



## ICHTHYOFAUNAL DIVERSITY AND CONSERVATION STATUS OF PUTHIMARI BEEL OF BARPETA, ASSAM, INDIA

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### Abstract:

Assam is recognized as one of the hotspots of freshwater fish diversity. Biodiversity and its conservation are regarded as one of the major issues of enabling sustainable use of natural resources. A survey was conducted on the Puthimari beel of Barpeta district since June 2017 till Feb-2018. Its geographical location falls under latitude 26°20'11" N and 90°45'19" E. Situated on the North of Barpeta district lies the Puthimari beel, which falls under Barnagar revenue circle. The beel is almost 2 km far from Sorbhog town. Primary data were collected by visiting the studied area twice a month. The local people and fishermen have been questioned and interviewed. The total area of the wetland was recorded to be 300 ha. The present investigation reveals an ichthyofaunal diversity of 46 indigenous fish species belonging to 37 Genera, 8 Orders and 19 Families. Among these 5 species are nearly threatened (NT), 01 species vulnerable (VU), 39 species least concern (LC) and 2 Data deficient (DD). Conservation status is evaluated based on IUCN data (2017-2). Order Perciformes was highly dominant representing 07 families. The Cyprinidae family was most diversified family with 16 representative species. This wetland holds numbers of economically important fish species having high market value as live fish many of which have potential value as food and ornamental. Most of the fish species once dominant in the beel are now endangered. If properly managed in scientific lines, these water bodies can play a vital role in boosting rural economy in addition to ground water recharge and flood control. So in this study an attempt has been made to know the actual status of ichthyofaunistic resources of the Puthimari beel and its conservation status.

**Key Words:** Freshwater, Fish Diversity, Wetlands, Conservation Status, Assam.

### 1. Introduction:

India, with its varying topography and climatic regimes, supports diverse and unique wetland habitats (Bassi *et al.*)<sup>2</sup>. The available estimates about the areal extent of wetlands in India vary widely from a lowest of 1% to a highest of 5% of geographical area, but do support nearly fifth of the known biodiversity (Space Applications Centre, 2011)<sup>3</sup>. Wetlands help to lessen the impacts of flooding by absorbing water and reducing the speed at which flood water flows. In terms of growth in fish production in India, wetlands play a significant role. At the moment, majority of fish production in the country from inland water bodies is around 61% of total production. It increased from 0.2 million tonne in 1950–1951 to about 5.1 million tonne in 2010–2011 (MOA Report, 2012)<sup>1</sup>. There are about 1392 wetlands in Assam (locally called as beel). Total area of beels associated with river Brahmaputra and Barak along with its tributaries is estimated at 92000 ha. and 8000 ha. respectively (CIFRI, 2000)<sup>10</sup>. The district of Barpeta holds 195 small wetlands (<2.25 ha), River/stream occupies 93.22% of wetlands. The other major wetland type is Lake/pond (4.48%) and Waterlogged (1.57%). There are 37 Lake/pond (locally called as Beels) with 2644 ha area. Ox-bow lakes occupied 235 ha area 0.4% (NWIA\_ASSAM, 2010)<sup>12</sup>. However, many wetlands across the world have undergone significant degradation with negative impacts on biological diversity and peoples' livelihoods. Much of their resources are considered under risk as a result of human interferences on those wetlands. The losses are larger and faster on inland than on coastal natural areas (IUCN 2018)<sup>14</sup>.

In Northeast India several workers have studied fish diversity and reviewed many factors responsible for decline of fish biodiversity in aquatic ecosystem and conservation of various water bodies. Goswami *et al.* (2012)<sup>13</sup> reported 422 species under 133 genera and 38 families from Northeast India. Sen (2003)<sup>14</sup> recorded and reported 291 species from N.E. India. Goswami (2007)<sup>4</sup>, Vishwanath (2007)<sup>4</sup>, Jayaram (2007)<sup>4</sup> and Dutta (2007)<sup>4</sup> studied Natural and Anthropogenic Hazards of fish fauna of Northeast India. Malakar *et al.* (2017)<sup>11</sup> studied diversity and present status of three flood plain wetland of central Assam.

