

## **Ichthyo Faunal Diversity and Conservation of Kolleru Lake- A Ramsar Site in Andhra Pradesh**

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**Abstract:** In Andhra Pradesh, Kolleru Lake has been recognised as wetland of international significance and a Ramsar site. The wetland provides habitat to diverse flora and fauna including some rare and threatened fauna. Seventy eight fish species belong to fourteen orders, 37 families and 57 genera's were identified in the Kolluru Lake and Upputeru Creek diversity. Order cypriniformes was dominant with 26 species which contributed to 41.94% of the total species followed by Perciformes 22.58%, Siluriformes with 19.36%, Channiformes 6.45%, Anguilliformes 3.23%, and Osteoglossiformes 1.61% at Kolleru Lake. The recorded families, genus and species under seven orders the number is same, the order Perciformes was dominant with 07 families, genus and species which contributed to 43.75% followed by Mugilliformes contributed 03 families, genus and species (18.75%). Osteoglossiformes contributed 02 families, genus and species (12.5%). Cyprinodontiformes, Siluriformes, Gonorhynchiformes and Plurionectiformes contributed to each with 01 (06.25%) at Upputeru creek. List of fishes including their order, family, genus, species, common name, economic importance, IUCN (2014.3) and CAMP status were recorded in the present investigation.

**Keywords:** Fauna, Diversity, Kolluru Lake, Upputeru Creek, IUCN, CAMP status

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### **I. Introduction**

Contemporary freshwater fish biodiversity has seen a constant decline in recent years due to destruction of habitat on account of various threats and anthropogenic factors. Wetland ecosystems are fragile but productive and vital ecosystems recognized for their role in conservation of biodiversity and are being designated as 'Ramsar sites' (Internationally recognized wetlands) which qualify under the Ramsar criteria. Role of the wetlands in conserving fish diversity is widely acknowledged as these wetlands are used by the various fish species as a refuge for breeding, feeding and spawning purpose at one stage or the other in their life cycle. The Kollerulake supports a rich fish fauna, including some endemic sub species. There is a rich variety of fish fauna inhabiting the lake because of the great variety of ecological niches available. Fish in the wetlands form a key group which supports other species of varied animal diversity and act as a good indicator of healthy ecosystems. They have been a table item in the diet of many people. Though fish is largely explored vertebrate group but still a number of fish species are unexplored in wetlands. They form an important element in the economy of many countries. The paper deals with the fish diversity and abundance of fish species in Kolleru Lake highlighting the economic importance.

Fisheries is directly associated with the economy of the country and provide alternate resource of food for the growing population. Fishery sector is one of the 'Engines of growth'. Fishes are valuable source of high grade protein and they occupy a significant position in the socio-economic fabric by providing the population not only the nutritious food but also income and employment opportunities. The freshwater native fishes of Kolleru Lake are currently facing an alarming decline in fish diversity and production as a result, a sizeable portion of freshwater fishes have been threatened. The lake is being subjected to considerable stresses, the adverse effects of which are being manifested in the decline of native fish populations. Another problem is the introduction of invasive alien species, the *Tilapia Oreochromis mossambicus* for commercial purposes, which has replaced many native fish species. Once the lake had an abundant resource of fish with an average production of 7000 metric tonnes per year which has plummeted to 1000 metric tonnes in recent years. The 'Sharp decline' in the native fish in the lake primarily on account of reduction in the natural water spread area. This emphasizes an immediate need for the management to protect and conserve the aquatic ecosystem.

### **II. Materials And Methods**

The fishes were collected with the help of local fishermen by using different types of nets viz. hand nets, cast nets, stake nets and gill nets. A common fish method peculiar to Kolleru is Dadikattu, operated from October to February. The fishes caught were examined for their colour bands or spots present on the body and recorded in the field. They were brought to laboratory noting down the colour and other morphological features and the specimens were preserved in 4% formalin. Seasonal collections were made from January 2009 to February 2011 spanning over a period of two years.

The specimens brought to laboratory were further studied for their species identification. The species were ascertained on the basis of various morphometric characters and meristic counts following criteria given by Jayaram K.C (2002), (1999), (1981), (1961) Jhingran and Talwar (1991) Day, F. (1889), (Day, F. (1958)). Standard identification keys were used for identification of specimens upto species level (Hamilton – Buchanan, F. 1822, Misra 1962, Dutta Munshi and Srivastva 1968, Dutta and Malhotra 1984, Dutta et al., 1987, Jhingran 1982, Nath 1986, Munro, I. S. R. 2000. and Nelson 1976). Rama Rao. K., (2014) a study was conducted on Fishing Craft And Gear In Lower Manair Dam, Karimnagar Dt. Andhra Pradesh, India.

