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Ichthyofaunal diversity, status and Anthropogenic stress of Beki River, Barpeta, Assam

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Abstract

This study was carried out in Beki River, from November 2013 to December 2014. A total, 114 species belonging to 73 genera, 31 families and 11 orders have been recorded from six different fish landing zone during the study period. The ichthyospecies of the Beki River belongs to the following orders- Osteoglossiformes (1.75%), Clupeiformes (2.63%), Cypriniformes (46.49%), Siluriformes (24.56%), Anguilliformes (1.75%), Cyprinodontiformes (0.88%), Symbranchiformes (3.51%), Perciformes (14.91%), Mugiliformes (1.75%), Beloniformes (0.88%) and Tetraodontiformes (0.88%). And out of these total 78.95% considered as LC, 0.87% considered as VU, 0.87% considered as EN, 9.65% considered as NT, 7.01% considered as NA and 2.63% considered as DD criteria according to IUCN 2014.3 status report. Cypriniformes is the most dominant group throughout the River (53 species) and Cyprinidae is the most species rich family (45 species). *Danio rerio*, *Puntius conchonus* and *Puntius sophore* were the most common species in the Beki River.

Keywords: Ichthyofauna, Threats, Beki River, Assam.

1. Introduction

Fishes are the most ancient and most numerous forms of species among the vertebrates. The Brahmaputra drainage system is one of the richest sources of fresh water ichthyofauna in India. The northeastern part of India is gifted verity of fresh water habitats mainly in the form of the mighty Brahmaputra and its major tributaries. Beki River is an important right bank tributary of Brahmaputra River. In Barpeta district; Beki River flows from North to South. Fish constitutes slightly more than one- half the total numbers of approximately 54,711 valid vertebrate species. There are descriptions of an estimated 27,977 valid species of fishes^[15]. Of 54,711 vertebrate species recognised the world over 27,977 under 515 families and 4,494 genera^[15] are valid species of fish of which 11,952 are of freshwater and 12,457 species using freshwater. In the Indian region alone out of 2,500 species 1,570 are marine and 930 are freshwater inhabitants belong to 326 genera, 99 families and 20 orders^[16].

Fishes are a treasured source both in terms of utility as food and as material of scientific study^[3]. Fishes are often a key element in environmental planning and they appear to be good indicators of the status of aquatic environments^[4].

Northeastern Region of India is known as a global hotspot for ichthyofaunal diversity. The diversity of ichthyospecies in the North East India is attributed to the recent geological history, especially the Himalayan orogeny^[10]. The ichthyofauna of north eastern region of India has elements of the Indo-Gangetic region; and to some extent, of the Myanmar's and South-Chinese's region^[6]. The fresh water ichthyospecies diversity of Assam was reported by Dey^[12, 13] is one of the pioneer workers on the fishes. Ghosh and Lipton^[11] had reported 172 species of fishes with reference to their economic importance, while Sen^[8] reported 187 species in Assam. Sinha^[5] compiled a list of 230 species of fishes from north eastern part of India. Later Sen^[9] had reported 285 fish species belonging to 114 genera under 38 families, which is approximately 33.13% of total India fresh water fishes.

The exclusive literature survey indicates that only a few information is available on River based ichthyofaunal diversity of Barpeta district^[7].

To the best knowledge of the authors, there was no diversity based research effort on ichthyofauna was carried out in Beki River. Subsequently, the aim of the present paper was to carry out the first comprehensive ichthyofaunal diversity in Beki River, Barpeta, Assam.

2. Materials and Methods

The extensive study was carried out from November 2013 to December 2014.

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2.1 Study Area

Beki River, also known as Kurissu River in Bhutan, lies between 26° 20' 00" N; 90° 56' 00" E and located in Barpeta district and flows from North to South through Barpeta district. The climate is extremely varied, ranging from hot and humid subtropical conditions in the south to cold and dry alpine conditions in the north. From May to October, Tropical monsoon climate provides two distinct seasons- summer and winter. The summer season of March to May is followed by the Monsoons from June to September. This is followed by cool winter season from October to February. Beki Riverine areas receive annually over 4,000 - 4,200 millimetres in the southern parts and 550–700 millimetres precipitation in the northern parts. The survey was conducted in six different landing zone of Beki River.

2.2 Places (Survey Landing Zone) Description

- Madulizar zone: (26°27'56" N and 90°54'37" E): It is about 16 km from Barpeta road. This landing zone is very near to Riverbank.
- Uttar Ganakguri: (26°29'00" N and 90°54'15" E): It is about 12 km from Barpeta road. Lower upstream part.
- Lisuka Ghat: (26°31'34" N and 90°55'54" E): It is about 3 km from Barpeta road. Upstream part of River.
- Dumuni Ghat: (26°32'39" N and 90°57'40" E): It is about 6 km from Barpeta road. Upstream part of River.
- Gobardhana Ghat: (26°36'72" N and 90°58'89" E): It is about 16 km from Barpeta road. Upstream part of River.
- Narayunguri Ghat: (26°39'56" N and 90°59'48" E): It is about 22 km from Barpeta road. Upstream part of River.

