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Article abstract

The small urban rivers of the Paris conurbation are subject to local land use and segmentation processes at the threshold between urban politics and environmental policy. At present, the obligation to restore these streams pursuant to the Water Framework Directive is challenging stakeholders to proceed as collectively as possibly in this undertaking. This article attempts to identify the points of agreement and disagreement within a shared representation of local decision-makers' relations with waterways through several spatiotemporal trajectories that are specific to each small river. We will show that the shared management of a river involves the management of not only the resource but also of a shared space. Choosing to model the relation between local societies and their river in time and space around a land-based diagram provides local and regional authorities with an explanation of their interactions with the river and its environments and can foster their capacity to act cohesively.

SPATIALIZATION OF POLITICAL ACTION APPLIED TO WATERWAYS MANAGEMENT AN OVERVIEW OF PARISIAN URBAN SMALL RIVERS

Catherine CARRÉ¹
Jean-Paul HAGHE²

❶ RÉSUMÉ

Les petites rivières urbaines de l'agglomération parisienne sont caractérisées par une segmentation territoriale de pratiques et de gestion qui doivent elles-mêmes s'inscrire dans une dynamique d'ajustement entre politique urbaine et politique environnementale. Actuellement l'obligation d'une restauration de ces cours d'eau (mise en application de la DCE) pose la question de la coordination des acteurs et de leur capacité à agir pour une prise en charge collective de cette renaturation. Dans cet article, il s'agit de rendre explicite les convergences et divergences dans la représentation commune de la relation des acteurs locaux au cours d'eau à travers un certain nombre de trajectoires spatio-temporelles propres à chaque petite rivière. Nous montrerons que l'enjeu d'une gestion commune de la rivière n'est pas seulement celui d'une gestion de la ressource mais d'un espace commun. Choisir de modéliser la relation entre les sociétés locales et leur rivière dans le temps et dans l'espace, autour d'une figure territorialisée, fournit aux acteurs locaux et régionaux une explication de leurs interactions avec la rivière et ses milieux, révélatrice d'une capacité à agir ensemble.

MOTS-CLÉS ■ Rivière urbaine, restauration de cours d'eau, directive cadre sur l'eau, espace commun, modèle spatial

❷ ABSTRACT

The small urban rivers of the Paris conurbation are subject to local land use and segmentation processes at the threshold between urban politics and environmental policy. At present, the obligation to restore these streams pursuant to the Water Framework Directive is challenging stakeholders to proceed as collectively as possible in this undertaking. This article attempts to identify the points of agreement and disagreement within a shared representation of local decision-makers' relations with waterways through several spatiotemporal trajectories that are specific to each small river. We will show that the shared management of a river involves the management of not only the resource but also of a shared space. Choosing to model the relation between local societies and their river in time and space around a land-based diagram provides local and regional authorities with an explanation of their interactions with the river and its environments and can foster their capacity to act cohesively.

KEYWORDS ■ Urban river, river restoration, Water Framework Directive, common space, spatial model

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INTRODUCTION

The European Water Framework Directive, hereafter referred to as WFD or Directive, was adopted on October 23, 2000 to work toward the ecological restoration of small urban rivers. The Directive calls on European societies to engage in the collective management of rivers by coordinating the many players involved. Among the challenges are, for water agencies, to find contractors willing to take on restoration operations and, for resource management bodies for each watershed, to bring together all the rivers' users (Borowski et al., 2008). Yet, neither the Directive nor other existing measures for dialogue between users (local water commission, watershed committee) have succeeded in advancing the discussion on waterway issues or in rallying a significant number of participants.

Today, one of the main problems of the WFD is that it imposes, through its scientific standards, a spatiotemporal concept of the river that destroys its territorial dimension (in time and space) as well as the local stakeholders' incentives to take action (Steyaert and Ollivier, 2007). Yet, French urban and periurban waterways have been substantially developed by local society—in Île-de-France as far back as the 12th century—such that they are today totally anthropized streams (Benoit, 2007). In parallel, the ongoing restructuring of the public authorities, including a renewed focus by federal-level agencies on regulatory missions, are such that it is precisely the local public authorities (municipalities and intermunicipal institutions), funded in part locally, that are tasked to implement concrete development operations for waterways and their adjacent environments. These latter operations also involve dealing directly with the private owners of the riverbed, the riverbanks and the wetlands (Roche et al., 2005).

Since the French Revolution, the majority of French urban rivers have enjoyed a status as a non-state entity. Thus, the riverbanks and riverbeds to be restored to their original meandering as well as the former wetlands to be reestablished are all the private property of private persons or public entities. Moreover, there is no unified management of the rivers, although competencies are shared between the players. The stakes involved in restoring streams are precarious with regard to the legislation on water, which in France is based on the right of soil, i.e., the right to land ownership (Billet, 2005).

Efforts to improve the relations between players must henceforth ensure the restoration of ecosystem functioning and not only the uses. In addition, they must integrate the cultural and social aspects that have been in existence prior to the project (Kondolf and Yang, 2008). Finally, shared river management (see [Rules, Games, and Common Pool Resources](#) (1994) by Elinor Ostrom on the concept of shared resources) requires the capacity to manage not only a resource but also shared space, and the sharing of space. As such, it calls for the integration of society and nature in a way that transcends the conventional recourse to the legal status of land.

This article aims to build on the work of researchers such as Walsh et al. (2005), who recommend integrating socioeconomic and political drivers into the management of the urban environment and to establish an ecology-centered approach to managing rivers. Yet, before engaging in a dialogue on restoration projects, this article will examine the points of agreement and disagreement in the shared representation of a waterway between the local players. Collective management of these rivers is impeded by the fragmentation of the parties and the accumulation of issues (urban projects, flood control measures, restoration of natural sites, etc.). The creation of a river as a space for shared benefit requires making the river–society interactions currently in place explicit. In that context, identifying the points on which the different players agree can provide a common base for negotiation. Conversely, the points of disagreement and opposition revealed by researchers should be recognized by the players so as not to impede negotiations. These interactions can be identified by the political sciences through a spatial and temporal analysis of conflicts and social movements. This would involve providing all actors with a vision concerning their use of waterways, their management mode, and the place the river holds in their development plans. Such an analysis would also examine how the spatial players shape their relation to the river over time through common past and present experience, alongside their future expectations. The results of the analysis would then allow for a better understanding of how territorialities are established around urban rivers (Hartog, 2003; Haghe, 2010).