### III. Results

The results of the present study revealed that the occurrence of seventy eight fish species belong to fourteen orders, 37 families and 57 genera's were identified in the Kollurulake and Upputeru creek. List of fishes including their order, family, genus, species, common name, IUCN (2014.3) and CAMP status (1998) and Molur, S. & Walker, S. (1998) were recorded in the present investigation was given in Table 1 and 2. Out of 78 species six are exotic species are available in Kollurulake. (\* Introduced fishes; \*\*Invasive alien species)

In the present investigation the number and percentage composition of families, genera and species under different orders at Kolleru Lake are shown in Table 3 and Fig 1. Order cypriniformes was dominant with 26 species which contributed to 41.94% of the total species followed by Perciformes 14 (22.58%), Siluriformes with 12 (19.36%), Channiformes 04 (6.45%), Anguilliformes 02 (3.23%), and Osteoglossiformes 01 (1.61%). Recorded families out of 21, Perciformes contributed 08 (38.09%) the families followed by Siluriformes 05 (23.81%), Cyprinodontiformes 03 (14.29%), Osteoglossiformes, Channiformes and Anguilliformes each with 01 (04.76%). Recorded genera out of 41, Cypiniformies contributed 17 (41.46%) species followed by Perciformes with 11 (26.83%), Siluriformes 07 (17.07%), Cyprinodontiformes 03 (07.32%), Osteoglossiformes, Channiformes and Anguilliformes each with 01 (02.44%).

The percentage composition of families, genera and species under different orders at Upputeru creek are shown in Table 4 and Fig 2. Recorded the families, genus and species under 07 orders the number is same, the order Perciformes was dominant with 07 families, genus and species which contributed to 43.75% followed by Mugilliformes contributed 03 families, genus and species (18.75%). Osteoglossiformes contributed 02 families, genus and species (12.5%). Cyprinodontiformes, Siluriformes, Gonorhynchiformes and Plurionectiformes contributed to each with 01 (06.25%).

In the Ramasar site of Kollerulake and Upputeru creek fishery is mainly divided into basing on economic importance in this region. It is divided into six categories namely Commercial, Fine food, Coarse food, Aquarium fish, Forage fish and others are given in the Table: 5. In this fishery regions investigated and calculated fish product is 39.74% attain commercial value, 14.10% fine food, 26.92% coarse food, 92.31% aquarium fishes, 7.62% forage fishery, 20.51% cultivable fishes and less percentage of medicinal value, scientific value, by-product, public health and Larvivorous fishes.

The Percentage occurrence of fish species in Kollerulake under the conservation status, according to IUCN (2011) forty four species contributed to 70.97% are least concern (LC), six species contributed to 9.68% are near threatened (NT), four species contributed to 6.45% not evaluated (NE), three species contributed to 4.84% are data deficient (DD), three species contributed to 4.84% are endangered (EN) and two species contributed to vulnerable (VU) (Table. 6, Fig. 3). According to CAMP (1998) status twenty two species of fishes are each with contributed to (35.48%) Low risk near threatened (LR nt) and not evaluated (NE), ten (16.13%) species of fish are vulnerable (VU), three species of fishes are each with (04.69%) endangered (EN) and low risk least concern (LRlc) and two species contributed to (3.23%) data deficient (DD) (Table. 6, Fig. 4). In Upputeru creek the conservation status according to IUCN (2014.3) nine species contributed to 56.25% are least concern (LC), five species contributed to 31.25% not evaluated (NE), two species contributed to 12.50% are data deficient (DD) (Table: 7, Fig: 5).

### IV. Discussions

Anish Dua and Chander Parkash (2009) studied that its importance for rich diversity, fish assemblages in seven different reaches of Harike wetland was studied to determine their abundance and distribution. 61 fish species of 35 genera were recorded from Harike wetland during the present study. *Cirrihinus mrigala* and *Cyprinus carpio* belonging to family Cyprinidae were the dominant fish species. Lake and Riyasat having many microhabitats supported highest diversity of fishes (60 and 56 respectively) followed by Beas (20) Sutlej (14), Confluence (12), Reservoir (9) and Downstream (8). Among the IUCN designated threatened species, 1 Critically Endangered, 4 Endangered and 13 Vulnerable fish species of India are found in Harike wetland. Species diversity index, dominance, evenness and catch per unit effort were calculated to ascertain the fish distribution in Harike wetland. Earlier in Ramsar site of India is only 26 species of commercial importance were reported by Ladhar et al. (1994) and Ramsar (2002). Dudgeon, D et al (2006) and Sarwade, J. P, Devi Prasad, A. G et al (2009) and Khillare, Y. K. (2010). Anish Dua and Chander Parkash (2009) reported 61 species from

Harikeri wetland where cyprinidae was dominant with 27 species. The exotic fishes and freshwater fish diversity the indiscriminate transfer of exotic fishes has brought about a wide array of problems including extirpation of indigenous species clearly mentioned by Bijukumar A. (2000). Rama Rao (2014) observed that the ichthyofaunal biodiversity and larvivorous fish species efficacy in the lower Manair Dam at Karimnagar district; Telangana State.

