



Contribution of stakeholder perceptions to managing aquatic environments

Anne Rivière-Honegger, Marylise Cottet et Bertrand Morandi
(coordinators)

The French National Agency for Water and Aquatic Environments

Onema is a public agency operating under the supervision of the Ecology ministry. It was created by the 2006 Water law and launched in April 2007. Onema is the principle technical organisation in France in charge of developing knowledge on the ecology of aquatic environments and monitoring water status. Its mission is to contribute to comprehensive and sustainable management of water resources and aquatic ecosystems. The agency contributes to restoring water quality and attaining the goal of good chemical and ecological status, the objective set by the European water framework directive.

Onema, with a workforce of 900, is present throughout continental France as well as in the overseas territories in the framework of the national interbasin solidarity policy. In carrying out its mission, Onema works closely with all stakeholders in the water sector.

This book continues the *Knowledge for action* series that makes new research findings and science-advice work available to professionals in the water and aquatic-environment sector (scientists, engineers, managers, instructors and students). The book is available on the Onema site (www.onema.fr), in the Resources section, and at the national portal for "Water technical documents" (www.documentation.eaufrance.fr).



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Foreword

Trends in the relations between nature and society are impacted by technical and scientific progress, however they also signal changes in how people think about the environment. These changes are the product of modifications in individual perceptions and in the collective representations prevalent in society, an example being the current shift of our societies toward sustainable development.

The water and aquatic-environment sector is one of the fields where the relations between nature and society take form, are visible and may be observed, whether they concern the protection and management of environments and water resources or the creation of organisational structures for negotiations between stakeholders, drafting of new legislation, etc. Similarly, because the sector also brings into play values, imagination, memory and the very identity of humans and territories, as well as action plans and relational systems, the many uses of water differ significantly and in potentially conflictual manners.

Attempting to understand the individual perceptions and collective representations of water and aquatic environments, without forgetting that they always exist in a spatial and temporal context, is essentially an attempt to understand the meaning that individuals and social groups assign to water and aquatic environments. In the framework of integrated, basin-centred management requiring prioritisation among issues, this approach is the means to unite stakeholders around a shared vision, to understand their reactions and even to reduce tensions.

With this book, Onema again highlights the valuable contribution of the human and social sciences in implementing water policy.

Structured around two essential steps in a management project for aquatic environments, namely the formulation and assessment stages, this book looks at the contributions and limits of current research on stakeholder perceptions and expectations in an array of different situations. The study of each step is illustrated with ample feedback from projects and diverse stakeholder viewpoints that facilitate the learning process for the knowledge required for the operational management of projects by water managers.

Philippe Dupont

Director of the Research and development department, Onema



Preface

Management of water and aquatic environments currently finds itself in a context where particular attention must be paid to the perceptions held by the various stakeholders (managers, elected officials, people active in those environments, the general public, etc.). The European water framework directive (WFD) specifically targets the involvement of all stakeholders and requires an integrated approach to water and aquatic environments by one and all. Unfortunately, a more fragmented knowledge base is often observed. The new conditions now prevailing (climate change, territorial modifications, water quality, biodiversity, population growth, social change, trends in governance, economic pressures, etc.) are a source of tensions between present and future water uses and values. In view of creating a shared vision and reducing tensions, it is worthwhile to study, in different contexts and for various types of aquatic environments, the potential contribution of stakeholder perceptions in managing aquatic environments.

This book, written collectively, emerged from a national multi-disciplinary symposium of young researchers titled Perception and management of aquatic environments that was held in Lyon over the end of 2011 and the beginning of 2012 (<http://perception-aqua.ens-lyon.fr/>). The series of meetings was an occasion to review the scientific and operational issues and the progress made in the field. Presentations and round-table discussions facilitated the sharing of information and experiences between renown researchers, water managers and younger researchers. The group as a whole took a critical look at the methods currently employed.

The book itself was drafted collectively during writing workshops held throughout the year 2013. This experimental approach brought together approximately 60 people, including researchers from the human and social sciences (geography, sociology, etc.) and from the earth and life sciences, as well as water managers.

The objective of this book is to facilitate the implementation of integrated and participatory management of water and aquatic environments, and to initiate dialogue at the interfaces between the various disciplines and where the scientific and management fields meet. A further objective is to provide insights based on recent research. Finally, a number of case studies highlight the diversity of the aquatic environments studied and of management situations.

Anne Rivière-Honegger, Marylise Cottet, Bertrand Morandi
Coordinators



Abstract

Contribution of stakeholder perceptions to managing aquatic environments

Integrated management of aquatic environments requires that particular attention be paid to studies on the perceptions held by the various stakeholders (managers, elected officials, people active in those environments, the general public, etc.). The questions that arise concern the utility and methods of mobilising these studies for operational management.

A collective approach

This book is the result of recent work by 23 young researchers who addressed the issue of perceptions and expectations via a number of different and complementary approaches, including interviews, questionnaires, participant and non-participant observations, analysis of document collections, etc. They produced scientific knowledge on an array of aquatic environments (peat bogs, ponds, small and large rivers, etc.) and for different territorial situations (cities, predominantly agricultural rural regions, areas only slightly impacted by human activities, both in France and abroad), associated with a number of management issues (socio-economics, ecology, landscape, hydraulics and flood control, patrimonial¹ and recreational issues, etc.). The knowledge produced was discussed during a multi-disciplinary national symposium bringing together researchers and water managers. The process was overseen by a scientific committee and a number of experienced researchers contributed their ideas.

Four chapters

The contributions of studies on stakeholder perceptions are analysed taking into account the essential development steps in management projects for aquatic environments. Prior to the project itself, these studies produce knowledge by identifying stakeholders and their expectations (Chapter 1), and by delving into the history of the relations between societies and aquatic environments (Chapter 2). At the end of a project, they are an important factor in questioning and assessing management practices (Chapter 3). The book also presents the opinions of stakeholders in the field in the form of feedback from management and research projects, both in France and abroad (Chapter 4).

1 Identifying stakeholders and their expectations

Study of the perceptions and expectations of the various stakeholders concerning aquatic environments produces useful information during the preliminary diagnostic phase of the project. By characterising the diversity of stakeholders and their expectations, it provides the information required to address all the issues involved when developing a project. That is why the study must be launched in advance in order to effectively define the project. Awareness of the perceptions of the various stakeholders makes it possible to improve stakeholder-involvement efforts that take into account the interactions between stakeholders and to make decisions during the discussions that are a necessary part of defining a management plan. Conversely, lack of knowledge on public perceptions raises the risk of neglecting issues and of setting management objectives that do not correspond to the expectations of certain stakeholders.

2 Learning more about the history of the links between societies and aquatic environments

The case studies presented in this chapter demonstrate the value of studying the relations between history and aquatic environments when implementing management projects. Discussing and explaining past events enhances our understanding of more recent development work. This in turn raises questions on environmental dynamics over relatively long time spans and thus puts into perspective and/or pinpoints contemporary problems. Information on the history of aquatic environments can also be used for mediation work during project implementation. It is of value in creating a story, a narrative on aquatic environments.

3 Questioning and assessing management practices

An assessment of a project acquires greater depth by integrating an analysis of the perceptions of the various stakeholders involved. The analysis can be used to evaluate the environmental measures taking into account the complexity of the relations between stakeholders and the environment, and thus enhance management of future projects. Different stakeholders can have very different opinions on management projects. The perceptions concerning each aquatic environment differ for each person, with different expectations as a result. The fulfilment or the frustration of those expectations can profoundly influence the final assessment of a management project. Assessment results depend on how the project is set up and conducted.

4 Feedback

The book also presents the opinions of water managers and scientists who discuss their practical experience and provide their thoughts on the subject of the perceptions of aquatic environments. This information takes the form of feedback from eleven projects addressing the diversity of the aquatic environments studied (river basin, small and large rivers, etc.) and a number of research and management situations, both in France and abroad (Austria, Canada and Switzerland). The objective is to pull together a number of "stakeholder viewpoints" providing examples and feedback useful in expressing various needs and gaining perspective in terms of current practices.

Also in the book

■ Case studies

A total of 18 case studies, from different regions in France, illustrate the links that studies on perceptions and expectations have with:

- various legislative and regulatory texts in the water sector and more generally in the environmental and landscape-planning field, e.g. SBMPs (sub-basin management plans), river contracts, flood-prevention plans, local zoning documents, regional nature parks, etc.;
- specific aspects of each project, ranging from urban areas to nature parks and from the restoration of river banks for landscaping and recreational purposes to flood control;
- the diversity of the areas studied on different spatial scales, including peat bogs, ponds, small and large rivers.

■ Viewpoints, concepts and methods

The book also contains 13 Focus sections on viewpoints, concepts and methods providing readers with background information on the theories and methods used to produce the data on stakeholder perceptions of aquatic environments. The sections also present the strengths and the weaknesses of the methods employed, notably surveys based on interviews and questionnaires, participant and non-participant observations and analysis of document collections (oral, written, imagery).

1. Patrimony or heritage? See the introduction to Chapter 2 on the difference in French between the two terms. This English translation uses the two words in the French sense.



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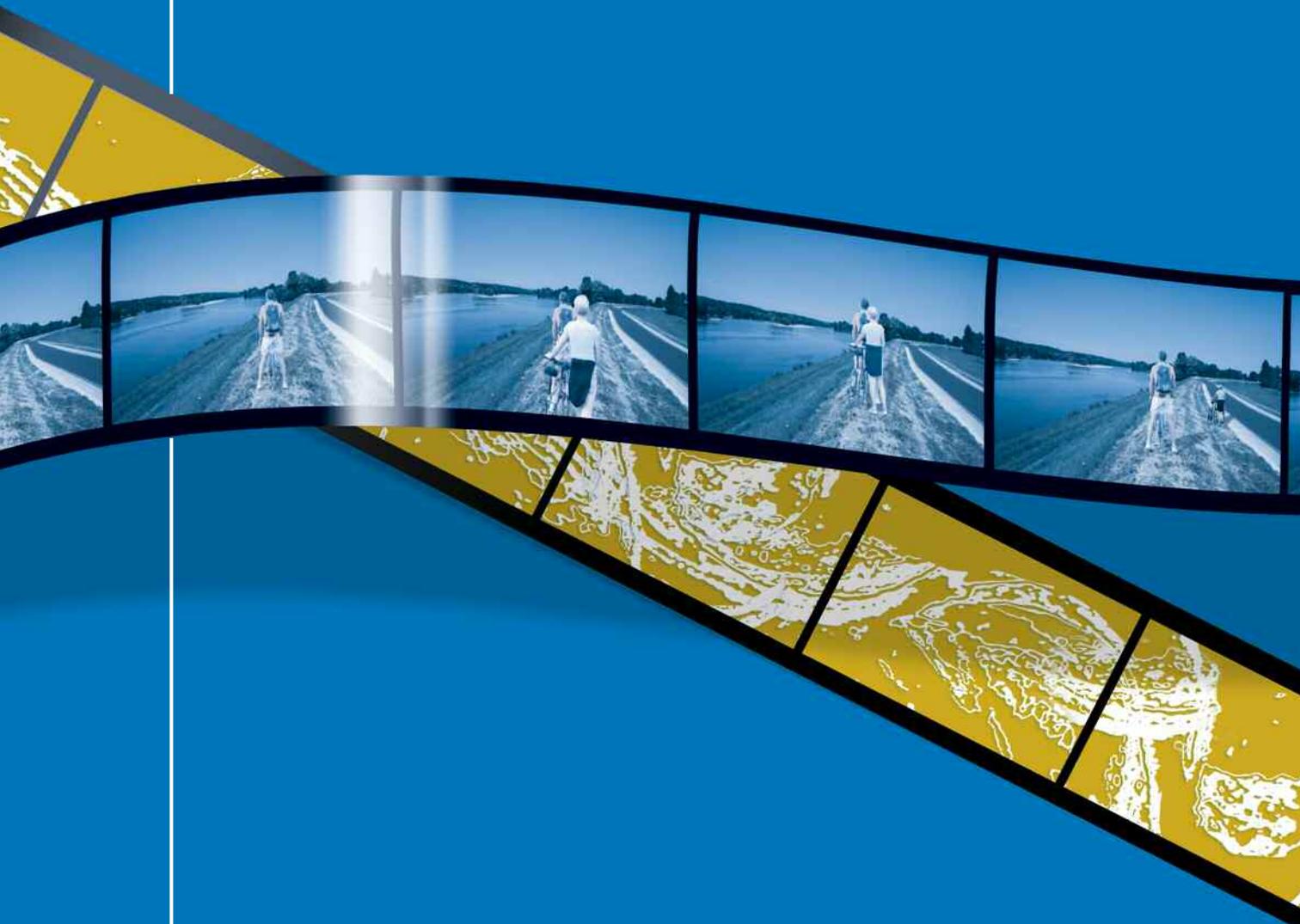


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Viewpoints, concepts and methods

- Marshes and literature, spellbinding words
- The project, uniting stakeholders for new and shared objectives
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Introduction



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The how and why of mobilising stakeholder perceptions for management of aquatic environments

Environmental managers work to promote, conserve and restore environments. However, any efforts toward rational management must be based on previously acquired knowledge on not only a given environment (e.g. what is an aquatic ecosystem and how does it function?), but also on the people and societies living nearby. This is because all environmental work takes place in a given cultural and social context. The formulation and implementation of environmental projects generally implies the coordination of individuals and groups of people that must work together to solve a given problem. When these stakeholders make decisions and take action, it is essentially on the basis of their knowledge of the environment. Management is therefore a question of knowledge and, above all, of the diversity of knowledge. But what is meant by knowledge on the environment?

Knowledge is acquired via the senses. Perception is defined as "all the mechanisms and processes by which an organism gains knowledge on its environment and the world on the basis of information processed by its senses" (Bonnet *et al.* 1989, p. 3). For example, the sight of a pond, the croaking of frogs and the smell of mud inform a person that they are most likely near a marsh (see Figure 1). Perception consists of complex information processing involving both automatic functions, based on sensory reflexes, and other, more controlled functions, based on cognitive activities. The results of scientific research increasingly show that perception does not produce an instantaneous image of the world (Barrow and Tenenbaum, 1986). Pre-existing cognitive models (knowledge, expectations, past experience, motivations) contribute to making sense of the sensory input. In the previous example, the person knows that they are near a marsh because they have already encountered that type of environment and it is linked in their mind to the "marsh" concept. Similarly, bird songs and lapping water are above all sensory stimuli, but they are also closely linked to the notions of nature and calm, they evoke peacefulness.

Figure

1



The sight of a pond, the croaking of frogs and the smell of mud are all sensory information indicating that a person is most likely near a marsh.

a © M. Monsay - Onema, 2010
b © M. Bramard - Onema, 2011

Cognitive models include mental images that serve to interpret the environment. The mental images or representations structure the perceived reality and provide each person with the means to organise and plan their reactions. The mental representations take form via the relationships that the person has with the environment. In this sense, they are specific to each individual. That being said, each person lives in a social environment that creates links and permanent interaction between the person and the society. As a result, social representations take form, notably via education, art, painting, photography, literature (see the Focus section below, titled *Marshes and literature, spellbinding words*). These collective representations take the form of "a represented image that, during its development, acquires a socialised value, i.e. shared by a large number of people, and a socialising value, i.e. that contributes to the formation of an interpretation of reality that prevails for a group at a given moment in its history" (Mannoni, 1998, p. 16). They are a type of social thought, of socially constructed and shared knowledge that "guides us in how we together name and define the various aspects of our daily reality, in how we interpret them, make decisions on them and, where necessary, judge and defend them" (Jodelet, 1989, p. 31).

For the management of aquatic environments, it is important to have scientific knowledge on environments and how they function, however it is equally important to know the perceptions and collective representations pertaining to those environments because they are a means to understand how individuals and social groups relate to their environment. This approach is all the more useful that there numerous uncertainties surrounding environmental action. Given the complexity of hydrosystems, biology, ecology and hydromorphology can offer only a partial understanding of the phenomena at work. In this context of uncertainty, the collective representations are all the more diverse. Individuals and social groups tend to fill in any gaps in their knowledge by constructing an idea of reality that they deem rational (Moscovici, 1961). When bringing individuals and social groups together for a joint project, particular attention must be paid to the ideas formulated by the participants.



Marshes and literature, spellbinding words

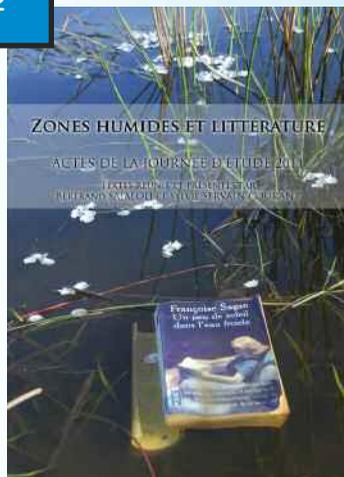
Marshes and wetlands in general, often seen as strange and captivating places, have long intrigued writers and stimulated their imagination. Marshes fascinate and take on an epic nature when one must cross them, a mythical aura where supernatural forces are met and must be fought, an ethical and initiatory character where, once the forces of evil have been vanquished, the hero can pursue his route. Even today, due to their physical and symbolic contradictions, to their rare inclusion in globalised market structures which encourages the imagination, wetlands are often present in literature, whether romantic, thrillers or fantasy (Sajaloli and Servain-Courant, 2013) (see Figure 2). Subtle relations are established between readers and wetlands. Literature is capable of creating landscape concepts that are firmly anchored in the minds of managers, both public and private, when making decisions to work on marshlands. It is the words that create the water and the landscape, as was predicted by André Ferré in his *Géographie littéraire* (Ed. Sagittaire, 1946).

Wonderfully presented by Gaston Bachelard in his book *L'eau et les rêves. Essai sur l'imagination de la matière* (Ed. Joseph Corti, 1942), the semiotics of water, i.e. its symbolism, is based on the many states of water, stagnant, running, clear, deep, calm, violent, in order to elicit the various material images linked to water. Throughout the chapters of the book, water is described as spring-like, lively, running, transparent, odorous and evocative of narcissistic and amorous sentiments. It is erotic, passionate and its odour, when mixed with humus, is that of desire.

When immobile, heavy, dark and inscrutable, water constitutes a meditation on death and inexorable time. When slack, it signals the passage of time, but muddles the chronological markers, elicits memories and causes supernatural breaks in space-time. Stagnant water is also a sign of death accepted, of feminine suicide, the drowning of Ophelia, the source of infinite sadness and melancholy, it is the substance of despair. When mixed with soil, water constitutes the original mud, the matrix, from which spring life and the wealth of nature, and the symbolic defilement makes spiritual renewal possible. The muddy water is also the symbol of a special fear, a wet fear that feeds fantastic stories and legends, similar to the washerwomen of Georges Sand in *Les Légendes rustiques*. But water is maternal, it is the milk of the Earth and of Nature, it lulls, consoles and purifies. It is a fountain of youth that refreshes and heals. When violent, torrential and wild, water manifests divine anger and evokes all the cosmological notions of punishment. But, as Bachelard himself admitted, his book could not cover all aspects of water. It is too intimately, to organically a part of humans and of their imagination, it resists any rational approach.

Figure

2



© Groupe d'Histoire des Zones Humides

The eighth symposium of the Wetlands history group contributed to updating the semiotics of water.

Though it is possible to link a particular symbolism to each type of wetland, e.g., the passage of time for rivers, death and contemplation for ponds and stagnant waters, supernatural phenomena for peat bogs, etc., the most striking feature is their inherent paradox, i.e. that they are simultaneously one thing and its opposite (life and death, yesterday and tomorrow, hell and paradise, etc.). The literary approach places such contradiction at the centre of the symbolism, but also of the biophysics and politics of wetlands. In addition, a shift occurred very recently in the literary perception of wetlands, from an attitude of neither-nor (neither earth, nor water), which made these areas very difficult to understand and manage for modern societies, to one of and-and (earth and water, good and evil, natural and human, etc.), where marshes, symbolising the complexity of the relationships between humans and nature, offer a post-modern model of territorial management. By praising the paradox and imbuing it with value, one is likely to invent new forms of conservation. Therefore, literature contributes to promoting the value of wetlands.

Bertrand Sajaloli (Geographer, University of Orléans. Wetlands history group)
Wetlands history group: <http://www.ghzh.fr/>

This book will explore the potential contribution of research on perceptions and representations to the management of aquatic environments (see Figure 3). The first step is to determine the role played by the research in the project, then to make available feedback from the field and research results taking into account the diversity of management situations, finally to present methods currently used in work on perceptions and representations.

Figure

3



a © M. Cottet, 2006

This book will explore the potential contribution of research on stakeholder perceptions to the management of aquatic environments.



Incorporating research on perceptions into project management

The perceptions that local stakeholders associate with aquatic environments merit sustained attention because they provide insight into current issues in the area. Regular monitoring provides managers with the means to address current issues and to shape project strategies in an overall framework of environmental management. However, it is often at the beginning of a management project that questions concerning perceptions take on the greatest importance. At this early stage, stakeholders may sit down at a table to discuss the issues involved in the project. They must reconcile the various expectations to settle on the compromises required to define the objectives. In this sense, the commencement of a project is the time and place where the perceptions and expectations of the participants are revealed, where consensus and/or conflict emerge.

It is this crystallisation of the issues by the management or restoration project that explains why most research on perceptions concerning aquatic environments is carried out on this phase. Projects generally comprise three steps:

- the formulation phase, which includes the technical and socio-economic assessment prior to any work, study on the environmental and socio-economic feasibility, discussions between the various stakeholders on the basis of the prepared scenarios, decisions concerning objectives, etc.;
- the implementation phase, which includes the actual work, dialogue among the project participants, communication on work progress, etc.;
- the evaluation phase, which includes measurements on the environmental effects of the work done, study of the socio-economic impacts, an appraisal of stakeholder satisfaction concerning project management and results, etc.

The management or restoration project is therefore a process defined in terms of time and space that requires a team and various partners (see the Focus section below). It can take on a number of different forms, from a territorial procedure in the framework of an SBMP (sub-basin management plan) or a regional nature park to a more local project to restore a river reach or to manage an exceptional environment such as a peat bog.

The project, uniting stakeholders for new and shared objectives

A project is a "unique process, consisting of a set of controlled and coordinated activities, with start and end dates, undertaken to achieve an objective complying with specific requirements, including constraints in terms of deadlines, costs and resources employed" (NF standard, ISO 9000). It is a specific and new action that progressively and methodically structures a future reality, for which there is not yet an equivalent (standard AFNOR X50-105).

Consequently, the project represents an innovation for the area, the population and the stakeholders, even if it is similar to an approach already experimented with elsewhere. A management project involves both a project team and a set of partners.

The project team is organised around the (complementary) skills of its members, as well as the availability and motivation of each person (voluntary participation) (see Figure 4). The objectives and operating rules of the team are worked out jointly. The setting of intermediate objectives is a means to engage a process developing team spirit and dynamics, as well as positive relations with external partners. These relations are indispensable to avoid situations where the energy turns more to maintaining the team than to achieving the project. In this sense, it is important to plan and mark the end of the project.

Figure

4



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The project team is organised around the skills, availability and motivation of each person.

The partnership is an association actively involving the various participants in the project. The partners maintain their autonomy, but join their efforts in order to achieve the project in which each, according to their respective missions, has an interest, a responsibility and an obligation. The partnership is based on a voluntary and cooperative effort in which individuals or groups undertake to work together. However, the partnership is often formalised and it is assumed that there exist shared interests, a minimum level of commitment and a degree of confidence based on the acceptance of reciprocal dependence.

Dominique Lassarre (Psychologist for the environment)

We decided to organise this book around these three project steps and to examine the potential contributions of studies on perceptions, expectations and collective representations to each step. Thanks to their experience in an area, managers acquire knowledge on the local stakeholders and their perceptions. However, research on perceptions and expectations can provide additional elements and inform from different angles (see the Focus section below on *Management, managers and research*). In general, the objective is to produce knowledge that can later be used in the framework of an operational process implemented by the managers, in conjunction with the engineering firms, environmental-protection groups, etc.

Studies on perceptions ideally occur in the preliminary phase prior to the project itself. They produce knowledge about the stakeholders in advance (Chapter 1) as well as on the history of their relations with the target aquatic environments (Chapter 2). This knowledge is extremely useful in establishing objectives that all stakeholders share and see as relevant. That is why studies on the stakeholder perceptions should take place prior to the project, similar to the preliminary assessment and feasibility study before the actual work.

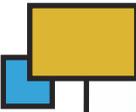
But that does not mean the contribution of these studies can be neglected during the subsequent phases of the project. Following the project, this type of inquiry represents an integral part of the post-project appraisal process (Chapter 3). These studies examine the opinions that various stakeholders have on the management project, on any benefits and impacts, on how the project was carried out. The studies are also a means to determine to what degree the perceptions of the stakeholders had, have or will have an impact (positive or negative) on the project.

Research on perceptions carried out during the project itself is somewhat different because it is generally conducted in the framework of a participatory procedure. The purpose is no longer to collect "steady-state" information, but to address the results of the interaction between the project stakeholders. This type of research has shown that there is more than one type of relationship between the management and scientific communities. In this context, it is common to distinguish between academic research and action research. D. Lassarre provides the following definitions:

- academic research does not interfere with the studied community. Its objectives and results do not have any direct impact on the real world. It tends to produce knowledge that can be generalised to other situations;
- action research interacts with the community. In most cases, it provides answers in response to a particular group and it focusses on the local context. Its results lead directly to changes in the local situation and can serve as a decision aid in similar situations.

In as much as the work of the young researchers involved in preparing this book falls primarily under the heading of academic research, the contribution of studies on perceptions during the actual management project will not be discussed here. However, an illustration of those contributions is nonetheless provided in the feedback from preparatory work for Ph.D theses on management projects dealing with flooding, urban renaturalisation and enhancement of local patrimony (see the Feedback sections on *The Rhône River*, page 130, and *The Furan River*, page 134).

Generally speaking, the work presented in this book is accompanied by feedback (Chapter 4) drawn from interviews carried out with French and foreign (Austria, Canada, Switzerland) managers and researchers. The objective being to pull together a number of "stakeholder viewpoints" useful in expressing various needs and gaining perspective in terms of current practices.



Management, managers and research

It is often useful to look back at the basic meaning of the words we use. For example, the term "management" is often used today when people speak about natural resources, the environment or biodiversity. It takes on a particular connotation when we look at its original meaning, which is "the action of managing the affairs of another person" or to "administer", etc. It is thus a question of administering the affairs of another person, which is indeed what many managers do.

And the managers? They make up vast groups and networks, ranging from the State down to each private landowner, with numerous middlemen such as public agencies, local governments, associations, etc., each having an array of very different rights and responsibilities. If the State passes a law, other entities organise the management procedures and still others carry out the actual work.

The difficulties that they must overcome are highly diverse and deal with pollution, disturbances, natural resources, environmental protection and biodiversity. Even if the knowledge bases in all these fields have increased substantially, notably over the past few years, managers still need the knowledge produced by scientific research to continually improve their management practices. For this reason, they lie at one end of the continuum spanning environmental management, from fundamental research to field work and from understanding ecological processes to making technical decisions (see Figure 5).



a

a © A. Dutartre - Irstea, 2012
b © A. Dutartre - Irstea, 2014



b

Our knowledge and technical decisions concerning water primrose have undergone significant change. Removal by mechanical means (a) remains necessary for large masses of the plants, however selective manual removal (b) is an effective technique that has not been shown to have any measurable impact on plants and other aquatic organisms not targeted by the work. Manual removal is now widely used on sites in the process of being colonised or as a complement to mechanical removal.

In most cases, the actual work is set up by managers in close contact with other organisations providing funding, technical support, etc. The success of these management projects depends in part on the quality of the functional links between the various partners (funding entities, organisers, operators) and on the compatibility of the objectives of those partners. Some of those objectives do not exclusively target the long-term management of the environment, but also aim to improve the short-term satisfaction of certain human uses occurring on the given sites. Local social demands are an integral element in management. In that knowledge on the functioning of aquatic ecosystems is still insufficient, there is a considerable degree of empiricism in management projects and their execution is frequently not followed up with a critical analysis of the results and of the changes made in the environment, which could assist in reducing the level of empiricism.

The discrepancies that continue to exist between research and actual management practices are one of the main causes of the uncertainties and approximations in the results of projects. The "operating speeds" of research (programme schedules, time required to acquire data, publication delays) and of management projects ("do it now") are very different, but cannot alone explain the continued existence of such discrepancies. The persistence of significant divisions between research fields and of a lack of appreciation for the importance of interdisciplinary links often makes it difficult to respond to management needs concerning major objectives, e.g. inclusion of biodiversity issues and the satisfaction of uses, when in fact the emergence of these needs should serve to stimulate research in these fields.

Management of aquatic environments has undergone major change over the past decades. This is a direct reaction to the most obvious degradation, the increase in anthropogenic pressures and efforts to produce qualitative improvements in the status of aquatic environments. It has progressively shifted from the virtually total dominance of the "hard" sciences (hydraulics, hydrology, etc.) used to physically modify environments without taking ecological quality into account, to a relative dominance of "softer" sciences (biology, ecology), which explicitly address the ecological integrity of environments and increasingly take long-term needs into account.

These changes, some voluntary, some not, have been based on an increasingly far-flung set of technical and scientific disciplines. The life sciences and their research findings are today much better integrated in management techniques (though there is still room for improvement), but there is no doubt that the human and social sciences must be encouraged to contribute fully to management efforts. Can anyone imagine why we could continue to neglect the importance of research on a form of management organised by society for society?

Alain Dutartre (Hydrobiologist)



Case studies and feedback to illustrate the diversity of management situations

The research presented in this book is representative of the diversity of management situations encountered in the field.

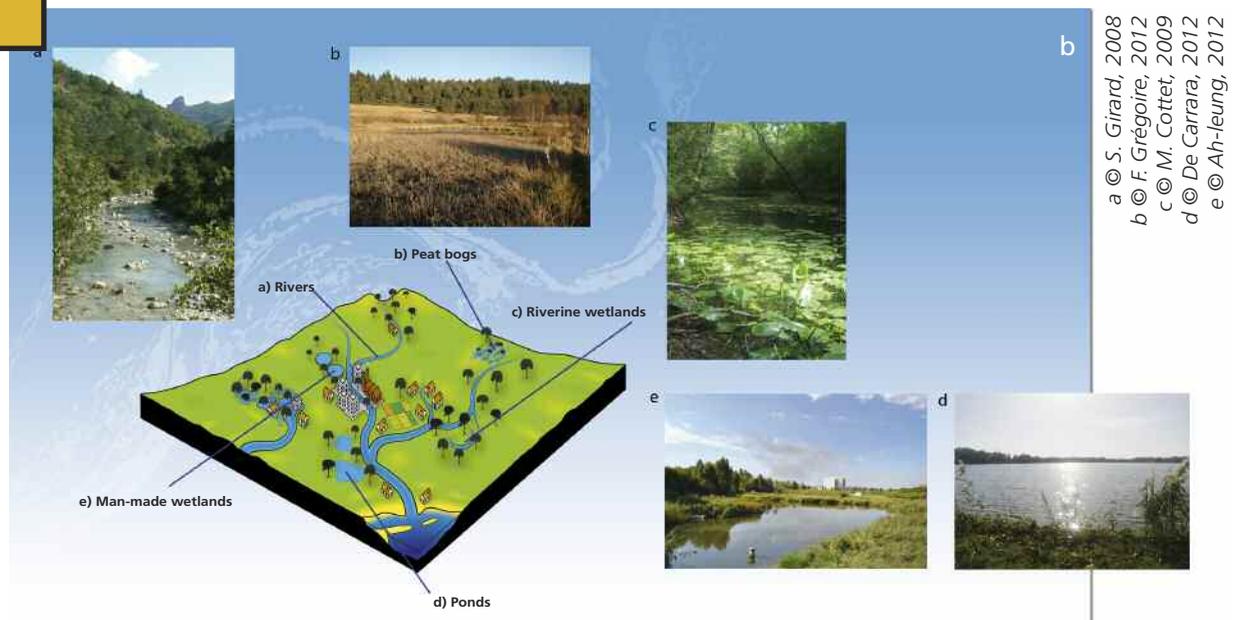
- First of all, this diversity is the result of the many legislative and regulatory texts in the water and aquatic-environment sector and more generally in the environmental and landscape-planning field. Any approach to environmental management projects must necessarily take into account the regulatory issues.

- Secondly, this diversity arises from the specific aspects of the areas covered by the projects, ranging from urban areas to nature parks, and all the related issues. The projects are themselves highly diverse, with some proposing work on river banks to restore the landscape and recreational functions, while others primarily address flood-prevention issues.

- Finally, diversity exists in the many different types of environments studied (see Figure 6), ranging from peat bogs to large rivers. Perceptions will obviously vary depending on whether the ecosystem addressed is a river, a bog or a pond. Though not predetermined, it is certain that uses, practices and the images evoked depend on the environment, its biophysical characteristics and the landscape.

These differences in local contexts result in a wide array of management and restoration situations. The type of environment implies a number of specific issues covered by legal and regulatory texts determining the framework for any work (see the Feedback section on *A consulting firm*, page 146). However, it would be senseless to create partitions and strict distinctions, notably for integrated management of aquatic environments which has been the guiding principle behind French public action in the field since the 1964 Water law (Narcy, 2013).

Figure 6



a © S. Girard, 2008
 b © F. Grégoire, 2012
 c © M. Cottet, 2009
 d © De Carrara, 2012
 e © Ah-leung, 2012

Stakeholder perceptions vary depending on whether the issue at hand is a) a river, b) a bog, c) a riverine wetland, d) a pond or e) a man-made wetland. Adapted from H. Tronchère, 2013.

Integrated management is a fundamental principle in the field of water and aquatic environments and it follows that studies on the stakeholder perceptions and collective representations have a role to play. According to a general definition, integrated management "for a coherent hydrographic unit, consists of discussions between and organisation of all stakeholders, as well as coordination of all restoration and management work (sector policies, programming, etc.), and secondly of efforts to encourage synergy between the good functioning of aquatic ecosystems and satisfaction of the various uses. Integrated management attempts to optimise all interventions in order to achieve balanced management" (EauFrance glossary, 2014). An initial step toward integrated management was taken in 1964 with the creation of the basin committees and of the basin financial agencies, and with the launch of management organised around the large hydrographic basins. However, the principle was truly established by the 1992 Water law. The latter created the necessary instruments, namely the river-basin management plans (RBMP) for each of the major French river basins and sub-basin management plans (SBMP) for smaller basins. Research on perceptions addressed these two instruments in a number of large-scale studies (see the Feedback sections on *The Sèvre Nantaise River* and *The Bourbre River*).

The principle of basin-centred integrated management encourages prioritisation of issues and projects focussing on one or more issues, where certain objectives are more important than others. The case studies and project feedback presented in this book often focus on a single issue, i.e. management of patrimony, ecology, recreational issues, flood risks, etc. (see Figure 7).

Figure 7



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 b © A. Dutartre – IRSTEA, 2012
 c © C. Roussel – Onema, 2012
 d © M. Bramard – Onema, 2014
 e © Y. Falatas – Onema, 2013
 f © E. Comby, 2012

Management of aquatic environments can involve many types of issues, including a) ecological, b) recreational, c) governance, d) flood risks, e) economic and f) patrimonial.

In terms of the ecological issues, the European water framework directive (WFD) constituted a major step forward. It is today one of the fundamental guidance documents in the field of water and aquatic environments. The directive was voted by the European parliament in the year 2000 and transposed into French law in 2004 and 2006, notably by the LEMA law on water and aquatic environments. It transformed public policy by shifting the onus from mandatory efforts to mandatory results. The overriding objective is to achieve good water status within relatively short deadlines (2015, 2021, 2027). The definition of "good status" centres on the environment, but nonetheless involves certain social perceptions (Narcy, 2013) (see the case study on the multiple definitions for the concept of river restoration, page 88).

Ecological management profits by integrating study on the perceptions that the management work elicits, but also that influence that work (see the case study on the perceptions and management of invasive plants, page 86, and the case study on the perception of logs and woody debris in rivers, page 97). The WFD in essence paves the way for studies on stakeholder and public perceptions in that its implementation must include socio-economic aspects and participation by the general public, not only on the basin level, but on more local levels as well (see the case study on surveys of efforts to encourage participation in the Yzeron River development project, page 91). The concept of participation is today an important, international issue in the ecological management of aquatic environments, even in countries where the WFD does not apply (see the Feedback section on *Switzerland*, page 150).

The issue of participation is all the more important due to the fact that the management of aquatic environments must be coordinated with other issues, notably safety issues that are strictly regulated (see the Feedback sections on *The Calavon-Coulon River basin*, page 138, and on *The Development agency for the Vilaine River basin*, page 126). The law on modernising public action (2014), by granting responsibility for the management of water, aquatic environments and flood prevention to local governments, also contributed to updating the notion of integrated management. The law established the link between the 2000 WFD and the 2007 European flood directive by setting up the legal requirement to coordinate restoration, water and aquatic-environment policy with the management of flood risks (Loupsans, 2014). Research in the field of perceptions can also produce useful knowledge for the operational implementation of policy in this new context. A great deal of research on flooding has already been carried out, notably in urban areas where the consequences for the safety of life and property are particularly high (see the case studies on the perceptions of floods in the Vilaine River basin, page 37, on using Rhône flood markers, page 81, and the Feedback section on *The Rhône River*, page 130).

The links between water and aquatic-environment management and urban restoration projects do not deal exclusively with the issue of flooding (see the Feedback section on *The Grand Lyon urban area*, page 142). For example, projects to restore river banks, in which recreation and the landscape are the prime objectives, are regularly included in local urbanisation plans (PLU) (see the case studies on the *Berges du Rhône* and *Rives de Saône* projects, page 94, and on restoring the banks of the Rhône in Lyon, page 70). These projects are often coordinated within the requirements of the Grenelle environmental laws (2009 and 2010) concerning ecological networks (see the case study on restoring the patrimony of the Loire River, page 72).

Going beyond the restoration of areas along rivers, studies on nature in urban areas have been expanded to the technical systems for stormwater management and efforts are now put into coordinating technical solutions with recreational and ecological issues (see the case studies on user perceptions and practices near stormwater-management systems, page 46, and on the technical and social assessment of modifications in Bourlione Park, page 104).

But again, recreational and landscape issues are not limited to urban projects (see the Focus section titled *The issues involved in managing marsh landscapes*, page 24). It is worthwhile to study them in the framework of management projects carried out in other types of areas. The Canadian example shows the value of landscape work in an agricultural environment (see the Feedback section on *Canada*, page 120), whereas the Austrian example deals with landscape issues and the number of visitors to rivers that are only slightly developed or ecologically restored (see the Feedback section on *Austria*, page 154).

Today, it has become difficult to design a restoration or management project without taking into account the local area and the local landscape planning tools and expertise. Studies on stakeholder perceptions can be used by organisations such as regional nature parks (see the 1967 ordinance on the creation of regional nature parks) (see the case study on the perceptions of stakeholders in the Brenne regional nature park, page 66) and more generally by all environmental-conservation organisations such as national parks (see the 1960 law on the creation of national parks) and nature reserves (see the 1930 law on sites of "scientific value"). Certain organisations (associations, local governments) are also in charge of managing Natura 2000 zones (created in compliance with the European directives on birds (1979) and habitats (1992)).

These different organisations often make efforts to raise awareness, educate and promote patrimonialisation not only of aquatic environments, but also of their uses and traditions (see the case studies on the management of the Dombes ponds, page 100, on patrimonialisation of rivers in the Drôme valley, page 63, on the history of bathing and boating in the Loire at Orléans, page 60, and the Feedback section on *The Furan River*, page 134).

This patrimonialisation process, reinforced by the 1992 law that made water a national heritage icon, has obviously generated interest in temporal approaches, an interest that studies on perceptions can satisfy in that they address long time spans (see the case study on 150 years of change in Rhône landscapes, page 68) as well as shorter-duration projects (see the case study on differences in uses of wetlands over time in the town of Dettwiller, page 80).



The issues involved in managing marsh landscapes

The issues of marsh management are closely linked to the perception of water and aquatic and marshland vegetation that is itself a function of the interests of the various stakeholders and users, both public and private. The main issue concerns the decision on how to benefit from, use and maintain a marsh, and on the compatibility of the selected techniques over time and space. Planning in this way should make it possible to turn the various local landscapes into coherent, modifiable, common goods that can be transmitted by and for current and future owners and users.

To achieve that objective, public and private managers of the land and water should develop a plan in a way that is transparent to the public and decide on joint, contractual solutions. Ideally, the solutions should reconcile the various landscape issues, i.e. patrimonial, economic, recreational, aesthetic, memorial, ecobiological, environmental, etc. (see Figure 8). The agreements between the owners, renters and managers of marshlands most directly influence landscape management. They include notably the visual and physical accessibility of aquatic and marshland environments, their hydraulic regulation, maintenance techniques for rivers and lakes, and regulations governing their collective and private use.

Often long discussions between local governments, private stakeholders and associations are required to ensure that managed wetland landscapes are accepted by a local majority of the people as a common good that they can adopt and transmit. If they fail, the public interest will have to take a back seat to purely private or governmental interests.

Pierre Donadieu (Landscape architect)

Figure

8



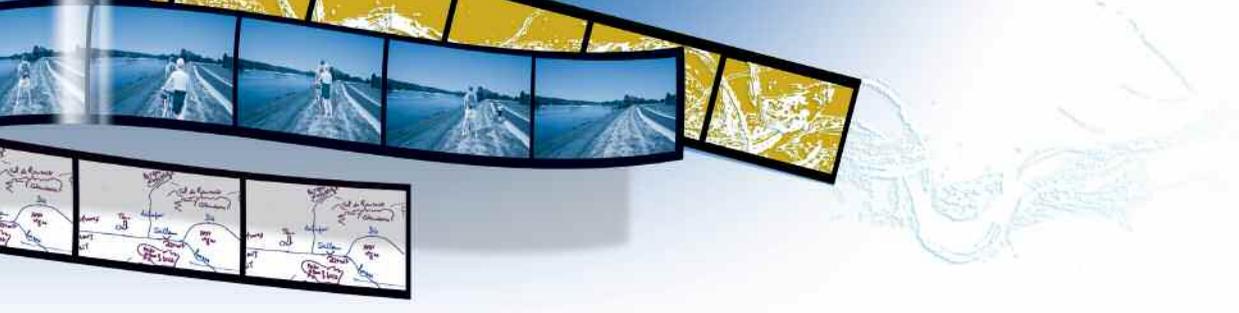
a

a © M. Bramard - Onema, 2011
b © DR Onema, 2011



b

Ideally, the solutions should reconcile the various landscape issues, i.e. patrimonial, economic, recreational, aesthetic, memorial, ecobiological, environmental, etc.



Methods to study stakeholder perceptions

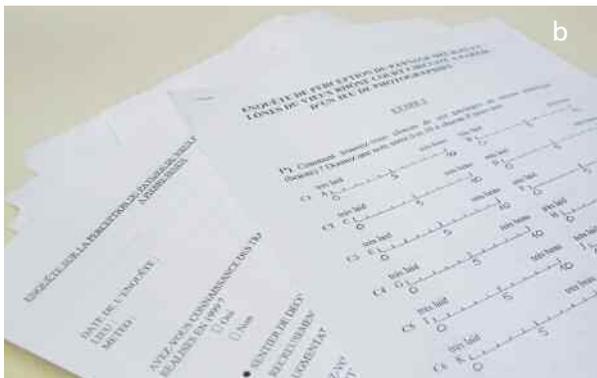
A further objective of this book is to present, in the Focus sections, the various methods used in studies on perceptions in order to produce knowledge on aquatic environments. The study of human phenomena is inherently subjective and the data produced cannot be compared to that of the "hard" sciences. That being said, it is possible to approach the data objectively using specific and rigorous methods. That is the goal of the human and social sciences that have developed a considerable and diverse set of methods.

Those methods include surveys based on interviews or questionnaires (see Figure 9), participant and non-participant observations (see Figure 10) and analysis of documentation (oral, written, imagery) (see Figure 11). The various techniques can be adapted and adjusted to no end, depending on the type of approach (qualitative and/or quantitative) and the tools used (camera, video). The point here, however, is not to propose a manual on methods. The examples presented throughout this book cover only a fraction of the many available methods. The point is rather to explain how the data on perceptions can be produced and to discuss the strong points and the limitations of the methods employed.

Figure 9



a, b © B. Morandi, 2013



a) A survey based on interviews, with or without recording equipment, is one means to analyse how stakeholders see their work. b) A survey based on a questionnaire is a standardised method to focus and facilitate the collection of opinions.

Figure 10



a © B. Morandi, 2014
b © S. Ah-leung, 2011



Observation is a survey technique that consists of observing the behaviour of one or more persons at a given time and place, either directly or using video or photographic equipment.

Figure 11



a, b © B. Morandi, 2011



Researchers in the field of perceptions analyse forms of discourse (text or imagery), often drawn from documents (a) or in digital form in archives and documentation centres (b).

This chapter was written by Stéphanie de Carrara, Marie-Anne Germaine, Sabine Girard, Fabrice Grégoire, Céline Sacca and Janique Valy, with contributions from Sébastien Ah-leung and Elise Catalan. Stéphanie de Carrara managed the writing workshop and monitored the writing process.

Focus sections

Viewpoints, concepts and methods

- Values and "postures", the many perceptions of aquatic environments
- Understanding the whole using samples
- Sounding opinions via interviews
- Photographic expression in survey methods
- Mind maps, drawings as a form of mediation
- Participant or non-participant observation?
- Geo-conceptual diagrams to express and spatialise diverse viewpoints

Case studies

- Perceptions of floods in the Vilaine River basin, a questionnaire-based survey
- User perceptions and practices near stormwater-management systems, a participant-observation study



Introduction

Completing a river-basin assessment or regional plan is an important step that should be taken in advance of a restoration project for aquatic environments or an integrated management project. An assessment consists of "analysing and understanding the structures and physical, economic and social processes influencing the organisation of an area and its management, while also identifying the issues and potential improvement projects for the area. The aim of an assessment is to understand before taking action. To that end, it should provide an analysis and an evaluation." (RESOTER, 2014). Today, natural factors (hydrology, ecology, etc.) are systematically taken into account in projects, but social, economic and cultural aspects are rarely integrated to a satisfactory degree (Germaine and Barraud, 2013a). Attention should however be paid to those aspects. The quote by A. Berque (1995, p. 17), that "societies interpret their environment on the basis of how they develop it and, conversely, they develop it on the basis of how they interpret it", is an invitation to managers to investigate the perceptions of the various stakeholders.

An integrated management project means putting together a territorial project that takes into account the stakeholders and their expectations (see the Feedback section on *The Bourbre River*, page 112). Studies on perceptions contribute to fulfilling that requirement. In the environmental field, social expectations are rarely incorporated into project planning. Identifying the perceptions concerning aquatic environments contributes to better defining the underlying issues of the project, the expressed or unexpressed expectations, and consequently to better understanding the stakeholder interactions that will drive the debates and influence the project (see the Feedback section on *The Sèvre Nantaise River*, page 116). Greater knowledge on these aspects is a means to anticipate tensions (in view of managing them), but also to establish more integrated objectives covering more (or all) of the issues involved in the management of an aquatic environment, for example, integration of the landscape dimension. Finally, an in-depth understanding of the perceptions makes it possible to comprehend current practices with respect to the environment and to better anticipate the conditions required for the success of the project.



Who should be surveyed and why?

Preparation of an integrated management plan implies learning about the many different points of view of the different stakeholders (see the Focus section below on values and "*postures*"). Aquatic environments are attributed a wide array of values and viewed from a number of angles (see the Feedback section on *Canada*, page 120). Attentiveness to the multiplicity of views leads to increased awareness of the complexity of individual expectations and of the collective issues and dynamics with respect to aquatic environments. But when studying the perceptions of aquatic environments, via surveys and participatory techniques, one is in contact with individuals. Is it possible to generalise on the basis of the data collected? How can we shift from individual perceptions to those of groups of stakeholders? There are a number of approaches to producing information on groups. Selection of one or the other depends on the information available for the local area and on stakeholder interaction.

Values and "*postures*", the many perceptions of aquatic environments

The concepts of "value" and "*posture*" proposed by Y. Droz and V. Miéville-Ott (2005) in their work on the perceptions of landscape constitute an interesting approach to understanding the diversity of perceptions, and their implications on how stakeholders can position themselves during a management project.

Postures are one of the factors explaining stakeholder opinions during a project. The concept of *posture* is grounded in the identity of the stakeholder who, according to Y. Droz *et al.* (2005, p. 22) "is not conditioned by a clear link to a given social group, but depends on the personal history of each person and on their multiple social ties (gender, professional and recreational activities, family history, etc.)". A stakeholder may also have a number of *postures* such that his words and action, which are a form of expression of his *postures*, may occasionally appear not very rational to the observer (Lahire, 1998). For example, it is not uncommon that in a local water commission (CLE), a representative of irrigating farmers defends, for economic reasons, agricultural activities that degrade water quality, but at the same time requests an improvement in water quality in his role as a consumer of drinking water or as a person partaking in aquatic recreational activities (Girard, 2012). Y. Droz *et al.* insist however that, concerning landscape, there is always one dominant *posture*. When defined in those terms, *posture* evokes what other authors call values or occasionally the value system.

Postures may be seen as frameworks within which an individual forges perceptions from which the person then projects values on aquatic environments. A *posture* is the result of multiple values that are coincidental and ranked.

Y. Droz *et al.*, (2005) proposed a classification of these values for mountain landscapes (productive value, aesthetic value, biological value, etc.). The ranking of the values revealed a number of different *postures*, that of people in the tourism industry, that of forestry workers, that of local people, etc. Identification of *postures* and of the constituent values is applicable to many fields other than landscape geography. Studies on the values of a region (Girard, 2012), of peat bogs (Sacca, 2009) and of biodiversity (Maris, 2010), to name just a few examples, have identified the *postures* of stakeholders in operational settings. These *postures* are in turn a means to understand the opinions of stakeholders with respect to an issue or management project, and consequently to approach participation processes with a maximum of insight.

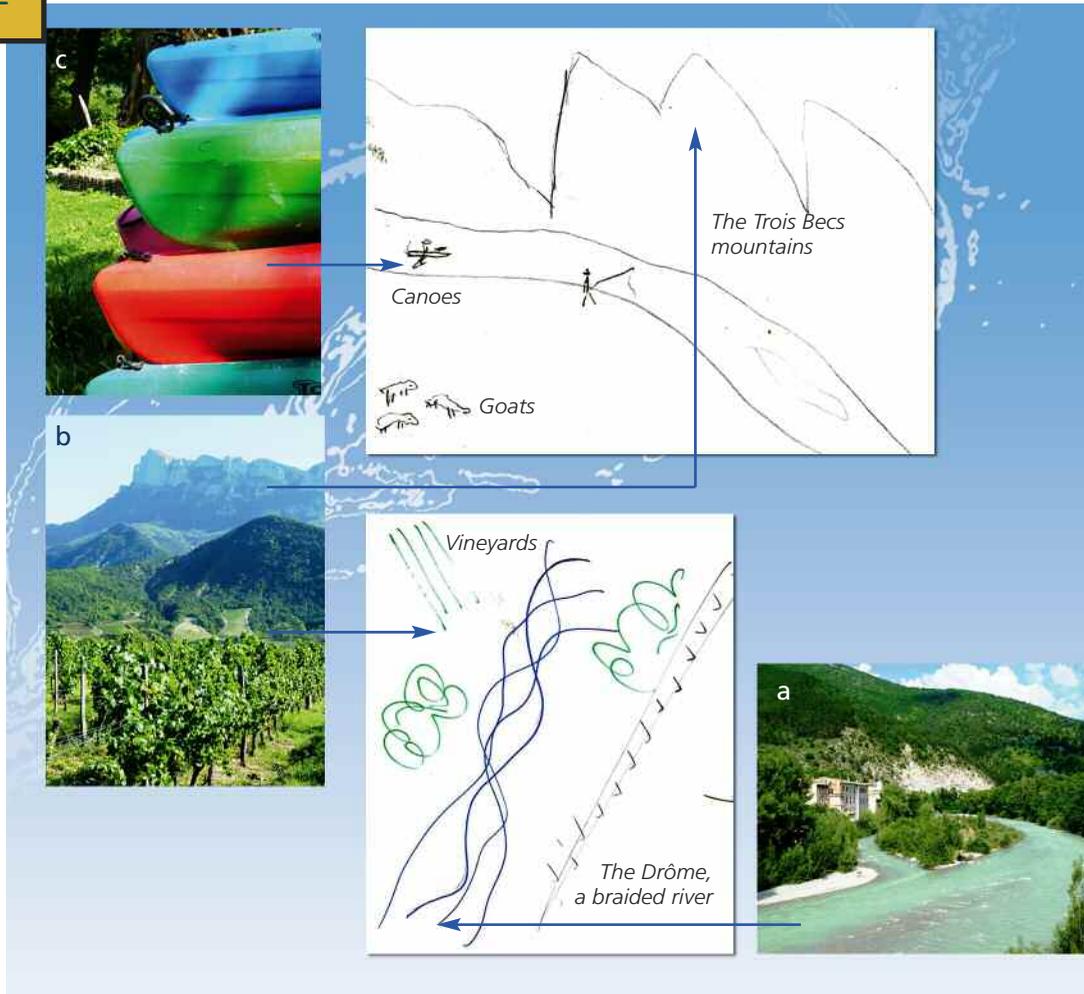
Individual perceptions often influenced by collective groupings

Each person defines and develops their personality in terms of their belonging (or desire to belong) to different groups, whether institutional or not. An individual identity depends on many factors, including regional, cultural, professional, family, etc. (Frémont, 1976; Guérin, 1989). The ties that each person forges with the various groups are based on the existence of shared values and standards, i.e. shared expectations, references and behaviours. That is why, in many cases, individual perceptions align, at least partially, with collective perceptions.

This was demonstrated by the use of mind maps in the Drôme valley (see the Focus section on mind maps, page 42). They were used as a means to collect mental images during an interview-based survey of people participating in the local water commission (CLE) for the Drôme SBMP (sub-basin management plan) to identify the spatial perceptions underlying local practices (Girard and Rivière-Honegger, 2012; Girard, 2012). The participants were asked about their perception of the "Drôme valley". What do those words evoke? How do they position the valley and set its limits? How do they see it in terms of the landscape, the economy, politics? They were asked to draw the "Drôme valley" on a blank sheet of paper and to comment their drawing. The results of the survey showed that, at least for the CLE participants, the subjective, individual perceptions also revealed a shared, collective perception. From the individual perceptions it was possible to conclude that water-related territorial boundaries existed for that group of stakeholders working on the Drôme River (Girard, 2012). This shared notion of a territory is probably a product of the intense collective efforts carried out within the CLE over a number of years.

Above and beyond the apparent differences in life experience and in drawing capabilities, analysis of the mind maps revealed a surprising degree of homogeneity in the perceptions of the Drôme valley among the group of water stakeholders. There were clear similarities in the definition and the limits placed on the Drôme valley, as well as in the identification of its landscape and landmarks. The "Drôme valley" is seen as a specific entity characterised by a number of markers, namely the river and certain mountain ranges, and by symbols such as vineyards, lavender and the donjon in the town of Crest (see Figure 12). Depending on the time they had lived there, the people questioned expressed their links to the valley as "a feeling of belonging", "attachment", "adoption" or "integration".

Figure 12



Drawings and photos © S. Girard, 2012

The "Drôme valley" is seen as a specific entity characterised by a number of markers, namely (a) the river and certain mountain ranges (the Trois Becs), by symbols such as (b) vineyards, goats and by activities such as (c) canoeing and fishing.

Analysis of the mind maps and the accompanying comments also showed that the process of becoming a territory is recent and is based to a large extent on the river and its management. Hydrographics play a central role in the symbolic organisation of space. The river and its tributaries form the key vectors and landmarks, similar to the streets and intersections in the mind map of a city. The river serves to focus and symbolise in a single object the values distinguishing the territory, for example its diverse (colour, discharge), wild (not contained) yet inhabited (many human uses of water) characteristics. It acts as an "expression both visual and symbolic of the territories" (Di Méo *et al.*, 2004). And historically speaking, it was on the topic of water that the towns upstream and downstream in the valley started working together in the framework of the river contracts and the SBMP. The river enabled people to overcome the existing differences by uniting and serving as a federating symbol. The work put into water management triggered the launch of a territorial project spanning the valley, initially addressing the river, but increasingly other objects and issues such as biodiversity and energy.

