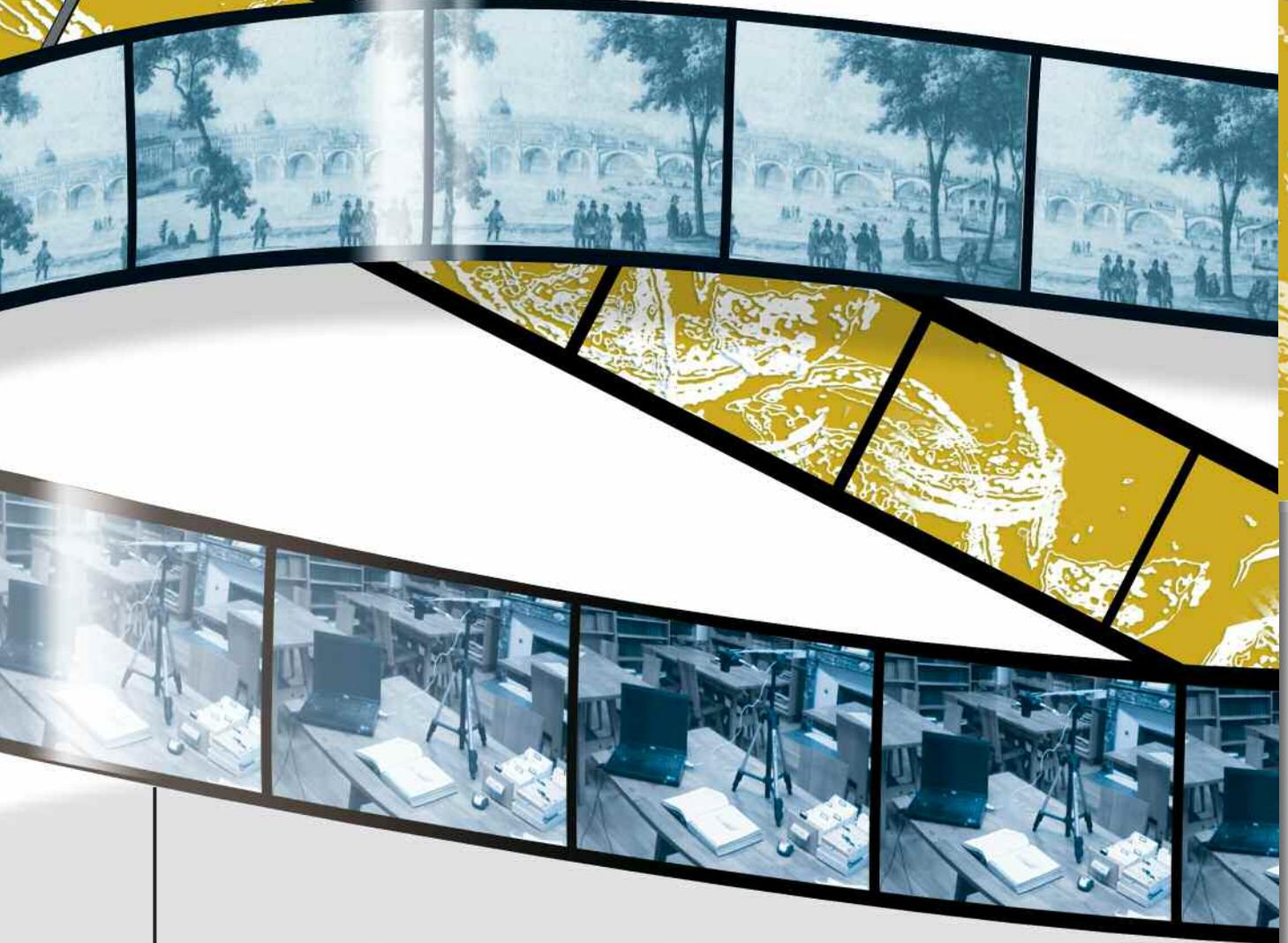


# Learning more about the history of the connections between societies and aquatic environments



- 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



This chapter was written by  
Emeline Comby, Sylvain Dournel,  
Pauline Gaydou, Christine Labeur,  
Anne Rivière-Honegger and Janique Valy,  
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



