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Transboundary Water Management: From Geopolitics to a Non-state Analytical Perspective: The Case of the Rhône River

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1 Introduction[1]

Globally, 60 percent of all freshwater flows across political borders (UNESCO 2008). As a result, the challenges regarding upstream-downstream coordination become evident (Wolf 1999). If water management is already characterized by complex multi-level interactions and trade-offs among various uses, the transboundary scale represents an additional level of intricacy with the involvement of different institutional and legal frameworks, multiple asymmetries among parties involved (Warner and Zawahri 2012) and tensions between national interests. In other words, transboundary water management represents a

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"wicked problem"[2] (Levin et al. 2012; Varone et al. 2013) that calls for new solutions and new institutional arrangements.

For approximately the last twenty years, the notion of "transboundary water management" has gained momentum in parallel with the emerging concerns over "water wars" (Starr 1991; Gleick 1993; Homer-Dixon 1994). The reinforced consideration of the river basin scale as a relevant unit for the implementation of water management policies has also played an important role in this increased level of interest as seen with the concept of Integrated Water Resources Management (IWRM) (GWP 2000; GWP and INBO 2009) (see Chap. 3).

This chapter focuses on the transboundary river management of the Rhône (see Fig. 4.1). The Rhône is an international river shared between Switzerland and France (Bréthaut and Clarvis 2015). This case is particularly interesting: the Rhône does not have an international commission dedicated to the implementation of upstream-downstream coordination of the river.[3] To illustrate, the only international convention regarding the operational management of the Rhône at the transboundary level is concerned with the management of hydropower infrastructures and on the restitution, after Geneva, of French waters previously diverted upstream from Lake Geneva.[4] Moreover, central states have long been at the periphery of the operational management of the river. As a consequence, the transboundary water management of the Rhône has been characterized by poor cooperation among countries leaving significant opportunities for other actors (in this case energy operators) to define the mechanisms of how the river is used.

With a clear focus on this specific case, this chapter concentrates on the evolving role of the state as an arbitrator between different uses and boundaries and the role of non-state actors and the various activity sectors in shaping transboundary river governance. To do so, the concept of *Functional Regulatory Space* (Varone et al. 2013; Nahrath et al. 2009) is mobilized in order to analyze the evolution of the public problem, the evolving role of states, the definition of new geographical boundaries and the different forms of regulation. In this regard, the chapter focuses on the following research questions: *how did the Rhône's Functional Regulatory Space evolve throughout history? How are use rivalries regulated at the transboundary level when no international commission is dedicated to the framing*

Fig. 4.1 The Rhône basin: geographical context

of upstream-downstream coordination? What is the role of activity sectors in shaping transboundary water management?

Initially the chapter will present a "state of the art" as to how authors from different disciplines grasp the issues related to transboundary water management. Then, taking the example of the Rhône, the construction

of a Functional Regulatory Space for transboundary river governance will be analyzed. In particular, three main phases demonstrating evolving power relations and varying degrees of involvement by central states will be considered: (1) monofunctionality, (2) the end of the hydropower monopoly and (3) the shift toward increasing integration. Finally, the chapter returns to the initial set of research questions.

2 State of the Art

The management of international rivers involves numerous issues of coordination, interactions between different regulatory frameworks, power positions that vary from upstream to downstream and a multiplicity of interdependent water uses along the river's course. In this regard, transboundary river governance is characterized by both strong cooperation dynamics and also significant tensions among those involved. Many scientific publications have focused on these issues with the aim of reaching a better understanding of these problems at different levels and in diverse contexts. Research on transboundary river governance is characterized by substantial interdisciplinarity, including analysis from a variety of perspectives (historical, legal, economical, political and international relations). In this state of the art, five main bodies of work are identified.

