



PhD Project

Institut national de recherche en sciences et technologies de l'environnement et de l'agriculture
(IRSTEA)

Department: Eau / Gestion de l'eau, des usages, des services et des infrastructures (GEUSI)

Research unit: Unité mixte de recherche « Gestion territoriale de l'eau et de l'environnement », UMR
GESTE (ENGEES/IRSTEA), Strasbourg

PhD Director: Rémi Barbier, Professeur de sociologie à l'ENGEES (Strasbourg)

PhD Co-director: Sara Fernandez, ingénieure-chercheuse en géographie politique à Irstea
(Strasbourg)

Doctoral School: Ecole Doctorale Augustin Cournot, Université de Strasbourg

External partner: Grand Est Region.

Title:

Towards an adaptive management for greatly anthropized
environments? The case of fish pass facilities.

Summary:

For the last thirty years, scholars in the field of environmental science have invested significantly the concept of “adaptive management of socio-ecosystems”. Such paradigm echoes with research carried out in the fields of science studies and sociology of the environment. It is today included in several environmental strategies and programs, in the USA, in France.... Concerning water issues, material devices significantly frame natural and social worlds. They, however, tend to remain unconceived and ignored within adaptive management practices. While taking seriously the idea of a “water adaptive management”, how to conceptualize and govern material devices, that embed significant potential irreversibility? How to conciliate the presence and the creation of irreversibility and adaptation? Can it help to move from a “project logic” towards a “programme logic”? Such a move allows a double management extension in time and space: can it help better articulating adaptability and irreversibility? To answer these questions, the proposed doctoral thesis will study a specific socio-technical assemblage: fish-way devices that have been, up to now, central for implementing rivers management adaptive strategies.

1 Practical information

This doctoral research will be carried out at the doctoral school of the University of Strasbourg Augustin Cournot. It will be hosted at the UMR GESTE, a laboratory that associates ENGEES (*Ecole nationale du génie de l'eau et de l'environnement de Strasbourg*) and IRSTEA. The PhD student will be supervised by R. Barbier, professor of sociology at ENGEES and by S. Fernandez, researcher at IRSTEA in the field of political geography.

The PhD student will undertake field trips in France (Grand Est and Occitanie regions...) and Germany. The UMR GESTE will pay for the costs of investigations in France and abroad. The UMR GESTE will also cover the costs to attend conferences. The doctoral contract will be of a limited period of three years, and it will begin by the end of 2018 at the latest.

The candidate must :

- Hold a master degree (« master 2 » in the French system) or be about to finish his/her master in social science, preferably in sociology/anthropology of the environment and/or sciences, or in geography of the environment.
- Be fluent in French and English; speaking and reading German would also be an advantage.
- Master the techniques of qualitative surveys; any experience in this field would be appreciated.

To apply, please follow the procedure as indicated in the Irstea Web Portal (PASI): <https://pasi.irstea.fr/fr/campagne/1>.

Please feel free to contact us for any additional information you may need: sara.fernandez@engees.unistra.fr and remi.barbier@engees.unistra.fr.

2 PhD subject

The issue of fish circulation across rivers is not new. In France, in 1865 a law designed rivers classification in order to define those with dams that should be modified to allow fish crossing. More than a century later, the 1984 act made compulsory preserving fish habitats. It imposed minimum flows for the sake of aquatic life, without financial compensation for dams' managers and it compelled them to make their facilities crossable for migrating fish (fish-way devices). However, this issue has also been lately brought back to the political agenda, in a renewed, intensified and extended manner. The water framework directive (2000) indeed considers that fish and sediments circulation is one of the pre-requisite for water bodies for them to reach a good status. The issue of "ecological continuity", intertwining fish and sediments circulation, is, as well, one of the key elements of the French "water and aquatic environment act" (*loi sur l'eau et les milieux aquatiques, LEMA*) adopted in 2006 and of the so called "Grenelle laws" voted in 2009 and 2010 that promote the notions of "green and blue corridors".

