

## PRELIMINARY SURVEY OF HERPETOFAUNA OF NARAYAN SAROVAR SANCTUARY, GUJARAT

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The Kachchh District is one of the largest districts in India and covers over one-fourth land area of Gujarat State. Four important protected areas that are situated in the district cover a total of 12,906.18 km<sup>2</sup> land area and 6.58% area of the forests of the state.

Reptilian fauna of Kachchh District is well documented in literature, as compared to other parts of the state. The earlier literature shows that reptiles of Kachchh region were studied by Stoliczka (1872), Murray (1886), McCann (1938), Himmatsinji (1985), Bhaskar (1978), Auffenberg *et al.* (1990), Sharma (1982), Akhtar and Tiwari (1991), Vijaykumar (1997), Vyas (1998) and Gayen (2000).

Amphibian fauna of Kachchh on the other hand is poorly documented in literature when compared to reptiles. The amphibians of Kachchh were studied by McCann (1938), Soman (1960) and Sarkar (1984). None of the literatures mention any amphibian and reptile record from any particular protected area. Therefore I made a one week inventory in the month of August 2000 (20-26) on amphibians and reptiles.

The Narayan Sarovar Sanctuary (NSS) (23°27'–23°42'N and 68°30'–68°57'E) is one of the important protected areas and is located in the western most part of the country. Administratively, the NSS is located within the Lakhpat taluka of Kachchh District. The NSS represents the ecological peculiarities of Biotic Province - 3A Kachchh, of Biogeographic Zone - the Indian Desert (Champion & Seth, 1968). The Sanctuary originally covered an area of 767.79 km<sup>2</sup>, when it was notified in 1981 but later in July 1995 an area of 321 km<sup>2</sup> was de-notified from the Sanctuary for lime stone and lignite-based industrial development of the state. At present the sanctuary is only 444.23 km<sup>2</sup>. The Kori Creek borders the Sanctuary on the north-west and mangrove forest to the west. However, no prominent land features are present on the eastern, northern and southern sides. The entire area of the Sanctuary has been rapidly surveyed and assessed for herpetofauna in the following manner, with the objectives being: 1. to determine present distribution and status of amphibians and reptiles, and,

2. to gather baseline information on the habitat and identify threats, if any.

Entire area was divided into small zones and each zone was rapidly assessed by vehicle. Each zone was randomly (biased) explored on basis of habitat structure and the possibility of availability of the species. All important major and minor water bodies, including seasonal rivulets were extensively explored for aquatic species, especially amphibians. In addition, secondary information on different species of amphibians and reptiles was gathered from local people of surrounding villages, forest personnel and wildlife enthusiasts by interviewing and showing colour pictures of the species to them. Information was collected from past relevant literatures.

All collected specimens were examined and carefully identified by using diagnostic keys given by Smith (1935; 1943) and Daniel (1963a, b; 1975) and Daniels (1997a, b, c). Nomenclatures adopted here are from Das (1994) and Dutta (1997) for reptiles and amphibians, respectively.

The status of each species of amphibians and reptiles (except serpents) is proposed in three categories on the basis of total number of each species encountered or sighted during the survey. The category values are: rare (1-5); uncommon (6-15); common (16-75) and abundance (above 76).

### Amphibians

During the present study, a total of 18 water bodies (Table 1) and a few moist forest pockets were surveyed for frogs and toads. Totally, seven anuran species belonging to three families were recorded from the area. These are five species of frogs and two species of toads, the relative abundance status is given in Table 2. *Bufo stomaticus* and *Euphlyctis cyanophlyctis* were found in all water bodies and *Microhyla ornata* and *Bufo* sp. were found only in five and three water bodies, respectively, thereby revealing their restricted distribution in the Sanctuary.

### Reptiles

Totally, 19 species of reptiles were recorded, belonging to 16 genera and 10 families (Table 3). These include 13 species of lizards and six species of snakes, including two venomous snakes.

Four species of lizards from Agamidae, three species of lizards each from Geckkonidae and Lacertidae, one species of Chamaelionidae and one species of Varanidae were documented. *Ophisops microlepis*, *O. jerdonii* and *Uromastix hardwickii* were most abundant lizard species found in the area in comparison with other lizard species. *Varanus bengalensis*, *Calotes versicolor* and *Brachysaura* (= *Laudakia*) *minor* were commonly found in all types of habitat in the Sanctuary.

It is difficult to comment on the status of the remaining species

of lizards and snakes at present because of the very short study period and small data on the species. Also, at present there is no record of any species belonging to the order of Testudines although, earlier, *Geochelone elegans* (Star Tortoise) was reported from the area. The records of only two orders of reptiles from the area indicate that the earlier record of reptilian fauna of the Sanctuary is little higher than that of the present report.

During the study the following major threats were observed on herpetofauna.

**Vehicular road networks:** The State Highway passes through the Sanctuary (approximately 32km), viz. Panandhra to Koteswar, Koteswar to Dolatpur via Ravereshwar Village and Dolatpur to Dayapar Village. A large number of amphibian and reptilian species get killed on these roads during monsoon, which is the breeding season of most of the species. An average of total 150-200 vehicles pass daily only on Koteswar to Dolatpur road. During the five-day morning and evening road transects, a total of eight species, viz. *Calotes versicolor* (3), *Brachysaura minor* (2), *Sitana ponticeriana* (1), *Chamaeleo zeylanicus* (1), *Varanus bengalensis* (17), *Eryx johnii* (1), *Ptyas mucosus* (2), *Echis carinatus* (1) were found dead due to vehicles (numbers of specimens are given in parenthesis).

