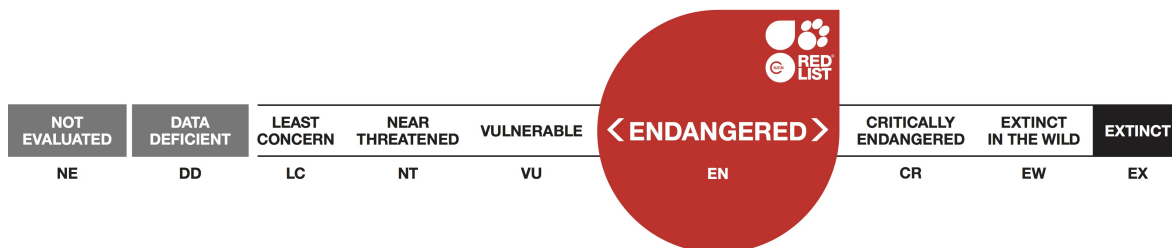


## Tor putitora

Assessment by: Jha, B.R., Rayamajhi, A., Dahanukar, N., Harrison, A. & Pinder, A.



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## Taxonomy

| Kingdom  | Phylum   | Class          | Order         | Family     |
|----------|----------|----------------|---------------|------------|
| Animalia | Chordata | Actinopterygii | Cypriniformes | Cyprinidae |

**Taxon Name:** *Tor putitora* (Hamilton 1822)

### Synonym(s):

- *Barbus progeneius* McClelland, 1839
- *Tor progeneius* (McClelland 1839)

### Taxonomic Source(s):

Eschmeyer, W.N., Fricke, R. and Van der Laan, R. (eds). 2018. Catalog of Fishes: genera, species, references. Updated 02 July 2018. Available at: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. (Accessed: 02 July 2018).

### Taxonomic Notes:

According to Catalog of Fishes *Tor progeneius* is now considered a synonym of *Tor putitora* (Hamilton 1822) and the concepts have therefore been merged in this reassessment.

## Assessment Information

**Red List Category & Criteria:** Endangered A2abcd [ver 3.1](#)

**Year Published:** 2018

**Date Assessed:** August 5, 2018

### Justification:

*Tor putitora* is a widely distributed species in south and southeast Asia, with a restricted area of occupancy. However, the species is under severe threat from overfishing, loss of habitat, decline in quality of habitat resulting in loss of breeding grounds, and from other anthropogenic effects that have directly resulted in declines in harvest in several locations. In addition, with several dams planned for construction in the future in the Himalayan region, they could have a more drastic effect on tor populations blocking their migrations and affecting their breeding. Inferring population declines from observed cases with that of the trends across the entire distribution range, the species is estimated to have declined by more than 50% in the past 21 years (3 generations) and if the current trends continue and with the new dams being built, the population may as well decline into the future. The species is therefore assessed as Endangered and is in need of urgent conservation efforts to save it from becoming extirpated in several localities.

## Geographic Range

### Range Description:

*Tor putitora* is naturally distributed throughout the rivers (and associated reservoirs) of the South Himalayan drainage (namely the Indus, Ganges-Yamuna and Bramaputra) from Pakistan (also unverified reports from Afghanistan) in the West to Myanmar in the East. Records are also available from several river systems and associated reservoirs in the Mahanadi (previously recorded as *Tor mosal mahanadicus*) and the Krishna (as a consequence of captive breeding and stocking from hatcheries) located south of the Himalayan landscape. In addition to exhibiting natural adaptation to changing riverscapes and the presence of thriving populations in reservoirs, multiple successful introductions of *T. putitora* have also been made to Himalayan lakes. An introduced population is known to exist in Papua New Guinea (Kolkolo 1996).