2.3. Data collection and analysis

Survey was conducted in six different fish landing zone and

the random sampling was carried out three times in every month from November 2013 to December 2014. Survey was conducted in the early morning and late evening because those hours all the fishermen and fish landing zone is much more active in other times in a day. Fishes were caught by using different types of Gill nets, Cast nets, Drag nets, scop nets, bamboo traps and angling with the aid of local fishermen. In addition nearby fishermen communities have been interviewed. GPS (Garmin e-Trex Legend) was used for recording the geographical coordinates of landing sites. Gill nets of mesh sizes used by fishermen include: 2½ inch, 3 inch, 3½, 4inch and 4½ and 5½ inch; cast nets of mesh size 7 x 7 mm and sweep nets mesh size 5x5 mm (Appraisal). Fish samples were also collected from the different fish landing centres and local fish markets of the studied area to ascertain the fish species composition as far as possible, the fish species were identified in the field itself. The samples were photographed, immediately prior to preservation as formalin decolorizes the fish colour on long preservation.

2.4. Preservation and Identification

After photography, unidentified collected specimens were preserved in 7-10% aqueous formaldehyde solution. Separated jar with label was used for preserving individual species and brought to the Wildlife and Biodiversity conservation department of North Orissa University laboratory for identification. The specimens were identified according to Jayaram [17]; Das and Biswas [14] and Talwar and Jhingran [16] with the help of the photo illustrations and the descriptions provided. Nomenclature will be done on Fish base database [19]. For ascertaining the conservation status (threat criteria) of the ichthyospecies is based on IUCN (2014.3) [18].

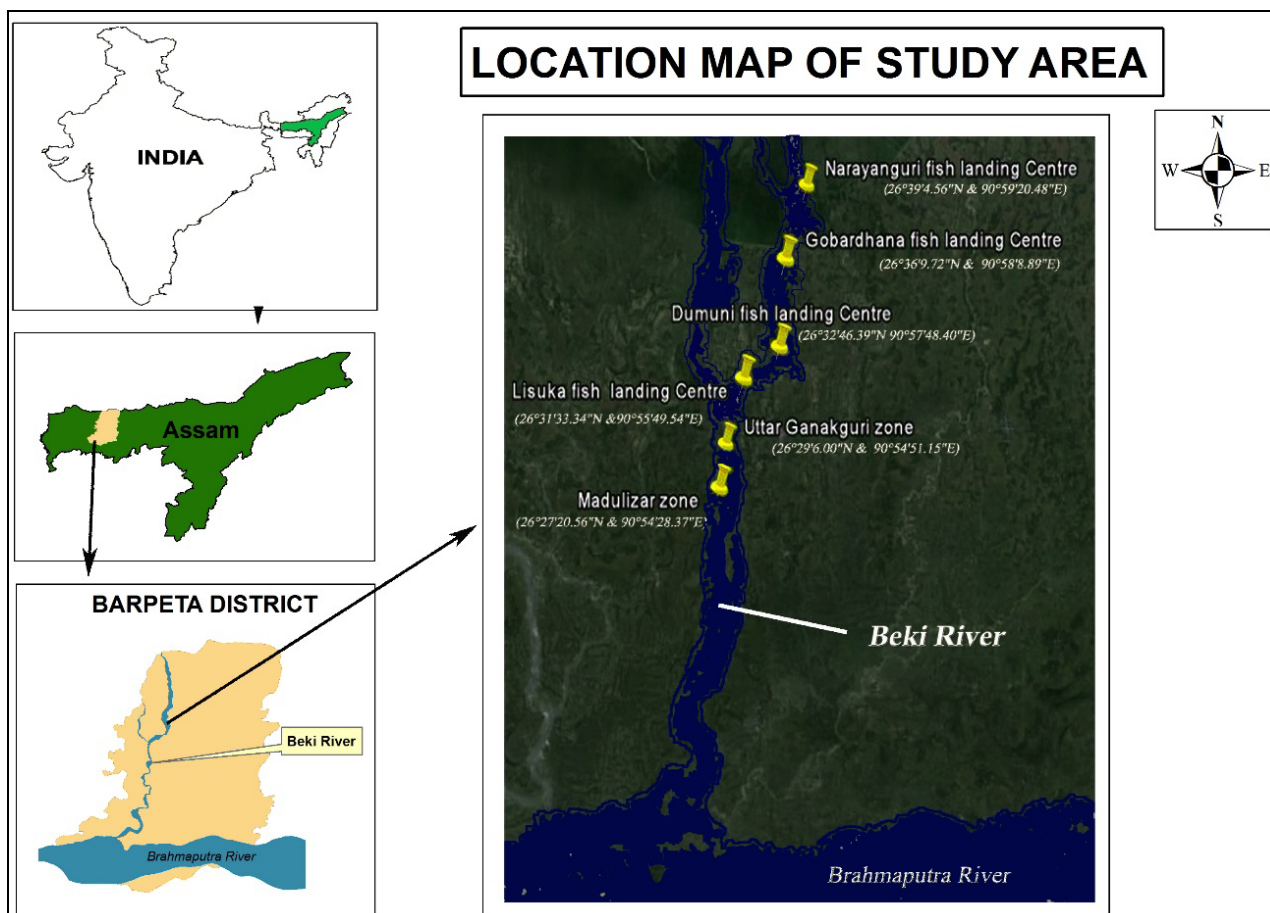


Fig 1: (Source: North Orissa University, RS & GIS Dept.): Survey area Location Map