This example shows that, in certain cases, the historical context of an area can lead to the emergence of groups of people sharing collective perceptions. This type of management situation justifies the shift from individuals to groups of people when analysing the perceptions concerning aquatic environments. However, working on groups of people defined *ex anti* requires certain precautions. In which type of context is this approach useful? And what are the alternative methods to produce data on collective perceptions?

Categories, the first step or the end of analysis?

In the management of aquatic environments, analysis of perceptions generally addresses different groups of stakeholders involved in a project (managers of natural areas, local elected officials, farmers, recreational users, industrial representatives, etc.). This categorisation is based on the assumption that each group of stakeholders has a number of shared interests that contribute to generating a specific set of perceptions of aquatic environments. Each person is assumed to have perceptions consistent with those of the group(s) to which that person belongs. In this sense, the individual perceptions constitute, for the purposes of the analysis, the collective perceptions of the various categories of stakeholders.

Survey methods are often based on such *ex anti* categorisation of stakeholders. This situation was illustrated by research in the Vilaine basin looking at how floods are perceived by the residents (Dupont, 2012; Valy, 2011) (see Figure 13 and the case study page 37). A questionnaire was given to different groups of residents assumed to have specific perceptions of flood risks. The categories were established prior to the survey on the basis of an in-depth analysis of the studied area. The initial criterion consisted of defining areas in terms of their exposure to flood risks, i.e. areas confronted with similar levels of potential vulnerability. Those areas were then redefined according to their distance from the river and the type of residential area (these two criteria were assumed to influence the perceptions of residents concerning flood risks). As a result, eight categories of residents were established prior to running the survey.

Figure 13



© Vilaine and Côtiers flood-prevention department, 1974

Flood of the Vilaine River at Pont-Réan, in the town of Bruz, in 1974.

Analysis of the perceptions of groups of stakeholders defined *ex anti* obviously requires excellent knowledge on the various parties involved in the project. If insufficient knowledge on the interaction between stakeholders is available, this type of approach may produce erroneous results. For example, excessive importance may be placed on certain perceptions while neglecting others. Consequently, this approach should be used only when in-depth analysis on the interaction between stakeholders has already been or can still be undertaken. If the analysis has not been carried out, there are other, equally rigorous methods available to shift from the individual to collective perceptions.

In the latter case, categorisation no longer constitutes the beginning of the analysis, but rather the result. How should one proceed? The surveys are not carried out on specific groups of stakeholders, but on a set of individuals representing the overall population of the studied area (see the Focus section below on samples). The data on perceptions collected during the survey are analysed and ranked in terms of qualitative and quantitative criteria (Berthier, 2010). The categories are the result of the analysis where the objective is to constitute groups of people having similar perceptions, without first taking into account their profile (age, sex, type of stakeholder, etc.). Subsequent analysis of the groups can then characterise them as a function of the variables assumed to influence the perceptions of aquatic environments (age, sex, type of stakeholder, etc.)



Understanding the whole using samples (according to Berthier, 2010)

Selection of a sample for a survey consists of selecting a representative part of the studied population (the parent population). It is first necessary to define a number of variables used to characterise the parent population and subsequently to obtain the data on those variables. Then, depending on the overall objective of the study, the researcher can select people such that the sample reproduces the characteristics of the parent population (if the objective is quantitative) or people whose characteristics cover all the different cases found in the studied population (for a qualitative objective).

This type of approach was adopted for the *Renouissance* project that studied the perceptions of residents along the Rhône River (in the town of Vernaison, downstream of Lyon) concerning Japanese knotweed, an invasive plant that grows along rivers (Valy, 2013). A sample of almost 150 people thought to be representative of the population of Vernaison was put together. In this case, representativeness was defined on the basis of age and sex criteria obtained from INSEE (National statistics institute). Each person then received a photo-questionnaire (see the Focus section on photo-questionnaires, page 102). Their answers were analysed statistically in order to constitute different classes of people having developed identical perceptions. Among the factors explaining the differences in perceptions among the people surveyed, knowledge of the plant and ability to identify it had significant influence. People capable of identifying and naming the plant on the basis of a photograph found the landscapes shown to be less aesthetically pleasing than people who did not have the necessary knowledge. This approach, based on a sample group of people, was thus capable of distinguishing two groups of stakeholders having different perceptions, namely those possessing knowledge of invasive species and those without. This categorisation is of particular importance when attempting to set up an integrated management plan for controlling invasive species along rivers.



Techniques used to study the perceptions of aquatic environments

Surveys can be used to obtain data on social perceptions concerning water and aquatic environments. There are three main types of methods and each has specific features enabling different approaches to the issues raised by the management project:

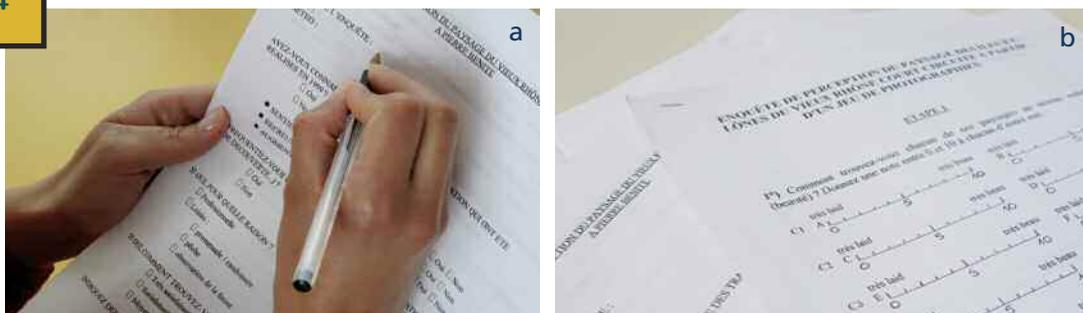
- questionnaires;
- interviews;
- observation.

The three methods may be used separately or they may be used to complement each other. The point here is not to compare them, but to describe each and facilitate selection on the basis of the questions that the managers wish to answer as well as the constraints weighing on the project. Whatever the method selected, the objective is to test the previously developed hypotheses that will result in the survey strategy.

Questionnaires

A questionnaire-based survey is a standardised method with inherent advantages and disadvantages (see Figure 14). Its purpose is to standardise and facilitate the collection of information on opinions. The influence that surveyors can have on the answers provided by the surveyed persons is generally seen as limited (Berthier, 2010). However, it is certain that the wording of the questions can significantly impact the answers. The initial, preparatory work is therefore a key step in the survey. The decision on whether to use open (respondents may answer freely) or closed (respondents choose among a limited number of predefined answers) questions, their wording and the order in which they are presented are all factors that must be thought out and tested prior to the actual survey. The survey may also combine the two types with variable proportions of open and closed questions, given that the former constitute a richer source of information, but are more difficult to process statistically. Care should also be taken to ensure that the questionnaire is fairly short to facilitate the procedure and ensure reliable data. The study carried out on the perception of flood risks in the Vilaine basin is an interesting example of a questionnaire-based survey (see the case study opposite).

Figure 14



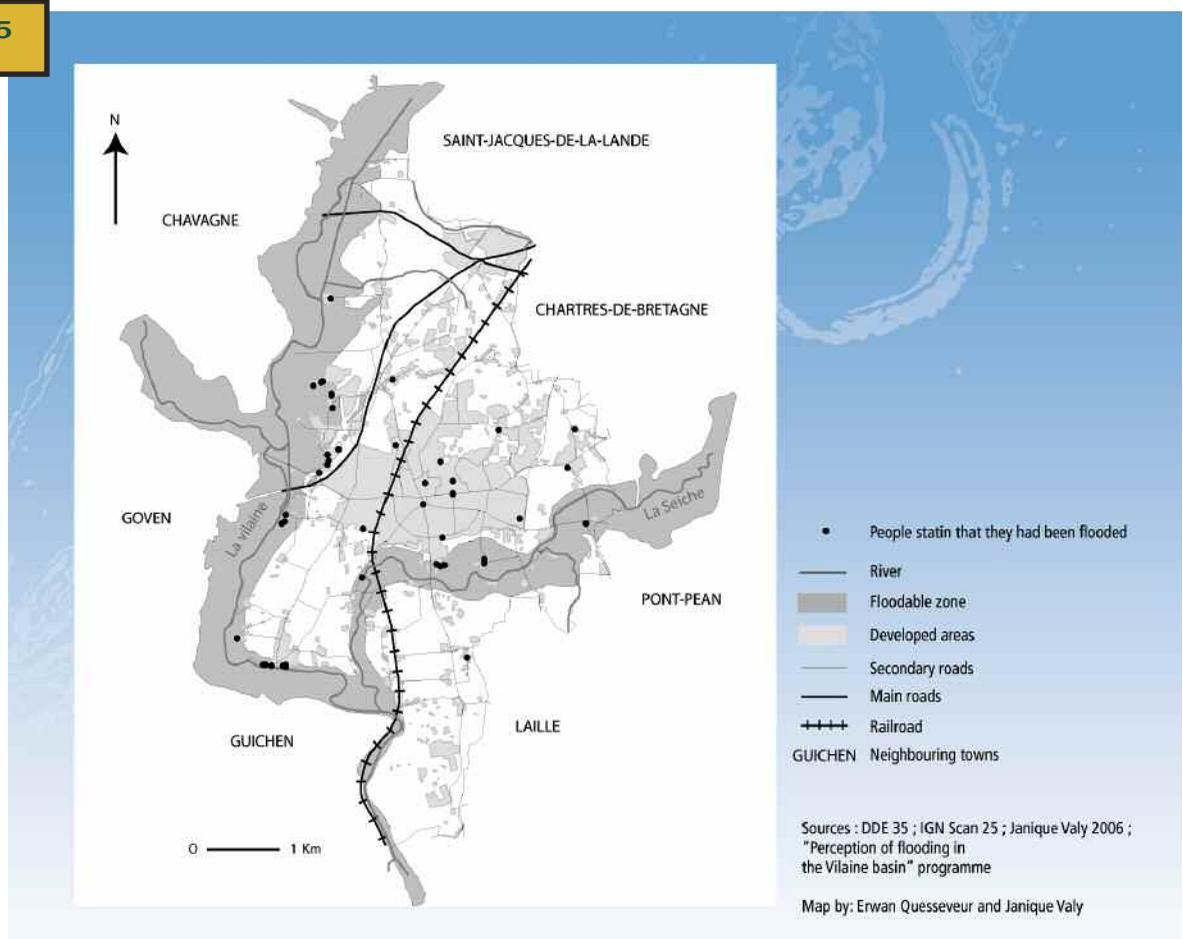
a, b © B. Morandi, 2013

Surveys may consist of both types of questions, with a majority of closed questions and a few open questions.

Perceptions of floods in the Vilaine River basin, a questionnaire-based survey

The research programme titled "Multi-disciplinary approach to perceptions of floods in the Vilaine basin" (2005-2007) is an example demonstrating the value of questionnaires in gaining knowledge on the perceptions of stakeholders (Dupont *et al.*, 2008). The objective of the programme was to characterise the perceptions of floods of residents, institutional stakeholders and economic stakeholders using a mixed set of approaches to determine how the flood itself, the memory and the experience were described, as well as perceptions concerning nature and water, etc. The study consisted of comparing two different towns, Bruz (see Figure 15) and Montfort-sur-Meu, over a period spanning the last three centuries. It was sponsored by the local EPTB (public river-basin territorial agency) and the Vilaine development agency (IAV), that co-funded the research (2003-2009) with the French State in the framework of the action plan to prevent flooding in the Vilaine basin. A minimum of 30 questionnaires were used in each of the predefined geographic sectors in the two towns. The ratio of surveyed persons in the two towns was roughly equivalent to the ratio of the number of residents (281 surveyed persons in Bruz and 142 in Montfort-sur-Meu). The perceptions of the stakeholders (the institutional and economic stakeholders) were analysed, however particular attention was paid to the residents, "who would appear to be the 'great unknown' in the basin" (Dupont, 2012, p. 26). The residents were informed via the town bulletin about the survey, the context in which it was being conducted and that a researcher would soon contact them. The researcher delivered a copy of the questionnaire and set up appointments with the residents. The purpose of the meetings was to carry out part of the questionnaire face-to-face and then collect the written responses.

Figure 15



Map showing the locations of residents of Bruz (Ille-et-Vilaine department) who stated during the survey that they were flooded during the events at the end of the 1900s.

The results show that a sizeable proportion of the residents are aware of flood risks, but that they are not seen by managers as stakeholders with worthwhile project recommendations. The local residents possess valuable information on the risks, based on their experience and knowledge transmitted (Dupont, 2012, p. 227). In light of these results, participation on the local and regional levels must be developed in compliance with the European flood directive (2007/60/EC). For IAV, which had already expressed the desire to "better understand the impressions of the different concerned persons", these results will "clarify the current situation and assist in future decision making on flood management in the Vilaine basin" (Dupont, 2012, p. 8). A further result was improved preparation and diversification of communication strategies (see the Feedback section on the *Development agency for the Vilaine River basin*, page 126).

It is also possible to use images (photographs, maps, etc.) in the questionnaire. A photo-questionnaire happens to be one specific type of questionnaire (see the Focus section on photo-questionnaires, page 102). It is a useful method to study the perception of the overall landscape of an aquatic environment or to address the perception of a particular element in the landscape (dead wood, invasive plants, riparian vegetation, etc.). The photo-questionnaire technique is also of interest because research tends to show that people do not perceive actual landscapes (viewed *in situ*) differently than photographed landscapes (Le Lay *et al.*, 2005). The use of images is also a means to limit the variability of responses and to facilitate processing of results because the participants respond to identical visual input rather than to open questions that may refer to non-standardised places, landscapes and objects (Goeldner-Gianella and Humain-Lamoure, 2010).

One of the main advantages of questionnaire-based surveys (both photographic and other) is that they facilitate comparisons over both space (different sites) and time (different dates, e.g., before and after a project). They are also a means to better identify perceptions concerning large areas. For example, they are a suitable method for the study of large populations. The collected data are easy to quantify and can be analysed statistically. However, caution is advised in generalising any results obtained because it is not always possible to ensure that the selected sample is representative.

The cost of this method in terms of the time spent on each person questioned is fairly low, however a large number of persons must be surveyed in order to produce statistically rigorous and reliable results. It is also necessary to vary the times and days when the surveys are carried out to avoid over- or under-representation of a particular profile, e.g., retired or unemployed persons. As a result, the total time spent on a questionnaire-based survey is significant and the corresponding human and financial costs are not negligible.

Interviews

Interview-based surveys can be used to "explore different facts for which words are the main vector", where the facts in question concern both representative systems and social practices (Blanchet and Gotman, 1992, p. 25). Analysis of the meaning that stakeholders vest in their practices can reveal the value systems and normative reference points underlying their behaviour (Blanchet and Gotman, 1992). It should be noted that there are different types of interviews (see the Focus section below on interviews).



Sounding opinions via interviews

Selection of the type of interview depends on the topic of study and on the operational conditions. A distinction is generally made between structured, semi-structured and unstructured interviews. All are carried out face to face and the interview may be recorded. A recording serves as a memory for the interviewer who is therefore freer to participate in the discussion. The transcription of the interview can be used for systematic analysis, i.e. an analysis of its thematic content, the syntax and the vocabulary employed, etc. Voice-recognition software is available to automate the transcription, such as Sonal or Dragon (© Nuance communication).

Unstructured interviews are used to acquire an in-depth understanding of complex phenomena or to study situations undergoing change. The interviewee organises his thoughts on a topic that is proposed in an informal manner without a pre-established framework. "Via the progression of the discussion and the association of ideas, the interviewee expresses his perception of a situation, an event, his interpretation and experiences, and reveals his thoughts and attitudes" (Berthier, 2010, p. 72). The semi-structured or guided interview is the most commonly used. It is based on an interview guide that, similar to an unstructured interview, proposes a starting point, but is then followed by a list of important topics that the interviewer wants to cover. This type of interview may be carried out in groups of six to ten people. In this case, the data collected pertains to a set of collective, not individual opinions. Structured interviews are used for studies attempting to verify information. Doing interviews requires time and know-how concerning their design, execution, transcription and analysis.

The difficulty for the interviewer is to have the interviewee put into words something that has not yet been expressed. Rather than influencing the person to say what other people think (e.g. "everyone here does it that way", "yes, we all think the river is dirty", etc.), the goal is to focus the interview on the subjective ideas of the person surveyed in order to understand the driving forces behind his/her perceptions and practices.

A further difficulty in interview-based surveys lies in interpreting what the interviewees say concerning the reasons why they do what they do. The content produced by stakeholders can be analysed in two stages, first by examining the exact words, then later by stepping back and considering the context in which the person's ideas are expressed (Olivier de Sardan, 1995). Given that a stakeholder may project several *postures* (Droz and Miéville-Ott, 2005), it is necessary to allow for some inconsistency in the opinions expressed and their justifications (see the Focus section on values and *postures*, page 31). Another risk lies in attempting to inject meaning where there may be none (Lajarge, 2008).

Similar to questionnaires, images may be used during interviews to complement the discussion. The interviewer can supply the image as a topic, in the form of a photograph, a post card, a map, etc. (see the Focus section on photography in survey methods on the next page). Techniques such as 3D geovisualisation, used to date in public-involvement efforts (see the Feedback section on *The Rhône River*, page 130), may also serve as a topic for interviews. The image may also be presented (or produced) by the interviewee (see the Focus section on mind maps, page 42). In which case, it serves as a means to enhance the knowledge on or the understanding of the perceptions that individual people have concerning aquatic environments.

Compared to questionnaires, interviews provide more precise information on the perceptions of stakeholders by offering them a chance to express themselves. This type of survey is therefore better suited to smaller target populations, primarily because it requires more time per person. Interview-based surveys can also be used to complement questionnaires for a number of key stakeholders in the area.



Photographic expression in survey methods

Photography has three advantages that justify its use as a survey method, namely 1) it represents real life ("it exists, I saw it and the photo proves it"), 2) it is a popular, easy-to-use technique and 3) it provides a non-verbal language which can facilitate the expression of ideas that are difficult to put into words. It may be said that photography serves as a "can opener" for ideas.

There are two survey methods using photography.

- **A photo-questionnaire, i.e. the photo(s) already exist (see the Focus section on photo-questionnaires, page 102).**

Photographs may be used, for example, to study how people react to restoration projects. In this case, the interviewer selects a series of photos and asks the interviewees to mark them, to comment them, to sort them or simply to select a few from the series.

This technique implies that the photographs have already been taken. It may be necessary to call on a professional photographer to produce the photos. The advantage of this technique lies in that it is quick and flexible. The interviewees can perform the requested task rapidly, they are not obliged to travel to the site and a computerised questionnaire may be used for the survey. The gain in time means that a larger number of people can be surveyed, thus making possible quantitative analysis.

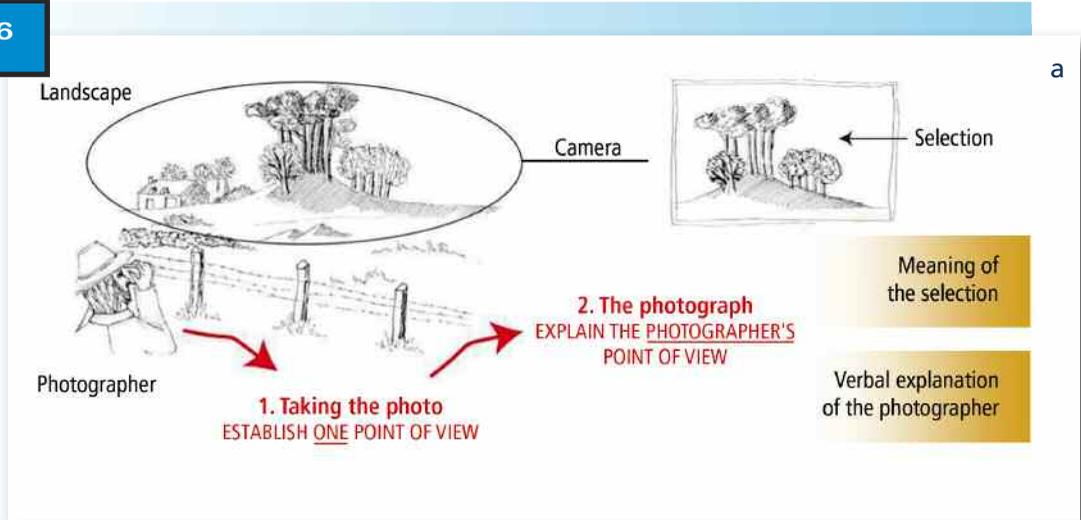
- **The interviewee takes the photos (*native image making*)**

Photography can also be used in the sense that the interviewee travels to the site and takes the photos (Blouin-Gourbilière, 2013) (see Figure 16). In France, the agronomist Yves Michelin (Michelin, 1998) developed this method in the 1990s. Some preparation is required because certain selected (and willing) people receive a questionnaire with precise instructions (e.g. "photograph the landscape that you prefer", "photograph the site of a river project that, in your opinion, was a success"). It is also possible to provide them with a disposable camera. After a few days during which they think about and carry out the task, the participants then send in their photographs with a short explanation. It should be noted that it is also possible to use the same technique for a group. In this case, the participants are not selected. They volunteer for a workshop, a photo contest, a trip to the site, etc.

The resulting photographs may be used in three ways. First of all, in conjunction with competent experts from the social sciences, it is possible to analyse the perceptions expressed by the photos and the comments. The results are often highly informative (location of favoured sites, expression of affinities, tastes and distastes, statements, etc.). Secondly, the photographs may be used as a topic for discussion during a meeting. It is often easier to express an opinion in reaction to a photo. Finally, the photos may serve as a "showcase of shared knowledge" and be used for an exhibition, a promotional document, a slide show, etc. In this case, one speaks of promoting "non-expert knowledge", as compared to "expert knowledge". It is highly gratifying for a local resident to know that managers place importance on the opinions expressed.

Figure

16



© C. Blouin-Gourbilière, 2013

Two steps in formulating a discourse on landscape using photography. First establish a point of view, then explain it.

Mind maps, drawings as a form of mediation

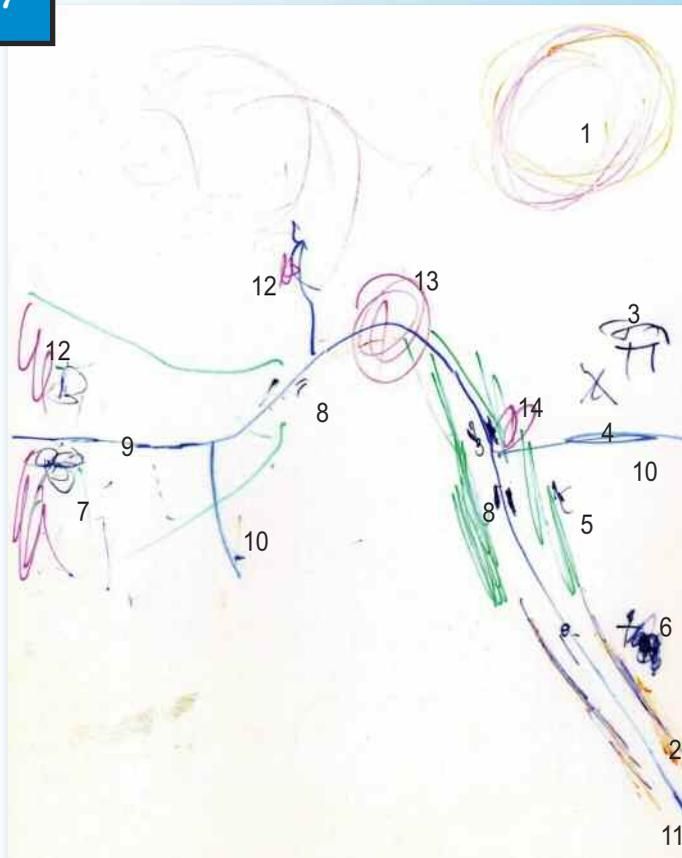
Mind maps (see Figure 17) can be used for a number of different purposes:

- understand how people position and orient themselves in space;
- identify the preferences people have for certain spots;
- understand the boundaries seen by people and the meaning assigned to space.

Mind maps were developed in the 1980s. They were first used to reveal the subjective and individual perceptions of space. Since then, environmental geographers have used them to understand the social perceptions of groups of people (Mc Kenna *et al.*, 2008; Gueben-Venière, 2011). In this sense, mind maps make visible territorial relations, e.g. those between stakeholders and the area, and provide information on the landscape itself, i.e. a space adopted and organised by those stakeholders. One way to interpret the drawings was inspired by the two-step analytical framework devised by K. Lynch (1969):

- identification and physical structuring of the area. The goal is to understand the spatial organisation using a basic set of figures (point, line, surface area), to determine the spatial relations between the figures (intersections, overlaps, etc.) and finally to establish the relations between the figures and the observer (frequency of contact, residency);
- meaning of the socio-cultural area. The goal is to understand the practical meaning and the sentimental value attributed to the spatial image, in particular by integrating memories and subjective experience.

Figure 17



© S. Girard 2012

- 1. sun and clouds
- 2. mountains
- 3. sheep
- 4. people working
- 5. camp ground
- 6. ski resort
- 7. (fruit) trees and factories
- 8. people bathing
- 9. Drôme River
- 10. small streams
- 11. source of the Drôme River
- 12. cities and large villages
- 13. city of Die
- 14. town of Luc-en-Diois

Example of a mind map of the Drôme valley with notes by the interviewer on the basis of the comments made by the interviewee.

A number of criticisms have been raised concerning the use and interpretation of mind maps, meaning that they must be used with caution. The mental processes involved in the perception and understanding of space remain largely unknown and geographers can simply access the external manifestations (the results) of those processes (André, 1998). In addition, mind maps are very sparse expressions of the mind. Their analysis is both more complicated and less productive than that of expressed words because though they can be used to assess distance and orientation, they cannot address other aspects of how space is perceived, contrary to words (Bonin, 2001). In addition, a major criticism concerns the temptation to establish a direct link between the mental processes and the represented object, given that a number of intermediate operations must take place, notably materialisation of the concepts, to say nothing of the aptitude and the visual and manual skills required for the drawing. Two main risks exist:

- the surveyor, through the words chosen and the proposed form of expression, can influence the depiction of the spatial object;
- the depiction is in all cases just one potential and contextualised interpretation of the object.

Consequently, mind maps must be used in parallel with other tools, such as interviews, to even out the differences in drawing capabilities and to question each person on the meaning of their drawings. It should be noted that a request to draw may be perceived with apprehension and motivate a complete refusal to participate in the survey. It is therefore preferable, when different techniques are used together, to propose the mind map as the last step.

It is also preferable to have a single surveyor or team of two surveyors to ensure that the interviews and the sequence of questions are as similar as possible from one survey to the next. A prerequisite for this method is the capability of the surveyor to inspire enough confidence on the part of the interviewee that the latter feels free to express his opinion. But the surveyor must also tread softly to avoid influencing the answers (avoid creating the feeling that the surveyor expects a particular answer). Interview-based surveys require a significant investment of human resources, which has a cost. To that, it is necessary to add, when interviews are recorded, the transcription and processing (qualitative or quantitative) times which far exceed the time required for the interview itself.

● Observation

Observation is a survey technique that consists of observing the behaviour of one or more persons at a given time and place (Arborio and Fournier, 1999). This technique puts the surveyor in a position to live the reality of the observed persons and to gain information that cannot be obtained using other methods (Soule, 2008). Observation requires a three-fold effort on the part of the surveyor, i.e. perception, memorisation and notation, that together make it possible to achieve the previously set objectives. Observation may be participant or non-participant, and it may depend solely on the eyes of the surveyor or also on photographic/video systems (see the Focus section on observation, next page).

Participant or non-participant observation?

There are two types of observation, participant and non-participant.

Non-participant observation implies that the surveyor remain outside the study zone and the on-going situation in order not to influence or alter the behaviour of the observed persons. This type of observation is used when the situation does not allow for the presence of an external person (for practical reasons or in order not to alter the information). For example, a video camera may be used for the survey to film an area (with the necessary authorisations).

Participant observation requires that the surveyor enter the same environment as the surveyed persons and list the observed behaviour, practices and customs using a predefined document. Similar to non-participant observation, the surveyor may also use a camera and/or video system to cover every detail (see Figure 18). Images, whether still or animated, directly capture the reality of the moment (Terrenoire, 1985). A camera can retain a movement and illustrate the observations of the surveyor, whereas video can be used to describe movements and analyse complex behaviour on the basis of action sequences.

Figure 18



© S. Ah-leung, 2013

Example of a video camera positioned in situ for a participant observation on the behaviour of people in urban wetlands..

During surveys in the field, the behaviour of people may be modified by the combined presence of the surveyor and of a camera or video system. The people may react in different ways. Some people ask questions and, depending on the answer provided by the surveyor, modify their behaviour. Others leave the observed area or explicitly request that the surveyor leave the area. All of these reactions, said to be "profilmic" (De France, 1989), may potentially be troublesome for the surveyor, but are often limited to the initial contact with the camera or video system. Generally speaking, these reactions dissipate over time and the surveyor/device become virtually invisible once the people have become accustomed to their presence.

Practically speaking, the observations may take place at night or day, over one or more seasons. Depending on the aim of the survey, the surveyor can adjust the observation in terms of its duration (between one and six hours), but also according to the days of the week.

For example, if the studied population consists of children, the observations will take place on a weekend. To facilitate data collection, observations are often carried out using a predefined document indicating the elements that should be noted. The document is filled out *in situ* and the contents are then recapitulated in a summary sheet (one per observation) that is used for data processing. The post-observation part of the work generally consists of grouping and organising the collected data in databases (location, site, number of observation hours, number of persons encountered, etc.) and in image banks (sorting of photos according to the observation site, elimination of "bad" photos, etc.). Once the processing has been completed, the analysis can begin. It consists of using the processed data to provide answers to the questions raised by the study. For example, if the objective is to analyse the behaviour of the public in urban wetlands, the photos may be used to list and characterise the various attitudes and actions of the public. Finally, in terms of the work involved, it is necessary to plan on two hours of analysis for each hour of observation (this may vary depending on the level of detail required by the study).

This data-acquisition technique is particularly well-suited to analysis of habits and practices, as is shown by the study carried out near urban stormwater-management systems (see the case study on the next page). The study of these habits and practices is a means to simultaneously grasp types of perception of environments. It is necessary, however, to adopt an objective position and approach in order to obtain useful results. Similarly and in view of verifying and consolidating the data obtained, it is advised to combine observation with other sociological investigations.

Observation also raises a number of ethical questions, in that the observed persons are not always aware that they are being observed, and legal implications when techniques such as photography and video are used. This is because the image rights are part of the personality rights of each human being. In France, they are protected under article nine of the French Civil code and by article eight of the Declaration of human rights. In other words, each person may decide to authorise or oppose the taking and broadcasting of their image. Image rights are a component of a person's personality and authorisation is therefore required. In a public area (understood as a place freely accessible to all without requiring any particular authorisation, where access is permanent or limited under certain conditions), photography and filming do not require that the authorisation of each person present be obtained.

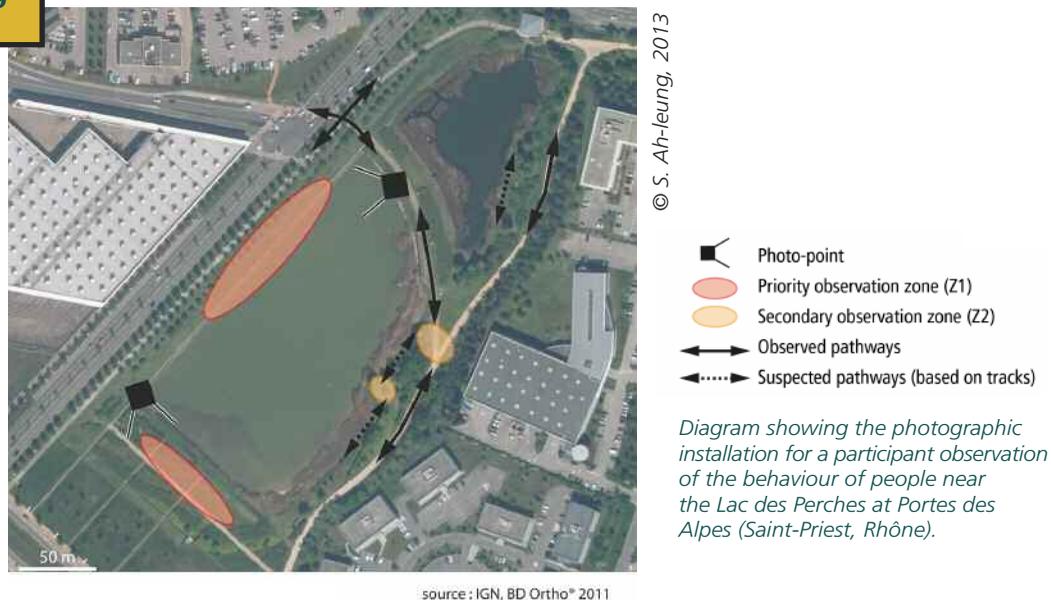
However, it is necessary to obtain the authorisation of isolated, recognisable individuals, particularly if the image may cause a problem for or bother the person. The authorisation must be written, thus providing proof that the person consented to the taking and dissemination of their image. To be valid, the authorisation for dissemination must be limited in duration and identify a specific media and use. This rule may be interpreted in different manners. For example, the courts have ruled that certain tolerances concerning the use of images are acceptable for artistic and educational projects. What is more, the authorisation of a person may be considered tacit if the person, once informed, does not oppose the use of the images (on the condition that the person had the opportunity to express their opposition) and in cases where the person is filmed in going about their public activities.

It is therefore necessary, even before obtaining their authorisation, that people be informed of the possibility that they might be photographed or filmed. Practically speaking, this can be done by setting up a sign indicating, for example, that anyone entering a given zone may be photographed or filmed for a study. Finally, in some cases, it may be necessary to request authorisation to photograph or film from the entity managing the area where the study takes place.

User perceptions and practices near stormwater-management systems, a participant-observation study

A study including participant observation was set up as part of the SEGTEUP project (Ah-leung, in prep.). The study dealt with the perceptions and habits of the public near stormwater infrastructure designed to manage rainwater (basins, reservoirs, etc.). The purpose of the study was to produce knowledge on the conditions guiding decisions concerning environmental technologies, to observe practices and the difficulties raised by environmental technologies in terms of their maintenance and management, and finally to better understand the conditions surrounding the generalisation of these technologies in urban areas. Photographic equipment was used to understand these conditions. An example is presented here, focussed on the *Portes des Alpes* basins in Saint-Priest (Rhône department) (see Figure 19).

Figure 19



The installation was used to acquire 63 hours of observation spanning the period from the summer of 2011 to the spring of 2012. The observation provided an array of information, indicating first of all that the public used the management site for many types of activities, including relaxation (sun bathing, fishing, reading, rest, etc.), sports (rugby, skateboarding, swimming, soccer) and recreation (throwing stones in the water, playing on the screen rakes or trash racks, running after the ducks, etc.). The various uses spanned the year, but also depended on the season. During the summer, the number and diversity of activities was greater, except for fishing which appeared to take place exclusively during the spring. The information on these activities also revealed the incompatibilities between the uses planned by the site manager and the effective use by the public. For example, signs signalled that it was forbidden to swim and fish in the basins, but those were two activities observed. Similarly, children were observed playing on the screen rakes. Above and beyond the danger involved, the system could be damaged and no longer able to treat the urban stormwater.

The study served to better understand the relations between the technical systems for water management and the general public. It provided the system managers (Grand Lyon urban area) with information on the unforeseen uses and potential malfunctions, thus providing them with food for thought on how to address the problem.



Practical use of knowledge of the perceptions of aquatic environments

Studies on perceptions contribute to developing knowledge on stakeholders and their expectations with respect to aquatic environments. The four examples presented below illustrate how they (could have) contributed to informing the management of water and aquatic environments.

The Souche marches

A number of definitions have been proposed for the term "collaborative management" (Narcy, 2013; CREN, 2009). For J.-E. Beuret (2006, p.73), "collaborative management takes place in the framework of a stakeholder-involvement process, which may be understood as the collective development of questions, perceptions, objectives and/or joint projects through dialogue on an equal footing between participants who engage the process voluntarily and mutually acknowledge the legitimacy of the other participants. However, collaborative management may also include moments of simple dialogue, negotiation, consultations with certain social groups and providing information to the participants." The project, led by ADREE (Association for the development of environmental research and teaching) in the Souche marches (Aisne department), is an occasion to examine the procedures implemented and the tools used. This raises the unspoken issue of how knowledge, and consequently perceptions, are shared among the managers, local stakeholders and scientists.

The Natura 2000 site of the Souche marshes, one of the large alkaline fens in northern France, covers a surface area of 2 500 hectares. The marshes span a dozen towns and over half of the total area belongs to private owners. The Souche is also a river approximately 30 kilometres long on which development work took place long ago, perhaps even earlier than the Middle Ages, and its management is a major local issue (see Figure 20).

The stakeholder-involvement process undertaken in view of its management succeeded in overcoming a prior, conflictual situation that was particularly visible during the period when environmental measures were set up for the flat expanses. The objective was to "improve relations among the local stakeholders and elicit comprehensive projects for the sustainable development of the site". Submitted in 2003, the project received financial support from the *Fondation de France*. Since that time, it has continued with the support of the Aisne departmental council (www.naturagora.fr). Under ADREE management, the stakeholder-collaboration group was established.



a) Fens and peat bogs may be used in a number of ways, i.e. traditional uses such as peat extraction (now totally abandoned), hunting and fishing, poplar stands and, along the edges, intensive farming, and recreational uses such as nature hikes and educational excursions. b) They are also used to experiment new forms of management, e.g. weirs and grazing.

a © F. Grégoire, 2012
c © V. Pierron – CREN Rhône-Alpes, 2003

The first step in the project was to draft a Charter for the stakeholder-involvement process approved by a majority of the stakeholders (www.naturagora.fr/images/stories/les_pdf/pdf_scientifique/concertation_charte.pdf). Approximately 30 people volunteered to participate. Two potentially conflictual issues appeared, water management and path management. The "Water" discussions took place over the years 2007 to 2009, those for paths started in 2010.

Three meetings were necessary for each. The first served to establish a "meeting place" for the sharing of experience and information. The attempt to clearly delineate the problems identified by the participants was a success. The second served to define the future lines of work and to determine their acceptability. Finally, the third assessed their feasibility and the level of interest on the part of the participants for the topic of the stakeholder-collaboration meetings before transmitting the project to the public.

The "Water" cycle elicited a high degree of participation and produced a unifying project for the marshes as a whole. On the other hand, regrets were expressed concerning the slow progress of results in the field. Some thought must be put into integrating the procedure better among stakeholders because it is still overly scientific in nature. The "Paths" cycle brought to light the problems concerning travel through the marshes, path management and use, and the tranquillity of local owners. It launched a discussion on the perceptions of stakeholders and users concerning the marshes, on sharing of time and space, and on opening and closing times for the marshes.

Three conclusions may already be drawn, even though the involvement process has not been terminated and can be reactivated at any time by the participants (Grégoire, *in prep.*). The first is that the stakeholder-involvement process came into being in response to social demand. It was the participants who, in setting up the rules for the groups, proposed the topics. The second is that the participants were very pleased with the discussions. The possibility of holding meetings where immediate decisions were not required was seen as positive and there are now plans to address new topics. The third is that the group can now function autonomously. Some assistance is still needed to set up the meetings, but that support is purely material.

Peat bogs in the Rhône-Alpes region

Management of peat bogs in the Rhône-Alpes region is a rich and complex subject. It was highlighted by a thesis (Sacca, 2009) dealing with the functions of peat bogs and how they are currently perceived. An examination of statements by stakeholders reveals two main difficulties. The first is a fear of seeing the management taken over by scientific experts, generally from outside the area. The result was mutual distrust, amplified by the concerns generally accompanying environmental protection, with limitations, legal constraints, inspections and interventions in town policy being particularly feared. This defensive reaction is typical of how people often respond to environmental policies in France. For example, it led local farmers to hide the presence of protected species. "I do not tell everyone, but there are turtles here, pond turtles, and lots!", "They are looking for it [sundews], but they did not find it, so we will keep our mouth shut. No point in it." These reservations are also clear in the words of certain local officials, "We did not favour Natura 2000 due to pressures from land owners. That is why we were in no hurry to sign the papers sent by the Park concerning the work on the peat bogs." These concerns may be explained by the fact that environmentalism, "far from constituting a positive factor in local identities, would seem on the contrary to reinforce in certain people a feeling of loss of land, of autonomy, even a loss of property and thus of their patrimony" (Kalaora, 1998). In the background behind these concerns lie the actual issues, i.e. what each person risks gaining or losing. In this situation, oppositions between stakeholders may arise.

The second difficulty, linked in part to the first, lies in the major difference between how an area is experienced and perceived endogenously, and how it is experienced and perceived exogenously (see Figure 21).

Figure 21



a. © F. Grégoire, 2012
b. © C. Sacca, 2007



Fens and peat bogs are areas experienced and perceived both (a) endogenously, as shown by the signs of past production in a Montselgues peat bog, and (b) exogenously, as shown by the educational trail in the Gimel peat bog (Rhône-Alpes region).

This difference may be explained by the influence of geographic proximity in the perception of a site. An area experienced and perceived endogenously is one where people live each day. It contributes to the feeling of belonging and to the memories of the social groups that shape the area, use it and most often live in it. The area is the object of the affective ties that progressively grow between people and places (Gumuchian, 1988). An area experienced and perceived exogenously is one seen by people from other places, who are not particularly concerned with the socio-economic processes at work there. For example, a visitor over a weekend wants to find the site open and accessible, with fun and educational features, whereas the local resident desires calm and tranquillity, and will likely disapprove of anything threatening that. There is therefore conflict between the needs and concerns of local residents and those of people from outside the area, which can result in high tensions. The differences between endogenous and exogenous perceptions would thus appear to be fundamental. Taking them better into account would make it possible to avoid certain conflictual attitudes.

Understanding perceptions is a means to become aware of conflicts, latent tensions and unspoken opinions that can obstruct future measures, and to come to know the area, which enhances credibility and mitigates the impression of exogenous management, often a source of conflict. In light of the difficulties presented above, a stakeholder-involvement process is often a useful technique in taking into account the diversity of stakeholder groups and their opinions. Improved acknowledgement of the perceptions of each person, as well as better management of tensions, therefore requires the acquisition of greater knowledge in this field.

To assist in carrying out such procedures, various tools can be used to clearly express the diversity of viewpoints. Geo-conceptual diagrams are a good example of how this can be done (see the Focus section on geo-conceptual diagrams below).



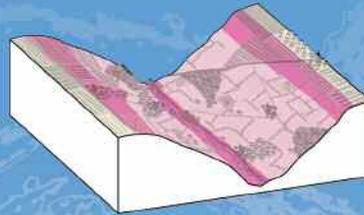
Geo-conceptual diagrams to express and spatialise diverse viewpoints

The wide variety of viewpoints on a river, collected during interviews with different categories of stakeholders, can be summed up using geo-conceptual diagrams (i.e. drawing or mapping opinions on the landscape level). That was the decision made in studying the Mue, a small river flowing in a valley to the west of the city of Caen (Calvados department), on a plateau characterised primarily by cereal farming and threatened by urban sprawl (Germaine, 2009). Each geo-conceptual diagram presents a viewpoint on the valley (see Figure 22). It has its own specific key adapted to the vocabulary and system of values used by the people in each category to describe the landscape. It is the objective criteria in terms of usage that determine how people judge an area's opportunities and limitations for their purposes. For example, farmers judge land very differently depending on whether they intend to use it for livestock farming or cereal cropping. In the first case, low-lying areas in the valley bottom are seen as good land, whereas in the second, they are deemed very difficult and even unusable. Finally, geo-conceptual diagrams are a means to spatialise perceptions (Michelin, 2000). On the one hand, the full extent of the living space becomes visible and often exceeds the area on which managers focus (entire valley vs. river corridor). And on the other, the various points of interest are pinpointed. For example, in the Mue valley, the river is of central interest to elected officials (flood risks) and managers, whereas the residents see the valley bottom as particularly attractive (recreational activities, rest and relaxation) in spite of the many difficulties in settling there or even gaining access. There is also significant pressure on the valley crests offering views that are prized for residential purposes. Finally, certain structures (mill, bridge) or other aspects such as the bocage landscape draw the attention of certain groups of buyers.

The Mue valley seen by...

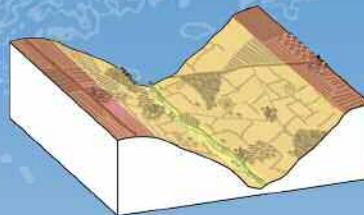
1. residents

- Living area
- desirable
 - agreeable
 - of no value



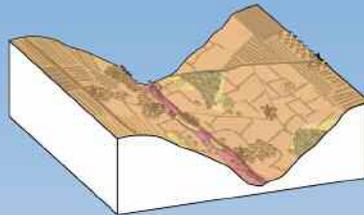
2. cereal farmers

- good land
- moderately good land
- difficult land
- unusable land



3. livestock farmers

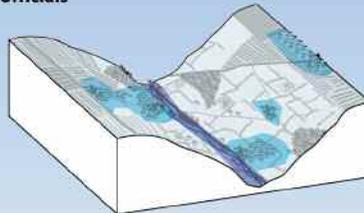
- good land
- moderately good land
- difficult land
- unusable land



4. managers and elected officials

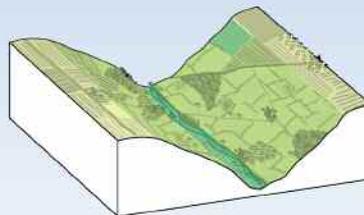
Areas for which they are...

- very focussed
- attentive
- indifferent



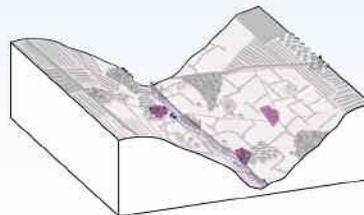
5. nature groups

- exceptional value
- remarkable
- interesting
- of no value



6. tourism professionals

- exceptional value
- remarkable
- attractive
- of no value



Presentation and spatialisation of different viewpoints on the landscape in geo-conceptual diagrams.

Drôme River (Rhône-Alpes region)

The Drôme River and the adjacent groundwater are used for many purposes, including irrigation for crops, supply of drinking water and various recreational activities such as fishing, bathing and canoeing. The local biodiversity is remarkable, acknowledged and protected, notably in a nature reserve (Ramières) (see Figure 23). The first SBMP (sub-basin management plan) in France was set up for the river in 1997 and entered the revision process in 2008. The revision period is a time conducive to analysing the (new) stakeholder configurations and the (re)defined local issues concerning river management. This was done by analysing semi-structured interviews with the participants of the local water commission (CLE) (Girard, 2012; Girard and Rivière-Honegger, 2012 and 2014).

The main problem mentioned during the interviews was the lack of water in the river caused by agricultural uses. The drops in the water level, which at times could lead to the riverbed running dry, resulted in tensions among the various users of the resource (irrigating farmers, swimmers, water sports, fishing) and endangered aquatic life.

However, the standard conflict between, on the one hand, the protectors of aquatic environments and, on the other, farmers wanting to use the water for agricultural production, gave way to a very different configuration among the stakeholders. In this case, the local level in water management confronted the State representatives on the regional level and from the major river basin (regional environmental directorate, Onema, Water agency). Even though they had very different objectives, the local agricultural representatives, the environmental-protection and fishing associations, and the local elected officials all joined forces with a shared set of arguments in favour of local water management and against any form of centralised and bureaucratic management. They put forward a number of specific local features and the capacity for self-management in order to justify exemptions and adjustments to the national and European rules. The issue of how water should be shared among the various users in a given area was secondary to the issue of gaining local control over water management.

Figure 23



© S. Girard, 2011

The Ramières nature reserve in the Drôme valley has come to symbolise biodiversity protection in the Drôme River (Rhône-Alpes region).

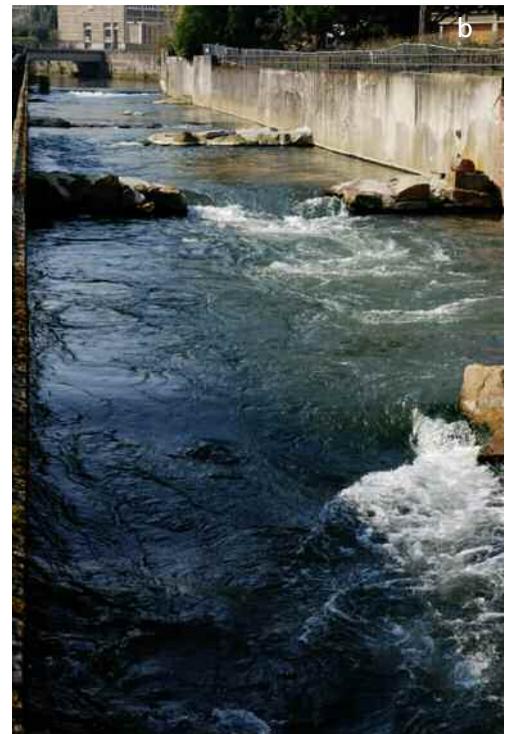
Touques valley (Basse-Normandie region)

The study of perceptions and social expectations is a means to highlight the importance of the landscape for people living along rivers. An analysis carried out in the Touques valley demonstrated the value of this type of study in anticipating the consequences of projects for landscapes and consequently in improving the acceptance of projects.

Considered the backbone of the Auge territory and presented as a structural axis, the Touques valley (Orne and Calvados departments) is characterised by its wide and straight path over 109 kilometres (Germaine, 2009). It is part of an extensive prairie system in which it occupies an unusual position (grass fattening of livestock in the regularly flooded valley bottom, cider production in the prairies on the slopes). These landscapes contribute to the excellent reputation of the Auge area for tourism, in spite of the major imbalance in terms of tourist numbers between the coast and inland.

This category-1 river in a limestone plain stands out as a reference in western France for its good ecological status and its favourable biological conditions for salmonids. Highlighted as early as 1978 in the first Salmon plan by the Ecology ministry, its potential for fish was subsequently improved thanks to 30 years of work on the banks and hydraulic structures. From 1994 to 2007, the PARAGES association carried out this outstanding management project through ecological restoration of the river (100 km of river banks, 33 structures removed, lowered or opened, 38 structures equipped with fish passes) and promotion of fishing vacations (see Figure 24). With a stock of approximately 10 000, the Touques is now considered the foremost coastal river for sea trout in France. Following the financial difficulties of the PARAGES association, the board for the Touques River basin (SMBVT) took over in 2008 to ensure continued rational environmental management.

Figure 24



Enhancement projects along the Touques River (Basse-Normandie region) for (a) fishermen along the banks and (b) canoeing and kayaking in the city of Lisieux.

In terms of the ecology and fish, the work on the Touques is a success. It is presented as an outstanding example by the Seine-Normandie water agency and Onema. However, the surveys carried out in the Touques valley on water uses revealed more diverse opinions concerning the sharing of the benefits resulting from the work (Germaine, 2011). The series of 30 interviews conducted between September and December 2008 showed that the work on the environment had direct and major impacts on the landscape. Some were positive, some were negative. In both cases, the fact that the impacts were not anticipated highlighted project limitations.

The restoration work done on the Touques since the 1990s significantly modified the river landscape. It also transformed the river's image for the residents by recreating visual access that had been lost due to a lack of maintenance. This indirect, positive result was a significant factor in the approval of the ecological restoration project by local owners and local governments. The improvement in living conditions and the greater contact with the river represented a true benefit for residents that was more readily perceptible than the increase in the numbers of fish. However, over time, the change in the landscape and the rediscovery of the river elicited new expectations on the part of the residents of the valley. Those expectations primarily took the form of requests for greater access to the river. But those requests remained unanswered because the projects never targeted anything more than environmental restoration and promotion of fishing. As a result, residents and tourists found they could not gain access to the river banks.

The example of the Touques would suggest that it is necessary to include the landscape in the preliminary studies for projects affecting aquatic environments in order to anticipate the potential transformations in the landscape and their implications for the practices and perceptions of the various users. This example shows that ecological projects can produce social benefits that should be taken into account in terms of both communication and assessment procedures because improvements in living conditions are important factors in the overall results of environmental measures. That is equally true for any negative effects that assessments should also take into account. Finally, this example shows that the results of a project, in terms of both the elements affected and the scale, can largely exceed the initial plans. That confirms the need to look beyond the river corridor and to consider aquatic environments in both their immediate and wider geographic contexts in order to take into account all the aspects involved in the many management issues (uses, practices, perceptions).



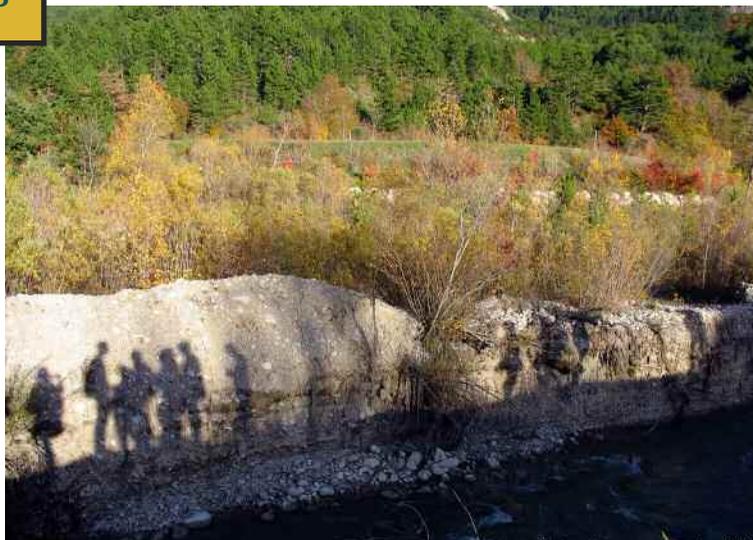
Conclusion

Study of the perceptions of the various stakeholders concerning aquatic environments produces useful information during the preliminary diagnostic phase of a project. By characterising the diversity of stakeholders and their expectations, it provides the information required to address all the issues involved when developing a project (see Figure 25).

The various case studies showed that awareness of the perceptions of the various types of stakeholders and their possible contradictions could not always prevent conflict, but it ensured better preparation for the management of the relations between stakeholders and for dealing with the debates that always take place during the formulation of management plans. Conversely, unawareness of the perceptions means that some issues will be neglected and increases the risks of setting management objectives that do not correspond to the expectations of certain stakeholders.

The examples presented in this chapter showed that the study of perceptions is based on diverse and complementary methods that, in some cases, can require a significant amount of time to implement. That is why they must be launched well in advance of project design.

Figure 25



© A. Honegger, 2010

The banks of the Drôme River.

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Emeline Comby, Sylvain Dournel,
Pauline Gaydou, Christine Labeur,
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with contributions from Sébastien Ah-leung,
Claire Blouin-Gourbilière and Marylise Cottet.
Emeline Comby managed the writing workshop
and coordinated the writing process.