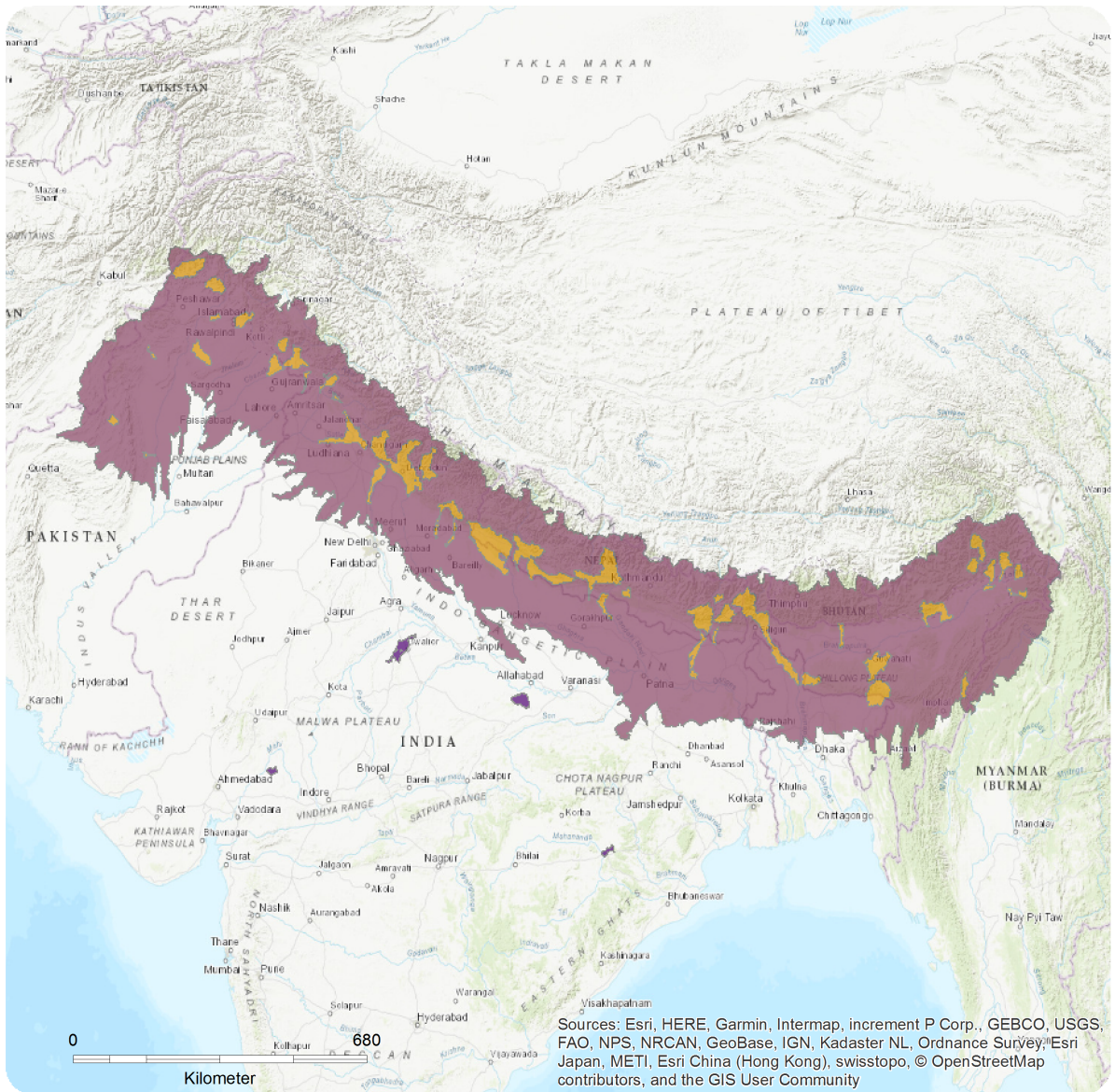
**Country Occurrence:**

**Native:** Bangladesh; Bhutan; India (Arunachal Pradesh, Assam, Darjiling, Haryana, Himachal Pradesh, Jammu-Kashmir, Maharashtra - Introduced, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Sikkim, Uttaranchal, Uttar Pradesh, West Bengal); Nepal; Pakistan

**Introduced:** Papua New Guinea

# Distribution Map

*Tor putitora*

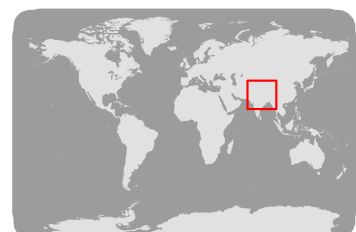


## Range

- Extant & Introduced (resident)
- Extant (resident)
- Possibly Extant (resident)

## Compiled by:

Bournemouth University



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.



