

**1. Date this sheet was completed/updated:** 1/6/1998

**2. Country:** Greece

**3. Name of wetland:** Nestos Delta and adjoining Lagoons

**4. Geographical coordinates:** lon: 24<sup>0</sup> 47' lat: 40<sup>0</sup> 54'

**5. Altitude** (average and/or max. & min.): 0

**6. Area** (in hectares): 21,930

**7. Overview** (general summary, in two or three sentences, of the wetland's principal characteristics):

It is a large delta with a variety of habitats, part of a wetland complex of 100 km of continuous coastline, which includes the adjoining Ramsar site of Vistonis- Porto Lagos - Ismaris. It consists of lagoons separated from the sea by narrow sandy strips, remnants of a riverine forest, reeds along the river beds and the canals, freshwater lakes with reedbeds and water lilies, agricultural land. and poplar plantations.

**8. Wetland type** (please circle the applicable codes for wetland types as listed in Annex I of the Explanatory Note and Guidelines document):

**marine-coastal:** A · B · C · D · E · F · G · H · J · K

**inland:** L · M · N · O · P · Q · R · Sp · Ss · Tp

Ts · U · Va · Vt · W · Xf · Xp · Y · Zg · Zk

**man-made:** 1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9

**Please now rank these wetland types by listing them from the most to the least dominant:** 3, J, A, H, E, G, F, N, O, Ts, Xf, 9.

**9. Ramsar Criteria:** (please circle the applicable criteria; see point 12, next page)

1a · 1b · 1c · 1d | 2a · 2b · 2c · 2d | 3a · 3b · 3c | 4a · 4b

**Please specify the most significant criterion applicable to the site:** 3b

**10. Map of site included?** Please tick yes  or no

(Please refer to the Explanatory Note and Guidelines document for information regarding desirable map traits)

**11. Name and address of the compiler of this form:**

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## 12. Justification of the criteria selected under point 9, on previous page

Criterion 1: see Sections 16 and 18

Criterion 2: see Sections 17 and 18

Criterion 3: see Section 18

Criterion 4: see Section 18

**13. General location:** The wetland is situated in the eastern part of Northern Greece, in the Region of Anatoliki Makedonia and Thraki (Macedonia and Thrace). The nearest big cities are Xanthi to the east (37,500 people) and Kavala (58,025 people) to the west, 16 km and 25 km away from the wetland respectively.

## 14. Physical features:

Geology and geomorphology: Nestos Delta is an alluvial lowland plain consisting of lagoons, saltmarshes, shallow brackish areas, dunes, riparian and lowland forest.

Origins: It is a natural ecosystem intensively modified by human interventions (1960).

Hydrology: River Nestos (130 km in Greece) has high water levels in winter and spring and an average annual discharge of 58m<sup>3</sup>/sec. An irrigation dam has been operating since 1966 in Toxotes and a hydroelectric dam has been constructed upstream since 1985 but is not yet in operation. The lagoons hydrologically depend primarily on Nestos discharge and secondarily on the discharge of other torrents and of the irrigation channels.

Soil type and chemistry: The soil consists mainly of clay, sandy clay, clayey sand, gravel, silt, humid clay, and coastal deposits.

Water quality (physico-chemical characteristics): Water quality of the river Nestos is high, with pH 7.86. Other parameters are provided in the table below.

<u>Physical parameters of Nestos River</u>	<u>Average value</u>
Conductivity	305.6 µmhos/cm
Cl <sup>-</sup>	0.1 meq/l
SO <sub>4</sub> <sup>-</sup>	05 meq/l
HCO <sub>3</sub>	3 meq/l
Na <sup>+</sup>	0.4 meq/l
Mg <sup>++</sup>	0.3 meq/l
Ca <sup>++</sup>	2.9 meq/l
Dissolved O <sub>2</sub>	11 mg/l

Waters in the lagoons are quite eutrophic.