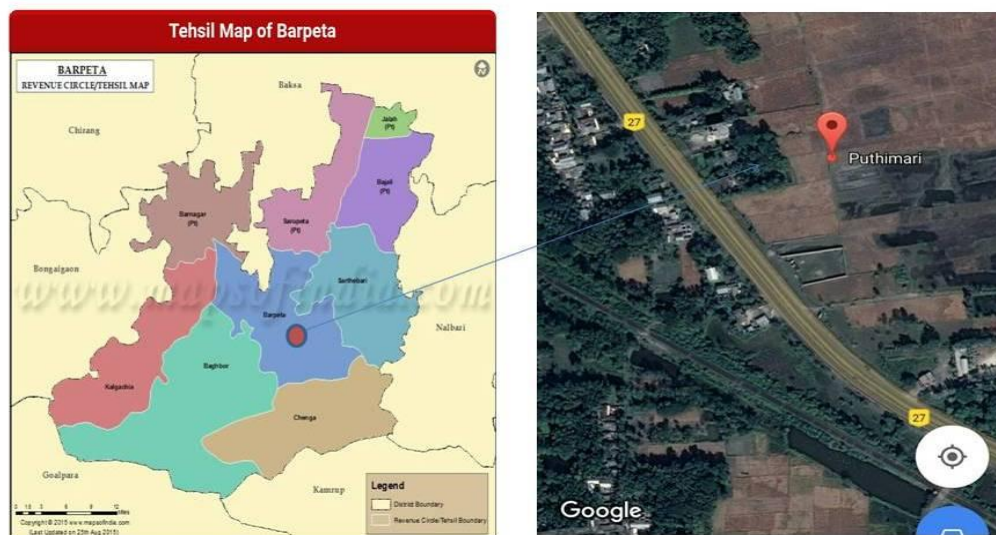
### 2. Aim and Objectives of the Study:

The Puthimari beel is a major habitat for the aquatic fauna including varied type of Fish species which form the principal economic source for the fishermen of the concerned area. It harbours a wide variety of indigenous fishes. Although survey on ichthyofauna of this region has been carried out by few workers, but yet in Barpeta, there is no detailed information regarding the fish diversity, and status of Puthimari beel. In the present study an attempt has been made to document the actual status of fish diversity and its conservation status.

### 3. Materials and Methods:

### 3.1 Study Area:

The studied area was located on the north of Barpeta district in Assam. Its geographical location falls under latitude 26°20'11" N and 90°45'19" E. During investigation the total area of the beel was recorded to be 300 ha as per data recorded in Dag no. 106 of Barnagar revenue circle office. The locational map of the studied area is depicted in fig.01. The climate of the studied area remains mild throughout the year. It falls under tropical monsoon climate. The area receives an average rainfall of 1409 mm. The maximum and minimum temperatures recorded for the district are 35°C and 7°C respectively (SAC, 2010). The distance of the beel was about 3 km from N.H. 31.



(Source: www.googlemap)

Figure 1: Locational Map of the Puthimari beel

### 3.2 Data Collection and Analysis:

The survey was carried out from June 2017 to Feb-2018 on the Puthimari beel of Barpeta district. Data analysis were done by visiting the beel itself on monthly basis and through questionnaire to the fishermen of the wetland having years of experience. Fishes were collected from the water body using locally available fishing gears from pre-selected sampling sites. Fishing gears and devices used during fishing operation were moving nets (*Dhekijal*, *Khewali jal* etc and *Drag nets* of various mesh sizes), Different traps namely *Jakoi*, *Polo*, *Sepa* and *Bamboo bana*. The moving nets were used throughout the year while, Gill net is extensively used during the monsoon period. Fishes were collected during pre-monsoon, monsoon, and post-monsoon seasons. The species which could not be identified on the spot were brought to the laboratory and these were identified by using different keys of various standard literatures and Morphometrics study of the fishes following Talwar and Jhingran (1991)<sup>9</sup>, Jayaram (2013)<sup>7</sup>. The secondary data was collected from various sources such as journals, books, and other published works. Photographs were taken on the spots. Later fishes were preserved in 5% formalin. The conservation status was evaluated based on IUCN status (2017-.2).