In our present study order Cypriniformes was found to be the most dominant group among all other orders which is in accordance with the other studies Chandra Sekhara Rao. J et al (2013) revealed that the occurrence of fifty eight ornamental fish species belong to 10 orders, 26 families and 40 genera in the Lake Kolleru, a freshwater wetland of International importance Ramsar site. Shinde, S. E et al., (2009), Pramod Kumar et al (2011), Chatoan Tesia & Sabitry Bordoloi (2012), Jaiswal, D. P. & Ahirrao, K. D. (2012). Das and Sabitry [2012] reported 62 ornamental fish species from the river island, Masuli, Assam where cyprinidae was more dominant with 20 species. Rama Rao (2014) observed that the diversity of ornamental fishes in Lower Manair Dam is the Order cypriniformes was dominant with 23 species contributing 43.40% of the total species followed by Perciformes with 11 (20.76%), Siluriformes 09 (16.98%), Channiformes 04 (7.55%), Anguilliformes and Beloniformes each 02 (3.77%), Osteoglossiformes and Mogiliformes each 01 (1.87%). The similar observations represented by Chakravarty, P et al (2012) and Mahapatra, B. K et al (2006).

## V. Conclusion

The result of present investigations confirmed the occurrence of seventy eight species of fishes including five introduced fish species, belonging to five orders and 24 families recorded in commercial catches. The order Cypriniformes was dominant with twenty six species followed by order Perciformes with sixteen species, while the order Siluriformes are represented by 14 species, Anguilliformes were represented by two species and rest of the order Osteoglossiformes with a single species. The commercial catches are represented by Carps, Catfishes, Feather-backs, Eels, Perches, Murrels and rest of them belonging to miscellaneous category. The average annual catches of various species and their composition in the annual landings during 1974 the production of fish was 7000 metric tonnes and the catch decreased to 3000 metric tonnes in 1985 (Anon 1991), but in recent years the production has plummeted to 1000 metric tonnes per year. The major carps like *Catla catla*, *Cirrhinus mrigala*, *Labeo rohita* and *L. fimbriata*, were once available in large numbers growing to a very large size. These fishes became increasingly scarcer in recent years. Apart from carps, the lake used to support a rich fishery of catfishes, perches, murrels and eels with an estimated catch of over 7,000 tons /year. Presently the fishery consist mostly airbreathing fishes which are also depleted. Their number has not dwindled so drastically as the major carps. Fishes of minor importance are *Nandus*, *Etroplus* and *Mystus* which are patchy in their distribution in the lake. The species are classified on the basis of commercial importance by following proforma given by Lalger (1956). Out of sixty species, thirty six are commercially important, eleven species have food value and two species are classified as coarse food fishes as they form food for poor people of this region. Three species are suitable for aquarium, while five species have importance in public health, as they are larvivorous and others are of medicinal value.

Potentially fish resources are the richest, in terms of production too. The lake has been the worst victim of the anthropogenic pressures and has undergone tremendous ecological changes. The lake is facing multidimensional threats and is under severe pressure from weed infestation, siltation, pollution, eutrophication, agricultural encroachments besides conversion of wetland for aquaculture. The plethora of factors contributing to the decline in habitat quality and species population has been growing in the past two decades.

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**Table: 1.** List of fishes and their order, family, genus, species, common name, IUCN and CAMP status at Ramsar site Kolleru Lake.

Order / Family	No.	Scientific Name	Common Name	IUCN Status (2014.3)	CAMP Status
<b>Osteoglossiformes/</b>	<b>I</b>				
1. Notopteridae (1)	1	Notopterus notopterus	Grey feather back	LC	LRnt
<b>Cypriniformes/</b>	<b>II</b>				
2. Cyprinidae (25)	2	Catla catla	Catla	LC	LRnt
	3	Labeo bata	Bata labeo	LC	LRnt
	4	Labeo calbasu	Black rohu	LC	LRnt
	5	Labeo fimbriatus	Gangetic latia	LC	LRnt
	6	Labeo rohita	Rohit	LC	LRnt
	7	Cirrhinus mrigala	Mrigal	LC	LRnt
	8	Cirrhinus reba	Reba carp	VU	VU
	9*	Ctenopharyngodon idella	Grass carp	LC	NE
	10*	Cyprinus carpio	Common carp	VU	NE
	11	Osteobrama cotio cunma	Cunma	LC	LRnt
	12	Puntius amphibius	Scarlet-banded barb	DD	NE
	13	Puntius chola	Swamp barb	LC	VU
	14	Puntius ticto	Ticto barb	LC	LRnt
	15	Puntius sarana sarana	Olive barb	LC	VU
	16	Puntius sophore	Spot-fin swamp barb	LC	LRnt
	17	Puntius stigma	Pool barb	LC	NE
	18	Thynnichthys sandkhol	Sandkhol Carp	EN	NE

