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Ecological Impact on the status of otter (Lutra-Perspicillata)

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Abstract:

The Smooth otter (Lutra- Perspicillata) are endangered around the world due to vulnerability of the riverine habitat increasing pollution and environmental deterioration. River otter inhabits throughout the river. The degree of contamination, proximity to pollution source suggests that the species are at great risk from the environmental contamination. The problems faced by this animal caused by the adverse effects are in common with other members of the biota. Accepting that little can be done to improve the natural impacts an approach to the reduction of pollution load is advocated.

Keywords: Ecology impact, other Status.

1. Introduction

Smooth coated otters (Lutra-Perspicillata) are so named for their shorter smoother coats, as compared to the similar size of symmetric species. A little is known about the ecology of the species (Burton and Pearson, 1987). Otter Lutra were distributed worldwide and were found living in all continents except Antarctica and Australia (Corbert and Harris, 2001). Otters are found in rivers, in its tributaries, lakes, streams, ponds and nearby marshy places in forested areas (Banks, M. 1988).The smooth coated otter is a sociable and gregarious species. The smooth- coated otters were all hunted for their skin by the fishmen of Sindh (Roberts, 1977).The monetary value of the Otter skin is very high specially the Russians and the Chinese mostly used it as sign of wealth (Christian burg,1997). People hunt Otter for their valuable and beautiful fur (Yong Kwon, 2001). The Otter has no enemy except man, who has hunted it for its fur and to protect fish stock (Wild life Fact Files, 2002). Otters disappeared or were rare in the study area (Table 2). Otter populations are extremely sensitive to change in habitat. Otters tend to avoid the polluted or disturbed habitat. (Coulter 1984). It was once wide spread in the River Indus and was hunted for its skin and internal visceras used in medicines. By Controlling the flow of the Indus through series of low barrages, which divert water into irrigation canals, and their tributaries, has divided the otter population into sub population (Gachal and Slater, 2003). More over the polluted water has also isolated the otter population and disturbed the otter habitat. The disappearance of the otter from the lower Indus River is because of industrial effluents and degraded water. The relevance of water quality for otter is very important to evaluate the significant load of pollution for its prey. The pollution status of River Indus is comparable to that of well known formally polluted rivers of the world (Forstner and Wittman, 1982). At present Indus river is considered to be a dump house for all types of waste products that are streaming in to it untreated (Jallel, *et al*, 1995). The erection of dams, barrages, have degraded the aquatic habitat of the species. The construction of mega reservoirs, resulted in the degradation of habitat of otter and this tendered

potential negative impact on river eco-system. The damaging environment impact in those areas has also decreased the population of Otter. Fecal marking (spraints) have been found in Sukkur to Guddu area and are reportedly more frequent around Taunsa (Gachal and Slater, 2004). The habitat of unique fresh water mammals like otter has become restricted in swamp areas. The main River Indus is considered as the lifeline for the whole eco region (Global WWF, 2000). The impact of Agricultural, municipal and industrial pollution in the River Indus are of major concern. Pesticide are identified as major cause of the otter decline (Jeffries, 1974). Agricultural runoffs are rich in fertilizers that create a heavy additional nutrient load into the river system resulting in euterophication (Forest Dept: 2001) The untreated municipal waste passing into the river water increases the biological oxygen demand of the Indus River System (Dawood, 1999). As a result of toxic discharges of the industries, which contain heavy metals, metal salts, oils and even bacteria and acid putting high B.O.D load on purification capacity of the River Indus (Govt: of Pak. Env: divi: 1983). Presently the otter are quite rare in the lower Indus River System and have become threatened species in Pakistan (IUNC, 1990b and IUNC Red data list, 1996). The aim of the project is to determine the pollution load of the Indus river downstream Kotri barrage to delta.

2. Materials and method

Physico- chemical analysis of water.

The water samples were collected every month for a period of one year from mid- stream at a depth of 100cm and from the eleven location between G.M. barrage and Sujawal sites according to Standard water sampling procedure (WHO, 1982, APHA. 1976, Graham Scholey 1992, Jallel *et al.* 1995, Choudhry *et al.* 1994), fifteen water quality physico-chemical parameters were determined by the standard methods Parameters including.

pH, conductivity, total dissolved solids, **alkalinity, hardness, dissolved oxygen** (DO) **and biological Oxygen demand** were subsequently evaluated.

pH was measured with **ORION** 420 A pH meter.

Conductivity was evaluated with conductivity bridge **ORION 115** Boston USA

Alkalinity (P and M) was determined by titration of 5 ml with Standard Hydrochloric acid (0.1N) using phenolphthalein and methyl range as indicators.

