IUCN SSC PARASITE Specialist Group

CMK CENTRE FOR ENVIRONMENTAL SCIENCES UHASSELT

Ichthyo(parasito)logical research for parasite conservation, One Health, and education

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Belgian Society of Parasitology & Protistology Annual scientific meeting
Liège, 26 november 2024

AQUATIC BIODIVERSITY TEAM:
3 post-docs: 3 nationalities

13 PhD students: 6 nationalities

10 defended PhDs: 6 nationalities

Wetlands

BOX 1.2 Wetlands as a source of water supply and biodiversity, facilitating sustainable livelihoods.

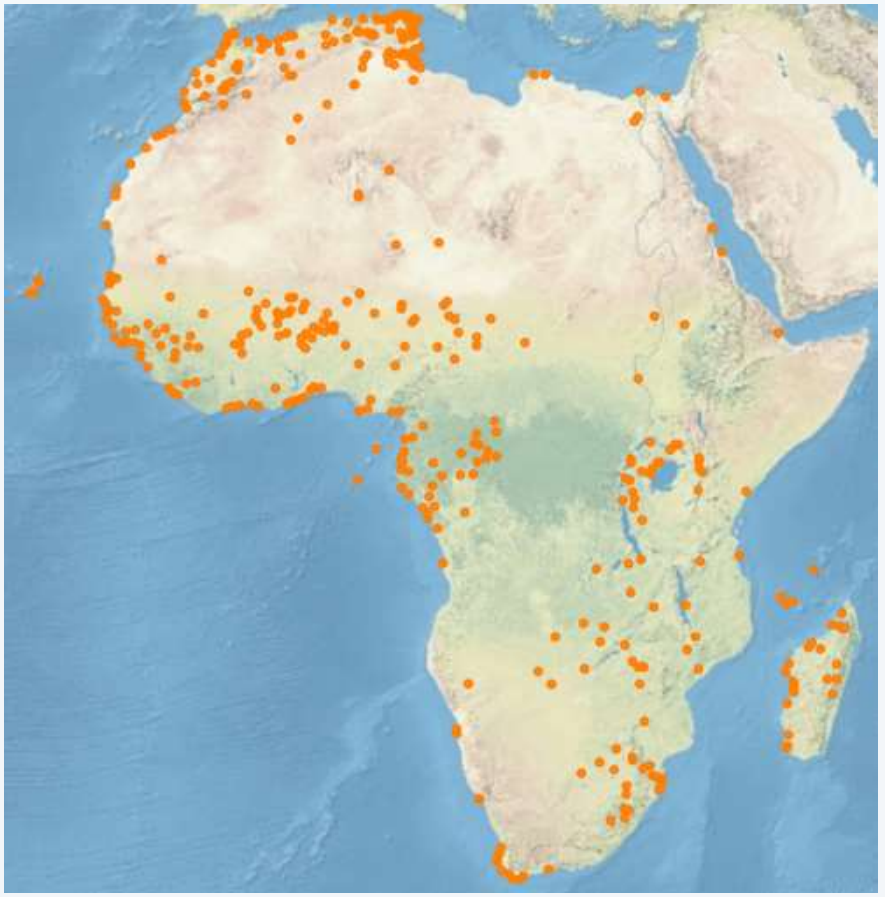
Wasserman & Dalu (2022) in: *Fundamentals of Tropical Freshwater Wetlands*

- freshwater ecosystems:
  - <1% of the Earth
  - > 10% of known animals
  - ca. 1/3 of known vertebrates
- wetlands:
  - kidneys of the landscape
  - nature’s supermarkets

