

Information Sheet on Ramsar Wetlands (RIS) – 2009-2012 version

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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 and guidelines 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.

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

August 2008

3. Country:

Russian Federation

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.

Volga Delta, including the Astrakhansky State Nature Biosphere Reserve (*Zapovednik*)

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

“This updated version of the RIS has been accepted under the condition that the Secretariat’s comments originally provided on this RIS will be taken into account during the preparation of the next update. Cartographic materials provided are schematic maps.”

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
- ii) 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:

Changes in ecological character were associated with variations of water regime of the Volga River and the Caspian Sea at the break of the 20th and 21st centuries, as well as with various human activities in the conditions of sweeping social and political changes in the former USSR, including those on territory of the Ramsar site in the Volga Delta.

A rise of the Caspian Sea level began in 1978, which, according to some scientists, was a result of the development of the current cool and wet centennial climatic phase. By 1995 the sea level rose by over 2 m. Thereafter, it gradually decreased by 56 cm and became relatively stable in 2001/2002. See point 20 for more details.

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.

The site is located within the lower zone of the emerged part of the Volga Delta, transition (*kultuk*) area, and the foredelta from the border of Republic Kalmykia (Russian Federation) to the border of Kazakhstan.

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.

45°54' N, 48°47' E.

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.

The wetland is located on territories of the Limansky, Kamyzyansky, Ikryaninsky and Volodarsky districts of the Astrakhan Oblast, 80-100 km from the city of Astrakhan.

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

25 – 27 m below sea level.

11. Area: (in hectares)

800,000 ha

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 delta area with islands overgrown with thickets of *Phragmites* and *Typha*, willow groves, stands of *Phragmites* and *Sparganium*, open water stretches, and submerged meadows. Mass breeding grounds of waterbirds and colonial Pelecaniformes and Ciconiiformes. The area lies on one of the largest flyways of waterbirds. Mass spawning grounds of semi-anadromous and nonmigratory fishes; and migration route of sturgeons.

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 Volga Delta is a typical example of the delta of a large lowland river. The site is located in the zone of Caspian deserts, but the vegetation has a strongly marked intrazonal character typical for deltas, with the offshore vegetation type being predominant. In the conditions of permanent freshwater regime of the delta, multispecific plant associations act as distribution centers of these species across water bodies of the arid zone.

This wetland area plays an extremely important role in functioning of the Volga basin. The water of Volga River which flows through the delta comprises 90% of the surface run-off entering the Caspian Sea, and therefore determines the hydrological regime of this inland area.

Criterion 2. The Volga Delta is a habitat to many rare and endangered bird species included in IUCN Red List (IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. <www.iucnredlist.org>; VU – vulnerable, EN – endangered, CR – critically endangered) and the Red Data Book of Russian Federation (46 species), including:

- Dalmatian Pelican (*Pelecanus crispus*), VU – breeding species, 30 to 240 pairs.
- White Crane (*Grus leucogeranus*), CR – rare, yet regular migrating and stopover visitor.
- Red-breasted Goose (*Branta ruficollis*), EN – rare on migration.

- Pygmy Cormorant (*Phalacrocorax pygmeus*) – a rare breeder, up to 1500 pairs, with a trend towards growth in numbers.
- Cattle Egret (*Bubulcus ibis*) – a rare breeding species, 2 to 6 pairs.
- Spoonbill (*Platalea leucorodia*) – a breeding species, up to 240 pairs, with a trend towards decrease in numbers.
- Glossy Ibis (*Plegadis falcinellus*) – a breeding species, up to 1800 pairs (in 7 colonies).
- Osprey (*Pandion haliaetus*) – a common breeding species with stable numbers of 20 to 40 pairs.
- White-tailed Eagle (*Haliaeetus albicilla*) – a common breeding species with stable numbers of 150 to 160 pairs.
- Great Black-headed Gull (*Larus ichtyaetus*) – a rare breeding species in the delta. Island Zhemchuzhny in the sea 80 km from the Volga Delta supports one of the world's largest colonies of the Great Black-headed Gull numbering 15,000 to 25,000 pairs. This colony uses the Volga Delta as feeding grounds in spring and autumn.
- Bewick's Swan (*Cygnus columbianus bewickii*), White-headed Duck (*Oxyura leucocephala*) - EN, Black-winged Stilt (*Himantopus himantopus*), Avocet (*Recurvirostra avosetta*), Peregrine Falcon (*Falco peregrinus*), Saker Falcon (*Falco cherrug*) - EN, Imperial Eagle (*Aquila heliaca*) - VU, Steppe Eagle (*A.nipalensis*) - VU, Great Bustard (*Otis tarda*) - VU, Demoiselle Crane (*Anthropoides virgo*), Purple Swamphen (*Porphyrio porphyrio*) are rare on migration.

The Caspian seal *Phoca caspica* (EN) – is common in delta areas bordering on the sea.

Four species of plant listed in the Red Data Book of Russian Federation grow at the site: *Nelumbo caspica*, *Trapa natans*, *Marsilea aegyptiaca*, and *Aldrovanda vesiculosa*.