Focus sections

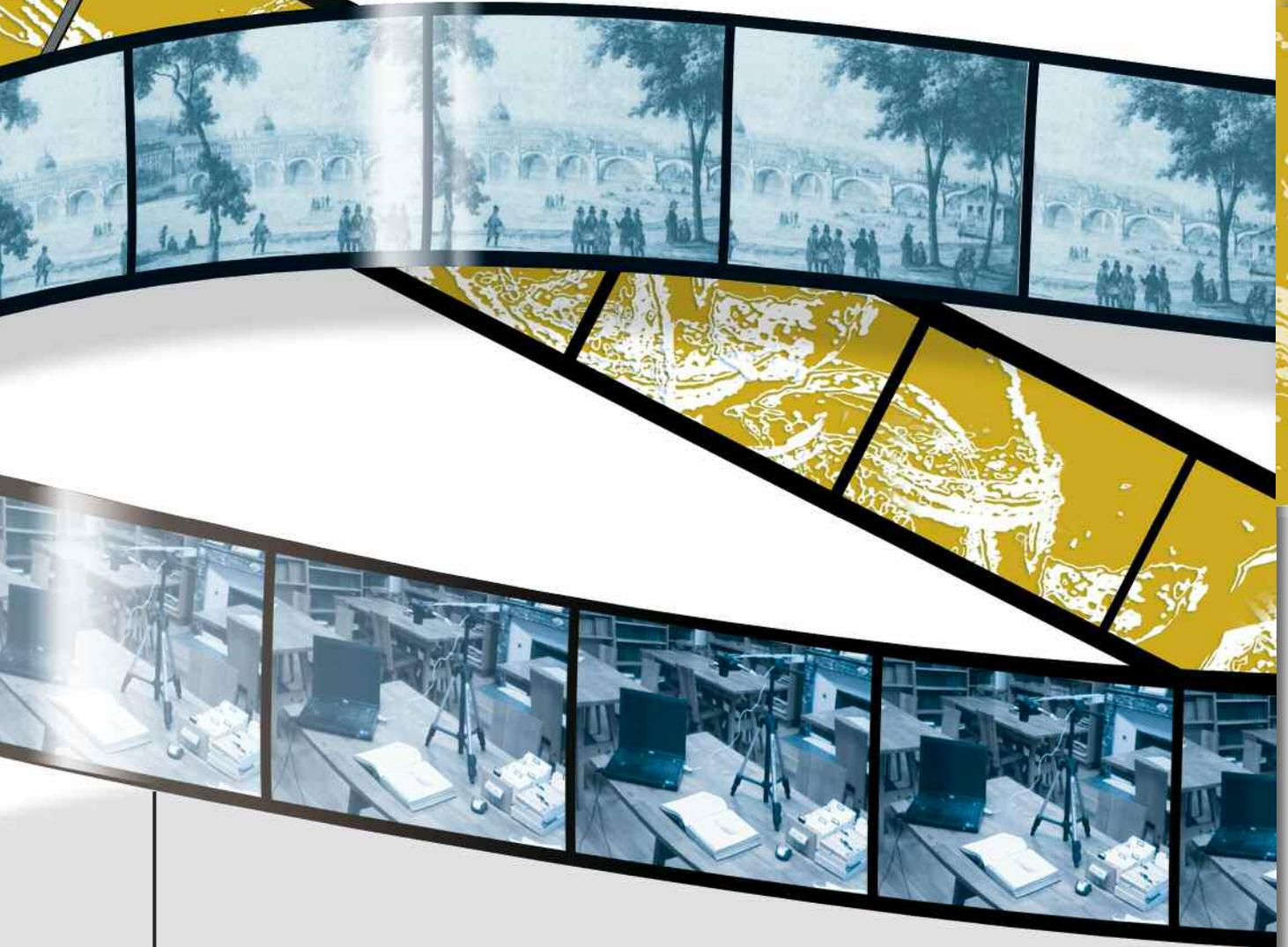
Viewpoints, concepts and methods

- Photographic observatories, the archives of environmental perceptions

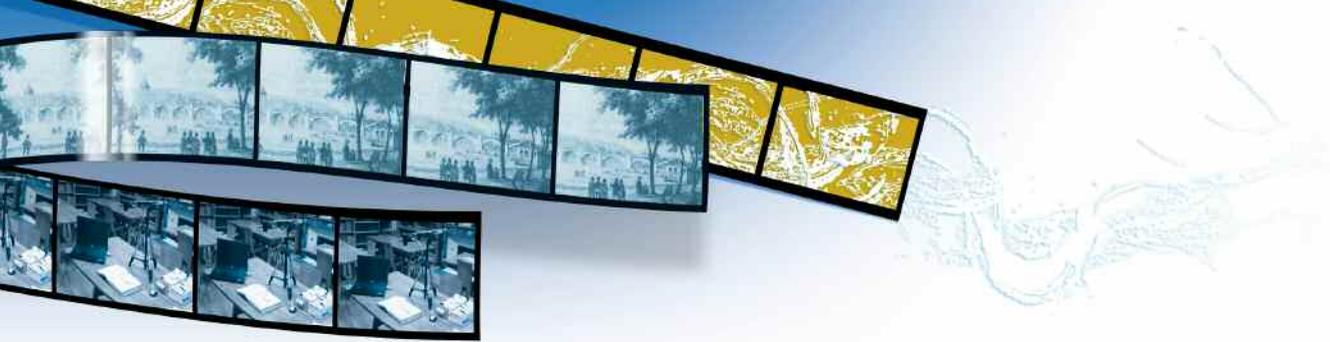
Case studies

- Using different archives to study the history of swimming and boating in the Loire at Orléans
- The press, a source in studying changes in public perceptions (patrimonialisation) of rivers in the Drôme valley
- A photographic observatory to identify the perceptions of stakeholders in the Brenne regional nature park
- Geo-conceptual diagrams of 150 years of change in Rhône landscapes used for the master plan to reactivate river dynamics
- Studying the local press on projects to restore the banks of the Rhône in Lyon
- Study on restoring the river patrimony in the framework of the Loire ecological network project
- A socio-historical survey on perceptions of floods in the lower Rhône River basin
- Combining analysis of interviews and archives to understand differences in uses of wetlands over time in the town of Dettwiller
- Using Rhône flood markers to inform and better manage risks

Learning more about the history of the connections between societies and aquatic environments



- 58 ■ Introduction
- 59 ■ Using history to develop a territorial diagnosis
- 70 ■ Contribution of history to projects and development work
- 75 ■ For which management purposes can history be useful?
- 83 ■ Conclusion



Introduction

Even a short history of the relationships between humans and aquatic environments reveals the ancient nature of those ties, the overlapping uses through time and space, and the wide variety and complexity of practices. Clearly, each area has its particular aspects, time lines differ somewhat, issues do not weigh in the same manner in different places, etc. That being said, historical studies are increasingly valued along with greater awareness of the co-evolution on the part of society and the environment, and acknowledgement of the concepts of patrimony and heritage.

The two terms, patrimony and heritage, though closely related and clearly tied to the concept of time, do not have exactly the same meaning. Contrary to English, the French language does not see them as synonyms. The distinction is the result of a process, patrimonialisation, that is a source of information on public perceptions and management of aquatic environments. The term "heritage" designates a transmitted material or immaterial entity that is intrinsically related to the past and, more specifically, to a memory that leaves a trace in the present. According to J. Burnouf and G. Chouquer (2008, p. 98), "heritage constructs the present space [...] the most insignificant objects are saturated with memory". In terms of landscape, moats, drainage ditches, mills, canals, ports, tow-paths, bridges, dikes and hydroelectric plants are all elements of heritage, the discreet or obtrusive manifestations of the history of aquatic environments (Dournel and Sajaloli, 2012a). The term "patrimony" designates a material or immaterial entity that has been transmitted by an institution, an association, a private company, an individual, etc. The concept implies unequal treatment toward the relics of the past. Some elements of heritage are favoured over others (Desvallées, 1995). An aquatic environment is enhanced by those favoured elements, e.g. a bridge, and degraded by the unfavoured, e.g. an industrial site. The first are preserved and maintained, the second are abandoned or even eliminated.

Public and private stakeholders distinguish between what is seen as remarkable and the ordinary, which implies the existence of criteria and a system of interpretation. Awareness of these "water histories" is not evenly spread throughout the country in that some rivers are much better known than others. Research programmes are a structural element in collecting this historical data. This scientific knowledge is enhanced when combined with the vernacular. In addition to archives and libraries entrusted with the mission of collecting and conserving traces of the past (post cards, photographs, administrative documents, letters, newspapers, etc.), many inhabitants have private collections of souvenirs.

The texts and images are traces, among others, of certain uses and practices, to which archaeological studies must be added. Different methods of exploring these means of expression (discourse) are presented here to clarify the approaches used in the human and social sciences. The use of history is of the utmost value in managing aquatic environments, whether for the socio-economic diagnosis of a region or for implementation of development projects.



Using history to develop a territorial diagnosis

The different types of discourse

Changes in the perception of aquatic environments can be analysed via different types of discourse. Aquatic environments elicit oral and written forms of discourse that evolve as a function of different measures and projects. These forms of discourse illustrate practices, but also perceptions concerning the environment and its management. These sources lie at the intersection of thought, knowledge and the action of managers, elected officials, local inhabitants and the users of the environment. Table 1 distinguishes the types of discourse as a function of the collection protocol, i.e. do they pre-exist or are they produced during the research project?

Tableau 1 *Discourse, a polymorphic material*

| | Existing discourse | Elicited discourse |
|---------|---|--|
| Oral | Generally public via the media (radio, television), public meetings, etc. | Unstructured, semi-structured, structured interviews Round tables, discussion groups, etc. |
| Written | Legal, political, tax, institutional, media documents, etc. Photographs (occasionally family photos), images, post cards, etc. | Questionnaire-based surveys. Contemporary photographs of a landscape marked by the past. Thoughts based on different scenarios presented in story form, etc. |

The historical approach provides knowledge on the evolution of natural environments and their management by societies. The sources are primarily written or in the form of images, and are available in archives (Bautier, 1967). In France, there are three types of institutional archives, the national, departmental and municipal archives, but there are also numerous archives that belong to public or private entities (National audiovisual institute, Water agencies, associations, Compagnie Nationale du Rhône (CNR), etc.), and to private persons.

The documents pertaining to the natural and social history of the environment and development projects are organised in "series" in institutional archives. They include legal documents, documents pertaining to public works and large projects, maps and atlases, administrative documents, the reports of countless administrations, the archives of certain associations, press clippings, etc. There are also audio and audiovisual documents from more recent periods.

The techniques used to process archives consist essentially of an in-depth analysis of their contents, their authors and of comparisons between documents. In this manner, via the archives, history provides information of use in understanding the status of aquatic environments and their evolution over time, and on management techniques and the perception of the environment at a given time (see the case study on the history of swimming and boating in the Loire at Orléans on the next page).

Using different archives to study the history of swimming and boating in the Loire at Orléans

The value of consulting archival documents lies in the diversity of sources and periods. An exploration and comparison of maps, drawings, graphs, engravings, photographs, paintings and texts (technical studies, media, books, regulations, etc.) produces for a given moment in a certain area a precise diagnosis of the situation at that time, not only in economic and social terms, but also concerning the environment and the landscape (Bouni, 2014). This type of study can also result in chronologies and landscape transitions over time when the focus is placed on documents spanning long time frames. This diachronic approach pinpoints the phases of stability and of change during the history of an area, of a studied object or of a project, and the factors underlying the identified temporal markers. In light of the above, archival documents are a means not only to understand and to precisely experience the history of aquatic environments, but also to gauge the importance of the resulting elements of heritage produced in the culture and the landscape, as well as how they might be turned into patrimony. A number of institutions (towns, departments, the State) and organisations (libraries, cultural centres, museums, etc.) facilitate the task by opening their collections via documentation centres and even offer enhanced access to certain documents via the internet.

As a practical example, the study of swimming and boating in the Loire at Orléans illustrates the importance of using the available archives given the recent rich history of these somewhat forgotten occupations and the resulting patrimonialisation issues (Dournel, 2010, Dournel and Sajaloli, 2012b).

The development of swimming in the Loire at Orléans in the middle of the 1800s took place in a more general context of increased numbers of public bathing sites throughout France. The river morphology, with its many sand bars and islands, made it ideal for water access. Private bathing sites and swimming schools abounded along the Loire at Orléans during the *Belle Époque* (see Figure 26).

Figure 26

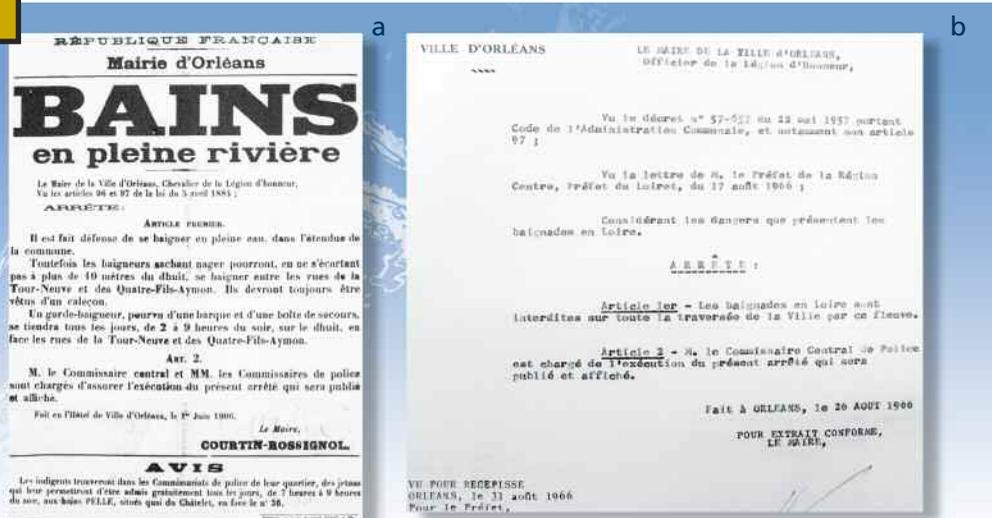


(a) *Swimming in the Loire* and (b) *a swimming school, on the Châtelet quay, in Orléans*. Photography was developing rapidly during the *Belle Époque* and represents a precious source of information on the initial bathing practices along the Loire and on the infrastructure related to these activities.

a © Orléans municipal archives (2F11264)
b © Orléans municipal archives (2F11322)

The First World War did not put an end to swimming, on the contrary it was recommended as physical preparation for the front. Between the two wars, swimming and beaches even became one of the main activities in the city of Orléans. The development of tourism, thanks to paid vacations, and travel by train meant that swimming in and around Orléans even attracted people from the Paris region. The socio-economic importance of the activity led city officials in 1938 to officially request that Orléans be listed as a vacation centre with a change in name to "Orléans les Bains". But the outbreak of the Second World War cancelled any effect of the request and put an end to swimming in the area. Other influential factors in the 1960s were the unsafe conditions, problems with water quality and the expansion of public swimming pools and of summer vacations on the seashore. Swimming in the Loire was subsequently forbidden by a municipal decision on 26 August 1966 (see Figure 27). But it nonetheless continues sporadically to this day.

Figure 27

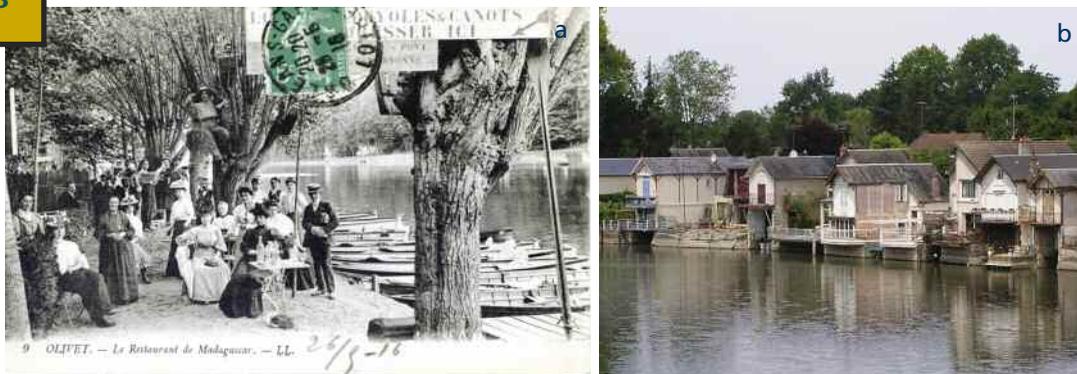


a - b © Orléans municipal archives

Organisation in 1906 and the 1966 prohibition on bathing in the Loire within the city of Orléans. The municipal documents contain precious factual indications on the organisation of swimming and the applicable regulations.

Similarly, archives constitute an indispensable source of information on the recent history of recreational boating activities on the Loire and Loiret Rivers, but also concerning the related patrimonialisation issues. These activities, which developed on the Loire according to a slightly different time line, continue today via a large organisational structure (the Orléans canoe and kayak club, founded in 1916) and fit well in the policy to reform and develop activities along the river. Boating even came to symbolise the Loiret River. In the 1800s, this short (11 kilometres) outflow of an underground branch of the Loire, consisting of an unusual succession of straight basins, was developed for boating. The basins were originally created by the hydraulic projects undertaken by monks to make use of the mechanical power of water. The first written records of the watermills date back to the 10th and 11th centuries. Up to 17 watermills existed at one time, proof of an active water-based economy that continued up to the 1700s. In the meantime, the construction of several châteaux starting at the end of the 1500s initiated a progressive transition of the Loiret, particularly appreciated for its quality of life and the recreational activities. The numbers of visitors increased and the river became highly popular during the *Belle Époque*. The steady growth in outdoor café-dance floors, café-restaurants and boat houses were the clear sign of the social favour enjoyed by the river environment for strolling, fishing and boating (see Figure 28). It was at that time that the Loiret boating association (1882) and several festive boating events were created that continue to enliven the river to this day.

Figure 28



a © Association Coll. M. Pillon; Association for the protection of the Loiret and its tributaries
b © S. Dournel, 2011

Boating on the Loiret was important during the Belle Époque and produced "heritage" structures. These two photographs make clear that though boating has declined, it has left behind numerous features in the landscape such as the boat houses that now serve as homes.

The study of swimming in the Loire and boating in Orléans highlights the value of using archival documents to understand and follow the history of aquatic environments. This qualitative method, based on the complementarity (type and period) of historical sources, is a means to revive the collective memory of water environments, to gauge the importance of the landscape heritage and to refine their diagnosis. What is more, the use of archival documents, both images and text, is a promising approach that can guide local stakeholders attempting to patrimonialise river environments.

Reveal changes in public perception over time

Researchers in the human and social sciences explore discourses in the form of texts and images. The two are studied using a number of different procedures where some may be used for both, but others are specific to one or the other (see Table 2).

Tableau 2 *Research methods for different forms of discourse.*

| Available analysis methods | Text | Images |
|-----------------------------------|------|--------|
| Analysis of textual data | X | |
| Qualitative analysis | X | X |
| Content analysis | X | X |
| Photographic observatories | | X |
| Geohistorical information systems | X | X |

■ Techniques applicable to both text and images

Superficial or in-depth reading of documents enables a qualitative, initial approach to understanding discourses (Bardin, 1977). Defined B. Berelson (1952), this approach is "a research technique for an objective, systematic and quantitative description of the manifest content of the communication". Content analysis is a means to "provide information on the dynamics of a social representation" (Negura, 2006) by synthesising the various discourses. Hypotheses must be formulated either following the reading in an inductive approach, i.e. deriving general observations from particular incidents, or beforehand in a deductive approach, i.e. employing a rationale to progress from the general to the particular. A unit of account must be selected, categories identified and within the categories, different types of conditions can be set. Careful reading is then required to identify the conditions that may or not be present within the set unit of discourse. Content analysis studies discourses using quantification techniques. It attempts to describe the characteristics of the transmitted message by transforming the qualitative discourse into quantitative data.

For example, content analysis on images can be used to work on recurrent landscape patterns, sometimes called "iconic signs". In this case, reading of a unit (e.g. a photograph) does not take into account artistic criteria, but rather the presence or absence of places, objects, topics, etc. This method remains influenced by qualitative approaches, notably when constituting categories, setting up analysis criteria, carrying out figurative interpretation, etc.

This process uses a database that may subsequently be processed using univariate (presence/absence), bivariate (involving issues concerning lexical coincidences or correlations) or multivariate statistics (that can facilitate the creation of typologies). This method does not require the purchase of software, a standard spreadsheet application can be used to enter the coded data and carry out the statistical calculations. However, certain applications can facilitate learning the method. Content analysis can thus be used to measure and compare different types of communication (Comby *et al.*, 2012).

That being said, some researchers prefer qualitative studies. These approaches involve working directly on the collected data and the sources, without any modifications to the data using quantitative methods. These studies highlight the raw discourse by extracting quotes, whether contextualised or not. In order not to alter the meaning of the stakeholders, these researchers attempt, on the one hand, to transcribe the world as it is described and experienced, and on the other, keep a tight rein on the effects of their subjectivity.

■ Written discourse and analysis of textual data

Analysis of textual data is a process used to explore the graphic information contained in a text, on the level of each word, expression, paragraph or of the text itself. Where content analysis sets categories and observes the discourse, analysis of the textual data attempts to postpone the interpretation in favour of studying how words are used (number of occurrences, sentence structure, proximity or distance of certain terms, etc.) (Comby *et al.*, 2012).

The textual sequence is reorganised in view of quantification using indexes (organisation of the text to detect the occurrences), matches (each occurrence of a word in its immediate context), partitions (via a unitary viewpoint concerning notably the independent variables such as the date, author, topic) and lexical tables (with words organised in lines and the various partitions in columns). The latter may be derived from the content-analysis coding and the metadata. The value corresponds to the number of occurrences of the word in a given article or part of the documentation. Using the table, statistical calculations and probability analysis can be carried out (see the case study on the patrimonialisation of rivers in the Drôme valley below).

Case study

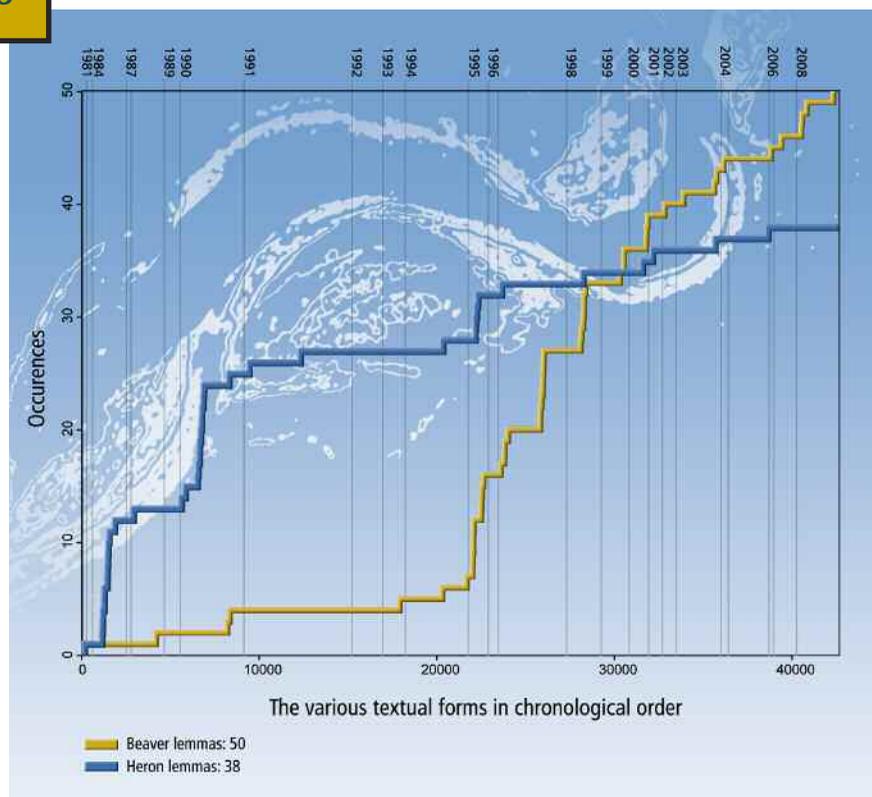
The press, a source in studying changes in public perception (patrimonialisation) of rivers in the Drôme valley

Newspapers have several advantages, namely they are published regularly (daily or weekly), can be read free of cost (in libraries, archives or private collections) and contain texts and images concerning aquatic environments. This example is based on a complete reading of the local, weekly paper *Le Crestois* in the departmental archives in Valence, spanning the period 1981 to 2008 (Comby *et al.*, 2012). A total of 85 articles were noted dealing with the Ramières national nature park created in 1987 in view, notably, of protecting a braided section, i.e. a wide active river section with numerous channels where islands may exist, in the lower Drôme valley.

The objective of the study was to show that the value of a natural element of patrimony is enhanced by images and perceptions that change over time, notably between the moment it is created and the moment it is established as a local resource. From 1981 to 1995, a heron symbolised the Ramières park, but from 1995 to 2008, a beaver was increasingly mentioned (see Figure 29). This impression was reinforced by the change in the logo of the park with the bird being replaced by a friendly, orange beaver greeting visitors. The change in symbols, from the heron to the beaver, signals the shift from a protected reserve, highlighted by the attention paid to a species seen as threatened, to an area more open to local development, based on the attractiveness of certain animals and local marketing decisions.

1. There is a range of software available, both free (Dtm-Vic, IRAMUEQ, R, TXM) and commercial. For a presentation of the available applications, see: <http://nombresetmots.ens-lyon.fr/spip.php?rubrique14>.

Figure 29



© E. Comby, progression plotted by TXM

From the heron to the beaver, the changes in animals at the Ramières nature park from 1981 to 2008 mentioned in the local, weekly press.

This approach makes it possible to retrospectively assess the strengths of the communicated elements. However, gathering the necessary documentation may take a great deal of time. It is necessary to select the newspapers, set the chronological limits, then read the newspapers and select the articles that will be analysed using optical character recognition (OCR) software. Subsequently, the documentation contents can be analysed and imported into software to analyse textual data.

■ Techniques specific to photography and images

In 1984, the National agency for territorial planning and regional action (DATAR) commissioned photographers to capture the essence of landscapes in France. The mission, titled "France in the 1980s - Landscape photographs" resulted in over 200 000 photos between 1984 and 1988, taken by 28 photographers with State funding. Their photographic collections addressed various subjects, e.g. business offices and high-tech sites (V. Milovanoff), family farms near Mâcon (R. Depardon), cars (Y. Guillot).

One year after the end of the DATAR photographic mission, the council of ministers on 22 November 1989 created the Landscape photographic observatory, an organisation charged with showing the transformations in landscapes and analysing the causes and the participants in the changes. Practically speaking, the objective was to create a "photographic itinerary", i.e. a series of viewpoints (photographs with captions) that were to be rigorously reproduced year after year (see the Focus section on photographic observatories on the opposite page). These "repeated views", also known as photo-monitoring, are a means to visually observe the changes in landscapes.

Though the establishment of the first observatories was difficult, it resulted in the creation of several photographic itineraries recording the local territories over time. Initially, the desire was to cover, at least in terms of the topics addressed, the main changes in landscapes throughout the country. Over the 1990s, the photographic-observatory concept continued to grow and was copied in many other countries. The various photographic itineraries contributed to a rich photographic collection, constituting a contemporary landscape archive whose quality derives from the precision of the repeated views and from the professionalism of the photographers (see the case study on the perceptions of stakeholders in the Brenne regional nature park on the next page).

Photographic observatories, the archives of environmental perceptions

In 2008, in order to manage the highly divergent developments in the observatories, the Landscape office drafted a national methods guide and started to archive the photos produced over the past 30 years. The objective was to facilitate public access to the archives. Recently, the photographic collection went on-line in the document information system of the Ecology ministry (see for example http://www.developpement-durable.gouv.fr/IMG/DGALN_methodeOPP.pdf). The photos may also be seen in the National archives (Fontainebleau site) and each viewpoint in the National landscape photographic observatory (OPNP) is georeferenced. The Landscape office has confirmed that new photographic itineraries may be granted permission to join the OPNP, on the condition that the prescribed methods be observed. Numerous organisations have adopted the concept of the landscape photographic observatory (Blouin-Gourbilière, 2013). The official method established in 2008 recommends a partnership agreement, photos by a professional photographer, a project managed by a steering committee (elected officials, technicians, associations and partners) and strict instructions concerning the formats used. Finally, the position from which the photos must be taken and the final product submitted by the photographer to the managing entity are defined in detail. In addition, the official method includes indications on managing the photo-monitoring over time, e.g. frequencies, changes in itineraries, technical decisions, etc. The instructions are so precise that few photo series comply completely. Variations abound and the observatories may be considered from different angles, i.e. scientific, artistic, citizen-science and documentary. The observed variations concern:

- selection of the photographer, who may be a professional, a technician from the managing entity or a number of persons acting in turn, including local residents;
- the type of photography (film or digital);
- the absence of project documents and analysis criteria (required elements for OPNP observatories);
- desired interaction via an internet site and/or participatory events;
- the frequency of the repeated views.

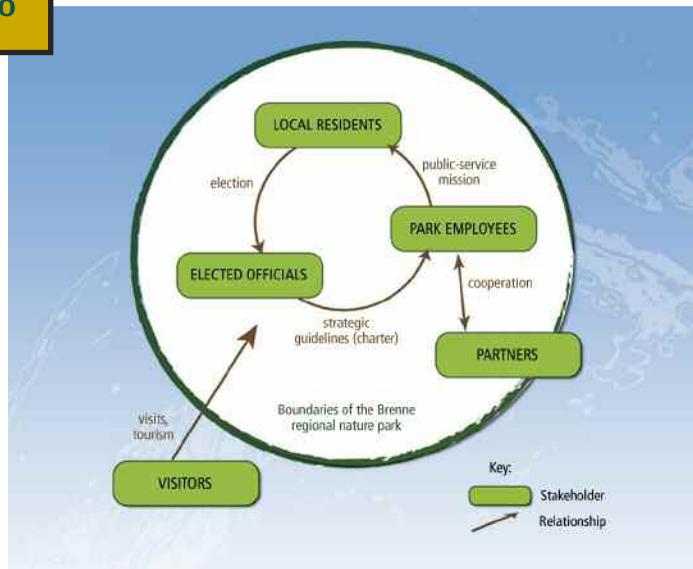
Today, there is 1) the Landscape photographic observatory (OPP), with a rigorous system defining how to implement photo-monitoring, and 2) the National landscape photographic observatory (OPNP), the national system comprising the observatories operating according to the method set up by the Landscape observatory of the Ecology ministry in 2008, and 3) many other types of landscape observatories. In 2011, 19 photo-series had been officially accepted by the OPNP. Since that time, the Ecology ministry has managed the process, but no longer supplies funding.

Using photo-monitoring to identify the perceptions of stakeholders in the Brenne regional nature park

From 2009 to 2013, the Brenne regional nature park set up a participatory landscape photographic observatory (Blouin-Gourbilière, 2013). The three objectives were first to question the various stakeholders (inhabitants, visitors, development professionals, elected officials, park technicians) concerning how they perceived the area. Secondly, opportunities for dialogue and mediation were created (workshops, field trips) bringing into play the landscape and photography. Finally, the park established for itself an operational tool to monitor its landscape management and to identify the major issues.

The stakeholders to be questioned were selected after drawing up a "map" of stakeholder groups (see Figure 30).

Figure 30



© C. Blouin-Gourbilière, 2013

Map of the stakeholder groups for the establishment of a participatory landscape photographic observatory (Brenne regional nature park).

Practically speaking, two methods to create images were established, namely two large photographic competitions in 2010 and 2011 (see Figure 31), and eight participatory workshops.

Via the two methods, five landscape topics were investigated, in response to questions raised locally concerning landscapes seen as positive, those seen as negative, patrimonialisation of landscapes, showcase landscapes and management of changes in landscapes.

These topics were expressed in seven precise questions put to the various stakeholders, i.e. which is the landscape that I prefer, that I feel ashamed of, that I would like to make disappear, that I would like to preserve, that symbolises my area, whose changes worries me, whose changes over time I would like to monitor. After 20 months of collecting data in the photographic competitions and the workshops, 308 viewpoints were produced in response to the seven questions. A viewpoint is made up of an image and a short text, drafted by the photographer, describing the person and their relationship to the landscape and the area.

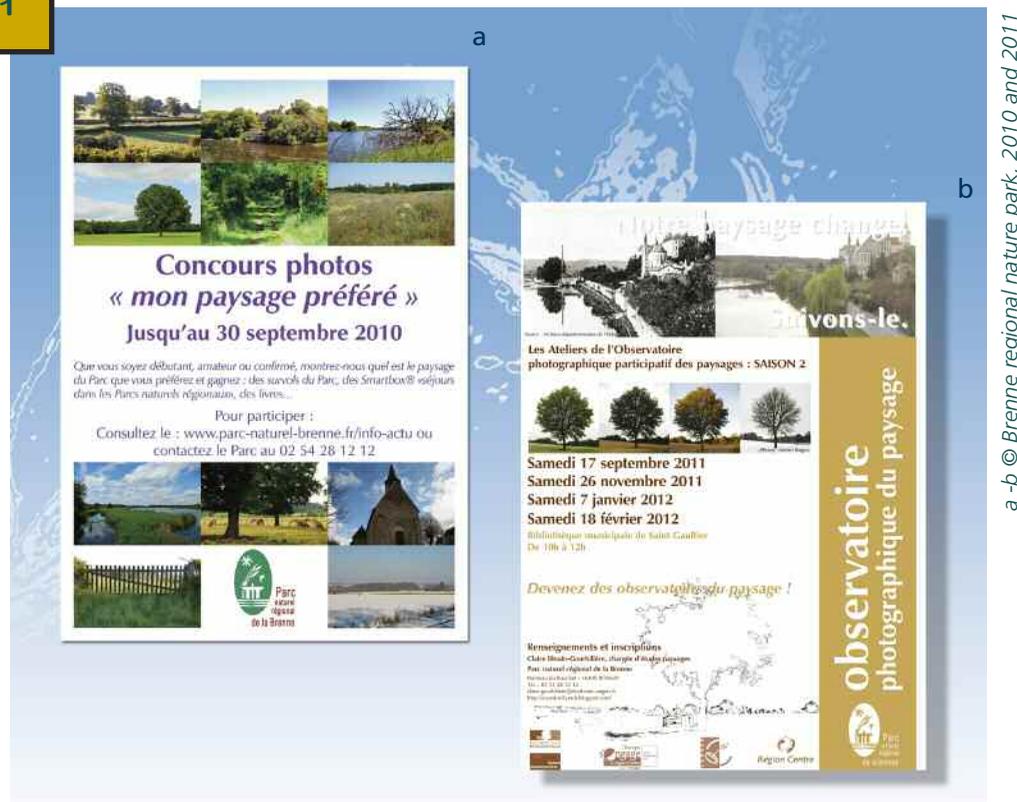
Starting with the 308 viewpoints, the various stakeholder groups together selected 52. They constitute the itinerary of the participative landscape photographic observatory of the Brenne regional nature park and serve as an operational tool to monitor landscapes.

In order to establish the photographic observatory, it was necessary to define:

- who were the photographers (inhabitants, visitors, elected officials, partners, park technicians) via the photographic competitions;
- the deliverable, i.e. the series of viewpoints (a digital photo and the accompanying text);
- the project documents, e.g. report on each workshop, blog, final report presenting the results;
- the level of interactivity (high);
- the frequency of the repeated views (initially quarterly, then longer intervals starting in 2013);
- the human resources (a Ph.D student employed full-time in a 36-month CIFRE contract);
- the duration of the project (December 2009 to March 2013).

The address of the blog (viewpoints, reports, images, etc.) is <http://avuedoeil-pnrb.blogspot.fr/>.

Figure 31



The photographic competitions and workshops (2010-2012) organised by the Brenne regional nature park served as the groundwork and catalyst for the participatory landscape photographic observatory.

Geohistorical geographic information systems (GIS) can also be used to analyse changes in landscapes and territories. They can display changes in a parameter chronologically, for example using maps or 3D images (geo-conceptual diagrams, 3D mapping, etc.) (see the Focus section on geo-conceptual diagrams, page 50, and the Feedback section on *The Rhône River*, page 130).

A geohistorical GIS is a computer program that inputs and processes georeferenced historical data. The program can manipulate layers of alpha-numeric data from different periods for a given territory. Practically speaking, this type of computer tool is used different purposes, notably operational (monitoring work in the Rhône River in order to prepare suitable measures), scientific (understand the rationales and time lines of work in the Rhône) and teaching (use as an educational tool to raise awareness concerning the natural patrimony) (Bruyère *et al.*, 2009).

This approach raises a number of difficulties. Above and beyond the potential cost of data (now reduced since some data has been made available by the National geographic institute (IGN), the absence and the difficulty of obtaining data are the main obstacles. When the data are available, it is sometimes difficult to obtain the precise information required to use them (precision of data, captions for images, dates, etc.). Often, data are not consistent over the entire area studied, which introduces distortions.

The first task with the available data is to scan the old paper maps or photos. Then the data must be georeferenced to create overlapping layers for comparison purposes. This work is long and tedious in that it often consists of finding and marking landmarks that exist over the entire period studied. The conclusions that can be drawn from visual depiction of the changes over long periods are particularly useful. They are a means to:

- better understand the current situation;
- draft recommendations on the future evolution of the studied parameter;
- put certain aspects into perspective in light of the changes over time of the parameter.

The map thus provides information and serves as a basis for discussion. It can also elicit reactions and launch dialogue. The combination of a geohistorical GIS with other sources of information (photographs, reports on the construction of structures, engravings, etc.) is a means to prepare geo-conceptual diagrams (see the case study on 150 years of change in Rhône landscapes below).

Case study

Geo-conceptual diagrams of 150 years of change in Rhône landscapes used for the master plan to reactivate river dynamics

A number of sources were used (Gaydou *et al.*, 2012) (Figure 32):

- the 1860 Ponts et Chaussées Atlas (bridge and road department), containing a map of the Rhône from Geneva to the Mediterranean in black and white, scale 1 : 10 000. It was very lucky to have a consistent document on the entire Rhône from a time when the river flowed in a number of channels and significant sediment transport took place;
- all the diagrams making it possible to locate the various generations of installations (Branciard diagrams drafted in 1910, scale 1 : 10 000, from Lyon to the sea; pre-work diagrams drafted by the Compagnie Nationale du Rhône (CNR) before the construction of hydroelectric installations);
- old aerial photographs (campaigns run by IGN from 1946 to 1961) used to assess the impact of the work done for navigational purposes between 1880 and 1920. These data are easily accessible for researchers now that IGN has supplied the sources;
- old post cards (Dürrenmatt collection) that can be consulted at the Maison du Fleuve Rhône (n.d.);
- current orthophotographs (IGN);
- all available on-line data, e.g. Google Earth.

Using all the above sources, the first step was to map, using GIS software, the diachronic change of developments and land use in 1860, from 1880 to 1920, from 1946 to 1961 (period after navigational work and before CNR work) and in 2006 (current period). This made it possible to follow the changes in development work on the Rhône and to observe the impacts on land use, and consequently on the landscape.

The second step consisted of field work, descending the river in a canoe and interviewing local inhabitants; Analysis using specific criteria of photographs taken from the banks distinguished different landscape units. Photographs taken from high points revealed the structure of the landscape (corridors, dense units).

Rhône landscapes, 150 years of change.

a © Dürrenmatt collection, MDFR

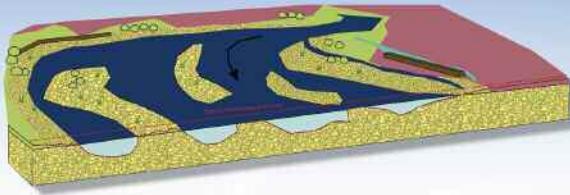
b © Dürrenmatt collection, MDFR

c © Aerial photo of the Rhône at Beauchastel in 1954 (IGN)

d © Gaydou, 2008

e © Initial images of the pilot site, left bank upstream of the Pont-Saint-Esprit bridge (CNR, 2010)

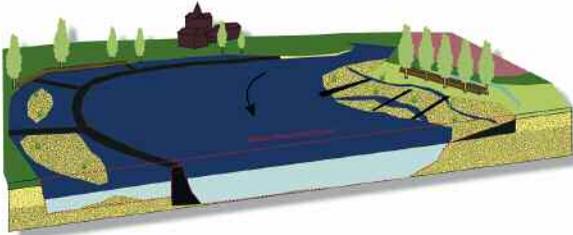
1860: a braided landscape



Flooding occurred frequently and water was everywhere. The stone and pebble banks were used for grazing, the rest of the plain was frequently flooded. Houses were built primarily on higher land. When that was not possible, the houses were adapted and dikes built to redirect the currents to reduce the destruction caused by flooding.



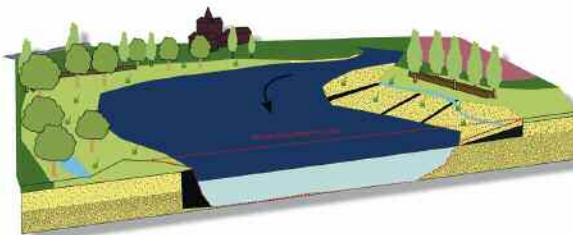
1880-1920: work for navigation



Most commercial goods were transported by water. This was the time of tow-paths along the river. The ports and villages of the bargemen were very lively. The river was systematically lined with low dikes that secured the dangerous sections and deepened the river, so that navigation became possible 355 days per year instead of 170. The landscape began to shift from multiple channels to a single, calibrated channel. Alluvial bars ceased to move. A static landscape replaced the former, fluctuating landscape.



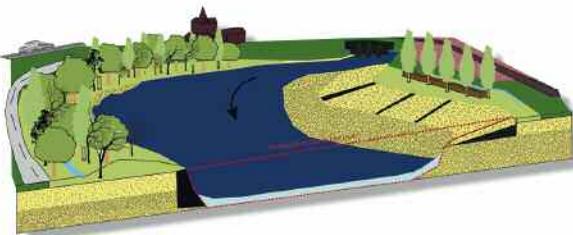
1946-1961: Prior to hydroelectric works by CNR



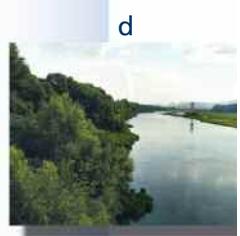
Railroads competed with the waterway. The dikes had become obsolete, but continued to trap sediment. Little by little, new areas were created. The alluvial forest colonised the new areas that were less and less impacted by floods. The forest formed a barrier, limiting access to the river. The water progressively disappeared from the landscape and local inhabitants moved closer and closer to the river, forgetting the flood risks.



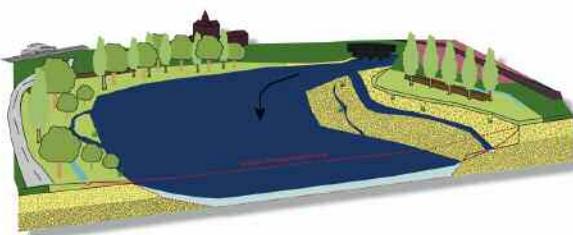
Today: Post hydroelectric works by CNR



The creation of hydroelectric installations created an additional barrier limiting access to the river. The water continues to disappear from the landscape because only a minimum discharge is sent into the short-circuited channels. Inhabitants erroneously think they are protected by the diversion. The alluvial plain is increasingly developed. The wooded, river margins become the site of new activities and are in some cases the only natural areas in the urbanised alluvial plain.

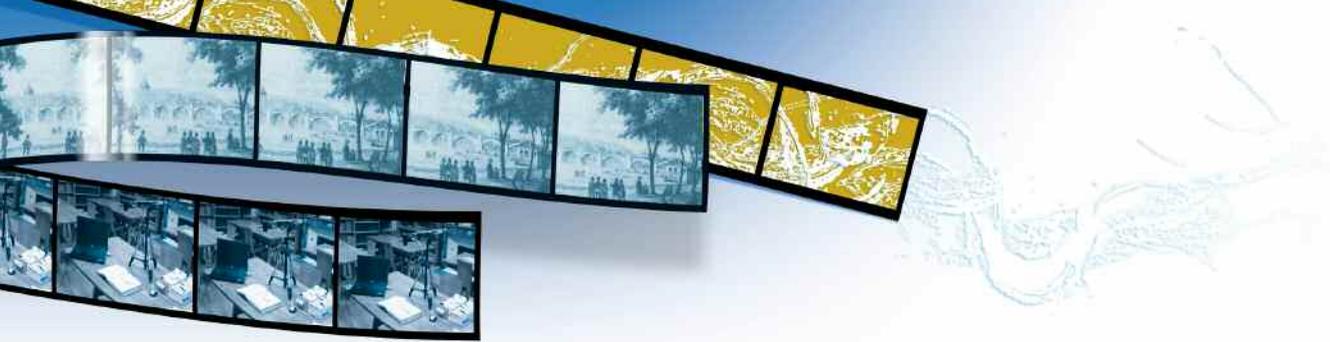


Tomorrow?



A project to dismantle the old, navigational dikes is now under way. The objective is to return to the river some of the areas filled in with sediment. This would increase the visibility of water in the landscape. This project is limited by the vulnerability of the activities established in these areas in step with the process of forgetting the flood risks. It is also limited by the fact that the inhabitants have become attached to these areas and by the patrimonialisation of the stone structures.





Contribution of history to projects and restoration work

Aquatic environments elicit numerous projects in areas that would like to stimulate restoration or even sustainable development. Local officials observe that these areas have been marginalised and depreciated, but also note their great patrimonial value, whether natural (diversity of fauna, flora and ecosystems) or cultural or in terms of local identity (they are the result of complex, centuries-old relationships between societies and their environment).

These historic relationships with aquatic environments, though profoundly modified, have resulted in a high degree of naturalness and biodiversity. Urban stakeholders are aware of this richness and bring history into play to inject meaning into their projects. Rivers and wetlands, bearing cultural heritage and outstanding landscapes, are above all conducive to many forms of patrimonialisation.

History used to design, legitimise or justify projects

History is used by stakeholders to promote restoration work. It assists in preparing projects by providing indications on the possible boundaries for the project, the potential stakeholders and funding, the suitable socio-cultural references, etc. (see the case study on the restoration of the Rhône in Lyon below). It is also a means to legitimise or to justify projects by presenting periods during which societies had very different relationships with their aquatic environments (Bouni, 2014).

Case study

Studying the local press on projects to restore the banks of the Rhône in Lyon

To generate acceptance for its projects to restore the river in an urban setting, the city of Lyon created festive events intended to legitimise the current stakeholders and, consequently, their decisions (Gravari-Barbas and Jacquot, 2007). A festive event is a means to modify the vision people have of a place, to change the place itself over a short period and to create good feelings about the new image (Comby, 2013).

In 2003, 2004 and 2005, the event was the *Quai des Guinguettes* (outdoor café-dance floors) along the lower banks of the Rhône from which cars were temporarily banned. Prior to the event, the banks were occupied by a parking lot, a vehicle technical-inspection centre and a road. The first event, from 11 to 14 July 2003, was an experiment made possible by the passage of the *Tour de France* bicycle race. The two events together justified the ban on parking. A dozen *guinguettes* and a few barges along the quay were visited each evening by at least 25 000 people. Following the success in 2003, the next year, the *Quai des Guinguettes* increased in duration (eleven days) and in the number of *guinguettes* (28). In spite of the success in 2004, the event was not scheduled for 2005 because work on the banks was planned. However, the work could be postponed and for the last edition in 2005, from 8 to 17 July, 1.5 million visitors swarmed the banks of the Rhône.

The short-lived events were also used to present the Confluence urban project, with the local newspaper *Le Progrès* defining it as the "*Quai des Guinguettes, version Confluence*" (*Le Progrès*, 25 June 2010). The banks became places to spend time with music, dance and relaxation. The events thus brought to life lost images of the banks, from a time before the omnipresence of cars and industrial decline. The temporary events, combining a party atmosphere and convivial, social occasions, sealed the social ties and the legitimacy of the project for the banks (see Figure 33).

Figure 33



a - b © B. Morandi - 2013



The Rhône banks in daily life.

The festive moments and events were perceived as something outside daily life, with the latter impacted by cars, city noise and eternal pollution. The new situation combined tradition (the use of the term *guinguettes*, the return of recreational areas for the game of boules and the masses of people that were present along the banks in the early 1900s) and novel aspects (VIPs and the general public flocked to *the place to be and to be seen*, where companies wanted to be seen as well, and the design and installations on banks were very modern).

Using history to guide the discussions of urban stakeholders and coordinate their action

The concept of restoration characterises and informs on the patrimonial and situational nature of this recent and experimental initiative that coordinates urban projects and guides territorial development (Dournel, 2010). However, the process is not easy given the diversity and complexity of the existing heritage, the methods required to use history, the use of knowledge in terms of communication and project implementation (see the case study on restoring the Loire patrimony on the next page).

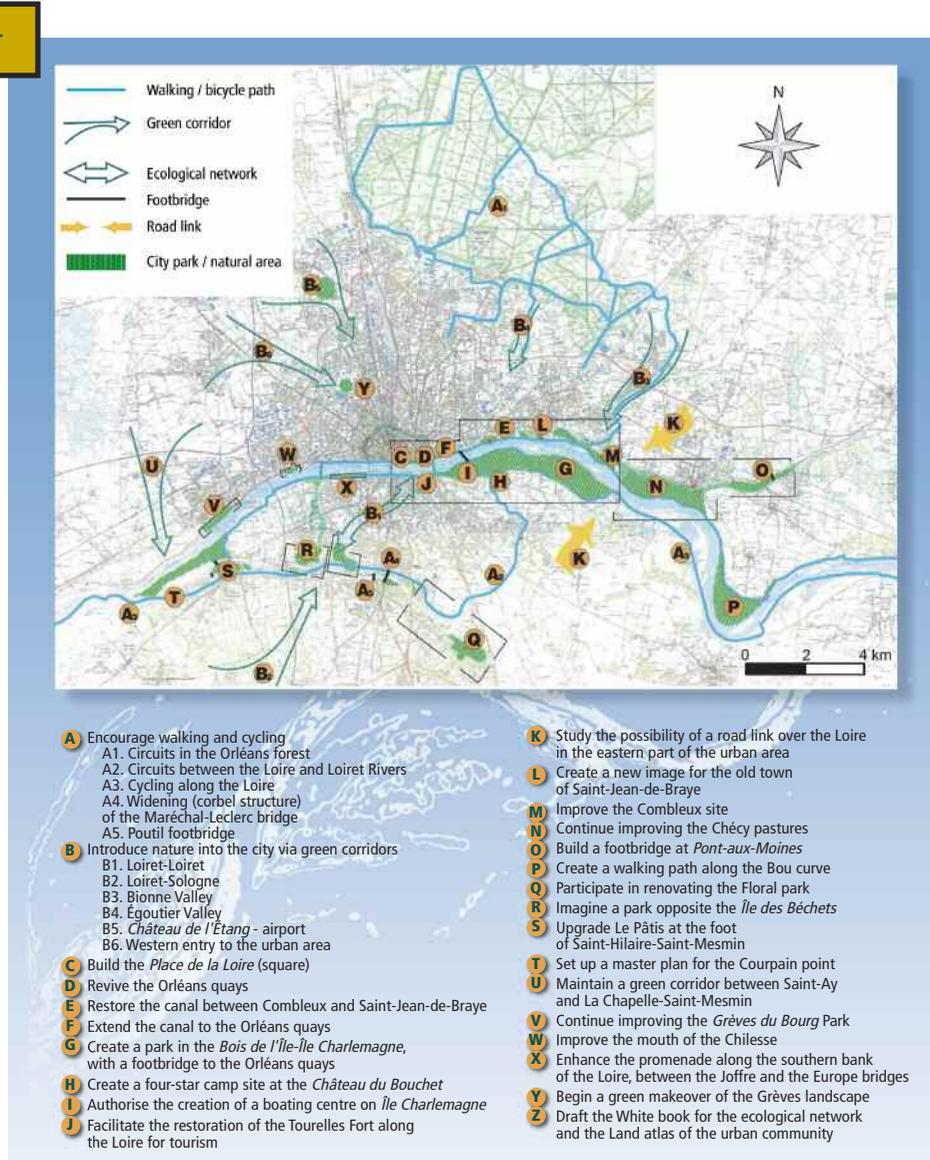
Study on restoring river patrimony in the framework of the "Loire Trame Verte" project

The "Loire Trame Verte" ecological-network project, targeting the restoration of Loire patrimony in the Orléans urban area, is a fascinating example (Dournel, 2010). In 2002, the elected officials of the *Orléans Val de Loire* urban community instituted the project as one of the six main planks in community policy. Four factors combined to induce the elected officials to redefine the role of the Loire River:

- the inclusion in 2000 of the Loire valley in the UNESCO list of world heritage as a living, cultural landscape;
- the recognition that aquatic landscapes were deteriorating and being forgotten;
- the desire to reacquire the status of a "royal river" linked to the prestigious history of navigation on the river;
- the desire to integrate the territory and restore the reputation of an urban area confronted with urban sprawl and located in the shadow of Paris.

The process of patrimonialisation of river landscapes was included in the project. The Loire and Loiret Rivers and the Orléans canal received most of the attention and constituted the three structural components of public policy (see Figure 34). The objective was to create shared spaces by enhancing accessibility and promoting outdoor recreational activities.

Figure 34



© Orléans Val de Loire (2002), modified by S. Dournel (2010)

The "Loire Trame Verte" project from A to Z.

Practical experience shows that history can be used to guide the discussions of urban stakeholders, legitimise the restoration strategy and coordinate their action. The purpose of the work undertaken on the quays and the lateral canal was to revive the historic port of Orléans. The city buildings along the river preside over one of the first and largest inclined quays for horse-drawn vehicles in the entire Loire valley, a clear indication that the river was developed almost exclusively for commercial navigation, in spite of the instability of the bed. The arrival of trains in 1843 plunged the port into oblivion (Dournel *et al.*, 2011). The creation of a lateral canal in 1920, linking the Orléans quays to the point where the Orléans canal (linking the Loire to the Seine) reaches the Loire (5.5 km upstream), was much too late and incapable of reversing the general trend. The current organisation of the urban area around the road and rail links crossing the river bear witness to the loss of the river economy.

Given their intention to redefine the role of aquatic environments, the elected officials of Orléans must deal with the degraded quays that for decades have served as parking lots under anarchic conditions and with the lateral canal that is barely visible in the landscape because its lock was covered in 1963 and the last thousand metres were filled in. Aware of the value of this heritage, the urban stakeholders took action to reduce the presence of cars, then to renovate and open the quays to walkers and cyclists in 2006-2007. However, the patrimonial process went further by using the history of navigation on the Loire for novel purposes in terms of tourism and recreational activities. Examples are the construction of a dock for small and traditional boats, the reconstruction of an 1837 steamboat and of a floating wash-house from the early 1900s that hosts bars and restaurants, the restoration and dredging of the lateral canal, the renovation of its lock where it meets the Loire, the construction of a port-authority building, etc. Other examples are the organisation of the biennial *Festival de Loire*, by the *Orléans Val de Loire* entity since 2003, and the biennial *Caravane de Loire* by the Loiret departmental council since 2004. The first event, which has attracted 500 000 visitors to each of the last three Festivals, brings back to life the glorious years of the river shipping trade in Orléans for a week, with over 200 rebuilt, traditional boats, and presents the know-how of the ancient trade (see Figure 35). The second event, more dispersed throughout the department, re-enacts traditional merchant caravans.

Figure 35



Patrimonialisation of navigation on the Loire with boats, quays and the lateral canal (*Festival de Loire* in 2007 and *Caravane de Loire* in 2008).

The history of navigation on the Loire, used by the urban stakeholders, legitimised the "Loire Trame Verte" project and even stimulated the renewed socio-cultural ties between the city and the river. However, this historical analysis of the Loire at Orléans was incomplete because it neglected, without intending to do so, the more recent past uses centred on swimming and boating in the Loire. The work for the Loire ecological network, by restoring the navigational structures, the Loiret basins, the mills and châteaux along the river, encouraged the use of the promenade, but neglected fishing and boating, as well as festive *guinguettes* and swimming, which were very popular in the past. Promotion of these elements would however be beneficial for elected officials aware of the value of patrimonialisation and wanting to revitalise the river environment. The educational signs explaining the history of these recreational activities, set up during the last editions of the *Festival de Loire*, and the parallel exhibitions signal the growing awareness of elected officials in Orléans for their heritage. But it is necessary to integrate the history of these pioneering forms of recreation into urban restoration projects and perhaps even reactivate any remaining activities that are compatible with today's complex legal and administrative conditions.

The study of the situation in Orléans reveals the importance of integrating history in urban projects and the corresponding patrimonialisation of aquatic environments. However, the process progresses haltingly over time, particularly today in spite of the fact that there are important issues in terms of the identity of aquatic environments and useful recommendations concerning projects and events for local stakeholders engaged in redefining environments and ensuring their integrated management (see Figure 36).

The use of history is necessary given the problems involved in the perception and management of aquatic environments. The study of restoration projects reveals the awareness of urban stakeholders concerning the use of history, which can be supported by the human and social sciences in view of launching coordinated development projects in line with the realities of aquatic environments. The dynamics of patrimonialisation can result in unconscious simplifications and historical interpretations that run counter to the functioning of rivers and their identity, and can even cause conflicts between existing uses and practices, and those supported by the projects.

Figure 36



a, b © B. Morandi, 2014
c © c. Forst - Onema

Projects to redefine aquatic environments in cities are now often integrated in urban development policies. Historical considerations often lie at the centre of these projects. The promenade along the Saône in Lyon (a and b) and the development of the Parc de la Seille in Metz (c) are two examples.



For which management purposes can history be useful?

