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Research Article

ASSESSMENT OF FISH DIVERSITY OF HARSI RESERVOIR, MADHYA PRADESH, INDIA

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ABSTRACT

The present study was conducted at Harsi Reservoir for a period of one year (Dec. 2016-Nov. 2017). The fishes were collected with the help of local fishermen by using various active and passive gears. During the course of study 52 species of fishes were identified belonging to seven orders, 17 families and 36 genera. As far as number of species contributed by different orders is concerned the most dominant orders was Cypriniformes (26 species), followed by Siluriformes (12 species), Perciformes (eight species), Osteoglossiformes and Synbrachiformes (two species each) and Clupeiformes and Beloniformes (one species each). As per IUCN (2018) out of 52 species, 40 species are of Least Concern (LC) category with a contribution of 76.92%, five species are Near Threatened (NT) with contribution of 9.62%, four species are Not Evaluated (NE) and contributed 7.69%, two species are Data Deficient (3.85%) and one species is Vulnerable with 1.92% contribution.

Keywords: Harsi Reservoir, Diversity, Fishes, Species, Gears.

INTRODUCTION

Water is a prime and basic natural resource for all living organism and a precious natural asset. It is essential for sustaining all forms of life, food production and economic development for general well being; hence its use needs appropriate planning, development and management. Of all renewable resources of planet, water has the unique place (Vencatesan, 2007). Fish and other aquatic organisms live in water, thus it is no surprise that water quality determines to a great extant the presence and abundance of species in a particular aquatic environment (Piper *et al*., 1982). Freshwater fishes are one of the most threatened taxonomic groups (Darwall & Vie, 2005), Because of their high sensitivity to quantitative and qualitative alteration of aquatic habitats (Laffaille *et al*., 2005). As a result they are often used as bio-indicators for assessment of water quality (Osorio *et al*., 2014). Fish constitutes half of the total number of vertebrates in the world and they live in almost all conceivable habitats. Fishes are one of the most important elements in the economy of many nations as they have been a stable item in the diet of many people.

Several renowned workers studied the freshwater fishes of rivers, ponds, lakes, dams and reservoirs of the country. The fish fauna of Madhya Pradesh was studied by Hora, (1938 and 1940); Hora & Nair, (1941); Dubey & Mehra, (1959); Malviya, (1961); Paunikar *et al*., (2012); Sharma, (2007); Soni, (1960); Srivastava *et al*., (2008); Swarup, (1953) and others. In the present investigation period, an attempt has been made to explore the fish diversity of Harsi Reservoir and to assess the status of these fish species as per (CAMP, 1998) and (IUCN, 2018) red list.

MATERIALS AND METHODS

Study area

The present study was conducted at Harsi Reservoir, Madhya Pradesh. It is constructed on Parwati River in 1935 (Started in 1925 and completed in 1935) by Gwalior state and is situated near Harsi village in Bhitarwar Tehsil, District Gwalior, Madhya Pradesh. It is approximately 95

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km from Gwalior city at an altitude of 266 m from mean sea level and is lying partially in Narwar Tehsil of Shivpuri District. Geographically, the reservoir lies at 077° 52' 59" to 077° 55' 20" E longitude and 25° 43' 20" to 25° 47' 23" N latitude. The catchment area of the Harsi Reservoir is approximately 1960 sq.km (at full reservoir level) with maximum length and width of 8.1 km and 3.8 km respectively (Figure 1).

