

Questioning and assessing management practices



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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

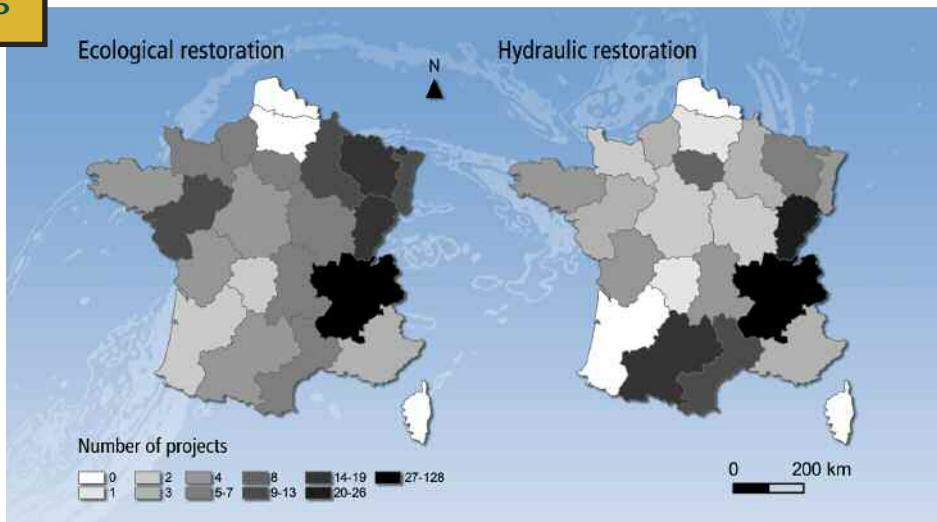


a © from *Diagnostic, aménagement et gestion des rivières : hydraulique et morphologie fluviales appliquées* (2^e éd.). G. Degoutte, Lavoisier, 2012
 b © A. Dutartre, Istéa