**Illegal collection of Spiny-tailed Lizards:** It was also recorded that a small number of burrows of Spiny-tailed Lizards were dug out at the Kanoj, Halapar and Dolatpur forest blocks of the Sanctuary, by local tribals for food and aphrodisiac value.

**Growth of bubal plant:** Earlier, the entire area of the Sanctuary was a prime habitat of the Indian Gazella (*Gazella bennettii*), but the uncontrolled growth of *Prosopis chilensis* has changed the habitat. A report (Anon, 1998) shows that within ten years (1988-1997) the invasion of this plant species has encroached a large area (increased by about 1606ha. at a rate of 89ha/year). This type of threat may not affect the herpetofauna in the short-term, but the change in habitat will definitely have an impact on the long-term conservation strategy of amphibians and reptiles.

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**Figure 1.** Road kill of a gravid *Brachysaura minor* at the Narayan Sarovar Sanctuary, Gujarat State.

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Figure 2. Road kill of *Varanus bengalensis* at the Narayan Sarovar Sanctuary, Gujarat State.

Table 1. List of the water bodies surveyed in the Narayan Sarovar Sanctuary for aquatic herpetofauna (especially amphibian species) during the study period.

Name of water body	Amphibian species						
	Bs	Bsp	Mo	Ec	Ht	LI	Sb
Golden Dam	P	P	-	P	P	P	-
Godhatal Gam Talaw	P	-	-	P	P	P	-
Forest Water bony (Near Sheh)	P	-	P	P	-	P	P
Lakhan river water pocket	P	-	-	P	-	-	-
Naredi Gam Talaw*	P	-	-	P	P	P	-
Katiya Gam Talaw	P	-	-	P	P	P	-
Mudia Gam Talaw	P	-	-	P	-	P	-
Mudia Sim Talaw	P	-	P	P	P	-	P
Mudia Gam Nalhu	P	-	P	P	P	P	-
Chamro Gam Talaw	P	P	P	P	-	P	P
Mindhari Gam Talaw	P	-	-	P	-	-	-
Santhro Dam	P	-	-	P	P	P	P
Bitiyari Gam Talaw	P	-	-	P	P	-	-
Bitiyari Sim Talaw	P	-	-	P	-	-	P
Bitiyari Gam Nalhu	P	-	-	P	-	-	P
Chodawala check Dam	P	-	P	P	P	P	P
Budha Gam Talaw*	P	P	-	P	P	-	-
Mori Sim Talaw	P	-	-	P	P	-	-

Bs - *Bufo stomaticus*; Bsp - *Bufo* sp.; Mo - *Microhyla ornata*; Ec - *Euphlyctis cyanophlyctis*; Ht - *Hoplobatrachus tigerinus*; LI - *Limnonectes limnocharis*; Sb - *Spaerotheca breviceps*;  
P - Present; \* water body out side on the edge of the Sanctuary

Table 2. List and status of amphibians at Narayan Sarovar Sanctuary.

Common English name (species)	Status
Bufonidae	
Toad ( <i>Bufo</i> sp.)	Rare
Marbled Toad ( <i>Bufo stomaticus</i> )	Common
Microhylidae	
Ornate Narrow-mouthed Frog ( <i>Microhyla ornata</i> )	Common
Ranidae	
Indian Skipping Frog ( <i>Euphlyctis cyanophlyctis</i> )	Abundance
Indian Bull Frog ( <i>Hoplobatrachus tigerinus</i> )	Common
Cricket Frog ( <i>Limnonectes limnocharis</i> )	Common
Short-headed Burrowing Frog ( <i>Tomopterna breviceps</i> )	Common

Table 3. List of reptiles recorded from Narayan Sarovar Sanctuary.

Family / Common Name	Species/Subspecies	Status
Eublepharidae		
Common Leopard Gecko	<i>Eublepharis fuscus</i>	?
Gekkonidae		
Warty Rock Gecko	<i>Cyrtopodion kachhensis</i>	Rare
Brook's House Gecko	<i>Hemidactylus brookii</i>	Common
Yellow-green House Gecko	<i>Hemidactylus flaviviridis</i>	Common
Agamidae		
Eastern Garden Lizard	<i>Calotes versicolor</i>	Common
Lesser Agama	<i>Brachysaura</i> (= <i>Laudakia</i> ) <i>minor</i>	Common
Fan-throated Lizard	<i>Sitana ponticeriana</i>	Abundant
Hardwick's Spiny-tailed Lizard	<i>Uromastix harswickii</i>	Abundant
Chamaeleonidae		
Indian Chameleon	<i>Chamaeleo zeylanicus</i>	Rare
Lacertidae		
Indian Fringe-toed Lizard	<i>Acanthodactylus cantoris</i>	*
Snake-eyed Lacerta	<i>Ophisops jerdoni</i>	Abundant
Small-scaled Lacerta	<i>Ophisops microlepis</i>	Abundant
Varanidae		
Bengal Monitor	<i>Varanus bengalensis</i>	Common
Boidae		
Red Sand Boa	<i>Eryx johnii</i>	ND
Colubridae		
Indian Trinket Snake	<i>Elaphe helena</i>	ND
Pakistani Ribbon Snake	<i>Psammophis leithii</i>	ND
Checkered Keelback Water-snake	<i>Xenochrophis piscator</i>	ND
Elapidae		
Spectacled Cobra	<i>Naja naja</i>	ND
Viperidae		
Indian Saw-scaled Viper	<i>Echis carinatus</i>	ND

\* - found in small pockets; ND - Not determined