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	19	Chela laubuca	Indian glass barb	LC	LRlc
	20	Salmostoma clupeioides		LC	LRlc
	21*	Hypophthalmichthys molitrix	Silver carp	NT	DD
	22	Amblypharyngodon mola	Mola carplet	LC	LRlc
	23	Danio devario	Devario danio, Dind Danio	EN	NE
	24	Esomus barbatus	South Indian Flying barb	LC	NE
	25	Esomus danricus	Flying barb	LC	LRnt
	26	Rasbora daniconius	Black line rasbora	NE	LRnt
3. Cobitidae (1)	27	Lepidocephalus guntea	Guntea Loach	LC	NE
<b>Siluriformes/</b>	<b>III</b>				
4. Bagridae (4)	28	Mystus bleekeri	Day's mystus	LC	VU
	29	Mystus cavasius	Gangetic mystus	LC	LRnt
	30	Mystus gulio	Long whiskers catfish	LC	NE
	31	Mystus vittatus	Striped dwarf catfish	LC	VU
5. Siluridae (3)	32	Ompok bimaculatus	Butter Catfish	NT	EN
	33	Ompok pabda	Butter catfish	NT	EN
	34	Wallago attu	Boal	NT	LRnt
6. Pangasiidae (2)	35	Pangasius pangasius	Pangas catfish	LC	NE
	36*	Pangasianodon hypophthalmus	Striped catfish	EN	NE
7. Clariidae (2)	37	Clarias batrachus	Air breathing catfishes/ Magur	LC	NE
	38*	Clarias gariepinus	African catfish	NE	NE
8. Heteropneustidae (1)	39	Heteropneustes fossilis	Stinging catfish	LC	VU
<b>Cyprinodontiformes /</b>	<b>VI</b>				
9. Belontiidae (1)	40	Xenentodon cancila	Freshwater garfish	LC	LRnt
10. Aplocheilidae (1)	41	Aplocheilichthys panchax	Panchax minnow	LC	DD
11. Poeciliidae (1)	42	Gambusia affinis	Mosquitofish	LC	NE
<b>Perciformes/</b>	<b>V</b>				
12. Ambassidae (2)	43	Chanda nama	Elongate glass perchlet	LC	NE
	44	Pseudambassis ranga	Indian glassy fish	LC	NE
13. Nandidae (1)	45	Nandus nandus	Mud perch	LC	LRnt
14. Cichlidae (3)	46	Etroplus suratensis	Green chromid	LC	NE
	47	Etroplus maculatus	Ornate chromid	LC	NE
	48**	Oreochromis mossambicus	Mozambique Tilapia	NE	NE
15. Gobiidae (1)	49	Glossogobius giuris	Tank/Bar-eyed goby	LC	LRnt
16. Mastacembelidae (3)	50	Mastacembelus armatus	Zig zag spiny eel	LC	VU
	51	Mastacembelus pancalus	Barred spiny eel	LC	LRnt
	52	Macrogathus aral	One striped spiny eel	LC	LRnt
17. Anabantidae (2)	53	Anabas testudineus	Climbing perch	DD	VU
	54	Anabas oligolepis	Climbing perch	DD	VU
18. Belontiidae (1)	55	Colisa fasciatus	Banded gourami	LC	NE
19. Osphronemidae (1)	56	Osphronemus goramy	Giant gourami	LC	NE
<b>Channiformes/</b>	<b>VI</b>				
20. Channidae (4)	57	Channa marulius	Spotted snakehead	LC	LRnt
	58	Channa orientalis	Walking snakehead	NE	VU
	59	Channa punctatus	Giant snakehead	LC	LRnt
	60	Channa striatus	Banded snakehead	LC	LRnt
<b>Anguilliformes/</b>	<b>VII</b>				
21. Anguillidae (2)	61	Anguilla nebulosa	Mottled eel	NT	NE
	62	Anguilla bicolor	Short fin eel	NT	EN