Wetlands

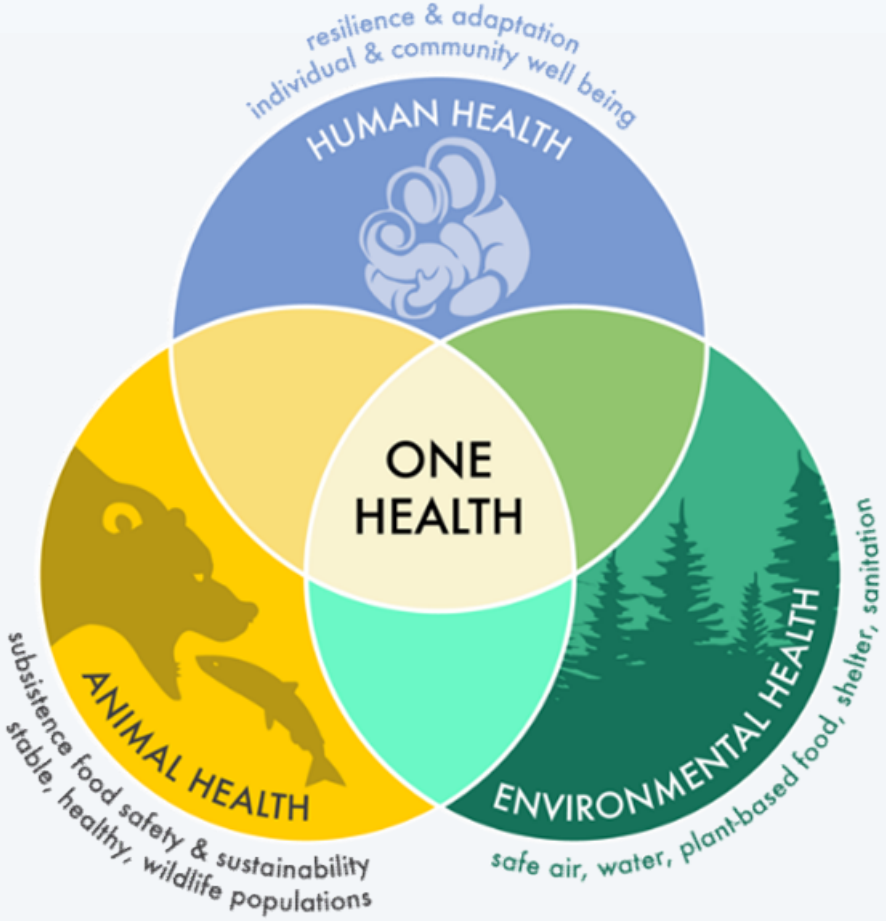
BOX 1.3 Examples of wetland degradation from the (sub)tropical regions of the world.