The first body of work (1) focuses on the analysis of legal instruments that frame and regulate transboundary water management. As demonstrated by Boisson de Chazournes (2008), transboundary water management has been greatly influenced by tendencies of integration. As a consequence, the international legal framework is seen to evolve towards stronger homogeneity (Malla 2008) and develops across five main principles: equis use of water, sustainable development, the no harm principle, application of the "polluter pays" principle and the duty of compensation for possible damages. At the international level, the management of transboundary waters relies on two main instruments that mobilize these principles (Rieu-Clarke and Kinna 2014): the Convention of the Law of the Non-Navigational Uses of International Watercourses (ratified 21 May 1997 in New York) and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (ratified

17 March 1992 in Helsinki). The two conventions are characterized by very similar legal dispositions and both are applicable at the global level. In this regard, authors raise the issue of compatibility between these two conventions and of possible misunderstanding among potential signatories states (McCaffrey 2014). With the same perspective, Rieu-Clarke and Kinna (2014) underline the different focuses adopted by the two conventions with an emphasis on environmental issues for the Helsinki Convention and with the concern of possible harm to countries downstream for the New York Convention. As a result, authors recommend considering the two conventions as a package with complementary provisions. However, whilst this literature allows a better understanding of the international legal framework regarding transboundary water management, it remains heavily centred on gaining an understanding of the dispositions themselves.

In a complementary perspective (2), other authors focus on the implementation of transboundary water management and on the role played by institutions and organizations (among others, Bernauer 2002; Gerlak 2004; Hooper 2006; Mc Caffrey 2007; Raadgever et al. 2008). Here, authors aim to understand how the management of international rivers constitute a problem of collective action as well as the possible solutions that institutions can provide (Marty 2001). Raadgever et al. (2008) attempt to define the true nature of transboundary water management regimes as characterized by the following elements: actors' network, legal framework, public policies, management of information, financing and cooperation processes. Lautze et al. (2013) describe the great diversity of river basin organizations such as international committees, commissions or basin authorities. Authors underline the importance of defining a tailor-made regime answering the particularities of each specific case.

The third body of work (3) focuses on economics. Here, authors study economic mechanisms considering the varying interests of upstream and downstream countries. This perspective introduces the notion of benefits sharing (Arjoon et al. 2016) and the attempt to quantify and give a financial value to the uses of the resources. Adopting a broader perspective, Garrick (2015) compares different institutional designs and focuses on the measurement of transaction costs involved in collective action at the transboundary level.

The fourth body of work (4) analyzes the dynamics of conflict and cooperation between upstream and downstream countries. Firstly, several authors concentrate on cooperation mechanisms (Delli Priscoli and Wolf 2009; Delli Priscoli 1996; Conca et al. 2006). In particular, Sadoff and Grey (2002) identify the benefits that can arise from cooperation in the case of international rivers. The diversity of benefits are described, including benefits for ecosystems, benefits provided by a productive use of the river, reduction of disaster linked to the river, or reinforced economic cooperation at the regional level.

Considering not only the notion of cooperation but also of conflict, Zeitoun and Mirumachi (2008) underline the continuum that exists between these two situations. Here it becomes increasingly relevant to understand the interactions between parties, to understand how riparian countries interact, how they manage asymmetries of power and how they are affected by political and economic inequalities. Interactions among parties are complex. Dinar (2009) shows that the hegemon is not always able to impose its agenda on downstream countries. Daoudy (2009), along the same lines, underlines that power asymmetries may also be favourable to interactions among countries that have access to a greater range of negotiation capacities and instruments.

Finally, the last body of work (5) highlights the necessity to extend the focus beyond state actors. Accordingly, authors reflect that non-state actors need to be considered in order to better understand the existing dynamics and the spectrum of situations that exist between conflict and cooperation. Several publications attempt to move away from a purely analytical perspective primarily centred on the role of state (Sneddon and Fox 2006; Suhardiman et al. 2012; Suhardiman and Giordano 2012; Dore et al. 2012; Bréthaut and Pflieger 2015; Bréthaut 2016). As stated by Suhardiman and Giordano (2012), focusing exclusively on states denies the chance to consider the multitude of other stakeholders who have an active role in upstream-downstream coordination. Moreover, focusing exclusively on states stunts an understanding of intra-states dynamics and their influence on decision-making processes (Suhardiman et al. 2012). Here, authors suggest an approach centred on processes. This analytical perspective allows a consideration of a significant number of stakeholders, a better understand-

ing of how decisions are made at the national level and the motives behind collaboration among riparian states. Sneddon and Fox (2006) adopt a similar approach with the concept of critical hydropolitics. Authors integrate the analysis of complex interactions between different scales, considering the river basin to be characterized by multiple socio-ecological dynamics and analyzing the construction of the river basin as an object of cooperation.