Criterion 3. The site supports habitats of rare and endangered species of animal and plant, as well as the biological diversity of the Caspian Sea lowland.

Criterion 4. The Volga Delta is an immense reserve for waterbirds and shorebirds providing vitally important habitats during migration, breeding, and moulting. The site is located on one of the largest migration routes of waterbirds and shorebirds that breed in the West Siberian Plain, North Kazakhstan and other areas and winter in a huge expanse of South West Europe, Africa, and West Asia. The Volga Delta is known as a mass moulting area of dabbling ducks. Currently, the delta wetlands are undergoing a profound transformation caused by increased water reserves. In general, biological capacity of the site as a waterbird habitat remains high, though its importance has decreased at certain stages of the birds' life cycle, such as the breeding and summer moulting seasons. See also point 22.

Criterion 5. The total number of waterbirds and shorebirds that migrate through the site per year is estimated in different years at 50 to 10 million of individuals in autumn and up to 7 million individuals in spring (Кривенко 1980, 1989). Numbers of colonial breeding birds (in 27 colonies) averaged 42,300 pairs in 1997-2004.

Criterion 6. The site regularly supports over 1% of the individuals in biogeographic populations of the following species:

- Dalmatian Pelican (*Pelecanus crispus*) – breeding species, 30 to 240 pairs, 1 to 10% of the European (Black Sea) population;
- Great Egret (*Egretta alba*) – breeding species, 2176 birds or 4.6% of the European population;
- Little Egret (*Egretta garzetta*) – breeding species, 2201 birds or 3.7% of the Central East European population;

See also point 22.

Criterion 7. The area is an internationally important center of fish biodiversity and abundance. It supports 58 species of fish. It is particularly important as a large center of biodiversity and abundance of sturgeons. Common here are *Huso huso* - EN, *Acipenser gueldenstaedtii* - EN, and *A. stellatus* - EN; less common is *A. ruthenus* - VU (VU – vulnerable, EN – endangered, CR – critically endangered: IUCN 2009. IUCN Red List of Threatened Species. Version 2009.2. <www.iucnredlist.org>).

Criterion 8. Lower portions of the Volga Delta support vitally important spawning grounds of semi-anadromous and non-migratory fishes, feeding grounds of adult and young fishes. The delta is used by sturgeons for spawning migration.

As the sea level rises, the transitional and subaqueous delta provides more favorable conditions for reophilic fish species. This zone supports autumn and winter aggregations of fishes that overwinter in hollows and deeper places with a slow current (carp *Cyprinus carpio*, bream *Abramis brama*, pike perch *Stizostedion lucioperca*, vobla – Caspian roach *Rutilus rutilus caspicus*, catfish *Silurus glanis*).

The populations of migratory and semi-migratory species are those which have been affected most by the construction of dams. Spawning grounds of sturgeons, the most valuable commercial species and those with the longest migrations up the Volga River, have reduced from 3600 ha to 430 ha. Only about 1% of the spawning grounds of the beluga sturgeon remains accessible to the fish. To compensate for this, sturgeon hatcheries have been developed, and millions of juvenile sturgeons are released into the Volga each year. However the population is still in decline. As sturgeon grow very slowly and take about 10 years to mature, it is a long time before depleted stocks can recover.

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:** Northern deserts

b) **biogeographic regionalisation scheme** (include reference citation): A.A. Tishkov. Biosphere functions of natural ecosystems in Russia. 2005. 309 p.p. in Russian

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.

Relief and hydrography

The Volga Delta is an alluvial plain sloping gently towards the Caspian Sea. Based on its topographic features, hydrography and water regime, the delta can be divided to the upper (emerged) portion and the lower or foredelta area. In the lower portion, the *kultuk* area is identified as a transitional zone between the upper delta and the foredelta.

The upper part of the delta is an extensive network of large rivers and narrow channels that divide the land to a great number of islands sizing between 2 and over 20 sq. km. Banks of all the streams are places of intensive sedimentation, which makes them the highest stretches of land (with altitudes of 0.5 to 1.7 m). Shores are usually steep and cusped. Stretches of land between the channels were formed by means of a less intensive sedimentation and are therefore considerably lower than the channel banks.

The present lower section of the delta was formed during a hot, dry stage of the climatic cycle (between 1930 and 1940), when the level of the Caspian Sea dropped by 2.3 m and extensive shallows were created.

Characteristic of the *kultuk* area are bays with slowly flowing water, with small islands, and underwater shallows. These bays extend in a line along the edge of the emerged portion of the delta, with their depths varying from 0.4 to 1.3 m in the low-water season and from 1.0 to 2.3 m during

floods. The ground is sticky; its accumulation is associated with river deposits and decomposition of plants.

The foredelta of the Volga comprises an extensive shallow area with a large number of low islands built of loose material of marine origin that were formed as a result of sea bottom exposure. The islands vary in shape, with most of them elongated along the current. Waterscapes between the islands have a subdued relief. Their bottoms are lined with 10 to 40 cm of aleurite, and sometimes with fine silty sand. This layer is underlain by ground of the same composition, but with bands of more silty sediments. Water depth vary between 1.0 and 1.7 m at low water (occasionally reaching 2.5 m) and increase by 0.7 to 1.5 m at high water.