Wasserman & Dalu (2022)
in: *Fundamentals of Tropical Freshwater Wetlands*



424 Ramsar Sites covering 111,127,201 ha

One Health

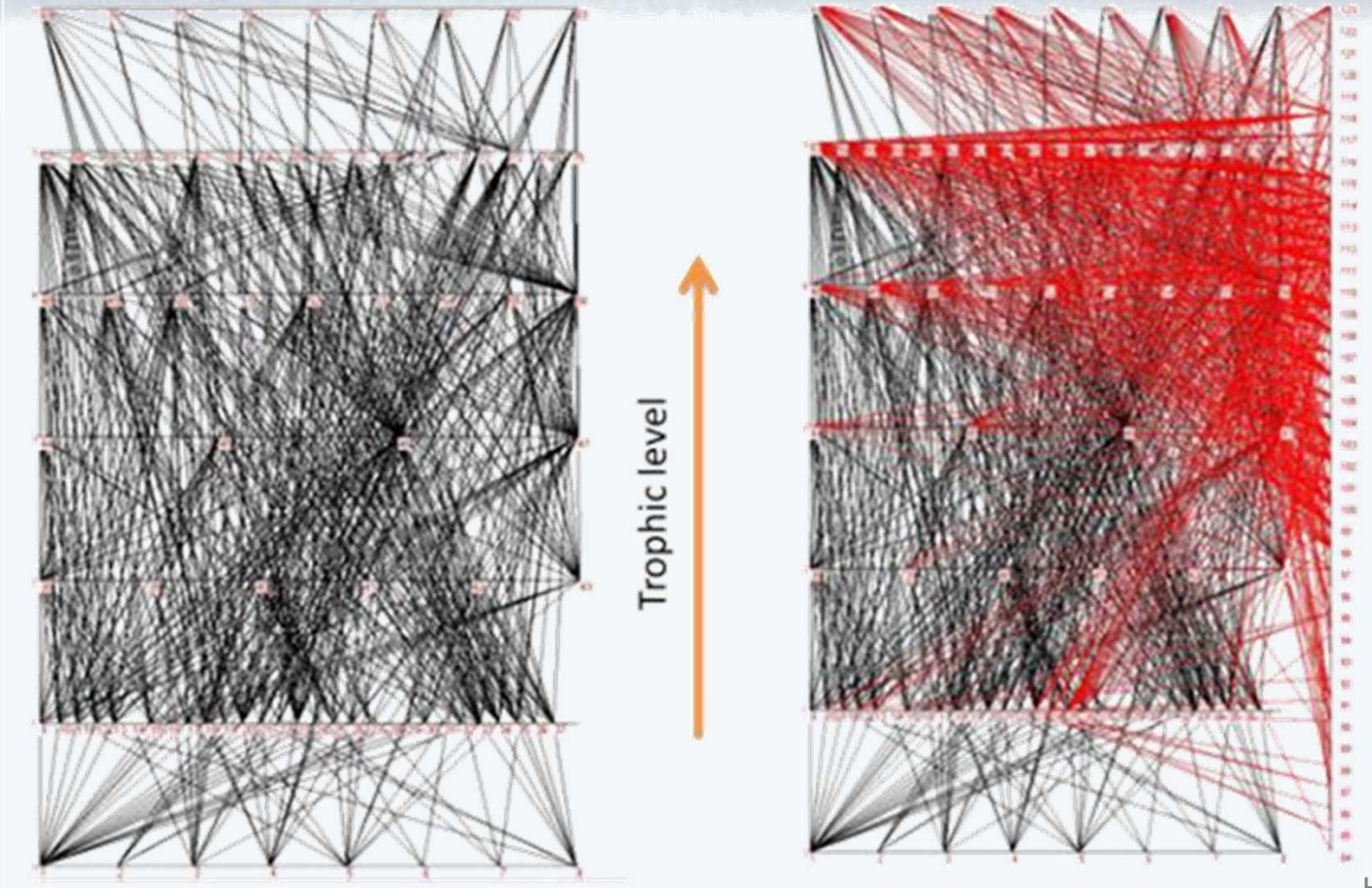


One Health: integrative approach

Change in perspective:
"us against them" → "shared risk"

Rabinowitz et al., 2008

One Health



Hudson et al., 2006

75% of the links in food webs involve a parasitic species

Worms of change: anthropogenic disturbance changes the ectoparasite community structure of Lake Victoria cichlids

dr. Tiziana Gobbin

Why study human impact on wildlife parasites?

- Status of ecosystem health
  ecosystem rich in parasites = healthy ecosystem
- Link between habitat degradation and spillovers
  ecosystem changes → host-parasite interactions change