\*Introduced fishes; \*\*Invasive alien species

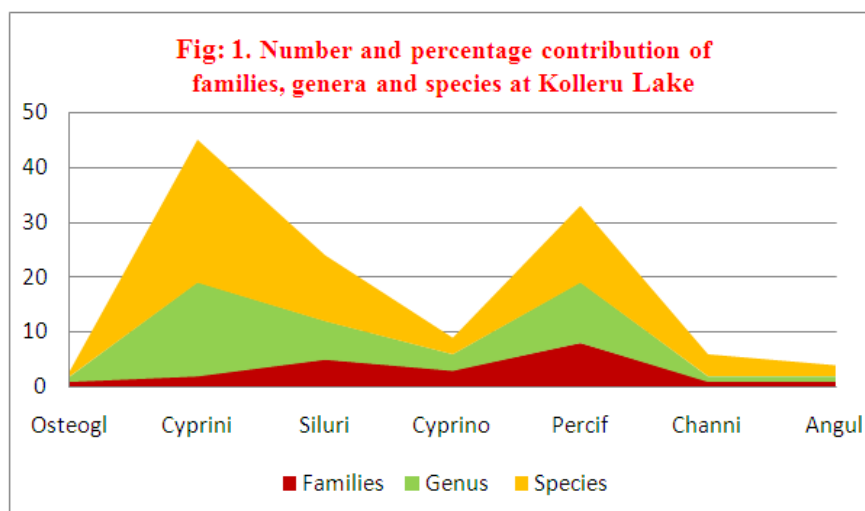
NT- Near Threatened; EN- Endangered; VU- Vulnerable; LRnt- Lower risk near threatened; LRlc- Lower risk least concern; LC- Least concern; DD- Data Deficient; NE- Not evaluated,.

**Table: 2.** List of fishes and their order, family, genus, species, common name and IUCN status at Ramsar site Upputeru Creek

Order / Family	No.	Scientific Name	Common Name	IUCN Status (2014.2)
<b>Osteoglossiformes/</b>	<b>I</b>			
Elopidae (1)	1	Elops saurus	Ladyfish, Tenpounder	LC
Megalopidae (1)	2	Megalops cyprinoides	Indo-Pacific Tarpon	DD
<b>Gonorhynchiformes/</b>	<b>II</b>			
Chanidae (1)	3	Chanos chanos	Milkfish	NE
<b>Siluriformes/</b>	<b>III</b>			
Ariidae (1)	4	Arius caelatus	Blacktip Sea Catfish	LC
<b>Cyprinodontiformes/</b>	<b>IV</b>			
Hemirhamphidae (1)	5	Hyporhamphus gaimardi	Congaturi halfbeak	DD
<b>Perciformes/</b>	<b>V</b>			
Centropomidae(1)	6	Lates calcarifer	Barramundi	NE
Teraponidae (1)	7	Terapon jarbua	Tiger perch	LC
Carangidae (1)	8	Caranx sexfasciatus	Bigeye Trevally	LC
Leiognathidae (1)	9	Leiognathus equulus	Common Ponyfish	LC
Lutjanidae (1)	10	Lutjanus argentimaculatus	Mangrove red snapper	NE
Gerreidae (1)	11	Gerres punctatus	Threadfin Silver Belly	LC
Scatophagidae (1)	12	Scatophagus argus	Spotted Scat	LC
<b>Mugiliformes /</b>	<b>VI</b>			
Mugilidae (3)	13	Liza parsia	Goldspot mullet	NE
	14	Mugil cephalus	Grey / Flat head mullet	LC
	15	Rhinomugil corsula	Corsula mullet	LC
<b>Pluronectiformes/</b>	<b>VII</b>			
Cynoglossidae (1)	16	Cynoglossus puncticeps	Speckled tonguesole	NE

