

Status of marsh Crocodile (*Crocodylus palustris*) in Sindh

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Abstract

The Sindh province is known to have ideal habitat for crocodile. All the important wetlands including rivers lakes and canals were surveyed from September 2001 to March 2003. Out of three species of crocodiles already known from Indian subcontinent, only one species i.e. *Crocodylus palustris* was recorded during the present study. Gavial has been completely wiped out from its habitat and population of marsh crocodile has also been declining due to habitat fragmentation, drought, poaching and population pressure etc.

Keywords – Marsh crocodile, *Crocodylus palustris*, status, Sindh.

Introduction

Sindh province is the second largest province of Pakistan in terms of population and third in terms of area. It boundaries on eastern side India on northern side with Punjab, on western, side with Balochistan and southern side with Arabian Sea. It is situated on latitude 23° 35'N and 28° 30'N and 66° 42' and 71° 10'E longitude. It consists of wetlands including rivers, streams, lakes, ponds and estuaries. Some of the important wetlands are Nara Game Reserve, Deh Akro II Game Sanctuary, Chotiari Reservoir and Haleji Lake. Some other places of captive breeding of crocodiles is being done are Khar Center, Karachi Zoo and Samzoo Park.

Out of three species of crocodilian known from Indian subcontinent, only one species i.e. mugger or marsh crocodile (*Crocodylus palustris*) is known from in Pakistan (Ahmad, 1986; Ghalib *et al*, 1981; Khan and Mirza, 1976). Mugger is successful ecologically, as it has adopted a wide habitat range from rivers to ponds, marshes and lakes. Marsh crocodile were extremely common in their former wide range from Dasht in the extreme west of Pakistan to Assam in north eastern India and also in Sri Lanka. *Crocodylus palustris* was widely distributed in Sindh including in Nara Canal till the start of twentieth century. With the construction of dams on Indus and diversion of water for agriculture and increase of human population, the habitat for this species got greatly disturbed and reduced which resulted in marked decline in its population. Although protective legislations have been enacted in Pakistan which provides for complete protection to the crocodile but persecution of crocodile is still reported to be continuing. The species is regarded as endangered, exterminated in most of its range, rare in Iran and near extinction in Pakistan (Webb *et al*, 1987). It is listed in IUCN Red Data Book and is included in Appendix I of CITES (IUCN, 1984)

Sindh Province shares its boundaries on northern side with Balochistan and Punjab, towards East with Rajasthan, India, toward south with Rann of Kutch and Arabian Sea and toward west it touches with Lasbella and Kalat Districts of Balochistan. Total area is about 1,40,915 Sq km. Soil is alluvial near river Indus and the rest is barren mostly desert and consists of mountain ranges including Kirthar, Kohistan Laki range, and Ganjo ranges. Riverine forests are present along the banks of Indus extends southwards from Ghotki to the Indus Delta. Irrigation system in Sindh is totally dependent on the Indus. Guddu, Sukkher and Kotri are the main barrages constructed to cope with the demand for water to support intensified agriculture practices in Sindh. Many lakes and wetlands are also recharged due to the Indus. These wetlands support a diversified faunal life.

The crocodile surveys were conducted from August 2001 to March 2003 in the Province of Sindh for the assessment of the status of marsh crocodile (Fig. 1). Main emphasis was given to Chotiari Reservoir and Nara Canal situated in Nara Game Reserve, Deh Aukro II Wildlife Sanctuary situated in Nawabshah District, Haleji Lake Wildlife Sanctuary located in Thatta District Khar Centre in Kirthar National Park and Mangopir Shrine at Mangopir Karachi.

Chotiari Reservoir: This important wetland is located District Sanghar and comprises of two large water bodies viz., Makhi Dhand and Baqar Dhand. These two dhands are made up of many small dhands. The dominant floral species recorded in the area are *Typha latifolia*, *Typha angustata*, *Phragmites harka*, *Arundo donax*, *Nelumbium nuliferum* and *Paspalum distichum*. Other submerged and partly submerged plant species are *Hydrilla verticillata*, *Nymphaea lotus*, *Polygonum hyarpiper*, *Utricularia lotus* and *Neoumbium nuciferum*. At the edge of wetland *Desmostachya bipinata*, *Prosopis spicigera* and *Acacia nilotica* are common.

