Dilemmas of Regional Governance: Sub-National Territorial Politics and River Basin Management in the USA, France, China, and India

A dissertation submitted to the faculty of the Department of Politics and International Relations, University of Oxford, in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Politics

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Trinity Term 2013

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Abstract

"Dilemmas of Regional Governance: Sub-National Territorial Politics and River Basin Management in the USA, France, China, and India"

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DPhil Politics

Trinity 2013

This dissertation identifies and explores the dilemma of regional governance, namely how to address political and economic challenges which occur at the meso-, as opposed to local, national, or international scale. Drawing on a large body of theoretical work on decentralization and federalism, this dissertation addresses the question, how do different institutional arrangements for political, fiscal, and administrative decentralization influence the capacity of political systems to capture regional-scale externalities? It does so by examining the responses of four different political systems, two federal and two unitary, to the problem of capturing economic externalities through River Basin Management (RBM), a quintessential regional issue. RBM outcomes are operationalized in terms of efficacy of capture of both water quality and quantity externalities which occur within inter-jurisdictional river basins.

Through close historical analysis of six paired case studies across the four country cases, the dissertation argues that the capacity of political systems to capture regional-scale externalities depends on the ability of sub-national jurisdictions to pursue localized preferences, which is in this dissertation referred to as sub-national territorial politics. These politics are most prevalent in federal systems, which typically accord sub-national territorial jurisdictions with greater political power and fiscal resources. These political systems feature fewer and weaker regional governance institutions, and generally less effective regional-scale externality capture, than their counterparts.

This dissertation contributes to a growing "sub-national turn" in comparative politics in two ways. First, it identifies the geographically-rooted interests which often shape sub-national actor preferences, particularly with respect to natural resource issues. Second, the dissertation discerns the lack of political incentives for central governments to resolve disputes between sub-national administrative jurisdictions, particularly in the federal systems in which these units are the basis for political representation at the national level.

Introduction: Management of Regional-Scale River Basins as a Political and Economic Puzzle

River basins, natural hydrological features in which both water and externalities flow downstream, present an intriguing puzzle for political scientists interested in the architecture of political systems. In an oft-cited article, the political economist Wallace Oates laments the fact that America's states are "quite poorly designed to deal with the provision of certain important public goods, notably environmental resources," and that "a much more rational map would probably entail some fairly sizeable regional governments that extend over watersheds, air-sheds, and other environmental resources" (Oates 1999, 1131). In a similarly influential essay on "the dangers of decentralization," Remy Prud'homme claims that France's Water Agencies, special-purpose entities specifically created to manage its watersheds, "have the appropriate geographic coverage to internalize the externalities associated with water resources management" (Prud'homme 1995, 214). These contrasting accounts raise a simultaneously theoretical and empirical question: are centralized political systems better equipped to capture the regional-scale externalities which occur within river basins relative to their more decentralized counterparts?

This question is moreover important because it encapsulates a broader issue, namely the efficiency with which political systems provide public goods and redress economic externalities. Traditionally, political scientists have held that decentralized architectures of governance, including federal systems, mount an ideal response to a basic challenge faced by all political systems: achieving a balance between realizing

economies of scale in public good provision and matching heterogeneous preferences which vary across space and place (Alesina and Spolaore 2003). Liesbet Hooghe and Gary Marks summarize this view well when they write that "Literatures in federalism, public policy, urban studies, and international regimes agree that the dispersion of governance across multiple jurisdictions is both more efficient than, and normatively superior to, central state monopoly. The core belief is that governance must operate at multiple scales in order to capture variations in the territorial reach of policy externalities. Because externalities arising from the provision of public goods vary immensely…so should the scale of governance" (Hooghe and Marks 2010, 17).

How, then, to make sense of Oates's and Prud'homme's contrasting observations? In this study, I propose that just because political systems escape the strictures of central state monopoly does not mean that they are sufficiently adaptable to efficiently provide public goods and capture externalities *at all spatial scales*. The efficiency of political systems should be measured not only according to the extent of political, fiscal, and administrative decentralization, but also whether the scale of governance can be adapted, particularly to that of the region. River basins are the signal case in point: economic development results in increased scarcity and pollution externalities which, given the tendency of rivers to flow across political boundaries, can only be efficiently captured at regional scales.

Moreover, it is here where variation in political architectures, including arrangements for decentralization and federalism, comes into play. The capacity of political systems to efficiently capture regional-scale river basin externalities is conditioned primarily by the role of the general-purpose, territorial jurisdictions which

form the basis of sub-national governance in virtually all political systems. And while there is considerable cross-national variation in sub-national governance architectures, political systems which most closely approximate the classic model of a federal system, in which the political, fiscal, and administrative functions of the state are predominantly exercised by territorial sub-national jurisdictions, confront the greatest difficulty in adapting to regional-scale governance challenges.

All political systems face a dilemma in adapting to regional-scale governance challenges, like river basin management, which arise dynamically over time: how to re-shape existing architectures of governance to take account of externalities which cross sub-national administrative unit boundaries yet concern parts of countries rather than the whole. Yet precisely because they are organized around durable, territorial administrative units, this dilemma is greater for federal political systems -- quite in contrast to their less extensively decentralized, less distinctly multi-level, and less territorially rigid unitary counterparts. For federal political systems, sub-national territorial politics are a distinctive and animating feature.