Hydrology

Seasonal variations of water level in the Volga Delta are determined by the river discharge. Moreover, occasional surges can occur as a result of strong winds from the Caspian Sea.

The annual hydrological cycle of the Volga delta is characterized by the following seasonal variations: spring-summer flood, summer-autumn low water, autumn flood, and winter flood. The first three variation types are caused by changes in the Volga discharge, while the latter one occurs as the ice cover is formed in the mouth portion of the delta.

Water begins to rise gradually in the second half of April to the spring-summer flood in May/June peaking in the second half of June. After the flood peak, water level decreases gradually to the autumn low water in August/September. Winter floods associated with the formation of a stable ice cover usually occur in January and last to the second half of March, when the spring flood peaks. Onshore winds cause increases in water level by 1.0 to 2.5 m, but occasionally by up to 5 m.

The hydrological regime of the Volga delta is characterized by long-term cyclical changes that develop over periods of 30 to 45 years (intra-centurial cycles) and 70 to 90 years (centurial cycles). The last hot, dry period in the hydrological history of the Volga Delta (within an intra-centurial cycle) occurred between 1951 and 1978; from 1978 to nowadays the situation develops according to the cool, humid scenario (within the centurial cycle), which will last approximately to 2003-2007 (Кривенко 1991; Клиге 1997).

Changes of the annual flow of the Volga and the total moisture content in the Caspian region affect the nature of the delta strongly. For example, the annual discharge of the Volga decreased to 207 km³ during the centurial hot, dry period of 1930-1940, which resulted in the recession of the Caspian Sea level by 2.3 m and the formation of an expansive foredelta. During the development of the present-day cool, humid stage of the climatic cycle, mean annual discharge of the Volga has exceeded 300 km³, and the Caspian Sea level has risen by over 2 m, while low-water season depths of the foredelta grew by 1.5 to 2.5 m as compared with the previous period.

In terms of water mineralization, the Volga Delta is a freshwater body. Maximal content of a dense deposit in water is 321 mg/l. The mineral composition of the delta water from Astrakhan to the 2.5 m isobath of the foredelta remains virtually constant. According to L.A. Barsukova (1956), the dense deposit concentrations in water of various parts of the delta in May were as follows: 132 mg/l off Astrakhan, 128 mg/l in the main zone of the foredelta, and 321 mg/l in the very foredelta.

Climate

Climate is temperate continental, with mean air temperatures of – 7 °C in January and + 25 °C in July. Mean annual precipitation is 180 to 210 mm. Most of the total annual precipitation falls between May and September (110 to 180 mm). Mean duration of the ice cover varies between 70 and 113 days. The ice usually breaks in end February at the earliest. The earliest dates of the ice cover formation are 19 to 21 November. The predominating wind directions are east, southeast, and, less often, northeast.

17. Physical features of the catchment area:

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

The Volga is the longest river of European Russia and Europe as a whole. It is 3531 km long and has a catchment area of 1,360,000 km². The total stream gradient of the river is 256 m.

The Volga catchment is located in several natural zones and covers 1/3 of European Russia, stretching from the Valdai Hills and Central Russian Upland in the west to the Urals in the east. The main feeding upper part of the catchment (from the riverhead to the cities of Nizhny Novgorod and Kazan) lies in the forest zone. The part from Kazan to Saratov lies in the forest steppe zone; from Saratov to Volgograd in the steppe zone; and the southern part of the catchment are semi-deserts and deserts.

The Volga has 151,000 tributaries over 10 km in length. Its left tributaries are more numerous and copious than the right ones. Main of these being: left tributaries the Mologa, Sheksna, Kostroma, Unzha, Vetluga, Kama, Samara; and right tributaries the Oka, Sura, and Sviyaga. 21 km above Volgograd the Volga's left distributary, the Akhtuba, splits off to flow about 520 km to the Caspian Sea. The delta begins, as the Volga's distributary Buzan splits off the main course 170 km from its mouth. The delta covers an area of 13000 km².

Main sources of the river feeding are snow (60% of the annual runoff), ground water (30%), and rain (10%). The natural water regime of the Volga is characterized by spring floods (in April/July), low water periods in summer and winter, and rain floods in autumn (in October/November). Before the Volga was regulated, annual variations of its water level used to reach 11 m in Tver, 17 m at the Kama River mouth, and 3 m in Astrakhan. After the construction of dams and water reservoirs, variations of water level dropped dramatically.

18. Hydrological values:

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

The site supports natural regimes of ground water and floods, accumulates sediments, and prevents bank erosion.

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: 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.

L, Q

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.

1. Islands with herb meadows

Islands covered predominantly with herb meadows (*Veronica anagallis-aquatica*, *Persicaria amphibia*, *Carex riparia*), and reeds. At the north, these habitats border on a zone of intensive agricultural development.

Channels between the islands have shore vegetation of *Sparganium erectum*, *Potamogeton perfoliatus*, *P. lucens*, *Nymphoides coreana*, and *Nymphaea alba*.