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



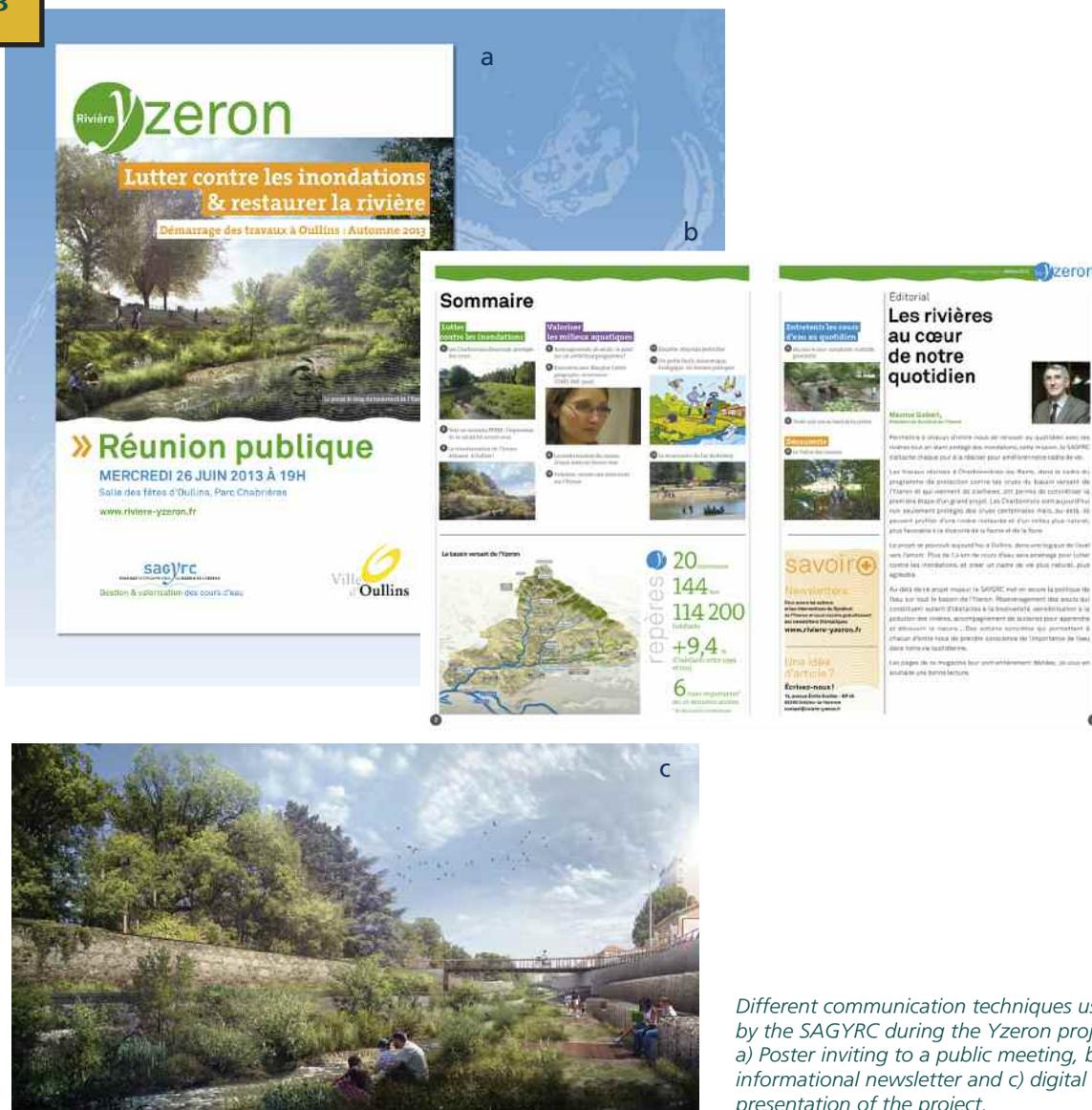
© M. Cottet, 2012

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

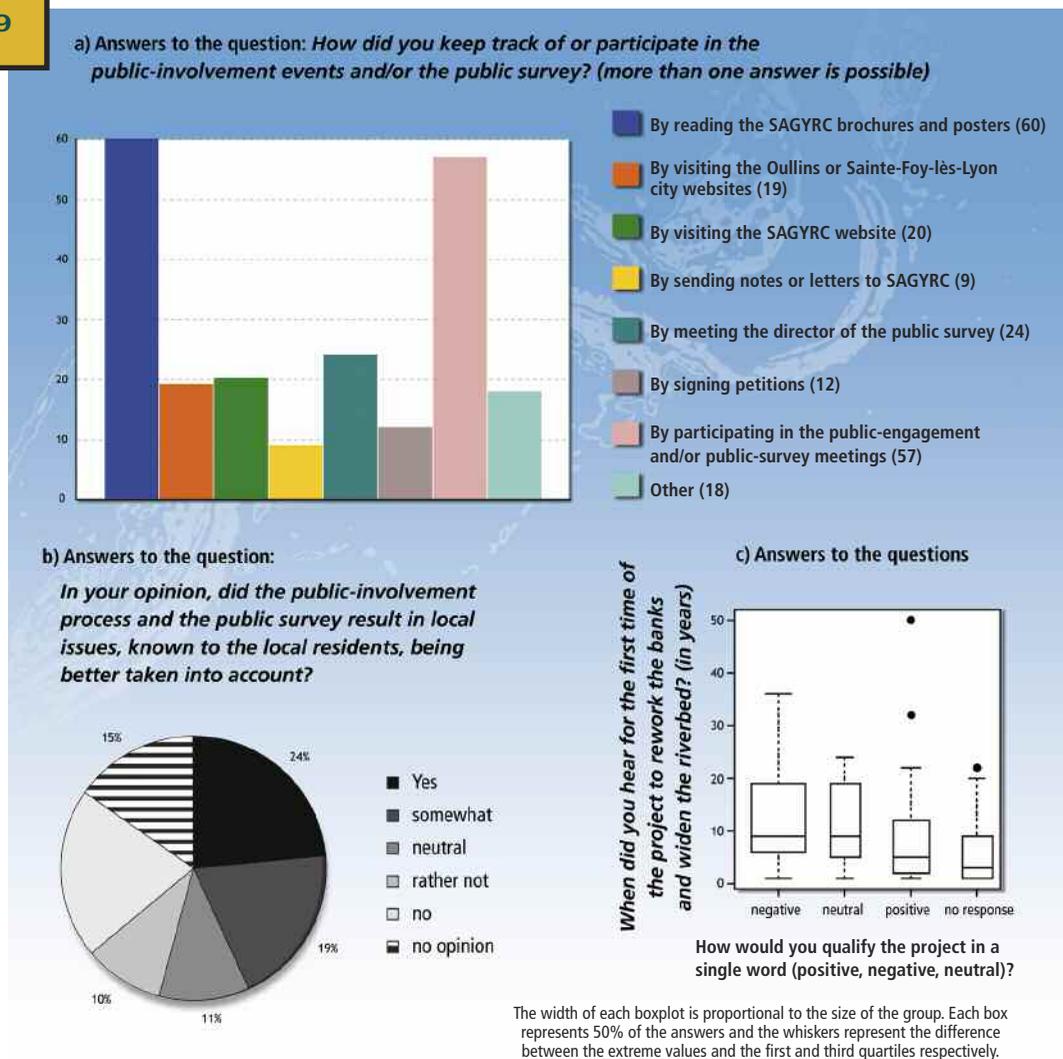


Different communication techniques used by the SAGYRC during the Yzeron project. a) Poster inviting to a public meeting, b) informational newsletter and c) digital presentation of the project.

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.

