

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 of the Conference of the Contracting Parties

Note: It is important that you read the accompanying Explanatory Note and Guidelines document before completing this form.

1. **Date this sheet was updated:** 19th August 2002.
2. **Country:** India
3. **Name of wetland:** KOLLERU LAKE
4. **Geographical coordinates:** 16^o 30' – 16^o 45' N Latitude and 81^o 05' - 81^o 20' E Longitude.
5. **Elevation:** (average and/or maximum and minimum): 0-5 m.
6. **Area:** (in hectares): 90100 ha at maximum flooding
7. **Overview:** (general summary, in two or three sentences, of the wetland's principal characteristics)

Lake Kolleru, a natural eutrophic lake, situated between the two major river basins of the Godavari and the Krishna. It is fed directly by two seasonal rivers, the Budameru and the Tammileru (East and West branches) besides 30 inflowing drains and channels. It has been functioning as a natural flood balancing reservoir between the deltas of two rivers. It has also been serving as the habitat for various resident and migratory birds besides sustaining fishing, agriculture and related occupations of the people dependent on it for livelihood.

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

| | | | | | | | | | | | | |
|------------------------|---------------------------------------|----|---------------------------------------|---------------------------------------|----|----|---|----|-------|-------|--|-------|
| <i>marine-coastal:</i> | A | B | C | D | E | F | G | H | I | J | <input checked="" type="checkbox"/> K | Zk(a) |
| Inland: | L | M | <input checked="" type="checkbox"/> N | <input checked="" type="checkbox"/> O | P | Q | R | Sp | Ss | Tp | <input checked="" type="checkbox"/> Ts | |
| | U | Va | Vt | W | Xf | Xp | Y | Zg | Zk(b) | | | |
| Human-made: | <input checked="" type="checkbox"/> 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Zk(c) | | |

Please now rank these wetland types by listing them from the most to the least dominant:
K, Ts, O, N, 1

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

1 2 3 4 5 6 7 8

Please specify the most significant criterion applicable to this site:

8

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.)

Yes

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

World Wide Fund for Nature- India,
Secretariat, 172-B, Lodi Estate
New Delhi- 110 003
Website: www.wwfindia.org
Tel: 91(11)4616532, 4691760-62

With Inputs From:

Dr. K.P. Srivasuki, Director, A P Shore Area Development Authority, E F S & T Department, 209-K Block, Andhra Pradesh Secretariat, Hyderabad 500 022, India
Ph. : 0091 44 3453181 Fax: 0091 44 3451440.

12. Justification of the criteria selected under point 9, on previous page: (Please refer to Annex. II in the Explanatory Note and Guidelines document)

(i) Criterion 1:

Ensnconced between the two major river basins of the Godavari and the Krishna, the lake has been functioning as a natural flood-balancing reservoir between deltas of the two rivers.

(ii) Criterion 2: The wetland supports the vulnerable species, Grey Pelican *Pelecanus philippensis*.

(iii) Criterion 4:

The lake harbors a variety of resident and migratory birds. Open billed storks are sighted from March to May every year near Bhujabalapatnam. The migratory birds include Gargeney teals, Mallards, Flamingos, Grey Pelicans Adjutant storks etc., and they visit the lake from October to March every year. The wild ducks including Mallards, Pintails and whistling teals etc.

(iv) Criterion 5: The lake regularly supports more than 50,000 waterfowls.

(v) Criterion 8:

The lake provides a habitat for large number of species of fishes and prawns. Rao *et al.*, (1987) recorded 61 species of fishes and 12 species of prawns. The Indian climbing perch *Anabas oligolepis* and *A. testudineus* dominate the landings. Commercially important species of catfish include *Clarias batrachus*, *Heteropneustes fossilis* and *Wallago attu*. The murrels, *Channa striata*, and *C. punctata*. Crap landings are representing by *Labeo rohita*, *Catla catla*, *Cirrhinus mrigala* and *Puntius sarana*. Other species of considerable importance to fishery are *Etrophus spp.*, *Mugil cephalus*, *Mystus gulio*, *Macragnathus spp.*, and *Anguilla bengalensis*.

