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Ichthyodiversity of the River Lakhandei at Runni Saidpur, Sitamarhi (Bihar)

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Abstract

The River Lakhandei is a significant tributary of the Bagmati river under the Ganga River system. It serves as a vital life-line for the district of Sitamarhi, particularly in the Runni Saidpur block. This article provides an exhaustive analysis of the ichthyodiversity (fish diversity) of the river at Runni Saidpur, examining species composition. Based on field observations we collected and identified 47 fish species from the Lakhandei River at Runni Saidpur, Sitamarhi, Bihar. The collected 47 species belong to 36 genera under 19 families and 9 orders. The most abundant order in terms of species diversity was Cypriniformes, an usual event in the rivers of the Gangetic plain. The order has 23 species under 17 genera and 4 families. Percentagewise it stands respectively as 48.94%, 47.22% and 21.05%. Its one family, Cyprinidae containing 12 species under 7 genera, is the most diverse fish family of the area. Its another family Danionidae, with 8 species under 8 genera, stands second. The second largest order is Siluriformes with 10 species under 8 genera and 6 families. It is the most diverse local fish order in terms of family diversity. The results are similar to that reported from Baya River, a tributary of the Ganga. Percentagewise, its species, genus and family share stands respectively as 21.28%, 22.22%, and 31.58%. Its largest family Bagridae having 3 species under single genus *Mystus*, is the third most diverse family, jointly with Mastacembelidae (order Synbranchiformes \approx Mastacembeliformes) having 3 species under 2 genera. Anabantiformes stands at 3rd position with 3 families while all other orders namely Osteoglossiformes, Clupeiformes, Beloniformes, Gobiiformes, Synbranchiformes and Tetraodontiformes contain one family each. Most of the reported species are categorized in IUCN Red List (2024-25) as Least Concern (LC) but several key species are under threat. *Chitala chitala* (*Notopterus chitala*), *Labeo pangusia*, *Ompok pabda*, and *Ailia coila* are Near Threatened (NT) while *Wallago attu* and *Cyprinus carpio* is Vulnerable (VU). Two species, *Cyprinus carpio* and *Ctenopharyngodon idella* are introduced (exotic) species while rest were native one. *Cyprinus carpio* is also an Invasive Species. However, increasing anthropogenic pressures such as pollution, embankment construction, unregulated fishing, and seasonal water scarcity pose significant threats to its fish diversity, highlighting the urgent need for conservation.

Keywords: Ichthyofauna, Ichthyodiversity, Lakhandei, Runni Saidpur, Red List.

Introduction

Vertebrates constitute less than 5% of the described animal species in the world (Zhang, Zhi-Qiang, 2013). Yet it is quite conspicuous and remarkably visible. Fishes, as a group, are the most diverse among vertebrates. More than half of the vertebrate is fish (Nelson *et al.*, 2016; Thakur *et al.*, 2021). Eschmeyer's Catalog of Fishes (2025) record 37,474 valid fish species. FishBase (2025) still reports 36,100 fish species. More than 18,000 fish species live in the global freshwaters (Samantha *et al.*, 2025, Tedesco *et al.*, 2017, Lundberg *et al.*, 2000). Eschmeyer's Catalog of Fishes (2025) reports 19,180 valid freshwater fish species.

Freshwater ecosystem supports a disproportionately high diversity of fish species compared to their spatial extent (Ralf B. Schäfer *et al.*, 2025, Battin *et al.*, 2023, Pekel *et al.* 2016). Among these systems, the rivers of the Indo-Gangetic plains are globally significant due to their ecological complexity, high species richness, and socio-economic importance. However, while major rivers such as the Ganga and Yamuna (Sarkar *et al.*, 2012, Das *et al.*, 2013, Das *et al.*, 2023) have been extensively studied, smaller tributaries like the Lakhandei River remain scientifically under-documented, despite their local ecological importance (Kumar and Kumar, 2023, Kumar *et al.*, 2025, Sharma and Paul, 2025).

The Lakhandei river is not merely a hydrological body; it is a socio-biological corridor. For the communities in Runni Saidpur. The river is a good source of protein and livelihood. However, increasing anthropogenic pressures such as pollution, embankment construction, unregulated fishing, and seasonal water scarcity pose significant threats to its fish diversity. Fishing has reduced recently due to industrial discharges (ADB, 2011). The present chapter provides a comprehensive assessment of the ichthyodiversity of the River Lakhandei at Runni Saidpur and can serve as a baseline reference for future field-based investigations and conservation planning.