The results presented in this paper are based on those of PIREN-Seine, which is a French research program on the Seine basin, and on collaborations with the main river management agencies. Today, Paris' small urban rivers, such as the Bièvre, the Orge, the Essonne and the Grand Morin, are returning to their original biological and morphological states through restoration actions. Given their location in

urban areas (Figure 1), their restoration will benefit a large number of the areas' inhabitants. Widely recognized as a necessary measure, the restoration is in part funded by the regional authorities, who are contributing 7.5 billion euros over six years (see budget of the 9th and 10th programs of the Agence de l'eau Seine-Normandie). Still, institutional participation is based on a top-down logic that may neither reflect local realities (Pestre, 2011) nor allow dialogue between all players. Understanding how rivers are spatialized will make it possible to collaboratively give the river a shape and a territorial trajectory that is in cohesion with the entire range of players. This will then serve as a basis for constructing the shape of a common space and facilitating collective action. By showing all stakeholders how to invest their territory, without denying the current oppositions and conflicts, this spatialization should allow them to benefit from the multiple incentives generated by the public institutions for restoring waterways.

I. CONTEXT

Small rivers in Île de France are representative of the local and regional social tensions around achieving the water quality required by the WFD. Compared to

the large urban rivers of the Paris conurbation of which they are tributaries (see Figure 1, the Seine for the Bièvre, the Orge, and the Essonne rivers, and the Marne for the Grand Morin River), the watersheds of small rivers are, proportionally, more urbanized. Moreover, because many of their segments are privately owned, they are not always easily visible or accessible. Because of their urban context, these rivers are particularly exposed to all sorts of pressures, from pollution discharge to the destruction of wetlands (whence the "urban stream syndrome" coined by Walsh et al., 2005).

The transformation of rivers with sometimes irreversible modifications to their morphology has been taking place over a very long period of time, from the Middle Ages until the 1970s. Users of rivers—farmers, industry, transportation managers and households—have attempted to control waterways, in particular their flow and speed, by modifying the form of the riverbed and its surrounding environments. Thus, waterways have been rectified, linearized and channelized, their flood plains filled in and occupied, and the space for the river to run eliminated (Figure 2). To its longitudinal segmentation (through hydraulic structures) is added extreme lateral

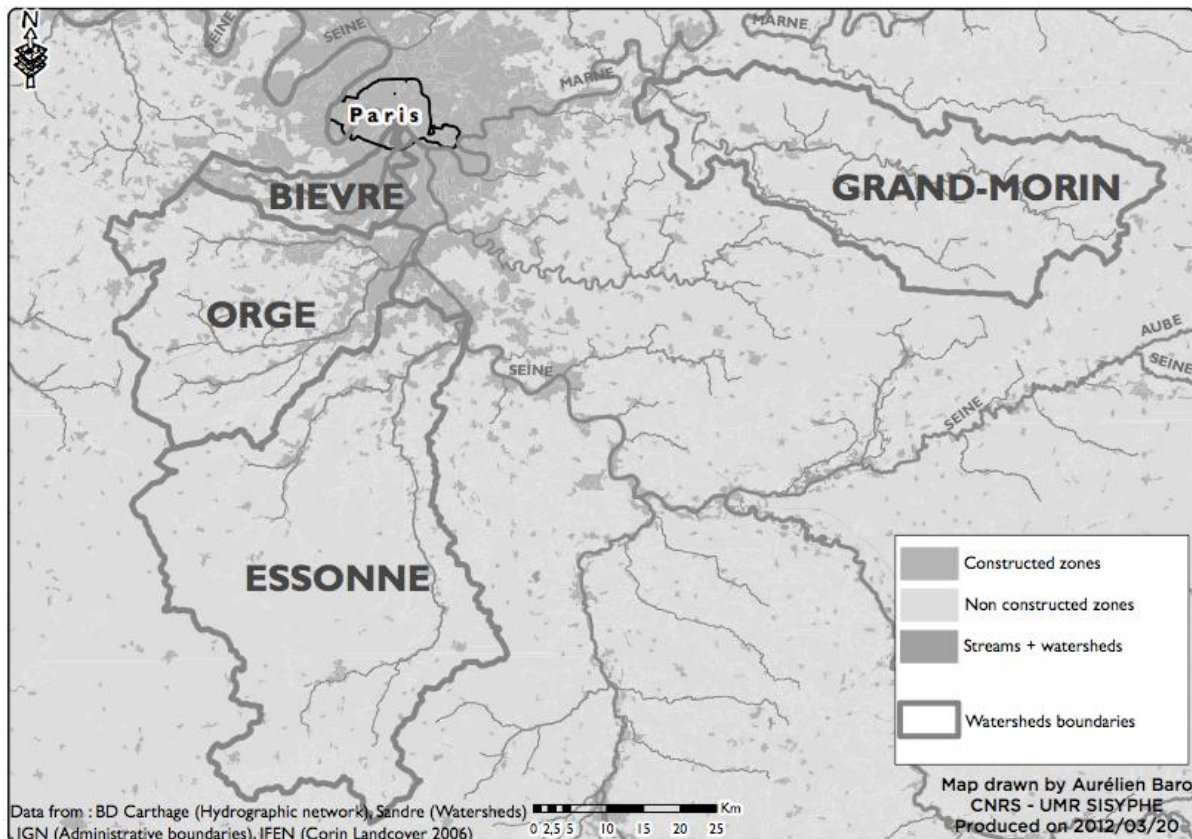


Fig. 1 - Paris conurbation streams: small streams in heavily urbanized watersheds, subjected to a number of pressures

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segmentation, with part of the banks cemented, the physical access to the waterway limited, and riparian vegetation often reduced. However, today these waterways have been able to regain a balanced profile, such as the Bièvre with a stabilized sediment budget (Carré et al., 2011).

Since 1990, river managers have observed a reduction in urban discharge (industrial and domestic) and an improvement in the physical and chemical qualities of waterways (see the reports published by the river commission SAGE Orge-Yvette, such as the annual reports of SIVOA, which is the intermunicipal commission for the lower Orge valley). However, the effort to restore these rivers to a good ecological state is challenged by their poor biological and morphological state. Public action is currently focusing on actions that remove water-level thresholds and reestablish the natural trajectories of waterways including their riparian vegetation (pursuant to the WFD).