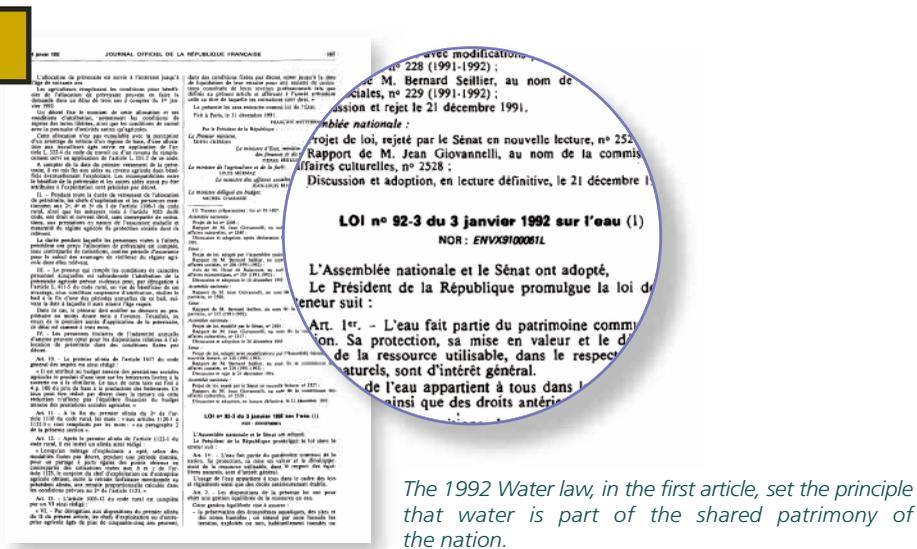
Heritage and patrimony linked to aquatic environments

Ever since the first use of the word patrimony in the 1960s within the administrative sphere (Desvallées, 1995), followed by its wider recognition by UNESCO in 1972, via the Convention concerning the protection of the world cultural and natural heritage, and the designation in France of 1980 as the Year of Patrimony, opinion polls, sociological studies and official reports have all underscored the growing interest in patrimony. But it is first necessary to agree on the meaning of the concept (Rivière-Honegger, 1995; Dournel, 2010). An analysis of the notion of patrimony involves asking how it arises from the many relationships with the environment, with others, with objects, time and space. As noted by P. Nora, "In fact, the word has become misleading. There are now many patrimonies and each raises its specific problems" (De Roux, 1994, p. 2). According to the author, the notion has not been expanded to include more objects, but has undergone a change in status. "We have shifted from a material to an immaterial patrimony, from a historical to a memorial patrimony, and from a national to a social patrimony." The idea of material and intellectual goods inherited by a community fills out the general value. Thus defined, the notion of patrimony lies at the intersection between environmental elements inherited from the past and new, meaningful constructions (Jeudy, 1990). It folds into the cultural and legal notion of historical monuments (Choay, 1988). Aquatic environments thus acquire patrimonial value as landscape and natural elements, and reveal the evolution in the meaning of the concept.

"Up until the 1800s, the notion of landscape patrimony did not exist" (Pitte, 1983, p. 96). That had definitely changed by the 1990s in that "patrimony now tends to include the legacy of history and the offerings of the land, literature, landscapes, areas and traditions, in a single, reassuring concept in which it is possible to find the possible warmth of the long term" (Chastel, 1986 in De Roux, 1994, p. 2). On this subject, it is necessary to note the importance of the 1930 law in France on the protection of natural monuments and of artistic, historic, scientific, legendary and picturesque sites, and the 1993 law on the protection and valorisation of landscapes. Landscapes are today seen as factors of development and as patrimony. Society must assume responsibility for their conservation, the purpose being to transmit landscapes and environments, in all their diversity and richness, as an inheritance to the future generations in compliance with the ethical postulates of sustainable development. The question of the overall aims is raised. F. Choay notes that valorisation, a "key term" in this debate, evokes not only the values of the patrimony that should be acknowledged, but also the notion of gains in value. "Enhanced value in terms of interest, pleasure, beauty, of course. But also in terms of attractiveness, for which there is no need to underscore the economic implications" (Choay, 1988, p. 164.). Undeniably, the concept of patrimony oscillates between the respect due to a collective good and the desire to profit from it.

Just as recently, "the notion of natural patrimony truly came on the scene in 1967 in the regulatory texts concerning the creation of the French regional nature parks" (Héritier, 2013, p. 5). The notion was further publicised by the U.N. Conference on the human environment in Stockholm in 1972, the Convention concerning the protection of the world cultural and natural heritage held in Paris the same year by the UNESCO General conference (Desvallées, 1995) and, on the national level, the 1976 law on the protection of nature. From that point on, all environments having a high level of faunistic and floristic biodiversity, including rivers and wetlands, acquired intrinsic value in the eyes of society, but that depended less on the time element, similar to other patrimonial values. What is more, water, acknowledged as the "shared patrimony of the nation" by the 1992 Water law (see Figure 37), reinforced indirectly the natural patrimonial value of aquatic environments (Ghiotti, 2009). Similar to landscape patrimony, society must protect the natural patrimony for future generations, which contributes to the notion of sustainable development.

Figure 37



Landscape patrimony and natural patrimony are just two types of patrimonial value granted to aquatic environments, to which others, including rural, cultural, urban, industrial patrimony, etc., may be added. This patrimonial acknowledgement, acquired thanks to the spatial and topical diversification of the notion (Garat *et al.*, 2005), nonetheless bears three risks, namely over-patrimonialisation, "museumisation" and rewriting of history (Neyret, 2004; Mercier, 1998). That being said, patrimony brings people together, it is charged with meaning, territorial identity, and it is a source of projects. According to E. Bonerandi (2005, p. 92-93), "the patrimonial process consists of building a strong and simplified image of a past shared by a group. The image must ensure the cohesiveness of the group over time (by strengthening the links between past, present and future, and the transmission function) and over space (by providing a durable territorial structure)". This process is characterised by the notion of patrimonialisation, where "Patrimonialisation, invented by conservatives, curators and the like, with support from managers and advice from anthropologists, is the process by which a human community attempts to conserve the past as it stands or to repossess it in order to add it to the collection, i.e. exhibit it" (Dibie, 2006, p. 101, quoted by N. Heinich, 2009, p. 19). The "patrimonial function" is supported by values, namely long lastingness, authenticity, oldness, rareness, meaning and beauty, whether artistic or natural (Heinich, 2009, p. 257-260). In other words, patrimonialisation is a means of possessing an area that involves a selection among the elements of heritage found there and that requires marking and interpretation of a place, object or element. Patrimonialisation is a collective process that involves the notions of redefinition, revalorisation and restoration of aquatic environments, notions comprising value systems and legal aspects. The question then arises as to what should be transmitted and revealed. That is a fundamental problem for rivers and wetlands. The complex function of these environments depends on societal and physical pressures, that are characteristic of the notion of environmental hybridisation developed by C. and G. Bertrand (1992). Consequently,

taking heritage and its transversality into account is a decisive factor in any patrimonialisation policy for aquatic environments. In an analysis specifically on natural and cultural patrimonies, the notion of inseparable patrimony appears (Serna, 2013).

A better definition of patrimony to better plan valorisation and transmission conditions

Aquatic environments are likely to be seen as valuable objects by individuals and groups. The values are defined as the perceived qualities of a cultural object or a site (Avrami, 2000). One speaks of "cultural values" when they are shared by a group or community. The existence of these cultural values and, consequently, of cultural meaning linked to environments, is the source of what is called patrimony, the common goods that should be protected and conserved for transmission to future generations. Management of patrimony implies having good knowledge of the values associated with the different environments and of how those values are transmitted within the group (see the Feedback section on *The Furan River*, page 134).

Better knowledge of history makes for better management of "natural patrimony". It serves in particular to identify the environments that constitute, socially speaking, patrimony and to set priorities for action. Managers may adopt a double approach. On the basis of the cultural meaning historically associated with environments, they can;

- select the environments requiring priority action from a social point of view (projects to preserve, conserve or restore);
- set up strategies to accompany the transmission of socio-cultural values pertaining to environments (see Figure 38). This is necessary because if the transmission of values does not take place, the future generations may lose interest in their preservation, conservation and restoration.

The preservation of aquatic environments is part of the job for managers of natural areas. However, society will respond to this issue only if the cultural meaning of these environments is maintained. This observation is not new. Managers fully understand it and have integrated it into their work. The installation of informational signs on local uses of rivers (e.g. the path for ecological interpretation along the Ain River in Châtillon-la-Palud) and the creation of museums presenting the environmental and social history of a river (e.g. the Escale Haut-Rhône museum) are examples showing the efforts of water stakeholders to encourage the patrimonial transmission of natural environments.

Figure 38



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Example of an informational sign for walkers, presenting the history of hunting among the Dombes ponds (Ain department). This sign contributes to the patrimonialisation of the activity and underscores the importance of its transmission for the present and future conservation of natural environments.

Research on perceptions can assist managers in this effort:

- first, by contributing to rigorously identifying first the values linked to a natural environment at different points in time and, secondly, the corresponding elements of heritage that today exist in the collective memory. For example, the *Escale Haut-Rhône* museum mentioned above was made possible thanks to the major contribution of scientists (historians, anthropologists, geographers, archaeologists, etc.) in defining contents for the exhibitions;
- in addition, by providing information on the factors and mechanisms that encourage patrimonial transmission from one generation to another (Cottet, 2010). For example, a research project has been launched on the Ain River to identify, via semi-structured interviews, the values linked to side channels by the older and newer (young adults) generations. The objective is to better understand the degree to which the values are transmitted and to determine the factors facilitating or blocking value transmission. This knowledge would make it possible, over time, to adapt management strategies and even to invent new strategies targeting better patrimonial transmission between generations.

Contribution of historical knowledge to better management of current hazards

In environmental management, hazards play an important role if only because of the size of the threatened areas. Studying the history of risk management in a given area provides information on changes in the vulnerability and adaptability of the populations subject to the hazards. History is a means to better understand the specific aspects of the current period.

The great catastrophes gave rise to new systems in the attempt to better anticipate them and to limit their future impacts. Current legislation comprises a series of laws and regulations instituted over time, often in response to a catastrophe. For example, the responsibility for Management of aquatic environments and flood prevention (GEMAPI) was created following the recent floods (Loupsans, 2014).

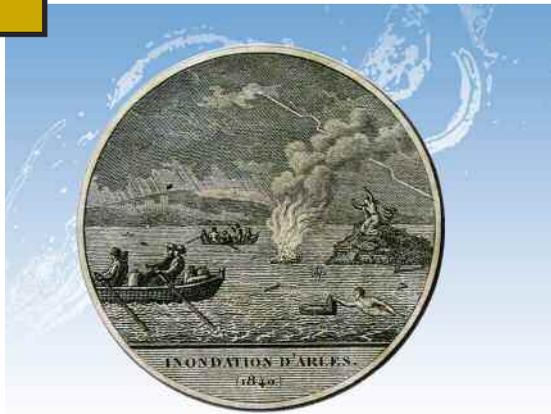
Very often, the major floods in France in the 1800s and 1900s were followed by new systems to enhance flood management. Laws on hazards address many different aspects, including prevention, protection of life and property, and crisis planning and management. The term "non-structural measures" designates policies that do not involve civil-engineering work (Valy, 2010). This new approach based on acknowledging the risk targets better management of land use and occupation. It attempts to modify practices in terms of land use, to reduce the areas at risk (numbers and vulnerability) and to spread the costs incurred.

Given that catastrophes are unavoidable, risk management consists in part of an effort to reduce the vulnerability of the existing population and material goods and structures. This mitigation, i.e. deploying resources and measures to attenuate the negative effects of a hazard, is the shared responsibility of both public authorities and individuals. Individual action is highlighted in the process of reducing the consequences of a catastrophe, notably in the 2004 Law on modernising the Public-safety directorate (Law 2004-811, 13 August 2004), in the Municipal safety plans (PCS) and, above all, in the Family safety plans (PFMS). Historical studies provide feedback on crisis management (see the case study on the perceptions of floods in the lower Rhône River basin on the opposite page). They can identify certain factors that contributed positively or negatively to the management of natural crises. They can inform managers on the measures to be taken and on the systems that should be developed to implement effective strategies for social organisation in the event of catastrophes (see the Feedback section on *The Calavon-Coulon River basin*, page 138).

A socio-historical survey on perceptions of floods in the lower Rhône River basin

Socio-historical research has taken an interest, via various sources (archives and semi-structured interviews), in the role played by individuals within groups confronted with catastrophes in the past and today (Labeur, 2011). Placing greater responsibility on inhabitants could improve crisis management. Inhabitants in areas afflicted by a catastrophe, as victims but above all as stakeholders, could reinforce the official crisis operations (see Figure 39) and serve as effective relays between society and the authorities in charge of managing the crisis, as illustrated in the following text from 1755. "The news, brought immediately to the Town Hall, was a terrible shock for the authorities. They foresaw all the horrors to which we would be exposed and right away sent all available aid throughout the town. To make sure that the boats went to those points where the danger was the greatest, they confided their orders to those persons who, due to their altruism and intelligence, seemed to most merit their confidence in the time of need" (excerpt from the text of François Morénas, 1755, *The history of what happened in the city of Avignon during the flood on 30 November 1755*).

Figure 39



© Louis Mège, 1840,
Old collections of the Arles
media library. C. Labeur, 2008

The floods in Arles in 1840, a medal engraved by Jacques Vêran.

Using the past to explain and better address present issues, notably management of multiple uses

During work to manage and protect natural areas, it is essential to take into account all the uses to which the areas are put in order to establish a management system suited to both the people involved and the environment. This is all the more true for wetlands that often concentrate a large number of activities (both legal and illegal such as dumps) (see the case study on the uses of wetlands in the town of Dettwiller on the next page).

In order to understand the links between people and wetlands, history is a source of information and offers interesting views that should be taken into account. This is because it often happens that current uses and practices cannot be explained by the existing situation, but on the contrary by the habits, customs and recollections buried in the collective memory.

Combining analysis of interviews and archives to understand differences in uses of wetlands over time in the town of Dettwiller

Certain managers, aware of what history has to offer, integrate that information in their environmental diagnosis. During a study run by the town of Dettwiller, in a partnership with Alsace Nature, on the wetlands along the Zorn Ried, the managers could not understand the differences in how wetlands in the town were treated (Ah-leung, 2010). Certain wetlands were protected and well treated by the inhabitants, whereas others suffered all sorts of degradation (see Figure 40).

Figure 40



a - b - c © S. Ah-leung, Alsace Nature, 2010

The Dettwiller Ried, where different perceptions result in different practices.

Following iconographic (photographs from the first half of the 1800s showing inhabitants and wetlands) and textual research (poetry, memoirs and press articles from the second half of the 1800s describing cultural and economic activities taking place near the wetlands) carried out in the municipal archives and semi-structured interviews with Dettwiller inhabitants in 2010, the study revealed that the differences in treatment were due to ancestral practices that had long since disappeared. Certain areas, seen as less useful and a source of inconveniences, had historically been used as dumps whereas others had been preserved because they served as "natural" skating rinks used by the entire population when the Zorn overflowed. Today, due to incision of the river, the flooding has ceased, but the inhabitants continue to preserve the wetland formerly used for skating. The old habits thus constitute one of the factors explaining why certain wetlands are preserved up to the present day. The full value of history is visible in this case because it can be used to compare past and present uses, thus providing additional information on the relationships between humans and the environment. The information thus made available enables managers to set up more precise management activities that are truly suited to the studied area.

Stories told for better understanding through environmental education

Managers are increasingly requested to create short events or longer exhibitions to provide environmental education, often to raise environmental awareness. However, a number of problems may arise:

- how to select what should and should not be said?;
- how to select the methods, time scales and media?;
- how to make the event attractive, notably by creating a story such as "Tell me about the/your/our river"?
- how to address different audiences, taking into account the expectations of each?

Certain insights from the human and social sciences can answer these questions. They also draw attention to the fact that the responses depend to a large degree on the size of the organising structure, the available time, the available budget, the objectives pursued, the public targeted, etc.

In addition, the law requires that the historical and local knowledge be taken into account. For example, the Bachelot Law (30 July 2003) stipulates that "In areas exposed to flood risks, the mayor, with the assistance of the cognizant State services, shall inventory flood markers existing on town land and create markers corresponding to historic floods, exceptional recent floods and seawater submersions. The town or group of local governments shall maintain and protect the markers" (Law 2003-699 (30 July 2003) on the prevention of technological and natural hazards and the repair of damage, Title II Natural hazards, Chapter I, Information, article 42). Flood markers are a means to raise and maintain awareness of flood risks.

This type of local initiative enables communities to become reacquainted with the notion of risk in their daily lives (see the case study on Rhône flood markers below). Markers come in many forms that are sometimes worn by time and threatened by the renovation of façades and demolitions. Many have disappeared in spite of their patrimonial value.

Case study

Using Rhône flood markers to inform and better manage risks

To raise awareness of flood markers, the Rhône public river-basin territorial agency, in the framework of the Rhône plan, contacted 300 towns along the Rhône requesting that they inventory the historic markers. By January 2013, 800 markers had been inventoried and could be viewed on the internet via an interactive map system. The decision to use the internet was motivated by the desire to reach the largest possible number of people and to be able to modify the map system with the arrival of new information. The purpose of listing these historic artefacts is to inform the general public. The water levels indicated by the flood markers have no legal value and do not invalidate the official documents that are legally binding (and may be consulted in town halls and prefectures).

The flood marker below (see Figure 41) is located on the wall of the Guillotière police station, a bit less than one metre above ground level.

Figure 41



© E. Comby, 2013

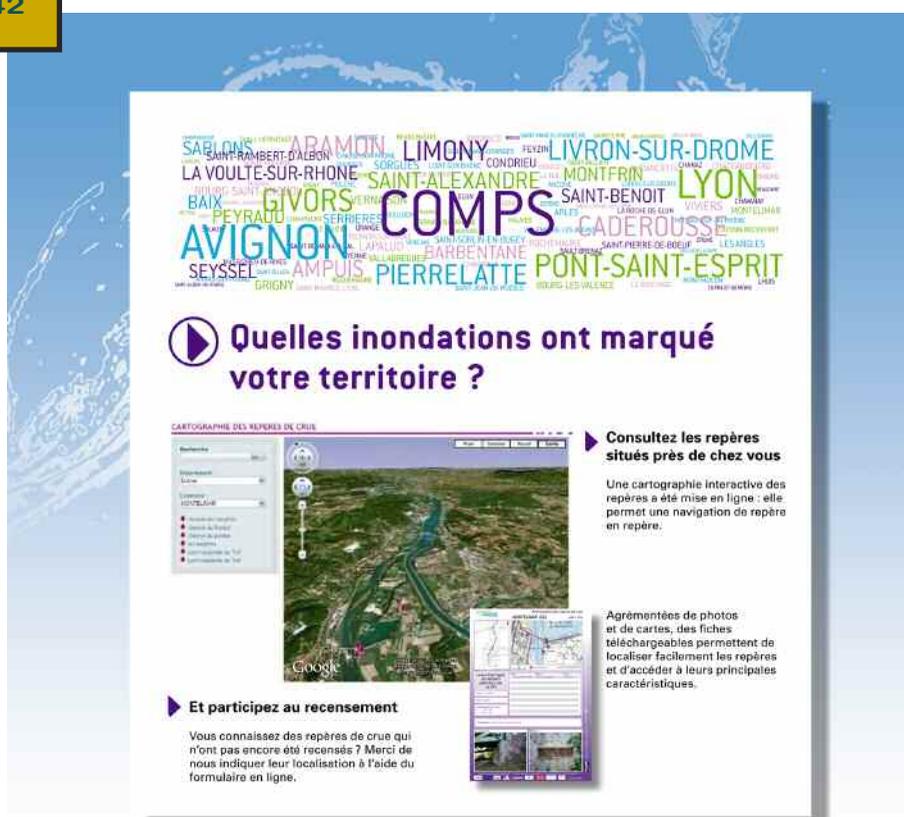
A flood marker along the Grande Rue de la Guillotière in Lyon.

The flood of 1812 was one of the larger floods in Lyon. Historical documents from the 1800s regularly mention the floods of 1812, 1840 and 1856 which hit the Guillotière quarter, the Brotteaux (left bank of the Rhône) and the peninsula (at the confluence of the Rhône and the Saône) (Comby, 2011).

To see the flood marker today may seem strange given that the Rhône flows 400 metres to the west. It is a reminder of a flood deemed remarkable for its size, but also of the fact that the Rhône in the 1800s, before the civil work on its bed, did not flow in the same place as today and was different in nature (Burnouf *et al.*, 1991). These markers are seen as elements of patrimony that should be highlighted to enhance understanding of risks past and present. Their presence on contemporary facades signals the desire to conserve this information in spite of renovation and urban renewal projects. The marker shown above has all the classic attributes of a flood marker. It is durably installed in a precise spot (on a stone tablet), with the date of a flood (generally a historic flood with a memorably high water level) and a line indicating the maximum water level.

Flood markers, whether present in public or private places, are an effective means to visualise past events. They serve to maintain the memory of events and to develop "risk awareness" that refuses to forget extreme events (see Figure 42).

Figure 42



© Territoire Rhône, 2011

Excerpt from a brochure on Rhône flood markers intended for the public and published by the Rhône public river-basin territorial agency (June 2011, page 4).



Conclusion

What can the human and social sciences contribute to the relationship between history and aquatic environments?

A few exceptional elements stand out in the project lessons learned and methods discussed here.

- Encourage data collection. Data can help in detecting signs in the local area through field work combining personal observations and remarks collected during surveys and interviews.
- Check data reliability by considering their spatial and temporal context. Work in archives is a means to combine the knowledge of scientists, managers and the general public. This effort to put things into context and perspective can combine excerpts from old texts and images to attempt to reconstruct data from the past.
- Tell and explain past events to better understand more recent development work. This is a means to raise questions on environmental dynamics over relatively long time spans and thus put into perspective and/or pinpoint contemporary problems.
- Ensure dissemination of the information. The information can be used to create or expand databases and subsequently paper documents (e.g. brochures) or internet sites. A museum exhibit may also be worthwhile. These data are of value in creating a story, a narrative for a previously determined media.

The sources studied here do not cover the entire range of data analysed by the human and social sciences. For example, archaeological data may fill in gaps in the textual and iconographic documentation for older periods. Recent developments in archaeology are promising and can supply additional information that occasionally contradicts that of the more classic sources, thus renewing the analysis of issues.

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Focus sections

Viewpoints, concepts and methods

- Photo-questionnaires, surveying with images

Case studies

- Japanese knotweed in a multi-disciplinary research project on the perceptions and management of invasive plants
- An inventory of river restoration projects reveals an array of different definitions
- Results of two surveys on public participation in the Yzeron River restoration project
- Using public-engagement feedback from the *Berges du Rhône* project to guide the *Rives de Saône* project
- An international photo-questionnaire on the perception of logs and woody debris in rivers
- Using interviews to reveal issues in managing the Dombes ponds
- A technical and social assessment leads to modifications in Bourlione Park

Questioning and assessing management practices



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- 88 ■ Why study public perceptions of a project?
- 97 ■ Why characterise the perceptions of aquatic environments affected by projects?
- 106 ■ Conclusion



Introduction

Management of aquatic environments increasingly requires an assessment of the action undertaken. This requirement for environmental assessment was created for certain planning documents (SBMPs, river contracts, etc.) by ordinance 2004-489 in the Environmental code which transposed into French law the European Plans and programmes directive from 2001. Generally speaking, assessment procedures are intended to improve management work for current and future projects. They are a means to put to use and to share knowledge, feedback and expertise.

Studies on perceptions are one element in the environmental assessment of management projects. Similar to other water stakeholders (local residents, walkers, etc.), managers have their own perceptions of aquatic environments (see the Feedback section on *The Grand Lyon urban area*, page 142). They guide, to some extent, the formulation and implementation of management work and must be regularly checked with respect to the environmental and socio-economic issues that the work is intended to address. What is more, managers are often the first to reflect on the basic premises of their work, when questioning their practices and the underlying concepts. Research on perceptions can assist the stakeholders involved in the management of aquatic environments. By exploring relationships between science and management, this research offers an outside perspective on social influences on management practices.

Management of invasive plants is an excellent example (see the case study on the perceptions and management of invasive plants below). While managers search for solutions to effectively counteract the progression of the plants, research on public perceptions is a means to reassess the rationale for making the effort. This research results in a better definition of a problem and its origin, and can, in some cases, eliminate the problem and propose innovative or more appropriate solutions. The objective is not to judge, but to provide a viewpoint that differs from that which the natural sciences (ecology, hydromorphology, biology, etc.) can offer and to understand why certain management techniques are not suited to a given socio-cultural context and may consequently encounter implementation difficulties. This research requires a multi-disciplinary approach.

Case study

Japanese knotweed in a multi-disciplinary research project on the perceptions and management of invasive plants

Certain species in the *Fallopia* genus (see Figure 43) are among the most widespread invasive plants in Europe. For example, *Fallopia japonica* (Japanese knotweed) is an invasive species in 40 countries (the term "invasive species" is used here to designate a species that is "non-native" to a given area, has become abundant and expanded its range (in this case, Western Europe).

In habitats invaded by knotweed, plant species diversity as well as the abundance and species richness of invertebrates are reduced (Gerber *et al.*, 2008). Soil composition in terms of nutrients is also modified (Dassonville *et al.*, 2007). Numerous and widespread attempts have been made to combat the plant in the field.

But it is very difficult to manage the plant, to say nothing of eliminating it. The methods employed differ significantly. For example, a combination of uprooting and herbicide is often used. Lacking methods that are totally effective in all places, attempts to eliminate knotweed fail in a majority of cases. What is more, the work has potentially serious side effects in that the cutting of the stalks, the uprooting of the rhizomes and the use of motor vehicles on invaded sites can all result in dispersal of the plant. That is why it is necessary to develop less ambitious management projects designed to meet the precise needs of managers and site users. A team of researchers at the Laboratory of Natural and Human-impacted Hydrosystems (LEHNA - Lyon) worked on methods to fight the invasive species (Rouified, 2011). However, they encountered a major difficulty, i.e. the underlying needs had not been clearly identified. Was the priority need to restore plant biodiversity, to limit the expansion of the existing stands, to open a passage through stands or to limit the height of the stalks? In response to the difficulty, a multi-disciplinary study was launched. In conjunction with ecologists, researchers working on environmental perceptions (social psychologists and geographers) worked to identify the reasons mentioned by stakeholders to justify the efforts against the plant. The postulate is that knowledge on the motivations of stakeholders should make it possible, over time, to answer the questions concerning the weed-control techniques. This project illustrates the relevance of combining disciplines and expertise in environmental management. The interaction between managers, researchers in the natural sciences and researchers working on perceptions assists in adapting management to a given ecosystem and to the associated natural-resource uses.

Figure 43



a © F. Piola and S. Rouified
b © S. Rouified

Study of perceptions concerning Japanese knotweed is a means to improve management work.



Why study the perceptions of a project?

In the framework of an assessment procedure, the research first examines the perceptions concerning the management project and the various stakeholders. It identifies in the management method itself the factors that contribute to project implementation or, on the contrary, that may inhibit it. More precisely, the research produces feedback on the selected management methods and notably on related participatory procedures.

Better understand the management methods employed

The legal and regulatory framework is a decisive factor influencing management methods. It has established a double principle, i.e. integrated management along river-basin lines and public participation (1964 and 1992 Water laws), that was reaffirmed by the Water framework directive (WFD, 2000) and the law on water and aquatic environments (2006) that transposed the WFD into the French legal system. The actual application of these principles depends on numerous regulatory stipulations, such as the composition of basin and local water committees. However, a degree of flexibility nonetheless exists in this regulatory framework and the effective decisions depend on the managers and, consequently, on their perceptions. The implementation and interpretation of the restoration concept are a good example of the use made of that degree of flexibility (see the case study on the array of different definitions concerning river restoration below).

Case study

An inventory of river-restoration projects reveals an array of different definitions

Theoretical formulation and its result, i.e. a concept, may be considered one of the most complex formalisation processes in generating knowledge. It is a manner of using the perceived to create a transmissible idea. A concept lies at the interface between thought and action, whether conscious or unconscious, whether expressed or not. The restoration concept reflects different realities (Morandi and Piégay, 2011). The first is inherited from hydraulic engineering practices and links restoration with the good flow of water (see Figure 44a). The second, focussing on fish, places particular importance on the availability of commercial fish stocks. Finally, the third, derived from recent advances in the field of ecology, pertains to integrated management of ecosystem functions (see Figure 44b).

Figure 44

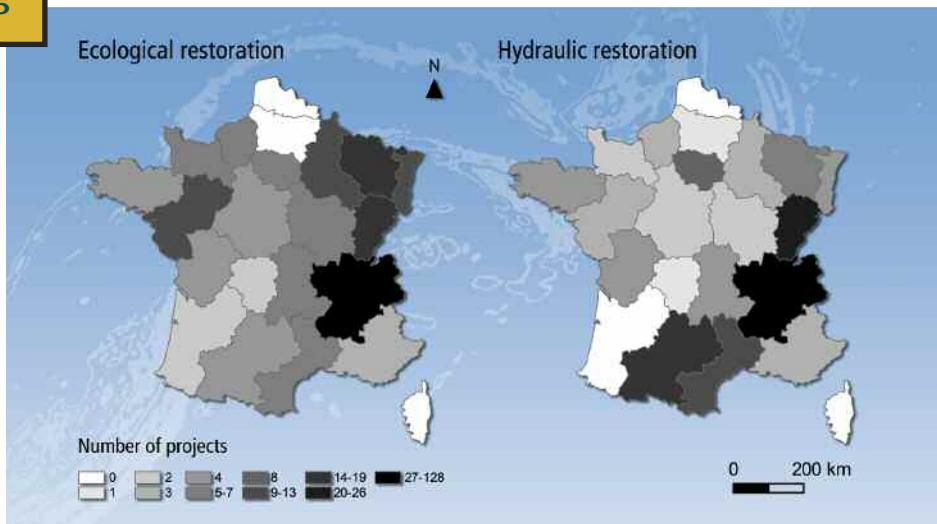


a © from *Diagnostic, aménagement et gestion des rivières : hydraulique et morphologie fluviales appliquées* (2^e éd.). G. Degoutte, Lavoisier, 2012
 b © A. Dutartre, Istea

An illustration of two different definitions of the restoration concept. (a) The first is a photograph of a hydraulic restoration project on the Chée River, intended to ensure the good flow of water. Obstacles were removed from the river bed and the banks were cleared of unwanted elements. (b) The second is a photograph of the restored Vistre River, showing increased hydraulic complexity and vegetation on the banks intended to restore the ecological quality of the environment.

The definition and implementation of a given concept can vary depending on the local context. For example, the different definitions of the restoration concept are not consistent throughout France (see Figure 45). The hydraulic approach is more prevalent in Rhône-Alpes and in Languedoc-Roussillon, but less so in Alsace and Lorraine where ecological approaches are more common.

Figure 45



© Adapted from Morandi and Piégay, 2011

Map showing the regional distribution of restoration projects according to the two definitions of the concept.

This restoration example is also an opportunity to stress that the definitions are not static. Concepts evolve, but do not follow one another in a linear manner. Generally, one definition does not replace another and the terminology used is not identical everywhere. There are constant changes and concepts overlap. For example, hydraulic-engineering forms of restoration continue to exist in response to the more recent requirements concerning "good ecological status" imposed by the WFD (Morandi, 2014). The danger in studying concepts would be to try to set them in stone. No concepts are definitive, they are based on values that are themselves diverse and constantly changing (Maître D'Hôtel and Pelegrin, 2012) and on new scientific and technical knowledge.

Concepts are developed by all disciplines, but the research in the human and social sciences provide an indispensable, critical contribution. In particular, they constantly remind us that scientific concepts in the field of ecology, though they address the environment, are formed by human beings in a social, cultural, political and geographic context that is not neutral.

The experience of the consulting firm Contrechamp (see the Feedback section on *A consulting firm*, page 146) teaches that, in spite of the limitations set by the legal and regulatory framework, managers retain a degree of flexibility in determining how they want to organise their work. In this context, studies of perceptions are perhaps most important in that they provide assessment criteria making it possible to understand how viewpoints are formulated and evolve over time. The viewpoints depend on the individual experience of the manager, his awareness and training, as well as on traditions and currently "fashionable" thought. They come into being through action, when the manager is confronted with the reality of the project.

Underlying the management techniques selected for projects are perceptions defining, among other aspects, how stakeholders perceive their relationship with "nature". Here again, biological invasions can shed light on the issue. A few years ago, chemical weeding was widely used to manage certain species of invasive plants such as water primrose. Subsequently, some researchers and managers criticised this technique, due to the environmental impacts suspected or observed in certain environments, and recommended other techniques such as manual uprooting. However, some managers were (and still are) reticent to put an end to chemical weeding. This reticence may be explained by perceptions related to technical innovation in the environmental field (Menozzi and Dutartre, 2007; Menozzi and Pelegrini, 2012). Whereas chemical weeding was seen as progressive, manual removal was considered "archaic" and associated with the traditional practices whereas technical innovation was seen as a factor of social progress and environmental action.

Improving the assessment of participation

Research on perceptions can not only help to better understand decisions concerning management methods, it can also provide insight into the detailed conditions of method implementation. With this in mind, a number of research projects have focussed on assessing participatory processes which can be quite diverse (surveys, consultations, public-involvement meetings, negotiation, mediation, etc.) (see Figure 46 and the Feedback section on *Switzerland*, page 150).

An assessment of the participatory procedures set up by the manager during a project necessarily requires a study of the perceptions of the various stakeholders concerning how they were included in the project. It is notably a question of qualifying and explaining their feelings of being involved. The capacity to "be heard" is a major element in their degree of satisfaction. That is clearly shown by the case study on the next page concerning the public-participation efforts in the Yzeron River restoration project. The study examined the perceptions that the stakeholders involved in the project have of the results of public engagement, of the public-involvement methods used and of the information and communication techniques employed.

Figure 46



© SAGYRC, 2013

A public meeting on the project to restore the Yzeron River, in Oullins (Rhône department) on 26 June 2013.

Case study

Results of two surveys on public participation in the Yzeron River restoration project

The Yzeron River is a tributary to the Rhône. Near its confluence with the Rhône, it flows through an urban area, near Lyon (see Figure 47). Since the 1990s, discussions about restoring the river have centred on flood control. The resulting project addressed both the hydraulic and environmental restoration of the river. Project construction began at the end of 2013. It had three objectives:

- safety (flood prevention);
- ecology (enhanced biodiversity);
- recreation and, more generally, improved quality of life (landscaping and creation of walking paths).

Two university studies assessed public participation in the project:

- the first (Flaminio, 2012) assessed the perceptions of local residents concerning public-involvement efforts;
- the second (Marchand, 2013) took a wider view of project perceptions of local residents and of the experts working on the project.

Figure 47



© M. Cottet, 2012

The Yzeron River in Oullins (Rhône department). This concrete-lined section was targeted for hydraulic and environmental restoration of the river.

Perceptions of public-participation efforts

Local residents were surveyed via questionnaire to determine their perceptions of the public-involvement efforts implemented over the past years (Flaminio, 2012). A total of 108 residents responded, ranging from 19 to 91 years of age, with an average age of 55. 60% claimed to have participated in the preliminary public-engagement meetings or in the initial public survey. Only 8% of the questioned people said they had not been informed of the prior public-involvement opportunities. The communication strategy implemented by the project manager, the Yzeron-basin board (SAGYRC), appears to have been fairly effective. The dissemination of brochures and posters (see Figure 48), plus a number of public meetings were apparently the most effective means of informing the majority of local residents (they were mentioned by 100% and 90% of the people surveyed, respectively) (see Figure 49a).

Figure 48

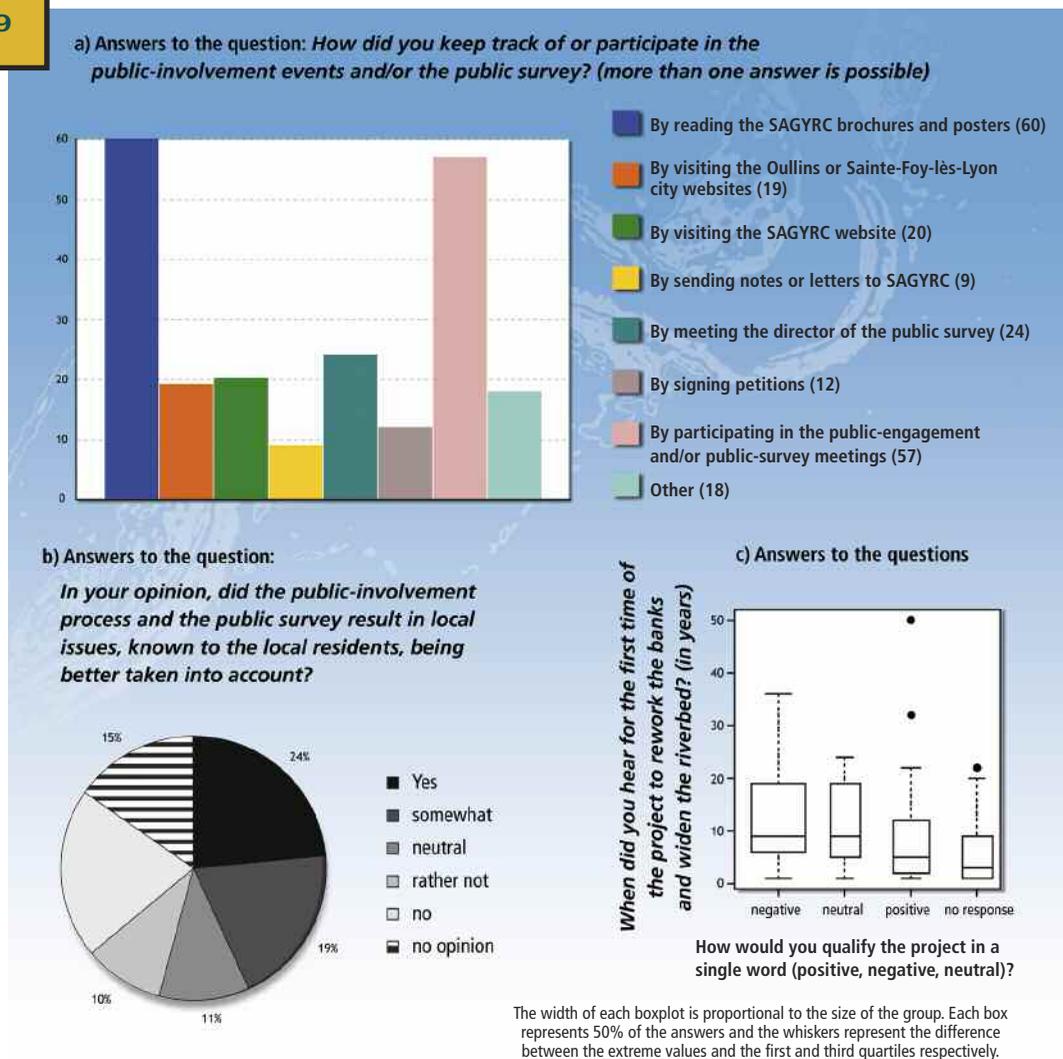


a, b, c © SAGYRC, 2013

On the whole, the residents involved in the public-engagement meetings emphasised the high quality of the information provided. The majority of people appeared satisfied because 43% of the people surveyed responded that the public-involvement process resulted in better integration of local issues, versus 31% of people who were not satisfied (see Figure 49b).

That being said, some people remained highly critical and declared that they felt there was a lack of discussion and that the flow of information was in one direction only. They also felt that the decisions had been made prior to public involvement. The results also seem to indicate that when public-engagement meetings took place in each part of the town, the reactions of the participants were more positive. Finally, it appears that those residents who were informed very early about the project were the most critical (see Figure 49c). Far from constituting a criticism of the participatory process, this result underscored the "fatigue" of these residents concerning a project that took years to prepare (the discussions lasted almost 20 years due to the necessary studies and changes in regulations).

Figure 49



© S. Flaminio, 2012

Graphs showing the results of the questionnaire-based survey (108 people responded) on the perception of the participatory process for the Yzeron project.

Resident perceptions of managing stakeholders

A second research project looked at the perceptions of the local residents concerning the river, on the one hand, and the restoration project on the other (Marchand, 2013). The work consisted of semi-structured interviews followed by content analysis, where 27 local residents were questioned from September 2012 to May 2013, a few months before the work began.

Among other things, the results show that the perception of the local residents concerning the other stakeholders depended on the roles and jobs assumed by those stakeholders. These perceptions may have influenced the interactions between stakeholders during the Yzeron restoration project. In particular, the interviews revealed some ambiguous opinions concerning the SAGYRC, the project manager. According to the local residents, this organisation played a key role.

Its long-standing presence in the area and the efforts made by its staff to launch and manage the public-participation process made SAGYRC, in the eyes of the local residents, the prime contact with which to discuss the project, providing the public an opportunity to influence the decisions. The SAGYRC was therefore, in many respects, identified as a key stakeholder and relay for the desires of the local residents in the framework of the river-restoration project. But on the basis of the interviews, the strong presence in the area also resulted in negative opinions on the part of many residents. The latter had difficulty in understanding the time required to prepare the project, which was confronted with regulatory procedures, reworking and difficult outside factors. Many people perceived, over the course of their long-term relationships with the SAGYRC policy officers, the organisations ineffectiveness or even its inaction. The above clearly illustrates the degree to which the perceptions of stakeholders concerning other stakeholders can impact (positively and negatively) the perception of the management project.

The Yzeron River case study demonstrates that management projects for aquatic environments have a history that cannot be neglected if the objective is to establish collaborative relations among stakeholders who all have perceptions and judgements concerning the others. The recognition of these mutual perceptions constitutes the starting point in going beyond the misunderstandings that can paralyse project implementation. It is a means to pursue activities by anticipating potential obstacles and conflicts through more useful dialogue among stakeholders.

The assessment results also raise the question of the best spatial and temporal scales for the participatory process, i.e. where and at what point during the project should the process be launched? On the spatial scale, an effective solution is to work as closely as possible with the people most directly impacted. In terms of the timing, it is generally recommended to involve all stakeholders as early as possible in the project in order to address all the issues and obtain the approval of a majority of those involved (Bourdin *et al.*, 2011; Jullien and Opériol, 2011). However, this approach may produce negative fallout if the project does not start on time or as expected. It would appear important to vastly increase the assessment procedures for participatory processes throughout the project. The feedback would shed light on the difficulties mentioned here and serve to optimise the timetable for participatory processes in the framework of management projects for aquatic environments.

The purpose of assessments on participatory processes is to improve future projects. The links between the *Berges du Rhône* and the *Rives de Saône* projects are an interesting example of the use of the knowledge acquired on perceptions to redirect the management of a new project (see the case study below).

Case study

Using public-engagement feedback from the *Berges du Rhône* project to guide the *Rives de Saône* project

Since 2000, the river banks in the city of Lyon have been restored, similar to many other cities. A first project, the *Berges du Rhône*, was launched in 2005 and inaugurated in May 2007. It was followed by the *Rives de Saône* project, for which the public-involvement process started in March 2010 and the work in 2012. The continuity in the communication efforts is highly visible in that the second project benefited from the assessment carried out on the first.

The photographic exhibition titled *Pan-eau-rama, understanding our city's relationship with our daily environment*, presented from 28 June to 12 August 2012 on the peninsula, between the Rhône and Saône Rivers, symbolised hydrologic continuity and repositioned the rivers as central elements in the city. It compared the restored banks of the Rhône River and those of the Saône River for which the restoration project was then being prepared. The exhibition, a "monumental photographic immersion", was created by Thierry Bazin in a partnership with the *Grand Lyon* urban area and the *Lyonnaise des Eaux* water company. It consisted of 500 metres of photographs on the 1 : 50 scale, showing 40 kilometres of river banks. It underscored the continuity between the two projects while highlighting very diverse urban/river landscapes.

Figure 50



Using prior assessments for new projects, illustrated by the Pan-eau-rama exhibition in the Bellecour Square in Lyon.

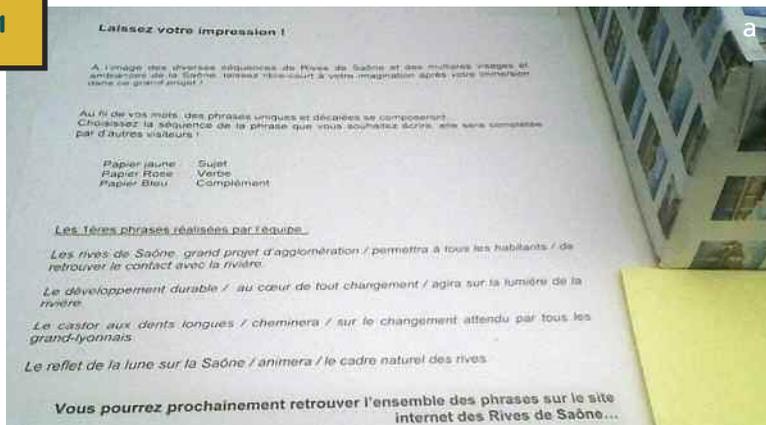
This continuity was visible in the restoration techniques, but also in the manner in which the public was consulted and informed. The lessons learned during the successful first project, *Berges du Rhône*, were put to good effect in the later *Rives de Saône* project.

In 2003, an exhibition revealed the *Berges du Rhône* project to the public, however the visitors found the project too "mineral" and used the guest book to request a "greening" of the project. The project was subsequently modified in part in response to the requests and was made "greener" (Comby, 2013). The lessons learned in the *Berges du Rhône* project were largely put into effect in the *Rives de Saône* project for which different types of green areas were created. The expression "*pastoral Saône*" was created to describe the less urbanised and more natural banks.

The conditions for the public-involvement process organised for the *Rives de Saône* project were also modified in response to the *Berges du Rhône* project. For the latter, public participation consisted of an exhibition showing an initial version of the restoration work and a guest book in which the visitors could note their remarks. This method was deemed relatively unfavourable in that the results were static.

For the *Rives de Saône* project, the public comments remained written, but the process was modified to avoid the static impression left by the guest book. A more recreational and interactive technique was employed (see Figure 51). A building, the *Rives de Saône pavilion*, was built near the Saône River for exhibitions on the project and to facilitate discussions (welcome area, contacts with residents and even technicians and contractors). Visitors to the exhibition were given a pen and three pieces of paper (yellow for nouns, pink for verbs and blue for other words) to describe their impressions. Similar to well-known word games, the various pieces of sentences were first proposed by the visitors and later analysed by the project managers. This generated a more recreational and interactive atmosphere for public involvement.

Figure 51



a © E. Comby, 2012
b © B. Morandi, 2014



A written public-involvement process (a) was used for the current *Rives de Saône* project (b).

The assessment of the participation in the *Berges du Rhône* project served to modify the public-involvement process for the *Rives de Saône* project in response to expressed expectations of residents and to open it to more artistic forms of expression (e.g., poems and exhibitions).

As the above makes clear, though the legal and regulatory system increasingly stipulates how management projects for aquatic environments should be designed and implemented, the system is not totally rigid. Managers still have some leeway in designing their projects. Even given the obligations and options, the manner in which a project should be implemented is not always the same for management stakeholders. Studies on perceptions are a means to question and to assess those obligations and options. Managers have every reason to use these studies to gain further knowledge on their management techniques and to improve them.



Why characterise the perceptions of aquatic environments affected by projects?

The perceptions linked to aquatic environments are often the source of the motivations, whether conscious or unconscious, underlying management work (Nassauer, 1992). In this sense, when assessing environmental projects, it is not sufficient to study how a given project is perceived. It is also necessary to look at the perceptions concerning the environment itself, and how they were taken into account during the preparation of the management project. These perceptions are themselves influenced by the knowledge one may have on the environment. Consequently, they depend on the level of education, personal experience, uses and relationship of the manager with the environment (economic ties, topic of scientific study, recreational area, etc.).

Better understanding the motivations guiding action

An aquatic environment lies at the interface between many different components, all interacting with each other, e.g. the physical component (soil, water, climate), the biotic component (animals, plants, microbes, all the related interactions, whether trophic or otherwise, as well as links with the abiotic environment), the human component (society, its activities and impacts, its links with the physical and biotic environments), the historic component (the evolution of all the above over a range of time periods).

Management of aquatic environments often involves great diversity of knowledge and experience. The manner in which knowledge is acquired unavoidably influences the selection of the objects addressed by projects, how priorities are set and how they are implemented. Better information on how knowledge influences perceptions of environments can assist in putting into perspective how it influences action. This is demonstrated by the example about the management of logs and wood in rivers (see the case study on the perception of logs and woody debris in rivers below).

Case study

An international photo-questionnaire on the perception of logs and woody debris in rivers

The perception of logs and woody debris that have fallen into rivers (see Figure 52) is a practical example studied in a number of countries by geographers using a photo-questionnaire (Piégay *et al.*, 2005; Le Lay *et al.*, 2008; Wyzga *et al.*, 2009) (see the Focus section on photo-questionnaires, page 102).

The results in Poland showed that the perception of logs and woody debris in rivers varied among

the professionals involved in the management and protection of rivers and among different groups of students studying to become river managers (biologists or hydraulic engineers). The study looked in particular at the perceived danger during observations of rivers with or without wood or logs present. The participants were asked to assess, over a series of photographs, different types of danger, e.g. flooding, bank erosion, impacts on recreational activities or on water quality.

Figure 52



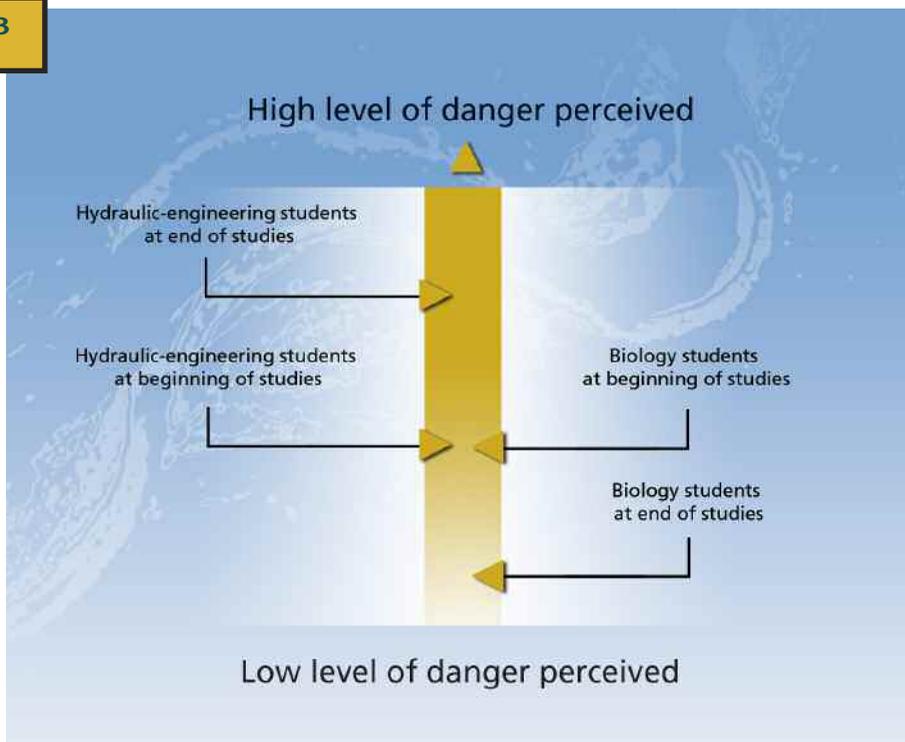
a © J. Riquier, 2010
b © J. Riquier, 2011



Examples of logs and woody debris accumulated in the Ain River (a) and in side channels of the Rhône River (b).

On the whole, the level of danger in rivers containing logs and woody debris was judged to be higher by the engineering students and was seen as fairly low by the biology students (see Figure 53). These results may be explained by the differences in training received by the groups of students and, consequently, in the differences in knowledge. The danger represented by obstacles to river flow (with an increase in water levels) is a typical management issue for hydraulic engineers. On the other hand, in that the presence of fallen trees in aquatic ecosystems increases habitat diversity, provides food and facilitates the installation of vegetation, it is seen as beneficial by biologists and not as a risk. The study also showed that the work habits and level of professional experience on the part of the managers questioned (Wyzga *et al.*, 2009), as well as their nationality could result in diverse perceptions (Le Lay *et al.*, 2008).

Figure 53



© adapted from Wyzga et al., 2009

Perception of the danger represented by logs and woody debris in rivers by students preparing for careers in the management and protection of aquatic environments in Poland.

Better identify the effects that perceptions of environments can have on management projects

The perceptions of managers concerning environments are influenced in part by their training and their experience. During project implementation, different perceptions can have consequences, e.g. in identifying the management issues, defining objectives and selecting the techniques employed. It is important to highlight these causal links in order to analyse them and, where necessary, change them.

■ Effects on prioritisation of management issues and objectives

At the end of a management project, it is not uncommon to observe that several groups of stakeholders were involved and that different perceptions of environments and management objectives were expressed and occasionally came into conflict. A number of perspectives, legitimate but often contradictory, emerge. Greater knowledge of these perceptions, acquired during the project and in light of stakeholder interactions, can provide the necessary information for future projects enabling them to add new expectations and issues to the existing ones (see the Feedback section on *Austria*, page 154). This is a means to go beyond the formulation of projects based on a single perception of the environment or whatever is currently in vogue, given that these are likely to change depending on the region and advances in knowledge. The example of the Dombes ponds illustrates how traditional management practices have evolved to take into account the perceptions and expectations of the various stakeholders in this particular aquatic environment (see the case study on the next page).

Using interviews to reveal issues in managing the Dombes ponds

The Dombes ponds have for centuries been managed by humans for fish production (see Figure 54). Management decisions have traditionally targeted economic profit. This has resulted in measures to enhance the productivity of the ponds, for example the use of manure to develop the growth of plankton consumed by the fish and adding lime to correct the acidity level of the water and to harden it, thus improving it for the development of aquatic species (Prompt and Guillaume, 2011). Efforts are also made to reduce the plant cover in and around the ponds in order to limit shelter for fish-eating birds and consequently fish losses due to predation. Following the emptying of a pond and cultivation, the maize stalks are left in place because after refilling, they hinder the movement of birds such as cormorants, increasingly common in the Dombes, and also serve as shelter for the fish (Bérard and Marchenay, 2006). This habit of emptying the ponds is also a means to "rejuvenate" the ecosystem by stimulating a new plant succession and limiting the filling in of the ponds. However, the ponds are also used for hunting and it has been estimated that 85% of the ponds are rented for that purpose (Prompt and Guillaume, 2011). The hunting is above all for waterfowl, which encourages the pond owners to maintain the plant cover serving as shelter for the birds.

The perceptions concerning the Dombes ponds today largely guide the desired management practices (De Carrara and Le Lay, 2010) and they differ between the hunters and the fishermen. The recreational activities in the form of hunting would appear to be contradictory with the economic activities in the form of fish farming. However, study of the different activities made it possible to find a compromise. The money generated by the hunting rentals is used for balanced management of the ponds, which contributes to increasing fishing profits and to supporting waterfowl management required for hunting (Prompt and Guillaume, 2011). By taking into account the diversity of stakeholder objectives, it was possible to balance the management practices and acknowledge the different expectations.

