



**IGB**

Leibniz Institute of Freshwater Ecology  
and Inland Fisheries



# Global change and biodiversity – a megafauna perspective

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Presented by Sibylle Schroer

24.11.2022



# Freshwater megafauna

Animal

Freshwater (and brackish) ecosystems

Body mass  $\geq 30$  kg



134 fishes



47 reptiles

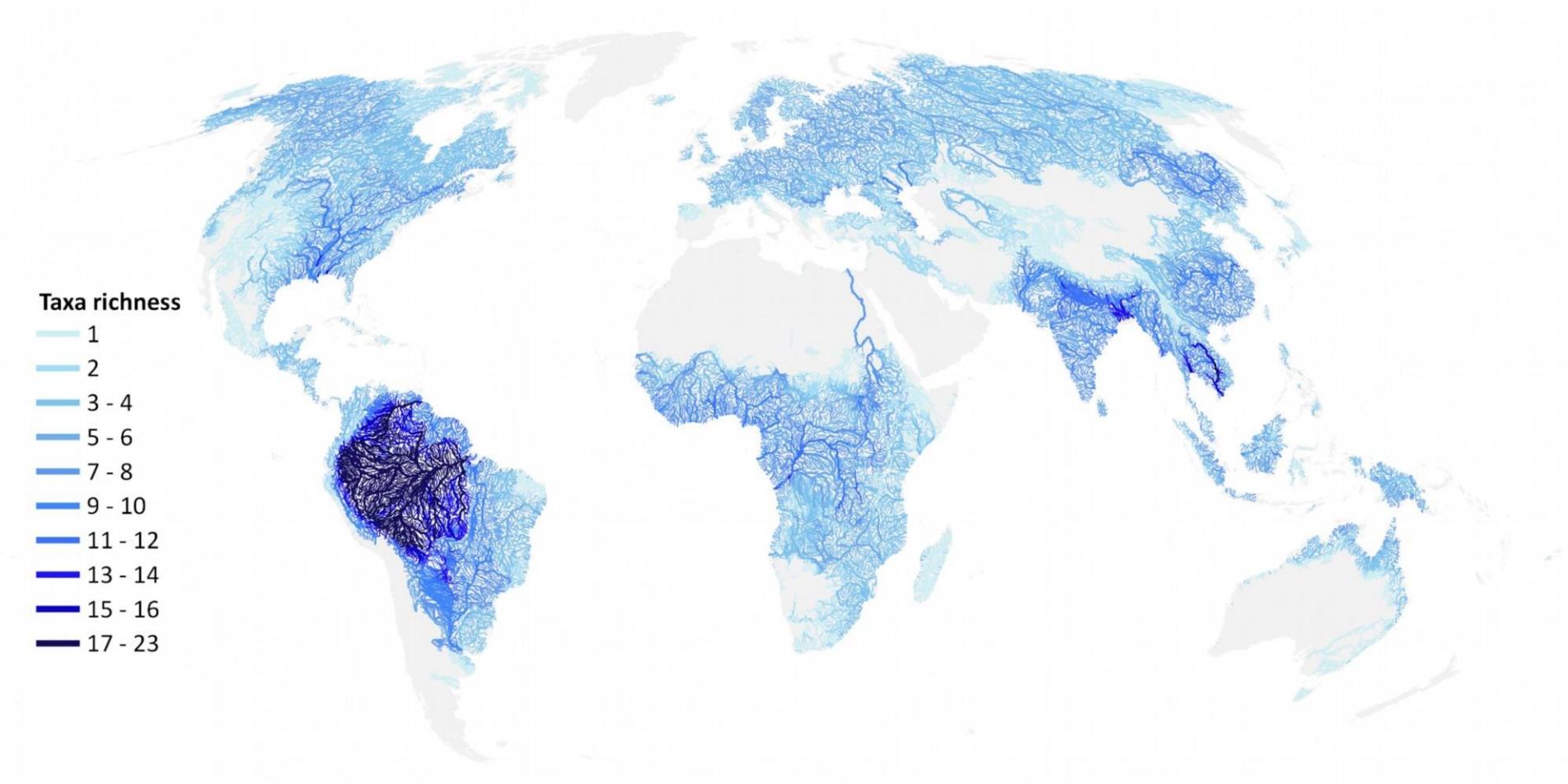


2 amphibians



