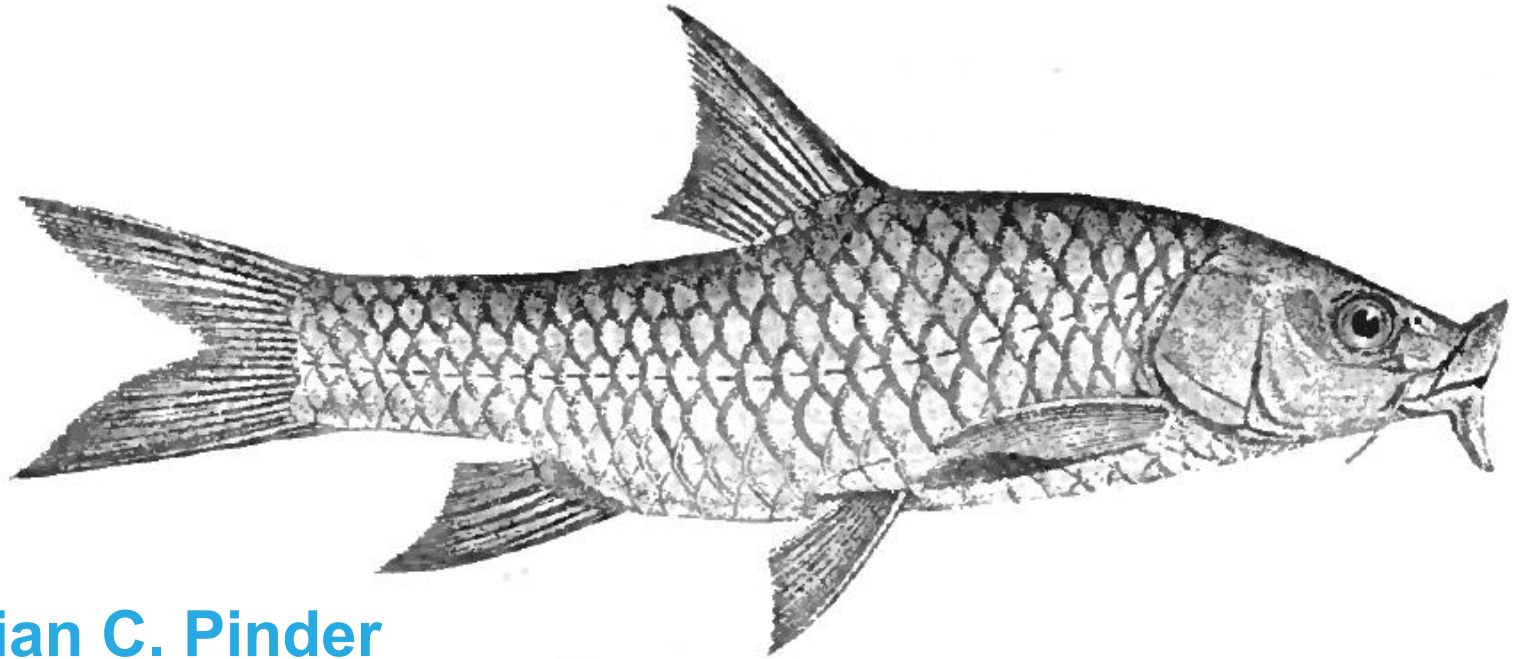


MAHSEERS (*TOR* SPP.) OF THE WORLD:

Status and conservation challenges



Adrian C. Pinder

December 2018, Paro, Bhutan



MAHSEER TRUST
RIVERS - FISH - PEOPLE

BU
Bournemouth
University

INTRODUCING THE TIGERS OF THE WATER



- >40 species of mahseer across the genera *Neolissochilus*, *Naziritor* and *Tor*
- Biogeographic range extending across South and Southeast Asia
- Flagship and indicator species
- High recreational, economic, cultural and conservation value
- Collectively regarded as the *hardest fighting freshwater fish in the world (Tiger of the water)*



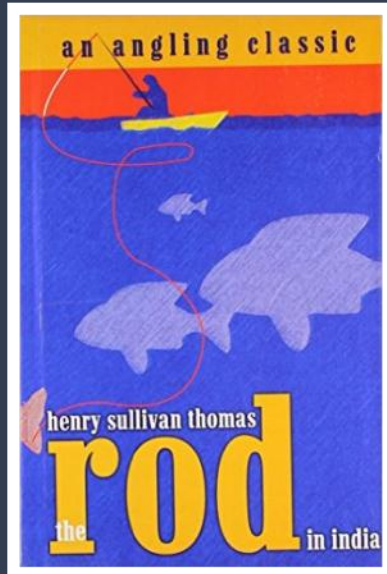
WHY ARE MAHSEER OF INTEREST? (religion and culture)



