Socio-natural dynamics of COGEPOMI plans for diadromous-fish management on the Garonne and Seine rivers

Comparison of two Committees for diadromous-fish management on the Garonne and Seine rivers raises questions on the different types of biodiversity management. What are the strong points, the weak points? What lessons may be drawn for collaborative biodiversity management?

France's diadromous-fish management committees (COGEPOMI) were set up by ministerial decree no. 4-157 of 16 February 1994 (consolidated on 23 March 2007) [1] to manage diadromous fish at the river basin level. These committees require collaboration between a number of different stakeholders, including representatives of State authorities (Prefectures, Regional environmental, planning and housing agencies (DREAL), maritime affairs, etc.), recreational and professional fishermen (sea and freshwater), regional and departmental elected officials, local residents, the National agency for water and aquatic environments (ONEMA) and the French Research institute for exploitation of the sea (IFREMER), as well as invited experts (on a consultative basis). "Permanent guests" are also involved in the committees and include industrial firms and associations. The objective of each COGEPOMI is to coordinate the various actions set up in a given river basin and to set out a single framework to manage the fishing of diadromous fish to the point where the river joins the sea. Indeed, these two territories are managed by different authorities (the Agriculture ministry for fresh water and the Maritime affairs ministry when it comes to the sea).

The 1994 decree defines the species covered by this form of management. Of the eleven diadromous species present in France, only eight are covered, Atlantic salmon (*Salmo salar*), Allis shad (*Alosa alosa*), Mediterranean shad (*Alosa fallax*), sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*), eels (*Anguilla anguilla*) and sea trout (*Salmo trutta*). In other words, the ruling includes exclusively fished species.

These committees apply a form of concerted management with an emphasis on "useful" biodiversity, i.e., biodiversity from which specimens are taken. The aim is not to manage fish for their own benefit, but to develop durable interaction between fish resources and fishing practices, so as to determine "*which measures are useful or crucial for the conservation of species and their optimal exploitation*" [2]. Cooperation within the COGEPOMIs is managed by the State, with the DREALs (formerly known as DIREN, Regional environmental agencies) providing secretarial functions.

Comparing the COGEPOMIs of the Garonne and Seine river basins allows us to look at how this type of structure operates, by asking three main questions listed below.

- Do the structure and workings of COGEPOMIs adapt to the local context, depending on the state of the fish population and related uses, or does the ministerial decree neutralise any local adaptation?
- How does scientific knowledge circulate within this type of committee? What role is available to scientists?
- In the event of a crisis or, in other words, the rarefaction of a fish species at a given time, do the COGEPOMIs adapt to the situation or do they revert to tried and tested methods, their *modus vivendi*?

1. http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000730215&dateTexte=
2. http://www.ile-de-france.ecologie.gouv.fr/spip.php?rubrique159

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❶ Fisheries activities of diadromous fish in the estuary of Gironde (France).

These questions have emerged from ongoing multi-disciplinary research [3], which establishes links between ecology and social anthropology with respect to sustainable diadromous-fish management. This article backs an approach whereby biodiversity management bodies are perceived as adaptive and dynamic social forums (Barthélémy and Souchon, 2009) that serve to highlight the interactions that form between the state of natural resources and the social activities linked to them.

A shared will to decompartmentalise the debate between the local context and a national decree?

The COGEPOMIs [4] in the various river basins act independently, with no coordination or harmonisation at the national level by the Ecology ministry (Balland and Manfredi, 2006). However the various coordinators have taken it upon themselves to meet at the Ecology ministry since 2007. This allows them to pool their experience and develop a more general view of the situation, beyond the specific cases observed in each river basin (Pellegrini and Rochard, 2008).

Though the decree was formulated to apply nationally, it can be adapted to the socio-natural peculiarities of each river basin, e.g. the stock of diadromous fish in the basin, the activities that take place there (see photo ❶) and the form of cooperation set up, all of which result in a set of specific localised issues. The state of professional fishing differs markedly in the two areas in question with strong presence on the Garonne (around 110 professional fishermen), where it is represented in the COGEPOMI, but fairly uncommon on the Seine (thirteen professional fishermen), where amateur and recreational fishermen are prevalent. When it comes to the collaborative structure, the stakeholders involved also differ (see table ❶). While the Seine COGEPOMI has 29 members, of whom 16 have voting rights, the Garonne COGEPOMI counts 50 members of whom 27 have voting rights. One peculiarity of the COGEPOMIs is the high number of guest members (21 for the Garonne and 11 for the Seine), as a result of repeated requests to take part. In addition, on the Seine there are no public territorial authorities managing the river basins, whereas there are several for the Garonne.

❶ Comparison between the composition of the Garonne and Seine COGEPOMIs.