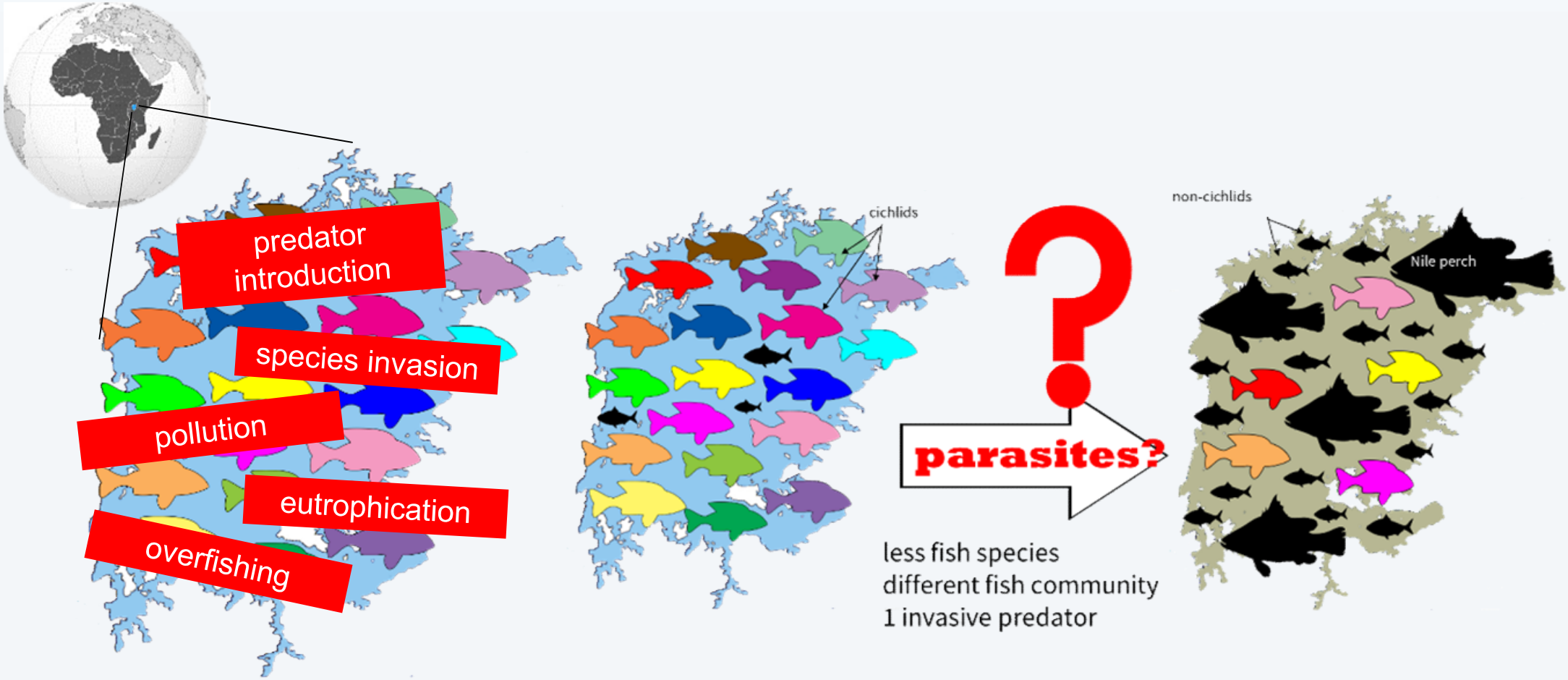
natural sciences .be

Naturalis Biodiversity Center

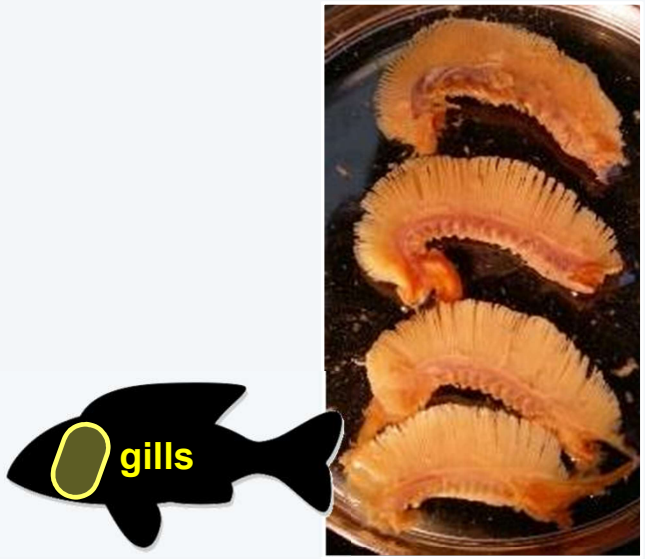
AFRICA museum

eawag aquatic research

Worms of change: anthropogenic disturbance changes the ectoparasite community structure of Lake Victoria cichlids



Worms of change: anthropogenic disturbance changes the ectoparasite community structure of Lake Victoria cichlids

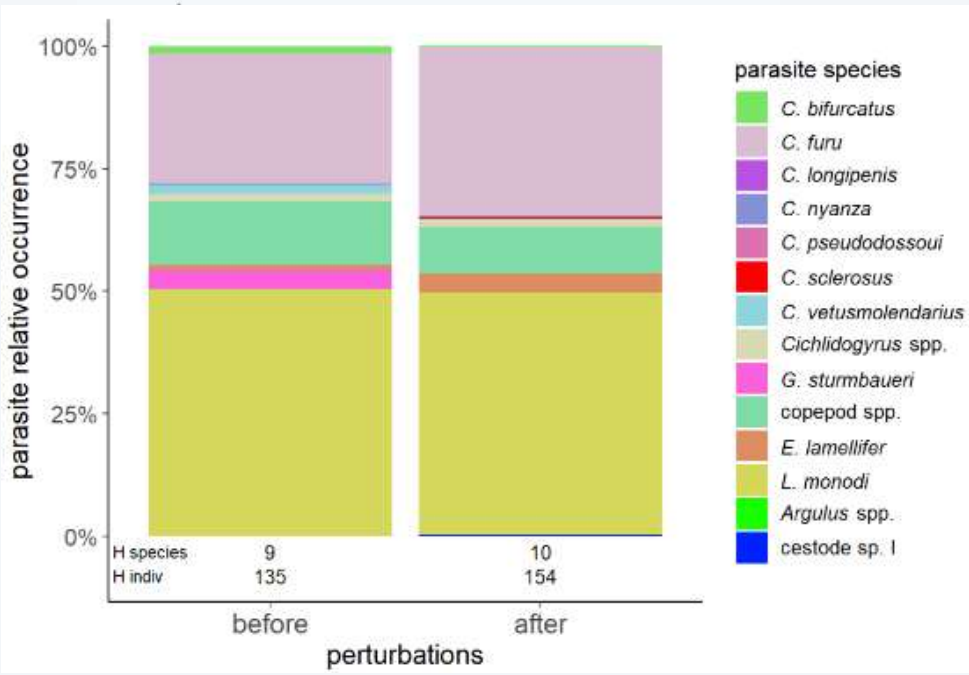


Worms of change: anthropogenic disturbance changes the ectoparasite community structure of Lake Victoria cichlids