Material and Methods

Runni Saidpur is a small town and a block under Sitamarhi district, Bihar, India. It is located between Lakhandei river in the north and the Bagmati river to the south. The town and study stretch lies between latitudes approximately 26°38'–26°50' N and longitudes 85°45'–85°55' E. Runni Saidpur Lakhandei Bridge is at 26°39' N and 85°50' E. The Lakhandei River is a tributary of the Bagmati River which finally meets the Ganga. It is a rain-fed, low-gradient river, typical of North Bihar plains. At Runni Saidpur, Lakhandei river takes on a meandering character, creating a network of deep pools (*dhabs*) and shallow stretches that provide diverse micro-habitats for teleostean fishes.

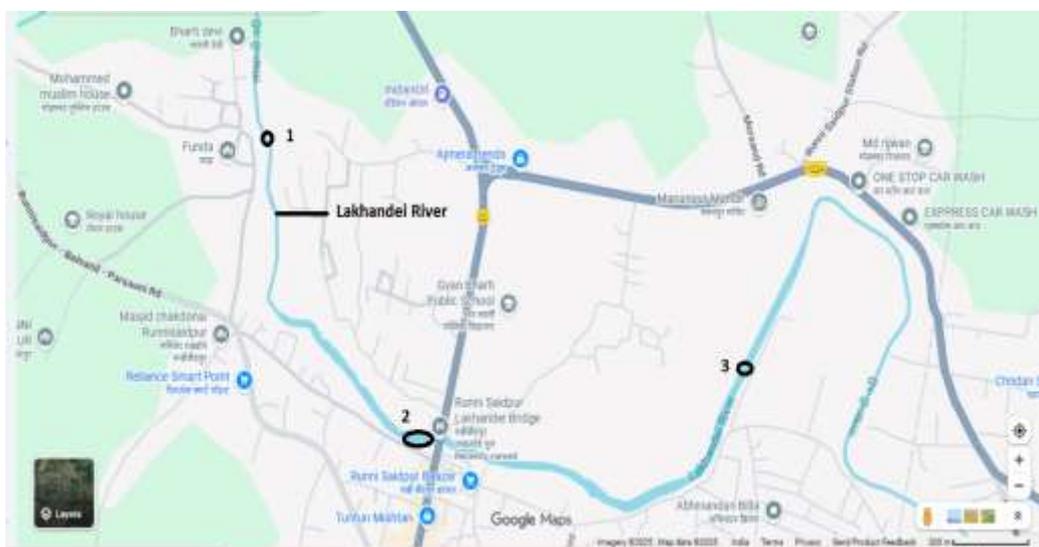


Fig: Lakhandei River and the three stations of work.

To assess the ichthyodiversity at Runni Saidpur, sampling was conducted at three major stations:

1. Station A (no.2): Near the Runni Saidpur Bridge (High anthropogenic activity).
2. Station B (no.1): Upstream, Confluence points with local drainage channels.
3. Station C (no.3): Downstream, rural stretches (Relatively undisturbed)

Sampling methods included the use of Cast nets (Bhanwar Jal) and Gill nets (Phansi Jal), of mesh sizes 18 to 100mm, Drag nets, hooks, *ghana* and *chachari* (a type of trap).

Collected specimens were fixed in 10% formaldehyde solution. Morphometric and meristic measurements were conducted in the laboratory. Their identification and taxonomy was based on standard references including Day (1878), Srivastava (1994), Talwar and Jhingran (1999), Jayaram (1999, 2010), Nelson (2016) and FishBase (2025). The classification and nomenclature are primarily adopted from FishBase (2025) and Eschmeyer's Catalog of Fishes (2025). Popular old (previous) zoological names are included under parentheses.

Observation

The fishes collected and identified from the Lakhandei River of Runni Saidpur Block belong to 47 species under 19 families of 9 orders. The most abundant fish order in terms of species diversity of the study site was Cypriniformes, as expected for a tributary of River Ganga. Its 23 species fall under 17 genera and 4 families. Percentagewise it stands respectively as 48.94%, 47.22% and 21.05%. Its one family, Cyprinidae containing 12 species under 7 genera, is the most diverse fish family of the area. Its another family Danionidae, with 8 species under 8 genera, stands second. Next abundant and diverse group was Siluriformes with 10 species under 8 genera and 6 families. Percentagewise, its species, genus and family share stands respectively as 21.28%, 22.22%, and 31.58%. Siluriformes stood first in terms of family diversity. Its largest family Bagridae having 3 species under single genus *Mystus*, is the third most diverse family, jointly with Mastacembelidae (order Synbranchiformes \approx Mastacembeliformes) having 3 species under 2 genera. Anabantiformes stands at 3rd position with 3 families while all other orders namely Osteoglossiformes, Clupeiformes, Beloniformes, Gobiiformes, Synbranchiformes and Tetraodontiformes contain one family each.