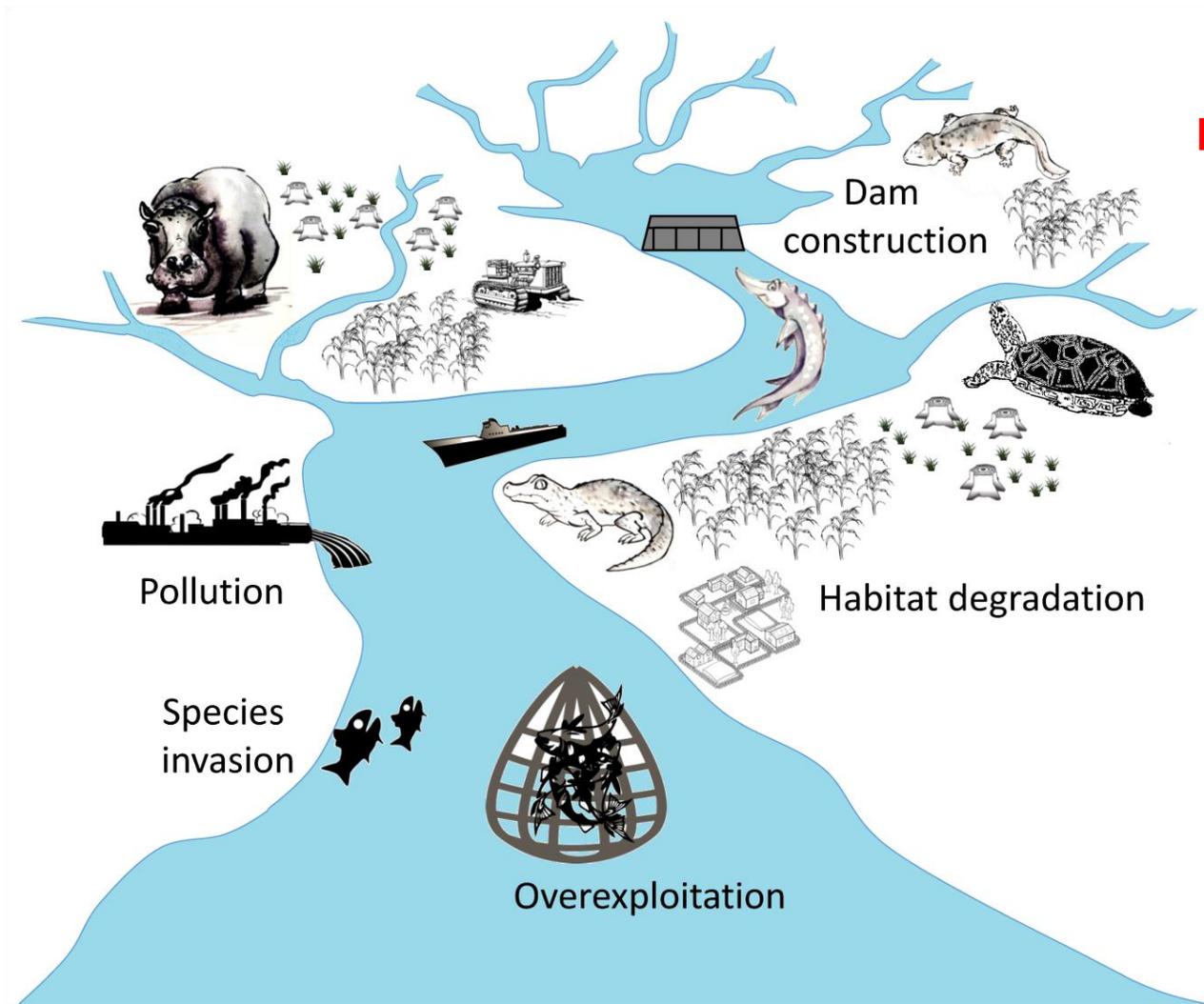
33 mammals

# Global distribution of freshwater megafauna



He et al. 2021 *Biological Conservation*

# Main threats to freshwater megafauna



**54% of all assessed freshwater megafauna species are threatened.**

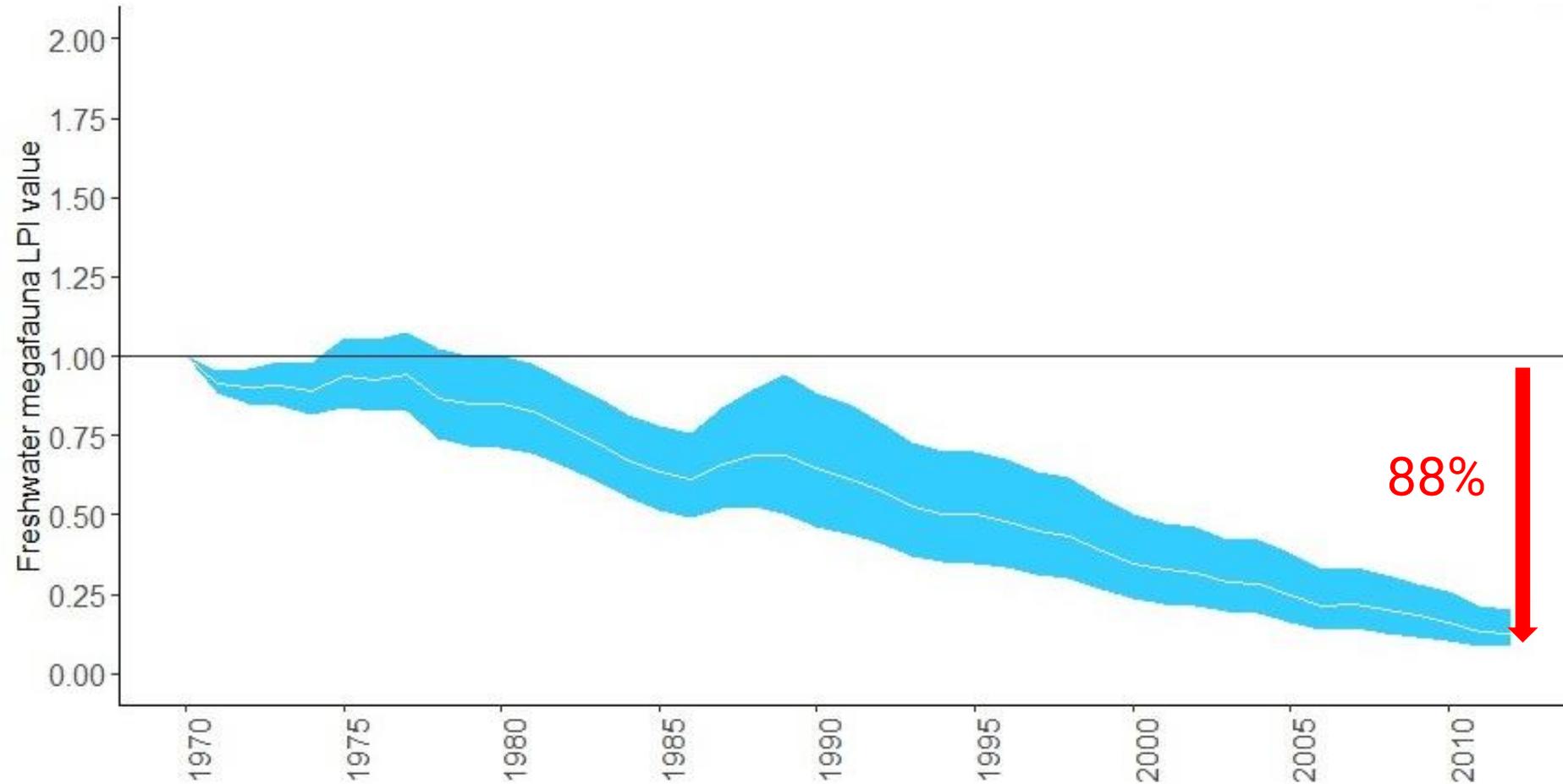
Decreased productivity,  
reduced fitness,  
increased mortality



Decline in population  
or even species extinction.