Today, the waterway restoration actions proposed by the WFD for small urban rivers raise outright opposition from private and public actors, starting with the mayors. The operations to remove thresholds and restore wetlands, which always encompass the entire water body, are faced with the challenge of reaching a consensus among all actors, private and public, involved in the management of the river, as illustrated in Figure 3. According to the WFD, the actions aiming to restore the good state of rivers must include the participation of the users concerned. Management of the entire network of waterways implies the participation of landowners (according to French law, the banks of the riverbed belong to the landowner in exchange for the obligation to maintain them), public players, government agencies, the local authorities responsible for managing the resource and

the environment, as well as the different types of users in the local and regional watershed committees (such as fishing or canoeing and kayaking clubs).

At the local scale, mill owners have a sentimental attachment to continue operating with sluice gates, which guarantee flow in the river and the presence of water in summer (Figure 2), which is something that local fishermen also appreciate. This state of the river and the hydraulic equipment contribute to the local heritage and identity. As such, local actors can utilize this hydraulic heritage by integrating it into their marketing agenda for the area (e.g., the route of the Grand Morin painters introduced by the tourism office).

At the regional scale, the measures stipulated by the WFD may run up against user opposition, such as members of a canoeing and kayaking club, who, seeking waterfalls, may argue in favour of a high water flow in summer. At the development policy level, the public authorities, including the national government agencies, will generally respond to the housing needs of the Paris conurbation by allowing construction projects in the flood plains of waterways and wetlands—which then fails to comply with the water and flood management policies.

2. MATERIALS AND METHODS

The spatial analysis of waterway management policies was based on a comparison of the stances of the players involved in river management and use with their current waterway practices and actions, including both waterway and land management, and the place allotted to rivers and wetlands. These stances and the state of the practices and actions were collected by the researchers through interviews and questionnaires.



Fig. 2 - Left: the Orge in 2008 at Athis-Mons, at the confluence with the Seine; Right: the watermill wheel at Crécy-la-Chapelle in 2010, downstream of the Grand Morin

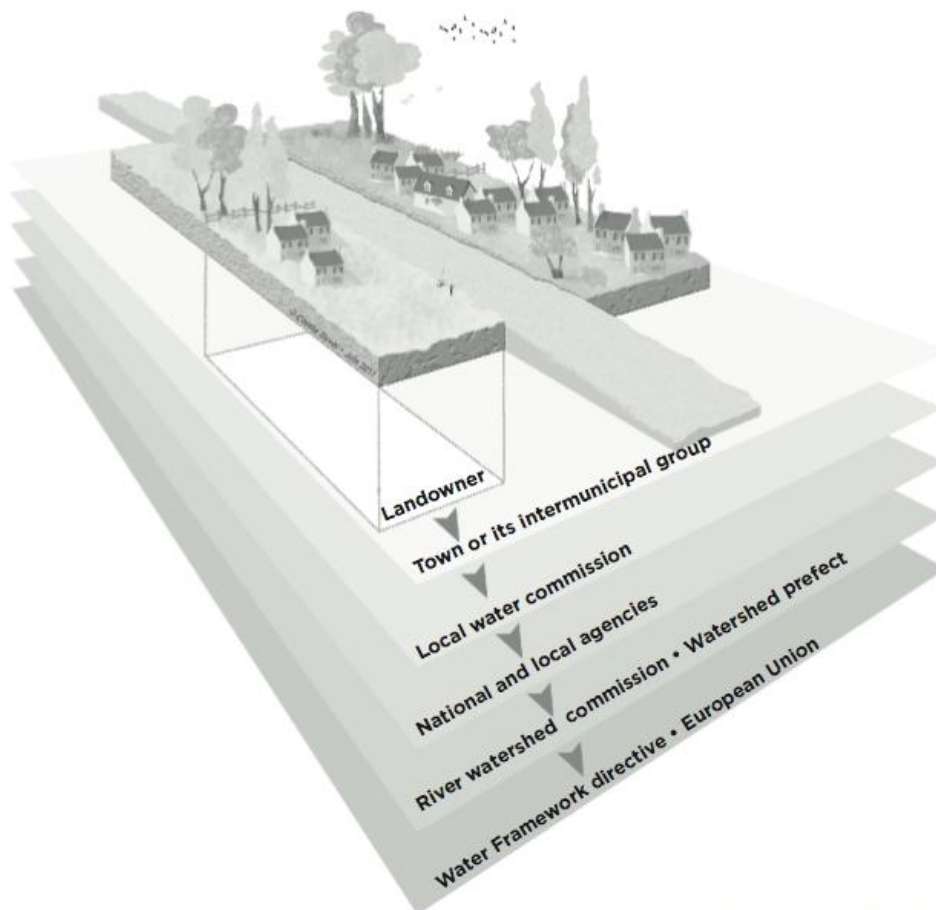
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The objectives were to identify the current and past uses of rivers, followed by an assessment of the modes of river management as well as the proportion of urban aquatic environments in the more global land management scheme, and of the extent to which this may have functioned as either a brake or a lever for collective action. These data were gathered through quantitative surveys, management document studies (annual reports of river commissions, local urbanism plans and urban planning projects) and interviews with managers, technicians and elected officials as well as sports clubs, environmental protection groups and local historical societies.

As part of the empirical collection of the stances of the players involved in rivers, the positions of the institutional players or river resource managers was compared to those of the inhabitants and users of waterways. Here, the objective of the questionnaires and interviews was to identify the main relations between the river and its inhabitants, to discern the representations of this relation (e.g., values given to the river, level of attachment), and to assess the degree to which these players are mutually aware of

these relations. A study of conflicts over river use served to identify the positions of the inhabitants regarding the actions of the different management entities as well as their understanding of the passage from a hydraulic management of the waterway (flooding, discharge management) to a more ecological management (restoration of hydrological continuities and wetlands).

The temporal analysis returns to the notion of the regime of historicity as developed by historians (Kosseleck, 1979; Hartog, 2003). The characterization of the inhabitants' field of experience is based on their relation with the water body (determined through the bibliographic study of uses and an analysis of the local press and websites), whereby their future expectations are estimated based on local forms of movement and commitment (e.g., associations, legitimacy of the waterway management methods, local projects). This again means extricating the points of agreement and disagreement of the past and the near future when seeking to identify a narrative of the relation with the river.