Nara Game Reserve: This game reserve which is located in Tehsil Nara, District Khairpur has an area of 109,966 ha. This area was surveyed from 16-01-2002 to 31-01-2002. Nara Game Reserve has irrigation canals, open waters, marshes, and dhands which have been developed due to seepage of water from Nara Canal. Flora of the canal, wetland and dhands consists of *Typha latifolia*, *Typha angustata*, *Paspalum distichum*, *Hydrilla verticillate*, *Nymphaea lotus*, *Polygonum hyaropier*, *Utricularia lotus*, *Nelumbium nuciferum*, *Desmostachya bipinata*, *Prosopis cineraia* and *Acacia nilotica*. These wetlands are surrounded by sand dunes which provide breeding ground to marsh crocodiles.

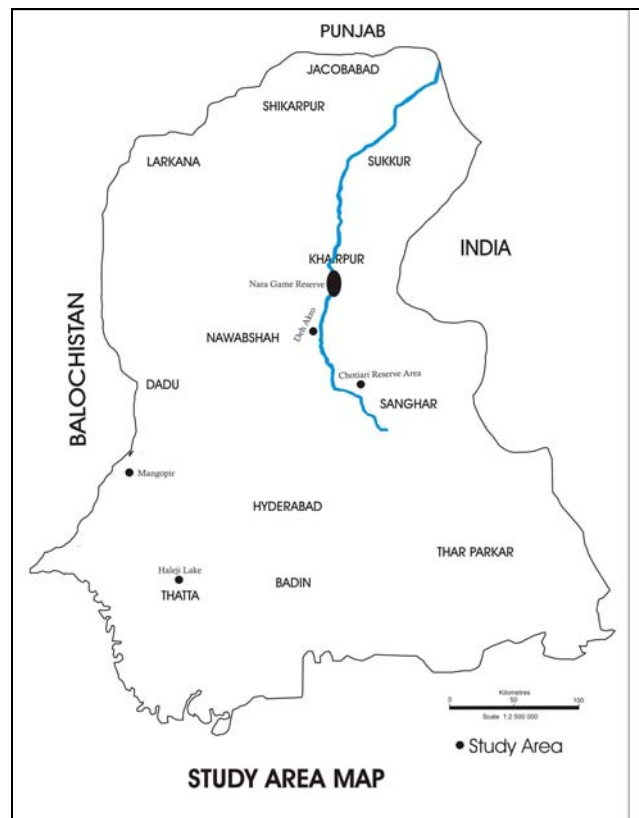


Fig. 1. Map of Sindh showing areas of study.

Deh Akro Wildlife Sanctuary: This sanctuary is located in District Nawabshah and consists of a complex of more than 29 lakes/ponds of various sizes separated by sand dunes. On the right bank of Nara canal these wetlands were created because of seepage during 40 years ago. Recently on left side of the canal construction of Chotiari Dam and the long dry spell has lowered the water table of wetlands and resulted in drying of many wetlands and increase in salinity in the others. This wetland complex is supporting a fair population of crocodiles and was surveyed from 23-03-2003 to 27-03-2003. Important flora of Deh Akro is *Acacia nilotica*, *Accacia senegol*, *Prosopis cineraria*, *Tamarix sp.*, *Salvadora persica*, *Cappris decida*, *Zizyphus nummularia*, *Calligonum polygonoides* and *Saecharum benghalensis* etc.

Haleji Lake Wildlife Sanctuary: This lake is located in District Thatta, have an area of 6.58 km². The lake has been declared is Wildlife Sanctuary and is also a Ramsar site. Crocodiles were introduced in the lake in 1972-73. Sindh Wildlife Department started captive breeding at Haleji in 1992 which is continuing with success.

Manghopir. This shrine of Manghopir is located about 18 km from Karachi. It stands on a low hill to the left of the road besides two hot sulfur springs.

Material and Methods

To determine the existence of marsh crocodiles direct and indirect methods were used. In the direct method sightings while basking or swimming or by spotlighting/night observation. Latter method is applied for catching reflection of eyes of crocodiles. Observations were made at night at Chotiari Reservoir area in August 2001. Basking method of locating crocodiles is the most suitable only during in winter season when the temperature of water of the lake drops. Due to cooler weather and cold water crocodiles which are cold blooded reptile water come outside the lake to bask in the sunshine and to keep themselves warm Thus the counting of crocodiles becomes very easy in a particular area during this season. In summer, however, this method cannot be used effectively because crocodiles seldom gets outside water. In the indirect method, presence of signs like fecal pallets, den or tunnels are noted or information from difference sources such as local people, game watchers, game inspector and fishermen etc. were collected.