## 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

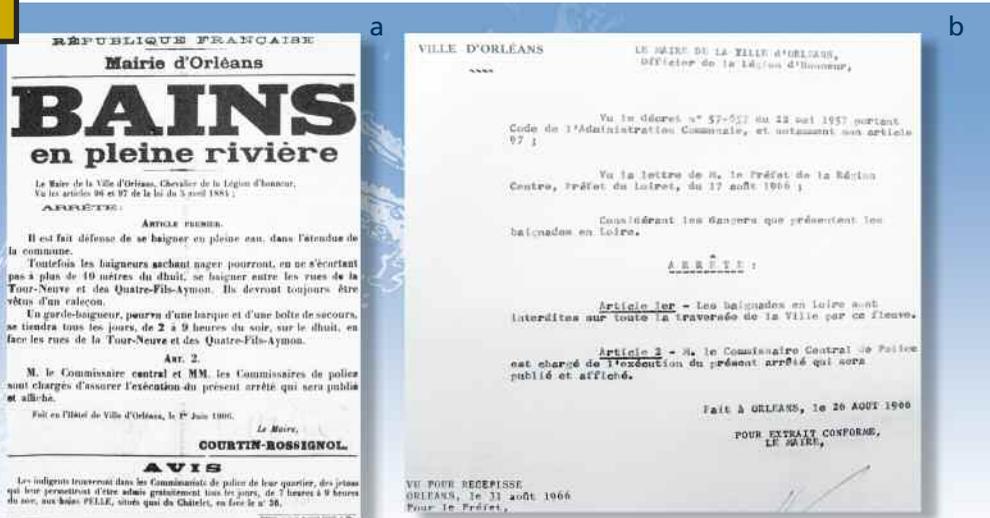


(a) *Swimming in the Loire* and (b) *a swimming school, on the Châtelet quay, in Orléans*. Photography was developing rapidly during the *Belle Époque* and represents a precious source of information on the initial bathing practices along the Loire and on the infrastructure related to these activities.