English translation : Aurélien Baro - CNRS UMR SISYPHE

Fig. 3 - The superposition of the lands of different public and private managers of a non-state river

Tableau I
Surveys conducted with inhabitants of towns located on small rivers

	Yvette	Croult	Vieille Mer	Bièvre	Orge	Essonne	Grand Morin
People surveyed	28	37	240	61	290	25	40
Survey location(s)	Villebon	Goussain-ville, Dugny	Saint-Denis	Cachan, Guyancourt	Athis- Mons, Morsang, Egly, Saint- Michel,	Gironville, Maisee, Boutigny	Crécy-la- Chapelle, Saint-Rémy- la-Vanne
Period	Nov. 2008	Nov. 2008	April 2010	Nov. 2008	April 2009	Dec. 2008	Jan. 2010

All types of players of the four rivers studied were encountered, whereby researchers were not considered as players as such, even if they were associated with river management work. Between 2008 and 2011, a total of 61 people were interviewed, among them, at the regional level, 15 public actors (government agencies and local authorities) and one representative of the regional canoeing and kayaking federation and, at the local level, 14 elected officials, 14 technicians (river commissions, purification, urbanism) and 18 associations.

The interviews lasted from one to two hours and revolved around people's individual and collective relations with the river; the place of the river within the surrounding territory; what was considered to comprise the river's quality; actions and expectations; players' representations of the river and the identity accorded to them; their general knowledge of rivers; their opinions on how rivers should evolve; actions undertaken on waterways; and collective commitments around rivers.

The interviews were complemented with additional questionnaires that were administered face-to-face with users of the rivers and inhabitants of towns located along rivers (Table I). These concerned the four rivers studied as well as on nearby rivers (Yvette, near Orge) or towns presenting identical

issues (possible reopening of the Vieille Mer as well as the Bièvre within Paris). The users were questioned on site along the waterway, whereas the inhabitants were met at home (mainly riverside landowners) or in the town centre.

The participants were asked about their river practices; their feelings about the quality of the water and the river habitats; the river's place in the territory; the managers' knowledge of the river; and their comprehension of WFD objectives around the rehabilitation of fish circulation, the reintroduction of meanderings and wetland restoration.

Between November 2008 and May 2010, 720 people were administered questionnaires and the surveys processed using Excel and Sphinx. These surveys were compared to those already conducted by the river commission on the same topics.

The examples featured in this article focus on the Orge River. Of all the rivers, this one has been studied the most closely (Carré, 2009) and is currently under ecological management by technicians and local elected representatives, making it particularly suitable for testing the discrepancy between river practices, inhabitants' expectations and management modes.

3. RESULTS

In a comparison between the state of knowledge of practices and actions concerning rivers and the players' discourse, we observed most particularly a lack of agreement, if not opposition, between players, which stood in the way of restoring the quality of the waterways.

3.1 Strong disagreement between limited practices and the importance accorded to waterways in the surveys

The surveys on river uses served to show that economic uses of the water, such as the microgeneration of electricity, agricultural irrigation and industrial use of water, had nearly disappeared compared to 1940. Recreational uses also turned out to be limited, generally reduced to a walk along the waterfront with occasional fishing, rowing and canoeing. However, the surveys carried out by river managers show substantial use, dominant on weekends, by walkers on certain stretches of the river. To the walkers who come from the adjacent neighborhoods can be added members of hiking or canoeing clubs who come from all over the region.

Our surveys confirm these observations. They also demonstrate the diverse profiles of river users among the river town inhabitants, from people who report coming every day to walk along the river to others who say they never go (see Figure 4).

It is thus fair to assume that small urban rivers are now in need of social reappropriation. In contrast to the few uses made of the rivers now, there was in the beginning of the 20th century still a great variety of economic uses and a wide range of recreational activities. However, the individuals (through the interviews) and the stakeholders (through the local press, Internet sites of local authorities) expressed their attachment to the river and their understanding of the river's contribution to the quality of life, the landscape and natural environment as well as to shaping the identity of the towns (e.g., town names). Often, the interviewees also referred to the river's industrial past, the pollution inherited and the risk of flooding (Table 2).

3.2 Partial and sometimes antagonistic knowledge of the river on the part of the local players

Meeting the goals of managing the waterways and restoring their ecological state requires a vision that is shared by all participants. However, the stakeholders had different rationales on questions concerning flooding, waterway restoration and the quality of the water. For example, with regard to flooding, the public authorities emphasized the lack of protection against a possible 100-year flood, whereas the inhabitants believed that the holding ponds, built by the river commissions, were sufficient protection. Yet, these holding ponds were sized for 20-year floods and do not protect inhabitants in cases of less frequent

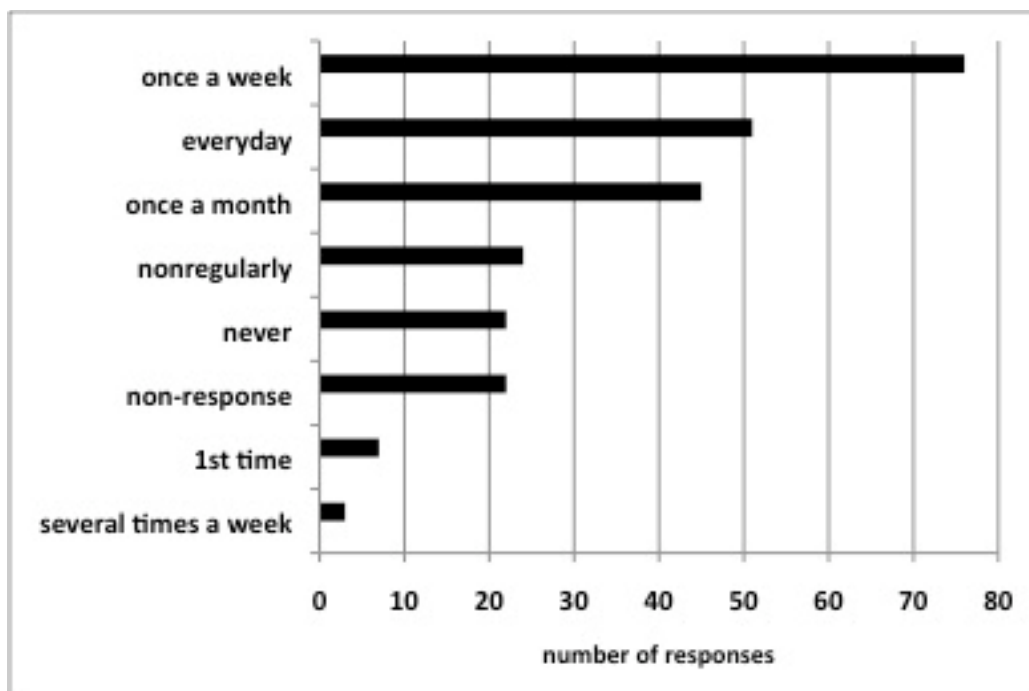


Fig. 4 - The differences in the number of people using the river: 250 interviewed in 2009 along 20 kilometers of the Orge River

Tableau 2
Appreciation of the Orge River by the inhabitants of local riverside communities in 2009

For you the Orge is:	% of “don’t know” or unconcerned	% of “disagree” and “strongly disagree”	% of “moderately agree” and “strongly agree”
An obstacle for getting around town	2	91	6
A barrier for town development	6	77	13
Too industrialized	15	75	8
Too urbanized	30	55	15
Polluted	30	33	35
An asset in the life of the inhabitants	15	15	68
A special place for recreation	9	18	71
An ecological niche for plants and wildlife	10	8	80
A landscape that should be preserved	3	4	82

flooding, nor from flooding caused by runoff. In matters concerning the quality of the waterways, the inhabitants were more preoccupied with the visual aspect of the river. In general, they are knowledgeable about the chemical composition of their urban discharge, yet are unaware of the biological and morphological impacts of that discharge on the quality of the aquatic habitats, a point the WFD now stresses.