13. General location: (Include the nearest large town and its administrative region)

Lake Kolleru, a natural eutrophic lake, situated between the two major river basins of the Godavari and the Krishna at about 55 km. east of Vijayawada and some 25 km north west of coastline. It is situated

between 16° 30' – 16° 45' N Latitude and 81° 05' - 81° 20' E Longitude. It covers parts of West Godavari and Krishna Districts of Coastal Andhra Pradesh and it opens into Bay of Bengal through Upputeru which is 62 km long. It broadly lies between Kaikaluru in Krishna District and Eluru in west Godavari District of Andhra Pradesh. The lake is situated 35 kms. inland from the present coast line on the East Coast.

14. **Physical features** (e.g. geology, geomorphology; origins – natural or artificial; hydrology, soil type; water quality; water depth, water permanence: fluctuations in water level; tidal variations; catchment areas; downstream area; climate) Geo-morphology of the lake:

The lake experiences brackishwater conditions in the SouthEastern region during summer months when the inflow of the fresh water into the lake is low. The saline water reaches up to the middle regions of the lake, while in the northern parts freshwater conditions exist.

The major geomorphic features identified are as follows: A. Lagoons B. Ancient beach ridges C. Tidal Marshes, etc. This lake maintains connection with the sea through Upputeru and this has a typical lagoon character. Towards the south of the lake there is a vast stretch of low lying marsh land of about 135 kms. Separated from the lake by a set of ancient beach ridge. Based on gravity and seismic surveys it is found that the Kolleru lake is depression of a minor trough bounded by faults on either side to the basement depth. Beach ridges are low, narrow, elongated and nearly parallel set of ridges each representing a former shore line. Tidal marsh is 40 km. Away from the sea towards Kolleru along the meandering course of Upputeru.

- **Soil:** Heavy alluvial deposits are found all around the lake due to annual floods and discharge through drain.
- **Tidal water effect:** Tidal water enters the lake through Upputeru the only outlet from lake to the Bay of Bengal. Normal tide is +3.0', summer tide is +5.0'. During normal period the effect is upto Tadinada lock i.e., 8/0 mile. During flood salt water intrusion is not felt above mile 12/2. Summer tide effect is felt upto 6/6 mile.
- **Climate:** The lake area enjoys a semi-arid (Dd) type of climate of Thornthwaite classification. Summer temperature is upto 38°-40°C. Winter temperature is upto 19° –23° C. It receives an average rainfall of 70-100 cm. Per annum both by the southwest and northeast monsoons. Major part of the rainfall is due to southwest monsoon (July-September). Considerable rainfall occurs during October and November months due to cyclonic activity in the Bay of Bengal.

15. **Hydrological values** (ground water recharge, flood control, sediment trapping, shoreline stabilisation etc.)

- **Drainage:** Budameru and Tammileru are the two important rivers joining the lake in the western and northwestern sides respectively. The drainage area of these two rivers is about 5,121 sq. km. A number of channels also enter the lake and most of them are from the northern side. Some artificial drains from Krishna and Godavari irrigation canals are diverted into the Kolleru Lake. The lake receives through its major drains and canals an inflow of more than 1,00,000 cusecs of water which is discharge at rate of 6,650 cusecs (at lake level '+7') into the sea by its narrow and only outlet, the sluggish "Upputeru" drain. The bed level of Kolleru is 2' to 3' higher than the bed level of the inflowing rivers. Therefore, there is backing effect into the drains from Kolleru Lake.

