage and the construction of dams to create irrigation storage as well as hydroelectric power potential brought some major impacts. The riparian wetlands decreased in the areas comprised between the river bank and the artificial levees. The catchment did not have a system of riparian depression that could contain flood surges. The construction of large and medium lentic storage reservoirs led to a high eutrophication potential. The exploitation of river sand for building constructions during the 1980s caused the formation of small retention basins along the river banks, partly supplied by the riverine aquifer, partly by the floods (as in the case of abandoned gravel pits). Human impact caused significant reduction of fish biomass and to the distribution of fish species.

(b) in the surrounding area:
 - anthropogenic change, illegal urbanisation;
 - dams and artificial canals built along the upper course of the Volturno produced morphological and hydrological changes. The cobble covered riverbed in the area comprised between Ailano and Ruviano used to be known as one of the few remaining active reproduction sites of *Alosa fallax nilotica* and of *Acipenser sturio*. Up to the last century, the sturgeon used to come up the Volturno beyond the residential centre of Capua. The commercial sturgeon fishery was popular and used to provide town families with a delicious meal; the fisherman who used to catch a sturgeon would enjoy a day of glory. Nowadays the sturgeon has gone from the Volturno and from the majority of Italian rivers. During the 1950s, a Capua fisherman died after being hit hard by the tail of a sturgeon, this particular specimen was 100 kg according to Aldo Marino (medical practitioner, maire of Capua).

27. Conservation measures taken:

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ; Ib ; II ; III ; IV ; V ; VI

c) Does an officially approved management plan exist; and is it being implemented?:

A plan management is approaching by Locals Authority.

d) Describe any other current management practices:

- 1) Regional Nature Reserve "Foce Volturno-Costa di Licola" officially instituted with Deliberazione n. 65/12.02.1999;
- 2) Important Bird Area (IBA);
- 3) SIC IT8010018 "Paludi costiere dei Variconi" – (EU-Directive 92/43/CEE)
- 4) The tribunal has taken control of the area to prevent abuse as requested by the judge (G.I.P. Giudice per le Indagini Preliminari) from the Tribunal of S. Maria Capua Vetere (Caserta), on the 27th January 2005.

28. Conservation measures proposed but not yet implemented:

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

Currently, a number of buildings and infrastructures with no legal building permit are being demolished. Poaching has been targeted by a specific plan of activity led by security forces, focussing onto protected species. A number of sites within the area have been secured under preventive judiciary confiscation.

29. Current scientific research and facilities:

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

The site is under scrutiny by the University of Naples, especially by the Institute and Museum of Zoology of the Science Faculty. Specific researches are being undertaken in botany and entomology. The avifauna is under continuous monitoring.

In the proximity of the area, the Experimental Centre-Pilot authority of Castelvolturno (under the Soil Sciences, Plants and Environment Department of the University of Naples) carries out its activities. In this centre, researchers implement observations and experiments related to the agricultural chemistry field. The centre can rely upon a meteorological station connected to the national monitoring network (UCEA and MIPAF).

Current research activities focus upon:

The definition of productive systems optimisation criteria and the implementation of innovative strategies supporting sustainable farming;

The definition of nutrient flux parameters, in particular at the level soil/plant to establish highly efficient manuring levels for the optimisation of vegetable production, for the protection of environmental resources, for the control of pedoclimatic variability, for the optimisation of production techniques, for giving support to the needs expressed by Lower Volturno farmers.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

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

A dedicated project targeting environmental education called "Let's adopt the oasis" has been designed by 2 NGOs (Legambiente together with LIPU) to develop environmental themes close to the curricula of primary and middle school children. Student classes conduct guided tours to the "Variconi" wetland within the Domitian coastline. These ponds are a main resting spot during the migration of birds from Africa to Central and Eastern Europe. The direct observation of local fauna and flora are complemented by interdisciplinary lectures to gain a deeper appreciation of the issues and the nature value of the area.

The pupils directly involved in the exercise suggest measures for the conservation of the observed protected area and contribute themselves to the continued monitoring of its ecological status.

Relevant objectives include the establishment of all possible synergies between society at large, private entrepreneurs and government authorities for the re-birth and the protection of an area endowed with remarkable natural features next to serious environmental degradation.

Born as a special agreement between the government and the city council of Castelvolturno, "Adottiamo l'Oasi" is being carried out in conjunction with the "Salvaitalia" campaign lead by Legambiente and with "Volo libero" by the Lipu.

31. Current recreation and tourism:

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

The site is not well equipped for hosting visits and eco-tourism; educational activities purposely designed for school children will be progressively adapted to meet the requirements of cultural and eco-tourism.

The site is provided with a bird observation hut and with a nature trail.

32. Jurisdiction:

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

A significant portion of the area has been confiscated by the judicial authority: Decreto di sequestro preventivo emesso dal G.I.P. (Giudice per le Indagini Preliminari) del Tribunale di S. Maria Capua Vetere (Caserta) in data 27.01.2005.

The remaining portion of the site is being managed by Campania region, the Province of Caserta and Castelvoturno city council.

33. 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.

- Ministry of Environment, Nature and Sea Protection: Directorate General for Nature Protection - Via Capitan Bavastro 174 00100 Rome – E-mail: dpn-dg@minambiente.it
- Campania Region: Environmental planning, Landscape, and protected areas Service-Directional Center- Isola A/6 – 80100 Naples - E-mail: l.criscuologaito@maildip.regione.campania.it
- Province of Caserta: Fish and game Office- Via Lamberti Area ex Saint Gobain - 81100 Caserta - E-mail: mariomammone@provincia.caserta.it
- Municipality of Castelvoturno: 81030 Castelvoturno (CE) - Piazza Annunziata - E-mail: web@comune.castelvoturno.ce.it

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

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