Complementary to these different approaches (legal, functioning of institutions and organizations, economical, conflict and cooperation and non-state actors), the chapter suggests a focus on the regulation of the different activities linked to the river and as such, linked to upstream-downstream coordination. An approach centred on activity sectors enables a better understanding of how public problems related to transboundary river governance are framed, how use rivalries are effectively regulated and how power games evolve within the configuration of actors. Through the analysis of the operational management of rivers' flows, the chapter considers how additional research avenues for analyzing the transboundary management of rivers can be opened. To grasp such an analytical perspective, the concept of *Functional Regulatory Space* (Varone et al. 2013; Nahrath et al. 2009) becomes particularly relevant. It allows the analysis of a social space centred around evolving use rivalries and around the regulation of these different rivalries. Viewing the evolution of transboundary river governance through this perspective allows a more integrated understanding of the situation and the main challenges. It enables a simultaneous consideration of public regulations, the influence of non-state actors (and notably of the concerned sectors of activity) and the institutional or geographical perimeter dedicated to the management of these rivalries. Authors define a Functional Regulatory Space as "*(…) a regulatory space, which politically emerges in order to tackle, support or solve problems concerning several policy sectors in different institutional territories and at different level of government*." In other words, it represents a "*regulatory space within which it becomes possible to tackle new types of problems* [that Varone et al. define as a public wicked problem] *that cut across various socioeconomic sectors as well as institutional territories and government levels*" (Varone et al. 2013: 320). In this chapter, the evolution of the transboundary governance system is analyzed focusing on the evolving

interactions within the different activity sectors. In the following sections, the evolution of Rhône's Functional Regulatory Space, characterized by evolving types of uses and rivalries is investigated.

3 Transboundary River Management of the Rhône River

The Rhône is one of the major Western European rivers. The total area of the river basin is 96,500 km^2 (Bréthaut and Clarvis 2015). In Switzerland, the river emerges as a run-off from the Rhône Glacier in the canton of Valais. It flows through the Rhône Valley, through Lake Geneva and exits Swiss territory after reaching the city of Geneva. In France, the river flows on 522 km down to the Mediterranean Sea (see Fig. 4.1). Along its course, the river is used mainly as a source for irrigation and energy production (hydropower and nuclear electricity), as a navigation axis, for the production of drinking water and for fishing, leisure and tourism. As already noted, there is no river basin organization to ensure coordination at the river basin level and therefore the transboundary governance of the Rhône is heavily structured around two main energy operators managing the river's flow under the control of both the French and Swiss authorities.

From the perspective of international water law, Switzerland and France are both signatories of agreements regarding transboundary water management. For example, the two countries ratified the Convention of the Protection and use of Transboundary Watercourses and International Lakes.[5] This agreement sets the global framework for transboundary water management and considers in particular the necessity to reduce any impact at the transboundary level (article 1 of the Convention). The operational management of the river relies on three main legal and institutional frameworks: Swiss, French and European Union. Switzerland is not part of the European Union and is therefore not legally bound to the Union's legal framework. Swiss water public policies are strongly influenced by the federal level (Varone et al. 2002; Mauch and Reynard 2004). Nevertheless, following the principle of subsidiarity, Swiss cantons are usually responsible for the implementation of rules and for framing the daily management

of rivers. In this regard, the canton of Geneva is a key stakeholder in the transboundary management of the Rhône and represents the main counterpart in operational discussions with France. Since the adoption of the European Water Framework Directive in 2000[6] and "the definition of objectives to ensure good status of surface water and groundwater" (article 4), France is obligated to define a river basin management plan and to report on the progress of its implementation (article 15). As a consequence, the coordination at the transboundary level gains significant importance as the operation conducted in Switzerland might potentially have an impact on French capacities to reach objectives regarding water quality and/or environmental policies, as defined in its management plans.