Numerous temporary water bodies are formed here during floods. With the exception of flood periods, most of these islands in the delta area remain free of water.

2. Islands with dense reedbeds

Islands covered predominantly with dense reedbeds of *Typha angustifolia* and *Phragmites australis*. Dense reed stands cover 90-100% of the surface area. *Phragmites* ranges in height from 3.5 to 5.6 m, and *Typha* from 1.5 to 2.5 m. Most islands are only inundated during floods, when the water level here increases to between 1.2 and 1.8 m.

3. Islands with forests

Islands ranging from 0.5 to over 3 km², temporarily inundated. They are usually located in the lowest portions of the emerged delta, at the border with the *kultuk* zone.

The vegetation cover of these islands is also dominated by dense reedbeds. However, forest vegetation is also developed here, mainly consisting of *Salix alba* 25 to 40 years old. Willow forests are the most common along channel shores, but are also found in large massifs in the interior of the islands. The second story of reeds is well developed among the trees, as well as another story of sedges, grasses, and forbs.

The most important habitats in the foredelta are as follows:

1. '*Kurtina*' reedbeds, bands of *kurtina* reedbeds, and massive stands of reeds covering 20-40% of the occupied area; bands of accreted *kurtinas* covering 50-60% of the surface area; and extensive fields (massive stands with small areas of open water) of reeds covering 70-80% of the surface area. Areas without reeds are usually occupied by bur-reeds *Sparganium erectum* and other emergent and submerged plant communities dominated by caltrops *Trapa natans*, *Salvinia natans*, *Nymphoides coreana*, pondweeds *Potamogeton* spp., *Vallisneria spiralis*, *Myriophyllum verticillatum* and *Nitella* sp. The three types of reedbeds are successive development stages, starting with the *kurtina* reedbeds and changing via *kurtina* bands to massive thickets.

2. beds of bur-reed *Sparganium erectum* dominate in many areas of the foredelta, covering 50 to 70% of the surface. Multispecies? communities of emergent and submerged vegetation. In the last 10 years, bur-reed beds have contracted in area because of increasing water depths.

3. Islands with dense stands of cat-tail and reedbeds form continuous thickets covering 90-100% of the surface area. Willow groves dominated by *Salix alba* 20 to 40 years old with a stand density of 0.2-0.4 seldom occur in thickets of reed and cat-tail on drying islands. They usually fringe the channels and oxbow lakes.

4. Areas of open water with depths of 70 to 250 cm between islands and close to the drop-off of the Caspian Sea. Many of these areas have well-developed submerged vegetation of *Vallisneria spiralis*, *Myriophyllum verticillatum*, and *Nitella* sp.

The increase in the annual discharge of the Volga and the Caspian Sea level as well as related profound changes of hydrological regimes of water bodies in the delta are accompanied by great structural changes of ecosystems (Strukturnye izmeneniya ekosistem delty Volgi 2003) that are briefly summarized in Table 1.

Table 1

Structural changes of the Volga Delta ecosystems caused by increased river discharge and the Caspian Sea level

Ecosystem components	Changes of ecosystem components caused by various factors					
	increase in ground water level	increase in depths	better water supply	changes of wave climate	changes of ice regime	direct human impacts

Vegetation.	replacement of xeromesophilous meadows with hygrophilous ones	changes in community composition and productivity	replacement of limnophilous species with reophilic ones	destruction of plant communities with fragile stems	destruction of aero-aquatic plant communities	load reduction
Insects	changes of community composition	substrate loss	replacement of phytophilous insects with predators	changes of community composition	substrate destruction	
Birds	changes of ornithocomplexes	worsening feeding, nesting, and protection conditions	changes of ornithocomplexes	worsening feeding and breeding conditions; increase in embryonic mortality	destruction of breeding biotopes; worsening feeding, nesting, and protection conditions	load reduction
Fish	changes of floodplain water bodies	expansion and improvement of habitats; changes of community composition	changes of community composition	changes of community composition	expansion of habitats	heavy increase of load
Mammals	changes of theriocomplexes	loss of habitats of terrestrial animals and re-distribution of aquatic habitats	expansion of habitats of water mammals; changes of theriocomplexes		loss of habitats of water mammals; changes of theriocomplexes	load reduction

The improvement of water regime and reduction of human loads on the natural environment have caused the following changes:

- rise in groundwater level and replacement of true meadows with boggy meadows;
- reduction? of *solonchak* areas;
- increased occurrence of top-drying and death in *Salix alba* caused by waterlogging at the marine edge of the delta and lower willow growth rate.
- rapid outspread of oleaster (*Elaeagnus angustifolia*) in abandoned engineering systems and areas with disturbed soil cover;
- considerable decrease in pollutants discharge to lentic water bodies;
- growing degradation of tree colonies of Pelecaniformes and Ciconiiformes at the marine edge of the delta and their migration to waterlogged massifs of reed and cat-tail thickets.
- worsening feeding conditions for some passeriform species and decrease in their population density;
- migration of breeding colonies of rooks from the reed belt in the onshore portion of the delta and an associated impairment of breeding conditions of owls, falcons, and other birds using rook nests in the nesting season.
- considerable expansion of favorable breeding grounds of Galliformes (pheasant) due to the spread of the reed belt, formation of levees, and growth of oleaster forests (the factor being primarily important beyond the northern border of the Ramsar site);
- improvement of wintering conditions of Passeriformes on abandoned agricultural lands and oleaster forests:
- growth in breeding density of wetland birds (including Passeriformes) in floodplain water bodies;
- growth in Piciformes numbers due to ageing of willow forests;
- closure of commercial reed harvesting for pulp-and-cardboard production and restoration of degraded reed meadows;

- contraction of cultivation areas, hayfields, and cattle grazing grounds because of a long stagnation of agriculture;
- increased harm done to the bird population by reed fires;
- illegal hunt for birds among the local population becoming more common, as a result of changes in the social structure;
- growth of recreation pressure as a result of tourism development.

The following changes in ecological character and bird population took place on the foredelta wetlands:

- a sharp contraction of nesting stations between islands in the foredelta;
- flooding of continuous reed and cat-tail thickets on islands and occupation of these by mute swans;
- loss of willow forests on islands due to waterlogging and withdrawal of breeding colonies of Pelecaniformes and Ciconiiformes;
- establishment of favorable breeding conditions for Ciconiiformes and pygmy cormorants in waterlogged massifs of reed and cat-tail thickets;
- destruction of nesting stations of Passeriformes (warblers) and their withdrawal;
- cease of mass summer moulting of ducks in the foredelta;
- loss of sandy-and-shelly islands with nesting grounds of gulls and terns;
- improvement of habitats of migratory diving ducks, swans, and coot as a result of growing productivity of *Vallisneria*, *Potamogeton*, *Ceratophyllum*, charophytes, and green algae;
- growing impact of the disturbance factor because of larger-scale commercial fishing, recreation (tourism, sport fishing, hunting etc.), improvements in technical equipment of some local people and availability of the wetlands for small boats;
- termination of economic activities on islands of the foredelta (cattle grazing, hay harvesting, reed harvesting etc.)

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.*

Three species of plant listed in the Red Data Book of the Russian Federation have been registered at the site.

The most valuable species of the local flora is the Indian lotus (*Nelumbo caspica*). This plant has been spreading out in recent decades occupying extensive areas (over 3000 ha).

Marsilea aegyptiaca is a very rare species.

Aldrovanda vesiculosa is a rare species. It is carried to the lower Volga Delta in wet years.

In the conditions of permanent freshwater regime of the delta, multispecific associations of emergent and submerged vegetation act as distribution centers of these species across water bodies of the arid zone. *Myriophyllum verticillatum*, *Vallisneria spiralis*, *Caulinia minor* and *Potamogeton lucens* are of particular importance in terms of biodiversity conservation.

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.*

Birds

Importance of the site for migrating birds

The site is located on one of the largest migration routes of waterbirds and shorebirds that breed in the West Siberian Plain, North Kazakhstan and other areas and winter in a huge expanse of South West Europe, Africa, and West Asia.

Spring migrations generally have a passage character. Many birds use the delta wetlands as a staging area for a short time. They congregate mainly in shallow areas of the foredelta overgrown with reeds and bur-reeds. Total numbers of passage migrants are estimated at 7.0 million individuals a year (Krivenko 1980, 1989).

The commonest ducks, such as the Mallard (*Anas platyrhynchos*) and Northern Pintail (*Anas acuta*), migrate through the delta during the second half of March. Other common species, such as Teal (*Anas crecca*), Tufted Duck (*Aythya fuligula*), and Goldeneye (*Bucephala clangula*), migrate en mass in late March and early April.

The Greylag Goose (*Anser anser*), the commonest goose in the delta primarily belonging to the local population, is one of the first migrants to arrive in spring.

The Whooper Swan (*Cygnus cygnus*) passes through the delta in large flocks among the first passage migrants to arrive. A pronounced migration of the Mute Swan (*Cygnus olor*) occurs after mid-March and involves mainly local breeders and many birds that breed and moult in Kazakhstan.

Of other groups of birds, some northern shorebirds and the Black-headed Gull (*Larus ridibundus*) have a pronounced passage migration.

The autumn passage migration is less pronounced than that in spring, except in the case of the Whooper Swan and, to some extent, White-fronted Goose (*Anser albifrons*). Total numbers of passage migrants are estimated at 5.0 to 10.0 million individuals a year (Krivenko 1980, 1989). However, the importance of the Volga delta as a stopover site for migrating waterbirds has declined in recent years due to the rise of water level. Numbers of migrating ducks in latest years reached 1.9 million birds, including 1.2 million dabbling ducks and 0.65 million diving ducks.

The species composition on autumn migration is similar to that in spring. A noticeable increase in the numbers of migrants can be observed in early October, and the main passage takes place between the middle of October and the end of November.