He et al. 2017 *WIREs Water*

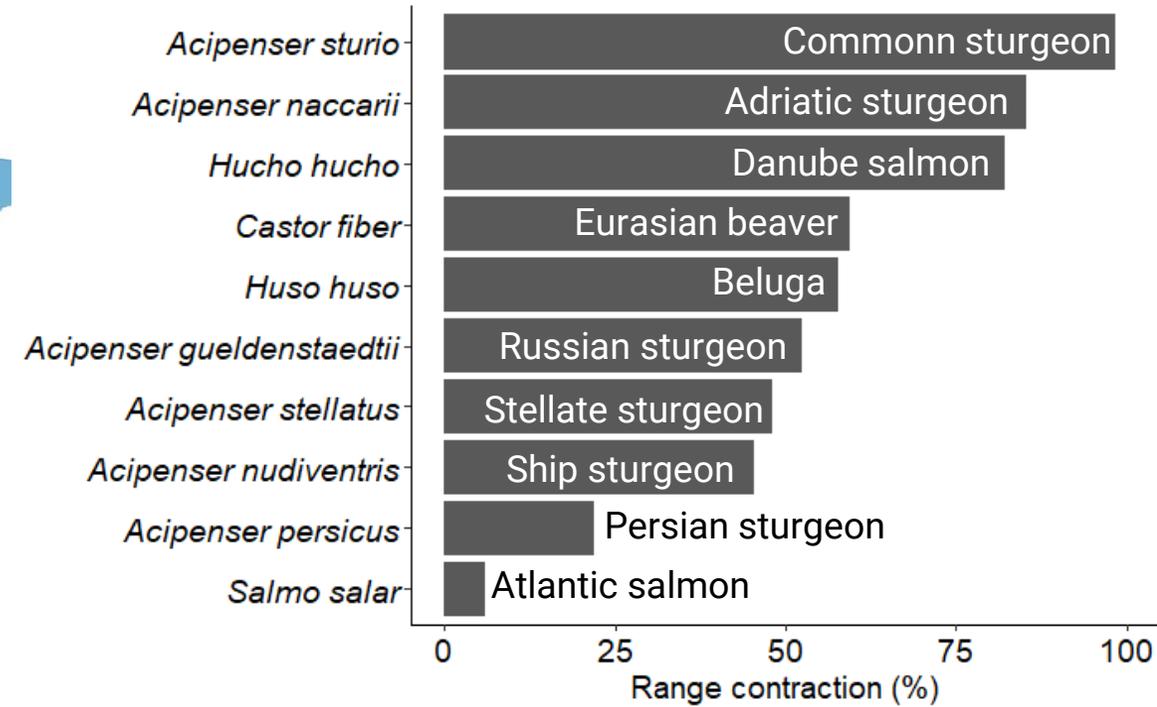
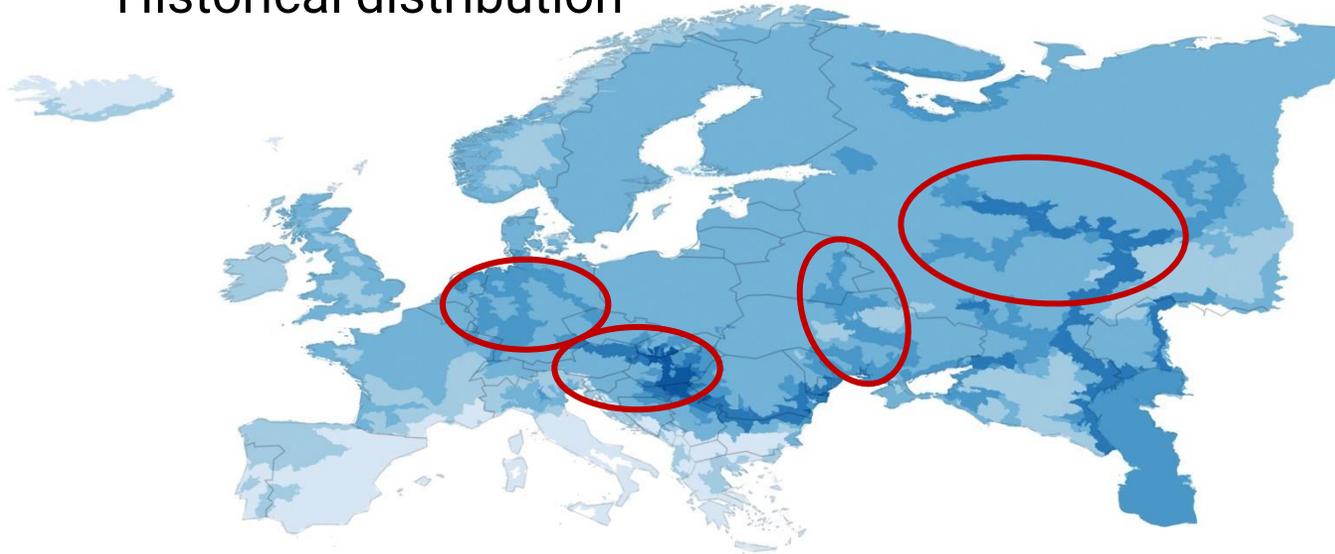
# Megafauna loss