	Garonne Dordogne Charente Seudre Leyre COGEPOMI	Seine-Normandie COGEPOMI
President	Prefect of the Aquitaine region	Préfet Ile-de-France, coordonnateur de bassin Seine-Normandie
Coordination	Aquitaine DIREN	DIREN de bassin Ile-de-France
Annual meetings	1 to 3	2
Members	50 27 with voting rights 2 with advisory status 21 guests without a vote	29 16 with voting rights 2 with advisory status 11 guests without a vote
Working groupe (coordinator)	5 Dordogne (Épidor) Garonne (DIREN Midi-Pyrénées) Charente (INST Charente) Anguille (MIGADO) Sturio	2 Haute-Normandie (DIREN) Basse-Normandie (DIREN)
Migratory-fish association	Migado	SEINORMIGR (depuis 2007)
Scientific advisors	Onema, Cemagref, Migado	Onema
Public territorial authorities in the river basin	Épidor, Board for sustainable development of the Gironde estuary, Board for the study and development of the Garonne river	x

3. Two studies initiated by the Cemagref "Estuary ecosystems and diadromous fish" research unit in Cestas, near Bordeaux, served for this comparison, (Pellegrini and Rochard, 2008), which was funded by the Cemagref MAITRISES 2006 call for projects, and (Barthélémy and Menozzi, 2009), which was conducted as part of the planning contract between the State and the Aquitaine Region. The research was carried out based on written documents and field surveys. We met with the members of the Seine and Garonne COGEPOMIs during face-to-face interviews, workshops and plenary sessions.

4. There are eight COGEPOMIs, i.e. Artois-Picardie, Rhine-Meuse, Rhône-Mediterranean-Corsica, Rivières de Bretagne, Loire, Garonne, Adour et côtiers, and Seine-Normandie.
The Garonne Dordogne Seudre Lèdre COGEPOMI covers the rivers in its name and some of their tributaries, while the Seine Cogepomi covers the Seine as well as coastal rivers in Normandy.

This keenness to open up to a diverse range of participants is reflected in the issues broached during the meetings. Sociological monitoring of these two COGEPOMIs has uncovered two similar themes, in addition to fishing management, i.e. the free circulation of diadromous fish and the quality of the environments inhabited by fish, taking into account the different sources of water pollution, the quality of spawning beds and the management of water levels during low-water periods. On the Seine, for instance, stakeholders qualify the latter as "invisible obstacles", in contrast to actual obstacles such as dams. Some participants would like these topics to be discussed within the COGEPOMI, but note the absence of stakeholders whose use of the river leads to this type of impact, e.g., dam operators and farmers who irrigate and therefore have an influence on low-water levels and fishing beyond the river and the estuary. We could add that the participants in the Garonne COGEPOMI do not all define the committee in the same way. Indeed, some define the COGEPOMI as a committee to manage the fishing of diadromous species, while others define it as a committee for the management of diadromous fish in general. The second of the two definitions illustrates the desire to open COGEPOMI discussions to issues other than fishing. For example, the sturgeon (*Acipenser sturio,* see photo ❷) is not one of the species covered by the COGEPOMI, despite its endangered status. Nonetheless, the Garonne COGEPOMI set up a Sturio committee in 2005 to deal with the last remaining population in Europe, present in the Garonne river basin.

The workings of these COGEPOMIs appear to be driven by two separate dynamics, the desire to open up to other issues relating to diadromous fish, as demonstrated by the various themes covered in the management plans, and the desire to refocus on fishing issues. With this in mind, the issue of fishing is addressed according both to its status among the river's other uses (electricity, agriculture, industry, etc.) and the status and role of fishermen in local political affairs.

❷ A sturgeon caught in Gironde during a fishing campaign aboard the trawler "l'Esturial".

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Limitations of the "Better knowledge for better management" principle

Managing means having knowledge on the managed entity and being able to measure the change brought about by the actions performed. Aquatic environments have formed the subject of interdisciplinary research on the Seine for some twenty years ("Interdisciplinary research programme on the environment of the Seine and its downstream section"). Studies on the Gironde estuary began at the end of the 1970s, in response to the Blayais nuclear power station project and the desire expressed by fishermen to become more organised and receive greater recognition. The initial data produced related to fishery aspects. The first surveys were conducted by Cemagref on request from both Électricité de France, which wanted an impact study for the plant, and fishermen, who wished to highlight the extent of this impact. Several series of data went on to be produced on the fish populations present and on the proportion caught by professional fishermen, allowing a monitoring system to be set up based on fishing logbooks. The logbook system was later extended to amateur fishermen using nets and traps, and shad anglers so as to expand knowledge of the number of shad caught by all fishermen. Some of this knowledge was produced as a result of collaboration between fishermen and scientists. Indeed, fishermen have a crucial part to play in improving knowledge of rivers.