Depth, fluctuations and permanence of water: Lagoons are shallow with a maximum depth of 0.5m and only in some parts they are deeper (0.80-1.00 m). Lagoons have high water levels in summer and autumn.

Tidal variations: The tidal variations are narrow (25 cm).

Catchment area: The entire catchment area of Nestos River is 5,751km<sup>2</sup> of which the 2,314 Km<sup>2</sup> lie in Greece.

**Climate:** The climate is intermediate between Mediterranean and mid-european type. The average annual temperature is 15<sup>0</sup>C. Minimum air temperatures occur in January (4.1<sup>0</sup>C-5.3<sup>0</sup>C) while maximum temperatures occur in July (23.3<sup>0</sup>C-25.9<sup>0</sup>C). The average annual precipitation is 580 mm. November, December, and January are the wettest months. The driest one is July. The coldest period is December-February with an average number of 11 days of frost.

#### **15. Hydrological value:**

The primary hydrological values of the wetland is groundwater recharging, irrigation water supply as well as flood control performed mainly by the riparian forest and the salt marshes. The riverbed of Nestos also acts as a filter to the water of the surface and of the groundwater layers.

**16. Ecological features:** Remarkable habitats are the existing riparian forest-mainly softwood; the river bed with sand banks, forested islands, dry river branches, and standing waters; the freshwater lakes, with reed beds and water lilies; the mosaic of habitats at the river mouth with reedbeds, tamarix scrubs and inland dunes; and several lagoons with surrounding salt marshes. The remaining lowland forest “Kotza Orman” (3,000 ha), despite its considerable devastation, is the largest and most intact lowland forest in Greece. The existing sand dunes are the largest and the most undisturbed in NE Greece, dominated by an endemic plant association: *Ephedra distachya* - *Silene subconica*. The system of lagoons and sand dunes presents a smooth transition from saline to fresh water which plays a key role in the international flyways of migratory birds. The river mouth and the lagoons are important spawning and/or nursery grounds for several commercial fish species (*Sparus aurata*, *Oicentraches labrax*, *Mugil sp.*, *Anguilla anguilla*, etc.). Keramoti lagoons are a complex of coastal saltwater lagoons, situated at the western extreme of Nestos Delta to the west of Keramoti town. The complex includes Vassova, Eratino, Agiasma (is the largest one) and Keramoti lagoons. The most important habitat types are the large coastal dunes, the saltmarshes, the reed beds, and especially the beds of marine vegetation-communities of vascular plants (*Zostera*, *Posidonia* etc.).

#### **17. Noteworthy flora:**

The species *Salvinia natans* is included in WCMC list. The species *Pancratium maritimum* is growing in wild and is seriously endangered by the human activities on the coast, and the species *Leymus racemosus ssp. sabulosus* reaches its extreme distribution limit in Northern Greece.

#### **18. Noteworthy fauna:**

The wetland area is important for migratory waterfowl. Among the 191 migratory species that breed, winter, or stage in the area, 67 species are included in Annex I of 79/409/EEC Bird Directive. The wintering populations include important numbers of ducks, geese and great roosts of two different cormorant species (1100 *Cygnus olor*, 251-500 *Anas penelope*, 101-250 *A. platyrhynchos*, 251-500 *A. acuta*, >2000 *Fulica atra*, 51-100 *Phalacrocorax pygmeus*, 101-250 *P. carbo*, 501-1000 *Larus ridibundus* etc). The landunit of sand dunes and lagoons, strongly influenced by the sea, is the breeding grounds of Kentish plovers, avocets, little bitterns, pranticoles, black-winged stilts etc. (more than 270 species have been observed there). Also, it is an important breeding site for *Holopterus spinosus* (35 pairs -largest breeding population in Europe), *Ardea purpurea* (30 pairs), *Egretta garzetta* (101-250 pairs), *Ardea cinerea*, *Ixobrychus minutus* (15 pairs), *Haemetopus ostralegus* (30

pairs), Lesser Spotted Eagles (4-5 pairs), bvgftr54of about 70-80% of the European population of Spur-Winged Plover (40-50 pairs) and of 4-5 pairs of lesser (*Aquila pomarina*). Also two species are included in the national Red Data Book the *Phasianus colchicus* and the *Cisticola juncidis*.