As already stated in the introduction, the Rhône is not supported by a river basin organization. At the transboundary level, the only active commission is the Commission internationale pour la protection des eaux du Léman (CIPEL), an international commission dedicated to the Lake Geneva basin and primarily to the management of water quality issues. No institution is dedicated to the river itself nor to issues linked with the management of river flows.

Other transboundary specificities of the Rhône include the attribution of the management of the river to hydropower producers that hold concession contracts granted for periods lasting between sixty and ninety years. These contracts are more or less encompassing. On the Swiss side, each dam is subject to a concession contract granted either by the canton of Geneva or by the Swiss confederation for bi-national infrastructure. In France, one concession is granted to mainly one operator for the management of the French part of the river, from the Swiss-French border towards the Mediterranean Sea. This concession comprises the management of dams but also the management of large portions of the river's banks. Since the first half of the twentieth century, there has been heavy involvement of hydropower operators (Pritchard 2011) and as such, the river was considered as a means of energy production more than as a hydrosystem.

Nowadays, the Rhône is undergoing several changes that challenge its governance structure, leading to new types of challenges and uncovering a number of uncertainties that need to be addressed. This situation is highlighted by growing tensions among river uses and growing uncer-

tainties linked to climate change, environment and energy policies. These "focusing events" (Birkland 1997, 1998) act as triggers to force a reconsideration of the transboundary governance of the river (Bréthaut 2015). Such events occur suddenly and whilst they are relatively rare, they are large in scale. They open new opportunities for policies (Kingdon 1995) to reflecting on public problems and on how to address such issues. These events shed light on the weaknesses of the system and on the difficulties linked to the coexistence of several, not necessarily coordinated, regulatory frameworks (Swiss, French, European Union).

Historically, the Rhône's transboundary governance has been characterized by a regime articulated around one sector of activity (production of energy) with strong management capacities. This is a result of the delegation of competencies. The Rhône's transboundary management evolved according to three specific periods, namely from 1870 to 1970, 1970 to 2000 and from 2000 to today (Bréthaut and Pflieger 2015).

These phases reflect the evolving perception of the collective problem of the river. They illustrate various configurations of actors and an increasing number of uses that are formally recognized by the regulatory frameworks. These phases also show an evolution in the way central states consider river governance, with varying degrees of involvement in the operational management of the river.

3.1 Phase 1: Monofunctionality (1870–1970)

In this first phase, the Rhône is essentially dedicated to the production of hydropower. The river is massively channelled on both sides of the border. The population is protected from flooding and therefore gradually the perception of the river as a natural hydrosystem changes. The management of infrastructures and subsequently of the flow of the river is delegated to a small number of stakeholders who are the operators of the river.

In Switzerland, the management of the water flow of the Rhône is defined by an agreement, signed among Swiss riparian cantons (Geneva, Vaud and Valais), that defines the regulation of Lake Geneva's levels.[7] Water flows are artificialized along with the building of infrastructures.

Downstream from Geneva to the Swiss-French boundary, three dams are used for the production of hydropower energy: Seujet dam (operating since 1984), Verbois dam (operating since 1943) and Chancy-Pougny dam (a bi-national dam operating since 1925). The first two dams are managed by the Industrial Services of Geneva (SIG), a semi-public Swiss energy operator granted with a concession contract by the Canton of Geneva for periods spanning about sixty years.

The third dam is managed by a company called Société des Forces Motrices de Chancy-Pougny (SFMCP SA). SIG holds up to 72 percent of SFMCP share capital. The remaining 28 percent is held by the company responsible for the management of the French Rhône, Compagnie Nationale du Rhône (CNR). As an operator of a bi-national infrastructure, SFMCP is granted a concession contract by the Swiss and French central states.