3. Results and Discussion

Altogether, 114 species belonging to 73 genera, 31 families and 9 orders have been recorded from the six different fish landing zone during the study period. The ichthyospecies of the Beki River belongs to the following orders- Osteoglossiformes (1.75%), Clupeiformes (2.63%), Cypriniformes (46.49%), Siluriformes (24.56%), Anguilliformes (1.75%), Cyprinodontiformes (0.88%), Symbranchiformes (3.51%), Perciformes (14.91%), Mugiliformes (1.75%), Beloniformes (0.88%) and Tetraodontiformes (0.88%). [Table 2 and Fig 2]. Out of these 114 species, 1 belong to family Anguillidae followed by Belontiidae (1), Clupeidae (2), Engraulidae (1), Balitoridae (2), Cobitidae (5), Cyprinidae (45), Psilorhynchidae (1), Aplocheilidae (1), Notopteridae (2), Ophichthidae (1), Ambassidae (3), Anabantidae (1), Osphronemidae (4), Channidae (5), Cichlidae (1), Gobidae (1), Mugilidae (2), Nandidae (2), Amblycipitidae (1), Bagridae (7), Chacidae (1), Claridae (2), Heteropneustidae (1) Pangasiidae (1), Schilbeidae (5), Siluridae (4), Sisoridae (6), Mastacembelidae (3), Synbranchidae (1) and Tetraodontidae (1) [Table 3 and Fig 3]. Cypriniformes is the most dominant group throughout the River (53 species) and Cyprinidae is the most species rich family (45 species). *Danio rerio*, *Puntius conchoni* and *Puntius sophore* were the most common species in the Beki River.

Emergence of high number exotic species like *Aristichthys nobilis*, *Ctenopharyngodon idella*, *Cyprinus carpio* var. *communis*, *Cyprinus carpio* var. *nudus* *Hypophthalmichthys molitrix*, *Oreochromis mossambicus* and *Clarias gariepinus* may be threat for indigenous species in near future. Out of 114 species following species *Tenualosa ilisha*, *Chitala chitala*, *Anabas testudineus*, *Channa marulius*, *Channa striatus*,

Mystus bleekeri, *Mystus cavasius*, *Mystus tengara*, *Rita rita*, *Sperata seenghala*, *Clarias batrachus*, *Heteropneustes fossilis*, *Neotropius atherinoides*, *Ompok bimaculatus*, *Ompok pabda*, *Ompok pabo* and *Monopterus albus* have high market value as food fish (NCFF & CFF). We found a serious issue during study that was; highly market demanded fishes like *Chitala chitala*, *Ompok bimaculatus*, *Ompok pabda* and *Ompok pabo* have coming into IUCN 2014.3 Near threatened category. Due to this reason; these four species maybe totally extinct from Beki River in near future. And species like *Xenentodon cancila*, *Acanthocobitis botia*, *Schistura corica*, *Botia dario*, *Botia rostrata*, *Canthophrys gongota*, *Lepidocephalichthys annandalei*, *Lepidocephalichthys guntea*, *Amblypharyngodon mola*, *Barilius barna*, *Barilius bendelisis*, *Barilius vagra*, *Danio aequipinnatus*, *Danio dangi* la, *Danio devario*, *Danio rerio*, *Esomus danricus*, *Osteobrama cotio*, *Puntius phutunio*, *Puntius conchoni*, *Puntius gelius*, *Puntius phutunio*, *Puntius terio*, *Puntius ticto*, *Rasbora daniconius*, *Rasbora rasbora*, *Psilorhynchus balitora*, *Aplocheilus panchax*, *Pisodonophis boro*, *Chanda nama*, *Parambassis ranga*, *Parambassis baculis*, *Trichogaster fasciatus*, *Trichogaster lalius*, *Trichogaster labiosa*, *Trichogaster chuna*, *Channa gachua*, *Channa punctatus*, *Badis badis*, *Chaca chaca*, *Neotropius atherinoides*, *Erethistes pusillus*, *Gagata cenia*, *Hara hara*, *Macrogynathus aral*, *Macrogynathus pancalus* and *Tetradon cutcutia* have high ornamental value around the globe. And it is also mentionable that some of species like *Schistura corica*, *Canthophrys gongota*, *Pisodonophis boro*, *Parambassis baculis*, *Chaca chaca*, *Ailia coila* *Ompok pabda*, *Bagarius bagarius* and *Hara hara* were found to be very rare during investigation and therefore it is necessary to conserve those species in the studied River.