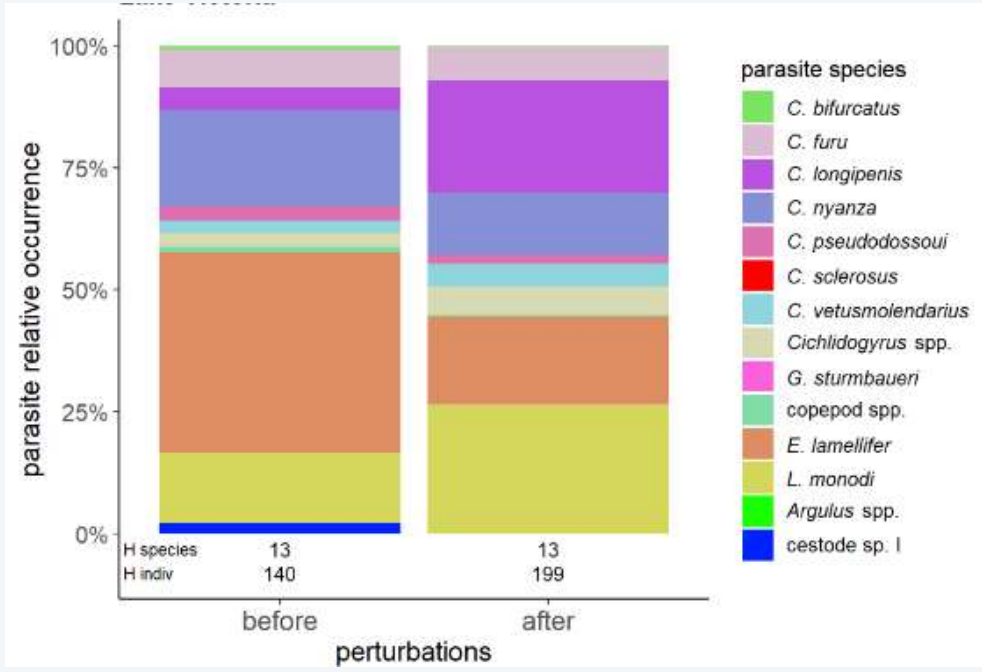
The relative occurrence of parasites changed in Lake Victoria (Gobbin et al., 2024, *bioRxiv*), but not in a pristine nearby lake

→ **observed changes actually result from anthropogenic perturbations**

Lake Edward (pristine)



Lake Victoria (human perturbations)



A network of change: fishes as predators of mosquitoes – an EcoHealth perspective

dr. Armando Cruz-Laufer

Mosquitoes have predators – incl. fish!

Overfishing might threaten these fish

Can protecting predators of mosquitoes reduce disease risks?

UHASSELT

ULB

Mangrove Specialist Group

IRD Institut de Recherche pour le Développement FRANCE

LEMAR

UNIVERSITY OF WASHINGTON 1861

A network of change: fishes as predators of mosquitoes – an EcoHealth perspective

Mangroves are in many places

… and are important for people

A network of change: fishes as predators of mosquitoes – an EcoHealth perspective

Saloum Delta National Park (Senegal)