Figure

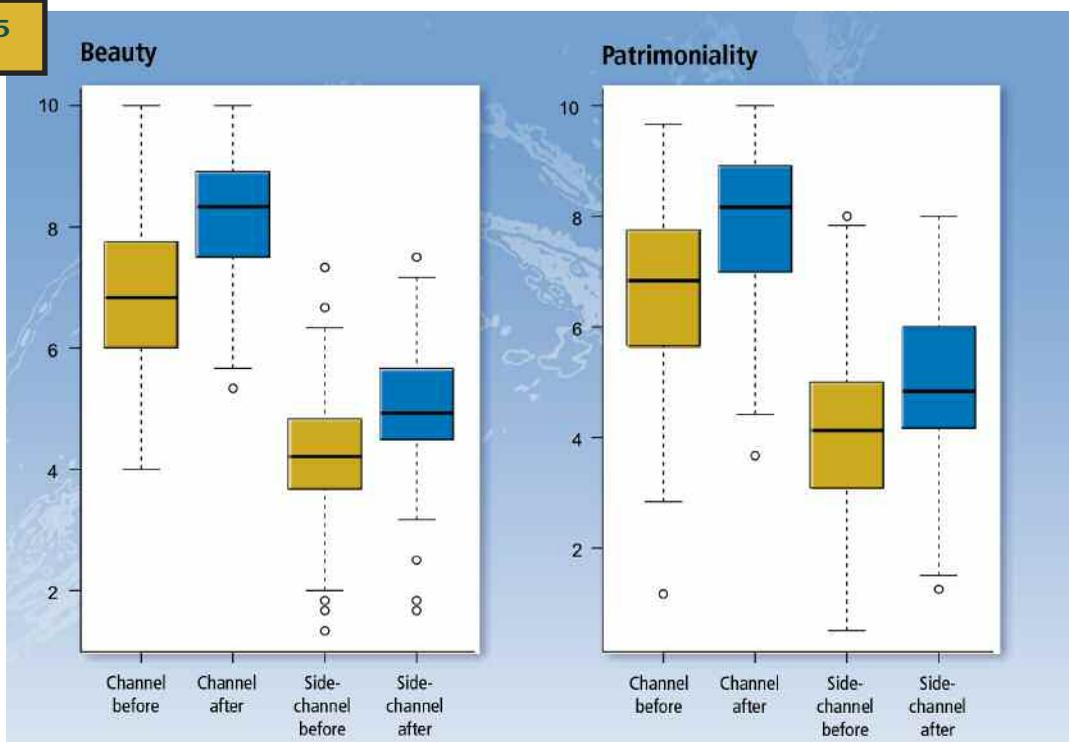
54



Management of the Dombes ponds takes into account different objectives, including (a) fish production and (b) activities enabling people to discover their natural patrimony.

The research carried out on side channels of the Rhône River is a further example of the value of assessing public perceptions. The side channels located near Pierre Bénite, to the south of Lyon, have been undergoing ecological restoration since 1999, when the ten-year programme for the hydraulic and ecological restoration of the Rhône was launched. The objective of the programme is to mitigate the ecological and socio-cultural effects of the work done on the river by the *Compagnie nationale du Rhône* (CNR) between 1936 and 1986 to develop navigation and hydroelectric generation. The project is based on an integrated approach combining both ecological and social issues. Landscape is a central issue because a particular objective of the project is to "produce an agreeable landscape for the local residents" and to "reinforce and consolidate the identity" of the Rhône Valley (Statement of objectives, 1996). Two years after the end of construction and the opening of the site to the public, a study was carried out to assess the impacts of this type of restoration project from a social point of view (Pupier, 2003). The study consisted, among other aspects, of a photo-questionnaire (see the Focus section on photo-questionnaires on the next page). It was made up of 12 sets of two photographs, each showing a scene before the work (Cemagref, 1996 and Smiril, 1999) and after the work (summer 2002 and winter 2003). Three groups of stakeholders, each comprising 40 to 50 people, were asked to participate, namely 1) school children around 10-years old, from the towns of Vernaison and Grigny, 2) town councillors from the towns participating in the Board for Rhône islands and side channels (SMIRIL) and 3) members of local non-profit groups working in the environmental field or specifically on the Rhône River. They were asked to judge each photo in terms of the beauty and the typicality of the Rhône landscapes. The results showed a clear increase in the scores for beauty and typicality of the Rhône and the side channels following the restoration work. This assessment demonstrated that the objective of an enhanced landscape, whether in terms of aesthetic or regional identity, was reached. It thus confirmed the success of the restoration project in terms of the social dimensions. Following this first research project, a new study was launched by a university. The objective was to characterise on a more general level, for both the Rhône and Ain Rivers, the perceptions of the public concerning the side-channel landscapes and to determine how those perceptions could be better taken into account in future restoration projects.

Figure 55



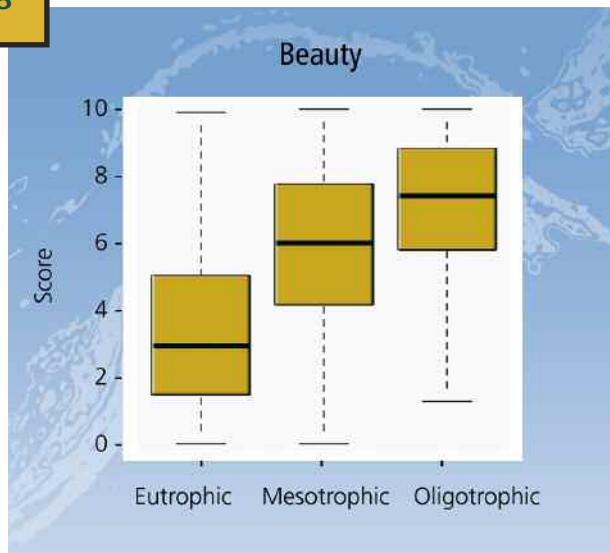
© S. Pupier, 2003

Scores for the beauty and patrimoniality of Rhône and side-channel landscapes, before and after the restoration work.

On the basis of the study results, it would appear that the aesthetic value of the side channels is inversely correlated with the trophic state¹ of the environment (Cottet, 2011). The higher the trophic level, the less aesthetic the water body is for the persons questioned (see Figure 56). This result shows that certain biophysical parameters have an impact on both the ecological level (physical quality of an environment) and the social level (aesthetic perception of an environment).

However, managers must counterbalance that impression by taking into account other issues, notably ecology. The eutrophic nature of side channels does not necessarily indicate an ecological alteration, but may correspond to a specific functional process, e.g. ageing of an environment. Eutrophic side channels contribute to functional diversity and the objective is certainly not to systematically create areas with low nutrient levels. This assessment procedure shows, however, that if social and ecological issues are to be reconciled, it is important to create, in certain, precisely targeted areas, pathways with views of landscapes perceived as agreeable by non-experts.

Figure 56



© M. Cottet, 2011 - Zone Humide Info

The link between aesthetic judgements and the ecological characteristics of an environment, based on the results of a survey using a photo-questionnaire.

Photo-questionnaires, surveying with images

Photo-questionnaires are a specific type of questionnaire in that the questions concern a series of photographs (Cottet, 2010). These are generally of landscapes that the participants are asked to assess according to different criteria (aesthetics, danger, naturalness, need for human intervention, etc.) along a scale of values (see Figure 57). The objective is to reveal the influence of a given aspect in the landscape on perceptions. To that end, the photographs are selected with the research question in mind. The selection criteria generally concern the composition and the structure of the landscapes. The assessment values assigned to the photographs are then processed statistically with the criteria characterising the landscapes. In this type of survey, the questions addressed should concern landscapes above all.

1. Parameter indicating the quantity of biological nutrients in a water body (nitrogen, phosphorous, etc.).

Figure

57

Question 4. Would you like to spend time in this place?

Click the scale below to indicate your desire to spend time there.
Photo no. 4.



No desire

Great desire

Help on using the scale

© M. Cottet, 2010

Example of a photo-questionnaire to assess the perception of side channels.

For example, for the restoration of the side channels along the Ain River, the stakeholders had questions concerning the visual criteria underlying the aesthetics and water quality of aquatic environments for non-experts. A survey using a photo-questionnaire was carried out via the internet. Photographs of side channels were presented to 278 people who were not familiar with this type of environment. They were asked to judge the beauty of the environment in each photo by attributing a score from 0 to 10. The photographs were not selected randomly, but rather according to visual and ecological characteristics, where the main criterion was the trophic level (see Figure 58). This rigorous selection made it possible to establish the link between the trophic level and the perception of the questioned group (Cottet, 2011).

Figure

58

| | | | | | |
|---|---------------------|--------------|--------------|--------------|--------------|
| T R O P H I C L E V E L | Eutrophic | A | B | C | |
| | Mesotrophic | D | E | F | G |
| | Oligotrophic | H | I | J | |

© M. Cottet, 2010

Photographs used in the photo-questionnaire to assess the perception of side channels.

■ Consequences for technical decisions

The perceptions of aquatic environments may have consequences for technical decisions. This aspect should be taken into account in assessments.

For example, in urban areas, the park departments increasingly implement what is called differentiated management. That consists of managing urban parks using alternative and green techniques, e.g. by limiting the frequency of mowing and the use of chemical products. Assessments have shown that this type of management, which results in parks that are perceived as more "wild" (higher grass, insects), can provoke dissatisfaction on the part of local residents. The latter are often accustomed to French-style gardens (intensive upkeep, strict, geometric organisation) and tend to negatively perceive more natural areas as "unkempt" and not managed (Nassauer, 1997; Rolston, 2000). The example of Bourlione Park shows that perceptions can conflict with technical designs. An assessment provides the information required to adapt the designs and to address as best possible the different issues involved in the project (see the case study on Bourlione Park below).

Case study

A technical and social assessment leads to modifications in Bourlione Park

Bourlione Park is a public area located in a residential district comprising individual homes in the town of Cornas in the Rhône department (Ah-leung, in prep.) (see Figure 59). It was created as part of an ecological-enhancement project launched by the municipality in the 1990s on formerly agricultural land in the centre of the town. The objective was to enhance the natural feel of the neighbourhood by creating a public area for recreational activities that would also serve to retain and infiltrate urban stormwaters. Completed in 2000, Bourlione Park was designed to welcome the public (benches, paths, waste baskets, etc.) and to provide hydraulic functions (retention basin, piping, etc.).

However, a few months after the opening, the park was perceived fairly negatively by the public (d'Arco, 2012) who used it as a dump. Numerous complaints were also made to the town hall concerning the landscaped grassy ditches that temporarily filled with water and were considered dangerous by the park users, who requested that they be filled. In addition, park maintenance was deemed insufficient. The overall assessment of the technical design objectives was rather negative. The park was hydraulically functional, but it raised a number of problems for the residents. The expectations concerning the park and the services it should offer differed significantly from that of the park designers. This discrepancy resulted in inappropriate behaviour, a degree of dissatisfaction on the part of the public and more difficult management for the town. This was due in part to the fact that the design decisions were based more on economic considerations and according to the principles of sustainable development than on a collaborative effort with the future users of the park. In this sense, only half of the objectives set for the park were achieved.

Following the assessment, the managers decided on a number of changes to better adapt the park to the expectations and perceptions of the public. First, a campaign to raise awareness and explain the functions of the park was carried out. Then, a number of features were modified to encourage behaviour corresponding to more "classic" uses of urban parks (more paths), to make the water-filled areas safer (creation of hedgerows) and to limit certain practices (installation of informational signs).

Figure 59



a, b © S. Ah-leung, 2012

Bourlione Park is an example where the assessment took into account both the technical solutions and public perceptions.

All the above modifications limited the degradations and the complaints by the local residents, and made it possible to achieve a number of results more in line with the initially targeted social objectives. The assessment procedures would appear to be useful in that they question the relevance and the justifications of the technical decisions and can explain the potential malfunctions resulting from those decisions. In the case of Bourlione Park, the assessment revealed the differences in the expectations of the managers, who had a very technical approach (in spite of a declared policy of welcoming the public), and the public, who saw the park more as a recreational site. This discrepancy between the expectations of the two groups could subsequently be reduced and the park would now seem to fulfil all of the initial objectives.

Perceptions of aquatic environments, in as much as they create different expectations, can have non-negligible effects on how management projects are conducted. The various examples presented here have shown that the diversity of viewpoints has consequences for the prioritisation of issues, the definition of objectives and the technical decisions. Project assessments should take this complexity into account to ensure that all opinions are included (or at least acknowledged), but also, where possible, to create the conditions required to improve the initial project and prepare for the future by involving all stakeholders and launching a conversation on the future of aquatic environments.



Conclusion

An assessment of management projects for aquatic environments acquires greater depth by integrating an analysis of the perceptions and expectations of the various stakeholders involved. Different stakeholders can have very different opinions on management projects that depend on:

- the way the project was designed and conducted. The overall opinion on the project depends on how the various stakeholders were brought into the project (or at least how they felt they were included) and how the local history and stakeholder interactions were taken into account;
- the manner in which the environment was considered. Each aquatic environment elicits different perceptions, with different expectations as a result. The fulfilment or the frustration of those expectations can profoundly influence the final assessment of a management project.

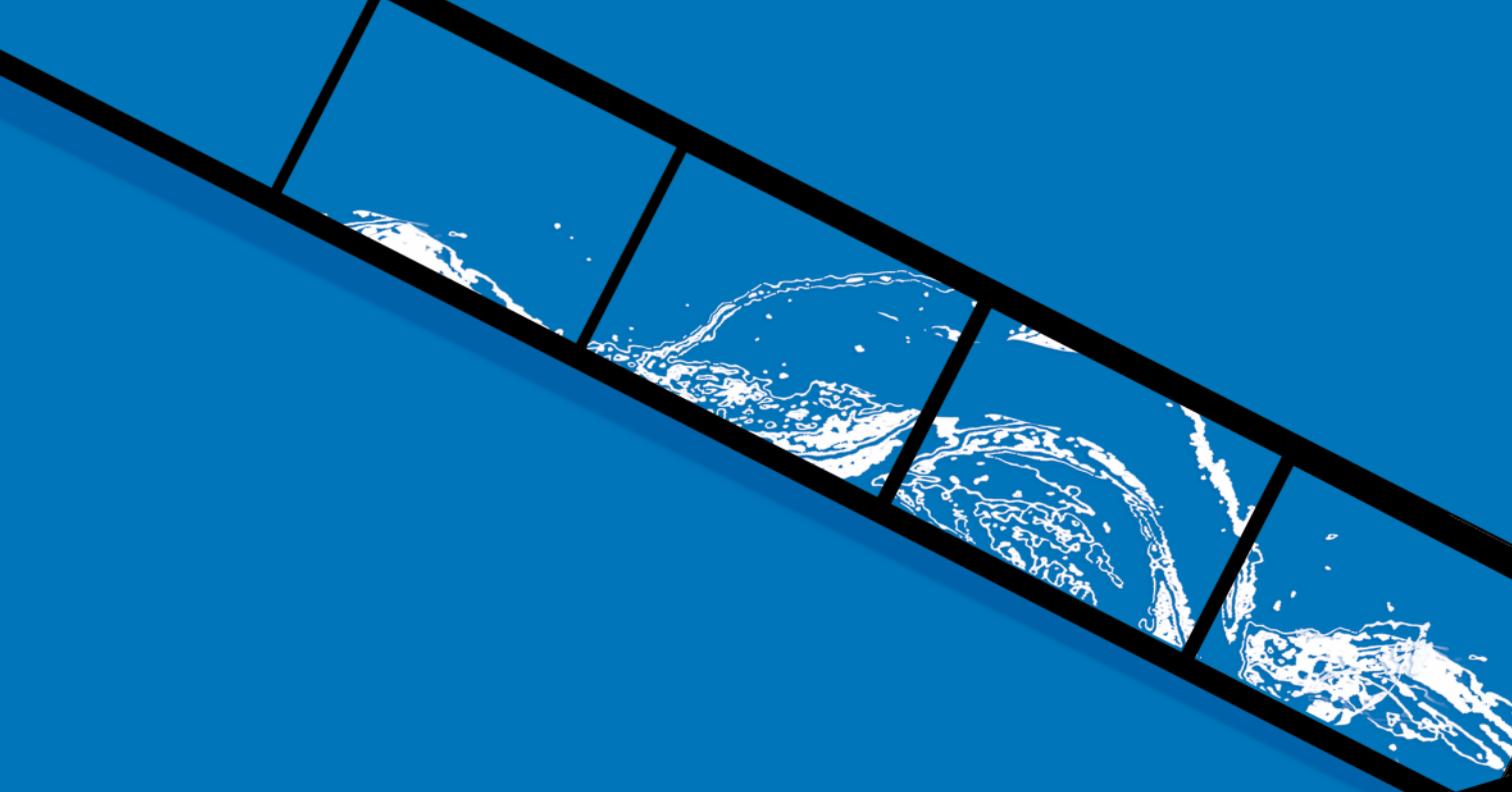
The integration of stakeholder perceptions during assessment procedures is a means to evaluate environmental projects, while acknowledging the complexity of the links between the stakeholders and the environment. The effort made must be more than simple compliance with regulations, because it is a path to truly improving knowledge about the managed area. It creates the conditions for more integrated management, taking into account the diversity of viewpoints (see Figure 60).

Figure 60



© M. Cottet, 2006

The integration of stakeholder perceptions during assessment procedures is a means to evaluate environmental projects and to enhance project management for more comprehensive and successful projects in the future.



This chapter was drafted on the basis of the interviews carried out by Régis Barraud with Antoine Charrier (Institution Sèvre Nantaise), by Marylise Cottet and Christine Labeur with Hervé Caltran and Elodie Renouf (Grand Lyon), by Nicolas Maughan with Thierry Corneloup (SIRCC), by Bertrand Morandi and Anne Rivière-Honegger with Bénédicte Cordier (SMBVB), by Janique Valy with Sébastien Baron (IAV EPTB), by Marylise Cottet with Jean-Baptiste Chémery (Contrechamp consulting firm) and with Sybille Chiari (BOKU), by Anne Rivière-Honegger with Gérald Domon (University of Montréal), Julie Ruiz (University of Québec at Trois-Rivières), Florence Jacquinod (GéoVision Avenir / University of Lyon) and Justine Ultsch (CIRIDD and Water and sanitation department, City of Saint-Étienne / University of Lyon), and by Bertrand Morandi with Matthias Buchecker (WSL).

Bertrand Morandi and Anne Rivière-Honegger coordinated and monitored the writing process. Aurélie Sureau participated in writing the chapter. Céline Cordani and Dorothée Hoenen contributed to transcribing the texts.

Feedback



- 110 ■ Introduction
- 112 ■ The Bourbre River
- 116 ■ The Sèvre Nantaise River
- 120 ■ Canada
- 126 ■ Development agency for the Vilaine River basin
- 130 ■ The Rhône River
- 134 ■ The Furan River
- 138 ■ The Calavon-Coulon River basin
- 142 ■ The Grand Lyon urban area
- 146 ■ A consulting firm
- 150 ■ Switzerland
- 154 ■ Austria



Introduction

In view of creating a shared vision, the contribution of knowledge about stakeholder perceptions to managing aquatic environments, in different contexts and for various types of aquatic environments, and for the various steps in preparing a project, is presented here.

This last chapter is a compilation of feedback data from the diverse aquatic environments studied in this book and from the research and management experiences of a number of projects, both in France and abroad (see Figure 61). To do so, the discussions initiated during the symposia were expanded upon via a series of interviews with several important managers and researchers. The goal was to pull together a number of "stakeholder viewpoints" providing examples and feedback useful in expressing various needs and gaining perspective in terms of current practices. The interviews were carried out by the members of the *Perception aqua* group using a common set of questions. The discussions were recorded and transcribed in full. The written documents were then validated by the interviewees.

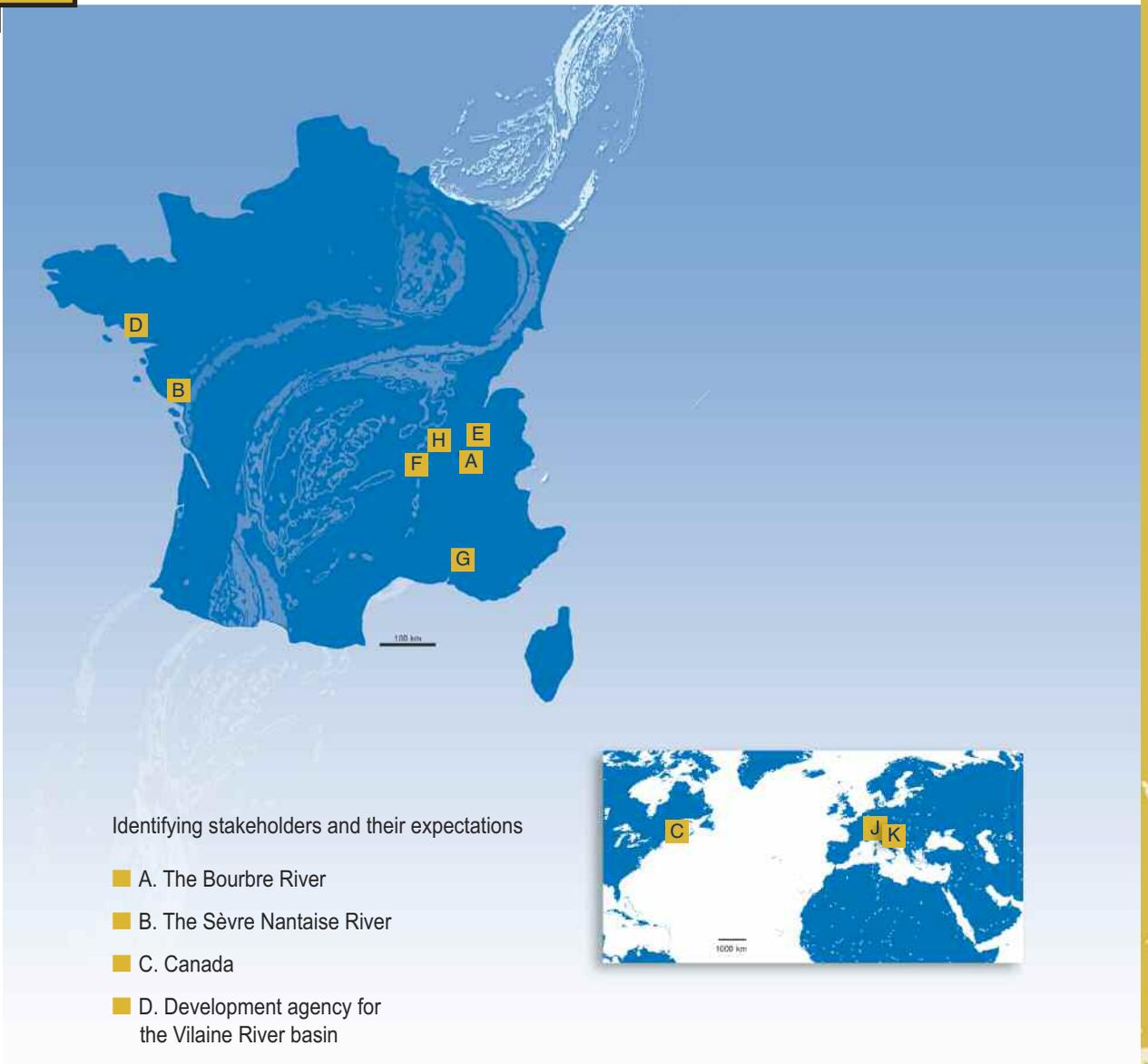
The feedback presented in this chapter is representative of:

- the diversity of the many legislative and regulatory texts in the water and aquatic-environment sector and more generally in the environmental and landscape-planning field. Any approach to management projects must necessarily take into account the legislative and regulatory issues;
- the specific aspects of the areas covered by the projects, ranging from urban areas to nature parks, and all the related issues. The projects are themselves highly diverse, with some proposing work on river banks to restore the landscape and recreational functions, while others primarily address flood-prevention issues;
- the many different types of environment studied, ranging from peat bogs to large rivers. Perceptions will obviously vary depending on whether the issue at hand is a river, a bog or a pond. Though not predetermined, it is certain that uses, practices and the images evoked depend on the environment, its biophysical characteristics and the landscape.

This feedback is organised similarly to the previous chapters around the progression of projects, ranging from the identification of stakeholders and their expectations, to learning the history of aquatic environments and to questioning and conducting post-project appraisals of management practices.

Figure

61



Learning more on the history of aquatic environments

- F. The Furan River
- G. The Calavon-Coulon River basin

Questioning and assessing management practices

- H. The Grand Lyon urban area
- I. A consulting firm
- J. Switzerland
- K. Austria

Bénédicte Cordier, SMABB policy officer for SBMP implementation and communication officer for certain projects in the river contract.

On the basis of your local experience and some precise examples, could you tell us about the importance of perception issues in the environmental management of aquatic environments in the Bourbre basin?

I think the term "perception of aquatic environments" is not currently used. However, perceptions of aquatic environments necessarily influence the opinions of residents and even of some river technicians on the Bourbre. For example, during a forum on alternative transportation, someone showed me a picture of the Bourbre where it was channelised and lined with poplars. The person said, "Oh, look how pretty the Bourbre is there!". Paradoxically, precisely that section of the Bourbre is not "pretty" to our eyes (see Figure a). I remember thinking that our opinions were "pretty" divergent and that we did not have the same perception. For a cyclist, the straight section of the Bourbre makes for easy travel and is perhaps even seen as beautiful. For a river technician, on the other hand, the straight Bourbre is simply a canal and not a river with a living ecosystem, that can overflow and that retains some naturalness.

On the institutional level, the concept of perception is never mentioned. But on the basis of my contacts, it is clear that perceptions exist, however they are not the same for everyone and they are not discussed. There is no shared vision or even any thought that might bring us to question the perceptions of other people concerning the river.

So in the studies that you have carried out to date on the Bourbre, perceptions have never been taken into account, for example the perceptions of local residents or in conjunction with projects?

I attempt to keep clearly in mind the difference between perception, on the one hand, and public engagement and communication on the other. The latter two are integral parts of our daily work. Concerning perception, I now work with an intern on the topic of flooding, not as pertains to civil work, but rather training, information and efforts to reduce vulnerability. The intern has met a certain number of mayors and gone through a questionnaire that we drafted together concerning flooding and runoff. So, I think we have begun to work on the issue of perceptions with questions such as "How do you see the Bourbre? Is it a problem for you?". Finally, in a few projects, we have touched on the issue of how people perceive the river, but it has not been the core issue. For example, in the framework of our hydromorphological study, it was of course the ecological benefits for the river that determined the setting of priorities, but there will be a public-involvement process at some later time. The objective of the public engagement and communication is to convince people of the importance of river renaturation and the benefits in ecological terms (improved water quality, better ecosystems, etc.), but also in terms of the living conditions for local residents. For the management plan, the public-involvement process was built into the technical specifications and into the selected set of deliverables (see Figure b). A consulting firm has been specifically put in charge of the public-involvement process. However, the issue of perceptions has not been explicitly addressed. There has been no real thought put into "What could be the value of a study on perceptions?".

Has it been possible to truly take into account the results of the work on flooding, the information collected?

It confirmed that the issue of flooding in the Bourbre basin is not generally seen as a problem necessarily linked to flooding of the Bourbre itself, but rather as a problem of runoff. When the intern met with the elected officials to discuss the flooding of the Bourbre, they spoke primarily of problems caused by stormwater runoff (see Figure c). That alone was of great use to us.

The report drafted by the intern will contribute to setting up the Action programme for flood prevention (PAPI) and will help in identifying the necessary projects and incorporating them in the PAPI. And now when towns contact us for their Local urbanisation plan (PLU) or their stormwater-management plan, we stress much more heavily the importance of focussing on runoff. I think the work of the intern confirmed a number of things that we had felt, but that had never been clearly expressed.

If you were to run a study on perceptions, how would you go about it?

 If tomorrow, we were to run a perception study on the Bourbre, I think we would try to work with the non-profit associations because it is always difficult to meet the public. By "associations", I mean in the wider sense, not only environmental groups. The idea would be to have representatives of the population and, of course, managers and our standard partners, i.e. the municipal associations, farmers, industrial companies, the Chamber of commerce and industry, and the members of the local water commission (CLE), which already comprises a number of stakeholder groups, similar to the river-contract organisation. And to implement the study, we would need special expertise, for example consulting firms that specialised in that particular field.

In terms of management and anticipating things, on what scale do you think a perception study would be useful? The whole river basin or some other scale?

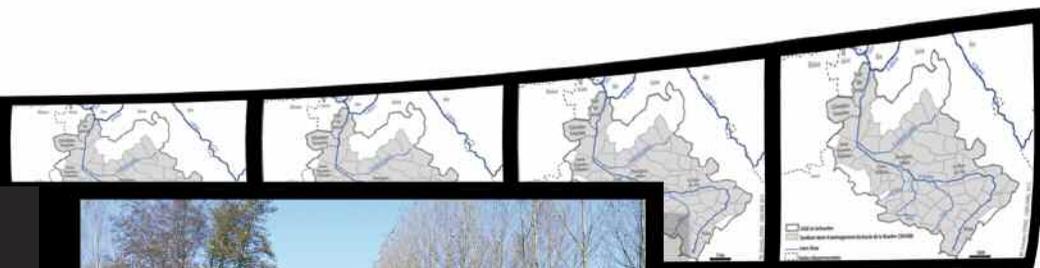
 I think there are two levels. Initially, the river-basin scale can be used for programming, to anticipate the necessary work, to identify and set priorities for certain sectors on which the population focusses, but that we do not see as important for the restoration of aquatic environments. But in as much as these sectors are seen as important by the residents, it may be useful to work on them in order to progressively lead the public to accept work on other sectors that are truly important in terms of environmental added value.

Ideally, we should work on a fairly large scale and integrate perception factors when the time has come to set priorities among the sectors. In this case, we could truly speak of anticipation. Today, that is not how we work, undoubtedly because our funding partners have major demands in terms of meeting the deadlines for the Water framework directive. We can hope to progressively include perception factors and thus not intervene purely on the technical level in an area, but also enhance living conditions in conjunction with the population, so that the residents feel inclined to support the project. In this latter case, the scale is different and corresponds, to my mind, more to the municipal-association level, i.e. not only an environmental (water, river, etc.) level, but more a territorial level.

Contact

The Bourbre-basin development board (SMABB) - Isère department
Internet site: www.smabb.fr





a

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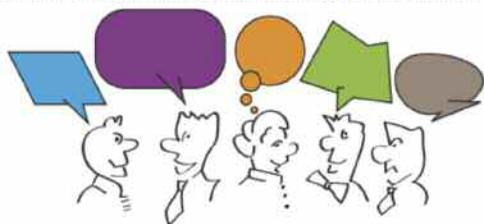
The channelised Bourbre River, lined with poplars. This reach is located in the town of Colombier-Saugnieu, just upstream of the Barquette bridge.

Excerpt from the SMABB newsletter (September 2011), explaining the public-involvement process launched in the framework of the overall management plan for the river basin.

b

Comment serez-vous impliqué ?

L'ambition du SMABB est d'associer un maximum d'acteurs du territoire à l'élaboration de ce schéma. Plusieurs instances vont accompagner la démarche, permettant d'associer différents partenaires aux réflexions et aux décisions qui seront prises.



On peut d'ores et déjà citer :

■ Les groupes focus

Ils permettent d'associer dès la phase d'état des lieux : les acteurs du monde de l'agriculture ; les acteurs de la protection de l'environnement ; les acteurs du monde de l'aménagement et de la gestion des inondations ; les élus du territoire.

■ Le comité de pilotage

Il assure le pilotage général de l'étude et la validation des scénarios et des axes d'interventions proposés. Il rassemble les principaux décideurs (SMABB, élus du territoire, services de l'Etat, partenaires institutionnels...).

■ Le comité de concertation

C'est un comité de pilotage élargi, regroupant les partenaires institutionnels, des élus de chaque partie du territoire, des représentants socioprofessionnels, des usagers... Il joue le rôle de relais entre le comité de pilotage et les acteurs de terrain, et assure la cohérence d'ensemble des décisions prises au niveau global.

■ Les réunions publiques d'information

Ouvertes à tous, elles permettent d'informer l'ensemble de la population des avancées et des résultats de l'étude. Elles seront organisées : à l'issue des phases "Etat des lieux/diagnostic", "Définition des objectifs", et enfin à la fin de la phase "Choix du scénario final", pour présenter le schéma d'aménagement global.

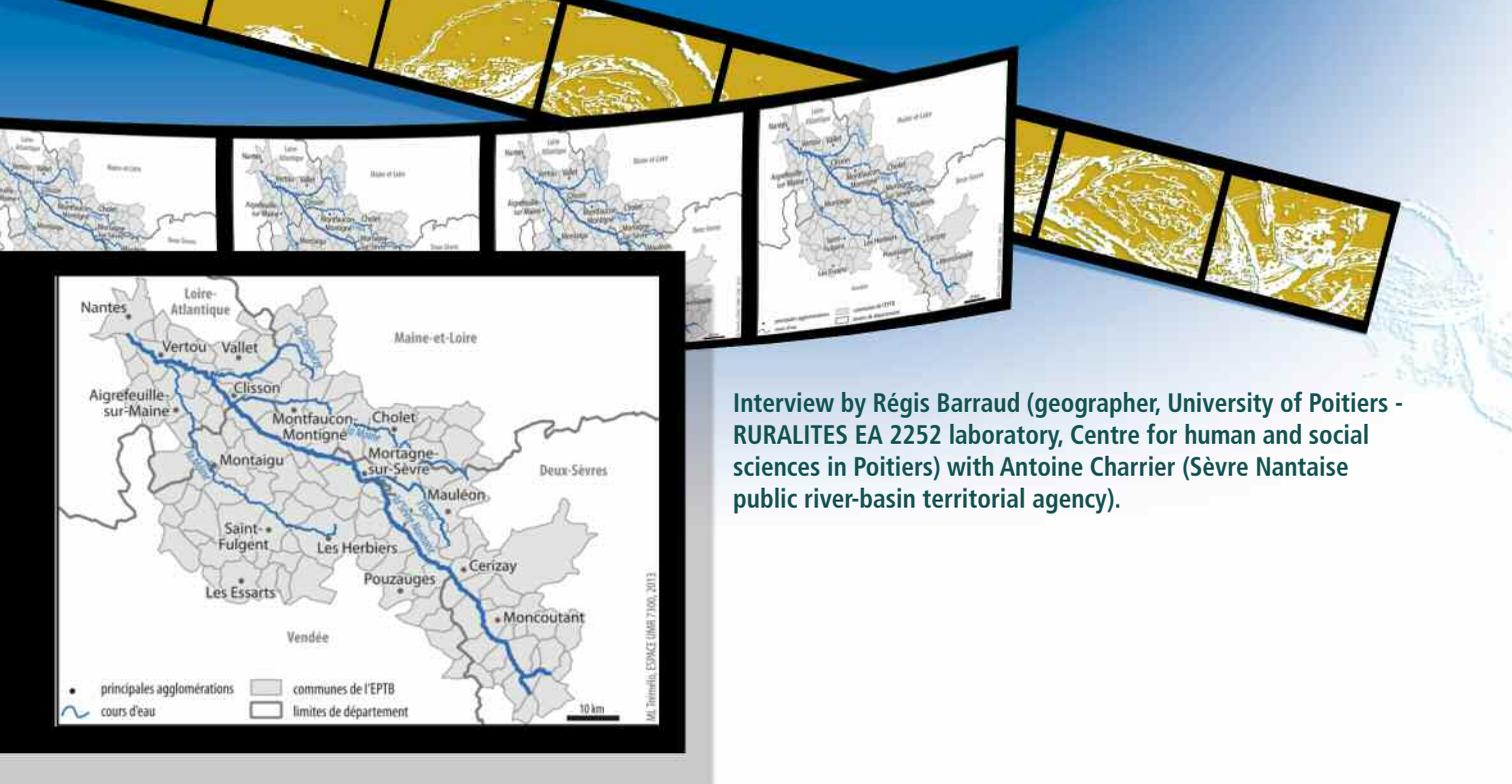
Les prochains numéros de cette lettre vous informeront de l'avancée de la démarche et des résultats de ces différentes rencontres.

© SMABB, 2011

c



Flooding when the lower Agny (a tributary to the Bourbre) overflowed in the town of Nivolas-Vermelle in 1993 (left photo) and flooding due to runoff in the town of Les Eparres, in the Bourbre River basin in August 2011 (right photo).



Interview by Régis Barraud (geographer, University of Poitiers - RURALITES EA 2252 laboratory, Centre for human and social sciences in Poitiers) with Antoine Charrier (Sèvre Nantaise public river-basin territorial agency).

The Sèvre Nantaise River

Taking into account perceptions to make local stakeholders aware of the value of management projects

Introduction

The Sèvre Nantaise and its tributaries (Maine, Moine, Sanguèze, Ouin and Crême Rivers), drain a basin spanning 2 356 square kilometres and the total hydrographic network runs over 2 000 kilometres. From Nantes where it meets the Loire to the springs in the extreme southern section of the Armorican Massif, the Sèvre Nantaise lends form to highly varied landscapes (bocage in Vendée, vineyards near Nantes, urban areas, etc.) and drains very different areas (urban and peri-urban near Nantes, low-density and ageing rural areas in the headlands, farm land and industrial areas near Cholet and in Vendée). The Sèvre Nantaise and its tributaries are characterised by significant variability in annual and interannual discharges, with severe low-flow levels. The rivers were heavily equipped with watermills which starting in the Middle Ages led to continuous economic development (the Breton Marchlands). The Sèvre Nantaise and its main tributaries are today dotted with almost 250 structures, of which most are old milling or factory sites (see Figure a). These relics of the past contribute to structuring the valley bottoms and constitute major management issues (patrimony, recreational uses, ecological restoration).

Several local management strategies have been formulated for the Sèvre Nantaise since the end of the 1970s. Following the creation of the Sèvre Nantaise association (1978), grouping the towns in the river basin to develop tourism and for patrimonial enhancement, a public entity to manage water and aquatic environments was launched in 1985. It was that entity that guided the drafting of the first river contract. In the field, mediation efforts and environmental-management work are carried out by seven river boards. The river technicians/mediators play an important role in local river management. Today, the Sèvre Nantaise public river-basin territorial agency (EPTB) coordinates implementation of the sub-basin management plan (SBMP), adopted in 2005 and currently being revised. The EPTB also coordinates the operational programmes to restore and maintain the rivers.

Antoine Charrier, head of landscape action, which coordinates the work of river boards and focusses on ecological continuity, hydraulic installations and the related uses.

On the basis of your local experience and some precise examples, could you tell us about the importance of perception issues in the environmental management of aquatic environments in your organisation? How are they taken into account, with which tools and which partners?

Perception issues play a central role in the management of aquatic environments in our basin. The perceptions of the various water users and the stakeholders in the management of rivers in the Sèvre Nantaise basin are noted and integrated right from the start of restoration and management projects and even during the overall formulation phase for our work strategies. That was notably the case for the management of hydraulic structures (mill dams, flap gates and other transverse installations). Perceptions are generally collected in a non-scientific manner, or shall we say an informal manner during the stakeholder-involvement process that serves to guide and implement our work. The perceptions can be collected in different ways, either via surveys or using less formal methods (round tables, interviews, collective work sessions). Concerning the management of hydraulic structures and valley-bottom landscapes, the technique implemented for the stakeholder and public-involvement assessments used these different collection methods. For projects involving major changes in the appearance of landscapes and the functioning of environments, steering committees are set up to monitor the projects on a very local level. In these committees, it is not rare to see the question of perceptions brought up. For example, in the Sanguèze valley, the experimental lowering of the water level in a pond was accompanied by a survey of the local residents and people using the pond (see Figure b).

But that is not all. The collected information on perceptions is very useful in adjusting our communication and information documents. We use that information at each step in promoting the projects (feedback, signs, press articles, etc.).

How are the studies on perceptions useful?

Once again, the gathering of information on opinions and feelings is essential to make local stakeholders (local residents, but also elected officials and the main decision-makers) aware of the value of the projects. Generally speaking, the perception of river status, its appearance or of the possible modifications will often influence the launch and the progression of a project. When perceptions are taken into account, acceptance of the necessary work is often greater. And finished projects are often assessed by residents and elected officials on the basis of their individual or collective perceptions.

Who decides whether or not to launch this type of study? Who are the influential persons?

In general, we do not launch a specific study on perceptions as such, but the issue is included in the development studies. The project manager, following an agreement with the steering committee, includes a section on social perceptions, focussing more or less on landscape issues, it must be said, just as these studies also include sections on legal and historical aspects, etc. The only study that specifically addressed the social representations of landscapes was carried out for the hydraulic structures, in the framework of a research contract with the EPTB, the Thouet valley board and an academic (a geographer). The project was financed by the *Loire Grandeur Nature* plan. The funding made it possible to conduct this more specific type of study. But it was the geographer who was the driving force behind the initiative and not our organisation, because we go about things in a more operational manner, notably at the request of our funding partners...

What did the study produce?

The study produced a number of opinions, consulted archives, mobilised university networks and their databases, etc.

What were the most useful techniques and methods? In your opinion, what type of information was the most easy to use for the project managers?

The surveys produced the most precise information, but required lead times for their production and processing that were not always compatible with our work schedules. The work groups in the field and the highly focussed interviews are techniques that make it possible to dig deeper, but they involve fewer people...

In the final analysis, what operational conclusions do you draw concerning the studies on perceptions? How well are they taken into account in management projects?

It is not easy to draw any conclusions on this issue. The analysis must take place on two levels. An overall level, on the scale of the entire river basin or of the sub-basins, and the local level, on the scale of each project, in the planning documents, the management strategy, efforts to raise awareness initiated right from the start. Perceptions are effectively taken into account in the field and projects are adjusted to meet the expectations of the local stakeholders with studies on buildings, flooding, compensatory and accompanying measures.

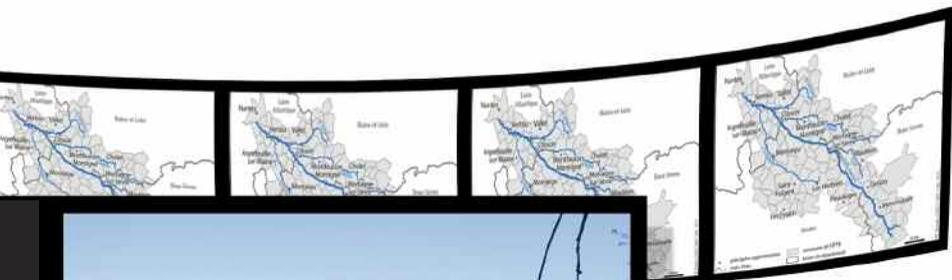
If you were to redo this type of study, what would be your expectations and how would you go about it?

Study on perceptions is inseparable from that on the participation of the public and stakeholder-involvement strategies (see Figure c). More public involvement is always expected, but as a manager, I expect the State to provide firm indications on what should be done. We must also keep the collective interest in mind and maintain balance in our projects. Is the subjective nature of perceptions necessarily compatible with projects targeting the collective interest?

Contact

The Sèvre Nantaise public river-basin territorial agency (EPTB)
Internet site: <http://www.sevre-nantaise.com>





a

© R. Barraud

Poupet mill dam on the Sèvre Nantaise River. The Sèvre Nantaise a large lowland river flowing a total of 156 kilometres with an interannual mean discharge of approximately 25 cubic metres per second. On the regional level, it is a dynamic river with a slope of 3.5‰ between Mallièvre and the Longeron.



b



© A. Barbier - EPTB Sèvre Nantaise, SIABVS

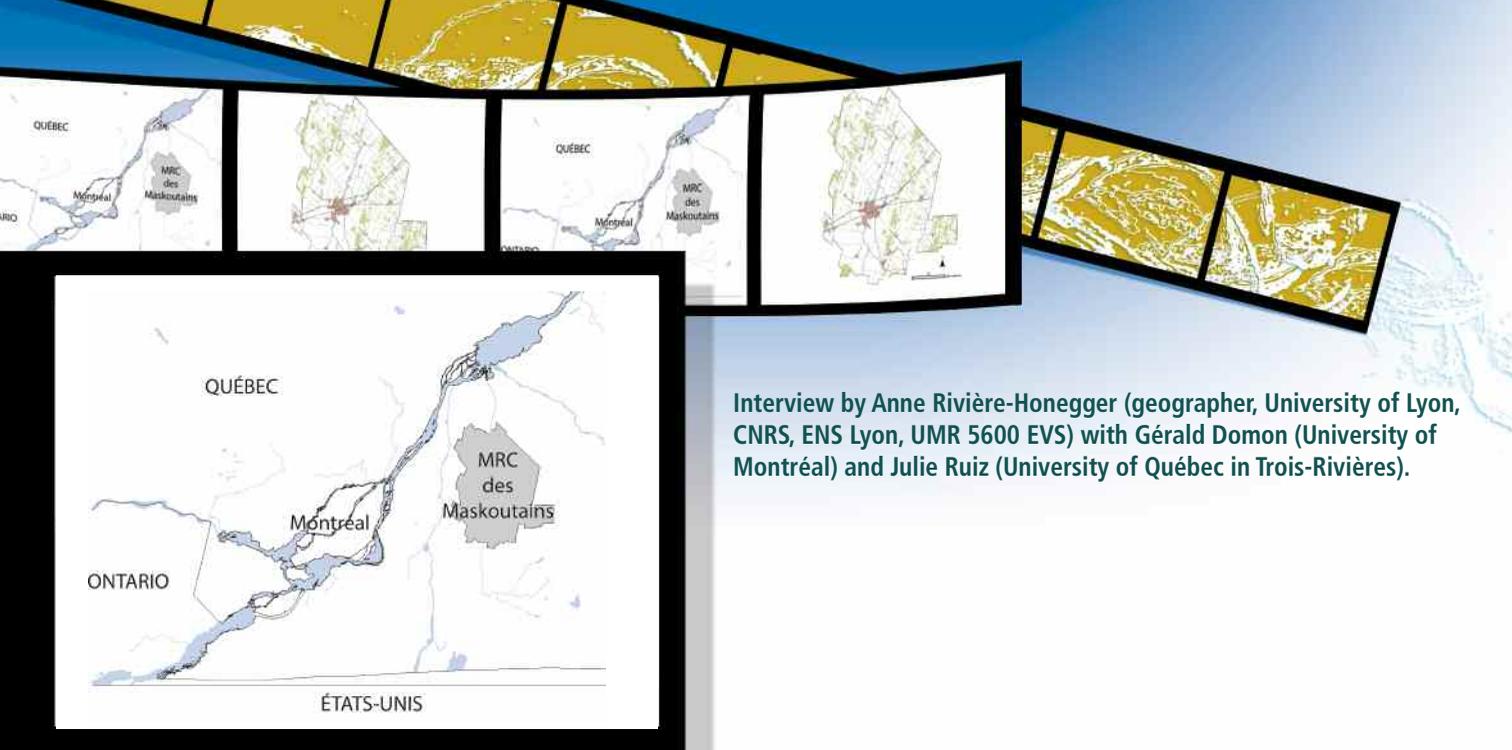
Experimental project to lower the water level on the Sanguèze river, in the town of Mouzillon. The photos show the situation before and after the work in 2004.

c



© EPTB Sèvre Nantaise

Informational meeting for the revision procedure of the Sèvre Nantaise SBMP.



Interview by Anne Rivière-Honegger (geographer, University of Lyon, CNRS, ENS Lyon, UMR 5600 EVS) with Gérald Domon (University of Montréal) and Julie Ruiz (University of Québec in Trois-Rivières).

Canada

Revealing the role of water in a territory, contribution of a collective diagnosis of landscapes

Introduction

Under the auspices of the UNESCO chair for landscape and environment and the UQTR chair for landscape ecology and development, a project was carried out by a team of academics and professionals to reveal, valorise and redefine landscapes of areas undergoing intensification of farming in Québec (Canada), using the landscape assessment for Maskoutains county as the starting point.

Areas confronted with agricultural intensification, i.e. a concentration of agricultural production in areas where farming techniques have particularly intensified soil use, are widely known for their environmental problems (degradation in the quality of water and soil, loss of biodiversity). The communities in these areas are also confronted with a new risk of loss of dynamism due to a two-pronged phenomenon. On the one hand, the clear drop in the number of farmers caused by the merging of farms means that farming alone can no longer maintain a sufficient level of dynamism. And on the other, the trend toward uniformity and even undistinguishable landscapes means they are increasingly viewed negatively and, in a context where landscapes increasingly influence decisions on where to live, the communities have difficulties in attracting new people.

That is why it has become indispensable to work on these landscapes in order to satisfy the expectations of farmers and non-farming residents, new residents and people passing through. With the above in mind, the elected officials of the Maskoutains County regional municipality (MRC, an administrative unit similar to a French department), located about 40 kilometres from Montréal, launched the Maskoutains landscapes project. The overriding objective of the project is to reveal the qualities and characteristics of the landscape that the public no longer sees, to valorise them and to redefine the landscapes modified by agricultural intensification. A further objective is to assign new qualities to both the physical reality of the landscape and to the image that people have of the landscape.

Carried out by a team comprising academics, MRC professionals and representatives of the elected officials and various ministries, the complex project made use of a landscape assessment report produced by local stakeholders, elected officials and citizens, which facilitated the emergence of a common perspective concerning the future of the landscapes in the resulting plan. The results of this project led to work on agricultural features and the entry-ways to villages, and they also revealed the importance of water in the area. It is this latter aspect that is presented here.

Gérald Domon, Full professor, Deputy scientific director, UNESCO chair for landscape and the environment, School for development, University of Montréal and Julie Ruiz, Professor, Department of environmental sciences, Research chair UQTR 2013 for landscape ecology and development, University of Québec in Trois-Rivières.

Why is the landscape an excellent entry point for studies on the future of territories?

Whatever the definition selected, e.g., "visible part of a landscape", "part of the landscape perceived by residents", etc., the notion of landscape is special in that it necessarily involves both people and the physical reality of a certain place, where the first contemplate the second. But the image that results from this contemplation can differ considerably from one person (or group of persons) to another because it depends on both the cognitive perception of the physical reality (visible and experienced) and the value system specific to the person or group of persons. Thus the image held by a tourist, resident, ecologist or grain farmer can differ significantly. This image is bound to influence any impacts that people will have on the physical reality. For example, for a marsh perceived as an environment rich in biodiversity, people will be more inclined to protect and preserve the site, whereas if it is perceived as unhealthy and unproductive, the marsh is more likely to be drained and cultivated. What is more, as the increase in environmental awareness shows, knowledge and values can change over time, thus modifying what each person sees and appreciates in an area.

The landscape is thus a complex entity, constantly changing, that is the result of the interactions between two factors, themselves constantly changing, namely the area itself and the values held by each person (see Figure a). In addition, this entity is subjected to the influence of a set of external forces acting at times on the area, at times on the people, namely development policies and programmes, the market economy, pressure groups, neighbours, etc. Seen in this light, a landscape is certainly a complex framework, but also an integrative one that can be used to analyse and reveal underlying factors comprising issues that should be taken into account in environmental-management policies.

How large was the area covered by the status report? How was the description of the landscapes drafted?

The objective was to provide a factual description of the landscapes in a given area (the Maskoutains MRC) and the status report was necessarily based on the main dimensions of the landscape concept previously identified. In other words, it dealt with both the physical dimensions (characteristics and evolution) and the perceptual and cultural dimensions of the people inhabiting or visiting the area.

The physical basis supporting the landscape

Geological formations, the relief and soil quality together constitute the physical basis of an area and play an important role in the development of human activities. To explain this role, the ecological reference framework, i.e. a mapping technique for the physical basis developed over the past 30 years, can be used to distinguish sections of an area having a similar structure in terms of their relief, surface deposits and drainage. Land-use data was then incorporated in the map, making it possible to understand the spatial organisation and context.

With this information, two sections covering 185 square kilometres stood out from the large clay plains that cover most of the MRC, which spans a total of 1 300 km² (see Figure b). The two, highly eroded sections were formed by the two large rivers transiting the area. By digging into the plains, the rivers exposed the clay-rich terrain to higher risks of landslides during wet weather. The frequent landslides created ravines, more intimate landscapes that are

strikingly different than the surrounding plains. It is the physical basis that enables us to understand the current relief of the landscapes along the rivers, but it is our understanding of the changes in landscapes that informs on the presence of so much idle land in these sections.

Landscapes undergoing constant change

 A rapid glance at the landscape may leave an impression of immobility, however closer observation reveals the signs of constant evolution. Learning to read and to understand this evolution puts us in a position to better apprehend current landscapes and to anticipate the landscapes of the future. A central factor in any development project, the evolution of landscapes was analysed here on a scale ranging from the regional to the local, similar to the experience of a person travelling through the landscape in a car.

On the regional scale, topographic maps were used to track the major changes in the area over a century (1907 to 2009) and monitor the diversity of situations. For example, wooded areas as a whole in the area fell from 20 to 15%, but these figures mask very different situations. In the clay plains, they dropped regularly and in 2009 represented only 4% of the plains, whereas the eroded sections formed by the rivers have seen a recent increase in their wooded areas. However, it is on the local scale, that of the *rang*¹, that detailed mapping of land use using aerial photographs (1931, 1964, 2009) made it possible to understand the driving forces behind the renaturation of the eroded sections (see Figure c). It is now clear that it was the abandonment of the pastures, unsuitable for farming in the eroded sections, that explains why there is currently so much idle land along the rivers.

Landscapes as seen by visitors

 Many people, whether on a trip to see family or friends, or cycling, travel along the roads of the region. Which landscapes, thanks to their visual qualities, are the most likely to attract their attention? What are the elements and the places that strike a discordant note, i.e. are poorly integrated, disproportionate, poorly maintained, etc.

To answer these questions, a landscape architect travelled the roads. Aware that a visitor may view the area in many different manners, the architect attempted to identify the visual elements of interest and the discordant elements in aesthetic, environmental and cultural terms. Among all these elements, the views overlooking the rivers and the curving roads along the rivers clearly stood out as visual elements of aesthetic value (see Figure d). The latter effectively offer a very different travel experience than the straight roads in the plains. Conversely, river sections without riparian vegetation or of low quality were seen as discordant visual elements for environmental reasons.

Landscapes as seen by residents

 Residents do not see the area as a tourist might, their view is coloured by their experience and their knowledge. However, given that they are the people who will be the most impacted by any approach or activity leading to a transformation, development or redefinition of landscapes, knowledge of how they see the landscape is particularly important. Through a number of activities, including participatory map-making, discussions on photographs and even collages, people representing the environment (elected officials, stakeholders, municipal inspectors, municipal general managers), farmers and foresters, as well as children aged 9 to 13, expressed their opinions on what they see as good and bad landscapes. A total of 265 features were identified as being positive by the persons questioned. Among those features, rivers and virtually all the *rangs* along the rivers were some of the most

1. In Canada, the *rang* is the system by which rural properties are divided. The lots, generally rectangular, are set perpendicularly to a river or road in order to facilitate their access.

favourably judged, not only for aesthetic reasons, but also for their naturalness, the feelings of tranquillity produced and because they are seen as being rich in biodiversity (see Figure d). Of particular importance is the fact that this section of the status report listed the rivers as one of the main sources of pride of the population in the area.



How did you shift from the status report to a landscape diagnosis? How were landscape issues defined?



In as much as our objective was to "reveal, valorise and redefine" landscapes, it was important to define the issues raised, in view of determining why or where action was required. That is the overriding objective of a landscape diagnosis. Though it was tempting to bring in an expert who, on the basis of in-depth knowledge, could identify what he thought were the main issues, it was deemed necessary, for a project attempting to set up a collectively defined objective, to implement methods incorporating different points of view. A relatively large number of methods exist, however the most well-known and perhaps the simplest is the SWOT method (strengths - weaknesses - opportunities - threats).

Used during collaborative work sessions bringing together regional stakeholders on the topic of "Agriculture and landscapes", the method identified the rivers as one of the strengths of the area. On the other hand, the limited access to rivers and their degradation were seen as the main weaknesses.

In conclusion...

The collective study on and using the landscape in the "Maskoutains landscapes" project revealed the special role of water in the region. The study showed the importance of bringing several viewpoints to bear on the landscape because in a project launched to address the trend toward uniformity and even undistinguishable landscapes in areas confronted with agricultural intensification, the importance of water could well have been masked by the agricultural aspects.

What is more, the variety of viewpoints revealed the diversity of the aspects (ecological, recreational, aesthetic, etc.) to which rivers contribute. It also made it possible to go beyond the issues dealing with water quality and to work on ecological and social restoration projects.