In France, as illustrated by Pritchard (2004, 2011), the river is considered as a tool of production dedicated to ensuring the autonomy of the country's energy. With this in mind, the construction of hydraulic infrastructures became considered as an important symbol of the rebuilding of the French nation after the destruction suffered during the Second World War. The Rhône is perceived as a major part of the national industry. This is even physically demonstrated on several French dams where it can be seen written that the Rhône is "at the service of the Nation."

The management of the river is framed by a concession contract granted by the central state to CNR[8] in 1934 for a period of ninety-nine years.

As demonstrated by Pritchard (2011), the system is characterized by a monofunctional vision of the river. This vision is primarily dedicated to the production of electricity through hydropower. This situation allows a certain number of uses to operate independently and, in fact, the transboundary level is not highly significant for either the states or the operators. Central states delegate operational power to a select numbers of stakeholders. They define technical specifications as a framework but leave large room for manoeuver for operators regarding the daily management of the river and, subsequently, regarding the strategy of the production of electricity.

3.2 Phase 2: The End of the Hydropower Monopoly (1970–2000)

This second phase is characterized by the implementation of self-organization among energy operators. Private law agreements are defined in order to regulate water transfers and to coordinate uses for efficient energy production.

Simultaneously, this second phase sees the emergence of a new arrangement where the use of the river is not only limited to the production of hydropower. Two major factors contribute to the disintegration of the "hydropower monopoly."

Firstly, this period is characterized by the emergence and the continuous reinforcement of environmental policies (Usui 2003). This trend is clearly seen at the national level (Switzerland and France) but also at the supra-national level (European Union) (Bressers and Kuks 2004; Kaika 2003; Varone et al. 2002). This policy change facilitates the return to a more natural perception of the river. The vision of the Rhône only as a means for production becomes less dominant. This evolution forces hydropower companies to include environmental considerations in the way they manage the river and this policy change reduces their freedom regarding the river's management. However, hydropower operators still have some scope to implement their own strategies of production[9] in order to respond to electricity consumption peaks.

The growing number of uses leads to a reinforcement of regulatory frameworks. This reduces the capacities granted to energy operators in the first phase by involving additional sectors (not necessarily economic stakeholders) in the system. By means of illustration, several nuclear power plants were built along the French Rhône during the 1970s. The French choice to invest in nuclear power relies on the necessity to have access to water for the cooling of power plants. As such, the Rhône has an important role in ensuring nuclear security on both the French and Swiss territories. For example, the nuclear power plant of Bugey is located about 50 kilometres from the city of Lyon and about 150 kilometres from the city of Geneva.

In this second phase, the governance structure dedicated to the production of hydropower is confronted with an increasing complexity revealing the necessity to negotiate with new types of river uses. Hydropower operators are forced to share the resource with new stakeholders and to adapt the management of river flows accordingly. In this context, states play a crucial role in this new paradigm for transboundary water management. This may be through the evolution of regulatory frameworks and the recognition of new uses or through strategic options regarding energy policy and new priorities regarding the use of water. As a consequence, the system governing a limited number of actors transforms itself. New negotiations begin on how to use the river and calls are made for a new role of central States in arbitrating different needs and uses.

3.3 Phase 3: Towards Increased Integration (2000–Present Day)

This last period witnesses the continuous proliferation of activity along the river. The Rhône is now viewed not only as a source of energy production but also as a means for irrigation, the production of drinking water, tourism or the maintenance of ecosystems services.

This last phase sees central states returning to the centre stage with the desire to reinforce their regulatory capacities on the system.[10] This return can be explained by various factors. The recurring droughts of the last ten years and specific focusing events, coinciding with patterns shown by climate and hydrological modelling (Ruiz-Villanueva et al. 2015, Chauveau et al. 2013; Beniston et al. 2011), ensured that transboundary coordination is placed firmly on the agenda. In fact, these events highlight the deficit of coordination and the intensity of use rivalries among the different sectors of activity. For example, in 2012, the lack of coordination between Switzerland and France led to concerns regarding the cooling of the nuclear power plant of Bugey. This event acted as a trigger for reconsidering transboundary water management and led to a ministerial discussion between the two countries.