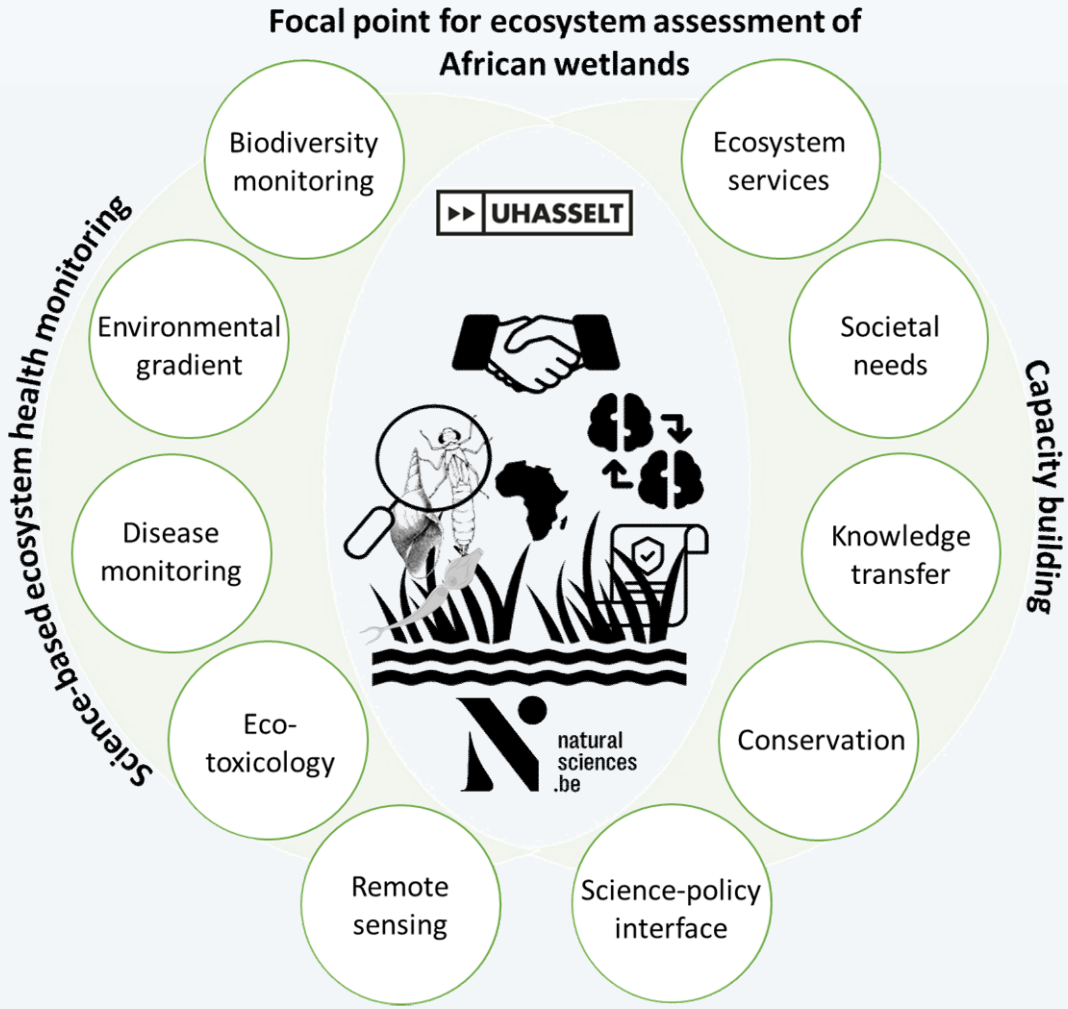
fishing ban *versus* fishing area

Monitoring African wetlands using macroinvertebrates and parasites: balancing ecosystem and societal needs

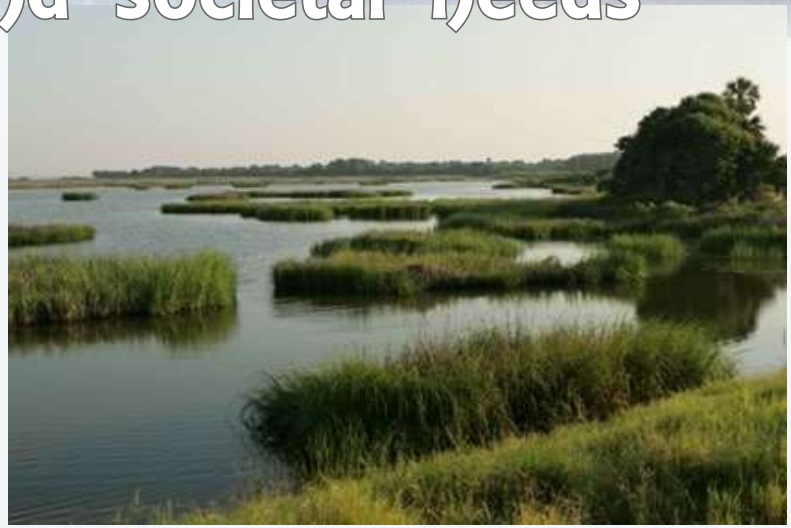
prof. dr. Nikol Kmentová

Vision

- reproducible framework for assessing ecosystem health in African wetlands
- macroinvertebrates and parasites as indicator taxa



Monitoring African wetlands using macroinvertebrates and parasites: balancing ecosystem and societal needs



First steps:
habitat selection for interpreting biological responses to anthropogenic stress