However, this collaboration is a double-edged sword for them. While they have gained greater influence by contributing to improving knowledge of the "invisible" biodiversity that aquatic wildlife represents, they nevertheless remain predators of this biodiversity. Declaring catches provides a snapshot of existing resources at a given moment, but it also serves to assign responsibility to fishermen for the act of removing specimens from the environment. At any time, they are liable to cross the thin line between knowledge partner and adversary. Within the Seine and Garonne COGEPOMIs , arguments surrounding fishing's role in the reduction of diadromous-fish stocks have, on several occasions, led fishermen to withhold information that could ultimately be used against them. In addition, the fishing community has levelled criticism at the poor reliability of logbooks and catch declarations. Subsequently, the quest for "trustworthy" figures has led scientists to offer decision-making tools geared towards synthesizing information (Woillez and Rochard, 2003). This situation highlights the fact that the problem is not only the "veracity" of the figures, but the lack of a common viewpoint on the situation (Pellegrini and Rochard, 2008). The issue raised by the COGEPOMI stakeholders is about more than just know-how and knowledge, it is about striking a balance between each party's viewpoints that will lead to the emergence of a common appraisal of a resource and, therefore, a shared commitment to its management. The current members of the Seine COGEPOMI admit that while they have learned to understand each other and how to make themselves heard, they have yet to learn how to talk to each other. This crucial need for mutual understanding is also mentioned by fishermen in the Garonne river basin, in particular to provide representatives of the authorities and elected officials with better knowledge of fishing

practices before they draft resource management proposals. Their feelings were expressed as follows in a trade magazine: "*The different groups of fishermen (anglers, amateurs and professionals) in the Garonne, Dordogne and Loire river basins are dismayed that the authorities do not receive basic training. They highlight the need to offer council staff and elected officials training out in the field. This would enhance project dynamics and the skills of project initiators*". Having met during the numerous meetings held since 1994, the various stakeholders involved in the management of diadromous species have learnt not only how to understand these species, but also how to understand each other. Thus, the COGEPOMI favours the development of a common culture when it comes to using indicators and certain ecological notions.

In addition, the more we know about the state of diadromous species in rivers, the more we realise how little is known about their marine existences. The majority of freshwater and estuary fishermen have expressed their irritation at being constantly incriminated in the rarefaction of species when nobody really knows what happens at sea. The Department of Maritime Affairs provided certain figures during the Seine-Normandie COGEPOMI 2007 plenary meeting, but these were a year out of date and incomplete. As a result, the representatives of both recreational freshwater fishermen and professional estuary fishermen threatened to cease contributing to fish management efforts if measures were not taken at the national level to compensate for the lack of resources invested by the Department of Maritime Affairs into monitoring catches, identifying the species caught and policing fishing. Similarly, the fishermen of the Gironde have raised questions about the number of shad caught by trawlers in the mouth of the estuary, on which no data are available.

The use of knowledge for management purposes requires far more than simply gathering information about the natural environment. Fishermen in particular question the value of the knowledge used, by placing it in the wider context of the social ecosystem encompassing interactions between the river, diadromous fish and the impact of activities on populations and environments. What types of knowledge are developed for what types of issue (the impact of fishing, obstacles to free circulation, environmental pollution or damage)?

In addition, it is important not just to have knowledge, but also to act. Knowledge must be negotiated between the different stakeholders of the COGEPOMI and all status reports must be shared (are stocks rising or falling? What are the causes? etc.) before action can be proposed. The COGEPOMI has the power to suggest initiatives, but it does not have its own resources and cannot enforce its decisions. The aim, therefore, is not only to practice genuine consultation, but also to ensure that a voice is given to all stakeholders with an interest in these fish and/or in the resulting measures and developments.

When crisis hits...