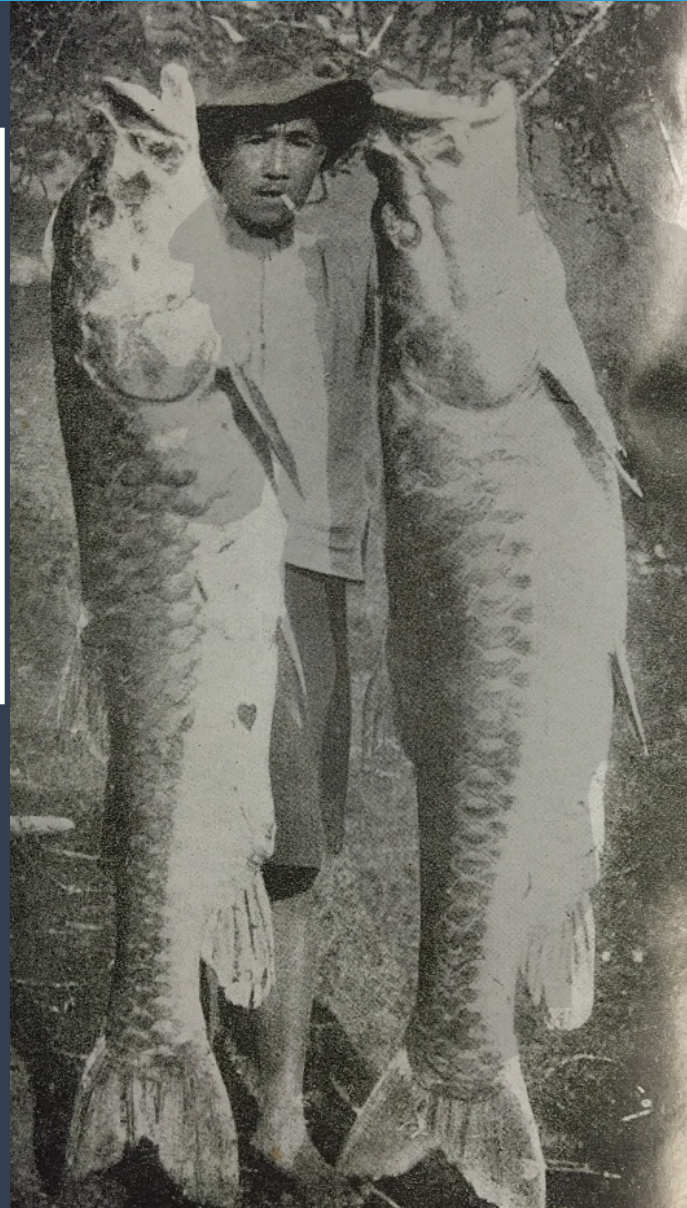
Indus Valley Civilization 3000BC



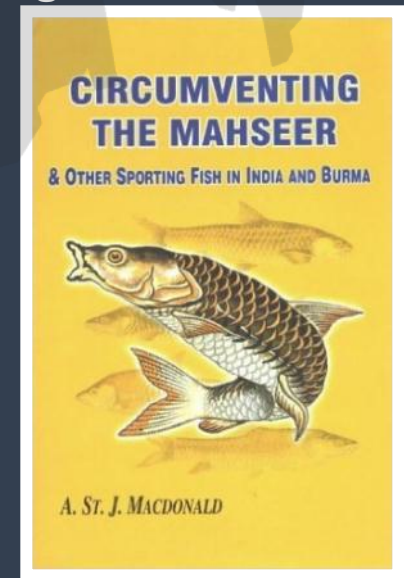
WHY ARE MAHSEER OF INTEREST? (recreational angling)



Henry Sullivan
Thomas (1873)



"There he stood the Mahseer off the Poonch beside whom the Tarpon is a Herring and he who catches him can say he is a fisherman". ~ Rudyard Kipling



Macdonald
(1948)

POPULATION THREATS: Pollution



POPULATION THREATS: Pollution

“We worship our rivers, yet we treat them with shocking disregard”