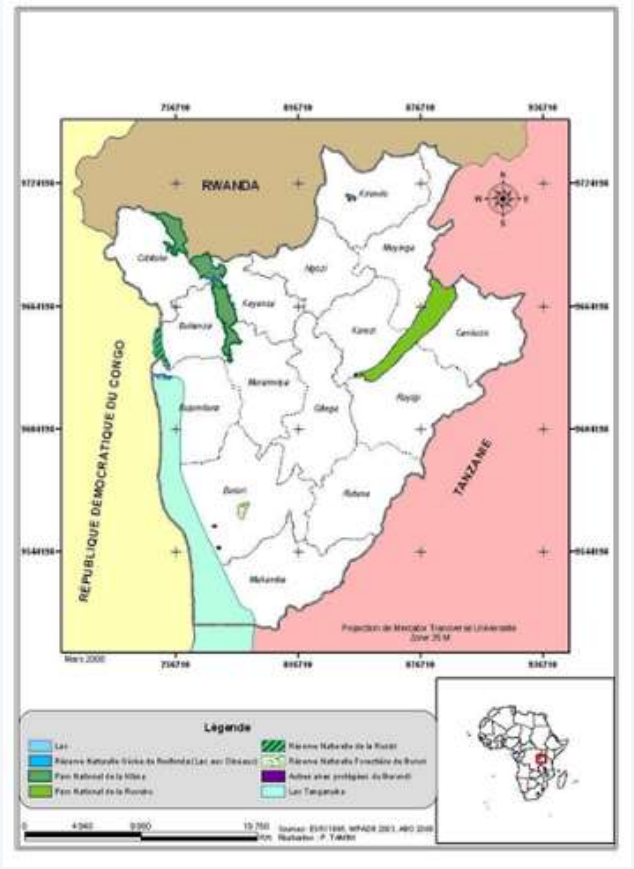
- physicochemical gradient (identification of the main disturbance gradient)
- “pristine” *versus* impacted areas

Monitoring African wetlands using macroinvertebrates and parasites: balancing ecosystem and societal needs

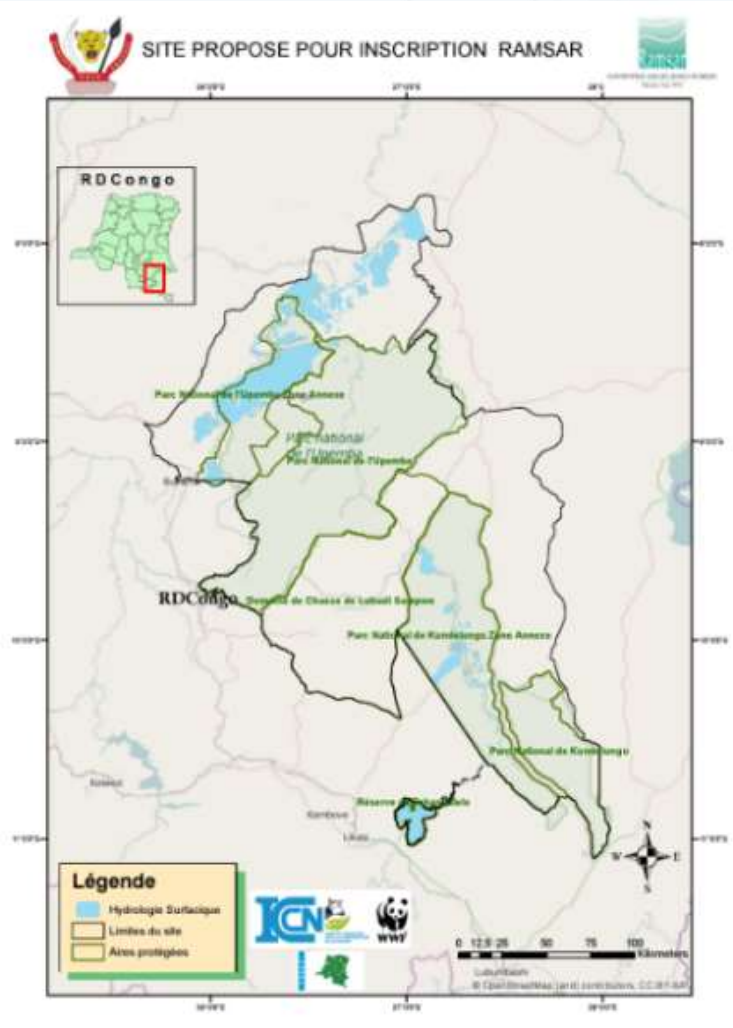
First steps:

- Rusizi
- Lufira

(UNESCO-MAB reserves & Ramsar sites)



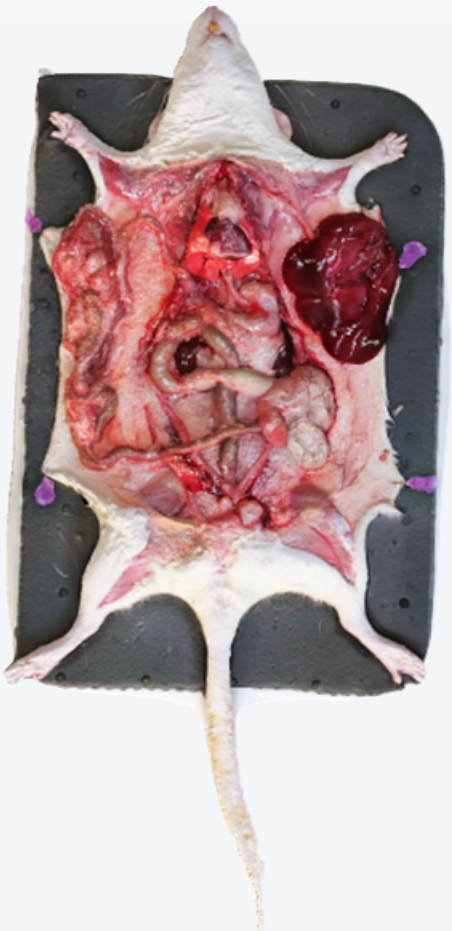
Nkezabahizi & Bizimana (2008)
Burundi's important bird areas