- The lake drains into the Bay of Bengal through the Upputeru River, which flows for a distance of 42 km. Although essentially a freshwater lake, Kolleru sometimes receives a small amount of seawater through the Upputeru River.
- The western zone is characterised by relatively high, dissolved oxygen content, low pH, high temperature, and low transparency values. As the eastern zone is farther from the river drainage points, the water temperature, transparency, and pH are not affected so much by river water, but influenced largely by seasonal climatic changes. On the whole, the pH is not affected so much by river water, but influenced largely by seasonal climatic changes. On the whole, the pH varies from 7.2 to 8.2. Surface water temperatures range from 24.2°C in December to 31.6°C in June. There are only slight vertical variations in temperature (maximum of 1.0°C), largely because of the abundance of aquatic vegetation. The lake shows rather high values of total alkalinity, hardness, and nitrates as compared with similar water bodies elsewhere in south India.
- **Water holding capacity of the lake:** The total capacity of the lake at +10' level is 1222 million/cft and at +7-0' level it is 508.4 million / cft only. The data from 1916 to 1990 shows that (i) +7-0' water level was obtained in 37 years out of 75 years (ii) high level of +9-0' or more was obtained in years 1916, 1939, 1949, 1959, 1962, 1964, 1978, 1983 and 1989.
- **Siltation Rate:** The survey of lake from 1964 to 1973 has shown that the bed is raised from (-3.0') to (-1.0') and (-2.0') at many places. This works out to a silting rate of 2.5 cm/yr. The raise in the bed level is due to settlement of silt reinforced with dead weed due to high eutrophic conditions prevailed in the lake. Thus the water holding capacity of the lake is getting reduced.

16. Ecological features (main habitats and vegetation types)

The entire area consisted of the lake, vast plains interspersed with pools of water with few tree species such as *Borassus flabellifer*, *Acacia nilotica* and *Azadiracta indica* etc. The shrubs and herbs are of typical coastal vegetation. The entire vegetation of this area can be classified into Aquatic or wetland vegetation and Terrestrial vegetation. The lake is covered by littoral vegetation, predominantly of hydrophytes. It showed variations in different spots with emergent submerged and free floating aquatic macrophytes.

- **Wetland vegetation:** The lake is covered by littoral vegetation, predominantly of hydrophytes. It showed variation in different spots with emergent, submerged and free floating aquatic macrophytes. The floating vegetation dominated by *Ipomea aquatica* and *Eichhornia crassipes* occurred throughout the lake and formed dense mats. The submerged weeds constituted by *Ottelia alismoides*, *Vallisneria spiralis*, *Ceratophyllum* were abundant in deeper parts of the lake and along ferry lines. *Nymphaea nouchali*, *Nymphaea stellata*, *Nymphoides hydrophylla* and *Salvinia cucullata* were moderately distributed in many parts of the lake. The notable feature of the lake vegetation was the presence of extensive stands of *Phragmites karka* which occur in vast stretches in many areas of the lake. Other weeds such as *Cyperus sp*, *Paspalidium*, *Pistia*, *Alternathera* and *Typha* were present in small patches in many parts of the lake. *Utricularia*, *Polygonum* and *Scirpus sp* were distributed in some areas only.

The following macrophytes can be grouped under emergent vegetation:

1. *Phragmites karka*
2. *Typha angustata Bory et chaub*
3. *Cyperus rotandus. L*

4. *Scirpus articulatus*. Linn
5. *Paspalidium flavidum*. (retz) Camus

Floating leaved Hydrophytes

1. *Nymphaea nouchali*. Barm. F
2. *Nymphaea stellata* wild
3. *Nymphoides hydrophylla* (Lour) O. Ktze
4. *Ipomea aquatica*. Forak
5. *Alternanthera sessilis* (L) R. Br.

Submerged Hydrophytes

1. *Ottelia alismoides* (L) Pers
2. *Vallisneria spiralis* (L)
3. *Ceratophyllum* Sp.
4. *Hydrilla verticillata*
5. *Chara & Nitella*
6. *Utricularia*

Free floating Hydrophytes:

They occurred in standing or slow flowing waters.