Dr Manmohan Singh

Prime Minister of India 2004 - 2014



POPULATION THREATS: River fragmentation



POPULATION THREATS: Changing riverscapes



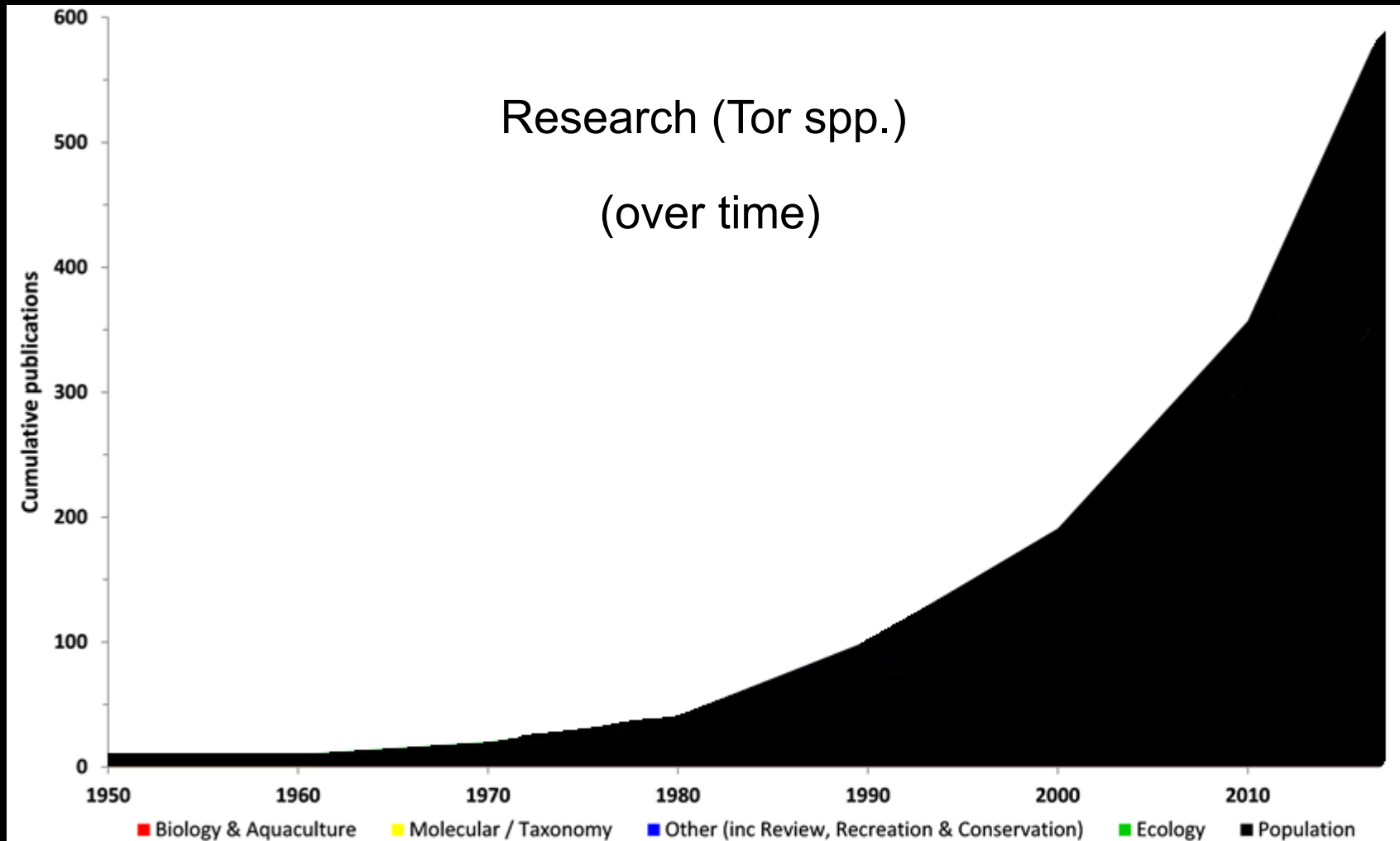
POPULATION THREATS: Abstraction



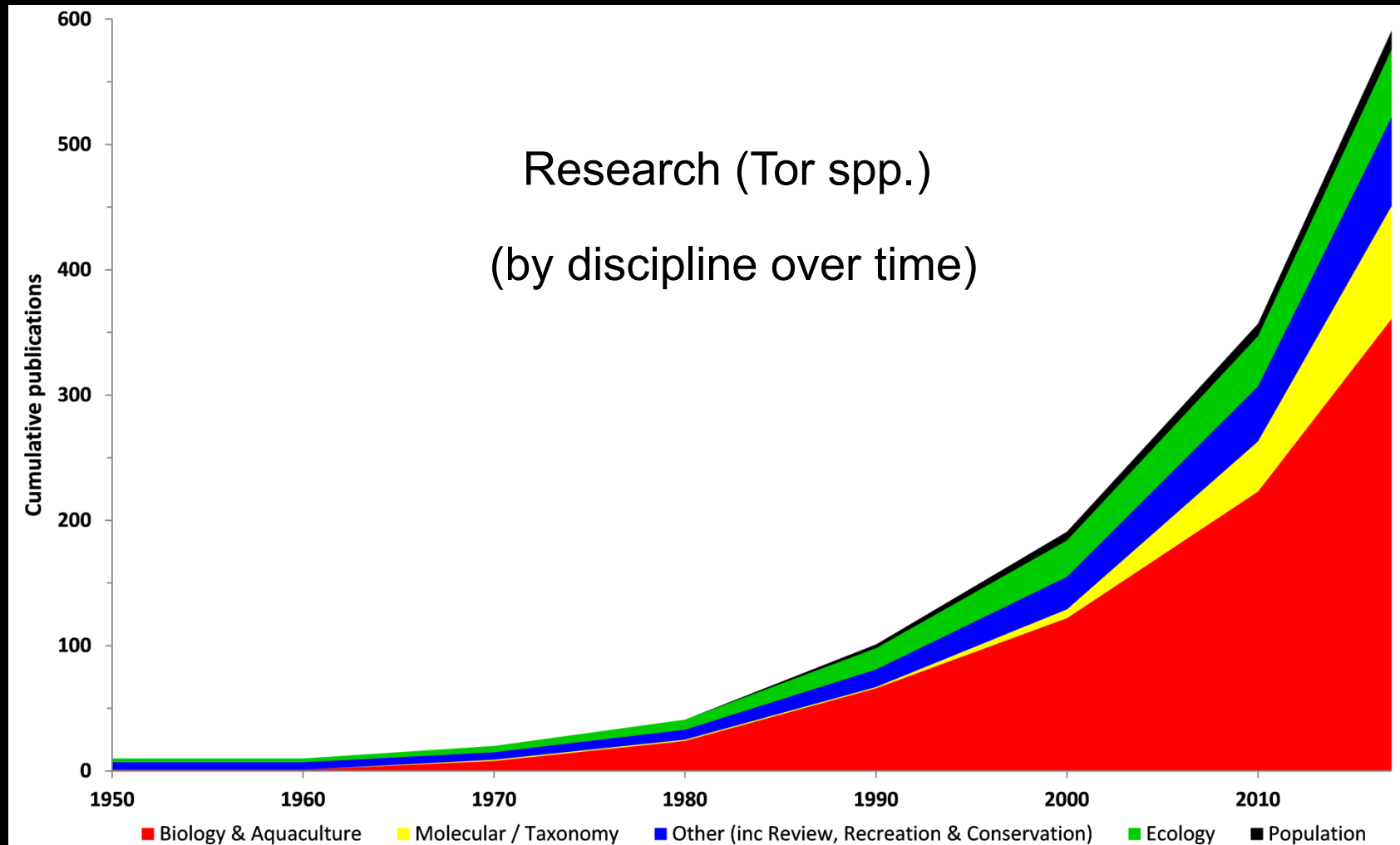
POPULATION THREATS: Unsustainable fishing



CONSERVATION CHALLENGES: Knowledge is power!



CONSERVATION CHALLENGES: Lack of relevant science



MAJOR KNOWLEDGE GAPS AND STUDY APPROACH

- Ecology – critical habitats
- Ecological plasticity and resilience to change?