Table 1: Ichthyofaunal Diversity of Beki River.

Name of the Species	Local Name	Economic value	IUCN Status 14.3
Order : OSTEOGLOSSIFORMES			
Family : NOTOPTERIDAE			
<i>Chitala chitala</i> (Ham-Buch,1822)	Chital	CFF,OR	NT
<i>Notopterus notopterus</i> (Pallas,1769)	Kanduli	CFF,OR	LC
Order : ANGUILLIFORMES			
Family : ANGUILLIDAE			
<i>Anguilla bengalensis</i> (Gray and Hardwiche,1831)	Bami	NCFF	LC
Family : OPHICHTHIDAE			
<i>Pisodonophis boro</i> (Kaup,1856)	Nal Bami	OR	LC
Order : CLUPEIFORMES			
Family : CLUPEIDAE			
<i>Gudusia chapra</i> (Ham. 1822)	Koroti	NCFF,OR	LC
<i>Tenualosa ilisha</i> (Ham. 1822)	Ilsh	CFF	NA
Family : ENGRAULIDAE			
<i>Setipinna phasa</i> (Ham. 1822)	Salo	NCFF	LC
Order : CYPRINIFORMES			
Family : CYPRINIDAE			
<i>Amblypharyngodon mola</i> (Ham-Buch, 1822)	Moa	NCFF, OR	LC
<i>Aristichthys nobilis</i> (Richardson, 1845)	Big head	CFF, EX	DD
<i>Barilius barna</i> (Ham-Buch, 1822)	Bairala	NCFF, OR	LC
<i>Barilius bendelisis</i> (Ham-Buch, 1807)	Bairala	NCFF, OR	LC
<i>Barilius vagra</i> (Ham-Buch, 1822)	Bairala	NCFF, OR	LC
<i>Bengana dero</i> (Ham-Buch, 1822)	Silgharia	NCFF	LC
<i>Cabdio jaya</i> (Ham-Buch,1822)	Bariwala	NCFF	LC
<i>Cabdio morar</i> (Ham-Buch,1822)	Bariwala	NCFF,OR	LC
<i>Catla catla</i> (Ham-Buch,1822)	Bhakua	CFF,	LC
<i>Chagunius chagunio</i> (Ham. 1822)	Lal Puthi	NCFF	LC
<i>Chela cachius</i> (Ham-Buch,1822)	Laouputhi	NCFF,OR	LC