1. *Eichhornia crassipes* (Mart) somls
2. *Pistia stratiotes*, L
3. *Salvinia cucullata*
4. Mats of *Azolla*, *Spirodella* and *Lemna*.

Amphibious plants: *Polygonum glabrum*, *sueda maritima* Distribution of aquatic vegetation:

- *Nymphaea stellata*, *Nymphaea nouchali*, *Nymphoides* occurred dispersed throughout the lake especially at Kollatikota, Chatakai, Prattikona lanka. *Paspalidium flavidum*, *Alternanthera sessilis* were greater abundance near Komatilanka, Bujabalapatnam, Prattikonlanka Chatakai, Gudivakalank areas.
- *Alternanthera sessilis* was mainly present near Pedayadlagadi, Komatilanka and Gudivakalanka areas. *Hydrilla verticillata* were abundant near Kollatikota Lakshmipuram areas and Prattikonlanka, Pandiripalligudem areas.
- *Vallisneria spiralis*, *Ceratophyllum sp.* were mainly distributed in Chatakai, Prattikonlanka, Kollatikota, Gudivakalank areas. Thick mats of *Salvinia* occurred near Pedayadlagadi, Kollatikota areas.
- *Cyperus rotundus*, *typha Angustata*, *Scirpus articulates* occurred in small patches at Pedayadlagadi, Komatilanka, Chatakai, Kollatikota, Gudivakalanka.

17. **Noteworthy flora** (indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc.)

- The field studies revealed that *Ipomea aquatica*, *Ottelia alismoides* and *Nymphoides hydrophylla* were the most dominant species which occurred throughout all the stations investigated from *Pedayadlagadi Upputeru*. *Elchhornia crassipes* formed thick mat over water surface and at many places it blocked the way.
- The notable feature of the lake vegetation was the presence of extensive stands of *Phragmites Karka* occur in vast stretches in many parts of the lake particularly Kolletikota, Chatakai, Prattikonanlanka.

18. **Noteworthy fauna** (indicating, e.g., which species are unique, rare, endangered, abundant or biogeographically important, include count data, etc.)

- The lake harbors a variety of resident and migratory birds. Open bill storks are sighted from March to May every year near Bhujabalapatnam. The migratory birds include Garganey teals, Mallards, Flamingos, Adjutant storks etc., and they visit the lake from October to March every year. The wild ducks including Mallards, Pintails and whistling teals etc., are very large (more than 50,000) in numbers.
- The importance of this lake remains a very important wetland for both resident and migratory waterfowl, although its importance has declined in recent years. *Pelecanus philippensis* formerly bred in large numbers but no longer does so. Kolleru Lake was formerly a wintering area for huge numbers of ducks. The flocks of ducks have been described as suggesting “smoke from a score of express trains running berserk”. Large numbers of birds still occur in winter; in a partial census of the lake in January 1988, over 17,000 waterfowl were recorded, including 110 herons and egrets of five species, at least 1000 open-bill storks (*Anastomus oscitans*).
- The following are the species of fish available in Kolleru and Upputeru (i.e., Perantala Kanuma and Upputeru upto Akiveedu bridge).

- | | |
|------------------------|-------------------------------------|
| 1. Family Notopteridae | 1. <i>Notopterus notopterus</i> |
| 2. Family Elpideaer | 2. * <i>Elops saurus</i> |
| 3. Family Anguillidae | 3. <i>Anguilla nebulosa</i> |
| | 4. <i>Anguilla bicolor</i> |
| 4. Family Chanidae | 5. * <i>Chanos chanos</i> |
| 5. Family Cyprinidae | 6. <i>Chela labuca</i> |
| | 7. <i>Oxygaster clupeioides</i> |
| | 8. <i>Danio devario</i> |
| | 9. <i>Esomus danricus</i> |
| | 10. <i>Raabora daniconius</i> |
| | 11. <i>Amblyoharyngodon mols</i> |
| | 12. <i>Barbus (Puntius) sarana</i> |
| | 13. <i>Barbus (Puntius) seohore</i> |
| | 14. <i>Barbus (Pontius) chola</i> |
| | 15. <i>Barbus (Pontius) ticto</i> |
| | 16. <i>Catla catla</i> |
| | 17. <i>Cirrhinus mrigala</i> |
| | 18. <i>Cirrhinus reba</i> |