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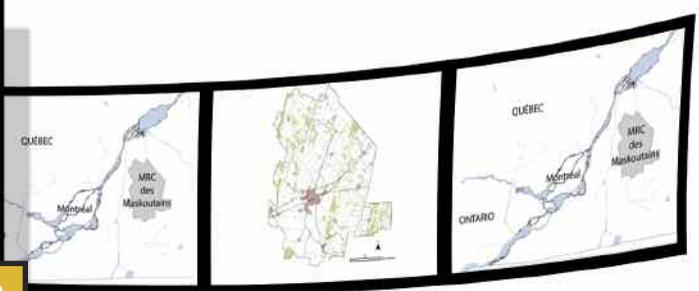
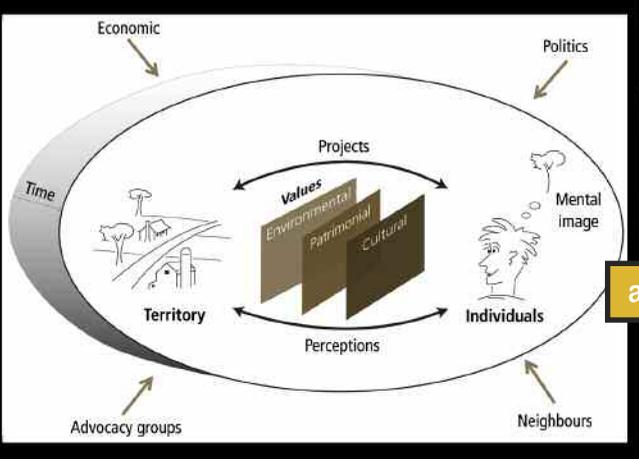
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https://oraprdnt.uqtr.quebec.ca/pls/public/gscw031?owa_no_site=1403&owa_no_fiche=1&owa_apercu=N&owa_imprimable=N&owa_bottin=

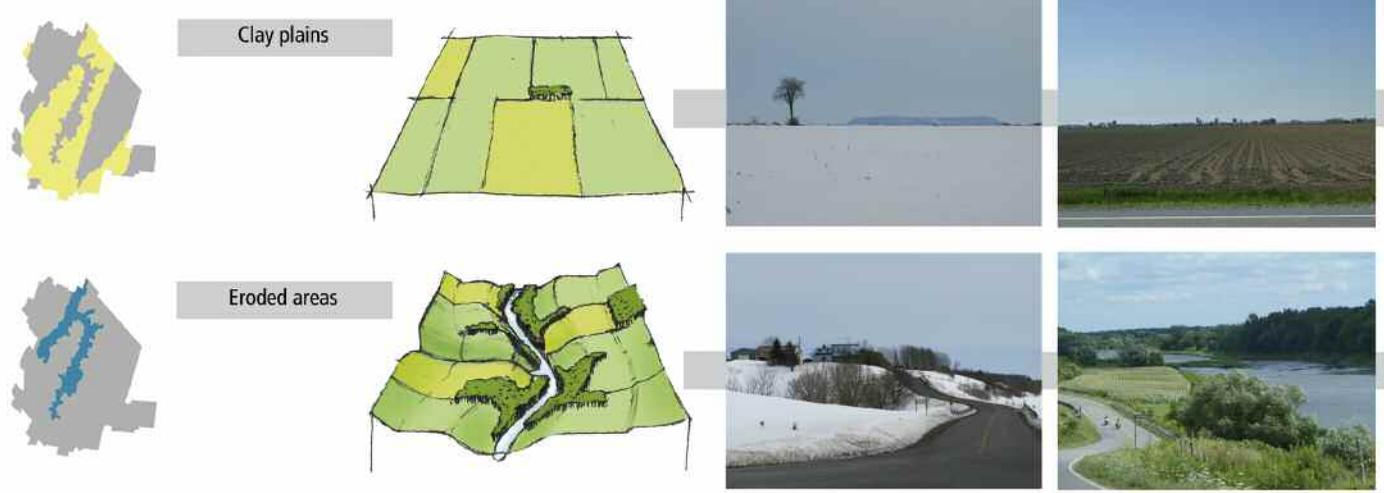




a

Landscape, a dynamic phenomenon resulting from the interaction between the land and people.

b

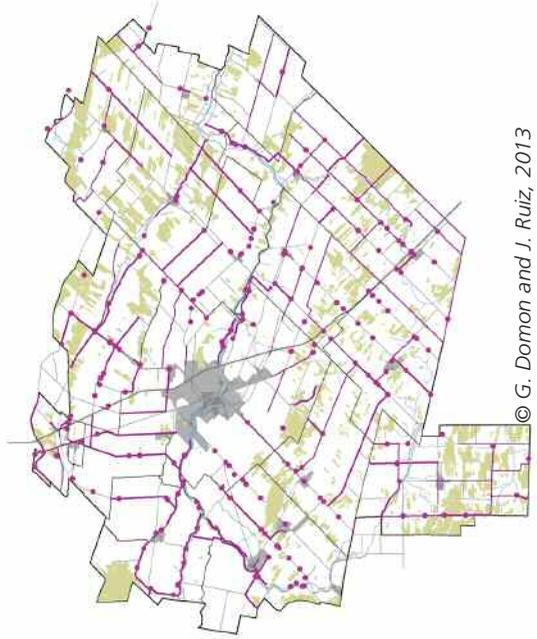


Areas eroded by rivers constitute islands of diversity in a landscape of intensively farmed plains.

d1

Elements of aesthetic visual interest listed by the expert

- Specific points (260)
- Road sections (70)



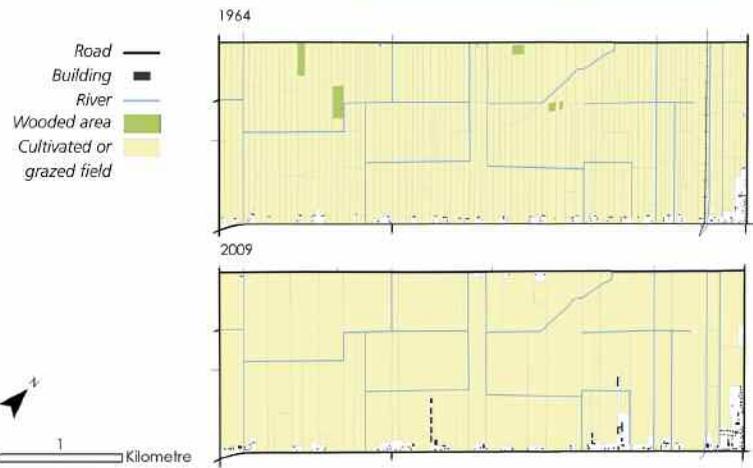
d1, d2, Rivers are highly appreciated.

Surface deposits

- Sand
- Clay

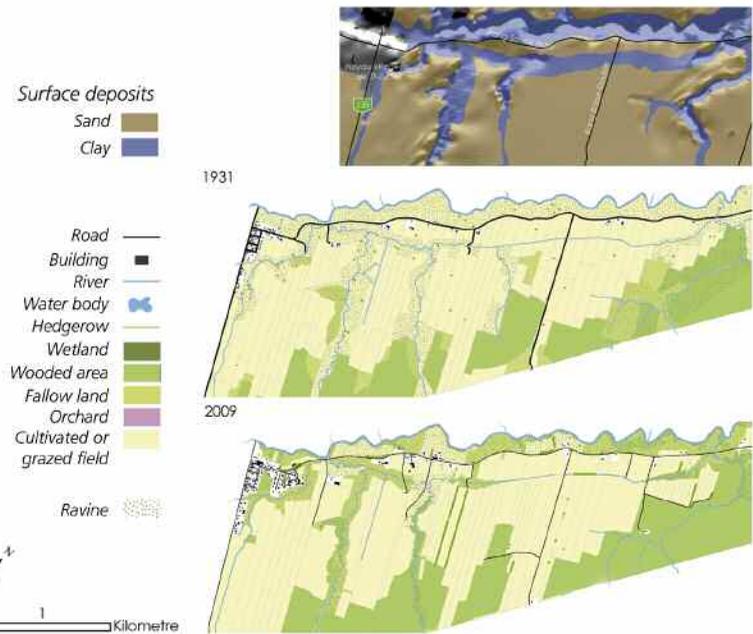


Clay plains and eroded areas evolve very differently in the landscape.



On the clay plains, the landscape tends toward uniformity

© G. Domon and J. Ruiz, 2013

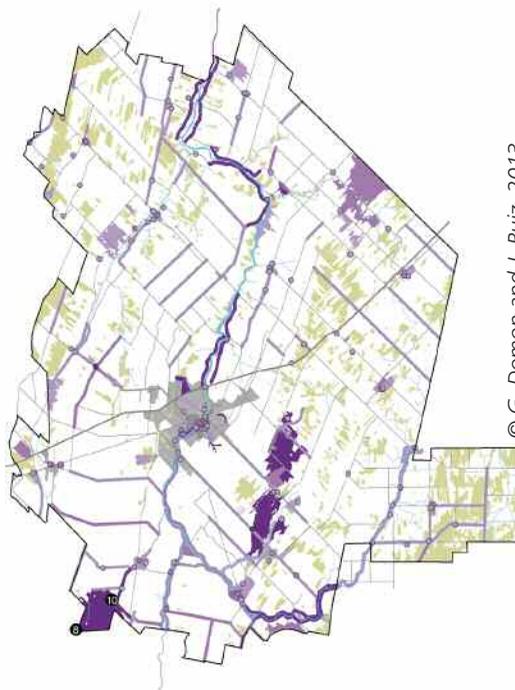


In the eroded areas, the landscape recovers its naturalness

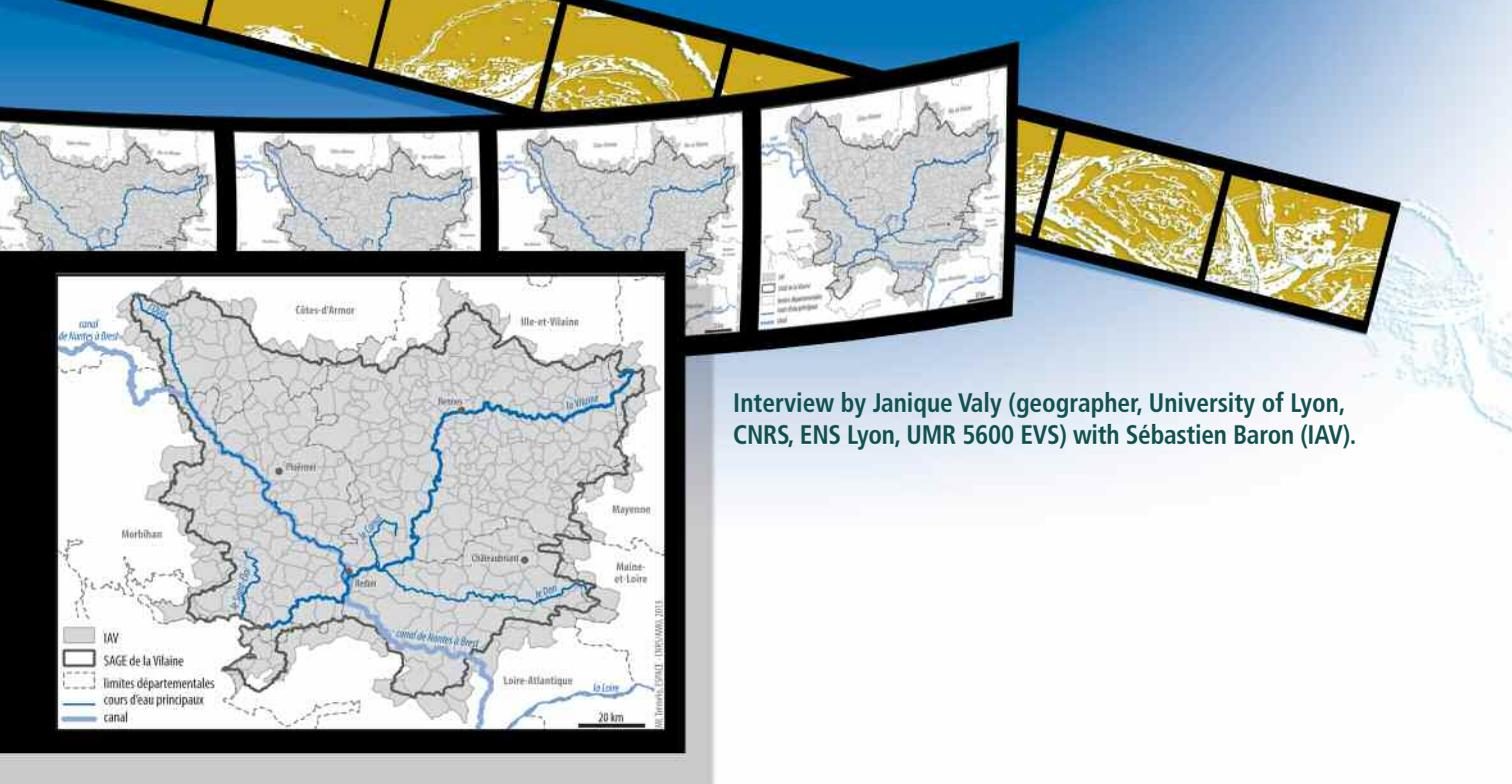
d2

Elements of interest listed by the population

- Specific points noted by
- 1 participant
 - 2 to 5 participants
 - more than 5 participants
- Linear elements noted by
- 1 participant
 - 2 to 5 participants
 - more than 5 participants
- Sections of territory noted by
- 1 participant
 - 2 to 5 participants
 - more than 5 participants
- Roads
 - River
 - Wooded areas
 - Urban and village centres



© G. Domon and J. Ruiz, 2013



Interview by Janique Valy (geographer, University of Lyon, CNRS, ENS Lyon, UMR 5600 EVS) with Sébastien Baron (IAV).

Development agency for the Vilaine River basin

"Understanding the perception of water makes it possible to raise awareness."

Introduction

The Vilaine River basin covers an area of 11 000 square kilometres, spread over two regions (Bretagne and Pays-de-Loire) and six departments (Côtes d'Armor, Ille-et-Vilaine, Loire-Atlantique, Maine-et-Loire, Mayenne and Morbihan). The basin is characterised by a dense, upriver network and slight slopes. The Development agency for the Vilaine River basin (IAV) was initially created by the Loire-Atlantique, Ille-et-Vilaine and Morbihan departments to manage hydraulic projects, but that mission later shifted to balanced water management for the river basin as a whole. Its tasks include:

- management of the Arzal estuarine dam with two main objectives, i.e. limit flooding in the town of Redon and maintain a reservoir of fresh water intended for drinking water (see Figure a);
- production of drinking water in a factory supplying up to one million people in the summer and ensuring a regional regulatory function;
- regional coordination in that it manages the Vilaine SBMP (voted in 2003 and fully revised in 2014) and provides assistance to the boards of the sub-basins;
- flood control by managing two action programmes for flood prevention (PAPI) in the Vilaine basin (the first from 2003 to 2011 and the second from 2012 to 2018) (see Figure b);
- management of natural environments, including the Natura 2000 programme for the Redon marshes, migratory fish, invasive plants and the Vilaine estuary.

The IAV was awarded the status of a public river-basin territorial agency (EPTB) in 2007. In its management work, the IAV has a major advantage in terms of its boundaries, i.e. the river basin making up the SBMP perimeter is identical to perimeters for the EPTB and the PAPI.

Sébastien Baron, flood-prevention and water-awareness engineer at the Development agency for the Vilaine River basin.

On the basis of your experience, could you tell us how perception issues are taken into account in basin management by IAV and the role they play today?

The perceptions of the various stakeholders involved in water management are taken into account on different levels.

First of all, on the level of the Vilaine basin as a whole, in the local water commission managed by IAV, each stakeholder presents his point of view and defends his interests. The different perceptions are expressed there and taken into account during the negotiations. IAV also works to raise the awareness of stakeholders in an effort cutting across the various water issues. The studies on perceptions that we have run have guided those awareness efforts and the positions adopted by IAV. During the revision of the SBMP, launched in 2011 and that should be finished in 2014, we included a chapter on raising the awareness of three priority groups of people, the project-site landowners and decision-makers, economic stakeholders and notably farmers, and finally young people and the general public. The chapter defined the organisational conditions as well as the key message for each issue.

In 2009-2010, IAV also ran a feasibility study in view of setting up a programme to raise water awareness throughout the Vilaine basin. The creation of a "Teaching tools" section on the IAV site is the first step in that direction (<http://www.eptb-vilaine.fr/site/index.php/ressources-pedago>). To date, it deals only with flooding and we designed a booklet for teachers and instructors working in environmental-education non-profits (see Figure c). The booklet contains ideas for activities related to the school curricula of children between the ages of 11 and 14 and provides links to numerous resources, e.g. scientific data, photographs, field trips. This section will grow progressively to cover the other issues managed by IAV, namely wetlands, the estuary and migratory fish.

This aspect is also taken into account in our operational work programmes. They generally include a phase for a territorial status report that, in addition to environmental data, lists the desires of the involved stakeholders. For example, in the Redon marches, the Natura 2000 programme is based on intense discussions with the elected officials, farmers, fishers and environmentalists. It is through daily contacts with the people in the area and the elected officials that we have come to understand the different perceptions concerning wetlands. In addition, a study is now under way on how to promote the marshes. It started with a photo-interpretation workshop on the perception of marshes and their promotion. Participants included elected officials, farmers, fishers, hunters, naturalists and economic-development agents for the various departments and the Chamber of commerce and industry (CCI). In the Vilaine estuary, projects are coordinated by an estuary committee made up of elected officials, commercial fishing and boating firms and environmental-protection groups. A sociological study was carried out in 2004 and made available to a wider public as a book, *L'estuaire de la Vilaine*, published by the Rennes university press.

Concerning flooding, a research programme was initiated during the first PAPI to uncover the different perceptions on the topic and to inject opinions differing from those of the managers. The multi-disciplinary study, coordinated by Nadia Dupont, a geographer at the University of Rennes II, included sections on the history, geography, sociology and economy of flooding. The research programme was presented during a symposium in June 2011 and a book, *Quand les cours d'eau débordent*, was published by the Rennes university press. The book was subsequently given by IAV to the mayors of all the towns exposed to flooding and to the State services and local governments involved in flood management.

What were the results of the studies on perceptions and what did they contribute to your work?

 These studies put us in a position to understand the behaviour and reactions that we observed during meetings with elected officials or during public meetings. Sometimes we propose an approach, but it does not go through because it does not correspond to the people's perceptions. For example, the concept of a river basin is not widely known, particularly among the general public. Another example is flooding. It is interesting to understand how people perceive floods. Do they see above all the natural or the anthropogenic factors?

What is the outlook and what are your expectations concerning studies on perceptions?

 We will carry out the awareness-raising projects stipulated in the SBMP, with in particular training sessions for elected officials. The latter are in effect decision-makers, developers, they issue building permits, draft the local urbanisation plan (PLU), but above all, they are in daily contact with the residents and the non-profit associations.

Two research programmes will be launched in the framework of the second PAPI. One will assess the effectiveness of our preventive information efforts, e.g. the installation of flood markers and the distribution of the Municipal information documents on major hazards (DICRIM).

Studies on perceptions provide opinions that differ from those of the managers. Project-site landowners, including IAV, do well to take them into account in formulating programmes and defining projects, but also in working to raise the awareness of the various stakeholders.

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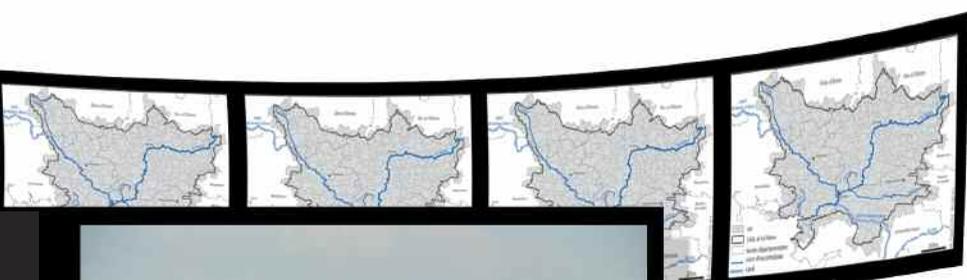
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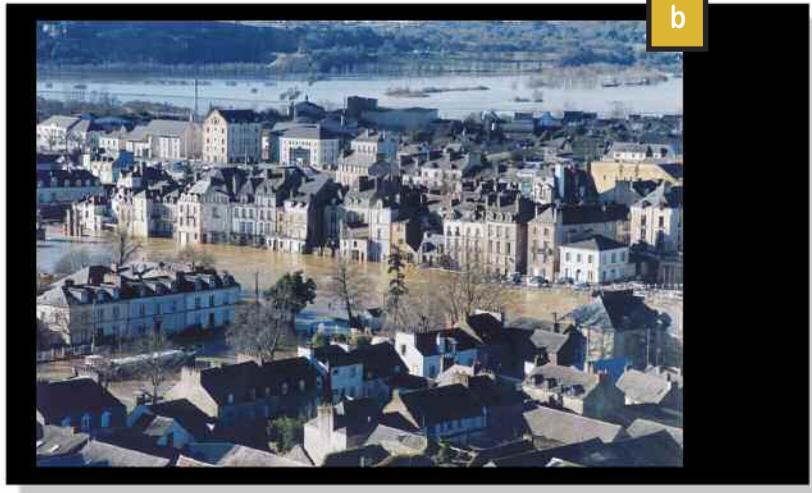


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a

The Arzal dam, at the mouth of the Vilaine, blocks the lower river basin from the ocean and thus limits the risks of floods caused by the combined effects of high waters and high tides.



b

© IAV, 2014

The last major floods caused by the Vilaine River occurred in 1995 and 2001.

c



L'institution d'aménagement de la Vilaine propose un

LIVRET THEMATIQUE : LES INONDATIONS

Propositions pédagogiques pour le collège

« Laissez vivre l'eau qui vit, l'eau qui bondit, l'eau qui jaillit » - Philippe Soupault

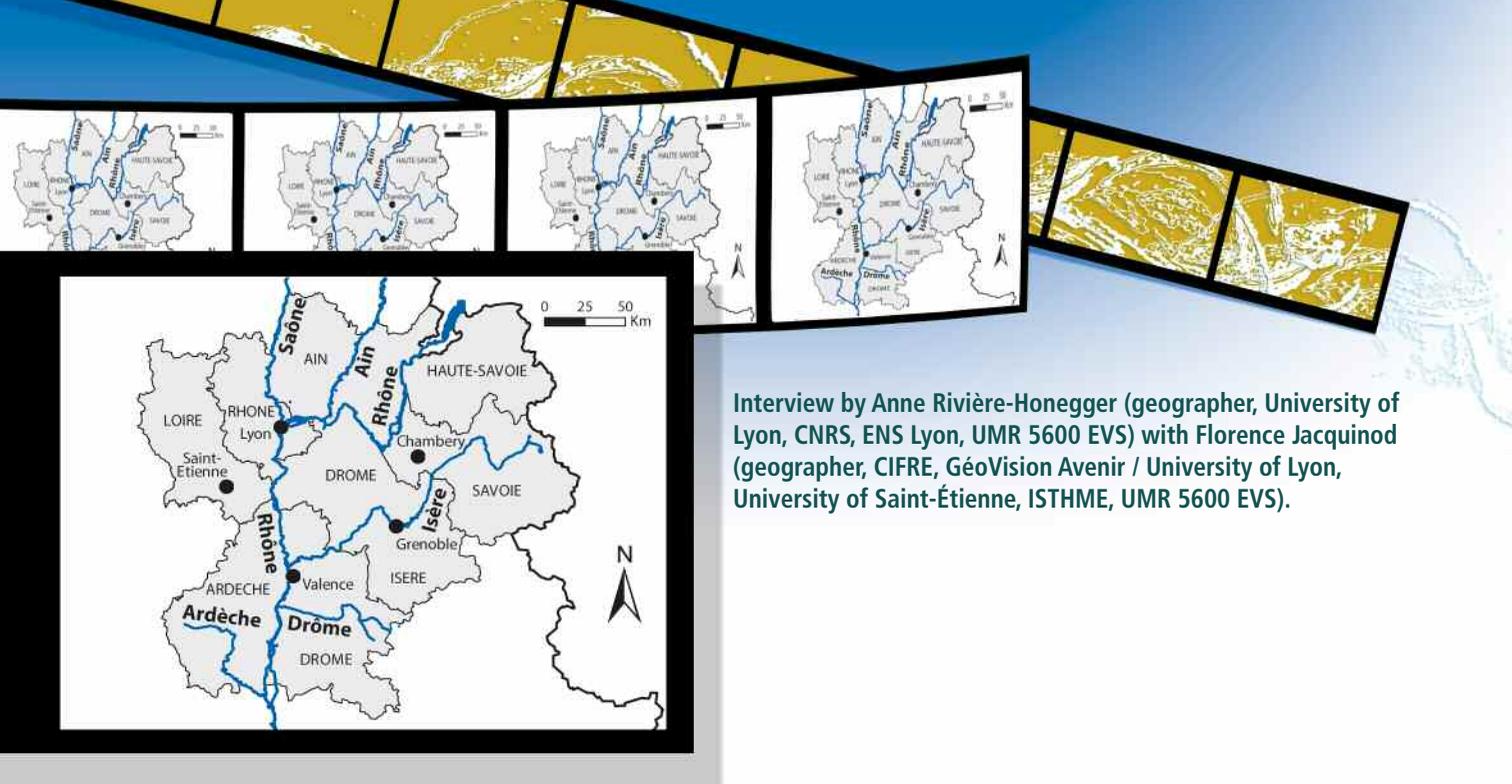
Février 2013

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Booklet on floods, intended for school children in the basin of the Vilaine River.

c,d © Justine Ullsch, 2008



Interview by Anne Rivière-Honegger (geographer, University of Lyon, CNRS, ENS Lyon, UMR 5600 EVS) with Florence Jacquinod (geographer, CIFRE, GéoVision Avenir / University of Lyon, University of Saint-Étienne, ISTHME, UMR 5600 EVS).

The Rhône River

3D geovisualisation techniques for the public-involvement process in the Flood-prevention plans (PPRI). Action research to develop tools to represent risks

Introduction

Between 2009 and 2013, several action-research projects were carried out by the Saint-Étienne section of UMR 5600 Environment, City and Society in a partnership with the Rhône-Alpes regional environmental directorate (DREAL RA) (Jacquinod, 2012; Jacquinod and Langumier, 2010; Jacquinod, 2014).

Funding was supplied by the European regional development fund (ERDF) as part of the Flooding section of the Rhône plan.

The purpose of the action-research projects was to develop 3D georeferenced landscape images for use in the flood-prevention policy. The 3D geovisualisation images portray areas subject to flood risks and the corresponding high-water phenomena, also known as the hydraulic hazards to which they are exposed. The images assist the stakeholders involved in implementing the prevention policy in devising development projects for the areas at risk, in discussing the necessary measures and, more generally, in informing stakeholders of the existence and the scope of flood risks in the area.

Florence Jacquinod (geographer), Ph.D, ISTHME associate researcher, University Jean-Monnet Saint-Étienne, CNRS – UMR 5600 Environment, City and Society.

In your opinion, what are the objectives and the value of action research to develop 3D geovisualisation?

In compliance with instructions (3 July 2007) on the consultation of stakeholders, the public-involvement process with the population and the implication of local governments in the Natural-hazard prevention plans (PPRN), 3D geovisualisation images of floodable areas can serve as resources for increasing public awareness of the Flood-prevention plans (PPRI) by proposing more intuitive maps of the potential hazards. Their purpose is to ensure better understanding of the technical data and of the consequences of floodable areas on development issues and dynamics (see Figure a).

The full value of the partnership between researchers and managers is achieved by pooling the scientific and operational skills of each participant. The partnership is particularly useful in complex and changing technological contexts in view of producing high-performance tools and an in-depth understanding of how they can contribute to existing practices in the environmental-management field.

The decision in favour of action research and a partnership with a research lab to develop these tools is based above all on the relative newness and the complexity of the implemented technologies. The objective of the collaboration between universities and State services is to develop tools and methods that are effective and suited to the needs of the entities in charge of implementing hazard-prevention policies. To that end, an action-research project is set up to experiment with the tools during actual use in order to produce precise knowledge suited to the operational context of the tools.

Researchers contribute to producing 3D geovisualisation images in conjunction with operational stakeholders and also observe how the images are actually used. Observations are direct, i.e. a form of participant observation in which the researcher observes the situations in which he participates. This type of observation, through active participation in hazard-prevention projects and in drafting regulatory documents, puts the researcher in a position to observe how 3D visualisation images are produced and used, but also to formulate, in conjunction with the operational stakeholders, methods that correspond precisely to the needs of the stakeholders. The observations made are also of use in more general approaches about how 3D visualisation images are used for landscape planning and management. Comparison of the scientific knowledge on 3D tools and their use with the experience and practices of operational stakeholders is a means both to create relevant tools and to produce in-depth knowledge on the observed processes (the PPRI in this case).

How is a 3D geovisualisation tool produced?

Practically speaking, 3D geovisualisation images are produced in several steps, as is shown by the following example concerning a town along the Rhône River. 3D geovisualisation images are produced using existing geographic databases and, for the Rhône, the Rhône topographic database assembled by the National geographic and forestry institute, which precisely describes the topography of the river and the floodable areas. Other databases are used to produce a general depiction of the area, including the BD ORTHO and BD TOPO databases from the National geographic and forestry institute. Data on flood risks are then added to the model, as are other significant elements, e.g. windmills, that serve as landmarks when visualising and presenting the 3D model (see Figure b).

What results were produced by the 3D tools for the Rhône Plan?

 In the framework of the Flooding section of the Rhône Plan, the 3D tools were used for approximately 20 towns in five departments, for both stakeholder-engagement meetings with elected officials and public meetings with local residents. The results were positive for the State services, for which the 3D tools constituted a real advantage in guiding the involvement process, notably in terms of making technical information on risks available in a clear and informative manner. When people are open for discussion, the 3D images of the area serve as a starting point for dialogue. They provide a clear presentation of the delivered data and a basis for building a shared analysis of the territory. For researchers, these experiments using actual projects make it possible to better understand the different roles played by 3D images in the context of different strategies for which they are used, and to produce scientific knowledge on the topic.

In your opinion, what are the key factors that contribute to the success of the project?

 In general, success depends on close collaboration between the various stakeholders. In a difficult context where we are implementing multiple reforms, including the general revision of public policies, the objective of the State services is to deploy the means required to acquire new skills by undertaking a transfer from research to the operational field of public action. In return, researchers benefit from the experience and expertise of the operational stakeholders in organising their studies.

More specifically, the following key points should be underscored:

-  the importance of reliable and sufficiently precise geographic data (in our case, the BDT Rhône database was an excellent source of topographic data);
-  the importance of collaborating with the various services that can each provide different skills and knowledge on the studied areas. Effective use of the tools requires that the many stakeholders work together to understand and become familiar with the new technologies, and to ensure that the resulting models are suited to the needs of each territory and to the corresponding procedures;
-  the importance of paying particular attention to the manner in which the territory is represented and in which digital visualisations are managed, particularly in the case of 3D geovisualisation images which have not yet been standardised and for which no symbolic codes have been established. However, it should be noted that ethical guidelines setting good practices for 3D geovisualisation images for urbanisation and development work exist, see the site <http://www.3dok.info/>.

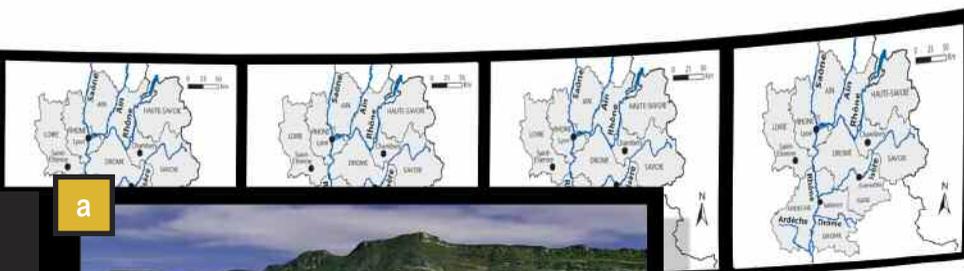
Contact

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The website of the Rhône Plan has a page specifically dedicated to this issue:

<http://www.planrhone.fr/front/index.php?lvid=273&dsgtypid=252&pos=3>.





a



© Image F. Jacquinod - IGN Data, CNR

Image of an area along the Rhône showing existing hazards (PPRI flood risks indicated in shades of blue). Working document, June 2012.

© Image F. Jacquinod - IGN Data, CNR

b



1. **3D modelling of the studied area**, based on relief mapping (DTM) and databases for a general depiction of the area (Large-scale reference dataset and Rhône topographic database (BDT) from the National geographic and forestry institute), working document, February 2011.

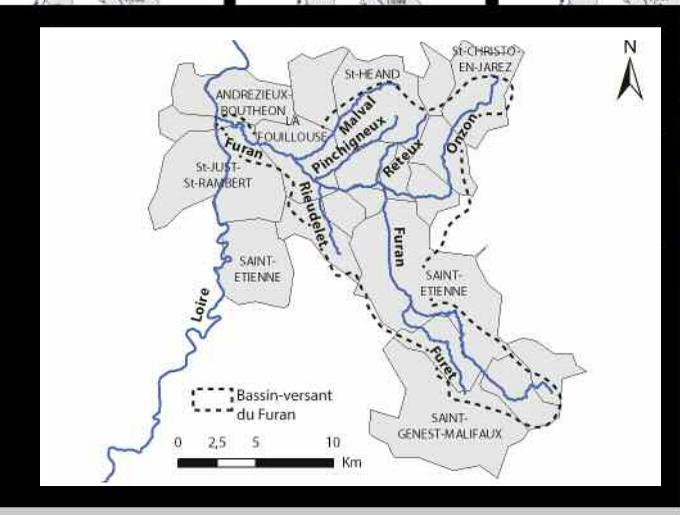
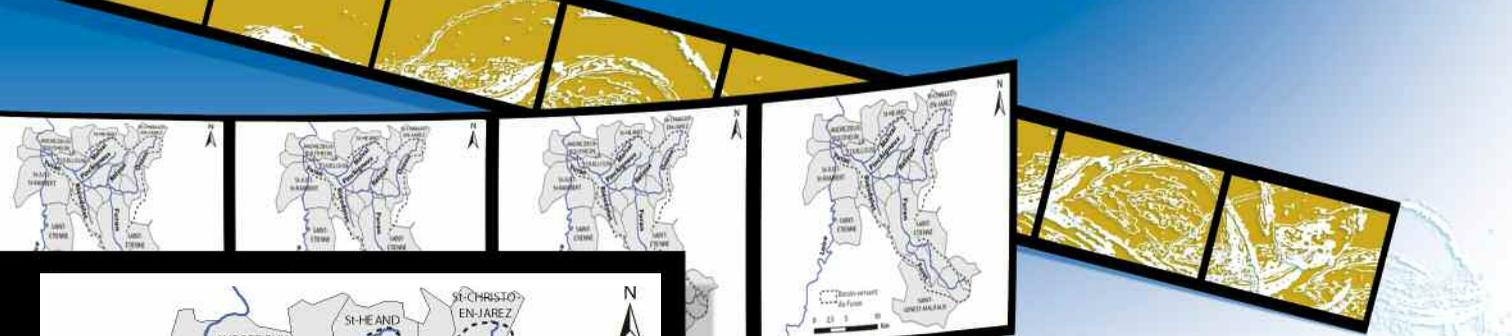
2. **Model showing the flood risks**, based on work done by the Regional environmental directorate, working document, February 2011.



© Image F. Jacquinod - IGN Data, CNR

3. **Finishing work and insertion of landmarks** with the local services (departmental territorial directorates) that are highly familiar with the studied area (in this case, addition of windmills and bridges along the Rhône), working document, February 2011.

4. **Creation of images, fly-over films and/or interactive models** to be used during the stakeholder-involvement phase, in conjunction with the State services drafting the PPRI plans, working document, February 2011.



Interview by Anne Rivière-Honegger (geographer, University of Lyon, CNRS, ENS Lyon, UMR 5600 EVS) with Justine Ultsch (geographer, CIFRE-CIRIDD and the Water and sanitation service, City of Saint-Étienne / University of Lyon, University of Saint-Étienne, ISTHME, UMR 5600 EVS).

The Furan River

An example of participant research on the Furan River in Saint-Étienne (Loire department)

Introduction

The Furan is a small river 36 kilometres long with approximately 30 tributaries. The relatively small basin, covering 178 square kilometres, drains an area with some 230 000 inhabitants in 17 towns. The Furan originates in the Pilat mountains (see Figure a), in the town of Bessat, located along the ridge that divides the Rhône and Loire basins. It flows down steep slopes to eventually join the Loire at the town of Andrézieux. The torrential regime is the product of the high-gradient terrain in the basin and the violent, highly localised storms, resulting in significant variations in discharge (severe floods and minimal low-flow levels).

Another specific aspect of the Furan is the fact that the river is completely covered for 4.8 kilometres where it crosses through the city of Saint-Étienne. The river, its tributaries and the adjacent reaches were covered between the 1600s and the 1900s as a solution to different problems, including health issues, easier travel within the city and as a means to facilitate urban expansion, to prevent floods and avoid certain social conflicts.

Justine Ultsch (geographer), ISTHME Ph.D student, University Jean-Monnet Saint-Étienne, CNRS – UMR 5600 Environment, City and Society.

What was the context for your research?

Covering the Furan meant that the now-underground river progressively became the main conduit for wastewater in the city (see Figures b and c). As a result, until recently, the ecosystem was severely degraded and remains anthropogenised to a large extent, a situation confirmed by the attribution of the "heavily modified water body" status to the section downstream of the city in the framework of Water framework directive (WFD) implementation.

Since 2004, the combined effect of major sanitation work to clean the Furan (with a 90% target compared to 10% previously) and efforts to manage flood risks, in a more general context of policies to restore urban rivers, led the city of Saint-Étienne to study the possible futures, both material and symbolic, for the river in a context of urban development (see Figure d).

To contribute to that study, I worked for the city of Saint-Étienne for a period of three years as an employee of the International resource and innovation centre for sustainable development (CIRIDD) in the framework of an Industrial contract for training through research (CIFRE) with the goal of preparing a geography and development thesis on changes in practices and discourse on the Furan from the end of the 1600s to the present, in order to shed light on the meaning and conditions of the potential restoration (Ultsch, 2010; Brenas *et al.*, 2009).

The objective of my task as a researcher on the Furan, reporting to the Water and sanitation department of the Roads and infrastructure directorate, was to understand the river in its many cross-cutting aspects. This was necessary given that the Furan was a central factor in a number of issues, as demonstrated by the many projects run by the various directorates of the city (roads, infrastructure, urbanism, cultural affairs, etc.) and by other stakeholders such as the Rivers department of the Saint-Étienne Métropole urban area.

In which fields were you particularly active?

This participant research was particularly active in four different fields:

- **environmental**, notably outreach efforts for sanitation work via different events (exhibitions, open-houses at the wastewater-treatment plant, underground visits along the Furan, etc.) and raising awareness about flood risks, notably in the history section of the interactive Urban information document on major hazards (DICRIM);
- **patrimonial**, including projects focussing on the river as a central component in the history of the city, with the *Ville d'art et d'histoire* prize and the Saint-Étienne municipal archives (publications, exhibitions, educational games, preparation of a geohistorical geographic information system, etc.);
- **urbanism**, via the inclusion of the river and its potential restoration in urban planning, strategic and regulatory documents (e.g. for a ZPPAUP¹), as well as in operational urban projects (renovation of squares, creation of a Furan-Furet educational train, etc.);
- **design**, in conjunction with the Cité du Design, involving an expanded study on the promotion of the river in the framework of the Design Biennial in 2008.

1. ZPPAUP, a protection zone for architectural, urban and landscape patrimony, an instrument now replaced by Areas for the promotion of architecture and patrimony (AVAP).

How was the work organised between managers and the researcher?

Initially, the work contributed to establishing in-depth geohistorical knowledge on the development and uses of the Furan in the urban development of Saint-Étienne over the long term (end of the 1600s to the present) by delving into specific archives. This knowledge, the groundwork for the research, was used in both the patrimonialisation process already under way for the Furan and in certain urban projects where the presence of the river can be mobilised in favour of the development policies.

Certain projects were developed jointly in a manager-researcher partnership, in response to both operational and scientific issues, for example the historical and geographic information system for the city of Saint-Étienne and the Furan River, called PGHASE (geohistorical project on the development of Saint-Étienne). This tool can be used for a diachronic depiction of development in Saint-Étienne and more specifically the hydrographic network, certain aspects of which continue to impact development projects.

How did your work contribute to operational management?

The presence of a researcher in the human and social sciences working on an "environmental" topic made it possible to remove barriers between the skills and responsibilities of the various directorates and to compare the knowledge and practices of each job sector, thus paving the way for a cross-cutting study of the Furan, both within the municipal services and without.

The multi-faceted study put us in a position to explore new groupings of stakeholders that were not in the habit of working together and, when the results were positive, to launch discussions on the outlook for restoring the Furan. The discussions were enhanced by a comparison of cities, occasionally networked, that had already undertaken efforts to daylight and restore, either physically and/or symbolically, their partially covered rivers.

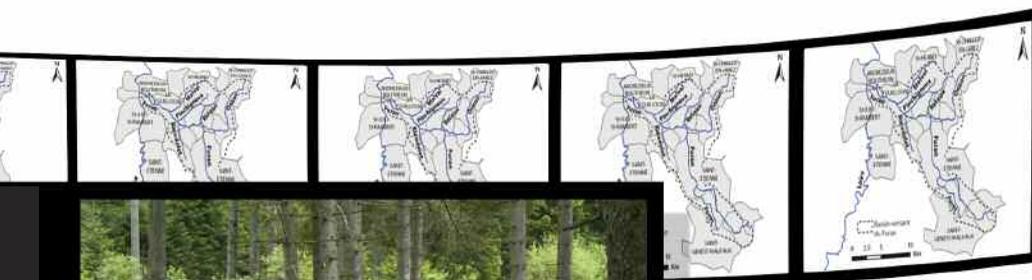
And the scientific contributions?

The research context, characterised by immersion in the services in the city of Saint-Étienne, made it possible to set up direct participant observation over a long period. The project was not only an opportunity to access new, complementary material providing information on the modifications to the river in Saint-Étienne, but also to acquire a more in-depth understanding of the decision-making processes involved in restoration and development projects. This action research is also said to be "participant" because, to various degrees, the researcher accompanied the changes and produced knowledge on those changes. This positioning encouraged the co-construction of the research topic by bringing into play the various forms of knowledge and related actions of the stakeholders involved.

Contact

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a

© Justine Ultsch, 2008

The Furon from upstream to downstream

Upstream of Saint-Étienne, in the Pilat mountains, at a place called Pont Sauvignet.



b

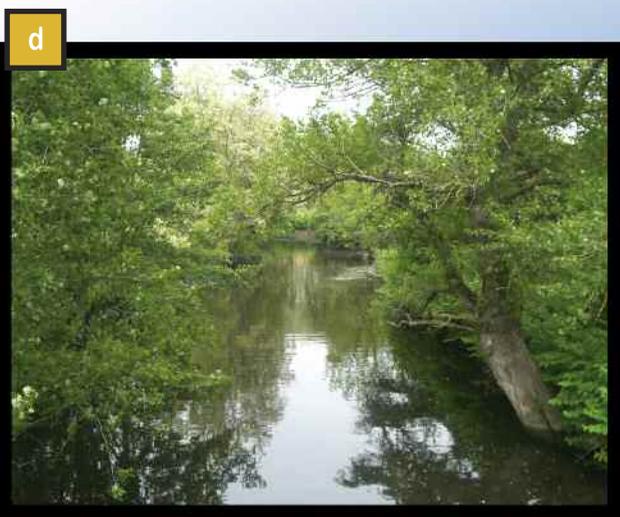
© Justine Ultsch, 2008

The Furon flowing through the Rivière quarter in Saint-Étienne.



c

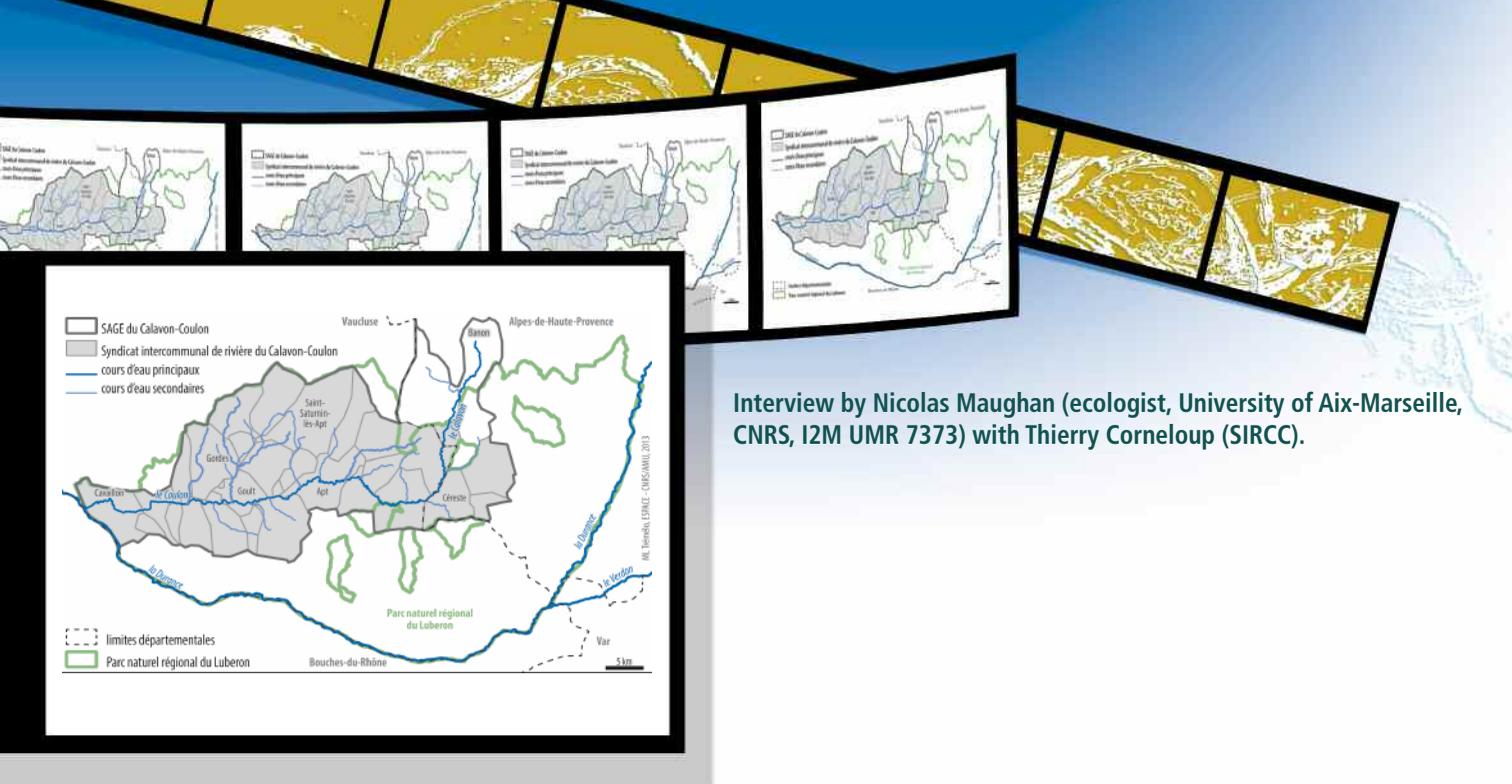
In the Valbenoîte section of Saint-Étienne, just before the river flows underground.



d

The Furon River just downstream of Saint-Étienne, at the outlet of the buried section, in the town of Fouillouse.

c,d © Justine Ultsch, 2008



Interview by Nicolas Maughan (ecologist, University of Aix-Marseille, CNRS, I2M UMR 7373) with Thierry Corneloup (SIRCC).

The Calavon-Coulon River basin

"Acknowledging perceptions is a daily and indispensable effort."

Introduction

The Calavon-Coulon is a Mediterranean river originating in the Alpes-de-Haute-Provence department at the base of Lure Mountain. It flows through the southern section of the Vaucluse department over a distance of 88 kilometres before joining the Durance River near the city of Cavillon, not far from Avignon. It drains a karstic basin of approximately 1 000 square kilometres and has the name Calavon in the upstream section and Coulon in the downstream section. Similar to many Mediterranean rivers, its management must take into account the scarcity of water during the summer and the large quantities during the fall and winter that regularly provoke flooding in the downstream section where the most urbanised parts of the river basin are located. The first management measures for the Calavon-Coulon were launched and implemented thanks to the initiative taken by the Luberon regional nature park, created in 1977, through which the river flows. These first efforts primarily concerned chronic pollution produced by the city of Apt (industrial emissions). It was following the severe flooding in Cavillon in January 1994 that the need for physical management of the river became evident and that the creation of a river board was proposed. Ten years later, in 2005, the founding documents for the Calavon-Coulon River Board were officially signed.

In the Rhône-Méditerranée-Corse basin, a total of over 40 sub-basin management plans (SBMP) have been established. The second SBMP for the Calavon-Coulon is now being ratified. The Flood-prevention plan (PPRI) for the Calavon-Coulon was finalised on 26 July 2002.

Thierry Corneloup, hired in 2006 as the director, set up the overall structure and managed the board until 2012. He is now a policy officer for "Water and aquatic environments" for the Provence-Alpes-Côte-d'Azur (PACA) region.

On the basis of your experience, could you tell us about the role played by perception issues in the environmental management of rivers?

The role of perception in my work was never precisely defined and formatted in a programme, for example an "Analysis of the perception of issues" on the basis of surveys and questionnaires. But in real life, in the actual management of projects, whether in putting together the governance of the river board with elected officials or in implementing measures to control flooding (notably work to protect and maintain river beds), we were obliged to strive for consensus and to explain to the population what we were doing and what we were not doing. This approach is more a part of the overall strategy of projects.

For example, my first job was to set up a river board capable of making elected officials, who had different views and policies concerning water issues, work together. During the preliminary phase of setting up the board, I spent a great deal of time on discussions enabling elected officials to express their expectations and explain in detail their perceptions concerning water management. There were differences in the ideas expressed by local residents and the elected officials, which suggested that a number of different features had to be included in the board. I would not say that a project must be approved unanimously, that is simply impossible, but there must be a certain degree of consensus, of approval, notably on the part of the local residents.

Why and how did you develop the study of perception issues?

It had already been done in a number of river basins in the Rhône-Méditerranée-Corse basin, prior to formulating SBMPs and at the end of each SBMP in order to obtain feedback. Due to my multi-disciplinary training, including sociological approaches, I am open to perception issues. And I attach a great deal of importance to this type of approach. Within the river board, though things were not formally organised, there was nonetheless, in the field, time for these issues. For me, there was a real need. That being said, an analysis of perceptions and an identification of "stakeholder interactions" did not take place prior to each project because we did not necessarily have time for that.

Concerning the human sciences, historians took part in preparing the PPRI. In this case, it was commissioned by the State. The purpose was to carry out a historical study in advance of the technical hydraulic work for the PPRI of the Vaucluse department. The study was based on a collection of images, post cards, interviews with stakeholders and local people. A film was produced to present the study. We participated in the film by supplying documents showing land use prior to the Second World War and current use of the floodable zones. The result was a diachronic approach and some very "expressive" documents.

I thought it was very worthwhile to put the history of the river basin into perspective. The study revealed the past management work and the creation of the various river boards over the centuries, as well as all the challenges they faced. That explained in part the difficulties encountered in establishing the current river board. It was also an occasion to highlight the patrimonial value of certain installations along the river. Those installations are currently a key element in discussions on ecological continuity and sediment transport... where different perceptions are in play.

We used the film in our management work, notably during meetings, as a means to initiate dialogue with the population and elected officials.

Are the local stakeholders accustomed and open to dialogue given that they are located in a regional nature park?

Concerning certain environmental projects, the answer is yes. It helps to be part of the regional nature park, because certain people are already highly aware of the impacts of infrastructure on natural environments. Conversely, for flood control, which in some cases requires major construction activities (see Figure a), the environmental-protection groups sometimes see our approach as contradictory. What is an advantage in some situations is a disadvantage in others.

There are a certain number of more or less influential non-profit associations in the Luberon regional park that were active participants in setting up the SBMP. I think it is very important to involve the population in preparing projects, but we must avoid creating expectations that we cannot meet, due to a lack of resources. That is what happened in 1994 after the floods. There were great expectations concerning a programme in which the public had participated. Then 15 years later, in 2008 when a major flood occurred, the population did not understand why the consequences were so terrible (see Figure b). Work had been begun, but the project as a whole was far from finished. The absence of communication on its progress had created "erroneous" perceptions and produced an impression of safety concerning the hazards involved, a dangerous situation when risks exist, whatever the level of work undertaken to minimise those risks.

Did you organise large meetings with all the stakeholders or did you prefer smaller meetings for specific groups?

We did both because people express themselves differently depending on the configuration. Initially, particularly following a crisis such as floods, it is important to bring everyone together. These meetings serve as an outlet for the anger and frustration. That is important. But afterwards comes the time for analysis and it is necessary to work in small groups. For example, that is what we did following the flood in 2008. We worked with people from the various flooded sections of town, often organised in associations, so that they could explain "what is OK and what is not" and so we could provide answers on what we could and could not realistically do. In this agricultural area, the issue of dredging was thus debated publicly and the proposals of the river board could be presented in detail and adjusted where necessary.

Were you satisfied with these efforts to encourage participation and what advice would you give to an organisation thinking about launching this type of process?

My goal was to carry out work, major construction projects in some cases, to prevent flooding. To that end, it was necessary to defuse the contentious points in the project by encouraging the local residents and the non-profit associations to participate. For example, we included the non-profit associations for flood victims who had been traumatised by the floods (see Figure c). We provided them with an opportunity to participate in the stakeholder-involvement process. That enabled us to defuse certain situations, to remain on schedule and to meet the set objectives. The same was true for the ecological value of the environment which was taken into account via the compensatory measures and the preservation of certain areas.

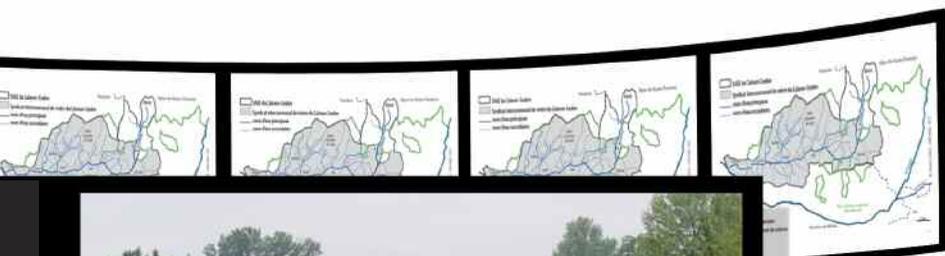
In terms of any advice I could give, practically speaking, I would say that it is necessary to organise meetings regularly with the local residents and stakeholders. In order to hear the different opinions and to explain our decisions and the factors justifying those decisions. The manager or the representatives of the entity involved locally in the project should be present. I truly think that a manager must be sociologically aware of the interaction between stakeholders. That is part of the day-to-day work, with elected officials, local residents and the non-profits. It is all part of the stakeholder-involvement process and the effort to communicate, to present the project. It is not only indispensable, but mandatory.