Fish-way devices have, for more than a century, been the subject of significant financial and scientific investments, convening knowledge and techniques produced by life sciences and water sciences (hydrology, hydraulics, civil engineering...). Such devices have also provoked controversies. Their efficiency is questioned, particularly because of the dynamics and "overflowings" of the ecological processes at stake: salmon don't find the way one would like them to take, others, unwanted and

invasive species, instead, go for it, etc. Fish-ways are also subject to conflicts with other water users (mills owners, fishing associations, etc.). In France, the EDF company (*Electricité de France*) has heavily invested in the development of fish-ways for the last decades. Fish-ways are, indeed, at the heart of EDF process of territorial legitimation, in a context where hydroelectric concessions are expiring and being renegotiated. For EDF, fish-ways represent a promise of common language with other local stakeholders.

Two waterscapes were chosen to conduct field-research: the Rhine and the Garonne rivers.

The Rhine case study is based on a preliminary research carried out in 2016 by two professors of the UMR GESTE, A. Rozan (economics) and R. Barbier (sociology), in collaboration with JN. Beisel, professor of hydro-ecology at ENGEES (UMR LIVE). This research showed the significant scientific and financial investments devoted to the design of fish-ways on the main hydroelectric dams of the Upper Rhine managed by EDF, at Iffezheim (2000), Gamsheim (2006) and Strasbourg (2016), others being also planned to enable salmon's circulation up to Bâle. This research also brought to light the diversity of fish-ways devices implemented on the Rhine and its tributaries by heterogeneous actors (local governments, German hydroelectricity producers, etc.¹).

The study of the Garonne case will be based on the field experience deployed by S. Fernandez (UMR GESTE, political geography) during previous research projects. The Garonne River holds three perennial control stations (video and trapping stations of Golfech, Toulouse/Le Bazacle and Carbonne) implemented to evaluate the efficiency of devices deployed for decades to enable fish crossing. These stations also contribute to a system of salmon's trapping and transportation². In Golfech for instance, the control station is located on the hydropower facilities of Golfech/Malause. Since its completion in 1972, this facility was equipped with various devices for fish crossing that were subject to a recent evaluation that revealed substantial uncertainties.³

Concerning « adaptive management », most of the research carried out has, up to now, focused on the definition of the concept, as well as on the instruments and institutions that would allow its deployment. Worldwide⁴, the number of scientific papers devoted to adaptive management has continuously increased since the 1980s and its growth has accelerated since the years 2000. Concerning more specifically water, papers on adaptive management worldwide⁵ have sharply increased from the years 2000 onwards. Most of them belong to the fields of ecology and system analysis. They insist on the hybrid dimension of waterscapes and they promote polycentric modes of governance. There is, thus, a significant and organized corpus that allows tracking the conceptual and methodological developments of the notion of adaptive management, particularly in the field of water.

¹ For instance on « la Bruche », a tributary of the Rhine (3 « natural » fish-ways), on the Rhine in Germany (changes in the micro-hydropower turbine of Breisach)...

² Trapping/transportation consists of (i) capturing young salmon upstream Saint-Gaudens to transport them by truck downstream Toulouse or Golfech (downstream migration) and (ii) trapping salmon at Carbonne (between Saint-Gaudens and Toulouse) to transport them by truck on the upper part of the Garonne watershed.

³ Interview with F. Travade, retired EDF expert in fish-ways and author of several papers and reports on this subject.

⁴ Based on a preliminary study carried out on Scopus.

⁵ Based on a preliminary study carried out on Scopus.

Hydraulic facilities shape and frame waterscapes: they can bring forms of social and material or physical irreversibility. Hydraulic facilities, however, mainly remain unthought or unconceived in the adaptive water management literature. This research proposes, instead, to focus on the manner adaptive management proceeds in situations characterized significant forms of irreversibility. How to think of, conceive and govern material facilities that bring strong framings and irreversibility to waterscapes, within adaptive management policies and practices? The study of the Rhine and the Garonne will be a manner to question two key figures of contemporary French public action: the « project » and the « programme ».

To summarize, the PhD research will deploy qualitative research methods to:

1. Characterize the social, political and scientific trajectory of fish-ways devices
2. Formalize the notion of “programme and produce a typology of the « programmes » of adaptive management in which fish-ways devices are inscribed.