The realisation that there had been a drastic reduction in the Gironde basin's shad population starting in 2006, on the basis of the data produced by Cemagref and Migado (the association in charge of diadromous fish management in the Garonne and Dordogne basins), led to a five-year moratorium on shad fishing, renewable each year. The consequences of this decision shed light on certain aspects of COGEPOMI workings and management methods. This crisis also highlighted the ambivalence of the fishermen's position. They contributed to the production of knowledge on shad, insofar as a group of cooperative fishermen handed over their fishing data to the Cemagref researcher. These data enabled figures on fisheries activities and population estimates to be produced, once they had been compiled with the data produced by Migado, the counts made using video stations at dams and the bull counts performed at spawning beds (behaviour consistent with the act of reproduction). Relations between fishermen and scientists were damaged by the decision to impose a moratorium after these data were presented. Some of the sample-taking fishermen refused to hand over their data under the pretext that scientists would use the data to ban fishing. However, the position taken by these fishermen is somewhat ambiguous and not entirely unanimous, given that the idea of imposing a moratorium originally came from a professional fisherman. While the other fishermen are keen to distance themselves from this individual, they nevertheless accept the moratorium. It should not be forgotten that it was the fishermen themselves who asked for the fishing logbooks to be set up to improve management of the resource. Are the fishermen angry with the Cemagref scientists because of the historical events that once brought them closer together and the fact that these scientists for a long time actually defended the fishermen's activities? The decisions taken based on the data they helped produce are invariably seen by some fishermen as no less than a "betrayal" by the scientists. Yet, all COGEPOMI members agree that the population has fallen (even though they disagree on the causes). The fishermen are suspicious of the way the decision was justified. Was the moratorium on fishing not imposed because the only information available was on fishing? What about the impact of physical obstacles on the movements of diadromous fish or that of pollution on fish populations in general? As far as these fishermen are concerned, the only reason a decision affecting fishing has been made is because very little has been done to generate other types of knowledge that would lead to decisions affecting other river users, such as dam operators, farmers or water-treatment plants. It is true to say that the knowledge produced on diadromous fish relates primarily to fishing and that this is the activity impacted by fish-management measures. Beyond the question of knowledge, this decision was also made for practical reasons, i.e. it is easier and quicker to ban fishing than to reduce an identified source of pollution or bring a dam up to standard.

Fishermen have no hesitation in placing this question of knowledge in the overall social ecological context they inhabit. According to them, making a decision on the management of diadromous fish based solely on data on fishing activities only begins to make sense if we take local social organisation into account. Fishermen believe their position in this organisation is weak and that they have a limited influence in the balance of power between farmers, dam owners, the town councils that run water-treatment plants, industrial firms and users who have an

impact on the river, all of whom they believe take priority over their own interests. In response to the measure banning fishing, they question scientists on the influence of water quality on diadromous fish. This is a question to which scientists can offer no immediate answer because of its underlying complexity.

But to what extent does the COGEPOMI use the knowledge produced to set out fish-management measures? According to agencies such as ONEMA and the Cemagref scientists, the knowledge generated had little influence on fish management up until the shad crisis. That also appears to be the opinion of professional fishermen (*Le pêcheur professionnel*, 1998), who criticise decisions that they believe run counter to effective management of the resource. Previously, this management was based primarily on bilateral dialogue and negotiations between the authorities and fishermen. Some stakeholders believed the decisions had little to do with resource management. Up until this point, the aim had been to "maintain social harmony" between the authorities and fishermen rather than to manage the resource, a form of management that virtually ignored environmental aspects. Past evidence tends to show that when scientists were brought in to take part in negotiations between authorities and fishermen, it was often only to validate a decision already made by the authorities or to support a request by fishermen. The knowledge they produced had no impact during negotiations. Up until the crisis, scientific advice appeared to play only a minor role in determining practices.

One of the theories we have developed to explain the shad crisis, in particular the "row" between some of the fishermen and scientists, is that, for once, scientific knowledge had been used to back a management decision. This altered the face of the negotiations usually held within the COGEPOMI regarding the assessment on the state of the environment, which had mainly been based on a local socio-political rationale, and the necessity, up until the crisis, to establish a peaceful social climate before thinking about the fate of the fish. Has the COGEPOMI been fatally undermined by this ban, despite having attempted not only to establish dialogue and a common overall appraisal, but also to produce shared decisions? Or will this situation simply lead to a redistribution of roles?

Conclusion

One of the recurring demands of fishermen is that their knowledge of the environment be taken into consideration, something they believe is not currently the case. Indeed, like scientific knowledge, their knowledge has yet to play a role in the decisions made regarding fishing. One of the solutions a number of stakeholders have suggested implementing when the crisis is over, be they fishermen, engineers or scientists, would involve assigning greater value to the role played by the environment's observers and "custodians". This would enable the knowledge and know-how of fishermen to be put to use in managing the resource and the environment. One of the measures accompanying the moratorium enables fishermen to play a part in producing knowledge. Rather than compensating fishermen for losses resulting from the moratorium, they have been offered financial incentives to take part in studies on fish and the environment. In the view of some COGEPOMI members, this type of role could make fishermen a valuable counter-force in discussions with the river's other users.

This also raises the question of how to share the different types of knowledge generated and pool them for the purpose of collective management. How can scientific, technical and professional know-how be shared to produce a body of knowledge that is more relevant to resource management? Can and should the COGEPOMI be the forum for this knowledge sharing? It would seem that this forms part of its role of ensuring cooperation on the management and fishing of diadromous fish.

To what extent does this working method, which takes various types of knowledge into account, give new political weight not only to the knowledge generated, be it scientific, technical or general, but also to elements such as diadromous fish and stakeholders such as fishermen? Ultimately, can the COGEPOMI be the platform to reorganise the relationship between human stakeholders, the environment and diadromous fish? ■

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