Small urban rivers were identified by government agencies, the local water commissions and the river commissions as “deeply modified” and, as thus, as degraded waterways. The inhabitants’ appreciation of the waterways was much more ambiguous. They were more likely to view the waterway as a natural element and an ecological heritage and had no real recognition of any disturbance of the river and the adjoining environments.

Thus, these surveys and the analyses thereof served to highlight that players tend to have heterogeneous, partial knowledge that is specific to their respective areas of concern. As such, there is a need for an integrated vision at the watershed scale that is shared by all players.

3.3 Highly diverse uses by river section

The number of people using the river varies along an urban gradient, with the highest numbers found in the most densely urbanized spaces where the river is an exceptional feature and decreasing as one reaches the periurban neighbourhoods. However, the types of practice and patterns of use are to a large extent induced by the type of features made available. Thus, the number of people who come and the diversification of recreational activities will depend on, for example, whether or not a public promenade is in place, whether the riverbanks are maintained or whether street furniture is installed, all of which contributes to the classification of the river as a public amenity. Other such infrastructures include bike paths, picnic areas and pools in the river’s flood plains, to allow for fishing and recreational water activities or to limit flooding. On the other hand, river development is not as common in less urbanized areas, generally because the riverbanks there are privatized, with ponds reserved for private fishing activities.

3.4 Local projects to restore the quality of the river, in contrast to the expectations of the local stakeholders

Concepts for river development in urban areas have considerably evolved over the last 40 years, changing from a recommendation for human intervention to channel the river to a recommendation to restore the original functions of the stream and its environment with as little intervention as possible. This change marks a complete reversal, proscribing today what was recommended only a short time ago, such as dredging rivers and cementing the riverbed and riverbanks. Political action over the last two centuries has transitioned from hydraulic and technical management aiming at water purification and the construction of sewage systems in the riverbed to the ecological management of the river.

However, it is uncertain whether this recent “more ecological” evolution of management policies, as reinforced by the WFD, is well understood by all stakeholders and whether the actions of river commissions meet the expectations of users and inhabitants. The adoption of such a historical perspective is a necessary stage in any information and consultation campaign.

Decisions on the part of some river commissions, such as the Orge downstream river commission, to limit their interventions on spaces open to the public countered the expectations of the users who are involved in maintaining and equipping the river banks and pools. At the end of the survey, the 141 people questioned along the Orge were given a “magic wand” to transform the river as they saw fit. Table 3 indicates that 90 responses corresponded to requests for development, including amenities that would restructure the river such as beaches with pedal boats.

These people were looking for the river to be swimmable, an expectation that likewise existed for the other rivers studied.

The inhabitants’ expectations in terms of management and development of rivers as expressed in the questionnaires differed significantly from what was proposed by the river managers. With regard to the managers’ interventions, the inhabitants appreciated in particular the importance granted to maintaining the riverbanks, such as mowing grass to allow walking, litter removal, and the provision of small equipment such as benches. Yet, such interventions are not those on which the river commission spends most of its money today. Instead, the commission targets work on hydraulic structures protecting against flooding, maintenance of wet zones and measurement stations for data collection. Nor do such interventions correspond with a more ecological management by river commissions, who are concerned with restoring riverside vegetation, leaving tall grasses in place for small fauna, and limiting access to the riverbanks.

Users conceive of river management mainly as a process of managing hydraulic fluxes. Moreover, they appear to believe that good functioning is not possible without human intervention. Yet, this contradicts the very principle of ecological restoration, which aims, over the long term, to allow the river to function on its own.

The expectations of management and development by the inhabitants as identified by the questionnaires comprise opposing views of environmental management methods. Views differed in particular with regard to two points: the restoration of wetlands and the removal of water-level thresholds. Questioned on the objectives of the WFD (Table 4),

Tableau 3
Differences between the expectations of users and river managers: the downstream part of the Orge (141 people interviewed, several answers possible)

River commission actions Answers based on management documents and manager interviews	Desires expressed by interviewees 141 people in 2009 along the downstream section of the Orge
Limit equipment Limit access to the river	Equip river for walking, swimming, recreational activities (boats, pedal boats): 90 responses Maintain, clean, rid river of pollution: 69 responses Limit animal expansion: 5 responses
Restore ecological functions of river and annex areas (wet zones)	Promote animal expansion: 25 responses Make the river wild: 18 responses Let nature take its course: 9 responses

Tableau 4
Waterway user reactions on measures to restore the Orge River to a natural river
(114 individuals surveyed in 2009)

To preserve the Orge as a natural river, we should:	% don't know or not concerned	No	Yes
Restore ecosystems (fauna and flora)	8	9	83
Recreate winding riverbanks (not always straight)	18	22	60
Allow rising waters to flood the banks	14	43	44
Completely recreate wetlands (swamps)	21	40	39

users showed a lack of understanding of the recommendations with regard to potential flooding of the riverbanks and the restoration of wetlands. Many also opposed the recommendations given their basic preference for maintaining the current access and uses available to them. Of concern were also the mosquitoes associated with wetlands, with many users having experienced extreme outbreaks of mosquitoes over the three previous years in the context of wetland restoration projects. In conclusion, the demand for maintaining the current uses (walking, fishing, recreational activities, access to riverbanks), and even for multiplying activities (pedal boats, swimming, small boating), may defeat the morphological restoration measures.