- | | |
|----------------------------|--------------------------------------|
| | 19. <i>Labeo bata</i> |
| | 20. <i>Kavei cakvasy</i> |
| | 21. <i>Kavei funvruata</i> |
| | 22. <i>Kavei riguta</i> |
| 6. Family Siluridae | 23. <i>Rigtei (Osteivrana) citui</i> |
| | 24. <i>Wallago attu</i> |
| | 25. <i>Ompok pabda</i> |
| | 26. <i>Ompok bimaculatus</i> |
| 7. Family Bagridae | 27. <i>Mystus qulio</i> |
| | 28. <i>Mystus cavasius</i> |
| | 29. <i>Myatus vittatus</i> |
| 8. Family Clariidae | 30. <i>Clarias batrachus</i> |
| 9. Family Heteropneustidae | 31. <i>Heteropneustes fossilis</i> |
| 10. Family Exocoetidae | 32. <i>Hyporhamphus gaimardi</i> |
| 11. Family Belontiidae | 33. <i>Xenentodon cancils</i> |
| 12. Family Cyprinodontidae | 34. <i>Aplocheilus panchax</i> |
| 13. Family Centropomidae | 35. <i>Lates caloarifer</i> |
| | 36. <i>Chanda nama</i> |
| | 37. <i>Chanda ranga</i> |
| | 38. <i>Chanda commersoni</i> |
| 14. Family Theraponidae | 39. <i>Therapon jarbus</i> |
| 15. Family Carangidae | 40. <i>Caranx sexfasciatus</i> |
| 16. Family Leiognathidae | 41. <i>Leiognathus equulus</i> |
| 17. Family Lutjanidae | 42. <i>Lutjanus Jahngarah</i> |
| 18. Family Gerreidae | 43. <i>Cerres punctatus</i> |
| 19. Family Scatophagidae | 44. <i>Scatophagus argus</i> |
| 20. Family Nandidae | 45. <i>Nandus nandus</i> |
| 21. Family Cichlidae | 46. <i>Etilopius suratensis</i> |
| | 47. <i>Etilopius maculatus</i> |
| 22. Family Mugilidae | 48. <i>Mugil cephalus</i> |
| | 49. <i>Liza parsia</i> |
| | 50. <i>Rhinomugil corsuls</i> |
| 23. Family Cobiidae | 51. <i>Closso obius giuris</i> |
| 24. Family Anabantidae | 52. <i>Anabas testudinosus</i> |
| | 53. <i>Anabas oligolepia</i> |
| 25. Family Channidae | 54. <i>Colisa fasciata</i> |
| | 55. <i>Channa striata</i> |
| | 56. <i>Channa punctata</i> |
| | 57. <i>Channa maruila</i> |
| | 58. <i>Channa punctata</i> |
| 26. Family Mastacembelidae | 59. <i>Macrognathus aculeatus</i> |
| | 60. <i>Mastacembellus armatus</i> |
| | 61. <i>Mastacembalus pancalus</i> |
| 27. Family Cynoglossidae | 62. <i>Cynoglossus puncticeps</i> . |

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

The combination of culture and capture fisheries is practiced in the area. Kolletikota situated in the middle of the lake has got a temple of the local diety. Every year thousands of people visit the temple on

a particular day during the annual JATARA (Festival of the diety). The place can be accessed only boat and has religious importance.