Conservation needs and action

Taxonomic confusion

Population trends

Conservation concern and prioritisation on Population threats

Distributions

TAXONOMIC CHALLENGES

- Many descriptions lack type specimens and/or illustrations
- Mahseer now extinct in some type localities
- Failure to reference type materials
- Stocking / translocation

And to make matters worse –
polymorphism!



Repetition / propagation

RESOLVING THE TAXONOMIC CONUNDRUM



- Extensive literature review
- Examination of type specimens and type localities
- Historical photographs
- Social media / Citizen science

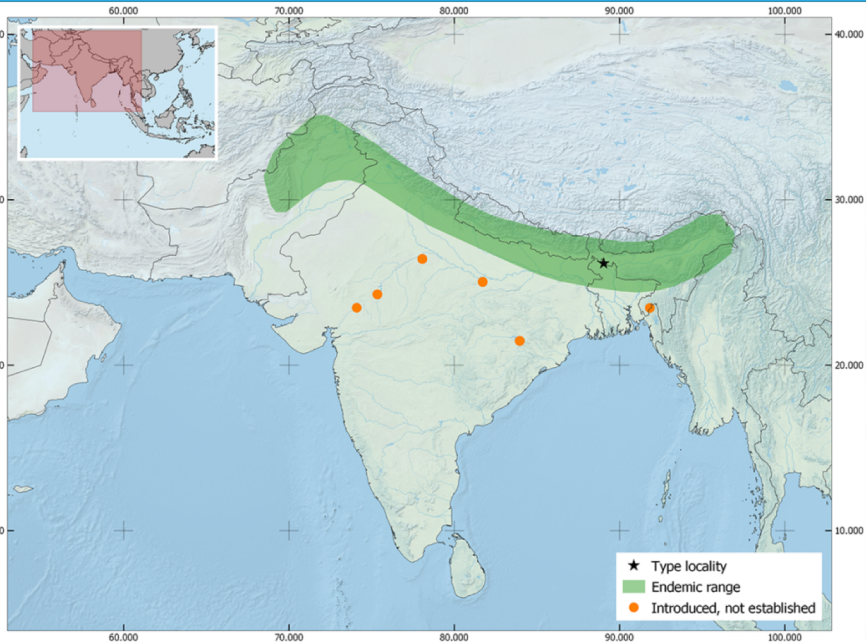
IUCN RED LIST WORKSHOP



- 16 species assessed
- Distribution range (hydro-basin scale)
- Population trends
- Threats
- Assessments

published 14th Nov

Tor putitora – golden mahseer / putitor mahseer (Hamilton 1822)

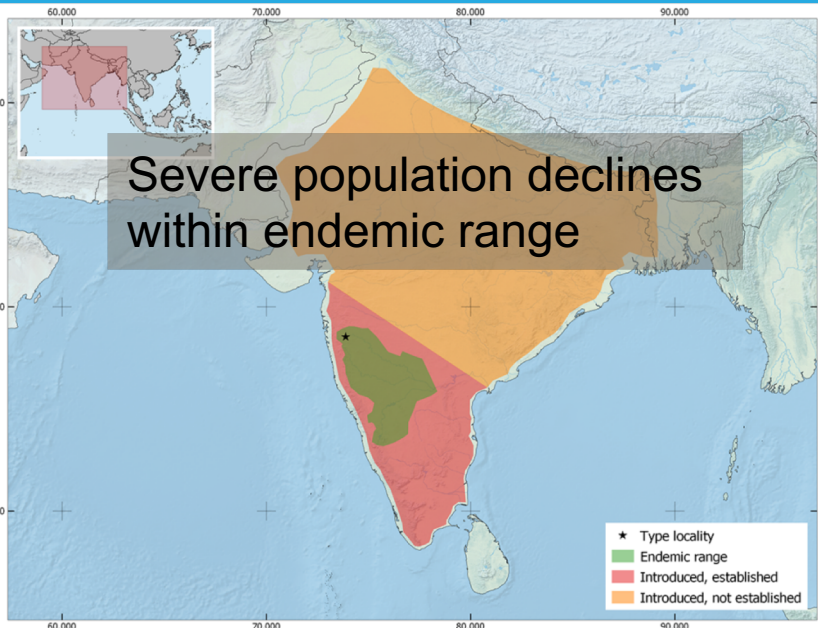


NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	< ENDANGERED >	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
NE	DD	LC	NT	VU	EN	CR	EW	EX