Most of the reported species are categorized in IUCN 2024-25 as Least Concern (LC) but several key species are under threat. *Chitala chitala* (*Notopterus chitala*), *Labeo pangusia*, *Ompok pabda*, and *Ailia coila* are Near Threatened (NT) while *Wallago attu* and *Cyprinus carpio* is Vulnerable (VU). Two species, *Cyprinus carpio* and *Ctenopharyngodon idella* are introduced (exotic) species while rest were native one. *Cyprinus carpio* is also an Invasive Species.

Table 1: Ichthyofauna of the River Lakhandei at Runni Saidpur, Sitamarhi, Bihar. Genus and species are arranged alphabetically within their respective taxons (i.e. family and genus).

Sr No	Order	Family	Zoological name	Occurrence (for India)	Local (vernacular) name	IUCN Status
1.	Osteoglossiformes	Notopteridae	<i>Chitala chitala</i> (Ham.) (= <i>Notopterus chitala</i>)	Native	Moya	NT
2.			<i>Notopterus notopterus</i> (Pallas)	Native	Moya	LC
3.	Clupeiformes	Dorosomatidae	<i>Gonialosa manmina</i> (Ham.)	Native	Ganges gizzard shad	LC
4.	Cypriniformes	Cyprinidae (>Cyprininae)	<i>Cyprinus carpio</i> (Linn.)	Introduced	Common carp	VU

5.		(>Xenocypridi dae)	<i>Ctenopharyngodon idella</i> (Val.) (= <i>C. idellus</i>)	Introduced	Grass carp	LC
6.		(>Labeoninae)	<i>Cirrhinus mrigala</i> (Ham)	Native	Naini	LC
7.			<i>C. reba</i> (Ham.)	Native	Rewah	LC
8.			<i>Labeo catla</i> (Ham.) (= <i>Catla catla</i>)	Native	Bhakur/ka tla	LC
9.			<i>Labeo calbasu</i> (Ham.)	Native	Basadi	LC
10.			<i>Labeo pangusia</i> (Ham.)	Native	Rewa	NT
11.			<i>Labeo rohita</i> (Ham.)	Native	Rohu	LC
12.		(>Smiliogastrinae)	<i>Puntius chola</i> (Ham.)	Native	Pothia	LC
13.			<i>Pethia conchoni</i> (Ham) (= <i>Puntius conchoni</i>)	Native	Pothi	LC
21.		(>Chedrinae)	<i>Opsarius bendelisis</i> (Ham) (= <i>Barilius bendelisis</i>)	Native		LC
22.			<i>Raiamas bola</i> (Ham.) (= <i>Barilius bola</i>)	Native	Trout barb	LC
23.			<i>Salmostoma bacaila</i> (Ham) (= <i>Oxygaster bacaila</i>)	Native	Chalhawa	LC
24.		Botiidae (>Botiini)	<i>Botia lohachata</i> (Chaudhuri)	Native	Bagha	LC
25.		Cobitidae	<i>Lepidocephalichthys guntea</i> (Ham.)	Native	Nakati	LC
26.			<i>Canthophrys gongota</i> (Ham.) (= <i>Somileptes gongota</i>)	Native	Gongota loach	LC
27.	Siluriformes	Siluridae	<i>Ompok pabda</i>	Native	Pabda	NT
28.			<i>Wallago attu</i> (Bl. & Schn.)	Native	Boari	VU
29.		Bagridae	<i>Mystus cavasius</i> (Ham.)	Native	Tengar	LC
30.			<i>Mystus tengara</i> (Ham.)	Native	Tengari	LC
31.			<i>Mystus vittatus</i> (Bloch.)	Native	Palawa	LC
32.		Ailiidae	<i>Ailia coila</i> (Ham.)	Native	Patasi	NT
33.			<i>Clupisoma garua</i> (Ham.)	Native		LC
34.		Schilbeidae	<i>Eutropiichthys murius</i> (Ham.)	Native	Bachawa	LC
35.		Heteropneustidae (Saccobranichidae)	<i>Heteropneustes fossilis</i> (Bloch.)	Native	Singhi	LC
36.		Clariidae	<i>Clarias batrachus</i> (Linn.)	Native	Mangur	LC
37.	Beloniformes	Belonidae	<i>Xenentodon cancila</i> (Ham.)	Native	Kauwa	LC
38.	Anabantiformes	Channidae	<i>Channa punctata</i> (Bl.) (= <i>C. punctatus</i>)	Native	Garai	LC
39.			<i>Channa striata</i> (Bl.) (= <i>C. striatus</i>)	Native	Sauri	LC
40.		Nandidae	<i>Nandus nandus</i> (Ham.)	Native	Dhebari, dhalo	LC