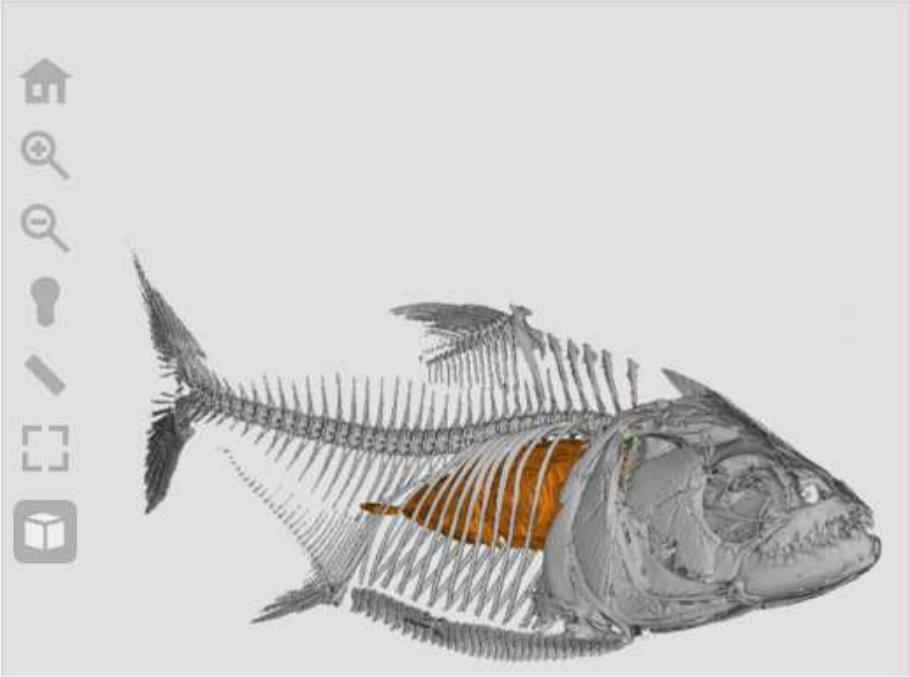
Blended education

an innovative educational project at UHasselt

dr. Nathan Vranken



Digital data



Piranha - Weberian apparatus

The Weberian apparatus is an anatomical structure that connects the swim bladder to the auditory system in fishes belonging to the superorder Ostariophysi. When it is fully developed in adult fish, the elements of the apparatus are sometimes collectively referred to as the Weberian ossicles or Weber's ossicles. The presence of the structure is one of the most important and phylogenetically significant distinguishing characteristics of the Ostariophysi. The structure itself consists of a set of minute bones that originate from the first few vertebrae to develop in an embryonic ostariophysan. These bones grow to physically connect the auditory system, specifically the inner ear, to the swim bladder. The structure acts as an amplifier of sound waves that would otherwise be only slightly perceivable by the inner ear structure alone (Wikipedia, 2024). Example 3D µCT scan from Miguel Garcia Sanz & Kelly Boyle, MNHN.

Blended education
an innovative educational project at UHasselt

Vision

A virtual learning environment with scans of museum specimens

- Annotated scans contribute to an integration between practicals and lectures
- Connect students with technological and societal developments
  - Animal welfare
  - Introduction to state of the art digitalisation methods
  - Integrating different courses
  - Course material for capacity-building in the Global South

Parasite conservation

IUCN Parasite Specialist Group

Red List to assess conservation status of species
Raise awareness, contribute to action plans

Does not include parasites of humans or domestic animals !

IUCN = International Union for Conservation of Nature

IUCN SSC PARASITE Specialist Group

RED LIST

UNIVERSITEIT GENT

NC STATE UNIVERSITY

INSTITUUT NATUUR- EN BOSONDERZOEK

Vlaanderen is wetenschap


Swiss National
Science Foundation
UHASSELT
fwo
Research Foundation
Flanders
Opening new horizons
belspo
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