### 4. Result and Discussion:

The present investigation reveals an inventory of ichthyofaunal diversity which consists of 46 species belonging to 37 Genera, 8 Orders and 19 Families. Among these 5 species are nearly threatened (NT), 1 species vulnerable (VU), 2 species Data deficient (DD) and 39 species were least concern (LC). Conservation status is evaluated based on IUCN data (2017-2). The collected fish fauna includes carps, minnows, loaches, barbs, catfishes and perches. Mainly 3 groups of fishes were found, fishes of Major groups, Intermediate groups and Minor groups. The species recorded during the survey is listed in table 01.

Table 1: Fish diversity of Puthimari beel of Barpeta district along with its conservation status

| S.No                        | Local Name | Scientific Name                           | Family       | Conservation Status : IUCN Ver 3.1(2017-2) | Status |
|-----------------------------|------------|-------------------------------------------|--------------|--------------------------------------------|--------|
| ORDER: I. OSTEOGLOSSIFORMES |            |                                           |              |                                            |        |
| 01                          | Chital     | <i>Chitala chitala</i> (Pallas)           | Notopteridae | NT                                         | +      |
| 02                          | kandhuli   | <i>Notopterus notopterus</i> (Ham.-Buch.) | Do-          | LC                                         | +      |
| ORDER: II. CLUPEIFORMES     |            |                                           |              |                                            |        |
| 03                          | Karoti     | <i>Gudusia chapra</i> (Ham.-Buch.)        | Clupeidae    | LC                                         | ++     |
| ORDER: III. CYPRINIFORMES   |            |                                           |              |                                            |        |
| 04                          | Chela      | <i>Laubuca laubuca</i> (Ham)              | Cyprinidae   | LC                                         | +++    |