Table 4.1 Evolution of the Rhône's transboundary river management through the lens of uses, position of central States within the configuration of actors and relevance of the transboundary level

	Phase 1: Monofunctionality (1870–1970)	Phase 2: The end of hydropower monopoly (1970–2000)	Phase 3: Shift toward increasing integration (2000–Present day)
Uses of the river	– Hydropower is the river's main use at the transboundary level	– Hydropower still dominates the configuration of users – Emergence of the nuclear power industry (nuclear power plant of Bugey) – Emergence of additional uses of the river (drinking water, irrigation) – Increase of environmental norms	– Hydropower still dominates the management of the river – Reinforced protection of the environment and obligation to report to the European Union – Arbitration necessary between the different uses
Position of central States within configuration of actors	– Attribution of concession contracts – Delegation of competencies and framing of activities through bills of specifications	– French central State accompanies and frames the emergence of new water uses – The operational management of the river remains primarily delegated to hydropower operators and a lack of clarity exists regarding private law agreements between operators	– Framing of operators' activities through the bill of specifications and through the regulatory frameworks – In France, new obligations from the European Union's regulatory framework – Growing need to better understand the system at the transboundary level – Growing pressure from France for the definition of an agreement at the transboundary level

(*continued*)

Table 4.1 (continued)

	Phase 1: Monofunctionality (1870–1970)	Phase 2: The end of hydropower monopoly (1970–2000)	Phase 3: Shift toward increasing integration (2000–Present day)
Relevance of the transboundary level	– Weak upstream-downstream coordination – Relevance of the transboundary level only through the lens of energy production and mainly through the collaboration of private operators	– Relevance of the transboundary level mainly through the lens of energy production and through the collaboration of private operators	– An emerging level of governance with an increasing involvement of central States – Recurring "focusing events" highlighting coordination issues at the transboundary level

Then, as an extension of the trend described in phase 2, the regulatory framework encounters an increase in environmental policies. At the EU level, this shift comprises the definition of environmental objectives and the obligation of reporting (Albrecht 2013), calling for reinforced supervision and control of the system by the French central state. The delegation of competencies through concession contracts meant that the system was long reliant on self-organization and on numerous agreements between the different energy actors. This situation led to growing opacity and raised questions regarding the coordination between different sectors of activity, and more specifically, regarding the coordination between the production of energy and other types of river uses.

As the number of recognized uses increases, the governance system itself becomes more complex and polycentric. Increased coordination is demanded and the states are required to gain a better understanding of the situation. As shown in Table 4.1, the governance system of the river transitions from a system with a limited number of operators toward a more complex constellation of activity sectors with significant overlap between different configurations of stakeholders. These include stakeholders dedicated to hydropower, production of energy and/or protection of the environment.

4 Discussion

This case uncovers the discussion around the role of non-state actors in implementing transboundary water management and the role of states in providing an increasing number of arbitrations. It encourages reflection on the benefits of integrating these two perspectives to reach a better understanding of transboundary water management. This reflection is structured around three research questions that are discussed in this section.

The first question examines *how the Rhône's Functional Regulatory Space evolves throughout history*. As shown in Table 4.2, this evolution has been analyzed across three phases and using four analytical variables. These are the extent to which transboundary river governance is considered as a wicked problem and is affected by political agendas, the definition of new hierarchies and priorities between policy sectors, the evolution of the governance system's geographical boundaries and the ever-changing division of competencies between different levels of government.