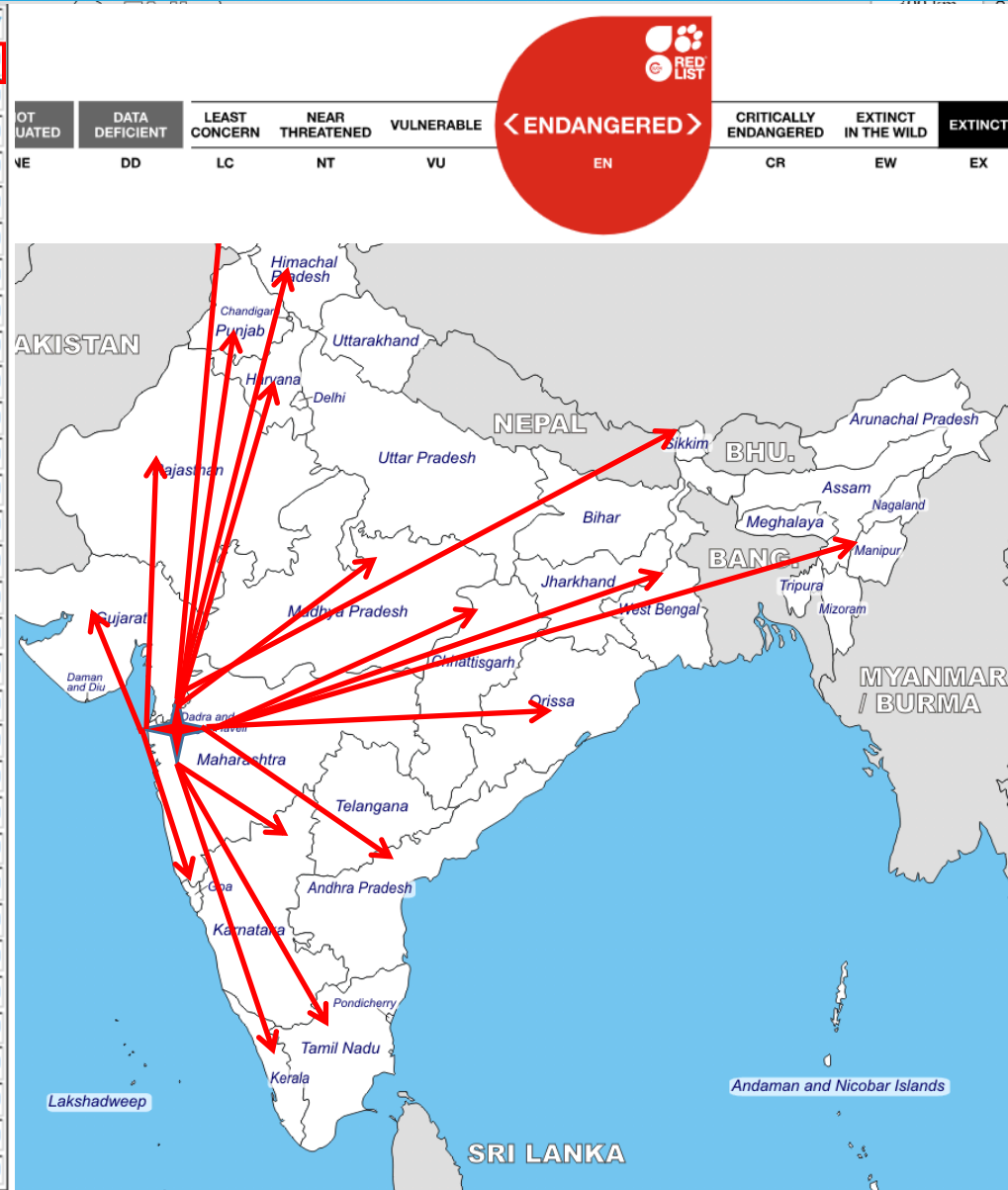
RED LIST

- Described from Teesta River in 1822
- Distributed throughout Himalayas
- Cultured for stocking
- Not established beyond endemic range
- Most studied of all *Tor*
- Migrates considerable distances
- Population reduced by >50% due to dams and overfishing

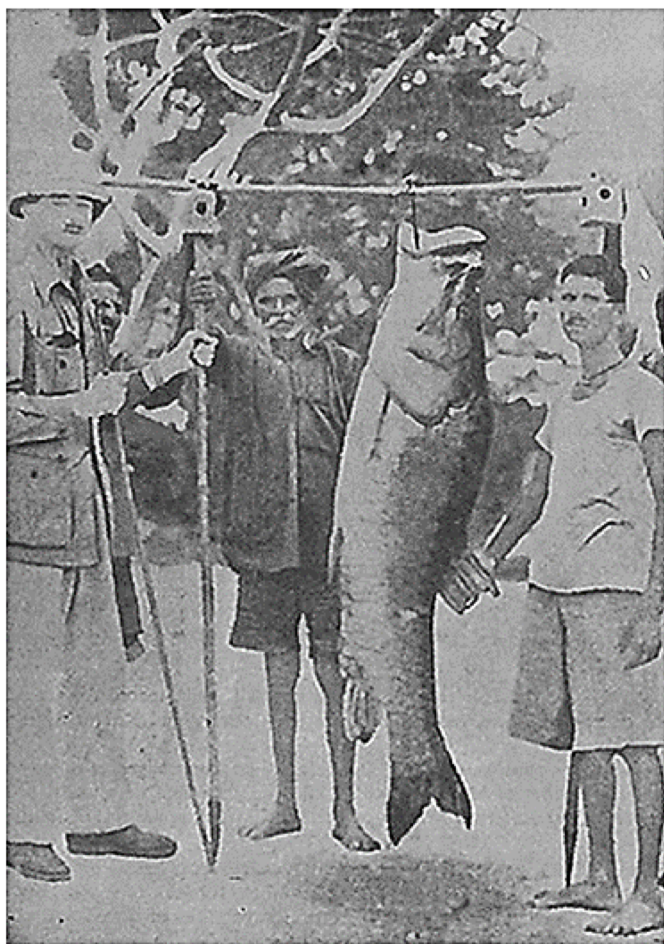
Tor khudree – Deccan / blue-fin mahseer (Sykes 1839).