|                            |                          |                                                   |                  |    |     |
|----------------------------|--------------------------|---------------------------------------------------|------------------|----|-----|
| 05                         | Dorkina                  | <i>Rasbora rasbora</i> (Ham)                      | Do-              | LC | ++  |
| 06                         | Moa                      | <i>Amblypharingodon mola</i> (Ham.-Buch)          | Do-              | LC | ++  |
| 07                         | Mirika                   | <i>Cirrhinus mrigala</i> (Ham.-Buch)              | Do-              | LC | ++  |
| 08                         | Lachim bhangone          | <i>Cirrhinus reba</i> (Ham-Buch.)                 | Do-              | LC | +++ |
| 09                         | Catla                    | <i>Catla catla</i> (Ham.-Buch.)                   | Do-              | LC | +++ |
| 10                         | Common carp              | <i>Cyprinus carpio</i> (Linnaeus)                 | Do-              | VU | +++ |
| 11                         | Dorkina                  | <i>Esomus danricus</i> (Ham.-Buch.)               | Do-              | LC | ++  |
| 12                         | Bhangone                 | <i>Labeo bata</i> (Ham.-Buch.)                    | Do-              | LC | ++  |
| 13                         | Kurhi                    | <i>Labeo gonius</i> (Ham.-Buch.)                  | Do-              | LC | ++  |
| 14                         | Rau                      | <i>Labeo rohita</i> (Ham.-Buch.)                  | Do-              | LC | +++ |
| 15                         | Mali.                    | <i>Labeo calbasu</i> (Ham.Buch.)                  | Do-              | LC | ++  |
| 16                         | Grass carp               | <i>Ctenopharyngodon idella</i> (Valenciennes)     | Do-              | DD | ++  |
| 17                         | Puthi                    | <i>Puntius sophore</i> (HamBuch)                  | Do-              | LC | ++  |
| 18                         | Puthi                    | <i>Pethia ticto</i> (Ham.-Buch.)                  | Do-              | LC | ++  |
| 19                         | Silver carp              | <i>Hypophthalmichthys molitrix</i> (Valenciennes) | Do-              | NT | +   |
| ORDER: IV. SILURIFORMES    |                          |                                                   |                  |    |     |
| 20                         | <i>Sperata seenghala</i> | <i>Sperata seenghala</i> (Sykes)                  | Bagridae         | LC | ++  |
| 21                         | Tengera                  | <i>Mystus vittatus</i> (Bloch)                    | Do-              | LC | +++ |
| 22                         | Ritha                    | <i>Rita rita</i> (Ham.-Buch.)                     | Do-              | LC | +   |
| 23                         | Arii                     | <i>Sperata aor</i> (Ham.-Buch.)                   | Do-              | LC | ++  |
| 24                         | Borali                   | <i>Wallagu attu</i> (Schneider)                   | Siluridae        | NT | +   |
| 25                         | Pabho                    | <i>Ompok pabo</i> (Ham-1822)                      | Do-              | NT | +   |
| 26                         | Kajoli                   | <i>Ailia coila</i> (Ham.-Buch.)                   | Schilbeidae      | NT | ++  |
| 27                         | Magur                    | <i>Clarius magur</i> (Linnaeus)                   | Clariidae        | LC | +++ |
| 28                         | Thailand magur           | <i>Clarias gariepinus</i> (Burchell)              | Do-              | LC | ++  |
| 29                         | Singi                    | <i>Heteropneustes fossilis</i> (Bloch)            | Heteropneustidae | LC | ++  |
| ORDER: V. BELONIFORMES     |                          |                                                   |                  |    |     |
| 30                         | Kokila                   | <i>Xenentodon cancilla</i> (Ham.Buch.)            | Belonidae        | LC | ++  |
| ORDER VI. SYNBRANCHIFORMES |                          |                                                   |                  |    |     |
| 31                         | Cuchia                   | <i>Monopterusuchia</i> (Ham.-Buch.)               | Synbranchidae    | LC | ++  |
| 32                         | Turi                     | <i>Macrognathus aral</i> (Bloch & Schneider)      | Mastacembelidae  | LC | ++  |
| 33                         | Turi                     | <i>M. pancalus</i> (Ham-Buch )                    | Do-              | LC | +++ |
| ORDER VII. PERCIFORMES     |                          |                                                   |                  |    |     |
| 34                         | Chanda                   | <i>Ambassis nama</i> (Ham.-Buch.)                 | Ambassidae       | LC | ++  |
| 35                         | Chanda                   | <i>Parambassis ranga</i> (Ham.-Buch.)             | Do-              | LC | ++  |
| 36                         | Dum vacheli              | <i>Badis badis</i> (Ham.-Buch.)                   | Badidae          | LC | +   |
| 37                         | Bhetki/Ajoli             | <i>Nandus nandus</i> (Ham.)                       | Nanidae          | LC | +   |
| 38                         | Patimutura               | <i>Glossogobius giuris</i> (Ham.-Buch.)           | Gobiidae         | LC | ++  |
| 39                         | Koi                      | <i>Anabas testudinius</i> (Bloch)                 | Anabantidae      | DD | +++ |
| 40                         | Kholisa                  | <i>Trichogaster fasciata</i> (Schneider)          | Osphronemidae    | LC | ++  |
| 41                         | Lal kholisa              | <i>Trichogaster lalius</i> (Ham.-Buch.)           | Do-              | LC | +   |
| 42                         | Goroi                    | <i>Channa punctatus</i> (Bloch)                   | Channidae        | LC | ++  |
| 43                         | Shol                     | <i>Channa striatus</i> (Bloch)                    | Do -             | LC | +   |

