

*The **ECOSPHERE research group** aims to study aquatic and valley ecosystems that are continuously challenged by natural and anthropogenic stressors. The research focuses on acquiring fundamental and applied knowledge at different levels of structural and functional organisation in order to underpin environmental management decisions.*

MASTER THESIS SUBJECT 2026-2027

Innovative sonar-based detection of invasive Chinese mitten crabs in Belgian waterways

Research group: ECOSPHERE

Hosting laboratory: CDE, Mesodrome

Promotor(s): prof. dr. Jonas Schoelynck Jonas.schoelynck@uantwerpen.be, prof. dr. Jan Steckel

Daily supervision: Heleen Keirsebelik



Water quality report and algae FORT 4 lake - source: PIH 2026

- This topic mostly contains ☒ literature study, ☐ lab work, ☒ field work, ☒ experimental work, ☐ GIS, ☐ numerical modelling, ☐ other:
- Possession of driver's license B is ☐ needed, ☒ recommended, ☐ not needed
- Possession of certificates needed: ☐ FELASA C, ☐ other:

The student will investigate whether imaging sonar can reliably detect and count migrating Chinese mitten crabs (*Eriocheir sinensis*), an invasive species that affects riverbanks and aquatic ecosystems in Belgium. The aim is to develop a monitoring method that can help water managers identify suitable locations for crab traps and support research on crab migration. Unlike camera systems, imaging sonar can operate in turbid water, potentially allowing crabs to be monitored with minimal interference with their movement.

The student will conduct controlled experiments using a Garmin LiveScope Plus imaging sonar system (or similar) in the large flume at the University of Antwerp's MESODROME facility. Sonar performance will be assessed under different combinations of flow velocity, crab density and water turbidity, using a full-factorial experimental design with multiple replicates. By comparing sonar observations with the known number of crabs introduced, the student will determine how accurately the system detects and counts crabs and which environmental conditions influence its performance.

If the controlled experiments demonstrate sufficient accuracy, the sonar system will be deployed in the Kleine Nete, downstream of the existing crab trap in Grobbendonk. Field observations will be compared with the number of crabs captured in the trap to assess the method's reliability under natural river conditions.

The results should ultimately establish the potential and limitations of imaging sonar as a tool for monitoring Chinese mitten crab migration. This will provide scientifically substantiated recommendations on its use for selecting strategic trap locations and studying crab movements in waterways where traps are not present.

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