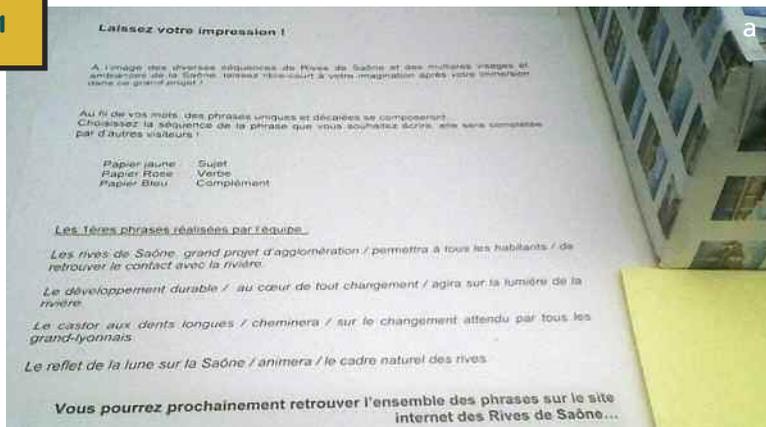
This continuity was visible in the restoration techniques, but also in the manner in which the public was consulted and informed. The lessons learned during the successful first project, *Berges du Rhône*, were put to good effect in the later *Rives de Saône* project.

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



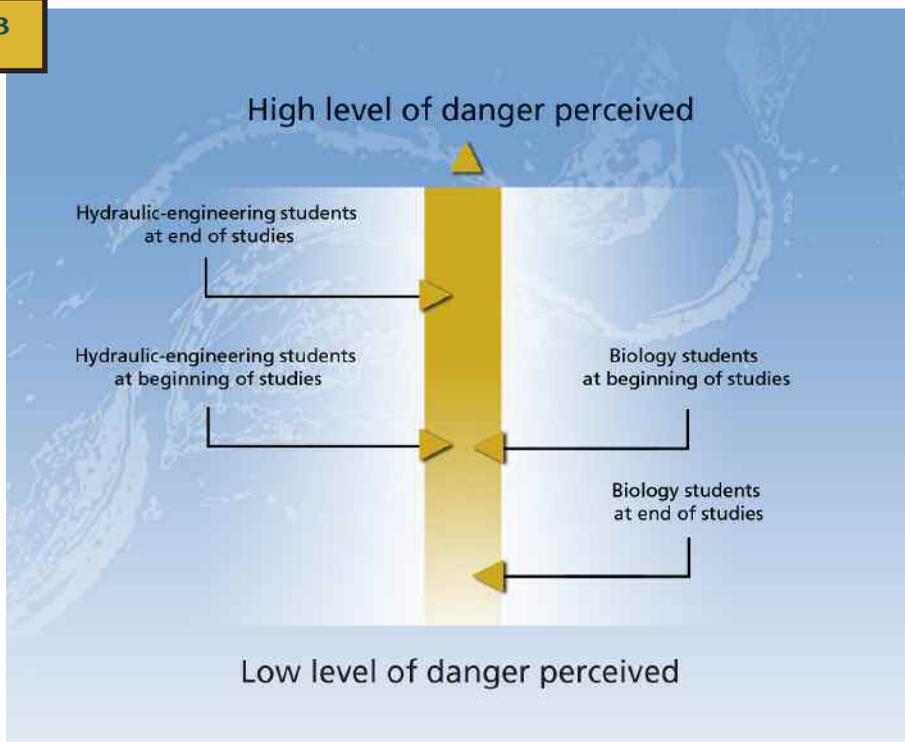
a © J. Riquier, 2010
b © J. Riquier, 2011