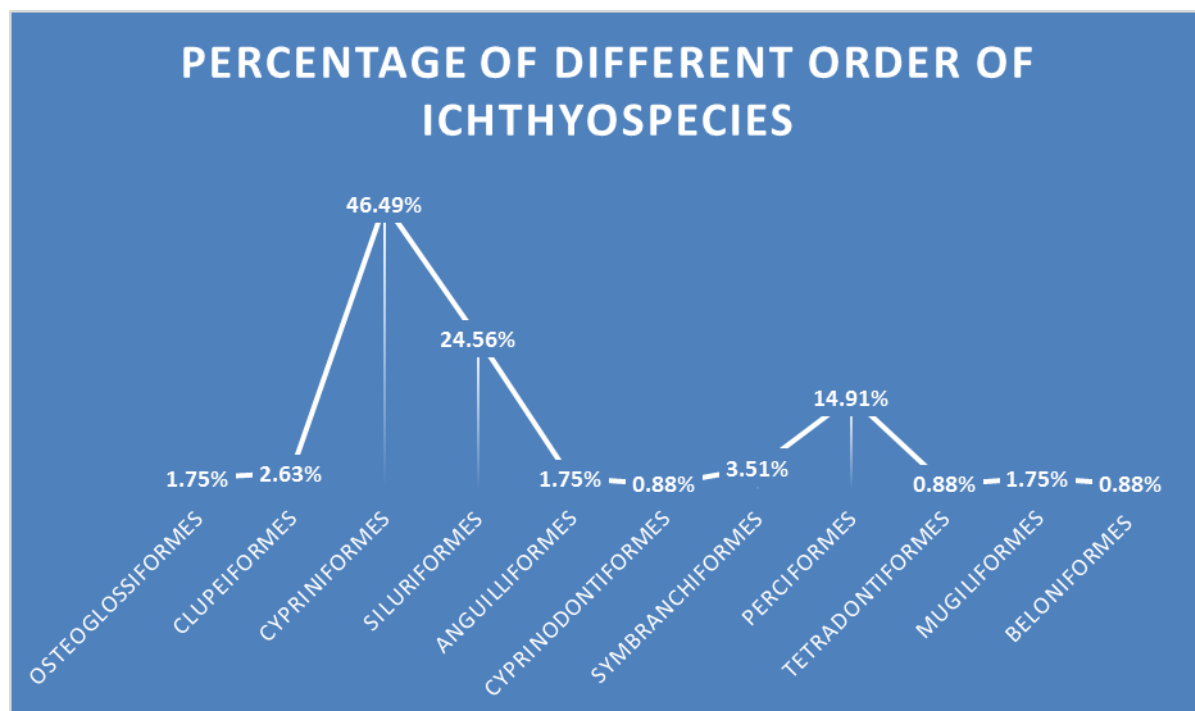
<i>Cirrhinus mrigala</i> (Ham-Buch,1822)	Mirika	CFF,OR	LC
<i>Cirrhinus reba</i> (Ham-Buch,1822)	Lachim Bhangan	CFF	LC
<i>Ctenopharyngodon idella</i> (Val. 1844)	Grass Carp	CFF, EX	NA
<i>Cyprinus carpio</i> var. <i>communis</i> (Linn. 1758)	Common Carp	CFF, EX	NA
<i>Cyprinus carpio</i> var. <i>nudus</i>	Common Carp	CFF, EX	NA
<i>Danio aequipinnatus</i> (McClelland,1839)	Saldarikona	NCFF,OR	LC
<i>Danio dangila</i> (Ham-Buch,1822)	Darikona	NCFF,OR	LC
<i>Danio devario</i> (Ham-Buch,1822)	Darikona	NCFF,OR	LC
<i>Danio rerio</i> (Ham-Buch,1822)	Darikona	NCFF,OR	LC
<i>Esomus danricus</i> (Ham-Buch,1822)	Dorikona	NCFF,OR	LC
<i>Garra gotyla</i> (Gray,1830)	Silkamura	NCFF,OR	LC
<i>Hypophthalmichthys molitrix</i> (Val. 1844)	Silver Carp	CFF, EX	NT
<i>Labeo bata</i> (Ham-Buch,1822)	Bhangan	CFF	LC
<i>Labeo calbasu</i> (Ham-Buch,1822)	Bai	NCFF,OR	LC
<i>Labeo dyocheilus</i> (McClelland,1839)	Ghora Mach	NCFF	LC
<i>Labeo gonius</i> (Ham-Buch,1822)	Kurhi	CFF	LC
<i>Labeo nandina</i> (Ham-Buch,1822)	Nandini	CFF	NT
<i>Labeo rohita</i> (Ham-Buch,1822)	Rau	CFF	LC
<i>Neolissochilus hexagonolepis</i> (McClelland,1839)	Bhokuwa	CFF	NT
<i>Osteobrama cotio</i> (Ham-Buch,1822)	Hafo	NCFF,OR	LC
<i>Puntius phutunio</i> (Ham. 1822)	Puthi	NCFF,OR	LC
<i>Puntius conchoni</i> (Ham-Buch,1822)	Puthi	NCFF,OR	LC
<i>Puntius chola</i> (Ham-Buch,1822)	Puthi	NCFF,OR	LC
<i>Puntius gelius</i> (Ham-Buch,1822)	Puthi	NCFF,OR	LC
<i>Puntius phutunio</i> (Ham-Buch,1822)	Puthi	NCFF,OR	LC
<i>Puntius sophore</i> (Ham-Buch,1822)	Puthi	NCFF,OR	LC
<i>Puntius terio</i> (Ham-Buch,1822)	Puthi	NCFF,OR	LC
<i>Puntius ticto</i> (Ham-Buch,1822)	Puthi	NCFF,OR	LC
<i>Raiamas bola</i> (Ham-Buch,1822)	Bairala	NCFF,	LC
<i>Rasbora daniconius</i> (Ham-Buch,1822)	Sal Darikona	NCFF,OR	NA
<i>Rasbora rasbora</i> (Ham-Buch,1822)	Dorikona	NCFF,OR	LC
<i>Salmostoma bacaila</i> (Ham-Buch,1822)	Chelekoni	NCFF,OR	LC
<i>Systemus sarana</i> (Ham-Buch,1822)	Seni Puthi	NCFF	LC
<i>Tor putitora</i> (Ham. 1822)	Jonga tora Pithia	NCFF, GF	EN
Family : PSILORHYNCHIDAE			
<i>Psilorhynchus balitora</i> (Ham.1822)	Balitora	OR	LC
Family : BALITORIDAE			
<i>Acanthocobitis botia</i> (Ham. 1822)	Botia	NCFF, OR	LC
<i>Schistura corica</i>	Boirali	NCFF, OR	LC
Family : COBITIDAE			
<i>Botia dario</i> (Ham-Buch, 1822)	Batuk Mash	OR	LC
<i>Botia rostrata</i> (Gunthur, 1868)	Botia	OR	VU
<i>Canthophrys gongota</i> (Ham-Buch, 1822)	Kukurbotia	OR	NA
<i>Lepidocephalichthys annandalei</i> (Chaudhuri 1912)	Botia	NCFF, OR	NA
<i>Lepidocephalichthys guntea</i> (Ham-Buch,1822)	Botia	NCFF, OR	LC
Order : SILURIFORMES			
Family : BAGRIDAE			
<i>Mystus bleekeri</i> (Day,1877)	Singora	NCFF,OR	LC
<i>Mystus cavasius</i> (Ham-Buch,1822)	Singora	NCFF,OR	LC
<i>Mystus tengara</i> (Ham. 1822)	Tengara	NCFF,OR	LC
<i>Mystus vittatus</i> (Bl. 1794)	Singora	NCFF,OR	LC
<i>Rita rita</i> (Ham. 1822)	Ritha	NCFF,OR	LC
<i>Seperata aor</i> (Ham-Buch,1822)	Ari	NCFF,OR	LC
<i>Seperata seenghala</i> (Sykes,1839)	Ari	NCFF,OR	LC
Family : SILURIDAE			
<i>Ompak bimaculatus</i> (Bl. 1794)	Pava	NCFF,OR	NT
<i>Ompak pabda</i> (Ham. 1822)	Pava	NCFF,OR	NT
<i>Ompak pabo</i> (Ham. 1822)	Pava	NCFF,OR	NT
<i>Wallago attu</i> (Bl.-Schn. 1801)	Barali	NCFF	NT
Family : SCHILBEIDAE			
<i>Ailia coila</i> (Ham. 1822)	Kajoli	NCFF,OR	NT
<i>Ailiichthys punctata</i> (Day,1872)	Kajoli	NCFF,OR	DD
<i>Clupisoma garua</i> (Ham.1822)	Neria	NCFF,OR	LC
<i>Eutropiichthys vacha</i> (Ham. 1822)	Bosa	NCFF, OR	LC
<i>Neotropius atherinoides</i> (Bl. 1794)	Bordiya	NCFF,OR	LC