The policy of restoring the morphology of a waterway and the aquatic environment therefore remains insufficiently understood and accepted by users at this time. While inhabitants are generally initially in favour of a reconstitution of the landscape and vegetation of a riverbank, this being more “natural,” they are less inclined to actually accept some of the anticipated advantages to ecosystems, for example, mosquitoes. The river commissions must therefore bridge the gap between the collective financial cost required to restore the waterway and the current absence of an “explicit social use” produced by this ecological restoration.

These divergences between user expectations and management practices were observed for all the streams studied. Although some river commissions are convinced of the value of no longer applying water-level thresholds, others such as the Grand Morin river commission retain the heritage values of the hydraulic structures and support the positions of private opponents. Their technical studies do not

systematically lead to an acceptance of removing these thresholds and they express reservations as to the feasibility of restoring river continuity. In conflicts around river water-level thresholds, this means, for the local actors, recognizing the quality of the space experienced by the inhabitants and their sensibilities and aesthetic perception of a particular environment outside of a developmentalist way of thinking. That recognition would also allow us to see participants’ refusal of development as more than just the conventional stance of owners toward attributes of individual or collective identity. Aesthetic strategies (“a river is pretty because there is water in summer”) are not only a form of resistance but also an “affirmation of a sensitive life that is absent from the representation given by intelligent and controllable environmental development” [translation] (Labussière, 2009).

Recognition of this aesthetic quality then calls on managers to design and consider possible actions based on what makes up the quality of a place for its inhabitants. Yet, there is no central place where a debate over such issues and objectives could be held. The local water commissions, as places for dialogue between the local elected officials, government agencies and user representatives, are first and foremost forums where information can be exchanged and where hydrographic measures adopted at the district scale can be integrated, all with the aim of meeting the WFD objectives.

4. DISCUSSION

What do the results of pooling the diverse discourses and knowledge on waterways contribute to the debate? What do we gain from adopting an understanding of the river as a social construction of

people's relation to the river—thereby veering from the stance promulgated by the natural sciences that human impacts are inevitably negative? Can the spatio-temporal approach applied on the four Parisian waterways?

4.1 Building community with the river

The lack of interest on the part of contractors and the refusal to undertake certain developments are attributed to the normative and technocratic characteristics of the WFD and the complexity of environmental regulations as a whole. The indicators (e.g., normalized fish, diatom, biological indicators) are incomprehensible for the lay person and refer exclusively to the physical functioning of environments, with no mention of any added value they may have on the quality of life of the contractors. The question is not only to introduce social drivers, complementary to the WFD's environmental drivers, but to make the value of a local waterway tangible for the inhabitants. Apart from that, the results show that projects do not meet the inhabitants' expectations.

The problem with mobilizing all the local actors and their commitment to an action on the river is not only a matter of administrative and legal segmentation, individual self-centered perspectives or the different types of attachments to urban natural areas (Ryan, 2000). Rather, the spatial analysis of the society–river relation points to a territorial segmentation of practices and management methods that are inscribed in a vast dynamic of adjustment between urban policy and environmental policy. Beyond the varied, segmented and individualized forms, this spatial analysis also points to the need for a more informal local river association as a necessary basis of any common action. This co-presence can be illustrated either by a territorial trajectory diagram or a local system of historicity.

4.2 Formalization of the method

4.2.1 LOCAL SYSTEMS OF HISTORICITY OF THE FOUR RIVERS STUDIED

River inhabitants today are in lack of a scientific model that has continuity over time. Yet they do, by contrast, have memories of the river and their individual and collective practices with regard to the river. This means that even if provided with a river restoration model (with an initial or reference state), inhabitants are still in lack of a history of their relationship with the river.

In the history of the relationships of urbanites with large rivers, a nearly unanimous narrative has existed for roughly 20 years that is used to legitimize the operations for restoring riversides within urban centres. The restoration of large rivers is integrated into actions of urban requalification. The elected officials of French cities have accompanied the development of riverbanks, ports and industrial wastelands with efforts to return the river to its inhabitants and to find a relationship with the river that had been interrupted by the functionalist urbanism of the last century. This does not mean, however, that this narrative can be applied to small rivers.

To understand how a narrative of the rivers studied is created, different sources of information need to be pooled. For a new narrative to be created, both a narrative and the reformulation of this narrative by several types of actors (elected officials, clubs, inhabitants) must be present. Existing narratives can be found in history books on the river or its towns, tourism guidebooks, documents on town development and planning, and documents of river managers. The circulation of this narrative is observed by means of questionnaires and interviews, in the local press (e.g., *Le parisien*) and on the basis of sales arguments used in real estate.

The narratives concerning the relation to the river may differ from one stream to the next, or may not exist at all. For example, there is no narrative on the Orge or the Essonne. By contrast, a dramatic narrative has been developed for the Bièvre, depicting it as the archetype of the abandoned river, the victim of urban pollution and of having been transformed into a sewer and buried along one part of its course during the first half of the 20th century. The restoration of the Bièvre is framed like a resurrection and atonement on the part of the inhabitants. This narrative has even received media coverage outside of France, namely in Europe, South Korea and Japan. Conversely, the Grand Morin is described by the inhabitants as a river “that has always worked for humans” and whose current artificialization raises no problems for the elected officials or the inhabitants.

To get the different types of actors to manage the river together and take advantage of the public financing programs designed for river restoration, researchers could attempt to rally these actors around immediate concerns that raise opposition, such as the removal of thresholds or the lowering of the water level in summer.

Tableau 5
Definition of a river reach

Types of use	Types of river management	Mobilization of the river	Description of river section
<p>Minimal recreational activities limited to walking and a little fishing.</p> <p>Creation of memorial narrative of a river sacrificed leading to an idealized river</p>	<p>Hydraulic control of river designed for flood monitoring and, more recently, qualitative control with management of waste discharge into river (domestic, industrial)</p>	<p>Aesthetic and landscape interventions to improve living environment.</p> <p>Mobilization of image of river in a local marketing perspective.</p> <p>Current reopening projects associated with restoration have a very good ecological potential.</p>	<p>Artifact Example: Bièvre River -downstream: narrative of industrial past that allows maintaining the river underground (historical route at Gentilly) -upstream: “natural” river giving its bucolic character to riverside towns (Buc, Bièvres)</p>
<p>Reduced to recreational activities limited mostly to walking.</p> <p>No particular narrative for the river.</p>	<p>Desire for ecological management expressed.</p> <p>Discourse constructed on renaturation and ecological services of river and environment.</p>	<p>Serving the living environment and general gain for the local area.</p> <p>Discrepancy between expectations of river commissions for ecological restoration and expectations of inhabitants around recreational uses (swimming).</p>	<p>Controlled Upstream portions and particularly the downstream portion of the Orge.</p> <p>Projects pushed by river commissions and local government lead to occasional agreements and disagreements.</p>
<p>Uses of river still economic alongside recreational uses.</p>	<p>Expectation of flood control management.</p> <p>Case-by-case management of restoration because of complexities of environment (physical constraints, protection of existing facilities).</p>	<p>River contributes to local identity of towns and inhabitants’ quality of life.</p> <p>River can be promoted as a natural barrier to urban expansion.</p>	<p>Exploited Sections of the Essonne on both urbanized sections downstream and rural sections upstream.</p>
<p>Uses of river still economic alongside recreational uses.</p> <p>Creation of historical narrative of a river serving humans and local attributes</p>	<p>Relatively limited management of river and riverbanks, associated with preservation of local attributes, including flood control structures.</p>	<p>Development of the river (including continuation of physical structure development) serving controlled local development.</p>	<p>Muzzled Sections of Grand Morin (Crécy-la-Chapelle, Coulommiers)</p>