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

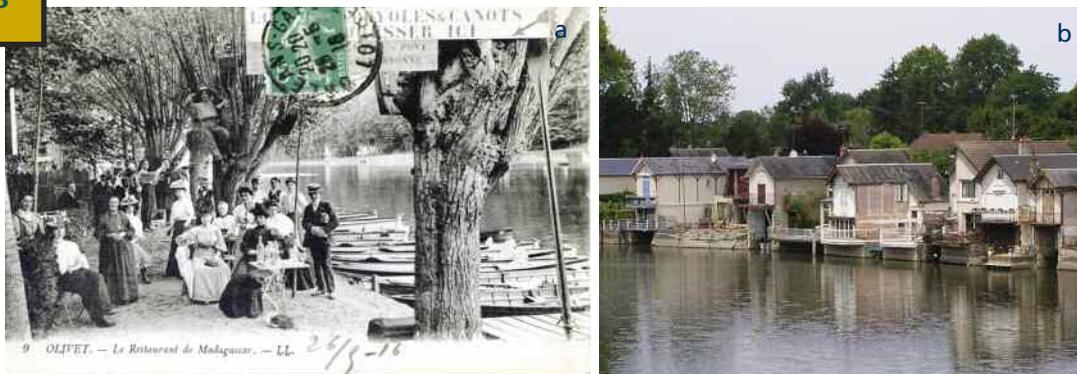


a - b © Orléans municipal archives

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

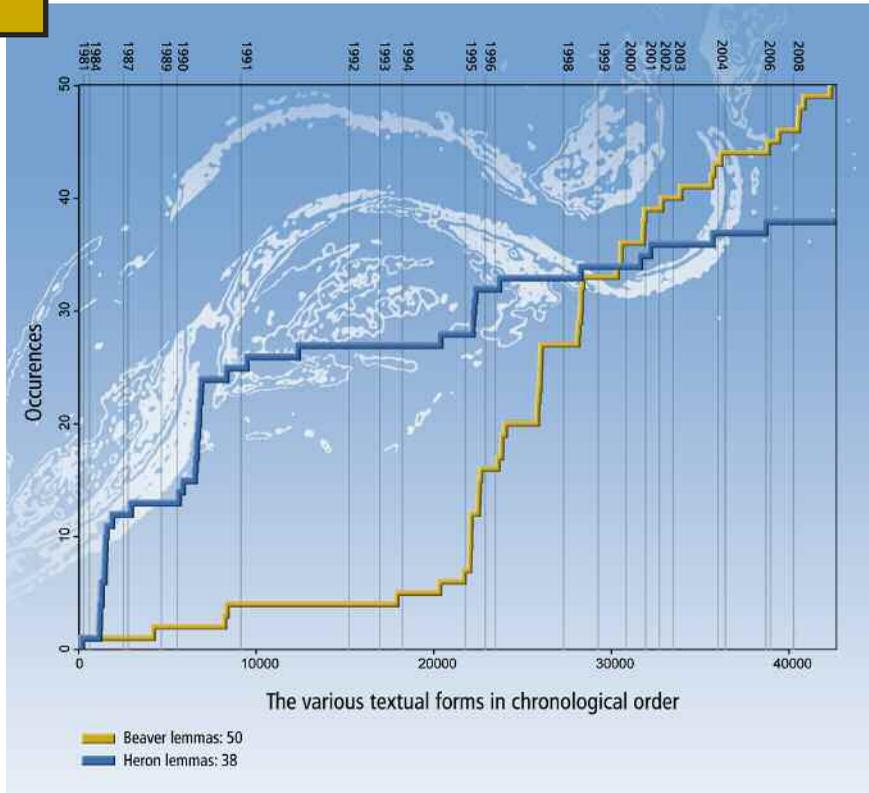
### The press, a source in studying changes in public perception (patrimonialisation) of rivers in the Drôme valley

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](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.

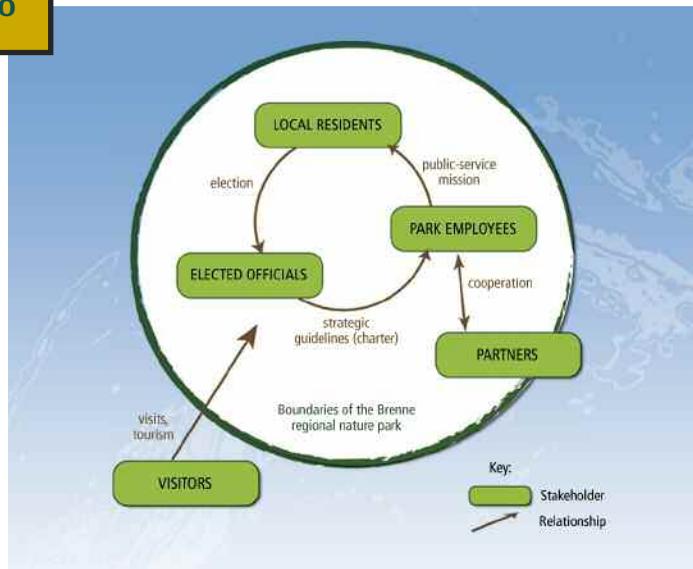
Today, there is 1) the Landscape photographic observatory (OPP), with a rigorous system defining how to implement photo-monitoring, and 2) the National landscape photographic observatory (OPNP), the national system comprising the observatories operating according to the method set up by the Landscape 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.