41.		Osphronemidae	<i>Trichogaster chuna</i> (Ham.) (= <i>Colisa chuna</i>)	Native	Kholsa	LC
42.			<i>Trichogaster fasciata</i> (Bl. & Sch.) (= <i>C. fasciata</i>)	Native	Khosti	LC
43.	Gobiiformes	Gobiidae	<i>Glossogobius giuris</i> (Ham.)	Native	Bulla	LC
44.	Synbranchiformes	Mastacembelidae	<i>Macrognathus aculeatus</i> (Bloch)	Native	Gainchi	LC
45.			<i>Macrognathus pancalus</i> (Ham.) (= <i>Mastacembelus pancalus</i>)	Native	Gaincha, Pataya, Malga	LC
46.			<i>Mastacembelus armatus</i> (Lacepede)	Native	Baami, Baam	LC
47.	Tetraodontiformes	Tetraodontidae (>Tetraodontinae)	<i>Leiodon cutcutia</i> (Ham.) (= <i>Tetrodon cutcutia</i>)	Native	Galphulani	LC
	09 orders	19 families	36 genera, 47 species			

Note: LC: Least Concern; NT: Near Threatened, VU: Vulnerable. Order Channiformes (\approx Ophiocephaliformes) is included under Anabantiformes (gouramies, snakeheads); so is Perciformes. Synbranchiformes \approx Mastacembeliformes.

Table 2: Fishes of the River Lakhandei at Runni Saidpur, Sitamarhi

S.N	Order	No. of family	% of family	No. of Genus	% of genus	No. of species	% of species
1.	Osteoglossiformes	1	5.26	2	5.56	2	4.26
2.	Clupeiformes	1	5.26	1	2.78	1	2.13
3.	Cypriniformes	4	21.05	17	47.22	23	48.94
4.	Siluriformes	6	31.58	8	22.22	10	21.28
5.	Beloniformes	1	5.26	1	2.78	1	2.13
6.	Anabantiformes	3	15.79	3	8.33	5	10.64
7.	Gobiiformes	1	5.26	1	2.78	1	2.13
8.	Synbranchiformes	1	5.26	2	5.56	3	6.38
9.	Tetraodontiformes	1	5.26	1	2.78	1	2.13
Total	09	19	\approx 100	36	100	47	100

Discussion

The River Lakhandei at Runni Saidpur is a biological treasure trove that is currently under siege. It possesses significant potential to support a diverse assemblage of freshwater fishes typical of the Gangetic floodplain. Singh, P. (1986) reported 29 fish species under 15 families in this river at Sitamarhi. Kumari (2009) reported 31 species at Lakhandei-Bagmati sangam near Chamunda sthan, Muzaffarpur. Present study strongly suggests the presence of cyprinids, catfishes, snakeheads, and other ecologically important species.

The River Lakhandei is currently facing a "Poly-crisis". Siltation including that from Nepal hills (Feasibility Study, CERP, 2023) is destroying the benthic habitats of catfishes. Agricultural Runoff including much more pesticide from local paddy and maize fields causes bioaccumulation in species like *Channa*. The accidental or intentional introduction of Invasive Species like African Catfish (*Clarias gariepinus*) and Common Carp (*Cyprinus carpio*) is outcompeting native breeds (Mahapatra

and Mohanty, 2023, Kadwalia. A., 2025). Erratic climate change (2025 Observations) like erratic rainfall leading to "Flash Floods" followed by extreme dry spells are, disrupting the biological clock of migratory fishes. Climate and land-use changes interact. This interaction drive long-term reorganization of riverine fish communities globally (L. Comte *et al.*, 2021). In temperate watersheds, freshwater biodiversity is also influenced by the forest age (Penaluna, B. E. *et al.*, 2026). Without a community-led conservation model, species like the *Wallago attu* and *Notopterus* may face local extinction. Protecting this ichthyodiversity is not just about saving fish; it is about securing the food future of North Bihar.

Increasing anthropogenic stress necessitates urgent scientific investigation and conservation planning for the local fishes. A Workshop for managing conservation of fishes of India was conducted at National Bureau of Fish Genetic Resources, Lucknow (Sanjay Molur & Sally Walker, 1998). Conservation planning should include, but not limited to:

- Establishment of River Sanctuaries: Small stretches of the Lakhadei should be declared "No-Fishing Zones" during the breeding months (June–August).
- Ranching Programs: The Bihar State Fisheries Department should conduct regular "Seed Ranching" of Native carps into the river.
- Pollution Control: Monitoring the runoff from local sugar mills and domestic sewage entering the river at Runni Saidpur.
- Promotion of Aquaponic and Cage Culture: To reduce the pressure on the wild riverine stock.

This chapter provides a foundational framework for future empirical studies and sustainable management of the river's fish resources.

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