Coorg Wildlife Sanctuary	15 000
Karakal Sanctuary of Tamil Nadu	15 000
Bhilai Steel Plant	2 000
Tata Engineering and Locomotive Co. Ltd.	70 000
College of Fisheries, Manglore	25 000
National Defence Academy, Khadakvasla	2 000
Central Inland Fisheries Research Institute, Barrackpore	3 000
Assistant Director of Fisheries, Madikeri	10 000
Fish Farmers Development Agency, Yadavgiri, Mysore	30 000
Baron Hotels Pvt. Ltd., Panshet, Pune District.	20 000
Karnataka Power Corporation	25 000
Indo-German Reservoir Project (Kerala)	15 000
M. P. SCIENCE & Technology, Bhopal	5 000
M.P. Matsya Maha Sangh, Bhopal	5 000
Panna Wild life Sanctuary	10 000
TOTAL	1 123 500



Tor remadevii – Hump-backed mahseer (Kurup & Radhakrishnan, 2007)

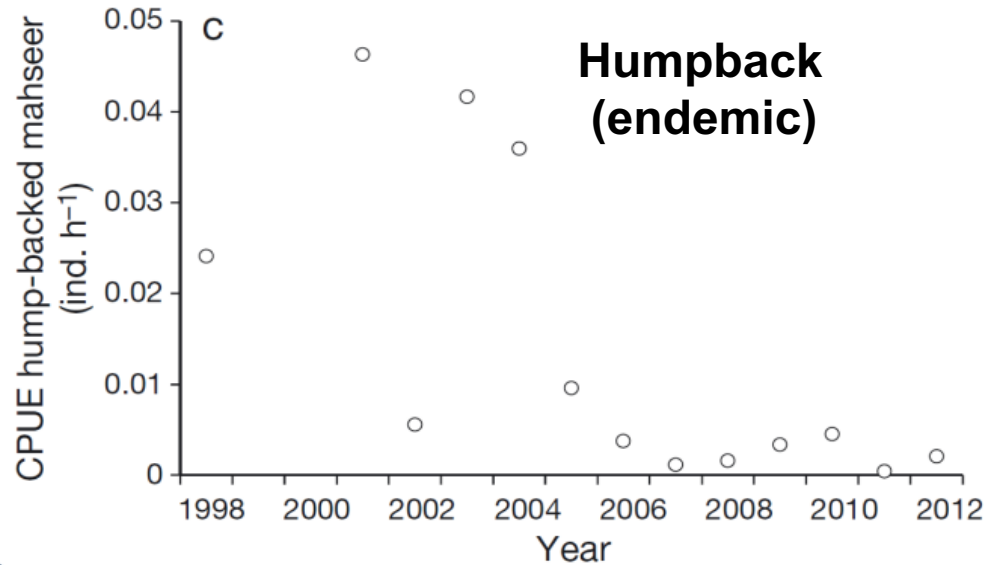
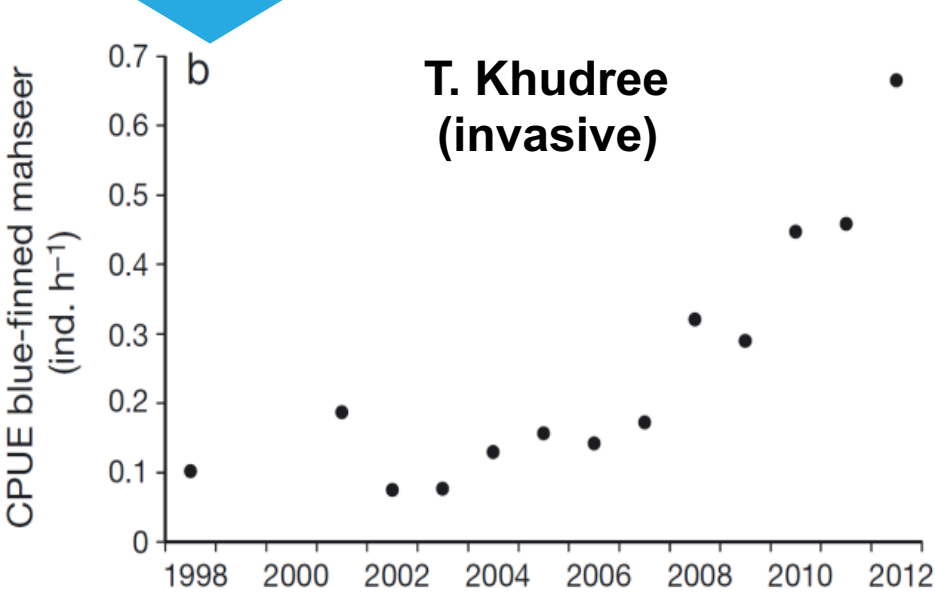


120lbs River Cauvery, 1946

- First documented by Henry Sullivan Thomas in *The Rod in India* (1873)
- One of the most sought after freshwater game fishes in the world
- Despite being the largest *Tor*, lacked a valid scientific name until 2018 (erroneously referred to as *Tor mussullah*)



