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Conference Abstract

The *Mental'eau* project: what is the relationship between aquatic ecosystem health and human well-being?

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Abstract

Background

In a global context undergoing profound transformation (climate change, collapse of biodiversity, new pandemics, social changes, etc.), the 'One Health' concept (World Health Organization 2023) may appear relevant both from a scientific point of view, to think about (and prevent) these crises, but also from a social - or even political - point of view, by proposing an additional way of making visible the ecosystemic interactions and interdependencies in which humans are involved. We explore this dual social and scientific aspect of the 'One Health' concept in Mental'Eau project, which focuses on the interface between humans and aquatic ecosystems (rivers, water bodies, canals). A preliminary literature review has shown that few studies have focused on the link between well-being and health in aquatic ecosystems. Co-funded by the Rhine-Meuse Water Agency, our 4-yr project proposes an interdisciplinary approach based on

environmental sciences, human sciences and scientific mediation. It brings together a multidisciplinary research team (LIEC - Université de Lorraine CNRS, LHAC - Ecole Nationale Supérieure d'Architecture de Nancy, EABX and Beta - INRAE, ICube and LinCS - Université de Strasbourg CNRS) and the ‘Vigie de l'Eau’ association (Vittel), and involves local stakeholders.

Objectives

In this interdisciplinary research project, we are investigating the relationship that individuals have with aquatic ecosystems, as landscapes and environments for a variety of recreational practices. How can these ecosystems be a source of well-being for humans, and conversely, how can users' perceptions help to improve the quality of aquatic ecosystems? To what extent can we link human health and ecosystem health, from the perspective of the 'One Health' concept? Finally, how is this concept perceived and integrated (or not) by individuals, with possible implications for their practices and their experience of these environments?

This research aims to link indicators of well-being (relaxation, ability to concentrate, happiness, serenity, creativity, etc.), as expressed by individuals frequenting places linked to water (rivers, lakes, etc.) with measurable indicators of the functionality and quality of these aquatic ecosystems (Observatoire National de la Biodiversité 2025) such as physico-chemical parameters, biodiversity.

These scientific research objectives are complemented by more operational ones, which anchor the project presented in the field of action research. The project has three main operational targets:

1. to raise awareness of the 'One Health' concept among the public visiting the various sites, through events, serious games, etc.
2. to support local authorities in their decision-making on aquatic site development projects, through information meetings and the drafting of practical guidelines, and
3. to provide scientific mediation for local residents in the vicinity of the sites studied, to present the research and its issues as well as its conclusions.

Outcomes

First, a corpus of around 30 aquatic ecosystems was selected in the river Moselle watershed (Figs 1, 2, 3). These sites were selected based on both frequentation and functional characteristics criteria.

The second step was to design a method for characterizing the ‘health’ of aquatic ecosystems. This work was carried out as part of an end-of-study internship at INRAE Bordeaux (Paul et al. 2025). The proposed method integrates indicators of ecosystem ecological integrity such as naturalness, diversity, water quality and ecological interest. Metrics are calculated on the basis of both physico-chemical and ecological parameters, and are represented by radar diagrams that provide a synthetic visualization of the

ecosystem's state of health. Metrics are assessed at the 3 scales of the landscape, the immediate environment and the aquatic environment itself. This multimetric and multiscalar method is currently being finalized and should enable us to estimate the state of health of the ecosystem and its utilization for the sociological part of the study.

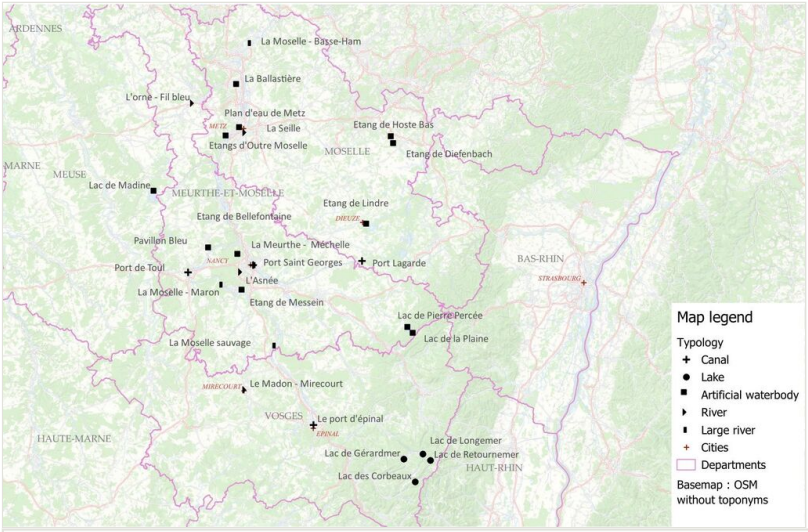

Figure 1. doi

Cartographic representation of the Mental'Eau corpus.

Figure 2. doi

Photograph of the Moselle River at Maron (54).

Figure 3. doi

Photograph of the Hoste-Bas Pond (57).

Sociological surveys combining observation, questionnaires (around 50 per site) and interviews (around 10 per site) will be carried out *in situ*. To date, a questionnaire has been designed by Caroline Denechaud (PhD student) and will be tested on the sites from spring 2025. The questionnaire covers various items, namely the perception of the characteristics of the site visited (sensory experience), the appreciation of the experience (effect of the experience), and the perception of the ecological quality of the site (individual assessment of the state of the ecosystem) (Denechaud et al. 2025). Survey results will be used to derive indicators of human well-being.

The last step will focus on analyzing the links between indicators of well-being and ecosystem health. Interpretation of these results will reveal, among other things, whether individuals relate their well-being to the health of the ecosystem and the indicators used, and whether there is resonance or dissonance between the state of well-being of individuals and the health of the ecosystems they visit.

We are also looking into ways of raising awareness of the 'One Health' concept among the general public. These awareness-raising activities will be carried out at selected sites, using a serious game built by the association ‘La Vigie de l'Eau’ (Fig. 4). The results of the awareness-raising study will help to answer the following question: is a citizen who is aware of the 'One Health' concept more sensitive to the well-being provided by a good-quality environment and, conversely, does he think he can influence the health of the ecosystems he visits?

Figure 4. doi

Photograph of the Mental'Eau serious game.

Keywords

One Health, human-nature relationship, aquatic ecosystem health, mental health, well-being

Presenting author

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Presented at

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Conflicts of interest

The authors have declared that no competing interests exist.

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