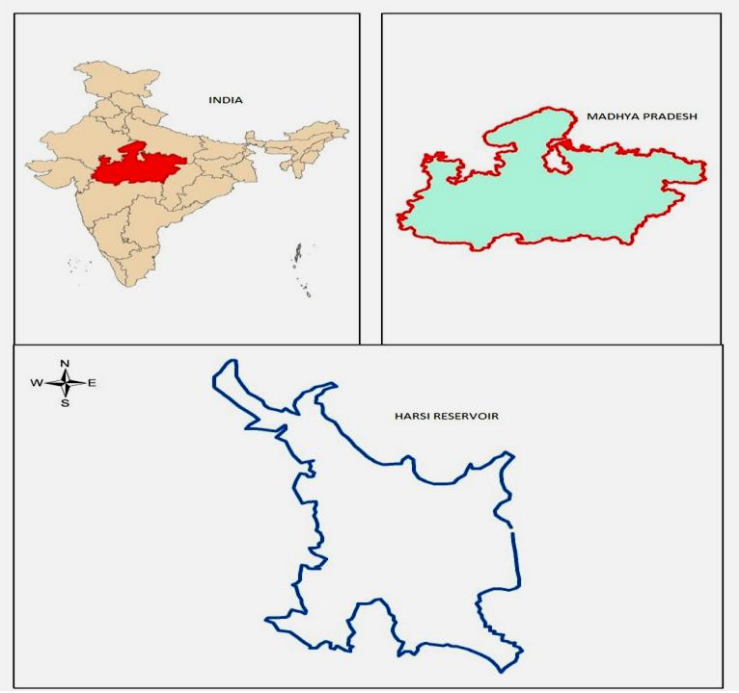

Figure 1. Map Showing Study Area, Harsi Reservoir.

Collection and identification of fishes

Fishes were collected from Harsi Reservoir on monthly basis with the help of local fishermen using a variety of active and passive gears such as scoop nets, drag nets, cast nets, gill nets and specially designed and fabricated net made of mosquito nets. Collections were also be made from the nearby local fish markets after gathering information on source of fishes. The collected fishes were identified with the help of standard keys given by Jayaram, (1999); Talwar, (1991) and (Srivastava, 1980).

RESULTS AND DISCUSSION

During the study period a total of 52 species of fishes belonging to seven orders, 17 families and 36 genera were recorded at Harsi Reservoir. On the basis of species richness and percentage composition the order Cypriniformes was most dominant (26 species), followed by Siluriformes (12 species), Perciformes (eight species), Osteoglossiformes and Synbrachiformes (two species each) and Clupeiformes and Beloniformes (one species each) (Table 1, Figure 2). The results were also supported by Rao *et al*., (2014) in their studies on the fish diversity of River Sarada, Visakhapatnam District, Andhra Pradesh, India. They recorded a total number of 66 fish species belonging to nine orders, 22 families and 38 genera. Order Cypriniformes was the most dominant with 26 species. Reddy & Parameshwar, (2015) investigated the ichthyofaunal diversity of Saralasagar Reservoir in Mahabubnagar district, Telangana, India and recorded 33 fish species belongs to seven orders, 22 genera of 13 families. Order Cypriniformes was most dominant group represented by 12 species.

Rao *et al*. (2014) described 66 fish species from River Sarada, Visakhapatnam, representing nine orders, 22 families and 38 genera. According to them as per IUCN (2018) three species belonged to Near Threatened category, three were Vulnerable, four were at Lower Risk near threatened, one species was Lower Risk least concern, 37 were Least Concern, 15 were Not Evaluated and three species were Data Deficient. In the present study as per IUCN (2018) out of 52 species found at Harsi Reservoir, 40 species are in Least Concern (LC) state with a contribution of 76.92%, five species are Near Threatened (NT) with contribution of 9.62%, four species are Not Evaluated (NE) and contributed 7.69%, two species are Data Deficient (3.85%) and one species is Vulnerable with 1.92% contribution (Table 1, Figure 3). Similarly as per CAMP (1998) out of 52 fish species found at Harsi Reservoir, 25 species are Low Risk near threatened (LRnt) with a contribution of 48.07%, 12 species are Not Evaluated (NE) with contribution of 23.07%, eight species are Vulnerable (VU) with 15.38% contribution, four species are of Low Risk least concern (LRlc) status with 7.69% contribution and three species are Endangered (EN) with 5.77% contribution (Table 1, Figure 4).

Table 1. Systematic list of fishes of Harsi Reservoir.