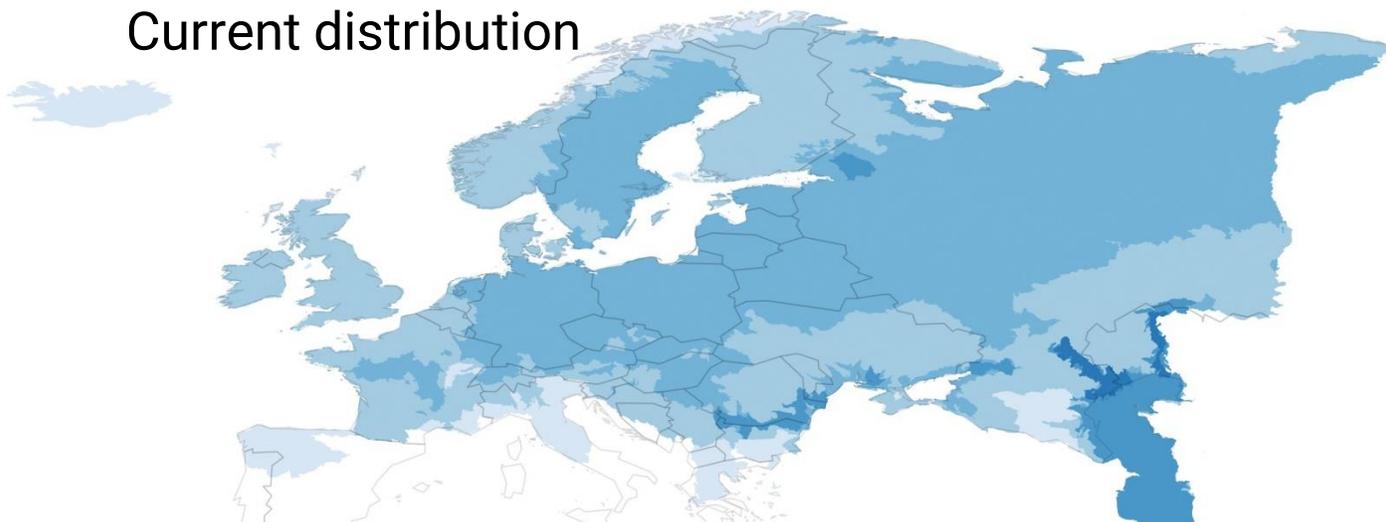
He et al. 2019 *Global Change Biology*

# Range contraction in Europe

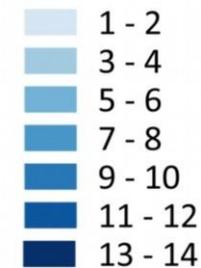
Historical distribution



Current distribution



Species richness



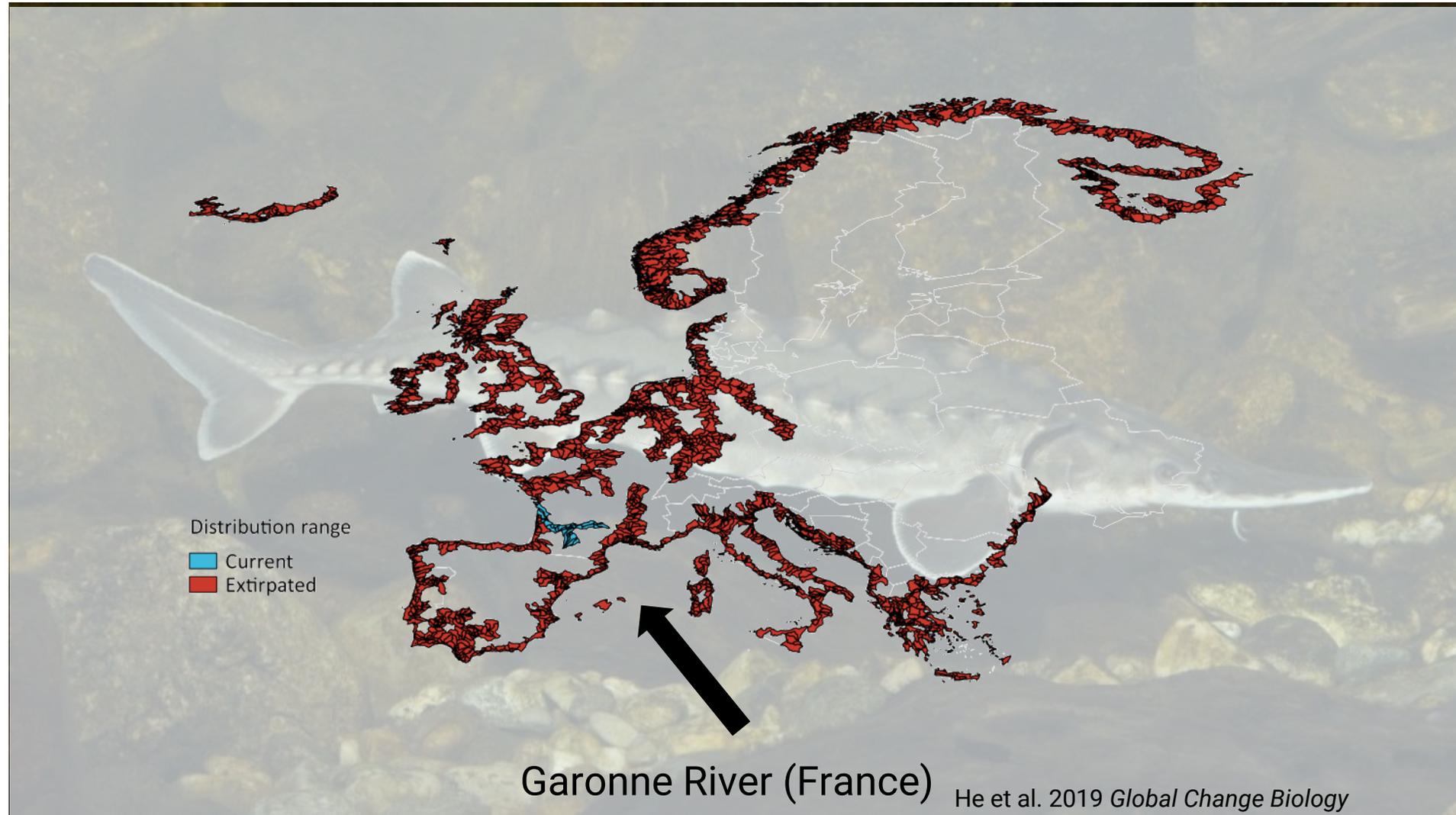
He et al. 2019 *Global Change Biology*