This analysis shows how the river's governance becomes a wicked problem, which entails complex rivalries among a large range of water uses. The necessity for arbitrations and for the definition of new priorities is evident. This has been forced by various factors including a shift towards increased integration at the national level, the evermore-popular view of the river as more than a tool for energy production and "new" issues such as the environment or nuclear safety. In consequence, the transboundary level is seen to evolve towards the definition of a Functional Regulatory Space in which authorities aim to tackle new problems and consider a growing number of implicated policy sectors. A new type of territoriality is considered. This goes beyond political boundaries. If the operation of the river has always relied on a limited number of stakeholders, this changes the situation. The need to discuss coordination at a higher institutional level with the involvement of national authorities becomes a necessity. This shift represents a (re)politicization of the governance system with a less decentralized operation and with discussion taking place between high-level administrations.

The second research question is linked directly to this reinforcement of use rivalries: *How are use rivalries regulated at the transboundary level when no international commission is dedicated to the framing of upstream-*

Table 4.2 A historical analysis of Rhône River's function space of regulation

	Phase 1: Monofunctionality (1870–1970)	Phase 2: The end of hydropower monopoly (1970–2000)	Phase 3: Shift toward increasing integration (2000–present day)
Wicked problem put on the political agenda	No. The river is mainly dedicated to the production of electricity, poor consideration for other types of uses and de facto rivalries between water uses.	On-going. Use rivalries are increasingly taken into account. New types of water uses are recognized implying a new consideration of transboundary river management.	Yes. Growing integration implies the need for considering and arbitrating multiple and complex use rivalries. As a result, states return to centre stage.
New hierarchies between policy sectors	No. Production of hydroelectricity remains a top priority for states. Concession contracts are granted to operators who benefit from a large room to manoeuver.	Yes. The monopoly of hydropower ended with the recognition of new policy sectors such as the growing body of environmental policies for example.	Yes. When the European Water Framework Directive entered into force, new hierarchies between policy sectors and new power games between France and Switzerland (the latter being not a member of European Union) were generated.
New geographical boundaries beyond institutional territories	No. River management is fragmented and does not imply strong transboundary collaborations.	On-going. The consideration of new uses such as nuclear power (and its related security) and the increase of environmental policies reinforce the need to reflect on the transboundary level and on upstream-downstream coordination.	On-going. As a consequence of previous phases and specific "focusing events," the transboundary governance of the river is (re)discussed between countries in order to ensure a reinforced upstream-downstream coordination.

(*continued*)

Table 4.2 (continued)

	Phase 1: Monofunctionality (1870–1970)	Phase 2: The end of hydropower monopoly (1970–2000)	Phase 3: Shift toward increasing integration (2000–present day)
New division of competencies between levels of government	On-going. In France, the 1965 water law creates water agencies, which structure the management of water around river basins. Nevertheless, this perspective remains rooted in the limitations of national boundaries.	On-going. The recognition of new types of uses implies the need for stronger arbitration and for governance capacities to be centralized toward states.	Yes. This last phase sees the return of national authorities to centre stage for the conduct of international negotiations regarding upstream-downstream coordination.

downstream coordination? The upstream-downstream coordination of an international river takes place without any active institution dedicated to the transboundary level and where central states have long been at the periphery of a configuration that is actually led by hydropower operators. In this context, private law agreements between hydropower operators have privileged specific types of uses. Greater flexibility in the operational management of the river has also been encouraged. For example, one of the main agreements authorizing the transfer of water between Switzerland and France ("Mesures d'exécution 2000") relies on hydropower operators and is possibly renegotiated every five years. In this context, private law seems to reduce the inertia linked to a decision-making process driven by the states. Nevertheless, the Rhône example also shows the risks of a lack of transparency related to the overlapping of different agreements (often resulting from multiple bilateral negotiations and private law agreements).