Class	Order	Family	S.No.	Name of Fish	IUCN Status	CAMP Status
	Osteoglossiformes	Notopteridae	1	*Notopterus notopterus*	LC	LRnt
			2	*Chitala chitala*	LC	LRnt
	Clupeiformes	Clupeidae	3	*Gudusia chapra*	LC	LRnt
			4	*Catla catla*	NE	VU
			5	*Cirrhinus mrigala*	LC	LRnt
			6	*Cirrhinus reba*	NE	VU
			7	*Cyprinus carpio*	VU	NE
			8	*Ctenophryngodon idella*	NE	NE
			9	*Labeo gonius*	LC	LRnt
			10	*Labeo bata*	LC	LRnt
			11	*Labeo calbasu*	LC	LRnt
			12	*Labeo dyocheilus*	LC	VU
			13	*Labeo rohita*	LC	LRnt
			14	*Labeo fimbriatus*	LC	LRnt
		Cyprinidae	15	*Osteobrama cotio*	LC	LRnt
	Cypriniformes		16	*Amblypharyngodon mola*	LC	LRlc
			17	*Puntius amphibius*	DD	NE
			18	*Puntius conchonius*	LC	LRnt
			19	*Puntius sophore*	LC	LRnt
			20	*Puntius ticto*	LC	LRnt
			21	*Tor tor*	NT	EN
			22	*Rasbora daniconius*	LC	NE
			23	*Barilius bendelisis*	LC	LRnt
			24	*Garra gotyla gotyla*	LC	NE
Actinopterygii			25	*Salmostoma bacaila*	LC	LRlc
			26	*Salmophasia balookee*	LC	LRlc
			27	*Salmophasia novacula*	LC	LRlc
		Cobitidae	28	*Lepidocephalichthys guntea*	LC	NE
		Balitoridae	29	*Acanthocobitis botia*	LC	LRnt
			30	*Mystus cavasius*	LC	LRnt
			31	*Mystus bleekeri*	LC	VU
		Bagridae	32	*Mystus tengara*	LC	NE
			33	*Sperata seenghala*	LC	NE
			34	*Rita rita*	LC	LRnt
		Sisoridae	35	*Gagata sexualis*	LC	NE
	Siluriformes		36	*Bagarius bagarius*	NT	VU
			37	*Ompok bimaculatus*	NT	EN
		Siluridae	38	*Ompok pabda*	NT	EN
			39	*Wallago attu*	NT	LRnt
		Clariidae	40	*Clarias batrachus*	LC	VU
		Heteropneustidae	41	*Heteropneustes fossilis*	LC	VU
	Beloniformes	Belonidae	42	*Xenentodon cancila*	LC	LRnt
	Synbrachiformes	Mastacembelidae	43	*Mastacembelus armatus*	LC	NE
			44	*Mastacembelus pancalus*	NE	LRnt
		Ambassidae	45	*Chanda nama*	LC	NE
			46	*Parambassis ranga*	LC	NE
		Nandidae	47	*Nandus nandus*	LC	LRnt
	Perciformes	Gobiidae	48	*Glossogobius giuris giuris*	LC	LRnt

	Anabantidae	49	*Anabas testudineus*	DD	VU
	Channidae	50	*Channa (Ophiocephalus) punctata*	LC	LRnt
		51	*Channa (Ophiocephalus) striata*	LC	LRnt
		52	*Channa (Ophiocephalus) marulius*	LC	LRnt