## Distribution of *Acipenser sturio*

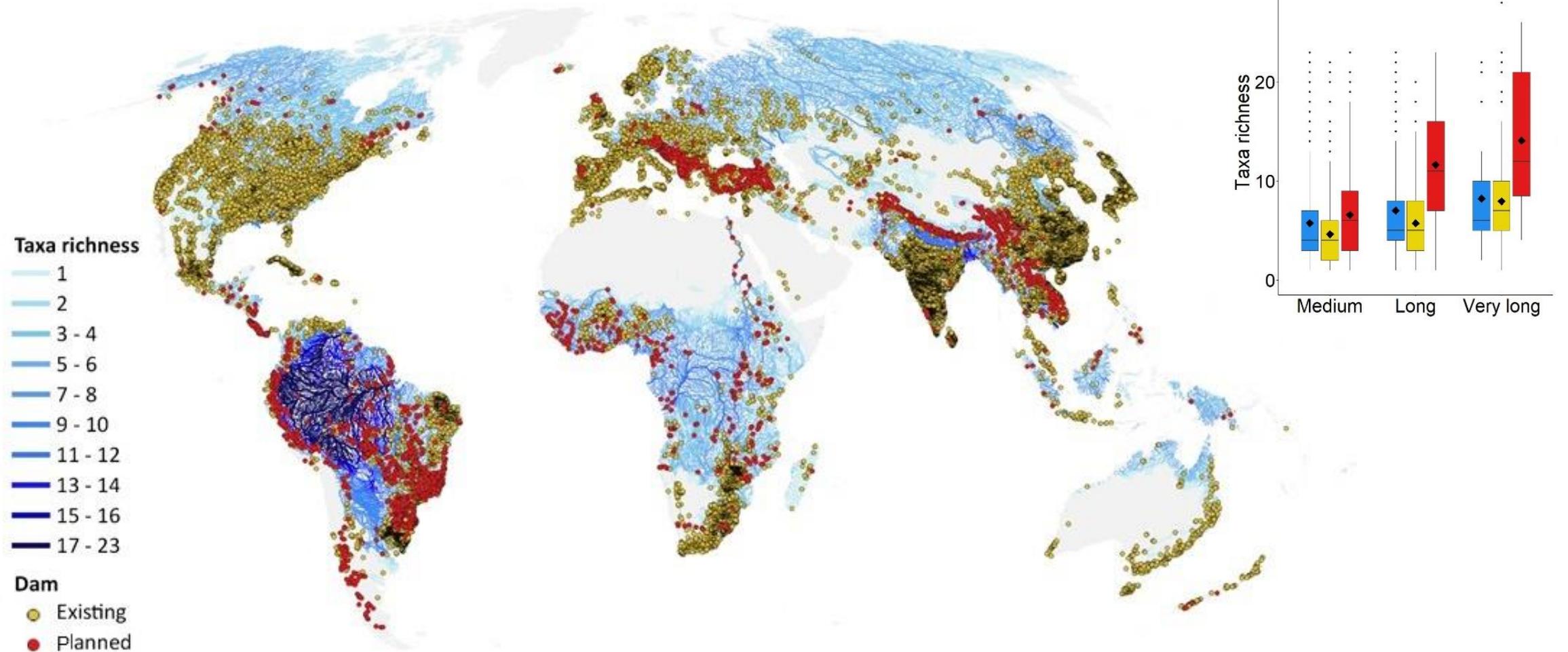


© IGB

# Distribution of *Acipenser sturio*

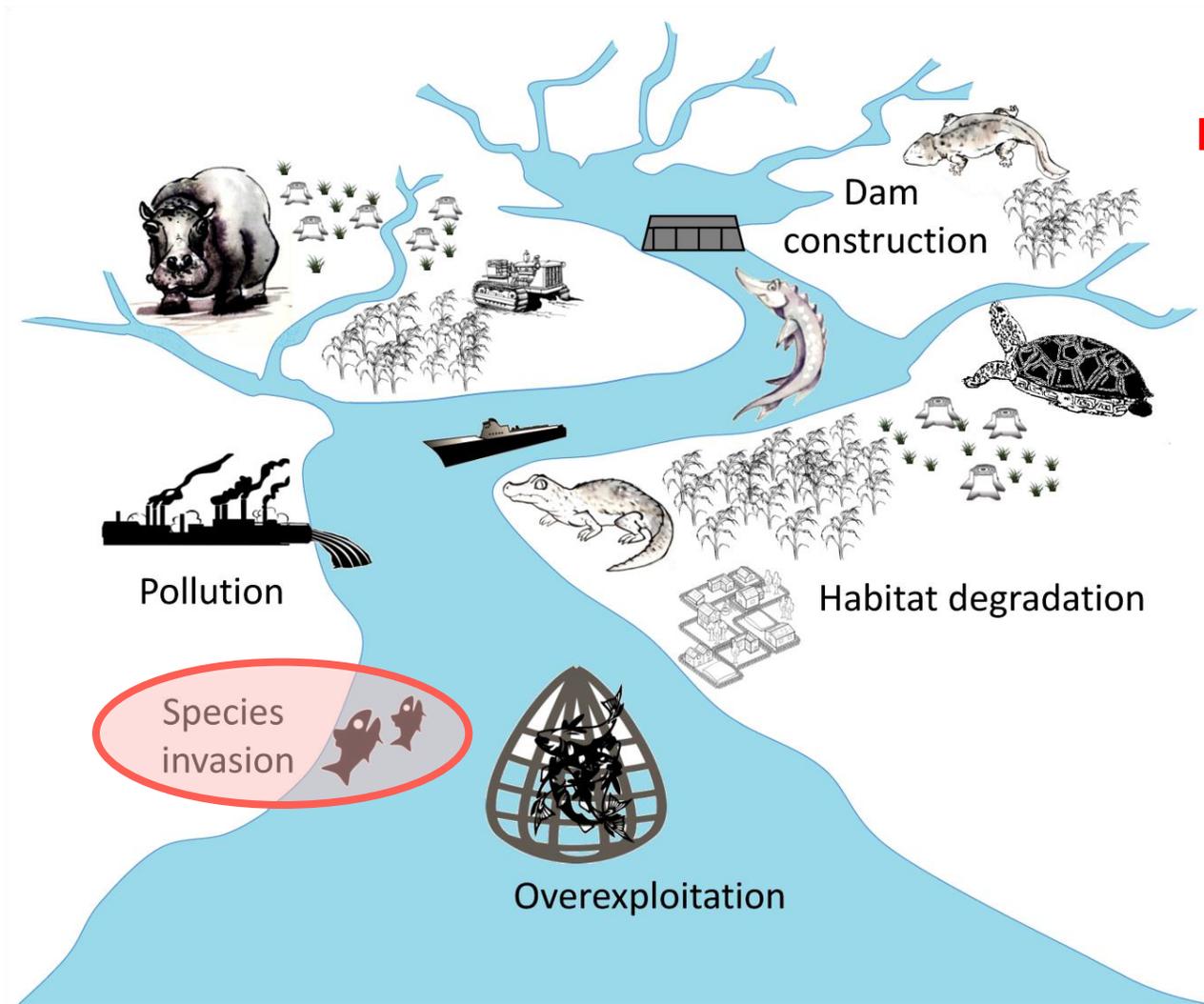


# Future threats: hydropower plans



He et al. 2021 *Biological Conservation*