Results and Discussion

The results of the survey are presented in Table-I which enlists the information gathered from all water bodies. Table-II summarizes the data collected from various areas of Sindh. Although in some cases by fishermen, local villagers and even in some cases game watchers etc. reports very high concentration of marsh crocodile, however, care evaluation of such information reveals very limited numbers. In any case data of marsh crocodile mentioned in this paper may not be considered as census of the population of marsh crocodile rather it indicates best possible estimate of the marsh crocodile population made through filed surveys. Further detailed studies may help in strengthening knowledge about the marsh crocodile in Sindh.

The five year long drought spell in southern Pakistan has further deteriorated the situation of wetlands in the province. According to the survey results the major population of crocodile is concentrated in Sanghar, Khairpur and Nawabshah Districts. Any ecological change in the habitat will effect the intact population marsh crocodile. Increase in population and intensification of agricultural practices, construction of dams and diversion of water channels for irrigation purpose are considered to be major reasons for shrinkage of the population of marsh crocodile. However, it may be noted that marsh crocodile is surviving in limited area in Sindh and a few places along coastal areas Balochistan and further degradation in its habitat may lead to extinction of marsh crocodile in Pakistan. Although attempts of captive breeding is

successfully done in Haleji, Khar Canter and Shamzoo Park but it requires protection of the habitat of the marsh crocodile to ensure its survival in nature.

TABLE-1. Status of Marsh Crocodile in Sindh

Chotiari Game Reserve. (District Sanghar)

S.No.	Date	Name of the Dhand, Wetland, Lake, Canal	Approximate Crocodile population (According to interviews)	Crocodiles seen.	Remarks
1	16-08-01	Makhi Dhand	5	----	Fresh fecal pellets and fresh tract were observed.
2	17-08-01	Cut Dhand	2	2	
3	17-08-01	Khorro & Jadpur Dhand	2	2	
4	18-08-01	Dhands near Abdul Karim Goth	25	----	The Mallahs of Goath informed that about 50 crocodiles are surviving in the area.
5	19-08-01	Sueri Bhit	15	2	Three nests were observed in the area. But fisherman reports more then 25 crocodile.
6	20-08-01	Baqar Dhand	----	----	According to fisherman population in the area was wiped out because people kill them from time to time because they eat fish.
7	21-08-01	Akanwari	15	2	A local person informed that he has seen two crocodile here.
8	22-08-01	Meena Dhand	4	----	A local person informed that he has seen four crocodile here.
9	24-08-01	Wagu Wala Dhand	15	----	Information from fisherman.
10	26-08-01	Chandanwala Dhand	3	3	Directly seen.
11	27-08-01	Namwali Dhand	5	5	Directly seen.
12	28-08-01	Surri Dhand	10	4	A local person informed that he has seen four crocodile here.
Total:			89	20	

Nara Game Reserve Area.(District Khairpur)

S.No.	Date	Name of the Dhand, Wetland, Lake, Canal	Approximate Crocodile population	Crocodiles seen.	Remarks
1	17-01-2002	Kathore Dhand – I	----	----	No information/ none observed
2		Kathore Dhand – II Near Sawoan	----	----	No information/ none observed
3	17-01-2002	Taj Minor (Kathore Channel)	----	----	No information/ none observed
4	19-01-2002	Nagiopir Dhand	3	2	3 crocodiles were reported by villagers out of three, two were seen directly basking.
5	19-01-2002	Khario Dhand	----	----	No information/ none observed
7	19-01-2002	Sumabhi Dhand	----	----	No information/ none observed
8	19-01-2002	Akhero Dhand	5	1	Only one crocodile was seen directly.
9		Wichanowaro Village	----	----	No information/ none observed
10	20-01-2002	Adkau	----	----	No information/ none observed
11	20-01-2002	Gunja Dhand – I	----	----	No information/ none observed
12		Gunja Dhand – II	----	----	No information/ none observed
13	21-01-2002	Keni Dhand	----	----	No information/ none observed
14	22-01-2002	Sawan Wetland-3	----	----	No information/ none observed
15	22-01-2002	Phario Dhand	----	----	No information/ none observed
16		Puno Dhand	----	----	No information/ none observed
17	23-01-2002	Tooty Dhand (Goth Baloch Khan)	4	1	Information from local staff but only one was seen.
18	24-01-2002	Sahore Dhand	----	----	No information/ none observed
19	24-01-2002	Jamalaho Dhand	----	----	No information/ none observed
20	24-01-2002	Akhanwari Dhand (Goth Allah Bukhs)	----	----	No information/ none observed
21	24-01-2002	Shaho Dhand	----	----	No information/ none observed