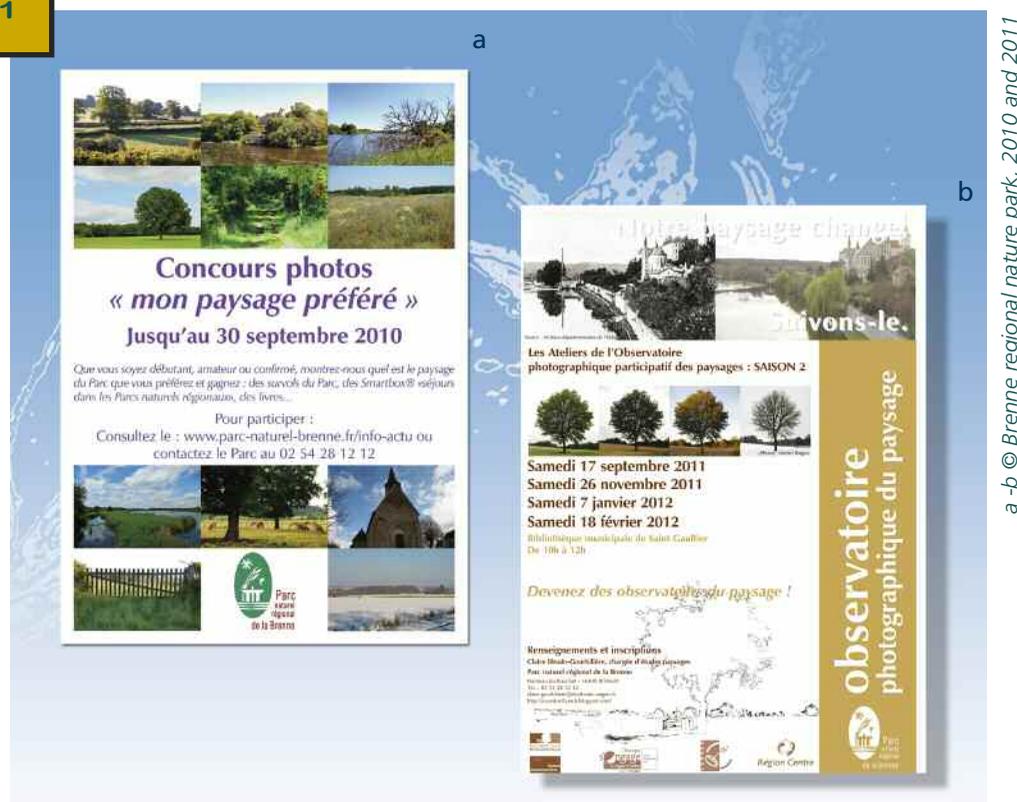
Starting with the 308 viewpoints, the various stakeholder groups together selected 52. They constitute the itinerary of the participative landscape photographic observatory of the Brenne regional nature park and serve as an operational tool to monitor landscapes.

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, MDRF*

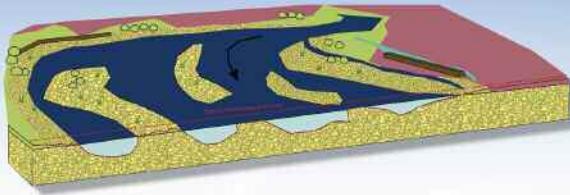
*b © Dürrenmatt collection, MDRF*

*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)*

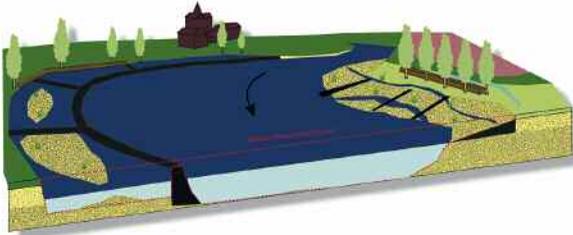
1860: a braided landscape



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.



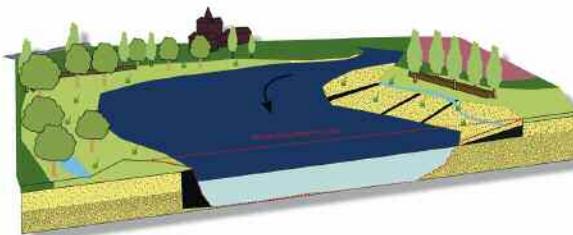
1880-1920: work for navigation



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.