## Population

No comprehensive range-wide population studies have been carried out on the species, although there are studies available from many individual river systems and reservoirs that make up the Himalayan landscape, which have observed declines from 25% to 90% (in a 10-20 year period). These include the tributaries of the Ganges in the Garhwal and Kumaon Himalayas, Nepal, Assam, Meghalaya and Arunachal Pradesh (Nautiyal *et al.* 2008, Nautiyal 2014, Kumar 1989, Bhatt *et al.* 2004, Wagle *et al.* 2008). Despite having been historically reported to attain lengths of 275 cm (Hamilton 1822) and weights of 54 kg (Nautiyal *et al.* 2008), the largest fish recorded in the last decade by anglers practising catch and release have not exceeded 150 cm (27 kg) from North India (M. Dhillon pers. comm.) and 32 kg from Nepal (I. Martin pers. comm). During a comprehensive study of *T. putitora* population dynamics from the River Ganges (Garhwal Region), spanning 1980 - 1995, Nautiyal *et al.* (2008) recorded a maximum size of 137.7 cm (22 kg) and associated maximum age of 17+ in 1880/81 with  $L_{\infty} = 272.2$  cm ( $K=0.055$ ) compared with  $L_{\infty}$  of 216 cm ( $K=0.056$ ) for respective years, demonstrating a decline over a decade, attributed to overfishing (Nautiyal *et al.* 2008).

**Current Population Trend:** Decreasing

## Habitat and Ecology (see Appendix for additional information)

This species inhabits montane and submontane regions in streams and rivers. *Tor putitora* is distributed throughout the Himalayan region. It naturally inhabits high energy river systems characterised by rapids and pools with a rocky substrate and has adapted to utilise lacustrine habitats created through the impoundment of dams. Introduced populations also persist in some lakes where ephemeral stream inputs provide functional habitats for reproduction.

In addition to invertebrates and fishes, algae and plant matter are widely reported to be consumed throughout the year (Nautiyal and Lal 1984, Shrestha 1997, Kishor *et al.* 1998, Malik and Negi 2007), but observed to dominate diet during the monsoon period (Dasgupta 1991). *Tor putitora* can be considered an opportunistic omnivore, as it has been shown to adapt its diet to the seasonal availability of prey items and has been reported to capitalise on the availability of burning human remains on floating funeral pyres (Bhatt and Pandit 2016, Pett 2016). While much of the information on the spawning migrations of *T. putitora* is based on anecdotal observations and empirically assessed seasonal shifts in local size range availability (Nautiyal *et al.* 2001, 2008); direct observations of nest construction have assisted greatly in consolidating the understanding of spawning behaviour and habitat characterisation (Shrestha 1997). In observing natural breeding behaviour in the rivers of Nepal, Shrestha (1997) describes the synchrony of upstream migration towards spawning creeks with the onset of monsoonal flows, where eggs are deposited in gravels  $\leq 10$  cm in diameter. Following an inter-gravel phase of development (Shrestha 1997), direct observation of young juveniles (0+) in the puddled areas of high gradient tributaries in the West Ramganga catchment, Utarakhand, India, also contribute to understanding the migratory movements of adults during monsoonal flows and the potential nursery function of these semi-ephemeral streams during the first year of life (A. Pinder pers. obs.). Despite considerable interest in the spatial ecology and impacts of river engineering projects on *T. putitora*, the first radio telemetry study to quantify annual movement of adults is currently underway in Bhutan.

Although this research is still ongoing, early results have indicated migration distances greater than 50 km in a 48 hour period, and the utilisation of warmer (non-snow fed) tributaries for spawning, and homing behaviour of individual fish to distinct tributaries on an annual basis (FCF and WWF Bhutan, pers. obs.).

**Systems:** Freshwater

## Use and Trade

*Tor putitora* is one of the most highly popular sport fish attracting anglers from around the world. It is also an important food fish harvested for both commerce and subsistence throughout its range often using unsustainable fishing methods. Juveniles of *T. putitora* is also used as an aquarium fish.

## Threats (see Appendix for additional information)

A range of anthropogenic impacts, the most significant of which is habitat loss and degradation due to the large number of existing and planned hydropower projects in the Himalayan range, has affected the past and continued survival of the golden mahseer. Other threats include overfishing, often using unsustainable methods (dynamiting, poisoning and use of fine-meshed nets), and pollution from both urban and agro-based sources are also significant stressors.

## Conservation Actions (see Appendix for additional information)

Species-specific conservation plans have largely focused on ex-situ methods including hatcheries and captive breeding facilities throughout the range countries, especially in India and Nepal. Fish from these facilities are being stocked in reservoirs and streams in the Indian and Nepal part of the Himalayan drainages. However there is no study that has impacted the survival of the stocked fish and how they contribute to replenishment of natural stocks. Several populations exist inside terrestrial protected areas where their populations are increasing or stable.