Contact

Internet site: <http://www.sircc.fr/>

Link to the film by Gilles Charensol and Denis Cœur:

<http://www.cimalpes.fr/Films-de-montagne-752-1258-0-0.html>



a

© T. Corneloup, 2011

Major construction to resize the river at Cavallon in 2011, which was contentious with environmental-protection groups and parts of the population.



b

© T. Corneloup, 2008

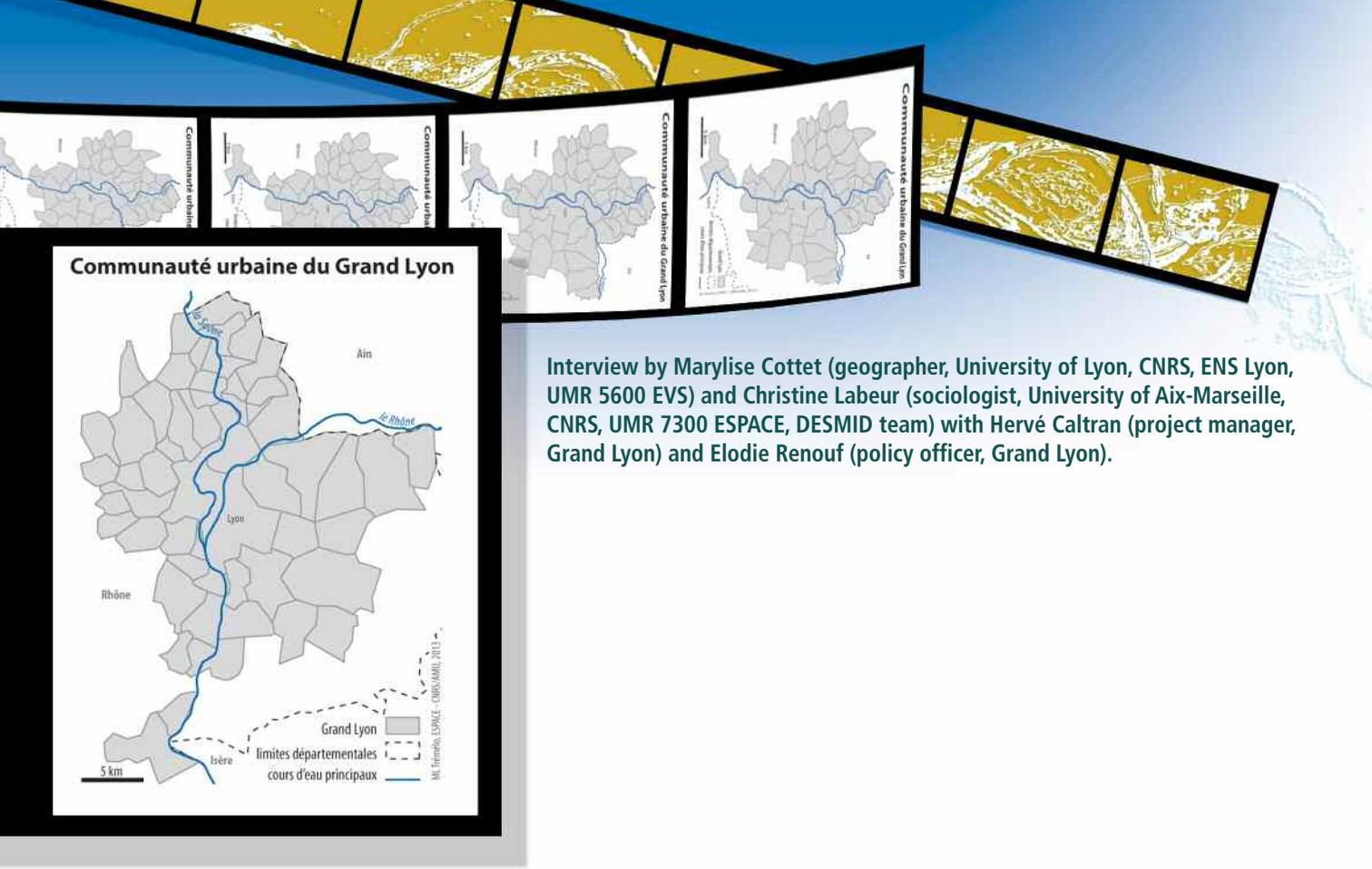
Flood of the Cavalon River in December 2008 in the town of Apt with traumatic consequences for the population.



c

© T. Corneloup, 2010

Public-engagement meeting in 2010, between elected officials and local residents.



Interview by Marylise Cottet (geographer, University of Lyon, CNRS, ENS Lyon, UMR 5600 EVS) and Christine Labeur (sociologist, University of Aix-Marseille, CNRS, UMR 7300 ESPACE, DESMID team) with Hervé Caltran (project manager, Grand Lyon) and Elodie Renouf (policy officer, Grand Lyon).

The Grand Lyon urban area

A new look at incorporating perceptions of rivers in urban areas

Introduction

Grand Lyon, the name of the Greater Lyon urban area, is an inter-municipal entity grouping 58 towns around Lyon. It is located in the Rhône department in the heart of the Rhône-Alpes region. Given the number of inhabitants (1.2 million), it is the largest public board for inter-municipal cooperation in France. It is active in a wide array of sectors affecting the daily life of residents, including water management. Grand Lyon has now adopted a proactive policy for sustainable development.

The area is crossed by two large rivers, the Rhône and its tributary, the Saône. There are also a multitude of smaller rivers in urban and peri-urban settings. Preservation of the quantity and quality of water resources is a prime issue within the Water directorate, where the work centres on drinking water and sanitation. The Grand Lyon urban area is also in charge of managing other issues related to aquatic environments, e.g. flood control and environmental preservation.

Hervé Caltran, project manager in the research department of the Grand Lyon Water directorate, and Élodie Renouf, policy officer in the unit for strategy and sustainable development in the same directorate.

On the basis of your experience, could you tell us about the context and the role of perception issues in the management of aquatic environments in your organisation?

Since the creation of the urban area, the work at the Water directorate has dealt with technical aspects concerning sanitation and drinking water. The role played by perception issues in the management of aquatic environments was slight, even non-existent. But there has been a change over the past few years. Grand Lyon now pays greater attention to the management of aquatic environments. For example, a plan for the political term, signed in 2008, repositioned aquatic environments as the central issue for our directorate. Even though, practically speaking, we continue to focus essentially on drinking water and sanitation, the importance of environments has grown. It is in this context that perception issues have started to emerge. With the development of opportunity studies and studies on project results, it is clear that more questions are now being asked about how people feel or see things. This increasing interest in perceptions recently took form in a new study initiated in 2010 by the Water directorate. It covers all the streams in the Grand Lyon urban area (see Figure a). It came into being due to the desire to mobilise elected officials around the issues of water management, stream daylighting and maintenance, in order to set up effective management on the river-basin scale, similar to that found in other inter-municipal river boards.

Tell us more about the study.

A consulting firm was hired to conduct the study. Initially, it consisted of a water-quality assessment that also focussed on flooding and on biodiversity. Our request, i.e. that of Grand Lyon, was to identify the important issues, to rank them and, on that basis, to make proposals on how we could manage rivers and streams. But above and beyond this technical diagnosis, we also wanted an assessment of sociological aspects (on perception), to show that our management approach, in fact a service, was approved by elected officials. For an issue to exist, there must first be a problem. The problem must also be expressed by a person or entity. If there is a problem with water quality, but no one cares, there is not an issue. If there is a problem with water quality and a non-profit association, an elected official or a stakeholder in the field repeatedly insists that "there is a problem", the problem becomes an issue and it is necessary to find an answer. The purpose of the study was to understand the expectations and the issues involved in the urban area. Issues can be defined and problems identified by listening to what people in the field have to say. The perception of people living along rivers and streams is not necessarily identical to that of technicians.

That is why we decided to directly question elected officials in the field to see how they perceive their rivers. The objective was to include the results in the aforementioned study. A questionnaire comprising 20 questions was drafted and sent to the 58 towns making up Grand Lyon (see Figure b). The instructions stipulated that the questionnaire was to be filled out by the mayor or a deputy mayor, not by the administrative or technical services of the town. The idea was then to process the answers statistically and to present them to the participants (see Figure c).

Were you satisfied with the results? What information did the perception study provide?

We were satisfied because we achieved a 50% return rate and because the instructions were followed.

To begin with, the study provided us with information on the local expectations throughout the area. The first conclusion has to do with the high response rates in towns confronted with runoff and flooding problems. Clearly, the elected officials respond when there are problems. That is fairly symptomatic. It would also appear that there are two types of towns that differ in terms of how they perceive rivers. The first group consists of towns that

see the presence of a river as beneficial, notably in terms of living conditions. For the second group, on the other hand, the presence of a river and the risk of flooding represents a constraint. The two groups however agree that they want Grand Lyon to manage the rivers and streams.

The meetings organised during the study also revealed the unexpected relationship that urban residents have with rivers. In cities and towns, there is no proprietary relation with a river, as is often the case in rural areas where the river passes through or along the property of the local residents. The latter may see the river as a constraint or as something positive. They may be more or less attached to the river. In cities and towns, there is an impression that the river does not belong to anyone. It is often located beyond property lines, in a public area, and can be culverted or blocked off. In which case no one will defend it or raise any questions about it. That is why it is all the more important to know the perceptions of the local residents in urban areas. And that explains why we must completely change our approach to subsequent work, for example when we want to restore a river or carry out maintenance work.

The last observation is that expectations concerning urban and peri-urban environments include a major "living conditions" component that we, the managers, never imagined. We became aware of it thanks to this study. It was interesting to note this more social perception that emerged during the overall analysis of the urban area. It provides a degree of perspective with respect to the regulatory aspects and technical approaches that this type of analysis can produce. As managers, we deal more with the technical aspects, with river hydraulics, water quality, biota, etc., but when we question the local residents in the field, they mention problems having to do with odours, the landscape and aesthetic aspects. There are truly differences between the approaches of technicians and local residents. As technicians, it is useful to see these issues in a fresh light, without any pre-determined opinions. This knowledge on perceptions is also a means for managers to become aware of their own perceptions and, with any luck, to adapt them in order to better deal with future, local issues. When a manager is subsequently called on to work on the restoration or the maintenance of a river in an urban area, it will be necessary to completely modify his approach and perception of rivers. This opportunity study revealed a new way of perceiving water management in an urban setting and will serve in our efforts to mobilise elected officials.

Contact

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communauté urbaine
GRANDLYON

a



An assessment study was carried out on the perception of urban streams and related issues in the Grand Lyon urban area.

The questionnaire below was sent to the towns in the Grand Lyon urban area as part of the assessment study on local streams.

b

ANNEXE 1 : Questionnaire

Gestion des ruisseaux non domaniaux du Grand Lyon
Enquête auprès des Maires - Avril 2011

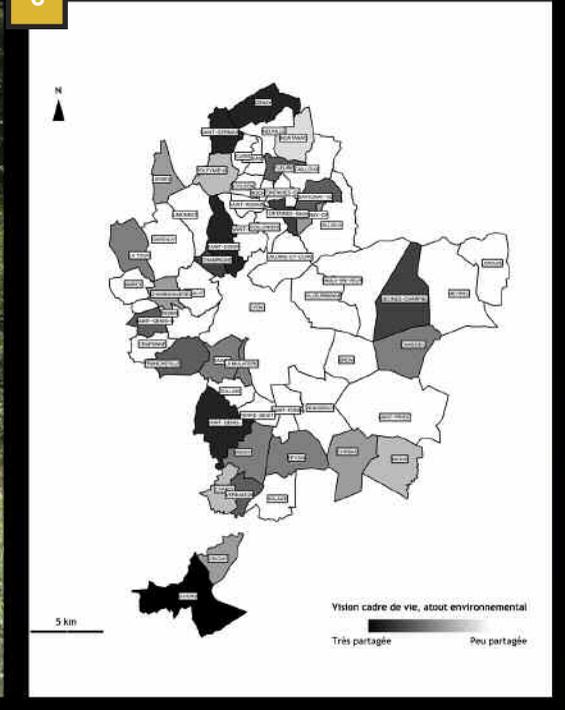
Commune :
Nom et fonction :

Entourez une ou plusieurs réponses.

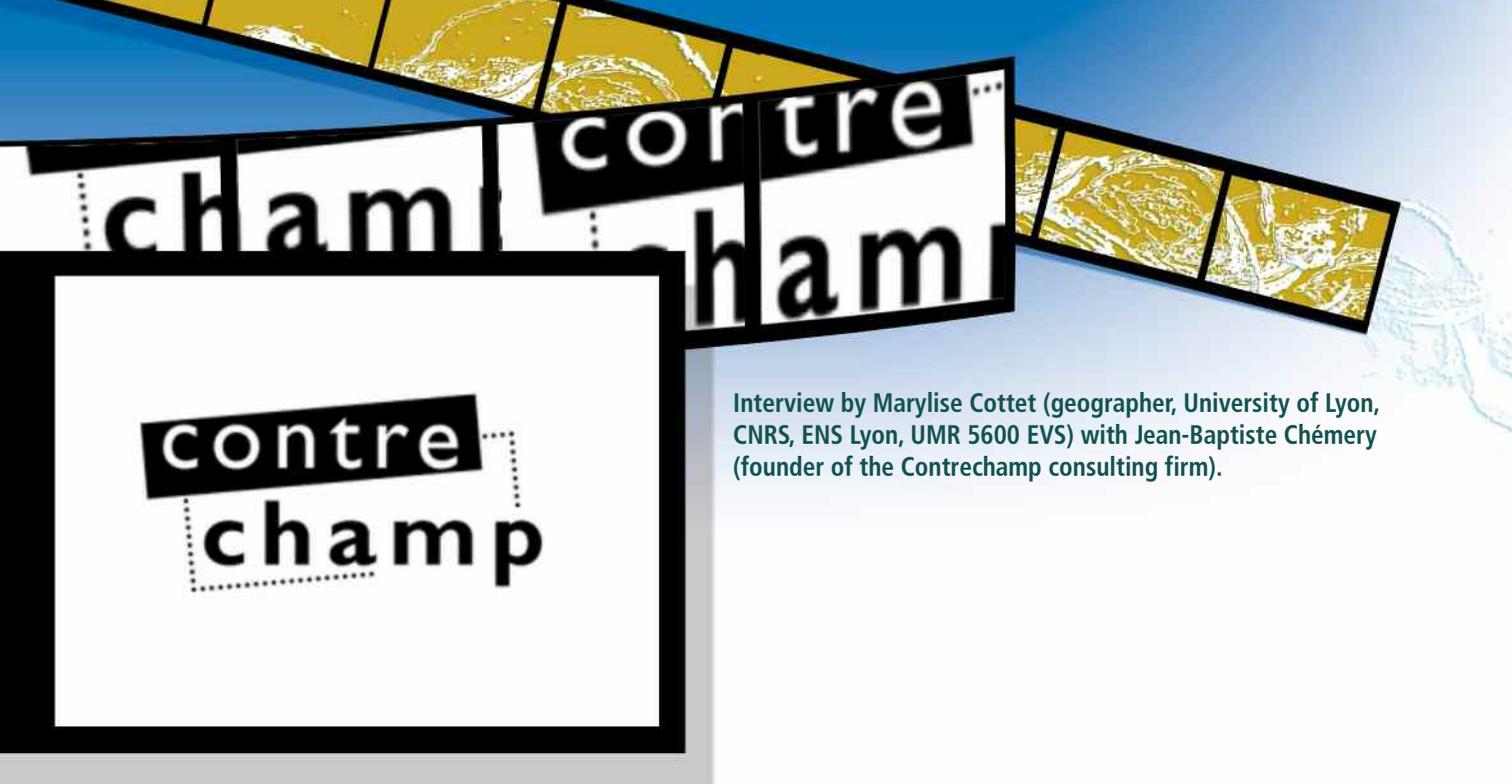
- Ma commune connaît des problèmes liés :
 - A. Aux ruisseaux (débordements)
 - B. Aux ruisseaux (autre ; précisez)
 - C. Aux ruissellements des parcelles agricoles
 - D. Aux ruissellements des sources
 - E. Pas de problèmes
- Je connais les ruisseaux et les ruissellements de ma commune (leur cheminement, les principaux problèmes qu'ils posent) :
 - A. Très bien
 - B. A peu près
 - C. Très mal
- Pour vous, un ruisseau ça peut-être :
 - A. Un cours d'eau avec un lit naturel ?
 - B. Un cours d'eau avec un lit canalisé ?
 - C. Un cours d'eau avec un écoulement permanent ?
 - D. Un cours d'eau avec un écoulement intermittent ?
 - E. Un fossé avec parfois de l'eau dedans ?
- Les ruisseaux sur ma commune :
 - A. Ne sentaient pas bons (comme les chats de Jacques Brel) alors on les a enterrés
 - B. Sont beaux, on aime s'y promener
 - C. Ont été oubliés alors ils se mettent en colère et se rappellent à notre bon souvenir
 - D. Un des rares lieux de nature sur notre territoire
- Ont-ils un intérêt pour la commune ?
 - A. Aucun ; terrain dévalisé, zone inondable
 - B. Paysagère/écologique
 - C. Cadre de vie : pêche, loisirs, promenade
- La première chose à laquelle je pense lorsqu'on me parle de ruisseaux, c'est :
 - A. Les travaux et problèmes que cela implique
 - B. Les procédures administratives à suivre pour mettre en œuvre toute action
 - C. Le coût que cela représente
 - D. La richesse écologique et la biodiversité que cela représente
- Les cours d'eau :
 - A. Il n'y a pas besoin de s'en occuper
 - B. C'est à la commune de s'en occuper
 - C. C'est aux riverains de s'en occuper
 - D. C'est au Grand Lyon de s'en occuper
- Sur ma commune :
 - A. J'ai des projets en cours en lien avec les ruisseaux
 - B. J'aimerais être mieux protégé des risques que représentent les ruisseaux
 - C. J'aimerais que les ruisseaux soient mieux valorisés pour l'environnement et le cadre de vie
- Sur ma commune, les ruisseaux :
 - A. N'intéressent personne
 - B. Intéressent quelques riverains pour des questions d'intérêts particuliers
 - C. Intéressent les pêcheurs et quelques associations « école »
 - D. Intéressent une part de la population pour qui le cadre de vie et l'environnement compte.
- Ce qui fait que les ruisseaux ou ruissellement posent problème :
 - A. L'évolution du climat
 - B. L'évolution de l'urbanisation
 - C. Les pratiques des riverains
 - D. Les pratiques des industriels
 - E. Les pratiques agricoles
 - F. Les contraintes liées à l'environnement / la pêche
 - G. Ils ne posent pas de problèmes

communauté urbaine
GRAND LYON

c



Map summarising the results of the questionnaire. The darker the colour, the more streams are perceived as positive elements in living conditions and as an environmental strong point for the town.



Interview by Marylise Cottet (geographer, University of Lyon, CNRS, ENS Lyon, UMR 5600 EVS) with Jean-Baptiste Chémery (founder of the Contrechamp consulting firm).

A consulting firm

What flexibility exists for managers to assert their own specific priorities and perceptions?

Introduction

Contrechamp is a small consulting firm founded in 1995 that supports and assesses public policies and territorial projects. It makes use of collective discussions, partnerships and stakeholder-involvement processes. It pays close attention to stakeholders and stakeholder dynamics in developing a socio-technical (study of the social conditions under which technical changes are carried out) and/or a socio-political approach (analysis of stakeholder interaction, partnerships, governance, etc.), based on close ties with the stakeholders in the supported or studied processes.

Contrechamp has specific experience in supporting and assessing landscape-management procedures concerning water and aquatic environments, e.g., sub-basin management plans (SBMP), river contracts, action programmes for flood prevention (PAPI), etc. The firm has also been active for a number of years in assessing public policies and systems, recently including various policies implemented by Water agencies (wetlands, maintenance and physical restoration of rivers, etc.). Contrechamp also carries out sociological studies, addressing both managers and beneficiaries of management on aquatic environments (Tille basins, Lake Bourget, Drôme and Arve Rivers, etc.).

Jean-Baptiste Chémery, geographer and sociologist, founder of the Contrechamp consulting firm.

In the current legislative and regulatory context governing the management of water and aquatic environments, how much freedom do managers have in implementing management projects?

On the basis of a dozen or so years devoted to assessing concerted management projects for water and aquatic environments on the scale of entire river basins (environmental contracts, SBMPs essentially in the Rhône-Méditerranée basin, see Figure a), our feeling is that the degree of freedom enjoyed by managers has undergone a significant change for various reasons.

Toward the end of the 1990s and early 2000s, the technical and financial partners tended to organise concerted management systems for each river basin. It may be said that the main issue at that time was to effectively ensure the political involvement and socio-technical management by establishing contractual relationships, e.g., environmental contracts or, more rarely, SBMPs. In this approach, most of the money put into these projects was devoted to improving water quality and funding expensive collective-sanitation services, which were undoubtedly a decisive factor in motivating elected officials to participate in these projects. Significantly less attention was paid to aquatic environments, where most projects dealt with traditional maintenance work on rivers (maintenance of riparian vegetation, removal of jamming material, etc.). The creation of teams comprising social-insertion workers for most of the maintenance work added a "social welfare" aspect to the projects that elected officials (and the population) appreciated, particularly in rural areas. Similarly, the inclusion of river-restoration projects targeting the landscape and the local tourism industry occasionally contributed to encouraging the participation of local governments (enhanced access to a river, creation of discovery trails, etc.). In this context, without going so far as to speak of true freedom, it may be said that the traditional and new expectations of local managers were largely taken into account.

Starting in the middle of the last decade, the implementation of the Water framework directive (WFD), which set new objectives for water policy in terms of the status of aquatic environments, contributed to changing the situation for managers and tended to reduce their freedom. First of all, the WFD, which is based on ecological quality criteria for which the local stakeholders involved in management work had no real say, led the technical and financial partners of the local managers to stipulate more precisely their priorities in order to achieve a higher degree of work effectiveness and consistency, thus reducing the room for proposals by the managers and their local partners. However, as is shown by the work to physically restore rivers and to manage wetlands (key aspects in the WFD programmes of measures), the complexity of the measures and the difficulty in determining their precise impact on the status of environments, in conjunction with new engineering techniques and the necessarily limited feedback, provided local managers with a degree of freedom in the face of the increasing constraints imposed by their regulatory and financial partners.

In this context, one may raise serious questions concerning the future freedom of managers of aquatic environments. It would seem that they must increasingly orient their work toward projects targeting more ambitious restoration objectives, in more or less close conjunction with precise regulatory frameworks, as is already the case for ecological continuity of rivers and the restoration of wetlands. This shift will be one of the key factors in obtaining public financing, if only to ensure the continued existence of the entities managing aquatic environments. Under these conditions, what freedom remains, now and in the future, for managers in asserting their specific priorities and perceptions? An analysis of the situation reveals that they can exploit two main possibilities.

■ The first, essentially technical in nature, deals with an engineering field that is still far from having an established set of guidelines. As we noted in one of our recent studies on the physical restoration of rivers (Rhône-Méditerranée-Corse Water agency, 2014), restoration projects continue to raise a number of questions, notably concerning the desired or reference morphodynamic status, that are rarely expressed, notably in terms

of the related human issues, or the acknowledgement of "self-restoration" capabilities in the given environment, in conjunction with the deadlines and spatial scales adopted in view of achieving good ecological status. In defining the objective of good ecological status, there are no standards determining the scope of a project and the general organisation must be adapted each time to the local situation. In this context, local managers, thanks notably to the technical and practical expertise of their technical personnel, have a real advantage that can be used to express and implement non-standard approaches to the management of aquatic environments.

■ The second is essentially political in nature. Above and beyond the issues related to aquatic environments, restoration and management projects can be seen as landscape-development projects, generally initiated or managed by local governments, in conjunction with other stakeholders (local residents, socio-economic stakeholders, non-profit associations, etc.). This is because the perceptions and practices that the latter put into question, the socio-economic interests that they disturb and the investments that they request make it impossible not to seek different forms of approval throughout the area. Without falling into a parochial vision of the issues, it may be said that these projects should be the result of agreements between local stakeholders, who are directly confronted with the compromises between public and private interests, within which the inclusion of the needs of natural environments may be seen as less important. The capacity of local stakeholders to produce shared guidelines based on sufficient cohesion represents another manner of constructing and integrating original outlooks in environmental management. This capacity is generally based on the existence of stakeholder involvement (or rather co-construction) systems and groups, integrating the viewpoints of the stakeholders more or less directly concerned (see Figures b and c). This means that the local managers must be in a position to identify the issues requiring work in these fields and to sufficiently expand the debates so that they are not confined to a strictly technical approach that would not be sufficient to inject meaning into the collective action.

It is by taking simultaneous action in these two segments, the technical and the political, that the positions of the managers and local stakeholders will find a means of expression and that reasonable management projects will come into being.

Contact

Contrechamp

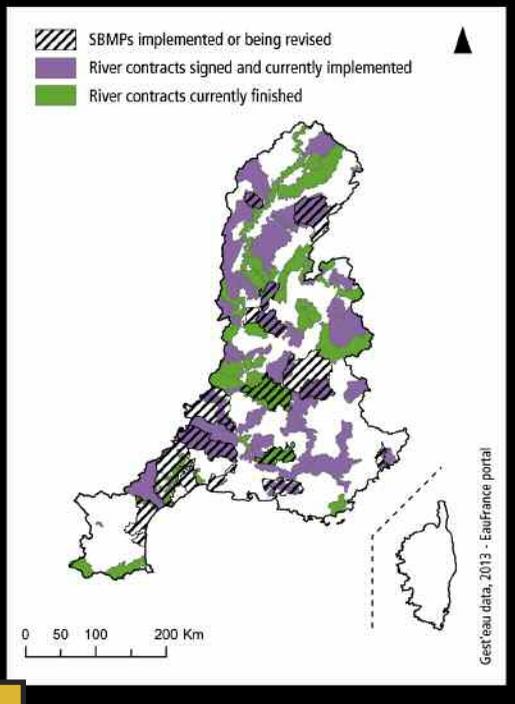
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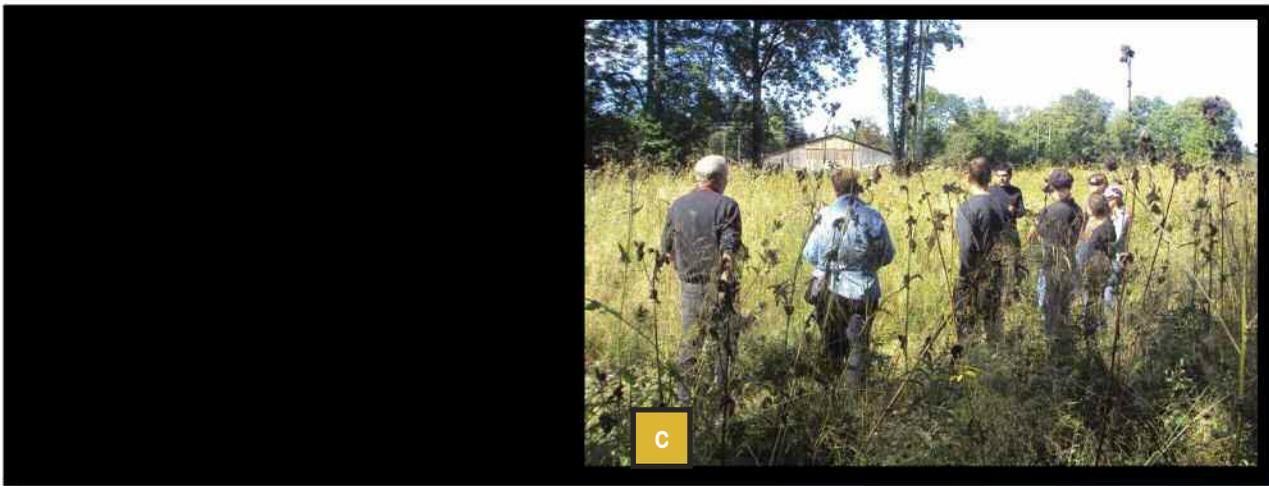
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Map of river contracts and SBMPs that are currently in progress or have finished in the Rhône-Méditerranée-Corse basin.

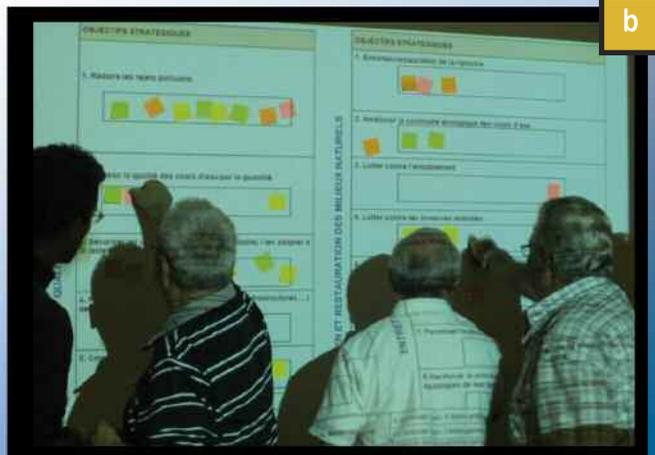
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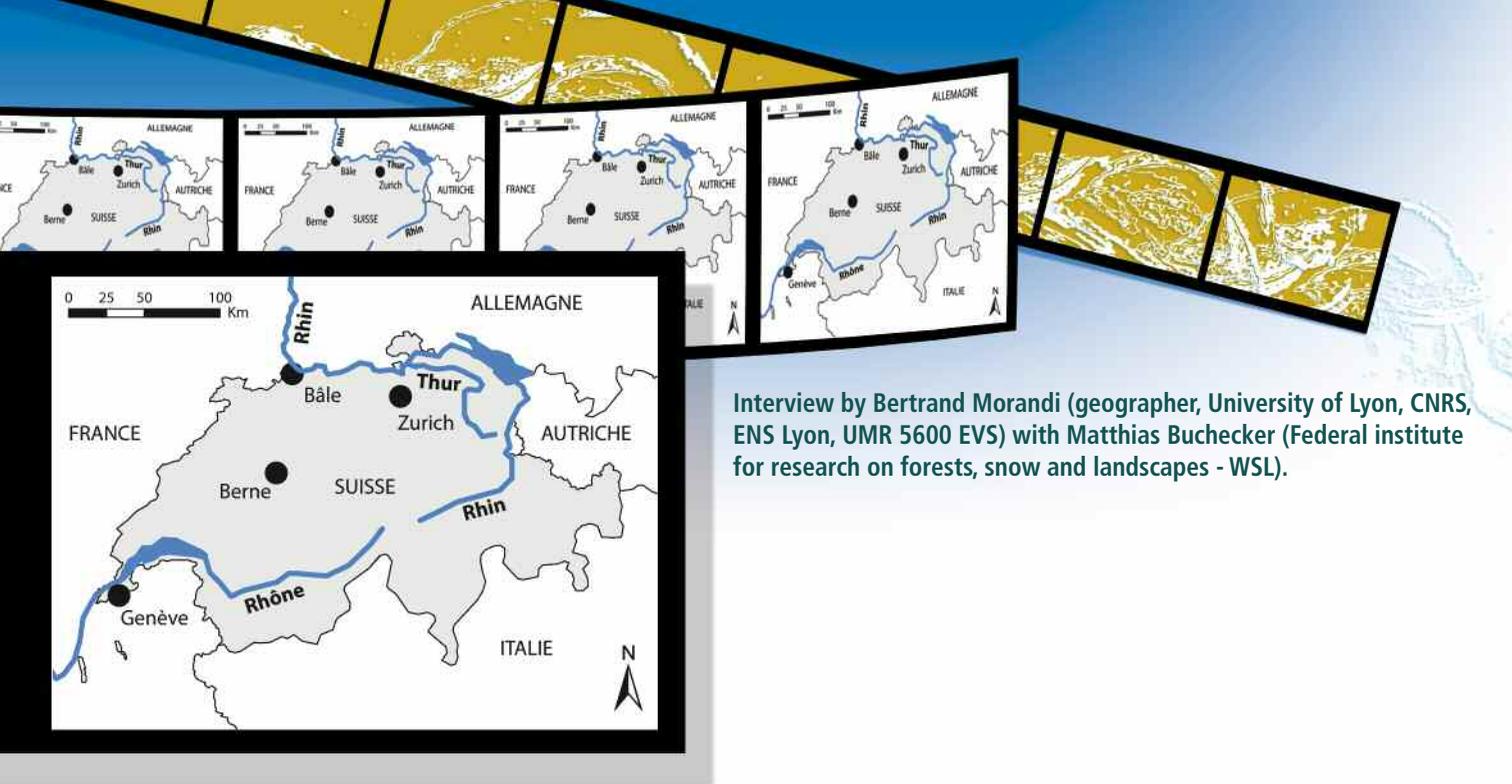
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▲
The capacity of local stakeholders to produce shared guidelines based on sufficient cohesion represents another manner of constructing and integrating respective perceptions in environmental management.



b

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Interview by Bertrand Morandi (geographer, University of Lyon, CNRS, ENS Lyon, UMR 5600 EVS) with Matthias Buchecker (Federal institute for research on forests, snow and landscapes - WSL).

Switzerland

The role played by local residents in river management, findings of empirical studies

Introduction

Since the end of the 1800s, river management in Switzerland and other parts of Europe was the exclusive domain of the engineers and public administrations working in the field of hydraulic engineering (Zaugg, 2002). Up until the 1980s, the main objective of river management consisted of structural measures targeting both flood protection and reclaiming land (Johnson & Priest, 2008).

During the 1990s, river management shifted toward an approach incorporating more river functions (ecology, recreational aspects, drinking water). The new, multi-disciplinary approach, expressly stipulated in Swiss water laws (the federal law on water protection, 1991) and in the European water framework directive (WFD, 2000), meant going beyond the technocratic approach implemented until then and greater involvement of the public. The new regulations explicitly call for the active participation of all the concerned stakeholders. However, they do not indicate which population groups must be consulted nor how they are to be involved. In Europe today, only the most powerful interest groups take part. Involvement is generally limited to setting up a procedure intended to acquire approval of the project (Höppner *et al.*, 2011). However, the scientific literature now recommends that the stakeholders use more "deliberative" participation procedures in order to improve projects and reinforce social learning processes (Muro & Jeffrey, 2008).

Matthias Buchecker, Ph.D in geography, project manager at the Federal institute for research on forests, snow and landscapes (WSL) in Switzerland. His work focusses in particular on public participation, the perception of natural hazards and social demands.

What are the results of the studies carried out on the perception of river-management projects in Switzerland?

A standardised survey of the Swiss population revealed that the people living near a river felt that its management was important to them and wished to participate in the planning process (Junker *et al.*, 2007). The persons polled see the rivers in the region where they live as recreational areas, as natural elements and familiar places and do not associate them with technological issues (canals), with successful engineering or with economic strategies (see Figure a). Consequently, they expressed a clear preference for the most natural river sites. A great majority declared that more space should be made available for rivers both in Switzerland as a whole and in their own region (Junker & Buchecker, 2008a). Concerning their role in river management, the study showed that the respondents wished to have a wide array of options, whether or not based on dialogue, putting them in a position to participate in planning river projects. Most of the people expressed a preference for the least interactive methods, e.g., information meetings and votes (see Figure b). In the list of stakeholder groups that could take part in project planning, the populations living near a river often wanted to be represented. This group of stakeholders placed fifth behind municipal authorities, environmental-protection groups, directly concerned farmers and property owners along the river, but ahead of cantonal authorities and fishing associations (Buchecker & Junker, 2013). Another study was conducted on a vast project to revitalise the Thur River. This project involved a number of interest groups and the residents living near the river. According to the study, the priority assigned to functional modifications by the project managers corresponded better to the priorities of the population than to those of the private interests (Hostmann *et al.*, 2005), notably in terms of reforestation, recreational areas and a reduction in agricultural activities. It thus appeared that the participation of people representing the population groups having an interest in the river could constitute a support base for broader implementation of projects.

In your opinion, what are the advantages of involving the population living near a river and other stakeholders?

Several empirical studies carried out in Switzerland have concluded that the involvement of both the local residents living near the river and the various stakeholders in river projects increases the positive reactions to river revitalisation and raises awareness concerning flood risks. An assessment was conducted on the advantages of involving residents living near a river in projects. It was based on the cross-sectional survey, mentioned above, of the Swiss population and addressed the revitalisation of rivers (Buchecker & Junker, 2013; Junker & Buchecker, 2008a). The results showed that the residents most satisfied by their involvement in a project were those who thought that river revitalisations were a particularly suitable solution for their region and who, consequently, actively support this type of management.

The residents who had a positive experience with a project also have stronger ties with the rivers in their region. They feel they are better informed on river management and are more aware of the advantages procured by revitalisation for flood protection. However, it is interesting to note that the residents most satisfied with the information received on past river-management projects are generally those who most benefited from the learning process. Another cross-sectional study was run on the Swiss population on the topic of projects to improve ecological conditions (Buchecker *et al.*, 2013b). It revealed that residents living near a river had a more favourable impression of river projects if they thought that the various stakeholders had been actively involved in planning the project.

There is also more empirical evidence of the positive effect that significant involvement of stakeholders has on the attitudes of participants. During recent studies in Switzerland, participatory management of projects on flooding were systematically assessed using quasi-experimental research models (Buchecker *et al.*, 2013a; Buchecker *et al.*, 2013b; Buchecker & Junker, 2013). The results repeatedly showed that the involvement of stakeholders, if it is correctly undertaken, produces advantages that go well beyond the acceptance of projects and a reduction in conflicts. The approval of stakeholders can even be increased for future river-management projects. Better yet, the essential values of participatory planning for a varied number of river-management projects produce effects in terms of social learning, particularly as concerns the importance of ecological improvements, in terms of raised awareness of flood risks and in terms of the confidence of stakeholders in collaborative planning (Buchecker *et al.*, 2013b).

In conclusion...

Legal frameworks in Switzerland and the EU require that the population be included in the management of water and aquatic environments, but do not clearly indicate which population groups should be involved nor how that should take place. The results of studies carried out by the Swiss federal institute (WSL) over the past ten years indicate that suitable involvement of interested local groups and of the people living near a river contribute to acceptance of the project and, over the longer term, to social learning processes that represent an indispensable basis for the sustainable development of regional natural resources.

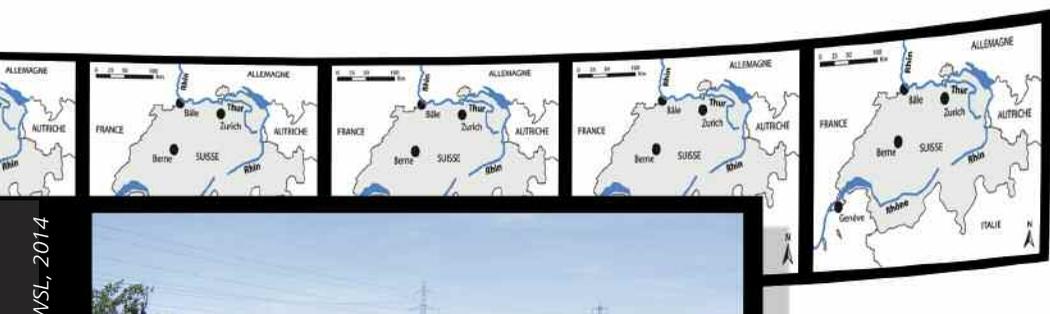
Information meetings should be organised for local residents so that the teams managing the project can provide detailed explanations and the public can immediately respond. Any interested person should have access to a number of tools enabling him or her to react to the project. To ensure successful project implementation, it is particularly recommended to include in the participatory planning process representatives of the people living near the river (an important interest group, but that often remains silent). In order to involve the local interest groups in the planning process, it is important that the overall approach include the long-term objectives. That requires early and regular integration of these groups throughout the planning process to enable discussions.

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a

A study carried out on the Swiss population revealed that rivers are more closely associated with the notion of nature than with that of technological prowess as symbolised by canals.

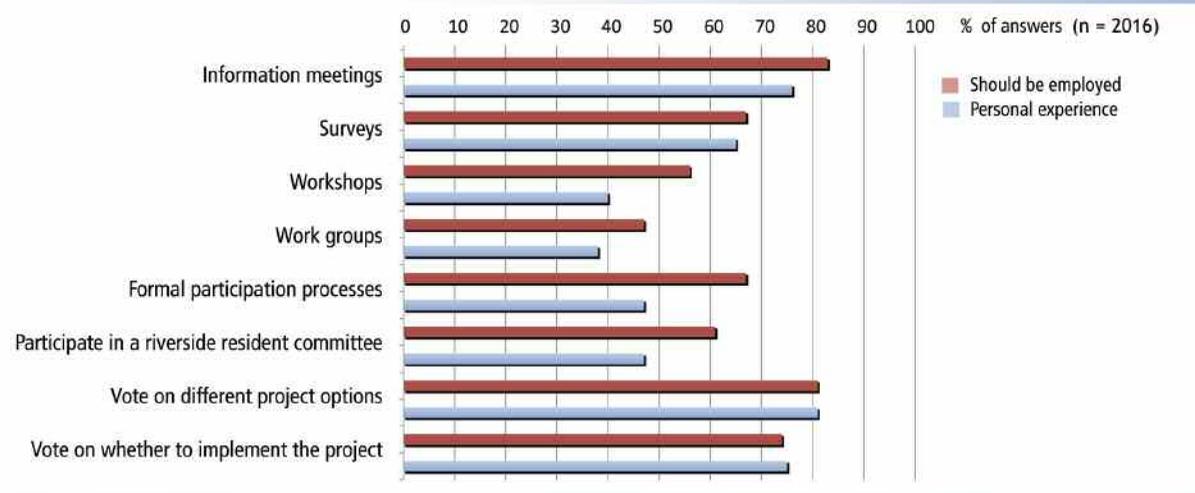
How important to you are the following characteristics of rivers?

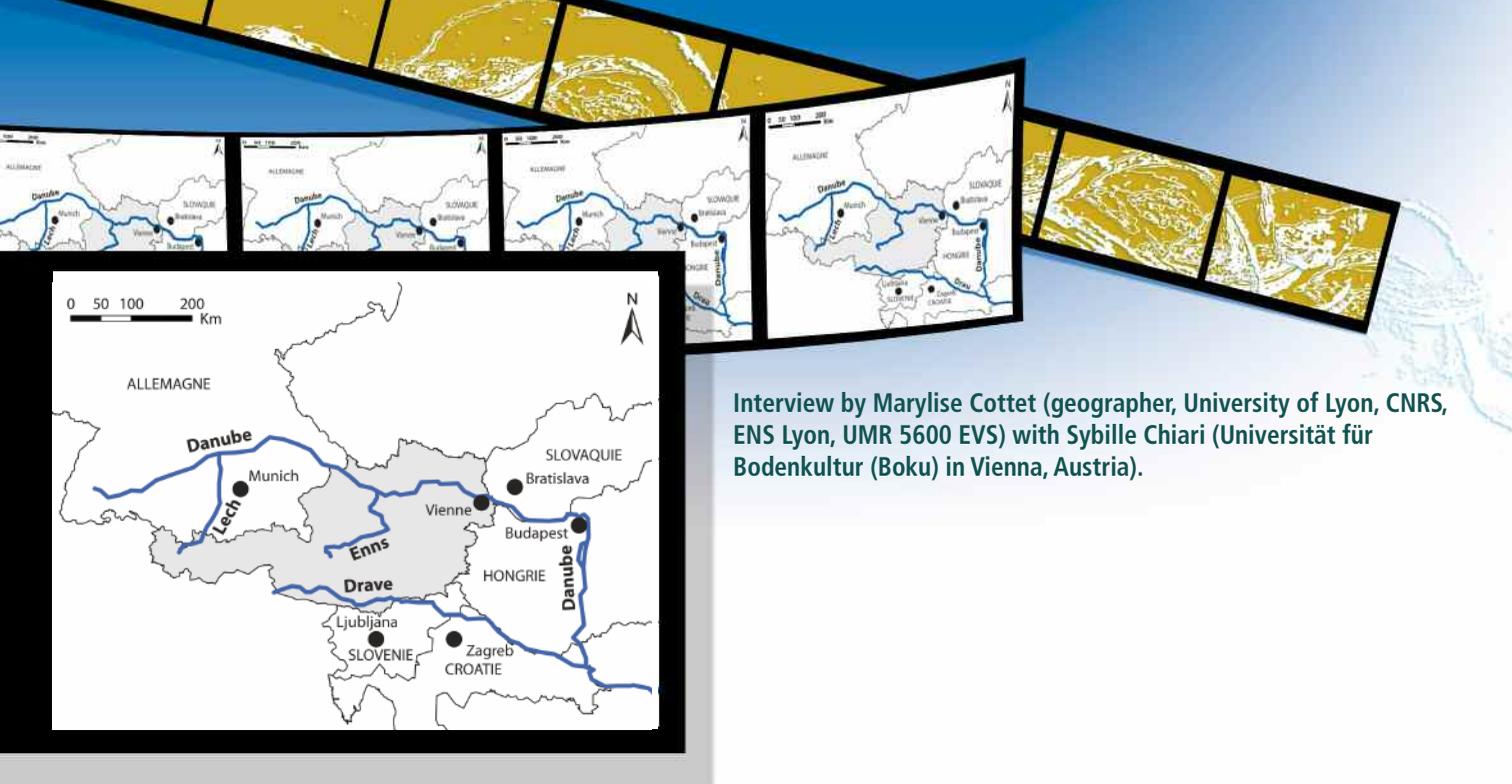


1. Very little importance, 2. Some importance, 3. Moderate importance, 4. Fairly high importance, 5. High importance

The study results show that the people living near a river wish to participate in planning projects in different manners ranging from information meetings to votes.

b





Interview by Marylise Cottet (geographer, University of Lyon, CNRS, ENS Lyon, UMR 5600 EVS) with Sybille Chiari (Universität für Bodenkultur (Boku) in Vienna, Austria).

Austria

The scenic value of Alpine rivers

Introduction

River recreation would appear to be an issue that has been neglected in river-management policies. Traditionally in Austria and in a number of other European countries, river management has included flood prevention, energy generation, fishing, reclamation of farm and building land, and more recently, ecological integrity. Recreational aspects were often neglected by river managers. They were seen as a secondary effect, i.e. the result of measures to preserve other essential aspects of rivers, for example the result of policy for ecological restoration.

However, recent programmes have acknowledged that rivers are essential for recreation, tourism and general well-being, and that the integration of recreational issues in planning work is indispensable if the negative ecological effects of those issues are to be avoided. What is more, the creation of recreational areas along rivers produces increasing awareness concerning the good status of rivers and reinforces the support and commitment of the public for conservation and restoration efforts. To take these issues into account in integrated management, studies on the preferences and needs of the people partaking in the recreational activities are required in view of developing suitable recreational infrastructure and planned tourism management that do not counteract the ecological objectives.

Sybillie Chiari, Ph.D, researcher at the Universität für Bodenkultur – Boku, in Vienna, Austria.

What makes river banks attractive to people?

Rivers have exceptional recreational potential in that they stimulate in different ways the senses of the people seeking recreation. Visual aspects, e.g., the beauty of the site and the surrounding nature, obviously enhance the experience (Junker & Buchecker, 2008; Kaplan, 1977). The acoustic environment, notably the lapping of the water, is particularly important for people wishing to relax. The haptic experience is also a central feature during activities along rivers, for example when people enter the water or when the water becomes a wild, manipulable and adaptable playground (Tunstall *et al.*, 2004; Tapsell *et al.*, 2001; Nicholson, 1971).

Among the various aspects characterising rivers, the biophysical qualities are a particularly important factor in the attractiveness of rivers. The clearness and the colour of the water are of course decisive elements (Smith *et al.*, 1995; Asakawa *et al.*, 2004). The morphology, discharge and corresponding quantity of visible sediment also play a role in the visual perception that people have of a river (Pflüger *et al.*, 2011; Brown & Daniel, 1991). However, preferences in terms of the discharge vary depending on the size of the river, an aspect that certainly has to do with safety issues. Pflüger *et al.* discovered that higher discharges are seen as more attractive for smaller rivers whereas more moderate to lower discharges are favoured for larger rivers (Pflüger *et al.*, 2011). These results concur with those concerning another fundamental biophysical component for healthy rivers, namely woody debris. In an international study involving students, the sites where wood was present were considered more natural, even if less aesthetic and more dangerous (Piégay *et al.*, 2005). It should also be noted that safety issues, for example perceived flood risks, considerably influence our perception of the scenic beauty of a site (Asawaka *et al.*, 2004). It would appear that there is also an innate "preference" for sites where trees and vegetation offer shelter, compared to sites where there is no vegetation (Asawaka *et al.*, 2004; Ulrich 1986; Kaplan & Kaplan 1989).

In short, an attractive riverscape must generate a feeling of safety, be sufficiently "legible" and organised, while retaining elements that satisfy our sense of mystery and involvement (Bulut *et al.*, 2009; Kaplan & Kaplan, 1989; Kaplan, 1977). In addition, it must be suitable for a wide range of activities (boating, fishing, bathing, picnics and sun bathing, among others).

On the basis of the studies that you have conducted on Austrian rivers, what is the landscape value of Alpine rivers?

A three-year study served to assess the landscape and recreational value of three Alpine rivers in Austria (the Drave, Enns and Lech Rivers) in view of analysing the synergies and any conflicts between the ecological and social functions of rivers (Chiari, 2010). The case studies covered an array of morphological sites, ranging from the vestiges of natural, braided rivers to restored sites and sites with highly regulated reaches. In addition to observations of the recreational activities along the rivers on days of heavy use, questionnaires were also submitted to 664 users. The survey included questions on their use of the site, their recreational and aesthetic preferences, and an assessment of photographs showing six different rivers, ranging from virtually natural to restored sites.

Over 90% of the people surveyed found the first set of natural scenes very attractive for recreational uses (see Figure a), whereas the second set of natural scenes was judged positively by only 50% (see Figure b). The judgements varied significantly among the users in the three case studies.

An analysis of the factors guiding these decisions showed that the perceived naturalness, combined with the potential for recreational activities, was the decisive element during the assessment. Other, more ambivalent landscape preferences for "wild" characteristics were identified among users, such as dead wood or gravel bars prevalent in the landscape. On the basis of the statements concerning naturalness, we assumed that a vast majority of users, particularly tourists, appreciate maintained, or rather regulated river sites. The study also showed

that the experience of users is considerably enhanced by factors concerning their own liberty of movement and an absence of restrictions. Most people confirmed that access to the water is an essential condition for recreational activities.

Concerning the recreational infrastructure (e.g. paths, seating, waste baskets), needs vary enormously depending on the questioned group. Older people appreciate standard equipment, namely picnic tables in order to take in the beauty of the landscape, whereas younger people particularly want safe access to the water, because their activities take place along the banks (skipping stones, wading, splashing in the water), and loose materials, e.g. sand, stones, vegetation, wood and water (see Figure c).

A spatial analysis of the usage-monitoring results revealed that the most heavily used sites were those that had been restored or were close to a natural state because they enabled access to the water and offered shallow areas and the presence of natural materials. What is more, we demonstrated a high, positive correlation between the number of recreational users and the presence of gravel. Even though large gravel bars are not seen as particularly aesthetic, they are well suited to most activities along a river. The distribution and intensity of activities depends to a large degree on the road and path networks linked to the site. The networks are a very effective means of guiding the public and steering recreational activities along rivers. The road and path networks must be taken into account as a whole when planning restoration measures in order to avoid any later conflicts with the ecological objectives.

In conclusion...

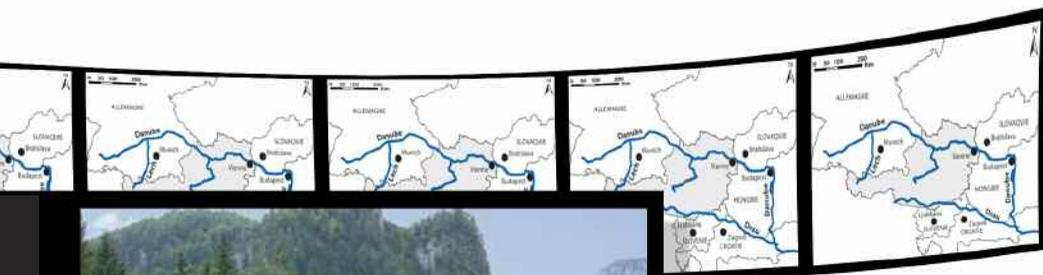
It is important to include recreational aspects in management processes. On the basis of these case studies, we have identified a rather high potential for synergy between the aesthetic and recreational values and the ecological needs. Balanced integration of these three issues over the long term depends on the integrated-management practices implemented and on the space available along damaged river reaches. Sufficient space is required to restore rivers, to make them more attractive, and to preserve the essential functions, including the ecological habitat functions, while avoiding any conflicts between the various issues.

It is necessary to implement integrated-management procedures that take into account, right from the start of the planning stage, both the ecological and socio-economic aspects. For example, listing the values and services that a river has to offer, including not only the ecological, but also the scenic and recreational elements, and then determining the priorities in a participatory manner for the river basin as a whole, could help in improving the values and services offered by rivers over the long term.

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a

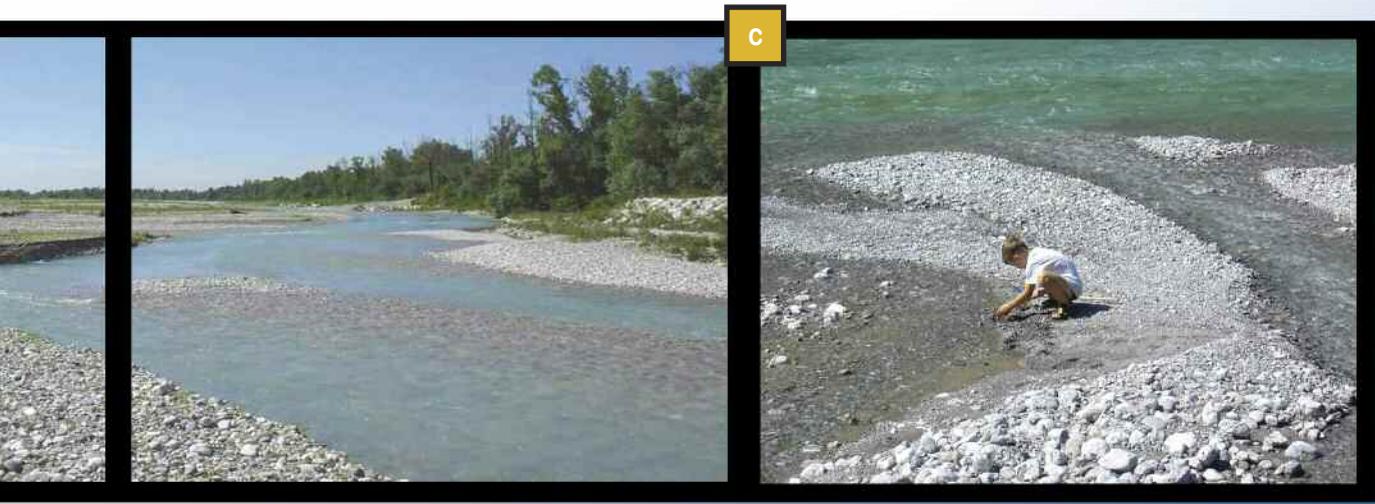
A natural site on the Enns River in the Gesäuse national park, in the Austrian Alps.



b

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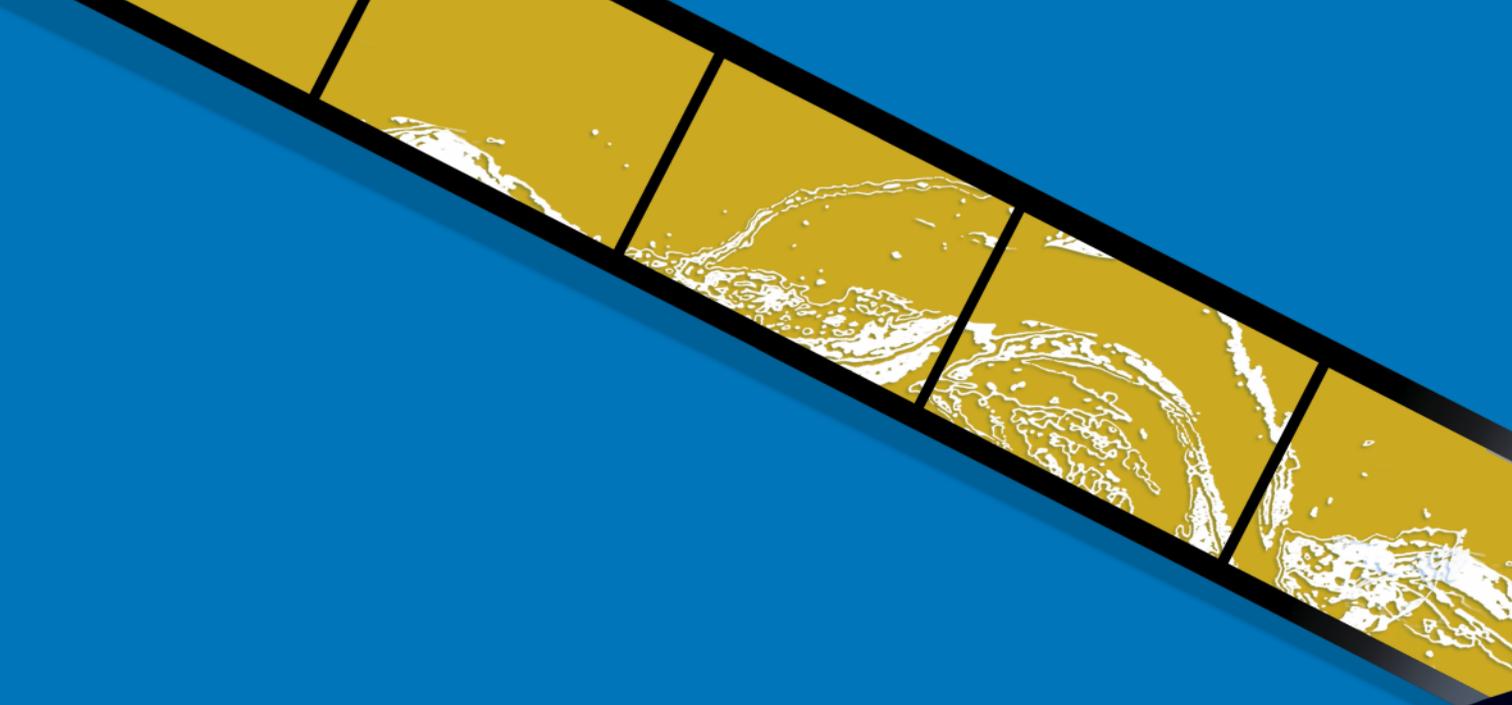
One of the last braided river reaches in Austria, on the Lech River.