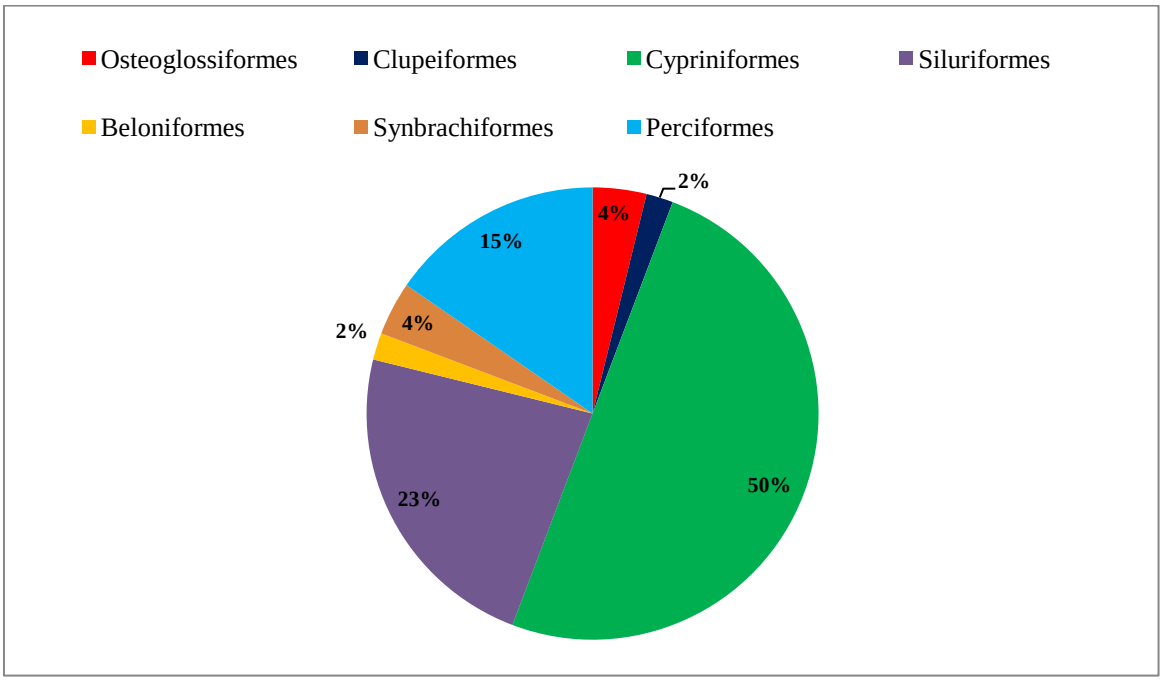

Figure 2. Order wise (%) fish species composition.