|                                                                                                                                                                                                                                                                                                                                                                                  |       |                                        |                |    |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------|----------------|----|----|
| 44                                                                                                                                                                                                                                                                                                                                                                               | Garka | <i>Channa barks</i> (Ham.-Buch.)       | Do-            | LC | ++ |
| 45                                                                                                                                                                                                                                                                                                                                                                               | Cheng | <i>Channa marulius</i>                 | Do-            | LC | +  |
| ORDER VIII. TETRAODONTIFORMES                                                                                                                                                                                                                                                                                                                                                    |       |                                        |                |    |    |
| 46                                                                                                                                                                                                                                                                                                                                                                               | Tepa  | <i>Tetraodon cutcutia</i> (Ham.-Buch.) | Tetraodontidae | LC | ++ |
| <p style="text-align: center;">Note :</p> <p style="text-align: center;">Conservation status:</p> <p style="text-align: center;">IUCN (2017-2) shows :LC = Least concern, VU= Vulnerable, NT= Nearly Threatened, DD= Data deficient.</p> <p style="text-align: center;">Species abundance analysis: Mostly observed +++,<br/>Frequently observed ++ &amp; Rarely observed +.</p> |       |                                        |                |    |    |

After the completion of the survey, it has been noticed that *Chitala chitala*, *ompok pabdo*, *Hypophthalmichthys molitrix*, *Ailia coila* and *Wallago attu* were fish among nearly threatened (NT) category, 2 species viz *Ctenopharyngodon idella* and *Anabas testudineus* were data deficient (DD) category and *Cyprinus carpio* was the lonely species assessed under vulnerable (VU) category. Out of 8 recorded orders, Perciformes contributed 07 families, followed by Siluriformes 05, Synbranchiformes 02 and Beloniformes, Cypriniformes, Osteoglossiformes, Clupieiformes and Tetraodontiformes each with 01 families respectively. Among families Cyprinidae is highly dominant representing 16 individual species. Jhingran (1991)<sup>8</sup> reported 16 exotic fish species from India and in the present study site 3 exotic Carps i.e. *Cyprinus carpio*, *Ctenopharyngodon idella*, and *Hypophthalmichthys molitrix* were recorded. Of the Murrels, the large sized Murrels like *Channa marulius* and *C. striatus* is very rarely found while *C. punctatus* dominates the beel among the murrels. Out of the two feather backs, the most important *Chitala chitala* which once dominated the beel is now depleting in a very high rate while *N. notopterus* was observed moderately. The most dominant species of the perch is *Anabas testudineus*. Among cat fishes *Wallago attu* is hardly observed and many other fishes like *Xenentodon cancila* and *Ompok pabo* etc are already endangered. *Trichogaster lalius*, *T. fasciatus*, *Badis badis*, etc were the larvicidal fish found. Air breathing fishes such as *Clarias magur*, *Heteropneustes fossilis*, *Channa spp.* and *Mastcembelus armatus* fetch having high market value as live fish. Moreover the rate of fish catch is increasing over years due to presence of many commercially important species like *Mystus vittatus*, *Nandus nandus*, *Anabas testudineus*, *T. fasciatus*, *Botia derio*, *Sperata aor*, *Notopterus notopterus*, *Monopterus cuchia*, *chitala chitala* etc. for having high overseas demand have potential value as food and ornamental.

## 5. Conclusion:

The result of the study indicates that Fish diversity of the Puthimari beel is very rich yet it has lost many of its native species in past few years and many of them are in diminishing condition. The beel is a habitat to wide variety of ichthyofauna. It harbours a wide variety of indigenous ornamental fishes. But, now a day, the production of the fish species is declined according to the fishermen communities living in and around beel due to over exploitation and human interference or economic benefit. In order to take advantage of the availability of a large number of varieties appropriate steps are necessary for the protection of breeding ground like, free migration of the breeders, control of overfishing by optimizing the gears and nets and stock assessment of the populations in the capture fishing improvement. If properly managed in scientific lines, these water bodies can play a vital role in boosting rural economy in addition to ground water recharge and flood control.

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