THE VALUE OF ANGLER DATA



RELATIVE ABUNDANCE RATIOS



Year	Ratio of Hump-backed to Blue-fin
1998	1:4
2012	1:218

TEMPORAL TRENDS IN HUMP-BACK (INDIVIDUAL) WEIGHT

Vol. 28: 11–17, 2015
doi: 10.3354/esr00673

ENDANGERED SPECIES RESEARCH
Endang Species Res

Published online May 13

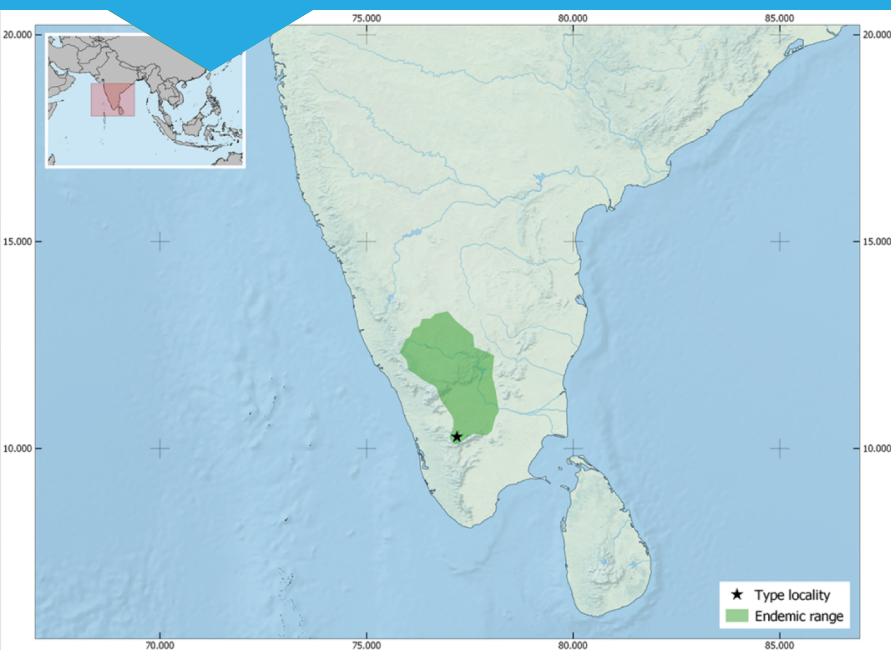


The legendary hump-backed mahseer *Tor sp.* of India's River Cauvery: an endemic fish swimming towards extinction?

Adrian C. Pinder^{1,2,*}, Rajeev Raghavan^{1,3,4}, J. Robert Britton²

0 | 1998 | 2000 | 2002 | 2004 | 2006 | 2008 | 2010 | 2012

Tor remadevii – Hump-backed mahseer (Kurup & Radhakrishnan, 2007)



NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
NE	DD	LC	NT	VU	EN	CR	EW	EX



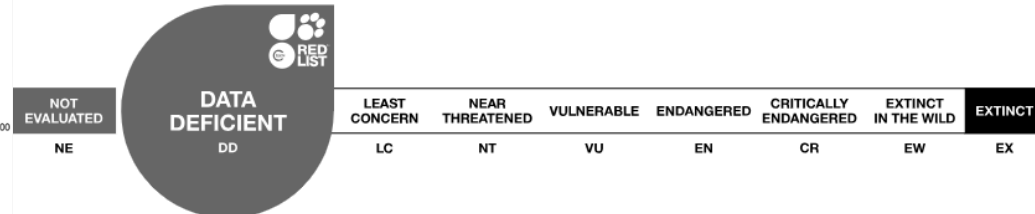
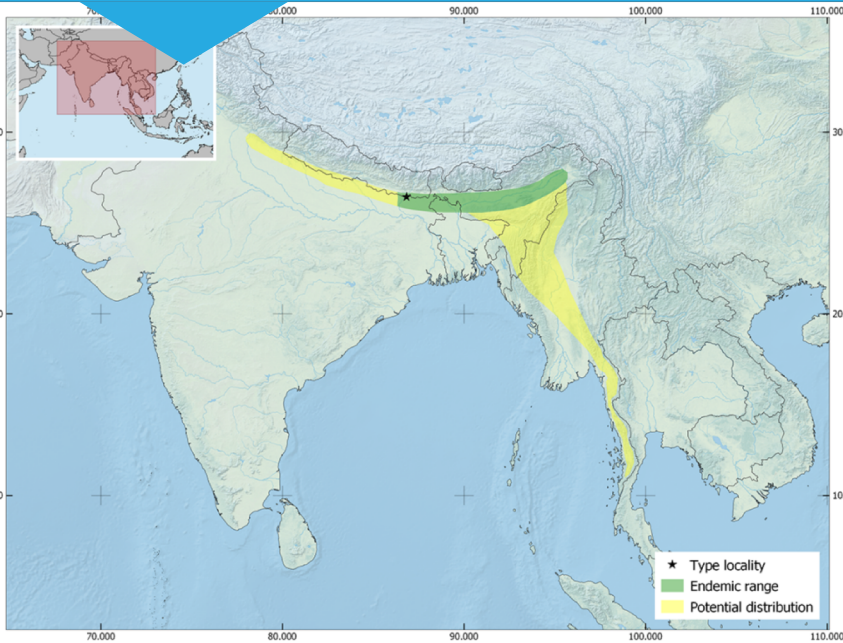
- Extensive exploration and integrated taxonomy study has confirmed the humpback is conspecific with *T. remadevii*
- Endemic and exclusively restricted to River Cauvery catchment
- Population decline of >90% in last decade




Resolving the taxonomic enigma of the iconic game fish, the hump-backed mahseer from the Western Ghats biodiversity hotspot, India

Adrian C. Pinder^{1,2*}, Arunachalam Manimekalan³, J.D. Marcus Knight⁴, Prasannan Krishnankutty⁵, J. Robert Britton¹, Siby Philip⁶, Neelesh Dahanukar^{7,8}, Rajeev Raghavan^{2,8,9}

Tor mosal – Mosal mahseer (Hamilton 1822)