20. **Land tenure / ownership of** (a) site (b) surrounding area

- (a) Site: Government of Andhra Pradesh.
- (b) Surrounding: Mainly Fish Ponds, Private ownership.

21. **Current land use** (a) site (b) surroundings / catchment

- (a) Site: Pisciculture
- (b) Surrounding: A major portion of the Private land is under Agriculture. In the Catchment area both dry and wet cultivation is prevalent while the former is in practice over more area.

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

(a) Site:

- The lake has been converting into a wetland and in large parts, into land – mass, over the years. This natural process hastened by human economic activity exploiting and depending on the freshwater of this vast area. Partly due to the legal status extended to culture fishing and agricultural activity within and around the lake spread in the last fifty years and partly due to the near – inelastic demand for freshwater fish besides paddy from the Kolleru, the ecological conservation of the area has become more a human than an aesthetic need.
- A lack of regulation of the seaward flow of the Kolleru waters during monsoon is progressively increasing the high-flood line, causing major flood problems in the surrounding cities of Eluru and Gudivada, besides submerging second-crop paddy lands and fish-tanks below the + 5 ft. contour of the lake spread area. The lack of regulation also causes drying up of the major inlets into the lake during the summer, reducing the lake spread to about 10000 acres and that too in patches of shallow, weed infested ponds, good mainly for animal washing and basket-fishing. The obstruction to free flowing drainage is caused mainly by haphazard raising of culture – fishing tank bunds and construction of three major roads within the lake spread, without adequate cross drainage works.
- Intermittent floods during the Monsoons, occurring every four to five years due to the back – up of rainwater and agriculture run-off have caused major economic losses. The State Government's investments in constructing upstream regulators to control river discharges, its recurring expenses on internal channel works, weed clearance and flood damage works, the losses of submerged crops, high water levels in the city of Eluru remaining static over 6 days at a time, submersion of fish tanks even with bunds as high as 15 ft. loss of cattle feeding grounds, mosquito menace and water borne diseases among the lake – people are few of the yet to be quantified economic losses which need to be prevented. Conversely, drying up of the lake in the summer due to poor drainage in the inflowing systems, also creates the problem of increasing nutrient concentration affecting lake water quality, fish and bird life adversely, thus slowly reducing the very basic natural interdependence of life forms upon which human economic life relies. The eutrophication phenomenon in the lake also affects ground water recharge, directly causing drinking water scarcity in the surrounding bed villages, in the Summer. Finally, tidal inflows have tended to increase after the Upputeru has been widened and reduced in length. Increased salinity levels during cyclonic tidal inflows, could permanently damage the limnological quality of the Kolleru.

(b) **Surrounding:**

- After the development of efficient ponds culture techniques resulting in increased yield from fish ponds, marginal areas of the lake have been converted into fish ponds. World Bank extended financial assistance to farmers for the construction and management of the fish ponds. In the last decade nearly 20,000 hectare have been converted into fish ponds. This has resulted in the degradation of the natural habitat in the lake proper over the years affecting the fishery. The area of the lake has diminished and the breeding areas of the many species are affected.

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)

The lake up to +5' contour has been declared as a wild life sanctuary recently with a view to protect the flora, fauna and the ecosystem.

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

Kolleru conservation and Management plan has been prepared but could not be implemented for want for funding.

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

Environment Protection, Training and Research Institute at Hyderabad has taken up some Research activities mainly for the monitoring of lake water quality.

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

Forest Department Government of A.P has started an Environment Education Centre.

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

Wild life enthusiasts and Bird watchers visit the area during winters. However organised tourism is almost non existing.

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

While Andhra Pradesh Shore Area Development Authority is the Supervisory Authority at Government level Forest Department manages the Sanctuary.

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

Andhra Pradesh Shore Area Development Authority, E F S & T Department, K-Block A. P. Secretariat Hyderabad – 500 022. India.

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

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