Hardness and Chlorine were calculated from titration (5ml for chloride and 25ml for hardness) with EDTA (0.01M) silver nitrate (0.0141N) respectively.

Dissolved Oxygen 270ml solution was tritated with sodium thiosulphate (0.025N). Maganese sulphate and sodium iodide were added to preserve the dissolved oxygen. BOD 270 ml samples were placed in a temperature controlled incubator for five days in the Dark at 20°C and analyzed by the Winkler method. Transparency of water was measured by Secchi disc.

3. Results and discussion:

Values for Physico-chemical parameters in water samples collected from different sites of river Indus and waterways between (September 2002 and August 2003) are shown in (**Tables** 1).

Temperature of the air/water 0°C: the temperature of water and Air one meter above the water surface was recorded by mercury thermometer.

Transparency/ Visibility: The transparency of water was measured by secchi dic. It was lowered in water till it disappeared and again it was raised until it reappeared and this depth was noted in cm. **(Table 1).**

Table 1. Water analysis of study area (Sept.2002-August 2003)

	Sept:	Oct:	Nov:.	Dec:	Jan:	Feb:	Mar:	Apr:	May:	Jun:	Jul:	Aug:
Temp: of air	29.27	26.73	22	21.15	22.62	17.55	25.91	12.17	29.17	40.47	37.09	24.82
Temp: of water	24.95	23.36	18.27	15.53	18.09	13.73	21.55	23.24	26.67	36.27	33.45	21.27
Visibility cm	2.55	2	2.27	2.64	2.64	2.45	2.27	2.27	2	2.09	2.55	2.91
pH	7.2	7.18	7.03	6.77	7.19	7.12	7.04	6.83	6.85	6.46	6.67	6.94
Conductivity µ/scm	1089.09	879.64	901.73	898.27	1032.27	812.45	639.82	598.91	539.73	544.41	522.83	565
Salinity mg/l	0.28	0.3	0.33	0.28	0.45	0.26	0.26	0.27	0.25	0.25	0.25	0.3
T.D. Smg/l	1303.27	1012.55	1028.18	873	973.59	806.11	768.24	538.72	495.92	458.41	443.92	525.52
D.O mg/l	5.18	5.47	5.77	6.02	5.49	6.1	6.64	6.01	6.59	6.58	5.74	6.79
Hardness mg/l	118.35	115.98	115.85	105.91	117.72	118.89	112.1	114.77	115.54	105.29	110.81	126.45
Chloride mg/l	273.78	222.97	298.35	237.87	241.73	233.95	267.09	262.6	267.8	238.28	238.33	245.51
Alkalinity mg/l	95.36	110.65	105.59	110.78	102.37	99.35	80.86	103.51	105.74	98.8	93.16	103.94
B.O.D mg/l	2.95	2.96	3.03	3.01	2.79	3.03	2.75	2.83	2.99	2.15	2.72	2.67
Sodium meq/l	3.4	3.36	3.18	3.17	3.73	3.62	2.65	1.88	1.69	2.5	2.39	2.94
Magnesium meq/l	3.55	4.17	4.53	3.93	3.69	4.17	3.62	3.31	3.25	4.01	3.68	3.76
Sulphate mg/l	176.85	179.58	175.66	165.11	176.5	160.34	214.4	169.06	165.9	163.36	160.22	171.04

pH: average pH values observed table1, from the month of September 2002 to august 3002, Table-1 suddenly decreased after may due to higher values of salts in the river water. The observed pH range is 6.46 to 7.19 similar to the recommended pH limits by WHO for drinking water, irrigation water and fish population Table-1.

Conductivity µs/ cm$^{2:}$ conductivity values of water samples are inductive of electrolyte concentrations and are highly variable between sites all times of the year table1 minimum and maximum recorded values are 522.89µs/cm^2 in July and in September 108909µs/cm^2. The standard for electrical conductivity is 300--400µs/cm^2 table-1 Salinity: maximum and minimum salinity observed in the month of May, June and July 0.25mg/1 and in January 0.45mg/tables1.

Total dissolved solids (TSD): the amount of total dissolved solids ranged widely between 443.92 mg/1 in July and 1303. 27 mg/1 in September table1, Maximum 500 mg/1 of TDS is allowed for a diverse fish population. These findings are potentially a threat to aquatic life particularly for fish growth.

Dissolved Oxygen (DO): The values of dissolved oxygen were 5.18mg/l in the month of September and 6.79mg/l in the month of augusttable1. The DO range allowed by WHO lies between 4-7mg/l for dissolved oxygen in

drinking water and relatively high DO levels are of benefit to fish.

Hardness: The values of hardness are variable in all months table1 and ranged 105.29 mg/l in June and august. The permissible limit for hardness is 100mg/l for drinking water by WHO.