Other fauna species that have been recorded and are included in Annex II of 92/43/EEC Directive are: one mammal *Lutra lutra*, 7 amphibians and reptiles (*Triturus cristatus*, *Testudo hermanni*, *T. graeca*, *Emys orbicularis*, *Mauremys caspica*, *Elaphe quatuorlineata*, *E. situla*), 5 fish (*Alosa fallax*, *Rhodeus sericeus amarus*, *Barbus plebejus*, *Cobitis taenia*, *Aphanius fasciatus*), two invertebrates (*Ophogomphus cecilia*, *Lycaena dispar*). Concerning other fauna species two mammal species are included in the national Red Data Book (*Canis aureus*, *Pipistrellus nathusii*). Of the invertebrates *Arachnia levana* is in the southern edge of its extension and *Maculinea alcon* is referred in 1998 IUCN Red List of Threatened Animals. 7 fish species are endemic (*Leuciscus cephalus macedonicus*, *Chondrostoma vardarensis* -also "vulnerable", *Gobio gobio bulgaricus*, *Alburnoides bipunctatus strymonicus*, *Vimba melanops* -also "rare", *Orthrias brandti bureschi*, *Cobitis strumicae*) Furthermore about 25 fauna species are protected under the Bern and Bonn International Conventions.

**19. Social and cultural values:** (e.g. fisheries production, forestry, religious importance, archaeological site etc.)

The Nestos Delta is a highly productive fishing ground. The commercial fisheries includes four main activities: a) the exploitation of lagoons (Keramoti lagoons have the greatest productivity per surface area in Greece with up to 200 kg/ha and have reached the highest level of development in the country); b) the shellfish-farming, especially mussel, in the Gulf of Keramoti; c) the freshwater fish farming which is of minor importance in the area, represented only with one trout farm; and d) the sea fishing which is of superior economic importance to the whole region. All the above have a great social value without any impact on the ecological character of the wetland itself.

Also, crop farming is a main source of income mainly regarding the wider area of the wetland site. During the last years, the intensive agricultural practices (irrigated crop farming) which were adopted, had a negative impact on soil quality, and on the quality and quantities of surface and ground water. Existing poplar plantations are mainly used for paper production, providing a supplementary income. Grazing has limited social value and it provides a supplementary income.

Low tourism activities are mainly concentrated around the village of Keramoti. and at the eastern edge of the wetland lies the ancient town Avdira.

Since 1996, there has been a notable recognition of the value of the site as a protected area amongst local communities. Moreover the area is of great scientific value in the fields of biology, ecology, hydrology and geology.

**20. Land tenure/ownership of:**

Site: In general it is state owned and only 15% is private, mainly by individual farmers.

Surrounding area: Mostly private and Community owned.

**21. Current land use:**

Site: Several communities are in direct or indirect connection with the site, of which Keramoti (1,726 people) is located within it. The main land uses are fisheries, and agriculture, and secondary are poplar cultivation, grazing, tourism and hunting.

surroundings/ catchment: At the wider area the main land use is agriculture. Industrial activities is a secondary land use.

## **22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:**

A decrease of fresh water inflow, due to the irrigation dam construction (completed in 1960-66) and increasing irrigation projects and water drillings in the upstream area of River Nestos, is obvious in the delta. Respective works for water retention and use have also been carried out outside the borders of Greece.

The groundwater level has shown decreasing trends, resulting in the restriction of marshland. Salt water intrusions during summer months were recorded. The planned operation of hydroelectric dams has been subject to Environmental Impact Assessment and Studies and environmental terms have been specified for this project from the Ministry of Environment in 1996, where measures are taken for effectively minimising any negative impacts to the site.