# Main threats to freshwater megafauna



**54% of all assessed freshwater megafauna species are threatened.**

Increased mortality,  
decreased productivity,  
reduced fitness.



Decline in population  
or even species extinction.

He et al. 2017 *WIREs Water*

# Impacts of alien species on native freshwater megafauna



## Predation

Alien wild boars prey on eggs of crocodilians.



## Poisoning

Mortality of freshwater crocodiles caused by toxic alien cane toad.



## Diseases transmission

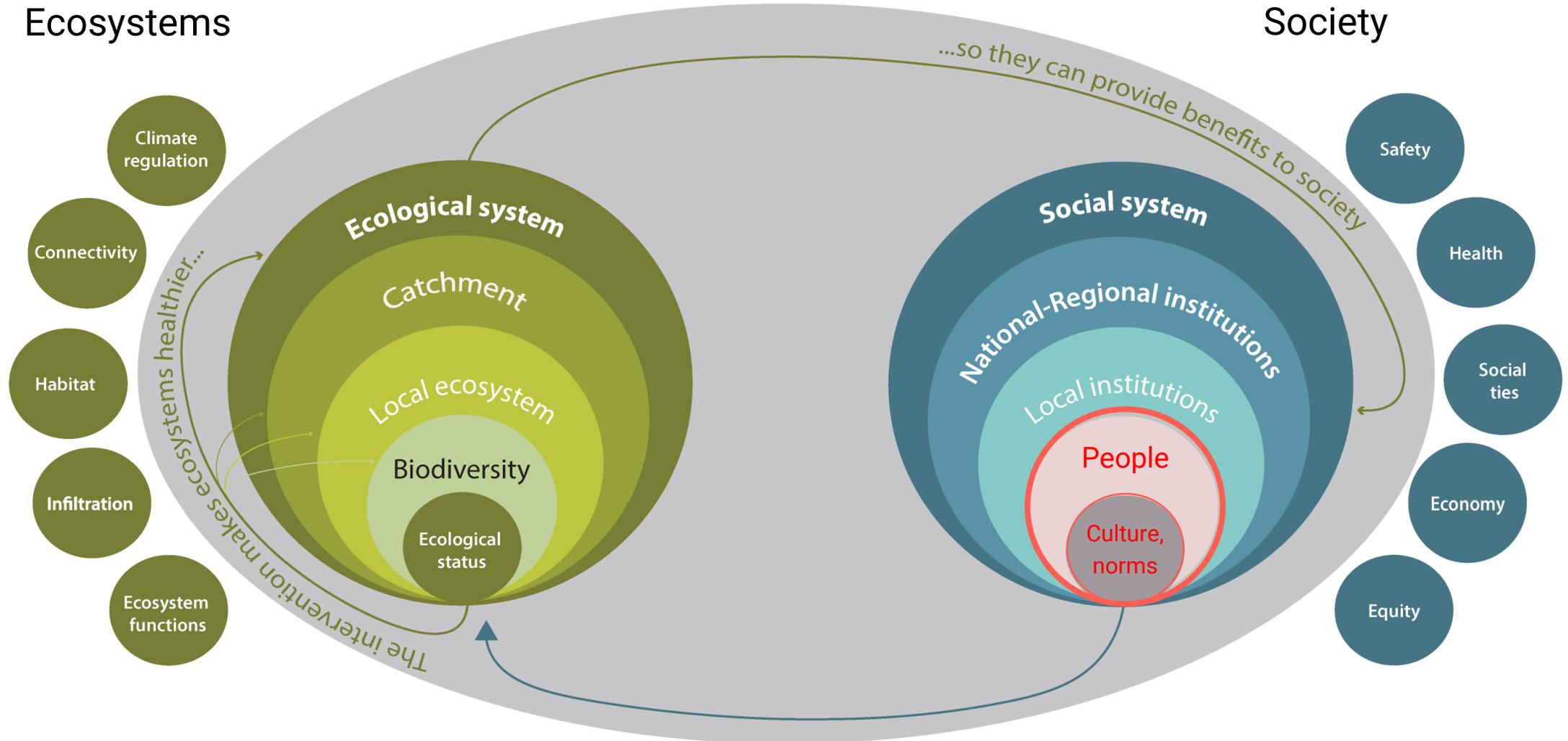
Parasites transmitted by alien snails were identified from hippo.