22	24-01-2002	Khakhro Dhand	----	----	No information/ none observed
23	24-01-2002	Sodapir Dhand	----	----	No information/ none observed
24	25-01-2002	Dolaho Dhand	----	----	No information/ none observed
25	25-01-2002	Sadro Dhand	----	----	No information/ none observed
26	25-01-2002	Lalri Dhand	----	----	No information/ none observed
27	25-01-2002	Putkan Dhand	----	----	No information/ none observed
28	25-01-2002	Khurandh Dhand	----	----	No information/ none observed
29	25-01-2002	Bearwari Dhand	10	----	Information collected from local staff.
30	25-01-2002	Gumbat RD	----	----	No information/ none observed
31	26-01-2002	Mangirko Dhand	----	----	No information/ none observed
32	26-01-2002	Barej Dhand	----	----	No information/ none observed
33	26-01-2002	Jagir Dhand	----	----	No information/ none observed
34	26-01-2002	Sim Dhand	----	----	No information/ none observed
35	26-01-2002	Kharari Dhand	----	----	No information/ none observed
36	26-01-2002	Jahari Dhand	7	1	Information from local staff.
37	26-01-2002	Dangiware Dhand	----	----	No information/ none observed
38	27-01-2002	Kherchand Dhand	----	----	No information/ none observed
39	27-01-2002	Sodra Dhand	----	----	No information/ none observed
40	27-01-2002	Dobhanwari Dhand	----	----	No information/ none observed
41	28-01-2002	Pir Dino Village (North of Nara canal)	----	----	No information/ none observed
42	28-01-2002	Chirakh Dhand (Pir Dina Village or Goth East of Nara)	----	----	No information/ none observed
43	29-01-2002	Western side of Nara Canal, Purana Pitan, Tasal is Head Jamrao	140	15	Scanning the area by formulating three parties from Purana Pitan to Head Jamro and seen 15 crocodiles

					whereas local wildlife staff is of the view that population of marsh crocodile in the area is about 500.
44		Goth Saida Sharif	13	3	One large crocodile (nearly 6 ft. in length) and small one were also seen.
45		Choti Dhand West of Nara	8	----	Information from local people.
46		Karan Dhand Thatho Goth West of Nara	5	----	Information from local people.
47		Deso Dhand Thatho Goth	3	----	Information from local fishermen
Total:			198	23	

Deh Akro (District Nawabshah)

S.No.	Date	Habitat	Approximate Crocodile population	Crocodile population seen.	Remarks
1	23-03-03	Chaach	----	----	No information/ none observed
2	23-03-03	Khanwarwo	----	----	Completely dried. Two years back there were 12 crocodile as reported by game watcher.
3 4 5 6	24-03-03	Rakhi Pakhanwari Shanwaryo Phullanwala	----	----	All completely dried.
7	24-03-03	Kandanwari	----	----	In 94-95, 20-25 were observed. Now totally absent.
8	24-03-03	Paniwaro	----	----	No information/ none observed
9	24-03-03	Bolan	15	----	Reported by game staff.
10	25-03-03	Khurandwari	20	----	Reported by Watcher/Assistant Warden Wildlife.
11	25-03-03	Gurju	----	----	No information/ none observed

12	25-03-03	Karonaro	15	----	Game staff observation.
13	26-03-03	Shoory	----	----	No information/ none observed
14	26-03-03	Kinro	----	----	No information/ none observed
15	26-03-03	Wasoo	25	3	Reported by local Game staff.
16	27-03-03	Kundo	----	----	No information/ none observed
17	27-03-03	Dragan	----	----	No information/ none observed
18	27-03-03	Chaccha	12	2	Watcher seen 2 in Dec. 2002.
19	27-03-03	Murakho	----	----	No information/ none observed
20	27-03-03	Looankhan	----	----	Complete dry.
21	27-03-03	Sanahryee	----	----	No information/ none observed
22	27-03-03	Kari	6	1	1 seen in Dec. by Watcher.
Total:			93	6	

Haleji Lake (District Thatta)

S. No.	Date	Habitat	Approximate Crocodile population	Crocodiles seen.	Remarks
1	March 2003	Haleji lake	100	20	Reported by local people.
2	21-03-2002	Manghopir	----	95	Personal visited and counted.

TABLE-II. Consolidated Result

Site	Name of Lake/Canal/Area	Estimated	Seen
Nara Canal	Nara Canal Mansher of Nara	198	23
Chotiari	Reservoir	89	20
Deh Akro	A complex of wetlands	93	6
Haleji	Haleji Wildlife Sanctuary	100	20
Manghopir	Shrine	----	95
Total:		480	164

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