Alkalinity: The values of alkalinity of the water samples from river Indus were variable in all months ranged 93.16mg/l in July, 110.78mg/l in the month of December table1 fluctuation in the alkalinity values probably indicate the presence of variable amount of substances, such as carbonates, bi-carbonates and hydroxide in the water samples. Acceptable Alkalinity values ranges between 30-500mg/l .

Biological Oxygen Demand (BOD): values of BOD reflecting the pollution in water, are generally very low, frequently below the detection, the limit exceed the WHO standard **(Table 1).**

Sodium: The values of sodium ranged 1.69 meq/l in may and the 3.73 meq/l in the month of January table1. Sodium concentrations increase in the winter and decrease in summer when the river Indus is at high flow.

Magnesium: The value of magnesium ranged 3.25meq./l in May and the 4.53meq/l in the month of November (Table1). The magnesium is common constituent of natural water.

Sulphate: The minimum and maximum of sulphate values were 160.22mg/l in July, 214.4mg/l in March Pakistan is gifted with a limited quantity of readily useable water resources. These resources are either in the form of surface waters or ground water. Alarming rate of population growth, which is about 2.6 percent per annum, is bound to double the population till 2032. Eighty percent of the irrigation water required for agriculture in the country is, through surface water resources and rest of the water comes through ground water. Irrigation system of Pakistan, which is one of the largest contagious system of the world, is facing enormous problems. The major problem is water shortage, use water use water logging and salinity, water quality, over exploration of ground water, seawater intrusion. Otter focuses attention on major issues of pollution concerned directly with human health due to polluted Water. The long-term fate of smooth – coated otter must be viewed in the context of increasing their population **(Table 2).** The animal has legal protection but the law enforcement is not providing security to the otter in this country. The quality of water is obviously important in determining the diversity and health of the aquatic flora and fauna. The restriction on use of persistent chemicals may be evaluated periodically to reduce the water pollution and to conserve the wild life. The pollution may be one of the serious problem in the habitat, which may severely damage the otter's health. The otter is not only the top mammalian predator on the habitat, which could be affected by man's activity and general uncontrolled use of agricultural and industrial chemicals (Gachal and Slater, 2004). Fecal marking (Spraints) have been found in the Sukkur to Guddu area and are reportedly more frequent around Taunsa (Gachal and Slater, 2003). If the pollution load of the river can be reduced then it would benefit both human and wildlife dependent upon river. (G.S.Gachal, *et al,* 2006). The direct and indirect effects of fishing and pollution, both domestic and industrial have reduced the pollution to a small numbers in the habitat. The indiscriminate use of agricultural chemicals leads to chemical pollution of the environment. Excess fertilizers runoff into courses causes uncontrolled algal growth and pesticides in water may kill all animal life including fish, and may bio accumulate through the food chain leading to otter contamination (Slater and Gachal, 2002).

Table 2. Comparative Field Survey Report for the Search of Otter.

S. No	Site visited	Reported by	Scrub	Muddy	Sandy	Tracks	Scat	Evidence
1	Chotyaroon	Mola Baksh	,,	,,	—	No sign	Nil	Not sighted
2	I. Shah Lake	Wali Dino	,,	,,	—	No sign	Nil	Not sighted
3	Magsi Lake	Sabu	,,	,,.	—	No sign	Nil	Not sighted
4	Ansari Farm	Dr. S. S. Ali	,,	,,	—	No sign	Nil	Not sighted
5	Bhambore	Ali Raza	Mangroves	Muddy	—	No sign	Nil	Not sighted
6	Kalri Lake	Bego	Scrub	Muddy	Sandy	No sign	Nil	Not sighted
7	Halaji Lake	Iqbal Shah	Scrub	Muddy	—	Found	Found	Sighted
8	Sujawal Swamp	Rahimoo	Scrub	Muddy	Sandy	Found	Found	Sighted
9	Jati. Begnamori	Buxal	Nil	———	Sandy	No sign	Nil	Not sighted
10	R.I. Ganjo Taker	Aleem	Nil	———	Sandy	No sign	Nil	Not sighted
11	R.I.Sajan Detho	Arab Khan	Nil	———	Sandy	No sign	Nil	Not sighted
12	R.I. Mahimayan	Rab Dino	Nil	———	Sandy	No sign	Nil	Not sighted
13	Head Jamshoro	Ali Gohar	Srcub	———	Sandy	No sign	Nil	Not sighted
14	Nara Canal	Rahim Bakhsh	Scrub	Muddy	Sandy	No sign	Nil	Not sighted
15	S.U. Reservoir	Rajar	Scrub	Muddy	——	No sign	Nil	Not sighted

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