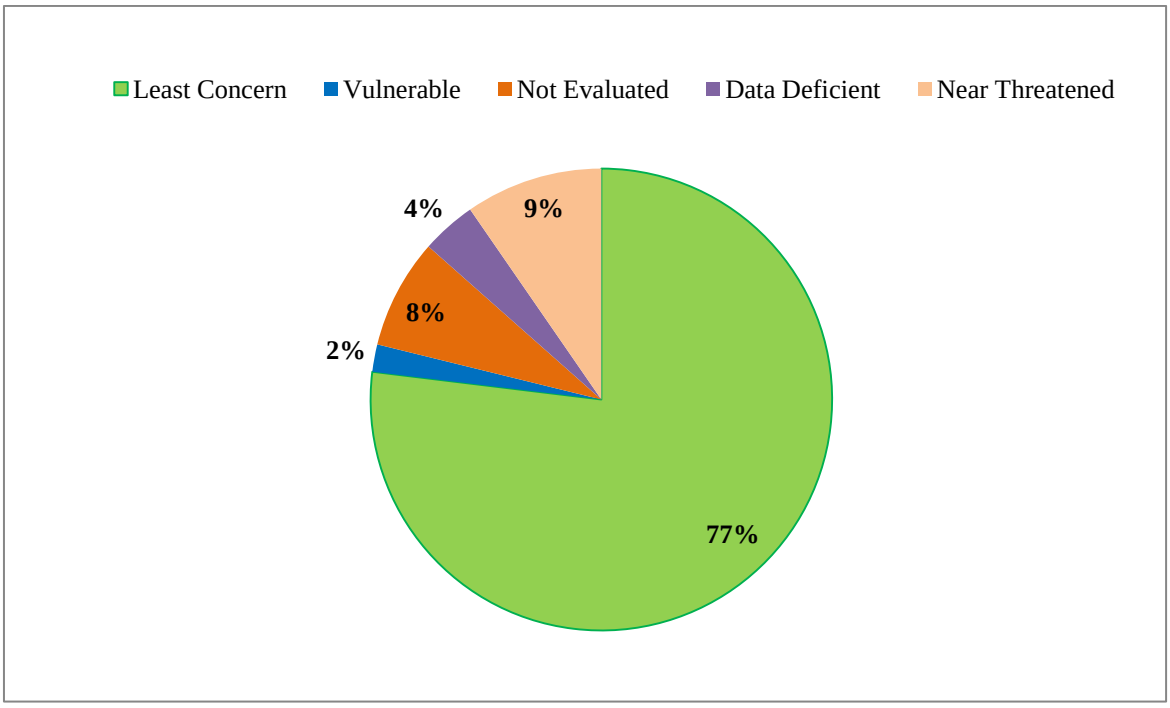

Figure 3. Percentage of species under different threat categories as per IUCN (2018).

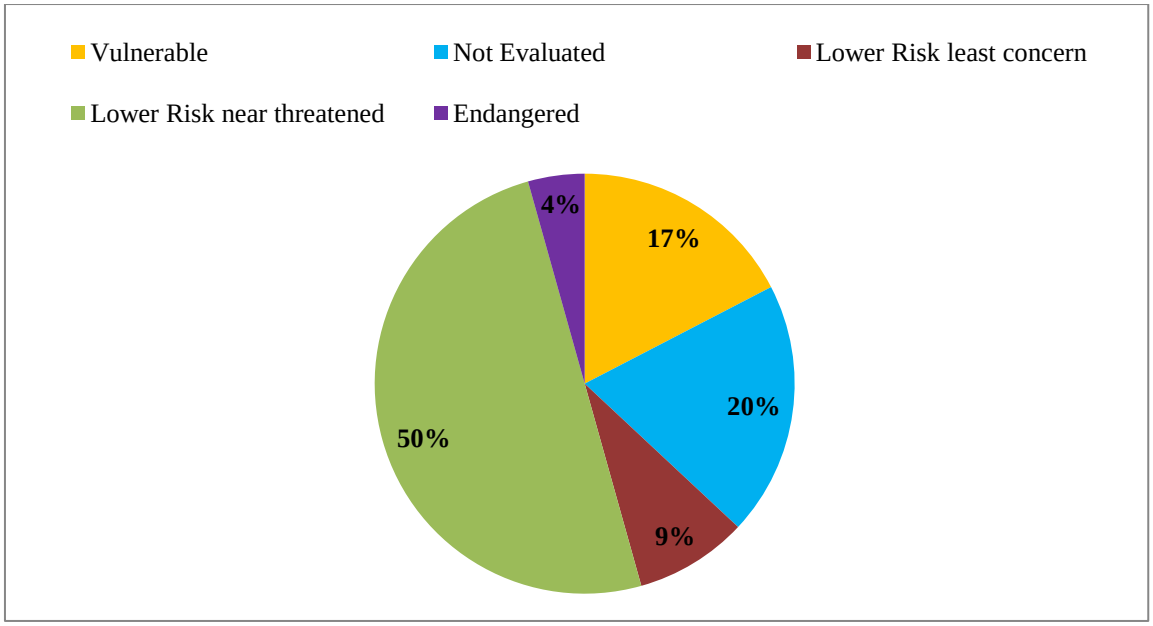

Figure 4. Number of species under different threat categories as per CAMP (1998)

CONCLUSION

From the above study it may be concluded that the Harsi Reservoir harbours rich fish diversity particularly of family Cyprinidae. It is therefore recommended that special enhancement programmes are required to initiate sustainable use of fisheries resources. Besides, during present study period it has been found that illegal fishing was widespread even during breeding season despite a ban by the state government. There should be rigorous implementation of the ban and heavy fines should be imposed on the defaulters to stop illegal fishing.

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