Importance of the site for breeding birds

In latest decades, with the Caspian Sea transgression and water level rise in the Volga Delta at the background, numbers of breeding waterbirds have steadily been declining. For example, the number of breeding pairs of Greylag Goose have decreased from 13,000 to 9,000; Mallard from 12,000 to 7,000; Red-crested Pochard (*Netta rufina*) from 4,000 to 2,000, Mute Swan from 9,000 to 7,000; and Coot (*Fulica atra*) from 170,000 to 130,000. The Great Crested Grebe (*Podiceps cristatus*) is common, but not very numerous (2,000 – 5,000 pairs) in the Volga delta. Another breeding species is Ruddy Shelduck (*Tadorna ferruginea*), with 200 to 300 pairs. The most important breeding grounds of all bird species are mosaic communities of reedbeds. Mallards often nest along channels shores of the upper delta.

Moreover, the Volga Delta is known as mass breeding grounds of Ciconiiformes and Pelecaniformes: herons and egrets, ibises, and the Great Cormorant.

There were 44 colonies of this group of birds totaling 56,800 pairs prior to the intensive water level rise in the Volga Delta. As the depths grew further, most of these species tended to decrease in numbers. Breeding colonies became larger and partially moved to massifs of reed and cat-tail thickets. Numbers of colonial breeding birds (in 27 colonies) averaged 42,300 pairs in 1997-2004 (Table 2).

Table 2

Colonial breeding birds in the Volga Delta

Year	Numbers of birds, thousands of pairs								
	Grey Heron <i>Ardea cinerea</i>	Great Egret <i>Egretta alba</i>	Little Egret <i>Egretta garzetta</i>	Night Heron <i>Nycticorax nycticorax</i>	Squacco Heron <i>Ardeola ralloides</i>	Spoonbill <i>Platalea leucorodia</i>	Glossy Ibis <i>Plegadis falcinellus</i>	Purple Heron <i>Ardea purpurea</i>	Great Cormorant <i>Phalacrocorax carbo</i>
1997	1240	2186	2350	1760		365	1382	650	28097
1998	866	1408	1724	1670		202	1070	610	22635

1999	2572	3090	3710	2090	670	410	1372	950	34846
2000	1060	995	1407	1256	530	135	660	720	35653
2001	1165	1850	2100	2210	630	285	1825	400	36390
2004	1215	3530	1915	2100	400	65	1250	1000	30650
Mean	1353	2176	2201	1847	371	243	1259	721	31378

Importance of the site for moulting birds

For several centuries, the Volga Delta has been renowned for its importance to moulting dabbling ducks that migrated to the delta from extensive breeding areas in West Siberia, northern and central Kazakhstan, and central areas of European Russia. In the 1970s, the total number of moulting ducks was estimated at 400,000 birds (Рузанов 1983). According to the data of the Astrakhansky State Nature Biosphere *Zapovednik*, changes in the hydrological regime, vegetation character, as well as worsening feeding and protective conditions caused a rapid reduction of the number of moulting birds. Expansive areas of the foredelta are no longer used as mass moulting grounds of ducks.

Importance of the site for rare and endangered species

The Volga Delta is a habitat to many rare and endangered bird species included in the Red List of the IUCN and the Red Data Book of the Russian Federation (46 species). 72 species of bird are listed in the Red Data Book of the Astrakhan Oblast.

Importance of the site for conservation of biological diversity of mammals, amphibians, and reptiles

Common mammals in the Volga Delta include the wild boar (*Sus scrofa*, 400 to 1000 ind.), raccoon dog (*Nyctereutes procyonoides*, up to 4500 ind.), American mink (*Mustela vison*, up to 3000 ind.), muskrat (*Ondatra zibethica*, 7000 to 25,000 ind.), and red fox (*Vulpes vulpes*). The stoat (*Mustela erminea*), common otter (*Lutra lutra*), common vole (*Microtus arvalis*), and water vole (*Arvicola terrestris*) occur in small numbers. The tamarisk jird (*Meriones tamariscinus*) and midday jird (*M. meridianus*) can still be found on prominent landmarks – Baer knolls - in the emerged delta. The Caspian seal (*Phoca caspica*) is common in delta areas bordering on the sea. Bats (Chiroptera) include Leisler's bat (*Nyctalus leisleri*) and Noctule bat (*N. noctula*). Reptiles include the grass snake (*Natrix natrix*), dice snake (*N. tessellata*), and European pond terrapin (*Emys orbicularis*). The Dione rat snake (*Elaphe diene*) can be found occasionally. Amphibians are represented by the marsh frog (*Rana ridibunda*).

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:

Channels of the Volga Delta are the only sources of drinking and technical water for the local population. They play a key role for the economy as transport routes of local, interregional, and international importance. All freight traffic from the Caspian Sea to the Volga passes through the wetland.

The onshore area of the sites plays an important role for agriculture. It is used as grazing grounds, hay fields, and, to a small degree, for crop production.

It is a highly valuable fishery (especially as far as sturgeons are concerned) with developed global-scale commercial fishing; an important recreation center; an easily accessible and convenient territory for scientific research and environmental education.