Units of the secondary sector (industries for food, animal products, dye, paper, wood, tanneries) in the wider area possess waste treatment systems. As a means to deal with transboundary pollution incidents, on-line monitoring of water quality is being conducted in the Nestos river and any exceeding values are automatically communicated to the Prefecture and the Ministry of Environment.

Degradation of Kotza Orman lowland forest started in 1940-1950 because of the alignment of the Nestos river-bed and flood control works. The remaining forest is fractionated, interrupted by cultivated areas, poplar plantations and pastures, nevertheless further land reclamation has not occurred since 1996.

Hunting pressure is high, but incidents of illegal hunting have been gradually decreased. Behind the extended coastline, there are three settlements and their development/ expansion has been controlled since 1996.

Fisheries in the lagoons required specific management for ensuring their production. These works were carried out after examination of their possible impacts to the conservation values of the site and measures were taken to ensure compatibility.

A procedure for approval of Environmental Terms for a number of works and activities through Environmental Impact Studies has been established in Greece in 1990. Aiming to holding back the further loss and degradation of the site, all relevant planned works have been examined under this procedure by the Environmental Authorities. The majority of projects concerning animal farms, aqua-culture units and/ or agricultural improvement was rejected whereas only the absolutely necessary and less disturbing ones have been permitted for existing units.

**23. Conservation measures taken:** (national category and legal status of protected areas - including any boundary changes which have been made: management practices: whether an officially approved management plan exists and whether it has been implemented)

**A set of measures and delimitation of zones** are enforced since September 1996 by the Ministries of Agriculture, Environment and Development The Joint Ministerial Decision delimitates three zones and a brief description of the zones and measures is as follows :

Zone A includes part of the river bed, permanent or seasonal marshes, lagoons, riparian forests and shallow coastal areas

In zone A, permitted activities (under specific terms) are: traditional fishing and aquaculture; restricted sailing; maintenance of existing fishing infrastructure; restricted construction of new infrastructure for the previous purposes; maintenance of existing agricultural activities, poplar plantations, salt works, expansion of builded area is prohibited; scientific research; works for conservation and upgrading of the environment and mild tourism (restricted visits for nature observation and swimming).

Zone B includes a buffer zone to the river and shallow coastal areas,

In this zone, permitted activities under terms are: maintenance of existing agricultural activities and existing settlements (expansion is prohibited), maintenance and expansion of existing infrastructure; scientific research; conservation works; mild tourism (restricted visits for nature observation, and swimming); grazing in restricted areas; small stables; aquaculture and fishing.

Zones A and B comprise the Ramsar site

A buffer zone to the site in its wider / catchment area has been delineated and includes mainly agricultural land and grazing fields

In this zone permitted activities under terms are: hunting, scientific research, agriculture, grazing and aquaculture; maintenance and expansion of existing infrastructure; establishment of light infrastructure for energy production; preservation of existing archaeological places; housing, building of storage rooms, water tanks, green houses, infrastructure for agricultural activities, sport places, public buildings, parking places, recreation, hotels; animal breeding stations and slaughter houses are allowed

Zones A and B have been also proposed for inclusion in the NATURA 2000 network under the code GR1150010 Parts of this zones are already an SPA under the code GR1150001. The site is a game refuge and an area of hunting prohibition is established at a distance of 2 km along side the river bed.

**A Preliminary Management Scheme** has been established in 1997 on the site by two Programme Agreements, one for each Prefecture, signed by the Ministers of Environment and Agriculture, the Regional Environmental Services and Local Authorities. It comprises two Joint Committees for the steering of the implementation, it has a flexible administration and the required secretariat/ co-ordination support provided is by a Local Development Institution. The Programme Agreement has an Annex with the planned works and activities, their time-table (1997-1999) and budget. Priority actions include the operation of an Information Centre, works for the ecological development of the area (placement of signs, construction of warden houses, observation towers etc.), training of the personnel, warding of the site and reforestation of the Kotza Orman forest.