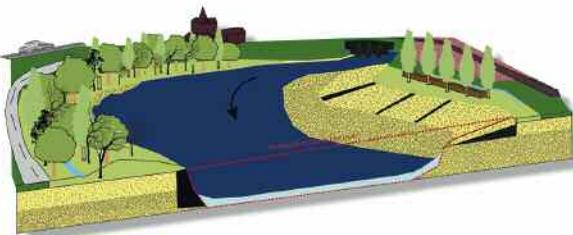
1946-1961: Prior to hydroelectric works by CNR



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.



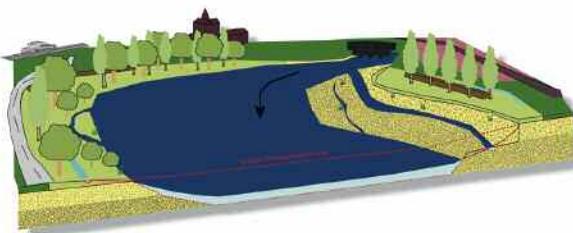
Today: Post hydroelectric works by CNR



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

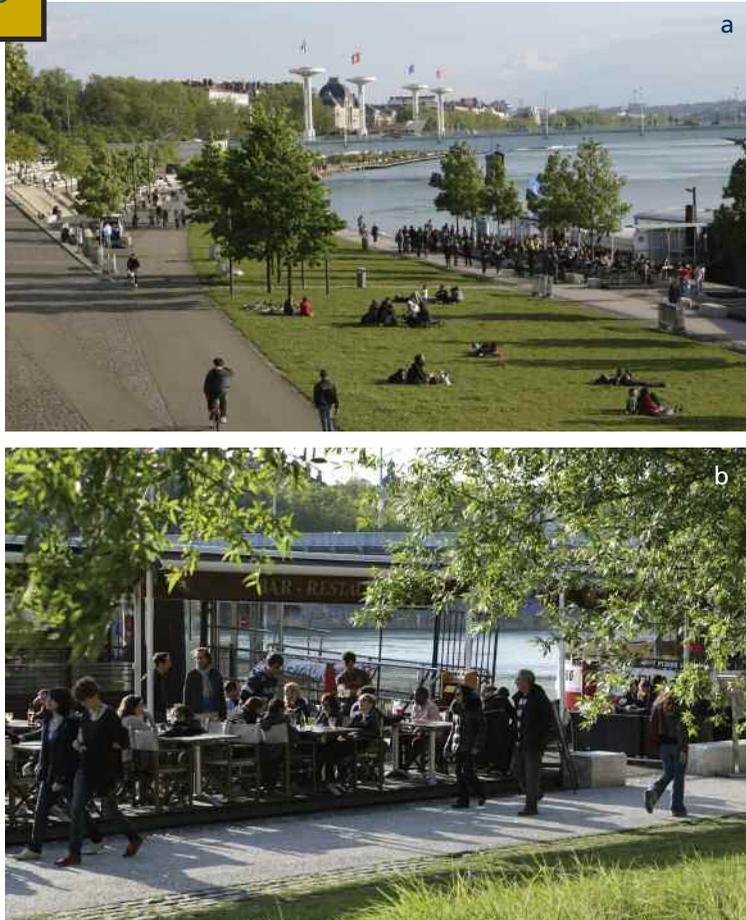
#### Studying the local press on projects to restore the banks of the Rhône in Lyon

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).