## Credits

**Assessor(s):** Jha, B.R., Rayamajhi, A., Dahanukar, N., Harrison, A. & Pinder, A.

**Reviewer(s):** Raghavan, R.

**Contributor(s):** Molur, S.

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## Appendix

### Habitats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

| Habitat  | Season   | Suitability | Major Importance? |
|--|----------|-------------|-------------------|
| 5. Wetlands (inland) -> 5.1. Wetlands (inland) - Permanent Rivers/Streams/Creeks (includes waterfalls) | Resident | Suitable    | Yes               |
| 5. Wetlands (inland) -> 5.2. Wetlands (inland) - Seasonal/Intermittent/Irregular Rivers/Streams/Creeks | Breeding | Suitable    | Yes               |
| 5. Wetlands (inland) -> 5.5. Wetlands (inland) - Permanent Freshwater Lakes (over 8ha)                 | Resident | Suitable    | No                |
| 15. Artificial/Aquatic & Marine -> 15.1. Artificial/Aquatic - Water Storage Areas (over 8ha)           | Resident | Suitable    | Yes               |
| 15. Artificial/Aquatic & Marine -> 15.3. Artificial/Aquatic - Aquaculture Ponds                        | Resident | Suitable    | Yes               |

### Threats

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

| Threat   | Timing    | Scope   | Severity       | Impact Score     |
|--|-----------|---|----------------|------------------|
| 1. Residential & commercial development -> 1.1. Housing & urban areas  | Ongoing   | Majority (50-90%)   | Rapid declines | Medium impact: 7 |
|  | Stresses: | 1. Ecosystem stresses -> 1.1. Ecosystem conversion<br>1. Ecosystem stresses -> 1.2. Ecosystem degradation |                |                  |
| 11. Climate change & severe weather -> 11.1. Habitat shifting & alteration   | -         | -   | -              | -                |
| 11. Climate change & severe weather -> 11.2. Droughts  | -         | -   | -              | -                |
| 11. Climate change & severe weather -> 11.4. Storms & flooding   | -         | -   | -              | -                |
| 3. Energy production & mining -> 3.2. Mining & quarrying   | Ongoing   | Majority (50-90%)   | Rapid declines | Medium impact: 7 |
|  | Stresses: | 1. Ecosystem stresses -> 1.1. Ecosystem conversion<br>1. Ecosystem stresses -> 1.2. Ecosystem degradation |                |                  |
| 5. Biological resource use -> 5.4. Fishing & harvesting aquatic resources -> 5.4.1. Intentional use: (subsistence/small scale) [harvest] | Ongoing   | Unknown   | Rapid declines | Unknown          |
|  | Stresses: | 2. Species Stresses -> 2.1. Species mortality   |                |                  |
| 6. Human intrusions & disturbance -> 6.1. Recreational activities  | Ongoing   | Majority (50-90%)   | Rapid declines | Medium impact: 7 |
|  | Stresses: | 2. Species Stresses -> 2.1. Species mortality   |                |                  |

|   |           |   |                            |                  |
|---|-----------|---|----------------------------|------------------|
| 7. Natural system modifications -> 7.2. Dams & water management/use -> 7.2.11. Dams (size unknown)                            | Ongoing   | Minority (50%)                                      | Unknown                    | Unknown          |
|   | Stresses: | 1. Ecosystem stresses -> 1.2. Ecosystem degradation |                            |                  |
| 7. Natural system modifications -> 7.2. Dams & water management/use -> 7.2.1. Abstraction of surface water (domestic use)     | Ongoing   | Majority (50-90%)                                   | Slow, significant declines | Medium impact: 6 |
|   | Stresses: | 1. Ecosystem stresses -> 1.2. Ecosystem degradation |                            |                  |
| 7. Natural system modifications -> 7.2. Dams & water management/use -> 7.2.2. Abstraction of surface water (commercial use)   | Ongoing   | Majority (50-90%)                                   | Slow, significant declines | Medium impact: 6 |
|   | Stresses: | 1. Ecosystem stresses -> 1.2. Ecosystem degradation |                            |                  |
| 7. Natural system modifications -> 7.2. Dams & water management/use -> 7.2.3. Abstraction of surface water (agricultural use) | Ongoing   | Majority (50-90%)                                   | Slow, significant declines | Medium impact: 6 |
|   | Stresses: | 2. Species Stresses -> 2.1. Species mortality       |                            |                  |
| 9. Pollution -> 9.1. Domestic & urban waste water -> 9.1.1. Sewage  | Ongoing   | Majority (50-90%)                                   | Slow, significant declines | Medium impact: 6 |
|   | Stresses: | 1. Ecosystem stresses -> 1.2. Ecosystem degradation |                            |                  |
| 9. Pollution -> 9.1. Domestic & urban waste water -> 9.1.2. Run-off   | Ongoing   | Unknown   | Unknown                    | Unknown          |
|   | Stresses: | 1. Ecosystem stresses -> 1.2. Ecosystem degradation |                            |                  |
| 9. Pollution -> 9.3. Agricultural & forestry effluents -> 9.3.1. Nutrient loads   | Ongoing   | Minority (50%)                                      | Unknown                    | Unknown          |
|   | Stresses: | 1. Ecosystem stresses -> 1.2. Ecosystem degradation |                            |                  |
| 9. Pollution -> 9.3. Agricultural & forestry effluents -> 9.3.2. Soil erosion, sedimentation                                  | Ongoing   | Minority (50%)                                      | Unknown                    | Unknown          |
|   | Stresses: | 1. Ecosystem stresses -> 1.2. Ecosystem degradation |                            |                  |
| 9. Pollution -> 9.3. Agricultural & forestry effluents -> 9.3.3. Herbicides and pesticides                                    | Ongoing   | Unknown   | Unknown                    | Unknown          |
|   | Stresses: | 1. Ecosystem stresses -> 1.2. Ecosystem degradation |                            |                  |