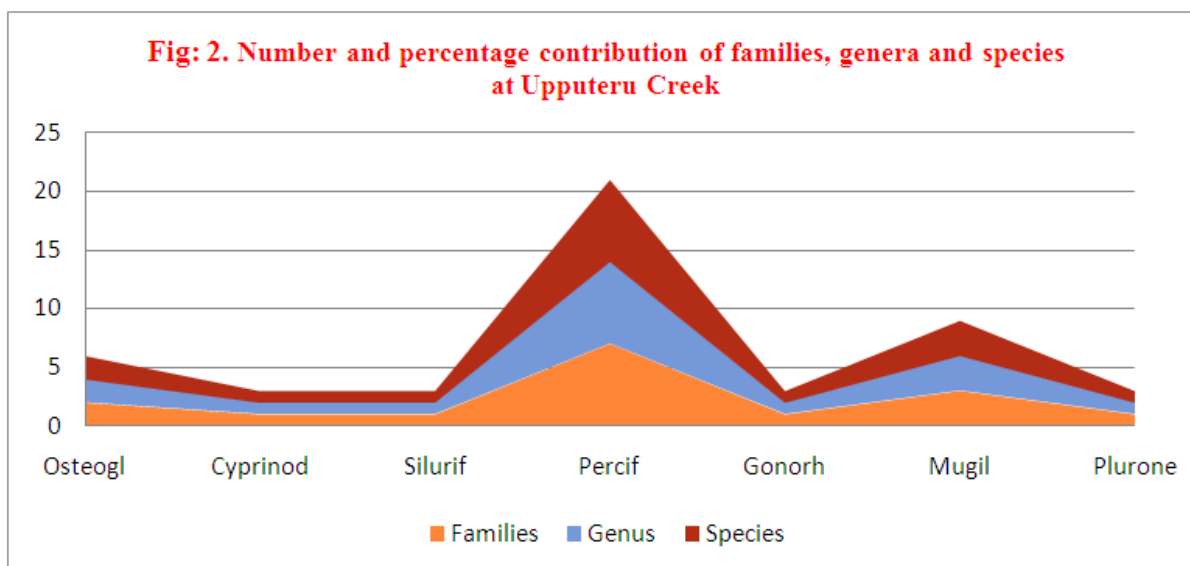
**Table: 3.** Number and percent composition of families, genera and species of fishes under various orders Order wise fauna diversity at Kolleru Lake

Fresh water fishes of Kolleru lake						
Orders (7)	Families	%	Genus	%	Species	%
Osteoglossiformes	01	4.76	01	2.44	01	1.61
Cypriniformes	02	9.52	17	41.46	26	41.94
Siluriformes	05	23.81	07	17.07	12	19.36
Cyprinodontiformes	03	14.29	03	7.32	03	4.84
Perciformes	08	38.09	11	26.83	14	22.58
Channiformes	01	4.76	01	2.44	04	6.45
Anguilliformes	01	4.76	01	2.44	02	3.23
<b>Total</b>	<b>21</b>		<b>41</b>		<b>62</b>	



**Table: 4.** Number and percent composition of families, genera and species of fishes under various orders Order wise fauna diversity at Upputeru Creek

Orders	Upputeru Creek fishes					
	Families	%	Genus	%	Species	%
Osteoglossiformes	2	12.5	2	12.5	2	12.5
Cyprinodontiformes	1	6.25	1	6.25	1	6.25
Siluriformes	1	6.25	1	6.25	1	6.25
Perciformes	7	43.75	7	43.75	7	43.75
Gonorrhynchiformes	1	6.25	1	6.25	1	6.25
Mugiliformes	3	18.75	3	18.75	3	18.75
Pluronectiformes	1	6.25	1	6.25	1	6.25
<b>Total= 07</b>	<b>16</b>		<b>16</b>		<b>16</b>	



**Table: 5.** Economic classification of fishes at Ramsar site of Kolleru Lake

Name of the fish	Commercial	Fine food	Coarse food	Aquarium fish	Forage fish	Others
1.Notopterus notopterus	-	-	X	X	-	MV
2.Elops saurus	X	-	-	X	-	LV
3.Megalops cyprinoides	-	X	-	X	-	-
4.Anguilla nebulosa	-	-	X	X	-	-
5.A. bicolor	-	-	X	X	-	-
6.Chanos chanos	X	-	-	X	-	C
7.Catla catla	X	-	-	X	-	C
8.Cirrhinus mrigala	X	-	-	X	-	C
9.C. reba	X	X	-	X	-	C
10.Ctenopharyngodon idellus	X	-	-	X	-	C
11.Cyprinus carpio	X	-	-	X	-	C
12.Labeo bata	-	X	-	X	-	-
13.L.calbasu	X	-	-	X	-	C
14. L. fimbriatus	X	-	-	X	-	C
15.L. rohita	X	-	-	X	-	C
16.Osteobrama caticunma	-	-	X	X	X	LV
17.Puntius amphibious	-	-	-	X	-	LV
18.P. chola	-	-	X	X	-	LV
19.P. sarana sarana	X	X	-	X	-	LV
20.P. sophore	-	-	X	X	-	B&MV
21.P. ticto	-	-	X	X	-	B
22.P. stigma	-	-	-	X	-	LV
23.Thynnichthys sandkhol	X	-	-	X	-	-
24.Chela laubuca	-	-	-	X	-	B, LV
25.Salmostoma clupeoides	-	X	-	X	X	LV
26.Hypophthalmichthys molitrix	X	-	-	X	-	C
27.Amblypharyngodon mola	-	-	-	X	X	LV
28.Danio devario	-	-	-	X	-	LV
29.Esomus barbatus	-	-	-	X	-	LV
30.E. danricus	-	-	-	X	-	LV