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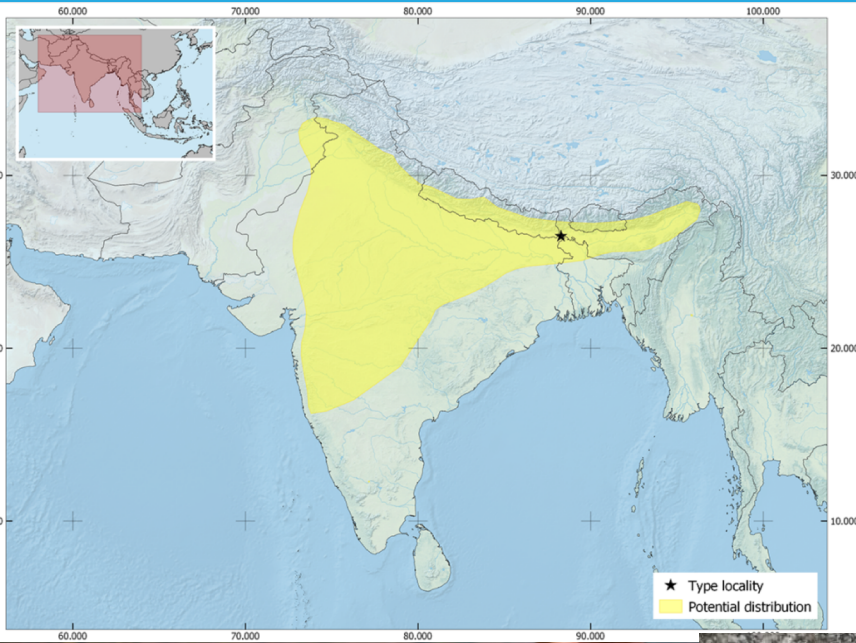
<https://doi.org/10.11646/zootaxa.4317.3.12>
<http://zoobank.org/urn:lsid:zoobank.org:pub:5467A113-B3C0-4378-BEDA-38FE217A38D3>

The type locality of *Tor mosal* (Hamilton, 1822) (Teleostei: Cyprinidae)

RAJEEV RAGHAVAN^{1,2}, NEELESH DAHANUKAR³ & RALF BRITZ⁴



Tor tor – deep bodied/red-finned mahseer (Hamilton 1822)



NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
NE	DD	LC	NT	VU	EN	CR	EW	EX

- Described from the Mahananda River, NE Bengal, 1822
- Currently considered to be most widely distributed of all *Tor*
- Assumptions of conspecificity require urgent validation



Mahseers of the Mekong drainage

Tor ater (Roberts 1999)



Tor laterivittatus
(Zhou and Cui 1996)



Tor sinensis (Wu 1977)



Tor dongnaiensis
(Hoang et al., 2015)



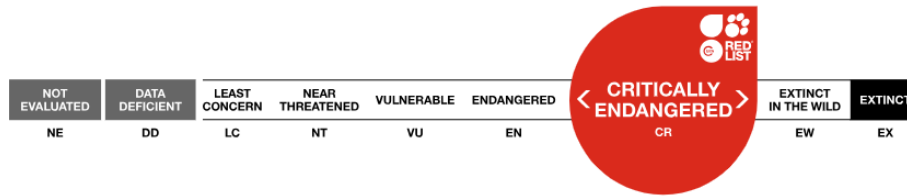
Tor yingjiangensis
(Chen and Yang 2004)



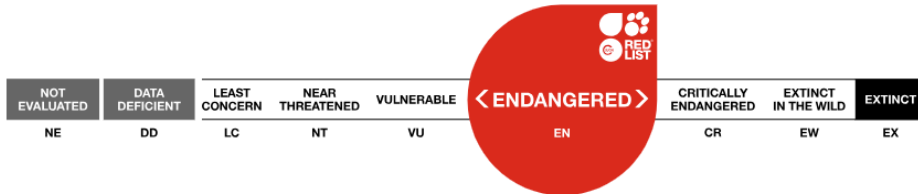
Tor polylepis
(Zhou and Cui 1996)



IUCN Red List (V2018.2) summary



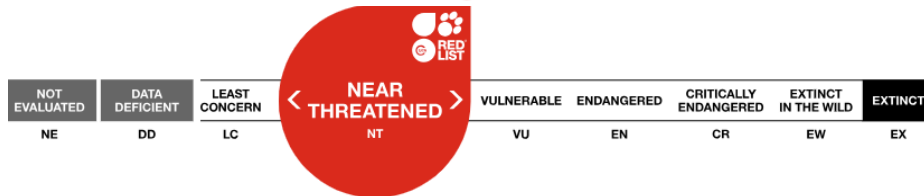
1 species (*T. remadevii*)



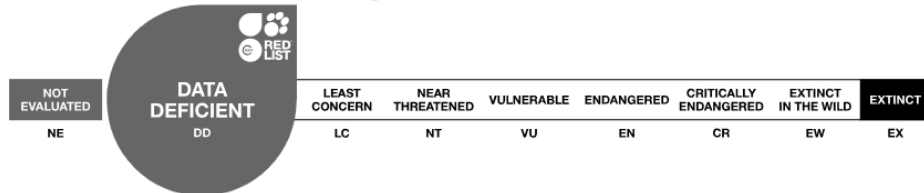
3 species (*T. putitora*, *T. khudree*, *T. malabaricus*)



1 species (*T. sinensis*)



3 species (*T. barakae*, *T. ater*, *T. dongnaiensis*)



8 species (*T. kulkarni*, *T. mosal*, *T. tor*, *T. tambra*, *T. tambroides*, *T. laterivittatus*, *T. polylepis*, *T. yingjiangensis*)

CONCLUDING REMARKS

- New taxonomic baseline validation



THE IUCN RED LIST
OF THREATENED SPECIES™

Mahseer (*Tor* spp.) fishes of the world: status, challenges and opportunities for conservation

Adrian C Pinder^{*1,2}, J Robert Britton¹, Andrew J Harrison^{1,2}, Prakash Nautiyal³, Shannon D Bower^{2,4}, Steven J Cooke⁵, Steve Lockett², Mark Everard^{2,4}, Unmesh Katwate⁶, K. Ranjeet⁷, Sam Walton⁸, Andy J Danylchuk⁹, Neelesh Dahanukar¹⁰ and Rajeev Raghavan^{2,11}

- Regular conservation reassessments required
- Effective in-situ conservation of wild populations will require a shift in research focus from aquaculture to species specific ecology throughout ontogeny.

Kadrin Chhe La



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