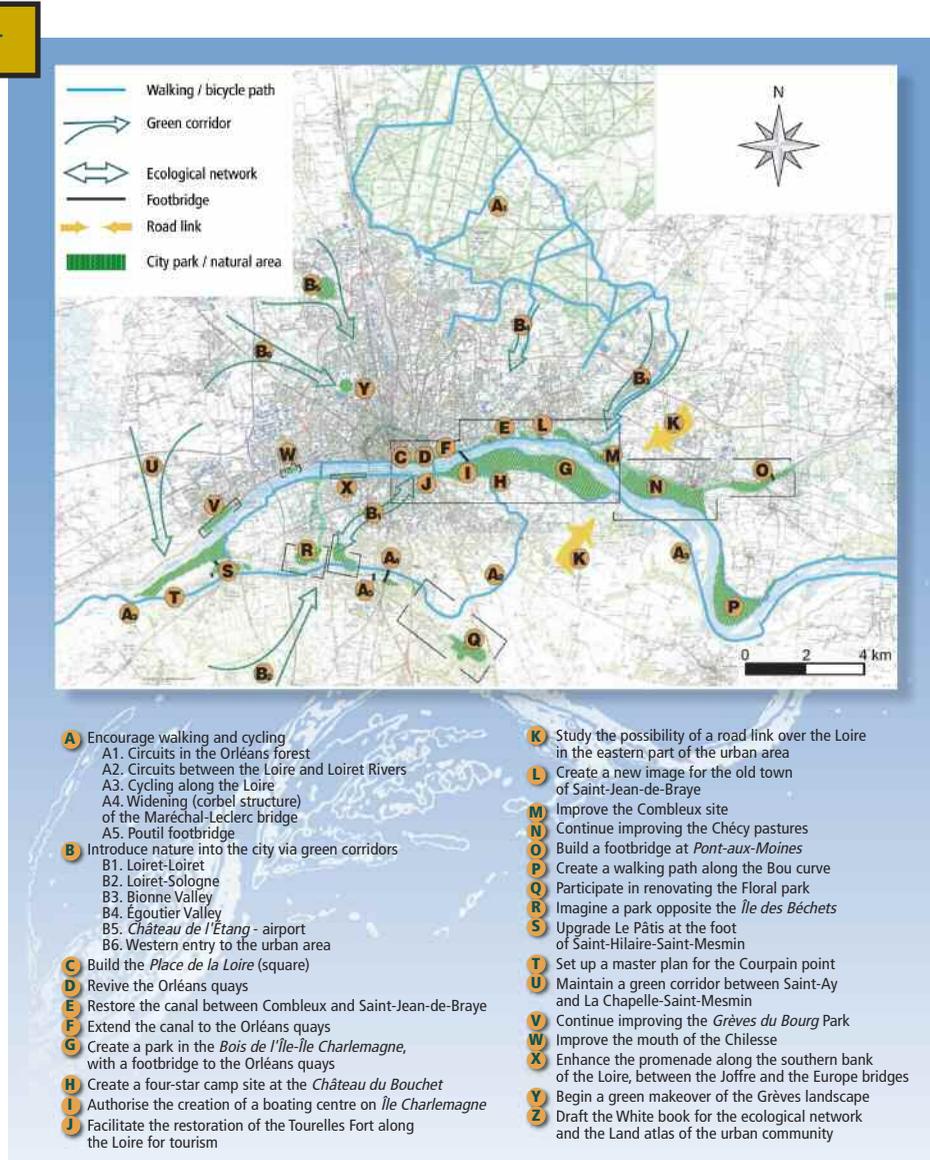
### Study on restoring river patrimony in the framework of the "Loire Trame Verte" project

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?