The notion of the “historicity regime” is conceived as a heuristic tool for better understanding how societies articulate the past, present and future. To reconstitute the history of the relation inhabitants have with their river, the past can be linked to the

future, namely through uses and conflicts surrounding uses, management practices and the arbitrations between users, the narrative and the river. This would involve analyzing the restoration measures proposed by water agencies, the local development projects that

may or may not concern the river, and the local mobilizations in favour of the river (creation of associations such as *Les amis de la vallée de la Bièvre*).

However, the different practices, management modes and inclusions of the river in local projects apply to only a section and not the entire length of a river (excepting the scientific models of the catchment basin or hydrological continuity). Thus, for the Bièvre River, the narrative is different upstream than what it is downstream. Downstream, the memory of a glorified industrial past makes it possible to maintain that segment of the river underground. Such an industrial memory is absent upstream, where real estate is promoted by exploiting the image of the Bièvre as a small bucolic river. For the Orge River, the absence of a shared history of the downstream section of the river is in part compensated by the actions on the part of the river commission, in existence for 150 years, and the local government, since the 1970s, to counteract the deterioration of the river. This mobilization is not found on the upstream portion of the Orge, which explains the classical management modes in practice for that section (e.g., the construction of a wastewater treatment plant in Ollainville in 2008) despite the expressed desire for a more ecologically centered management.

The classification featured in the far right-hand column of Table 5 was developed by considering both the past history of the river and its current situation. In this way, the image of the Bièvre River as an artifact

functions as a memorial, based on the weight of history, that relies on this memory to define what the river could be (with differences between the industrial narrative downstream and the citizens' campaign upstream). For the Grand Morin, in its central part at Crécy-la-Chapelle, the image is that of a museum, or a conservatory, of uses and equipment of what was and what should continue to exist. At the other extreme, the Essonne evokes a single discourse of the river commission around flood control. As for the Orge, it is the only river where ecological management was requested by the local elected officials and technicians, even though such a management is generally poorly understood or accepted by the inhabitants.

4.2.2. The territorial trajectory diagrams of a waterway

In terms of governance, the case of the small urban rivers of the Île-de-France region does not reveal a problem of usage conflicts (opposing networks or types of actors) but rather a problem in achieving consensus on the desirable states of aquatic environments. At present, public actors (national government services, elected officials) implement decisions without thinking about the desired or possible uses of small urban rivers or of the role these could play in local development.

Yet it is the common visions of these aquatic environments that can serve as bases of restoration projects that are better understood and accepted by

Tableau 5
Definition of a river reach

Figure Past/Present	Bièvre artifact	Essonne exploited	Grand Morin muzzled	Orge controlled
Fields of experience	Memory of industrial past. Importance of managing flood control and water quality.	Experience of elders important. Water managed in its continuity like taking care of an aging parent.	Water that has always been put to use for humans. Artificialization of waterway is accepted.	River developed as an environment and no longer as amenities by committed players.
Horizon of expectation	A river that should evolve around the creation of multiple narratives. - Resuscitate a sacrificed river - Develop a bucolic river	High risk of flooding. Importance of water as a factor of development.	Productive waters: Tourism, agriculture. Importance of hydraulic heritage and its transmission.	A full component of organization of urban space.

the area's inhabitants. The construction of historicity regimes has made it possible to replace local actors in the decision-making phase and has prevented decisions from being imposed by regional and national actors, in compliance with the WFD. The construction of local trajectories should allow local actors to build the river as the foundation of a public action project and to reflect with the other actors on priorities for actions, to assess the possibilities and to elaborate strategies.

Figure 6 illustrates a possible example of the construction of a local trajectory based on the possible states of the river. These states are obtained by pooling the following data:

- creation of a narrative (with the four following categories possible: artifact for the downstream Bièvre; muzzled for the Grand Morin central; exploited for the Essonne; and controlled for the downstream Orge);
- objectives in terms of results imposed by the regional catchment committee, under the authority of the prefect (WFD objectives), online on the water agency's site (with the objectives of a good ecological state for the Grand Morin and good ecological potential for the others);
- practices observed on the rivers during the surveys (with uses varying from recreational activities reduced to walking, including fishing and canoeing, and for the Grand Morin only economic uses such as microhydroelectric plants);
- management practices requested by managers in their documents and during interviews (local expectations of managers possibly limited to hydraulic flood control management or more ambitious with removal of thresholds on rivers and restoration of wet zones for the downstream Orge); and
- a place accorded to the river in local policy. Based on the study of local and regional development documents, the river can be a simple landscape element that enhances the quality of life (as for the upstream Bièvre), contribute to tourism development (such as the Grand Morin), or be integrated into urban planning (such as the Orge).

The vertical and horizontal planes refer to the environment field, whereas the diagonal axis refers to development. This illustrates the case of the downstream Orge, which is characterized by the ambition of current managers to ecologically restore the river, by the preference of the possible users to maintain the river's recreational uses, and by the justification of the measures adopted by the managers.