*Ichthyofaunal diversity and Conservation of Kolleru lake- A Ramsar site in Andhra Pradesh*

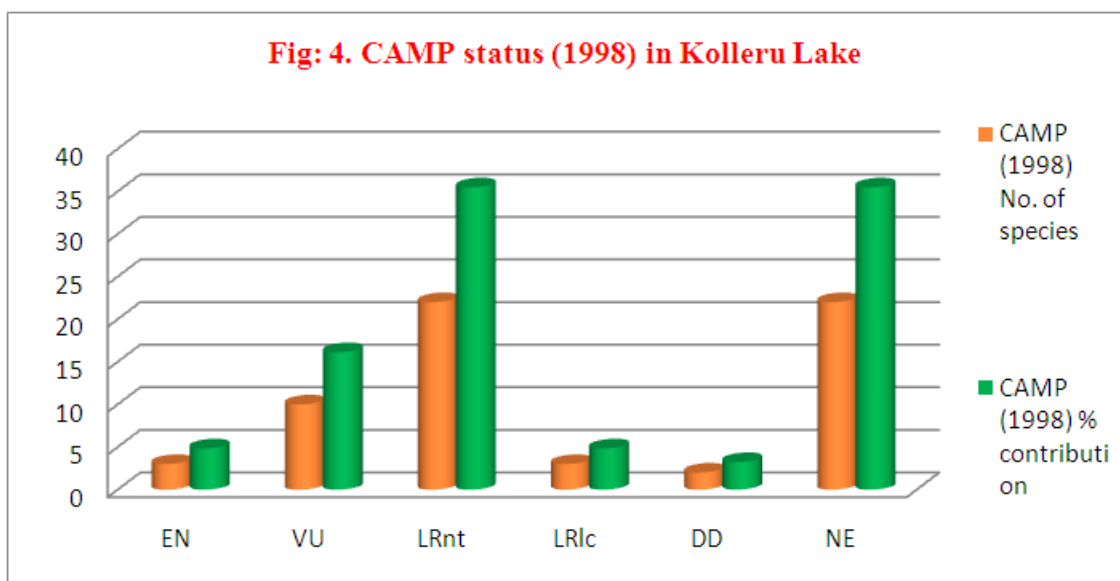
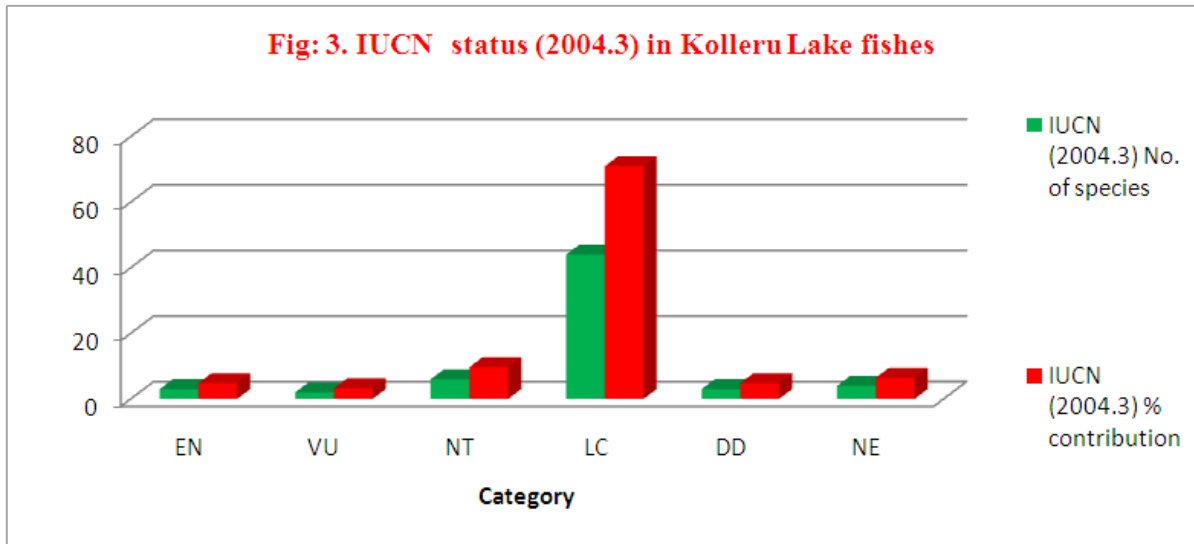
31. <i>Rasbora daniconius</i>	-	-	-	X	-	B, LV
32. <i>Lepidocephalus guntea</i>	-	-	-	X	-	
33. <i>Mystus bleekeri</i>	-	-	X	X	-	
34. <i>M. cavasius</i>	-	X	-	X	-	
35. <i>M. gulio</i>	-	X	-	X	-	
36. <i>M. vittatus</i>	-	-	X	X	-	
37. <i>Ompok bimaculatus</i>	X	-	-	X	-	
38. <i>O. Pabda</i>	X	-	-	X	-	
39. <i>Wallago attu</i>	X	-	-	X	-	
40. <i>Pangasius pangasius</i>	-	-	X	X	-	C
41. <i>Clarias batrachus</i>	X	X	-	X	-	BP&SV
42. <i>Heteropneustes fossilis</i>	X	X	-	X	-	MV
43. <i>Arius caelatus</i>	-	-	X	-	-	-
44. <i>Hyporhamphus gaimbardi</i>	-	-	X	X	-	-
45. <i>Xenentodon cancila</i>	-	-	X	X	-	-
46. <i>Aplocheilichthys panchax</i>	-	-	-	X	X	LV
47. <i>Gambusia affinis</i>	-	-	-	-	-	LV
48. <i>Lates calcarifer</i>	X	-	-	-	-	C,
49. <i>Chanda nama</i>	-	-	-	X	-	PH, LV
50. <i>Pseudambassis ranga</i>	-	-	-	X	-	-
51. <i>Terapon jarbua</i>	X	-	-	X	-	-
52. <i>Caranx sexfasciatus</i>	X	-	-	-	-	-
53. <i>Leiognathus equulus</i>	-	-	X	X	-	-
54. <i>Lutjanus argentimaculatus</i>	X	-	-	X	-	-
55. <i>Gerres punctatus</i>	X	-	-	X	-	-
56. <i>Scatophagus argus</i>	X	-	-	X	-	-
57. <i>Nandus nandus</i>	-	-	X	X	X	-
58. <i>Etroplus maculatus</i>	-	-	-	X	-	-
59. <i>E. suratensis</i>	-	-	-	X	-	-
60. <i>Oreochromis mossambica</i>	-	-	X	X	-	-
61. <i>Liza parsia</i>	X	-	-	X	-	-
62. <i>Mugil cephalus</i>	X	-	-	X	-	-
63. <i>Rhinomugil corsula</i>	-	-	X	X	-	-
64. <i>Glossogobius giuris</i>	-	-	X	X	-	-
65. <i>Anabas testudineus</i>	-	-	X	X	-	-
66. <i>A. oligolepis</i>	-	-	-	X	X	MV
67. <i>Colisa fasciatus</i>	-	-	-	X	-	-
68. <i>Osphronemus goramy</i>	X	-	-	X	-	-
69. <i>Channa marulius</i>	X	-	-	X	-	C
70. <i>C. orientalis</i>	-	X	-	X	-	C
71. <i>C. punctatus</i>	X	-	-	X	-	C
72. <i>C. striatus</i>	X	-	-	X	-	C
73. <i>Macrognathus aral</i>	-	X	-	X	-	-
74. <i>M. pancalus</i>	-	-	-	X	-	-
75. <i>Mastacembelus armatus</i>	X	-	-	X	-	-
76. <i>Cynoglossus puncticeps</i>	-	-	X	X	-	-
77. <i>Pangasianodon hypophthalmus</i>	-	-	X	-	-	-
78. <i>Clarias gariepinus</i>	-	-	-	-	-	C