Finally, this chapter focuses on non-state actors with the concluding research question: *What is the role of sectors of activity in shaping transboundary water management?* As demonstrated by Marty (2001), sectors

of activity might represent a relevant entry point for considering transboundary river management. In fact, several examples (the Danube or the Rhine) show how the collaboration around sectors of activities has been the starting point of more formal transboundary collaborations. With this in mind, the Rhône example shows how relevant it is to analyze transboundary river governance using the sectors of activity and related rivalries as the entry point. It also shows how sectors of activity can represent significant levers for central states when developing transboundary collaborations. This is particularly true in the case where institutional contexts and regulatory frameworks really differ. In the case of the Rhône, three regulatory frameworks coexist (Swiss, French and European Union). Here, the implementation of private law agreements exceeds the constraints of multiple and fragmented institutional settings. The implementation of a depoliticized transboundary river management occurs that is based primarily on operational considerations. By doing so, collaboration between sectors of activity may represent a stepping-stone for a more formal transboundary management. Conversely, the Rhône case also demonstrates the difficulties linked to a transboundary governance system that relies primarily on operators. In fact, the emergence of a polycentric system made up of competing water uses demands two things: reinforced coordination through the return of central states to the centre stage and the need for arbitration at a higher institutional level (Ostrom 1990).

5 Conclusion

Transboundary water management requires coordination between different institutional and legal frameworks and various sectors of activity with diverse objectives and modalities for the use of water. Literature shows that a huge range of institutions and organizations has been established in an attempt to address these challenges. This is seen with international legal frameworks that define obligations of parties and with the implementation of international commissions dedicated to the upstream-downstream coordination.

This chapter analyzes the evolution of the Rhône's Functional Regulatory Space. It illustrates how this regulatory space evolves, how it

meets the challenges of increasing use rivalries alongside the proliferation of environmental policies and water uses. As shown, these changes demand an evolution of the way that actors are configured and witnesses a shift in the way central states position themselves regarding the operation of the river. The Rhône case shows how states initially entrusted the management of the river to the electricity operators before returning to the centre of the configuration with a new role to arbitrate among a growing number of recognized uses.

This analytical approach is mirrored in the existing literature that concludes that focusing on non-state actors contributes to a better understanding of transboundary water management (Suhardiman and Giordano 2012). This analysis, therefore, is focused on the evolution of structuring sectors, on the evolution of regulatory settings and of the role played by authorities. The specificities of the management of the Rhône is a pertinent case to reflect on the evolution of non-state actors' room for manoeuver. The latter evolves over time, revealing power struggles between sectors and changing levels of autonomy in how the river is operated. This analysis demonstrates the added value of a system where key sectors of activity are responsible for implementing transboundary river management and notably the advantage of the flexibility of agreements based on private law. Nevertheless, this context also has its limits and this is seen with the tendency towards greater opacity and the exclusion of other types of river uses. In this regard, the analytical perspective of non-state actors has facilitated the simultaneous review of transboundary river management through different lenses: the study of power relations, the strategies used to secure different water needs and the evolving role played by central states within the system.

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de Genève (SIG), CIPEL. The opinions stated in this article are the sole responsibility of the author.

2. Wicked problem can be defined as: "*High-intensity public problems that result from multiple sets of complex interdependent causes, negatively affect large portions of a population, and to which high political priority should be accorded*" (Levin et al. 2012 in: Balsiger and Nahrath 2015, 9).
3. The upper Rhône is part of the Lake Geneva basin that is included in the perimeter of the International Commission for the Protection of Lake Geneva. Nevertheless, this commission focuses on the Lake basin exclusively and mainly focuses on water quality issues.
4. Convention entre la Confédération suisse et la République française au sujet de l'aménagement hydroélectrique d'Emosson (23 août 1963).
5. Also called the UNECE-Water Convention, Helsinki, 17 March 1992, entered into force in 1996.
6. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.
7. Acte intercantonal concernant la correction et la régularisation de l'écoulement des eaux du Léman, 11 September 1985.
8. Concession du Rhône, 20 December 1933.
9. Interview conducted with the Head of Electricity Production Activities at Industrial Services of Geneva(SIG), 18 July 2012.
10. Interview conducted with the Head of the "Pressure on water Bodies" service at the French Ecology, sustainable Development, Transport and Housing Department Rhône-Alpes, Lyon, 10 July 2012.

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