Chen et al. *under review*

# Another view is needed

Ecosystems

Society



Serra-Llobet et al. 2022 *Front. Environ. Scie.*

# Cultural important freshwater megafauna species

- Culturally Important Species (CIS) are those highly significant for local and Indigenous peoples
- Freshwater megafauna are a high-potential group for conservation of biocultural diversity
- Co-management focused on CIS in close partnership with local people can be an effective tool



Rebecca Tharme

Bayon Khmer temple relief, Angkor Wat, Cambodia

Tharme, Petry et al. *in prep*

# Example: cultural importance of Crocodylia

23+ species

**Indian gharial** - Traditional medicine, eggs, meat, skin, artworks

**Chinese alligator** – Dragon mythology, meat, skin

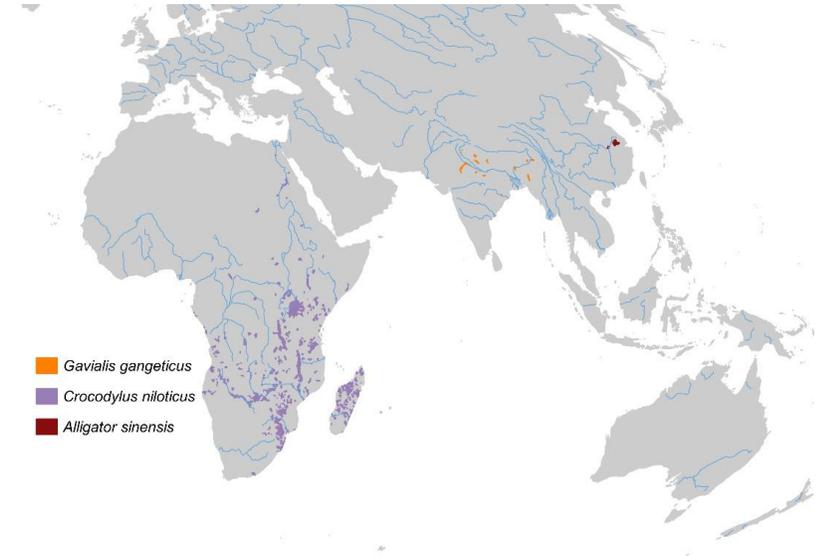
**Nile crocodile** – Proverbs, stories, songs, Indigenous belief systems, totem animal, origin myths, ancestral intermediaries, meat and eggs as food, skin, crafts, art



van der Ploeg 2013  
Artist C. Domelod



<https://www.harappa.com>



■ *Gavialis gangeticus*  
■ *Crocodylus niloticus*  
■ *Alligator sinensis*

Totemic Crocodile



Diawuo and Issifu 2015

# #FreshwaterFactCards



credit to Studio Adén, Berlin

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Lisa-Lene Heinrich  
Klement Tockner, Christiane Zarfl, Rebecca Tharme,  
Paulo Petry, Stan Kang

**Thank you very much for your attention!**



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**If you have any questions, please contact:**

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