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:

There are the following forms of land ownership at the site: state-owned lands (state reserve lands and lands of the state nature biosphere reserve (*zapovednik*)); lands in communal equity ownership (*kolkhoz* and *sovkhos* farms, associations of farms); private lands (individual garden plots, farms, and residences).

Water resources are exclusively public domain (unitary state water fund).

b) in the surrounding area:

State, communal, and private ownership.

25. Current land (including water) use:

a) within the Ramsar site:

In some areas of the upper part of the delta, production of rice and vegetables is developed. Rice cultivation has the most adverse effect on the delta ecosystems as pollutants (pesticides and fertilizers) come to the channels. However, the chemical load has decreased in the present-day economic situation.

Cattle grazing and hay harvesting take place on the highest islands in the upper part of the delta.

Commercial reed harvesting is practiced in some areas in the upper delta and foredelta islands. At that, reed habitats degrade after several years of harvesting with caterpillar vehicles. In recent years, reeds have been harvested in smaller volumes.

Commercial fishing is the most widespread in the upper part of the delta, where they use sweep-nets during the spring and autumn migrations of semi-anadromous fish. The greatest pressure of fishing activities is put on the upstream area outside the Ramsar site. In the lower part of the delta fishing is limited to using fixed gear, such as nets.

Waterfowl hunting is practiced during a 2.5-months period in autumn. Strict limits have been set on the number of visits and withdrawal rates. Hunting does not put a considerable negative impact on waterbirds.

Ecological tourism is a new activity in the Volga Delta.

b) in the surroundings/catchment:

The Volga River catchment includes, wholly or partly, 38 administrative entities of the Russian Federation, with the population of 61.3 million people, or about 40% of the Russia's population. The catchment is characterized by a high concentration of industrial production.

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:

Main factors adversely affecting natural complexes of the wetland are environmental pollution; rise in the Caspian Sea level; illegal use of natural resources (poaching); commercial and sport fishing on nesting grounds and near autumn aggregations of birds; reed fires; poorly regulated recreation activities.

Because of the water level rise in the foredelta, stopover sites for passage migrants have been shrinking; and, in combination with onshore winds, the above factor contributes to fatal inundation of waterbird clutches, which results in much lower nesting densities.

Much harm to the wetland ecosystem is done by fires that destroy reed thickets, forests, bird clutches, young and adult animals.

In recent years, with the development of organized and non-organized tourism in the Astrakhan Oblast, poorly regulated tourist activities have become a more and more serious threat to the Ramsar site that may lead to a sharp increase in recreation pressure on natural ecosystems.

Potentially, should an emergency situation has arisen, the activities related to prospecting, mining, and transportation of hydrocarbon material in the northern Caspian Sea, Volga Delta and the Volga-Akhtuba floodplain may put negative impact on the ecosystem of the Ramsar site.

b) in the surrounding area:

As the Volga River runs across the industrially developed territory of Russia, its waters contain relatively large amounts of pollutants.

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.

The Statute of the Ramsar site was adopted by the Head of Administration of the Astrakhan Oblast on 22 December 1997 (No. 500). The Statute sets limitations to economic activities in the wetland.

The Astrakhansky State Nature Biosphere Reserve (*Zapovednik*) was established in 1919 and contains three extensions covering an area of 68,800 ha. (IUCN category: Ia). It received the status of a UNESCO Biosphere Reserve in 1984. The buffer zone of the reserve measures 31,000 ha. (IUCN category: VI).

There are three State Nature game reserve (*Zakaznik*) (Teplushka, Zhirotopka, Krestovy) covering an area of 18,200 ha. (IUCN category: IV).

The site comprises four State Nature Monuments: Staro-Igolinsky (6 ha), Gandurinsky (5 ha), and Khazovsky (6 ha) protecting breeding colonies of Pelecaniformes and Ciconiiformes; and Estakadny (300 ha) is a spawning massif. (IUCN category: III).

In total, the protected areas cover about 17% of the Ramsar site's area.

The Ramsar site is included in the Important Bird Area of Russia "The Volga Delta" that covers an area of 1,150,000 ha (Ключевые... 2000).

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?:

The draft wetland management plan for the Volga Delta was developed in 1997-1999 in the framework of a project financed by the Small Grants Fund of the Ramsar convention (Development and implementation... 1999).

The management plan has the following sections:

1. Draft system for monitoring negative impacts and biodiversity status
2. Legislative initiatives
3. Licensing of activities at the site
4. System of required biotechnical measures
5. Development of economic mechanisms of biodiversity conservation
6. Establishment of new protected areas of nature
7. Wetland management
8. System of human dimension activities
9. Major sources of financing

d) Describe any other current management practices:

There are 17 game management facilities in the lower Volga Delta. The territories of each facility are protected by rangers. The total staff of game managers and rangers that protect corresponding territories are about 100 people.

The state control and supervision, as well as other powers in the field of wildlife conservation in 4 administrative districts on territory of the Ramsar site rest with state environment conservation inspectors of the Nature management and conservation service of the Astrakhan Oblast.