**Key to Table:** X-Use, - - Not in use, **Commercial** – Species which are prolific breeders, can be cultured and have market value, **Fine food** - Having good taste and protein value, **Coarse food** – Have less food value and preferred as a food by the poor people, **Aquarium fish** – Can be maintained in aquarium for aesthetic and recreational value, **Forage fish** – Food for predatory fishes, **Others** – Having some extra qualities such as **MV** – Medicinal value, **B** – Bait, **SV** – Scientific value, **BP** - By-product, **PH** – Public Health, **LV** - Larvivorous, **C** – Cultivable

**Table: 6.** Percentage occurrence of fish species in under the conservation status IUCN (2004.3) and CAMP (1998) in Kolleru Lake.

Category		EN	VU	NT	LRnt	LRlc	LC	DD	NE
IUCN (2004.3)	No. of species	03	02	06	-	-	44	03	04
	% contribution	4.84	3.23	9.68	-	-	70.97	4.84	6.45
CAMP (1998)	No. of species	03	10	-	22	03	-	02	22
	% contribution	4.84	16.13	-	35.48	4.84	-	3.23	35.48





**Table: 7.** Percentage occurrence of fish species in under the conservation status of CAMP (1998) in Upputeru Creek Fishes

Category		LC	DD	NE
IUCN (2004.3)	No. of species	09	02	05
	% contribution	56.25	12.5	31.25