Family : PANGASIIDAE			
<i>Pangasius pangasius</i> (Ham. 1822)	Pankaj	NCFF	LC
Family : AMBLYCIPITIDAE			
<i>Amblyceps mangois</i> (Ham. 1822)	Tayek	NCFF,OR	LC
Family : SISORIDAE			
<i>Bagarius bagarius</i> (Ham. 1822)	Gorua	NCFF	NT
<i>Erethistes pussillus</i> (Muller&Troschel,1879)	Tinkaitiya	OR	LC
<i>Gagata cenia</i> (Ham.1822)	Keyakata	NCFF,OR	LC
<i>Gogangra viridescens</i> (Day,1822)	Keyakatta	NCFF,OR	LC
<i>Hara hara</i> (Ham. 1822)	Tinkaitiya	NCFF,OR	LC
<i>Hara jerdoni</i> (Day,1870)	Tinkaitiya	NCFF,OR	LC
Family : CLARIDAE			
<i>Clarias batrachus</i> (Linn. 1758)	Magur	CFF,OR	LC
<i>Clarias gariepinus</i> (Burchell)	Thailand Magur	CFF,EX	NA
Family : HETEROPNEUSTIDAE			
<i>Heteropneustes fossilis</i> (Bl. 1794)	Singhi	NCFF, OR	LC
Family : CHACIDAE			
<i>Chaca chaca</i> (Ham-Buch,1822)	Kurkuri	OR	LC
Order: MUGILIFORMES			
Family : MUGILIDAE			
<i>Rhinomugil corsula</i> (Ham. 1822)	Uparchakua	NCFF	LC
<i>Sicamugil cascasia</i> (Ham. 1822)	Kharkharia	NCFF	LC
Order : BELONIFORMES			
Family : BELONIDAE			
<i>Xenentodon concilla</i> (Ham. 1822)	Kokila	NCFF, OR	LC
Order : CYPRINODONTIFORMES			
Family : APLOCHEILIDAE			
<i>Aplocheilus panchax</i> (Ham-Buch,1822)	Tin soukha	OR	LC
Order : SYMBRANCHIFORMES			
Family : MASTACEMBELIDAE			
<i>Macragnathus aral</i> (Bl.&Schn. 1801)	Tora/Turi	NCFF,OR	LC
<i>Macragnathus pancalus</i> (Ham. 1822)	Tora/Turi	NCFF,OR	LC
<i>Mastacembelus armatus</i> (Lecepede,1800)	Bami/Goshi	NCFF,OR	LC
Family : SYNBRANCHIDAE			
<i>Monopterusuchia</i> (Ham-Buch,1822)	Cuchia	CFF,OR	LC
Order : PERCIFORMES			
Family : AMBASSIDAE			
<i>Chanda nama</i> (Ham-Buch,1822)	Chanda	NCFF,OR	LC
<i>Parambassis ranga</i> (Ham-Buch,1822)	Chanda	NCFF,OR	LC
<i>Parambassis baculis</i> (Ham-Buch,1822)	Chanda	NCFF,OR	LC
Family : NANDIDAE			
<i>Badis badis</i> (Ham-Buch,1822)	Randhani	OR	LC
<i>Nandus nandus</i> (Ham-Buch,1822)	Bhetki/Bhehri	NCFF,OR	LC
Family : CICHLIDAE			
<i>Oreochromis mossambicus</i> (Peters,1852)	Japani Koi	CFF,EX	NT
Family : GOBIDAE			
<i>Glossogobius giuris</i> (Ham-Buch,1822)	Panimutura	NCFF,OR	LC
Family : ANABANTIDAE			
<i>Anabas testudineus</i> (Bloch,1792)	Kawoi	NCFF, OR	DD
Family : OSPHRONEMIDAE			
<i>Trichogaster fasciatus</i> (Bl.-Schn,1801)	Kholihona	NCFF,OR	LC
<i>Trichogaster lalius</i> (Ham. 1822)	Besheli/Besa	NCFF,OR	LC
<i>Trichogaster labiosa</i> (Day,1877)	Kholihona	NCFF,OR	LC
<i>Trichogaster chuna</i> (Ham-Buch,1822)	Besheli	NCFF,OR	LC
Family : CHANNIDAE			
<i>Channa gachua</i> (Bl.-Schn. 1822)	Cheng	NCFF,OR	LC
<i>Channa marulius</i> (Ham-Buch,1822)	Sal	NCFF,OR	LC
<i>Channa punctatus</i> (Bl. 1793)	Goroi	NCFF,OR	LC
<i>Channa stewarti</i> (Playfair,1867)	Chenar	NCFF,OR	LC
<i>Channa striatus</i> (Bl. 1793)	Sol	NCFF,OR	LC
Order : TETRADONTIFORMES			
Family : TETRADONTIDAE			
<i>Tetradon cutcutia</i> (Ham-Buch,1822)	Gangatop	OR	LC