Protection of fish resources resides with the North Caspian basin authority on conservation and reproduction of fish resources and fishing regulation (*Sevkasprybvod*). In addition to this, protection of fish resources has been performed by special mobile groups of state inspectors from operative, provincial, and local fishery inspections and fishery protection squads of the Astrakhan Directorate of Internal Affairs in collaboration with inspectors of the Astrakhan Oblast Service for Nature Management and Conservation.

Every year during spawning, the Astrakhan Oblast administration sets limitations for using motorboats? in channels of the lower delta and foredelta.

28. Conservation measures proposed but not yet implemented:

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

Strengthening and improving the structure of executive authorities in the Astrakhan Oblast in connection with their newly-obtained responsibilities on conservation and management of wildlife objects. Bringing various legal norms and documents in accordance with the legislation currently in force and development of applicable cases system. Considering an adjustment and implementation of the wetland management plan.

29. Current scientific research and facilities:

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

Detailed faunal studies have been carried out since mid 19th century (Becker 1853; Bogdanov 1871; Bostanzhoglo 1911). After the establishment of the Astrakhansky State Nature Biosphere *Zapovednik* in 1919, investigations comprised the whole range of natural components (Khlebnikov 1924; Lugovoi 1963; Krivonosov 1970; Krivenko et al. 1991). The Astrakhansky State Nature Biosphere *Zapovednik* extensions provide good facilities for scientific research, including within international projects.

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.

The bulk of environmental education and awareness raising work among the local population has been carried out by the ecological education department and research staff the Astrakhansky State Nature Biosphere *Zapovednik*.

The awareness raising work targets various population groups, in particular young people. Main forms and methods of the awareness-raising work are as follows:

- annual participation in the International nature conservation action "March of Parks";
- annual contests among schoolchildren for the best expert in the flora and fauna of the reserve;
- contests and exhibitions of children's drawings;
- summer field work for students of biological schools;
- In 2001-2002 trainings for biology and geography teachers were carried out in collaboration with the Astrakhan Oblast Museum of Local Lore and Teachers Refresher Institute;
- In 2002 the environmental contest "Stop fires" for making best leaflets was carried out among children and series of posters "Stop fires in the delta!" and "Future is in our hands!" published in accordance with its results;
- In 2002 the contest "Young environmental journalist 2002" was carried out among schoolchildren in association with journalists of local mass media;
- In 2003 the 1st research and practical conference of schoolchildren was carried out on problems of specially protected areas;
- In 2003 the action "Clean the delta of garbage" was carried out among schools of the Astrakhan Oblast.

The staff of the Astrakhansky State Nature Biosphere *Zapovednik* appear in mass media (radio, TV) and publish popular science articles in newspapers, magazines, and bulletins. Since October 2002 the *Zapovednik* has been issuing the bulletin *Zapovednye Vesti (The Reserve News)* that appears every quarter and is disseminated for free on request in schools of the Astrakhan Oblast, ecological institutions, and protected areas of 20 administrative entities of Russia (Литвинова Мошонкин...2003).

In 2006 the demonstration project "Enhancement of environmental awareness targeting effective water and wetlands ecosystem management of the Volga Delta" was launched in the framework of the UNESCO Moscow Office in partnership with Coca-Cola HBC Eurasia aimed at fostering better awareness of biodiversity resources of the Lower Volga water and wetlands ecosystems and understanding of the principles of sustainable development amongst local authorities and communities (Прхалова 2007).

31. Current recreation and tourism:

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

The Astrakhansky State Nature Biosphere *Zapovednik* has been carrying work on the development of ecological tourism on 13 excursion routes and in the Nature Museum located in the Damchiksky extension of the Astrakhansky State Nature Biosphere *Zapovednik*.

The tourism department of the Astrakhan Oblast Administration has been implementing some awareness raising work about recreational importance of the Volga Delta. In 2002 an official website on tourism was made, bilingual catalogues "Tourism in Astrakhan Oblast" and "Tourism in Astrakhan Oblast 2003" published, the digital version of the catalogue "Tourism in Astrakhan Oblast 2003" issued; advertisement booklets "Nature of Astrakhan Oblast" and "Historical Astrakhan" published in German and English; and two electronic mini-presentations made on tourism in Astrakhan Oblast.

Mass media, including regional TV, publish materials about tourism and its development in the Astrakhan Oblast. In 2001-2002 The tourism department of the Astrakhan Oblast presented the tourist industry of the Oblast at international exhibitions in Berlin and Moscow. According to an agreement made with the Moscow Government, the Astrakhan Oblast can participate for free in a permanent exposition in the tourist information center in Moscow (Литвинова, Мошонкин 2003).

32. Jurisdiction:

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

Government of the Astrakhan Oblast, Ministry of Natural Resources and Environment of the Russian Federation, Federal Supervisory Natural Resources Management Service (*Rosprirodnadzor*).

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.

The Astrakhansky State Nature Biosphere Reserve (*Zapovednik*)
414021 Astrakhan, Naberezhnaya reki Tsarev 119; phones: 33-17-09, 33-69-29. Director:
N.A. Litvinova

Nature management and conservation service of the Astrakhan Oblast, municipalities.

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

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