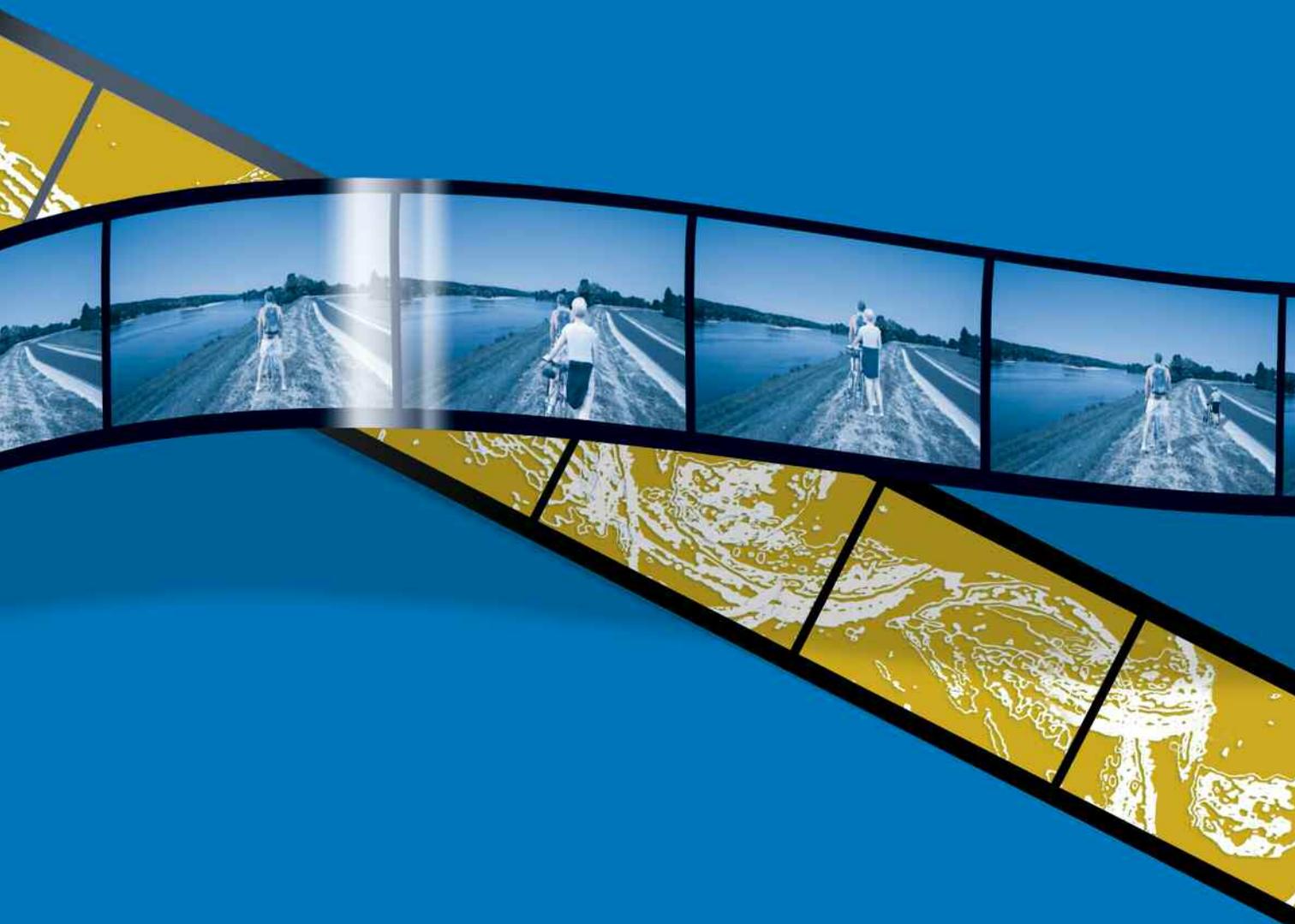
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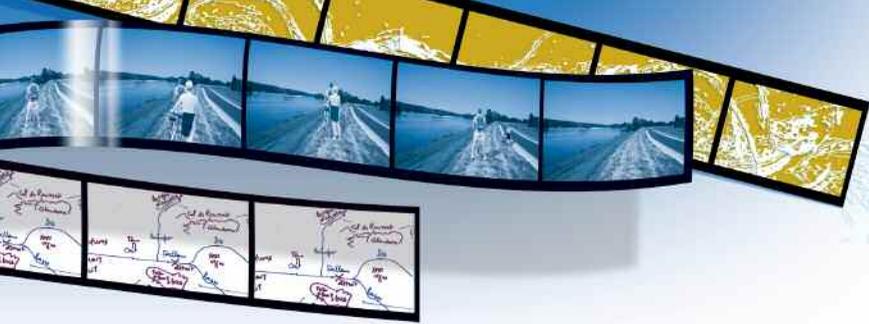
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Large gravel surfaces are well suited to most activities along a river.



Bibliography





- AGENCE DE L'EAU RHÔNE MÉDITERRANÉE CORSE, 2012, *Évaluation de l'incitativité des interventions de l'Agence de l'eau auprès des collectivités locales dans le domaine de la restauration physique des cours d'eau et des plans d'eau sur le bassin Rhône Méditerranée*, Contrechamp / EMA Conseil / ACTeon, Rapport d'évaluation et de recommandations, Avril, 92 p.
http://www.eaurmc.fr/aides-et-redevances/le-programme-daction-2013-2018/documents-devaluation-et-impact-sur-la-politique-dintervention.html?elD=dam_frontend_push&docID=2625
- AH-LEUNG S., 2010, *État des lieux et diagnostic biodiversité des zones humides du ried de la Zorn*, Mémoire de Master 2, Université de Lyon, 84 p.
- AH-LEUNG S., *in prep.*, *Condition d'adoption des objets de nature en milieu urbain : analyse des effets sociaux, techniques économiques et organisationnels de l'introduction d'un système de gestion et de traitement des eaux urbaines pluviales à base de filtres plantés de roseaux*, Thèse de doctorat en préparation, INSA de Lyon.
- ANDRE Y., 1998, *Enseigner les représentations spatiales*, Paris, Anthropos – Economica, 254 p.
- ARBORIO A.-M. et FOURNIER P., 1999, *L'enquête et ses méthodes : l'observation en direct*, Paris, Nathan Université, 127 p.
- ASAKAWA S., YOSHIDA K. et YABE K., 2004, Perceptions of urban stream corridors within the greenway system of Sapporo, Japan, *Landscape and urban planning*, 68(2), p. 167-182.
- ASSOCIATION RIVIÈRES RHÔNE-ALPES (ARRA), 2007, *Communication et sensibilisation dans le cadre des contrats de rivière. Quelques repères à partir d'un recueil d'expérience en Rhône-Alpes*, Cahier technique n° 2, avril, 36 p. [http://www.riviererhonealpes.org/fichiers/cahiers/\[86\]CT_n_2_Communication_petit1.pdf](http://www.riviererhonealpes.org/fichiers/cahiers/[86]CT_n_2_Communication_petit1.pdf)
- AVRAMI E., RANDALL M. et DE LA TORRE M., 2000, *Values and heritage conservation*. Research report, The Getty Conservation Institute, Los Angeles, 100 p.
http://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/valuesrpt.pdf
- BARDIN L., 1977, *L'analyse de contenu*, Paris, PUF, 233 p.
- BARROW H. G. et TENENBAUM J. M., 1986, Computational approaches to vision, in BOFF K.R., KAUFMAN L., THOMAS J.-P. (ed), *Handbook of perception and human performance*, New-York, John Wiley and Sons.
- BAUTIER R.-H., 1968, La phase cruciale de l'histoire des archives : la constitution des dépôts d'archives et la naissance de l'archivistique, XVI^e- début du XIX^e siècle, *Archivum*, t. 18, p. 139-150.
- BÉRARD L. et MARCHENAY P., 2006, L'activité piscicole dans les étangs de la Dombes, *Séminaire « qualité, environnement, marché »*, INRA SAD.
- BERELSON B., 1952, *Content Analysis in Communication Research*, New York, The Free Press, 220 p.
- BERQUE A., 1995, *Les raisons du paysage. De la Chine antique aux environnements de synthèse*, Paris, Hazan, 190 p.
- BERTHIER N., 2010, *Les techniques d'enquête en sciences sociales. Méthodes et exercices corrigés*, Paris, Armand Colin, 350 p.

- BERTRAND C. et G., 2002, *Une géographie traversière. L'environnement à travers territoires et temporalités*, Paris, Arguments, 311 p.
- BERTRAND C. et G., 1992, *Territorialiser l'environnement : un objectif pour la géographie*, Toulouse, Institut Daniel Faucher, Géodoc, n°36, p. 1-17.
- BEURET J.-E., 2006, *La conduite de la concertation. Pour la gestion de l'environnement et le partage des ressources*, Paris, l'Harmattan, 339 p.
- BLANCHET A. et GOTMAN A., 1992, *L'enquête et ses méthodes : l'entretien*, Paris, Nathan, 125 p.
- BLOUIN-GOURBILIÈRE C., 2013, *L'élaboration d'images « habitantes » : un levier participatif d'aménagement du territoire. Le cas du Parc naturel régional de la Brenne*, Thèse de doctorat, Université d'Angers, 628 p.
http://hal.archives-ouvertes.fr/docs/00/87/37/06/PDF/These_Blouin_version_finale.pdf
- BONERANDI E., 2005, Le recours au patrimoine, modèle culturel pour le territoire ?, *Géocarrefour*, vol. 80/2, p. 91-99. <http://geocarrefour.revues.org/991>
- BONIN S., 2001, Les paysages et représentations dans les guides touristiques. La Loire dans la collection des guides Joanne, Guides Bleus (1856 à nos jours), *l'Espace géographique*, 2, p. 11-126.
<http://www.cairn.info/revue-espace-geographique-2001-2-page-111.htm>
- BONNET C., GHIGLIONE R. et RICHARD J.-F. (dir.), 1989, *Traité de psychologie cognitive, Vol. 1, Perception, Action, Langage*, Paris, Dunod, 266 p.
- BOUNI C., 2014, Comment développer un projet ambitieux de restauration d'un cours d'eau ? Retours d'expériences en Europe, un point de vue des sciences humaines et sociales, Onema, Collection Comprendre Pour Agir 28 p. <http://www.onema.fr/IMG/pdf/Cerceau.pdf>
- BOURDIN L., STROFFEK S., BOUNI C., NARCY J.-B. et DUFOUR M., 2011, *Restauration hydromorphologique et territoires : concevoir pour négocier, Guide technique SDAGE. Restaurer et préserver les cours d'eau*, Agence de l'eau Rhône-Méditerranée & Corse, 108 p.
<http://www.documentation.eaufrance.fr/entrepotsOAI/AERMC/R156/66.pdf>
- BRENAS I., SANQUER C. et ULTSCH J., 2009, *La rivière Furan. Histoires, mémoires, devenir*, Saint-Étienne, Ed. Ville de Saint-Étienne, collection Trames urbaines, 73 p.
- BROWN T. C. et DANIEL T. C., 1991, Landscape aesthetics of riparian environments: relationship of flow quantity to scenic quality along a wild and scenic river, *Water Resources Research*, 27(8), p. 1787-1795.
- BRUYERE A., ULTSCH J. et VICTOR N., 2009, Élaboration d'un SIGéo-historique sur la ville de Saint-Étienne et la rivière du Furan, *Géomatique Expert*, n°66, Décembre-Janvier, p. 58-65.
- BUCHECKER M., MENZEL S. et HOME R., 2013b, The contribution of participatory flood and river management to stakeholders' social capacity building, *Nat. Hazards Earth Syst. Sci.*, 13 p. 1427-1444.
- BUCHECKER M. et JUNKER B., 2013, Was ist der Mehrwert von partizipativen Planung von Flussrevitalisierungen? *Naturschutz und Landschaftsplanung*, 45, 10/11, p. 227-334.
- BULUT Z. et YILMAZ H., 2009, Determination of waterscape beauties through visual quality assessment method, *Environmental monitoring and assessment*, 154(1-4), p. 459-468.
- BURNOUF J. et CHOUQUER G., 2008, L'archéologie et l'archéogéographie : pour comprendre l'espace et ses héritages, in DEMOULE J.-P. et STIEGLER B. (ed.), *L'avenir du passé. Modernité de l'archéologie*, Paris, La Découverte, p. 93-104.
- BURNOUF J., GUILHOT J.-O., MANDY M.-O. et ORCEL C. (dir.), 1991, *Le pont de la Guillotière, franchir le Rhône à Lyon*, Lyon, ALPARA, Documents d'Archéologie en Rhône-Alpes et en Auvergne (DARA n°5), 196 p.
- CHASTEL A., 1986, La notion de patrimoine, in NORA P., *Les lieux de mémoire*, Paris, Gallimard, tome II, volume 2, p. 405-450.
- CHIARI S., 2010, *Raumbedarf für Multifunktionale Flusslandschaften. Potentielle Synergien zwischen ökologischen Erfordernissen und den Bedürfnissen der Freizeit- und Erholungsnutzung*, Dissertation, University of Natural Resources and Life Sciences, Vienna, 219 p.

- CHOAY F., 1988, *L'allégorie du patrimoine*, Paris, Seuil, 272 p.
- COMBY E., 2013, Les discours de presse sur les reconquêtes du Rhône lyonnais (2003-2010), *Géocarrefour*, 88 (1), p. 31-43. <http://geocarrefour.revues.org/8917>
- COMBY E., 2011, *Le Rhône sous presse lyonnaise (2003-2010)*. Mémoire de Master 2, ENS de Lyon, 133 p.
- COMBY E., LE LAY Y.-F. et PIÉGAY H., 2012, La presse, une source pour l'étude spatiale et temporelle des attitudes. Potentialités et outils d'analyses des discours sur les crues, *Actes des Dixièmes Rencontres de Théo Quant*, 16 p. <http://thema.univ-fcomte.fr/theoq/pdf/2011/TQ2011%20ARTICLE%205.pdf>
- CONSERVATOIRE RÉGIONAL DES ESPACES NATURELS RHÔNE-ALPES (CREN), 2009, *Une démarche de concertation pour la gestion du patrimoine naturel*, Les Cahiers Techniques, 24 p. <http://www.cen-rhonealpes.fr/images/stories/documents/CTpdf/cahiertechnique/CTconcertation.pdf>
- COTTET M., 2011, La médiation paysagère : mieux faire le lien, dans la gestion, entre les enjeux écologiques et sociaux, *Zones Humides Infos*, dossier « Le paysage en zone humide », 3-4^{ème} trimestre, n°73-74. http://www.snpn.com/IMG/pdf/ZHI_73-74_Paysage_en_zone_humide_Web.pdf
- COTTET M., 2010, *La perception des bras morts fluviaux : le paysage, un médiateur pour l'action dans le cadre de l'ingénierie de la restauration. Approche conceptuelle et méthodologique appliquée aux cas de l'Ain et du Rhône*, Thèse de doctorat, Université Jean Moulin Lyon 3, 336 p. + Annexes. <http://tel.archives-ouvertes.fr/docs/00/55/51/46/PDF/these.pdf>
- D'ARCO S., 2012, *Les objets de nature dans la ville : fabrication et mobilisation, étude de deux parcs publics de l'agglomération lyonnaise intégrant des techniques de gestion alternative des eaux pluviales*, Mémoire de master 2, EVS-ITUS, INSA de Lyon.
- DASSONVILLE N., VANDERHOEVEN S., GRUBER W. et MEERTS P., 2007, Invasion by *Fallopia japonica* increases topsoil mineral nutrient concentrations, *Ecoscience*, 14, p. 230-240. <http://www.ecoscience.ulaval.ca/fr/paper/invasion-by-fallopia-japonica-increases-topsoil-mineral-nutrient-concentrations>
- DE CARRARA S. et LE LAY Y.-F., 2010, Produire la norme et l'espace : les paysages de l'eau et de l'arbre dans les recueils des usages locaux, *Séminaire « Géographie & Droit – Géographie du Droit - 2^e session »*, organisé par l'UMR 8586 PRODIG, 3-4 décembre, Carcassonne.
- DE FRANCE C., 1989, *Cinéma et Anthropologie*, Paris, éd. de la Maison des Sciences de l'Homme, 400 p.
- DERIOZ P., BERINGUIER P. et LAQUES E., 2010, Mobiliser le paysage pour observer les territoires : quelles démarches pour quelle participation des acteurs ? *Développement durable et territoires*. Vol. 1, n°2.
- DE ROUX E., 1994, Un entretien avec Pierre Nora, *Le Monde*, mardi 29 novembre, p. 2.
- DESVALLÉES A., 1995, Émergence et cheminements du mot patrimoine, *Musées et collections publiques de France*, 208, p. 6-29.
- DIBIE P., 2006, *Le village métamorphosé : révolution dans la France profonde*, Paris, Plon, Collection Terre Humaine, Plon, 406 p.
- DI MEO G., SAUVAITRE C. et SOUFFLET F., 2004, Les paysages de l'identité (le cas du Piémont béarnais, à l'est de Pau), *Géocarrefour*, 79/2, p. 131-141. <http://geocarrefour.revues.org/639>
- DOURNEL S., 2010, *L'eau, miroir de la ville : contribution à l'étude de la requalification urbaine des milieux fluviaux et humides (Bassin parisien, Amiens, Orléans)*, Thèse de doctorat en géographie, aménagement, environnement, Orléans, Université d'Orléans, 679 p. http://tel.archives-ouvertes.fr/docs/00/92/59/25/PDF/These-en-ligne_Sylvain-Dournel.pdf
- DOURNEL S., FRANCHOMME M. et SAJALOLI B., 2011, Géohistoire d'une résurgence d'eaux troubles : les milieux humides urbains et les cités fluviales de la France du Nord (début XIX^e – XX^e siècle), in *Actes du 3^e colloque international du Groupe d'Histoire des Zones Humides, Zones humides et villes d'hier et d'aujourd'hui : des premières cités aux fronts d'eau contemporains* (Valenciennes, 25-27 mars 2010), *Revue du Nord*, hors-série n°26, collection Histoire, p. 169-187.
- DOURNEL S. et SAJALOLI B., 2012a, Bains, guinguettes et tourisme fluvial en Val d'Orléans, in DAVODEAU H. (coord.), *Rapport du programme Patrimoines et trajectoires paysagères des vallées ligériennes* (2010-2012), chapitre 4, INHP d'Angers, p. 110-131. <http://hal.archives-ouvertes.fr/docs/00/78/87/50/PDF/PATRA.pdf>

- DOURNEL S. et SAJALOLI B., 2012b, Les milieux fluviaux et humides en ville, du déni à la reconnaissance de paysages urbains historiques, *Urban History Review/Revue d'Histoire Urbaine*, vol. 41, n°1, p. 5-21.
<http://urbanhistoryreview.ca/abstractfrench.html>
- DROZ Y. et MIEVILLE-OTT V. (dir.), 2005, *La polyphonie du paysage*, Lausanne, Presses polytechniques et universitaires romandes, 227 p.
- DROZ Y., MIEVILLE-OTT V., SPICHIGER R. et FORNEY J., 2005, *Le champ du paysage. Représentations paysagères et processus de légitimation des usages sociaux du paysage. De la Vue-des-Alpes au Pays-d'Enhaut*. NRP 48 « Landscapes and Habitats of the Alps », Final scientific report, 67 p.
- DUPONT N., VALY J. et INSERGUET J.-F., 2008, Les logiques d'urbanisation dans les plaines alluviales du bassin versant de la Vilaine (Bretagne, France), *Environnement urbain*, 2, p. 21-32.
<http://www.erudit.org/revue/eue/2008/v2/n/019219ar.pdf>
- DUPONT N. (dir.), 2012, *Quand les cours d'eau débordent. Les inondations dans le bassin de la Vilaine du XVIII^e siècle à nos jours*, Rennes, PUR, 268 p.
- FLAMINIO S., 2012, *De l'Yzeron perdu à l'Yzeron retrouvé, du côté des riverains inondés, perceptions et représentations de l'Yzeron et de sa restauration à Oullins et à Sainte-Foy-Les-Lyon*, Mémoire de Master 2, ENS de Lyon.
- FREMONT A., 1976, *La région, espace vécu*, Paris, PUF, 223 p.
- GARAT I., GRAVARI-BARBAS M. et VESCHAMBRE V., 2005, Préservation du patrimoine bâti et développement durable : une tautologie ? Les cas de Nantes et Angers, *Développement durable et territoires*, dossier 4, <http://developpementdurable.revues.org/4913>
- GAYDOU P., REYNAUD S., VIAUD N., FRANQUET E. et BRAVARD J.-P., 2012, *Le Rhône aval en 21 questions. Pourquoi gérer les marges alluviales ?*, Lyon, ZABR-OSR, p. 22-23.
- GERBER E., KREBS C., MURRELL C., MORETTI M., ROCKLIN R. et SCHAFFNER U., 2008, Exotic invasive knotweeds (*Fallopia* spp.) negatively affect native plant and invertebrate assemblages in European riparian habitat, *Biological Conservation*, 141(3), p. 646-654.
<http://www.sciencedirect.com/science/article/pii/S0006320707004582>
- GERMAINE M.-A., 2011, Dépasser l'enjeu piscicole, vers la définition d'une gestion concertée du cours d'eau et de ses berges. L'exemple de la vallée de la Touques (Calvados), *Géocarrefour*, 86/3-4, p. 161-175.
<http://geocarrefour.revues.org/8483>
- GERMAINE M.-A., 2009, *De la caractérisation à la gestion des paysages ordinaires des vallées du nord-ouest de la France. Représentations, enjeux d'environnement et politiques publiques en Basse-Normandie*, Thèse de doctorat, Université de Caen Basse-Normandie, 648 p. http://tel.archives-ouvertes.fr/docs/00/44/09/48/PDF/These_Gemaine_2009.pdf
- GERMAINE M.-A. et BARRAUD R., 2013a, Restauration écologique et processus de patrimonialisation des rivières dans l'ouest de la France, *Vertigo*, *Revue électronique en sciences de l'environnement*, <http://vertigo.revues.org/13583>
- GHIOTTI S., 2009, La patrimonialisation des fleuves et des rivières, *Mondes en développement*, n°145, p. 73-91. <http://www.cairn.info/revue-mondes-en-developpement-2009-1-page-73.htm>
- GIRARD S., 2012, *La territorialisation de la politique de l'eau est-elle gage d'efficacité environnementale ? Analyse diachronique de dispositifs de gestion des eaux dans la vallée de la Drôme (1970-2011)*, Thèse de doctorat, ENS de Lyon - Université de Lyon, 726 p. <http://tel.archives-ouvertes.fr/tel-00737165>
- GIRARD S. et RIVIÈRE-HONEGGER A., 2014, La territorialisation de la politique de l'eau : enseignements à partir du cas de la vallée de la Drôme (1980-2013), *Cahiers Agricultures*, n°23, p. 129-137.
http://www.jle.com/download/-agr-301503-territorialisation_de_la_politique_de_l'eau_en_france_enseignements_a_partir_du_cas_de_la_vallee_de_la_drome_1980_2013_-U-sEA38AAQEAAABlkAXwAAAAO.pdf
- GIRARD S. et RIVIÈRE-HONEGGER A., 2012, Les dimensions territorialisées et territorialisantes des nouvelles formes d'action publique dans un contexte de durabilité : le cas du SAGE (Schéma d'Aménagement et de Gestion des Eaux) Drôme, in MESINI B. (ed.), *Aménagement durable des territoires méditerranéens*, Aix-en-Provence, Presses Universitaires d'Aix-Marseille, Espace et développement durable, p. 185-195

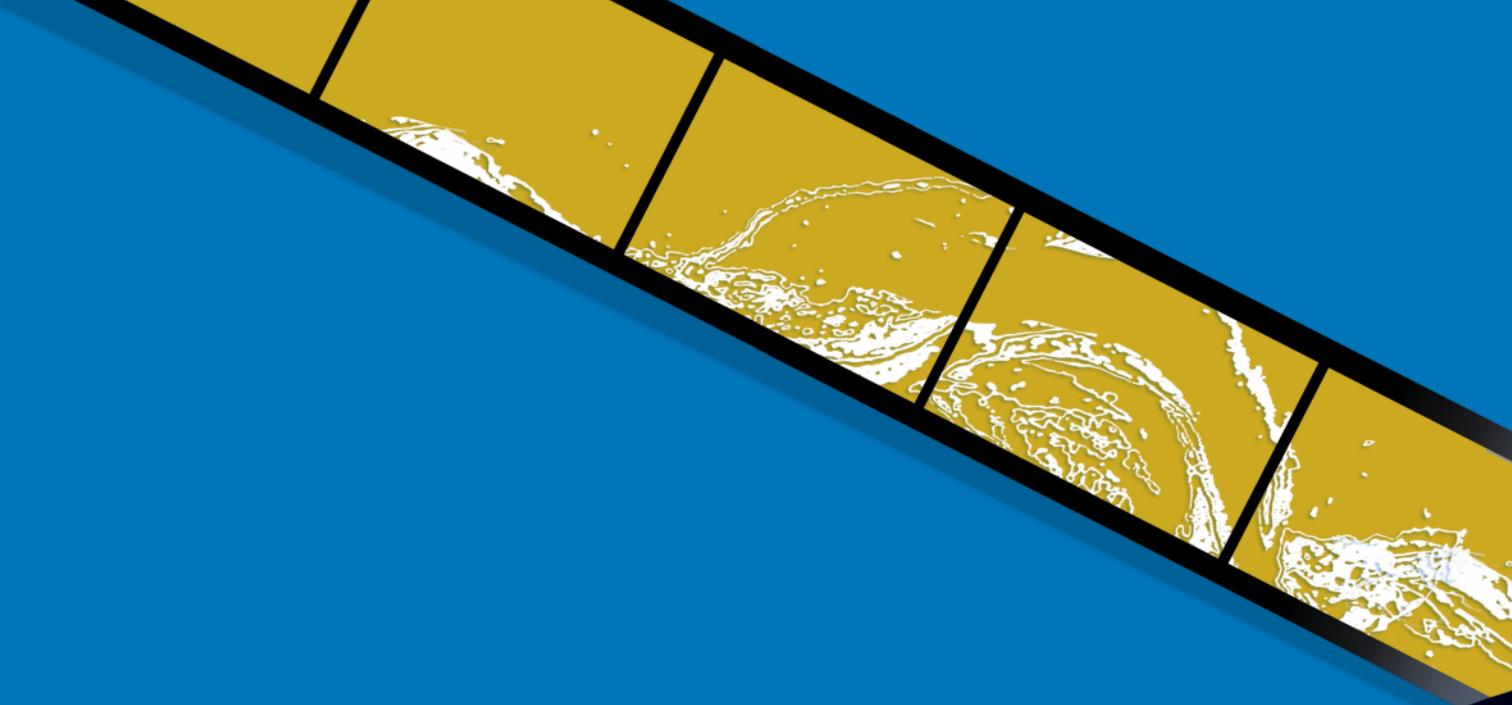
- GOELDNER-GIANELLA L. et HUMAIN-LAMOURE A.-L., 2010, Les enquêtes par questionnaires en géographie de l'environnement, *L'Espace Géographique*, 4, p. 325-344.
<http://www.cairn.info/revue-espace-geographique-2010-4-page-325.htm>
- GLOSSAIRE EauFrance, 2014. <http://www.glossaire.eaufrance.fr/> (dernière consultation le 18 août 2014).
- GRÉGOIRE F., *in prep.*, *Tourbières, fonctions, passé, avenir, place réelle dans le paysage français. Réflexions à partir de quelques exemples de tourbières du Laonnois et d'Ardèche*, Thèse de doctorat en préparation, Université de Saint-Étienne.
- GRAVARI-BARBAS M. et JACQUOT S., 2007, L'événement, outil de légitimation de projets urbains : l'instrumentalisation des espaces et des temporalités événementiels à Lille et Gênes, *Géocarrefour*, Vol. 82/3, p.153-163. <http://geocarrefour.revues.org/2217>
- GUEBEN-VENIERE S., 2011, En quoi les cartes mentales, appliquées à l'environnement littoral, aident-elles au recueil et à l'analyse des représentations spatiales ? *EchoGéo* (17), <http://echogeo.revues.org/12573>
- GUERIN J.-P., 1989, Géographie et représentation, *in* ANDRE Y. (dir.), *Représenter l'espace*, Paris, Anthropos, 227 p.
- GUMUCHIAN H., 1988, *De l'espace au territoire. Représentations spatiales et aménagement*, Grenoble, Université Joseph Fourier-Grenoble 1, collection Grenoble Sciences, 214 p.
- HEINICH N., 2009, *La fabrique du patrimoine, « De la cathédrale à la petite cuillère »*, Paris, éd. de la Maison des sciences de l'Homme, 286 p.
- HERITIER S., 2013, Le patrimoine comme chronogénèse. Réflexions sur l'espace et le temps, *Annales de Géographie*, n°689, p. 3-23. www.cairn.info/revue-Annales-de-geographie-2013-1-page-3.htm
- HÖPPNER C., WHITTLE R., BRÜNDL M. et BUCHECKER M., 2012, Linking social capacities and risk communication in Europe: a gap between theory and practice? *Natural Hazards*, 64 (2), p. 1753-1778.
- HOSTMANN M., BUCHECKER M., EJDERYAN O., GEISER U., JUNKER B., SCHWEIZER S., TRUFFER B. et ZAUGG STERN M., 2005, *Wasserbauprojekte gemeinsam planen. Handbuch für die Partizipation und Entscheidungsfindung bei Wasserbauprojekten*. Eawag, WSL, LCH-EPFL, VAW-ETHZ. (auch unter: www.rivermanagement.ch), 48 p.
- JACQUINOD F., 2014, *Production, pratique et usages des géovisualisations 3D dans l'aménagement du territoire*, Thèse de doctorat, Université de Saint-Étienne (équipe CNRS UMR 5600 – ISTHME), 546 p. + Annexes.
- JACQUINOD F., 2012, Simulation et participation : mesurer le risque / Simulation and participation: measuring risk, *in* NOVEMBER V. (éd.), *Catalogue de l'exposition art, science et société Risk Insight*, Lausanne, Presses Polytechniques et Universitaires Romandes, collection « Actes de congrès ».
- JACQUINOD F. et LANGUMIER J., 2010, Geovisualisation 3D en action dans l'aménagement du territoire. Stratégies et usages de l'outil à l'occasion de l'étude d'un Plan de Prévention des Risques Inondations, *Géocarrefour*, vol. 85/4, p. 303-312. <http://geocarrefour.revues.org/8163>
- JEUDY H.-P. (dir.), 1990, *Patrimoines en folie*, Paris, Ministère de la culture et de la communication, Ed. de la Maison des sciences de l'homme, coll. Ethnologie de la France, cahier 5, 297 p.
- JODELET D. (dir.), 1989, *Les représentations sociales*, Paris, Presses Universitaires de France, 447 p.
- JOHNSON C. L. et PRIEST S.J., 2008, Flood risk management in England: A changing landscape of risk responsibility? *International Journal of Water Resources Development*, 24 (4), p. 513-525.
- JULLIEN E. et OPÉRIOL P. (dir), 2011, *Restauration des cours d'eau : communiquer pour se concerter*, Guide méthodologique, Agence de l'Eau Loire-Bretagne, 62 p. http://www.eau-loire-bretagne.fr/espace_documentaire/documents_en_ligne/guides_milieux_aquatiques/Guide_restoration-CE.pdf
- JUNKER B., BUCHECKER M. et MÜLLER-BÖCKER U., 2007, Objectives of public participation: Which actors should be involved in the decision making for river restorations? *Water Resources Research*, 43.
- JUNKER B. et BUCHECKER M., 2008a, *Sozialverträgliche Flussrevitalisierungen. Ein Leitfaden*. Eidg, Forschungsanstalt für Wald, Schnee und Landschaft WSL, Birmensdorf, 58 S.
- JUNKER B. et BUCHECKER M., 2008b, Aesthetic preferences versus ecological objectives in river restorations, *Landscape and Urban Planning*, 85(3), p. 141-154.
- KALAORA B., 1998, *Au-delà de la nature, l'environnement*, Paris, Éditions L'Harmattan, 220 p.
- KAPLAN R., 1977, Patterns of environmental preference, *Environment and Behavior*, 9(2), p. 195-216.

- KAPLAN R. et KAPLAN S., 1989, *The experience of nature: A psychological perspective*, CUP Archive.
- LABEUR C., 2011, *Des catastrophes et des hommes : portrait d'une sociabilité événementielle. Le quotidien des inondations dans la basse vallée du Rhône entre 1755 et 2003*, Thèse de doctorat, Université Aix Marseille. 294 p. + Annexes.
- LAHIRE B., 1998, *L'Homme pluriel. Les ressorts de l'action*, Paris, Nathan, 272 p.
- LAJARGE R., 2008, Acteurs, engagement et dégageant, in CAVAILLE F. et MILIAN J. (eds.), Géodoc n°55 : *Mobiliser la notion d'acteurs en géographie*, p. 69-80.
- LE LAY Y.-F., MOULIN B., PIÉGAY H., 2005, Images et représentations du bois mort dans les cours d'eau, in VALLAURI D., ANDRE J., DODELIN B., EYNARD-MACHET R. et RAMBAUD D. (coord.), *Bois mort et à cavités. Une clé pour des forêts vivantes*, Paris, Lavoisier et Editions Tec & Doc, p. 193-202.
- LE LAY Y.-F., PIÉGAY H., GREGORY K., CHIN A., DOLÉDEC S., ELOSEGI A., MUTZ M., WYZGA B. et ZAWIEJSKA J., 2008, Variation in cross-cultural perception of riverscapes in relation to in-channel wood, *Royal Geographical Society*, 33, p. 268-287.
- LOUPSANS D., 2014, La compétence Gestion des milieux aquatiques et de prévention des inondations (GEMAPI), Onema, Collection *Comprendre pour agir*, 4 p.
- LYNCH K., 1969, *L'image de la cité*, Paris, Dunod, 222 p.
- MAITRE D'HÔTEL E. et PELEGRIN F., 2012, *Les valeurs de la biodiversité : un état des lieux de la recherche française*, Rapport FRB, série expertise et synthèse, 52 p.
http://www.mab-france.org/workspace/uploads/intranet/documents/rapport_valeurs_.pdf
- MANNONI P., 2012, *Les représentations sociales*, Paris, PUF, QSJ, 128 p.
- MARCHAND J., 2013, *Analyse comparée des critères de qualité d'une rivière urbaine aux yeux des différents acteurs (riverains et « experts »)*, Mémoire universitaire de Master 2 « interface nature – société », Université Lyon 2.
- MARIS V., 2010, *Philosophie de la biodiversité. Petite éthique pour une nature en péril*, Paris, Buchet-Chastel, 213 p.
- MC KENNA J., QUINN R. J., DONNELLY D. J. et COOPER J. A.G., 2008, Accurate Mental Maps as an Aspect of Local Ecological Knowledge: a Case Study from Lough Neagh, Northern Ireland, *Ecology and Society*, (13), p. 1-23.
- MENOZZI M.-J. et DUTARTRE A., 2007, Gestion des plantes envahissantes : limites techniques et innovations socio-techniques appliquées au cas des jussies, *Ingénieries*, 49, p. 49-63.
- MERCIER G., 1998, Patrimoine urbain et insignifiance, *Cahiers de géographie du Québec*, vol. 42, n°116, p. 269-273, <http://www.erudit.org/revue/cgq/1998/v42/n116/022741ar.pdf>
- MICHELIN Y., 1998, Des appareils photo jetables au service d'un projet de développement : représentations paysagères et stratégies des acteurs locaux de la montagne thiernoise, *Cybergeo : European Journal of Geography, Politique, Culture, Représentations*, <http://cybergeo.revues.org/5351>
- MICHELIN Y., 1995, *Les jardins de Vulcain. Paysage d'hier, d'aujourd'hui et de demain dans la chaîne des Puys du Massif central français*, Paris, éd. de la Maison des Sciences de l'Homme, 155 p.
- MICHELIN Y., 2000, Le bloc-diagramme : une clé de compréhension des représentations du paysage chez les agriculteurs ? Mise au point d'une méthode d'enquête préalable à une gestion concertée du paysage en Artense (Massif central français), *Cybergeo : European Journal of Geography, Environment, Nature, Landscape*. <http://cybergeo.revues.org/1992>
- MORANDI B. et PIÉGAY H., 2011, Les restaurations de rivières sur Internet : premier bilan, *Natures Sciences Sociétés*, 19, p. 224-235.
- MORANDI B., 2014, *La restauration des cours d'eau en France et à l'étranger : de la définition du concept à l'évaluation de l'action. Éléments de recherche applicables*, Thèse de doctorat, ENS de Lyon, 428 p. + Annexes.
- MOSCOVICI S., 1961, *La psychanalyse, son image et son public*, Paris, PUF, 652 p.

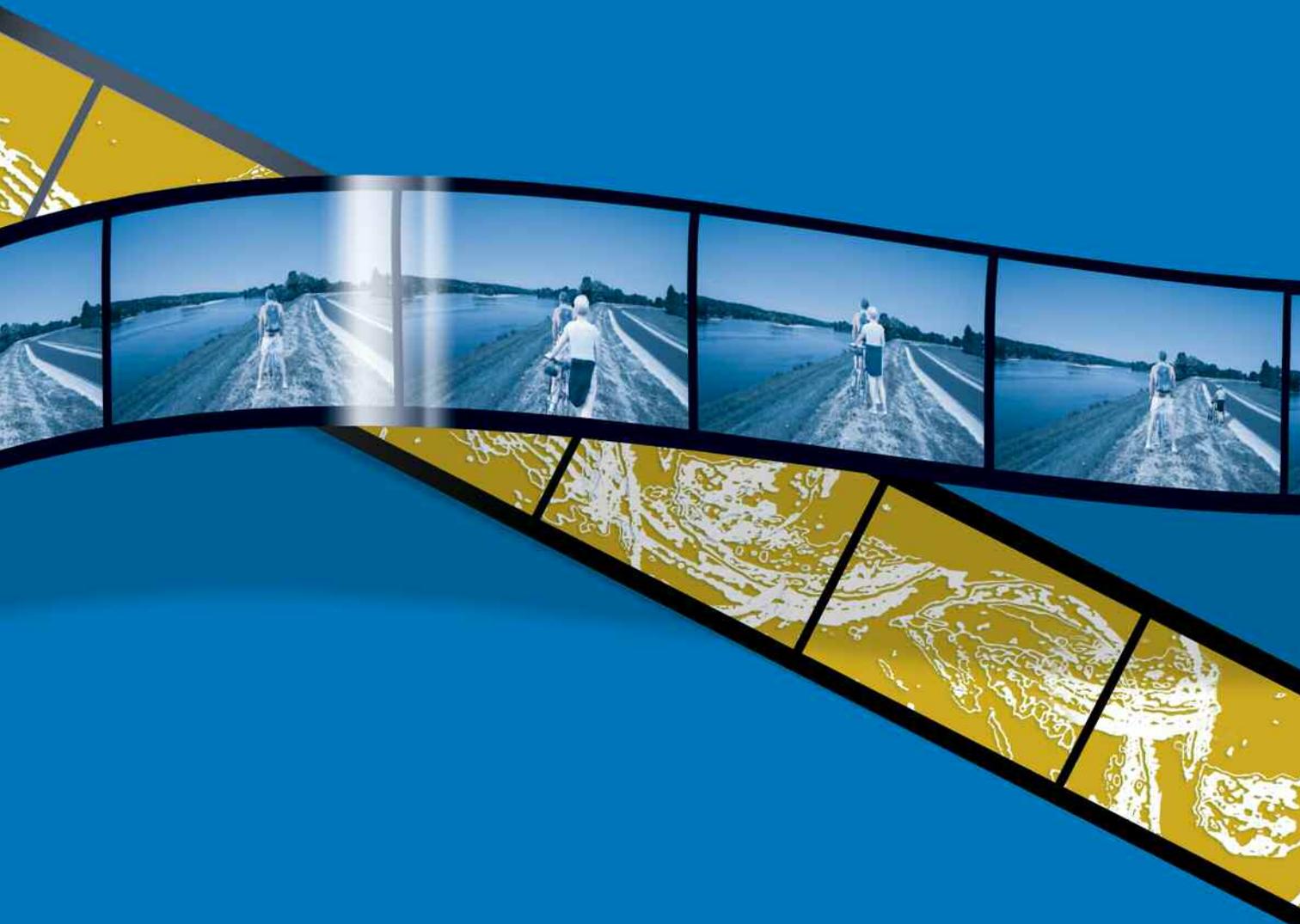
- MURO M. et JEFFREY P., 2008, A critical review of the theory and application of social learning in participatory natural resource management processes, *Journal of Environmental Planning and Management*, 51 (3), p. 325-344.
- NARCY J.-B., 2000, *Les conditions d'une gestion spatiale de l'eau. Le monde de l'eau face aux filières de gestion des espaces*, Paris, ENGREF, 492 p.
- NARCY J.-B., 2013, *Regards des sciences sociales sur la mise en œuvre des politiques de l'eau*, ONEMA, Collection Comprendre Pour Agir, 156 p. http://www.onema.fr/IMG/pdf/DIM_SO.pdf
- NASSAUER J.-I., 1992, The appearance of ecological systems as a matter of policy, *Landscape Ecology*, vol. 6, n°4, p. 239-250. <http://www-personal.umich.edu/~nassauer/Publications/LE92Appearance.pdf>
- NASSAUER J.-I., 1997, Cultural sustainability: aligning aesthetics and ecology, in NASSAUER J.-I. (dir.) *Placing nature. Culture and landscape ecology*, Washington D.C., Island Press, p. 66-83
- NEGURA L., 2006, L'analyse de contenu dans l'étude des représentations sociales, *Sociologies. Théories et recherches*, <http://sociologies.revues.org/index993.html>
- NEYRET R., 2004, Du monument isolé au « tout patrimoine », *Géocarrefour*, vol. 79/3, p. 231-237. <http://geocarrefour.revues.org/746>
- NICHOLSON S., 1971, Theory of loose parts: how not to cheat children, *Landscape Architecture*, 62, p. 30-34.
- OLIVIER DE SARDAN J.-P., 1995, La politique de terrain. Sur la production des données en anthropologie, *Enquête*, 1, p. 71-109.
- PAILLÉ P. (dir.), 2006, *La méthodologie qualitative. Postures de recherche et travail de terrain*, Paris, Armand Colin, 240 p.
- PFLÜGER Y., RACKHAM A. et LARNED S., 2010, The aesthetic value of river flows: An assessment of flow preferences for large and small rivers, *Landscape and Urban Planning*, 95(1), p. 68-78.
- PIÉGAY H., GREGORY K.J., BONDAREV V., CHIN A., DALHSTROM N., ELOSEGI A., GREGORY S.V., JOSHI V., MUTZ M., RINALDI M., WYZGA B. et ZAWIEJSKA J., 2005, Public perception as a barrier to introducing wood in rivers for restoration purposes, *Environmental Management*, 36(5), p. 665-674.
- PITTE J.-R., 1983, *Histoire du paysage français*, Paris, Tallandier, tome 1, 203 p.
- PROMPT E. et GUILLERME N., 2011, *Les étangs piscicoles : un équilibre dynamique*, Conservatoire Rhône-Alpes des espaces naturels, Les Cahiers techniques, 28 p. <http://www.cen-rhonealpes.fr/images/stories/documents/CTpdf/cahiertechnique/CTEtangs.pdf>
- REprésentations Spatiales et Organisation TERRitoriale (RESOTER), 2014, <http://resoter.cirad.fr/> (dernière consultation le 25 août 2014).
- PUIPIER S., 2003, *Perception paysagère des îles et îlons du vieux Rhône de Pierre-Bénite après réhabilitation du site*, Mémoire de Master 2, Université Lyon 2, 80 p.
- RIVIÈRE-HONEGGER A., 1995, Paysage et patrimoine, réflexions sur les pratiques de conservation et modes de valorisation en Languedoc-Roussillon, communication aux journées scientifiques du Pôle européen, Montpellier, 31 mars 1995, publiée in *Patrimoine, sociétés, cultures de la Méditerranée*, p. 73-91.
- RIVIÈRE-HONEGGER A. et PIOLA F. (coord.), 2014, *Étude des processus écologiques et sociaux pour optimiser la gestion des espèces invasives. Le cas de la Renouée*, Rapport final, Action 30 du programme 2010-2013 au titre de l'accord cadre Agence de l'eau ZABR, 175 p.
- ROLSTON H., 2000, Aesthetics in the swamps, *Perspectives in biology and medicine*, vol. 43, n°4, p. 584-597.
- ROUIFED S., 2011, *Bases scientifiques pour un contrôle des Renouées asiatiques : performance du complexe hybride Fallopia en conditions de contraintes environnementales*, Thèse de doctorat, Université Lyon 1, 148 p.
- SACCA C., 2009, *Analyse de la perception et des fonctions des tourbières : l'exemple rhônalpin*, Thèse de doctorat, Université Jean Monnet, Saint-Étienne, 356 p. http://tel.archives-ouvertes.fr/docs/00/39/98/45/PDF/these_celine_sacca.pdf
- SAJALOLI B. et SERVAIN-COURANT S., 2013, *Zones humides et littérature*, Collection Journées d'études du Groupe d'Histoire des Zones Humides, 144 p.

- SERNA V., 2013, Eaux, risques majeurs et patrimoine culturel : des directives européennes aux stratégies territoriales, 8e journées d'étude du Groupe d'histoire des zones humides, *Géohistoire des risques et des patrimoines naturels fluviaux. Des milieux ligériens aux autres espaces européens*, 11-12-13 avril 2013, Université d'Orléans.
- SMITH D.G., CROKER G. F. et MCFARLANE K., 1995, Human perception of water appearance: 1. Clarity and colour for bathing and aesthetics, *New Zealand journal of marine and freshwater research*, 29(1), p. 29-43.
- SOULE B., 2008, Observation participante ou participation observante ? Usages et justifications de la notion de participation observante en sciences sociales, *Recherches Qualitatives*, 27/1, p. 127-140.
- TAPSELL S., TUNSTALL S., HOUSE M., WHOMSLEY J. et MACNAGHTEN P., 2001, Growing up with rivers? Rivers in London children's worlds, *Area*, 33(2), p. 177-189.
- TUNSTALL S., TAPSELL S. et HOUSE M., 2004, Children's perceptions of river landscapes and play: What children's photographs reveal, *Landscape research*, 29(2), p. 181-204.
- TERRENOIRE J.-P., 1985, Images et sciences sociales : l'objet et l'outil, *Revue française de sociologie*, vol. 26, p. 509-527.
- ULRICH R.S., 1986, Human responses to vegetation and landscapes, *Landscape and urban planning*, 13, p. 29-44.
- ULTSCH J., 2010, Temporalités des usages et des représentations associés à la rivière du Furan à Saint-Étienne, *Géocarrefour*, vol. 85/3, p. 209-219, <http://geocarrefour.revues.org/8011>
- VALY J., 2013, Analyse des perceptions paysagères à partir d'une expérimentation par photo-questionnaire, Volet 4, 86 p.
- VALY J., 2011, *Croissance urbaine et risque inondation en Bretagne*, Thèse de doctorat, Université Rennes 2 – Université Européenne de Bretagne, 542 p.
<http://tel.archives-ouvertes.fr/docs/00/62/46/46/PDF/theseValyJanique.pdf>
- VESCHAMBRE V., 2007, Le processus de patrimonialisation : revalorisation, appropriation et marquage de l'espace, *Café géographique*. http://www.cafe-geo.net/article.php3?id_article=1180
- WYZGA B., ZAWIEJSKA J. et LE LAY Y.F., 2009, Influence of academic education on the perception of wood in watercourses, *Journal of Environmental Management*, 90(1), p. 587-603.
<http://www.sciencedirect.com/science/article/pii/S0301479707004227>
- ZAUGG M., 2002, More Space for running waters: Negotiating institutional change in the Swiss flood protection system, *GeoJournal*, 58, p. 275–284.





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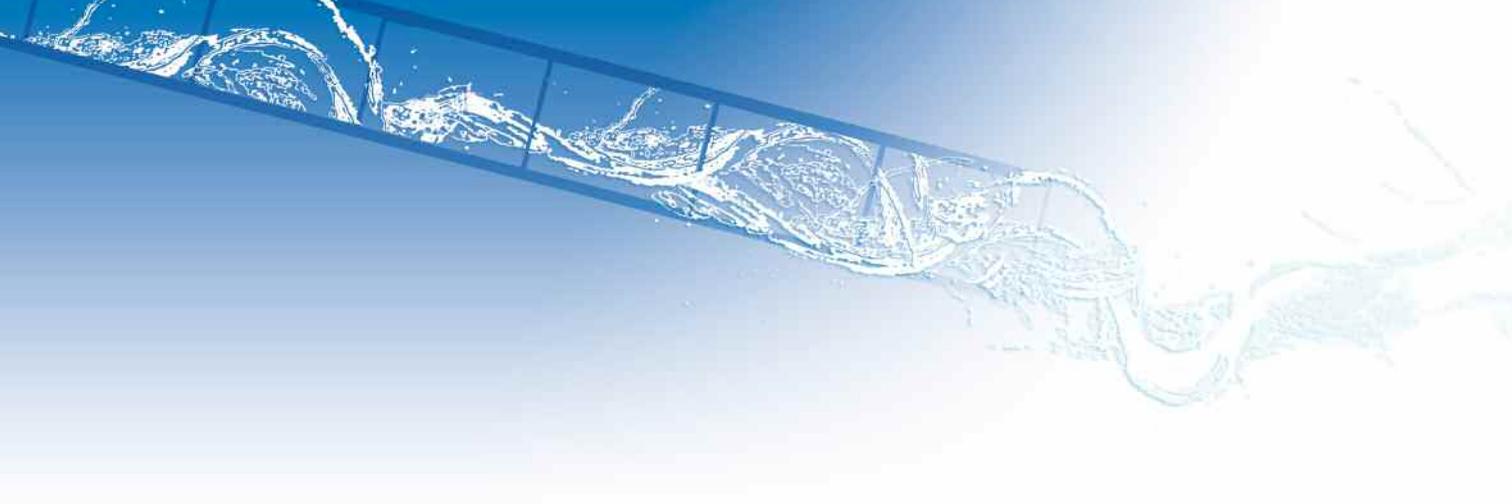


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- The speakers during symposium no. 2: Hervé Caltran and Elodie Renouf (Grand Lyon water department), Marc Foret (Saône-Doubs public river-basin territorial agency) and Alain Dervieux (CNRS, UMR 6012 ESPACE - DESMID, Arles); the participants in the round tables: Laurent Bourdin (Rhône-Méditerranée-Corse water agency), Caroline Champailler (Pilat regional nature park), Krystel Fermond (Drôme River board), Steve Muller (Bourbince River board), Nathalie Sureau-Blanchet (Rhône-Méditerranée-Corse water agency) and André Micoud (CNRS - Maison du Fleuve Rhône for the summary document of the meeting).
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Coordination

This project was coordinated by Anne Rivière-Honegger, Marylise Cottet and Bertrand Morandi (CNRS, UMR 5600 EVS, University of Lyon, ENS Lyon) and is the result of a novel, collective effort. It was prepared during writing workshops held over the years 2012 and 2013, following the "Perception aqua" symposia on the perception and management of aquatic environments held in 2011 and 2012 at ENS Lyon.

Writing

■ **Chapter 1** was written by Stéphanie de Carrara, Marie-Anne Germaine, Sabine Girard, Fabrice Grégoire, Céline Sacca and Janique Valy, with Sébastien Ah-leung contributing and Elise Catalan participating. Stéphanie de Carrara managed the writing workshop and monitored the writing process.

■ **Chapter 2** was written by Emeline Comby, Sylvain Dournel, Pauline Gaydou, Christine Labeur, Anne Rivière-Honegger and Janique Valy, with Sébastien Ah-leung, Claire Blouin-Gourbillière and Marylise Cottet contributing. Emeline Comby managed the writing workshop and monitored the writing process.

■ **Chapter 3** was written by Sébastien Ah-leung, Emeline Comby, Marylise Cottet, Nicolas Maughan, Bertrand Morandi and Soraya Rouifed, with Stéphanie de Carrara, Silvia Flamino and Jeannice Marchand contributing. Marylise Cottet and Bertrand Morandi managed the writing workshop and monitored the writing process.

■ For **Chapter 4**, the interviews with water managers were carried out by: Sébastien Ah-leung and Emeline Comby (SMBV Drôme), Régis Barraud (Institution Sèvre Nantaise), Marylise Cottet and Christine Labeur (Grand Lyon), Marie-Anne Germaine (CATER Basse-Normandie), Nicolas Maughan (Calavon-Toulon River board), Bertrand Morandi and Anne Rivière-Honegger (Bourbre River board), Janique Valy (IAV EPTB), Marylise Cottet (Contrechamp and Sybille Chiari), Anne Rivière-Honegger (Gérald Domon, Julie Ruiz, Florence Jacquinod and Justine Ultsch) and Bertrand Morandi (Matthias Buchecker). Bertrand Morandi and Anne Rivière-Honegger coordinated and wrote the chapter. Aurélie Sureau participated in writing the chapter. Céline Cordani and Dorothée Hoenen contributed to transcribing the texts.

Collaboration

Marie-Laure Trémélo and Hervé Tronchère produced the maps.

André Buisson reread the bibliographical references and ensured their compliance with applicable standards.

Bertrand Morandi collected and managed the figures for the book.

Robin Jenkinson participated in proofreading the English version.

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The *Knowledge for action* series makes new research findings and science-advice work available to professionals in the water and aquatic-environment sector (scientists, engineers, managers, instructors and students).

Already published

1. River hydromorphology. A primer
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3. Evaluating the ecosystem services of aquatic environments. Scientific, political and operational issues
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Management of aquatic environments currently finds itself in a context where particular attention must be paid to the perceptions and expectations held by the various stakeholders (managers, elected officials, people active in those environments, the general public, etc.). In view of creating a shared vision and reducing tensions, it is worthwhile to ask why and how studies on public and stakeholder perceptions can be included in projects to manage aquatic environments.

An array of recent work by young researchers has addressed this issue via a number of different and complementary approaches. The result is a mass of scientific knowledge on diverse aquatic environments and different territorial contexts that in turn raise a number of management issues. The knowledge produced was discussed during a multi-disciplinary national symposium that brought together researchers and water managers. This book in the *Knowledge for action* series emerged from those discussions.

It presents the contributions of studies on stakeholder perceptions and collective representations to the development of restoration and management projects for aquatic environments. These studies play important roles at critical steps in projects. Prior to the project itself, they produce knowledge by identifying stakeholders and their expectations, and by delving into the history of the aquatic environments. At the end of a project, they are an important factor in questioning and assessing management practices.

The book ends with feedback data on the diverse aquatic environments studied and on the research and management situations of a number of projects, both in France and abroad. The objective was to pull together a number of "stakeholder viewpoints" providing examples and feedback useful in expressing various needs and gaining perspective in terms of current practices.

The book as a whole constitutes a useful discussion in view of implementing integrated and participative management of water and aquatic environments.

Anne Rivière-Honegger is a geographer and research director at CNRS - UMR 5600 EVS. She contributes to experiments on tools implementing various assessment methods and to current discussions on landscape via studies focussing on river landscapes and the related social perceptions, notably in the Rhône basin.

Marylise Cottet is a geographer and researcher at CNRS - UMR 5600 EVS. Her research focusses on the links between societies and aquatic environments. A particular objective is to acquire knowledge on the perceptions and social practices pertaining to aquatic environments. Landscape-based analysis plays a central role in her work. The research contributes to current discussions on ecosystem management (ecological restoration and biological invasions).

Bertrand Morandi holds a Ph.D in geography and works at CNRS - UMR 5600 EVS. His research focusses on river restoration, in France and abroad. In particular, he addresses the history and current approaches of public action, from local practices of working on aquatic environments to scientific practices and discourse. His research on stakeholder perceptions is carried out indirectly, via an analysis on the use and definition of concepts.



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