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

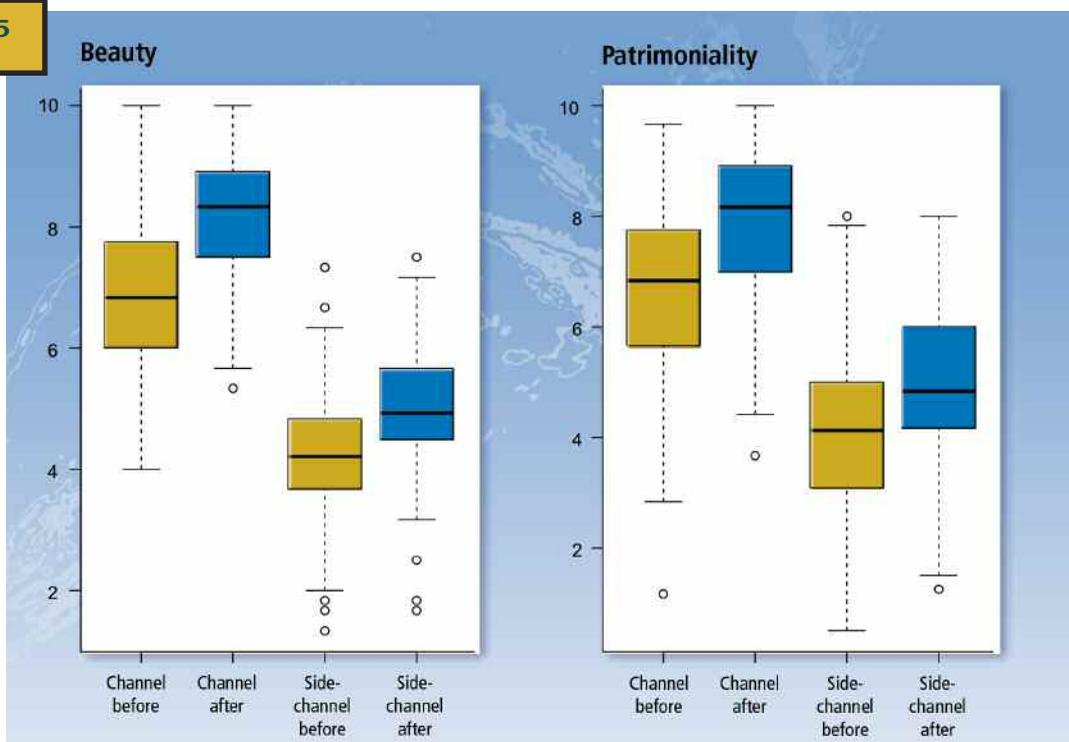
54



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



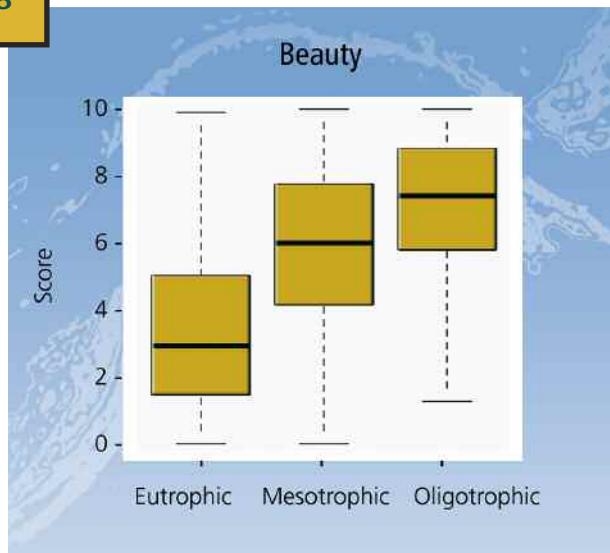
© S. Pupier, 2003

Scores for the beauty and patrimoniaity 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



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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 | |

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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.