NB: LC-Least Concern, EN-Endangered, VU-Vulnerable, DD-Data Deficient, NA-Not Assessed, NT- Near Threatened, EX-Exotic Species, OR- Ornamental, GF- Game fish, NCFF- Non cultivable food fish, CFF- Cultivable food fish.

Table 2: Number and percentage composition of different orders of ichthyospecies from Beki River

Order	Percentage	No. of sp.
OSTEOGLOSSIFORMES	1.75%	2
CLUPEIFORMES	2.63%	3
CYPRINIFORMES	46.49%	53
SILURIFORMES	24.56%	28
ANGUILLIFORMES	1.75%	2
CYPRINODONTIFORMES	0.88%	1
SYMBRANCHIFORMES	3.51%	4
PERCIFORMES	14.91%	17
TETRADONTIFORMES	0.88%	1
MUGILIFORMES	1.75%	2
BELONIFORMES	0.88%	1

**Fig 2:** Percentage of different orders of Ichthyospecies from Beki River**Table 3:** Number and composition of different families of ichthyospecies from Beki River

Family	No. Of Species
Anguillidae	1
Belonidae	1
Clupeidae	2
Engraulidae	1
Balitoridae	2
Cobitidae	5
Cyprinidae	45
Psilorhynchidae	1
Aplocheilidae	1
Notopteridae	2
Ophichthidae	1
Ambassidae	3
Anabantidae	1
Osphronemidae	4
Channidae	5
Cichlidae	1
Gobiidae	1
Mugilidae	2
Nandidae	2

Amblycipitidae	1
Bagridae	7
Chacidae	1
Claridae	2
Heteropneustidae	1
Pangasiidae	1
Schilbeidae	5
Siluridae	4
Sisoridae	6
Mastacembelidae	3
Synbranchidae	1
Tetradontidae	1

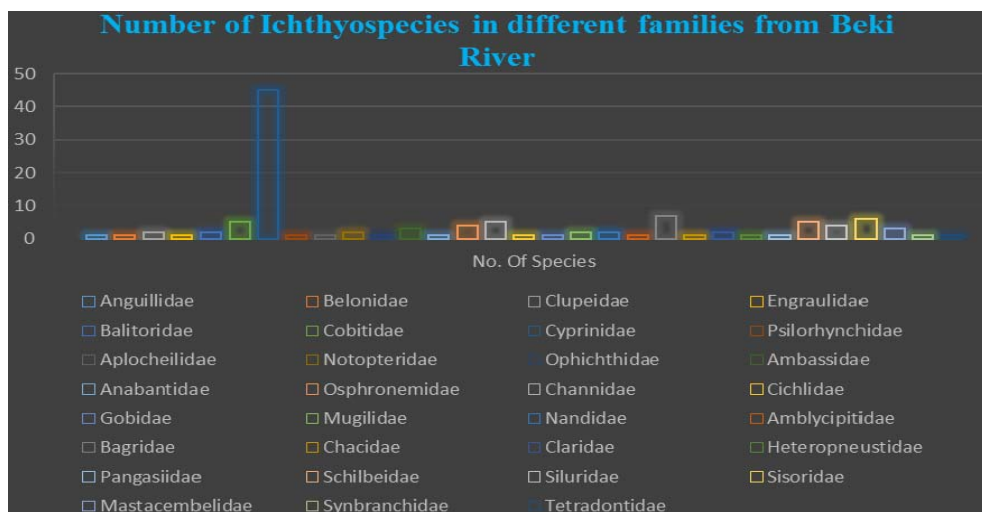


Fig 3: Number of ichthyospecies occurring in each family from Beki River

3.1 Effect of anthropogenic stress on the River

There are some serious problems in Beki River regarding fish conservation and management. There are no management activities under way in the Riverine fishery in Beki River. Some of the important management problems associated with the Beki River is as follows:

a. Destruction of Natural Habitat by Riverine Erosion and Sand and Stone Mining:

It is known that natural flow regimes are main factors controlling the Riverine ichthyofaunal assemblages in Riverine environments ^[1]. The flow regimes include the magnitude, timing, duration, frequency, and rate of change of hydrologic conditions which affect the ecological process in these aquatic environments ^[2]. Improper land use system such as construction of gravel and sand mining industry lead to Riverine erosion as well as yearly flood also lead to Riverine erosion. This may lead to heavy deforestation in Riverine area. Sand and Gravel mining from the Beki River is one of the major threat of ichthyospecies. Excessive sand-and-gravel mining occurred in Beki River it causes the degradation the aquatic condition of Rivers. This may lead to erosion and Riverbed instability, changes the route of River, which may lead to the destruction of aquatic and riparian habitat through large changes in the River channel morphology. Unstable River are inhospitable to most ichthyospecies. Many hectares of fertile Riverine lands are lost annually which lead to destruction of the Riverine vegetation. Due to Excessive sand and stone mining some downstream

part of Beki River has dried up yearly between last of November to mid of March.

b. Lack Awareness of fishermen and Riverine people: Lack of awareness about the importance of Riverine capture and capture cum culture fishery in the local fishermen is the major problem for the destruction of Riverine fishes. Uneducated local fishermen and Riverine people do not understand the destructive nature of the use of poison, use mosquito net and fishing all the season (including breeding period of fishes).

c. Others threats of Beki River: Other threats of Beki River as follows. (a) During different puja's (especially in Durga puja) God and Goddess are thrown in the Beki River as well as disposal of unwanted domestic materials and toxic substances in Beki River from its nearest town such as Sorobhog, Barpeta road, Barpeta town and Howly.

3.2 Evaluation of ichthyospecies under IUCN (2014.3) Status:

During evaluation, it was found out of these 114 ichthyospecies 78.95% considered as **LC** (Least Concern Criteria), 0.87% considered as **VU** (Vulnerable criteria), 0.87% considered as **EN** (Endangered Criteria), 9.65% considered as **NT** (Near Threatened criteria), 7.01% considered as **NA** (Not Assessed criteria) and 2.63% considered as **DD** (Data Deficient criteria).

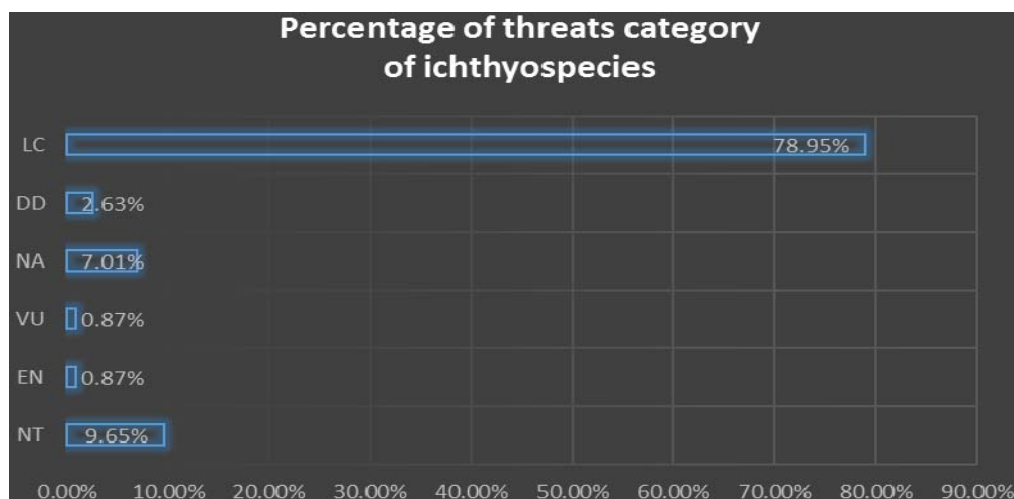


Fig: 4 Percentage of threat category (IUCN 2014.3) of Ichthyospecies from Beki River

4. Conclusions

Beki is gifted with immense resources of nature. From the results of the present study it appears that Beki River have a rich ichthyofaunal diversity. But ichthyofaunal diversity of Beki River has suffered a lot due to different serious anthropogenic stress. Maintaining the ichthyofaunal diversity is too essential, but it is impossible to identify which individual ichthyospecies are threaten or critically threaten in selective part of River. So different Conservation scheme and regular scientific research/survey will improve the ichthyospecies production to be more sustainable and easy to maintain diversity. But till no work have been done for the conservation strategy of fish fauna in the Beki River by any sector so far.

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