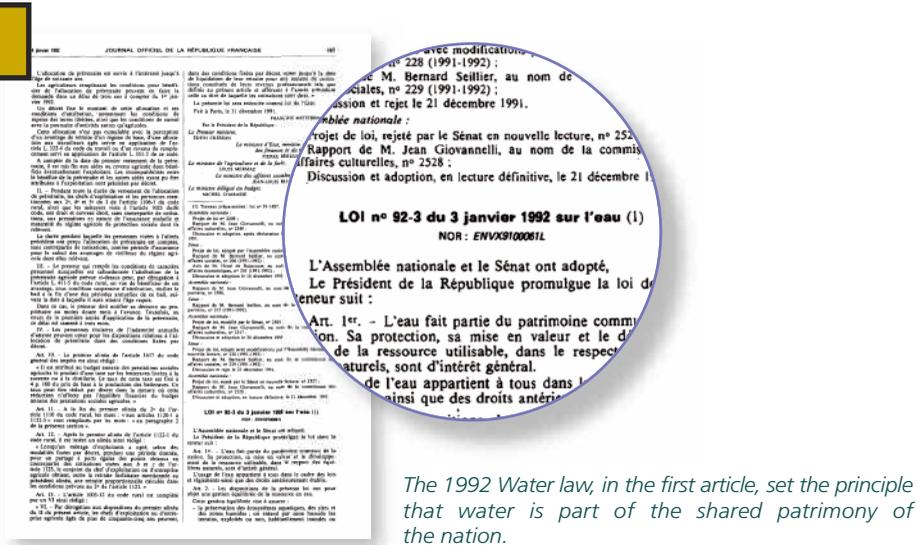
### Heritage and patrimony linked to aquatic environments

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

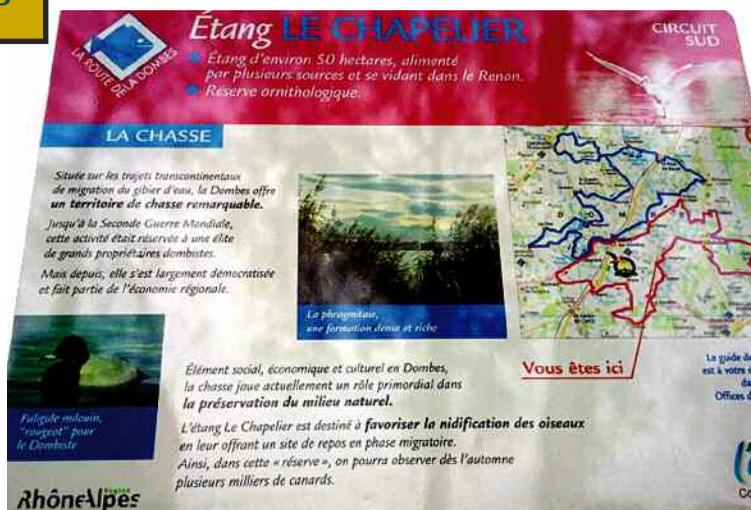
Aquatic environments are likely to be seen as valuable objects by individuals and groups. The values are defined as the perceived qualities of a cultural object or a site (Avrami, 2000). One speaks of "cultural values" when they are shared by a group or community. The existence of these cultural values 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



© S. De Carrara 2013

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).

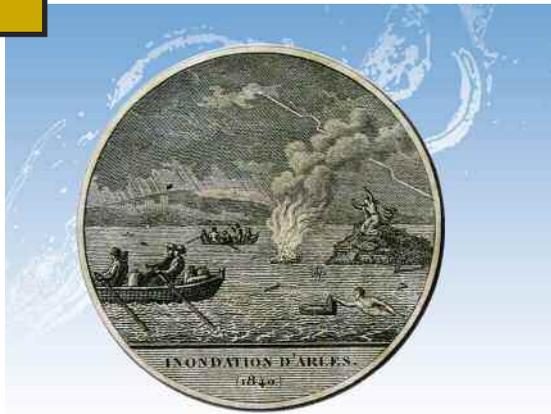
Very often, the major floods in France in the 1800s and 1900s were followed by new systems to enhance flood management. Laws on hazards address many different aspects, including prevention, protection of life and property, and crisis planning and management. The term "non-structural measures" designates 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

**Quelles inondations ont marqué votre territoire ?**

**Consultez les repères situés près de chez vous**

Une cartographie interactive des repères a été mise en ligne : elle permet une navigation de repère en repère.

**Et participez au recensement**

Vous connaissez des repères de crue qui n'ont pas encore été recensés ? Merci de nous indiquer leur localisation à l'aide du formulaire en ligne.

Agrémentées de photos et de cartes, des fiches téléchargeables permettent de localiser facilement les repères et d'accéder à leurs principales caractéristiques.

© 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

**W**hat 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.