Preliminary Management Schemes have a three-fold aim: 1) to respond quicker to the matters that arise concerning the every day management problems of the sites and 2) to

carry out projects concerning infrastructure, monitoring and management, and 3) to coordinate relevant authorities in working out the further priorities for the management of the sites

Since 1990, measures were taken against soil erosion in the catchment, mainly by reforestation of surrounding hills and mountains.

The site is included in the Montreux Record since 1990. Under the Management Guidance Procedure a mission that visited Greece in 1989 described the main problems of the area.

**24. Conservation measures proposed but not yet implemented:** (e.g. management plan in preparation; officially proposed as a protected area etc.)

The site, together with the adjacent site of Lake Vistonis, Porto Lagos, Lake Ismaris and adjoining lagoons is proposed for the category of National Wetland Park, according to the Law 1650/86 (legal text under preparation, in form of a Presidential Decree).

Further management proposals not yet officially approved, have been elaborated for many aspects of the management of the site, as part of the documentation required for the establishment of the National Wetland Park including the establishment of a permanent Management Scheme. The conservation actions proposed are in accordance with the "Guidelines on Management Planning for Ramsar sites and other Wetlands" and include monitoring, detailed study of the hydrology with proposed measures, mapping of the habitat types and study for the regeneration of the forest of Kotza Orman

A project of incentives for the voluntary implementation of management measures in agricultural land (using the agri-environmental regulation 2078/92) is to be submitted for approval. The project includes forwarding of biological cultivation, reduce of grazing, long-term pause and reduce of the amount of fertilisers used.

**25. Current scientific research and facilities:** (e.g. details of current projects; existence of field station etc.).

An important project is in progress for monitoring and conservation actions for *Phalacrocorax pygmaeus* and *Anser erythropus* undertaken by WWF and the Hellenic Ornithological Society.

Numerous research projects, some complete and some on-going study the geomorphology, the soil, the water quality, the flora and the fauna of the area. Also, a local NGO called «Society for the Protection of Nature and Ecodevelopment (EPO)» is carrying out many ecological studies mainly funded by the EC-ERASMUS program.

**26. Current conservation education:** (e.g. visitors centre, hides, information booklet, facilities for school visits etc.)

A fully equipped Information Centre is established at the site, accompanied by constructions for bird watching, guardhouses etc. This infrastructure will support the activities of information - public awareness, environmental education, monitoring etc. Specific actions of information and public awareness are being planned until the end of 1999 which include special publications, video tapes, CD Roms, organisation of workshops and guided tours of visitors and schools. Also, the local NGO, EPO, owns a "Nestos-Nature Museum" with some field station facilities.

**27. Current recreation and tourism:** (state if wetland is used for recreation/tourism; indicate type and frequency/intensity)

The wetland has very low tourism use, restricted in some parts of the coast. In general, tourism in the area is not significantly developed. In 1995, about 600 hotel beds were available for tourists in the wider area, which was visited by about 5000 people. Therefore, promotion of eco-tourism seems to be an interesting prospective for the site.

**28. Jurisdiction:** (territorial e.g. state/region and functional e.g. Dept of Agriculture/Dept. of Environment etc.)

Territorial jurisdiction over the site has the Region of Anatoliki Makedonia & Thraki. Concerning the functional (conservation) jurisdiction, co-ordination lies with the Ministry of Environment in collaboration with the Ministry of Agriculture, the Prefectures of Kavala and Xanthi and Local Authorities.

**29. Management authority:** (name and address of local body directly responsible for managing the wetland)

No single body legally responsible for the direct local conservation of the wetland exists. The Preliminary management Scheme is guided by a Joint Committee presided by a representative of local authorities. Secretarial assistance is provided by :

Information Centre of Nestos

Keramoti

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GREECE

Tel: +30-591-51209

**30. Bibliographical references:** (scientific/technical only)

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