## Conservation Actions in Place

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

|  |
|--|
| <b>Conservation Actions in Place</b>                   |
| In-Place Research, Monitoring and Planning             |
| Action Recovery plan: No                               |
| Systematic monitoring scheme: No                       |
| In-Place Land/Water Protection and Management          |
| Conservation sites identified: Yes, over part of range |
| Occur in at least one PA: Yes                          |
| Area based regional management plan: No                |

|  |
|--|
| <b>Conservation Actions in Place</b>                       |
| Invasive species control or prevention: No                 |
| In-Place Species Management                                |
| Harvest management plan: No                                |
| Successfully reintroduced or introduced benignly: Yes      |
| Subject to ex-situ conservation: Yes                       |
| In-Place Education   |
| Subject to recent education and awareness programmes: Yes  |
| Included in international legislation: No                  |
| Subject to any international management/trade controls: No |

## Conservation Actions Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

|  |
|--|
| <b>Conservation Actions Needed</b>   |
| 3. Species management -> 3.1. Species management -> 3.1.1. Harvest management                        |
| 3. Species management -> 3.1. Species management -> 3.1.2. Trade management                          |
| 3. Species management -> 3.2. Species recovery   |
| 3. Species management -> 3.3. Species re-introduction -> 3.3.1. Reintroduction                       |
| 3. Species management -> 3.4. Ex-situ conservation -> 3.4.1. Captive breeding/artificial propagation |
| 4. Education & awareness -> 4.3. Awareness & communications  |
| 5. Law & policy -> 5.1. Legislation -> 5.1.2. National level   |
| 5. Law & policy -> 5.2. Policies and regulations   |
| 5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.2. National level                          |

## Research Needed

(<http://www.iucnredlist.org/technical-documents/classification-schemes>)

|  |
|--|
| <b>Research Needed</b>   |
| 1. Research -> 1.2. Population size, distribution & trends       |
| 1. Research -> 1.3. Life history & ecology                       |
| 1. Research -> 1.5. Threats                                      |
| 2. Conservation Planning -> 2.3. Harvest & Trade Management Plan |
| 3. Monitoring -> 3.1. Population trends                          |

**Research Needed**

3. Monitoring -> 3.2. Harvest level trends

**Additional Data Fields****Distribution**

Estimated area of occupancy (AOO) (km<sup>2</sup>): 552

Continuing decline in area of occupancy (AOO): Yes

Extreme fluctuations in area of occupancy (AOO): Yes

Estimated extent of occurrence (EOO) (km<sup>2</sup>): 1305202

Continuing decline in extent of occurrence (EOO): Yes

Extreme fluctuations in extent of occurrence (EOO): Yes

Continuing decline in number of locations: Unknown

Extreme fluctuations in the number of locations: Unknown

**Population**

Continuing decline of mature individuals: Unknown

Extreme fluctuations: Unknown

Population severely fragmented: Yes

Continuing decline in subpopulations: Unknown

Extreme fluctuations in subpopulations: Unknown

All individuals in one subpopulation: No

**Habitats and Ecology**

Continuing decline in area, extent and/or quality of habitat: Yes

Generation Length (years): 7

Movement patterns: Altitudinal Migrant

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