4.3 Test of returning the river to the local actors in the PIREN-Seine project

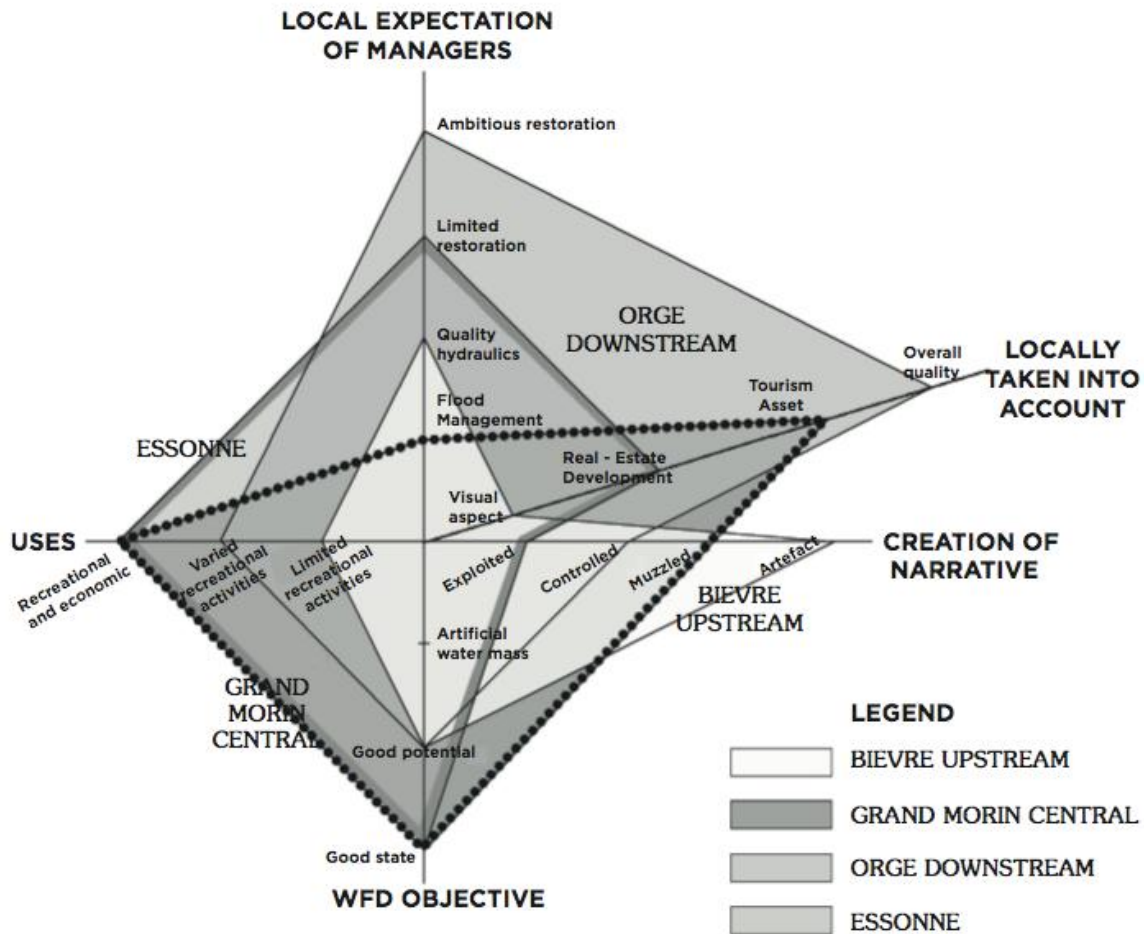
The results presented above were submitted to the actors encountered at the public meetings on local projects or at the annual PIREN-Seine conference in January 2011, which brought together researchers, the main government agencies and regional management. Beyond the validation of proposed diagrams, the test involved identifying whether, based on these diagrams, action or inaction could be determined within the context of implementing the WFD as well as indicating conceivable and feasible actions in waterway restoration.

4.3.1 RESTORATION OF AN ARTIFACT

For rivers that are artifacts, such as the Bièvre, the players involved in restoration first have to recognize the need for a commemorative narrative for the waterway. In future restoration projects, they must then find a way to reconcile that memory (e.g., of a sacrificed river) with any diverging idealizations of that river, depending on the local context. For the Bièvre, this would mean taking consideration of the memory of human labour and the symbolic power of a science park downstream with the notion of a bucolic river that exemplifies the longings for nature of neo-urbanites upstream. Occasional campaigns to excavate the river fail to comply with the overall concept of the WFD with regard to restoration. Thus, restoration will need to be integrated into an overall urban project to find a contractor.

4.3.2 RESTORATION OF A MUZZLED RIVER

In contrast to the sacrificed river, the Grand Morin River evokes an intact memory of an industrial-use river and the joint development of the river and its surrounding area, even if economic activities have decreased to make way for rural tourism. To gain acceptance, ecological restoration of waterways requires integrating the restoration of the local heritage, with hydraulic structures considered to be public property.



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Fig. 6 - Territorial trajectory figures of the four waterways studied

4.3.3 RESTORATION OF AN EXPLOITED RIVER

Other waterways are associated as a resource whose past has not been challenged and whose place in the area's symbolic identity has been accepted. In this way, they are seen to have no other purpose than to contribute to the inhabitants' quality of life. Yet the functioning of the river is clearly understood by all stakeholders, as are the imbalances that may result from restoration programs. To be accepted, these programs need to be conducted on a case-by-case basis, with flood control as a non-negotiable component. The need for the creation of a local narrative around risk culture has also emerged.

4.3.4 RESTORATION OF A CONTROLLED RIVER

This type of restoration corresponds to waterways whose contractors are already involved in a more ecological management of the river and its environments. However, if the aim is to go beyond the few prudent operations currently underway in terms of threshold removal, as is the case with the operations implemented on the Orge by the local representatives and the river commission, projects must hold open, public debates on the shared gains of restoration as well as collective learning.

CONCLUSION

The spatialization of political action applied to waterways management has allowed to create a shared and incentivizing space that demonstrates the ability of users and stakeholders to collaborate. This stands in contrast to conventional approaches that seek to solve the problems of fragmentation and local self-interest by constructing a new territory. Spatializing does not mean replacing territorial diagnostic approaches or environmental indicators with new local management tools. The approach to return decision-making to the local and regional levels was well received by the stakeholders involved in restoration, namely because it incorporates the river in a project that is not necessarily environmental and because it produces local information.

By proposing territorial trajectory figures for waterways, in respect of the local conditions of a collective co-presence at the river, we provide both a descriptive model of the existing river–society relation and an explanatory model of the interactions that will allow for action.

However, it should be noted that it remains difficult for local societies to pull out of an instrumentalization of the river (at any rate in France), especially in an urban environment, namely because of real estate pressure and the various interests that must be taken into account. The European context, where regulatory restrictions have steadily increased over the past 30 years, allows stakeholders to request a type of development of the resource water and the aquatic environment that is distinct from land development projects and to call for a territorial trajectory of the relation between the river and its inhabitants as parties in land development projects.

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