Pieces of the Puzzle: Varieties of Federalism, Decentralization, and Multi-Level Governance

In attempting to substantiate these claims, and to apply the corollary corrective to Hooghe and Marks' view, I begin by posing three critical, inter-related questions. First, given the enormous practical diversity in political system types, is the relationship between decentralization and economic efficiency which Hooghe and Marks describe generalizable across countries? Second, if this relationship is generalizable, is it directionally positive or negative? Finally, and perhaps most importantly, is causality

dependent simply on the vertical allocation of power between central and local government, as the emphasis on multi-level governance structures implies? I devote the remainder of this Introduction to asserting that these questions are open ones which in combination create considerable impetus for the comparative study which I propose to undertake. I also elaborate on its objective, namely to resolve the puzzle of how different political systems confront the dilemma of regional governance, and to what effect.

The first of these puzzle pieces concerns the range of variation in how governance is organized across countries. Political systems evince considerable cross-national variation in the means by which a sovereign central government achieves "the sharing or division of governmental competence with other agencies, institutions and actors" (Braun 2000b, 29). This sharing and division of powers varies across many dimensions. These include the formal distribution of powers through constitutional law, legislation, and jurisprudence, as well as the practical distribution of powers, which often depends on issues such as capacity, and which varies over time. Historical and cultural context is an especially significant source of variation: some political systems institutionalize ethno-religious, linguistic, or geographic cleavages through a constitutional distribution of powers, while others decentralize and delegate powers and responsibilities as a matter of administrative or financial expediency (Duchacek 1970). Despite these many dimensions of variation, cross-national variation in political system structure can be most fundamentally and usefully characterized by making a distinction between functional allocations of power between central and local levels of government,

and whether sub-national governance institutions possess a discrete territory or overlap with others.

Functionally, the extent of decentralization in a political system can be described in terms of three general categories, namely administrative, fiscal, and political. Of these, administrative decentralization, which consists of delegating responsibility for policy implementation to local agents who are subordinate to higher levels of government, is the most common and the least empowering for sub-national governments. Fiscal decentralization is also common and consists of vesting expenditure and/or revenue-raising powers in sub-national governments, while political decentralization, the rarest and most empowering form, entails the local selection of politicians who are empowered to make important policy decisions (Treisman 2007).

Spatially, sub-national governance takes two general forms, which Hooghe and Marks call term "Type I" and "Type II." The former are general-purpose and non-overlapping territorial jurisdictions, such provinces or states, while the latter are special-purpose and overlap with other administrative units, such as school and policing districts (Hooghe and Marks 2003). Type I jurisdictions thus possess a discrete and defined territory as well as defined functional powers and responsibilities, while Type II jurisdictions are non-territorial, typically occupying portions of a Type I jurisdictional territory, and occasionally certain of its functional tasks as well.

As this typology suggests, both spatial and functional forms of sub-national structure map generally but imperfectly onto characterizations of political systems as decentralized, multi-level, or federal. "Decentralization" of a political system implies administrative and fiscal decentralization, but not necessarily political decentralization

(Cheema and Rondinelli 2007). Federalism, in contrast, implies a sub-national governance structure characterized by administrative, fiscal, and political decentralization, the locus of which are Type I territorial "states" (Treisman 2007). Multi-level governance is something of a hybrid characterization, implying both considerable decentralization of all forms as well as variation in the Type I and Type II organization of governance (Hallerberg 2010).

These categorizations are useful, but are especially imprecise with respect to federalism: some federal systems are administratively and fiscally highly centralized, Type II jurisdictions exist in federal as well as unitary political systems, and historically centralized unitary systems such as France and Indonesia have vested at least some sub-national Type I jurisdictions with substantial autonomy. Given this conceptual confusion, there is a clear imperative for a study both of how countries divide power between central and local governments, but also how they govern at different spatial scales. In this a central objective must be to better to understand what federalism is and what it accomplishes relative to other forms of decentralization and multi-level governance—a goal that, as Jan Erk and Wilfried Swenden argue, "necessitates a comparative approach in which different forms of federalism are compared with each other and with non-federal regimes" (Erk and Swenden 2010, 7).

Even in comparative studies, however, attempts to link measures of federalism, decentralization, and multi-level governance to economic output data usually evince either weak, negative, or highly contingent effects, leading George Tsebelis to term federalism in particular "an elusive independent variable" (Tsebelis 2002, 143). While one large cross-national study found that federalism reduced economic growth in

developing nations, for example, another reached the opposite conclusion (Davoodi and Zou 1998); (Iimi 2005). Moreover, most output effects are significant only when intervening or co-variables are accounted for (Lancaster and Hicks 2000, 238), casting doubt on positive claims that federalism promotes economic efficiency (Wibbels 2006).

Indeed, the most recent, authoritative comparative political economy scholarship suggests that the economic merits of federalism, decentralization, and multi-level governance are highly contingent and variable. Daniel Treisman's comprehensive analysis of decentralization concludes that its advantages "depend entirely on the system in question" (Treisman 2007, 274), while Jonathan Rodden's extensive work on fiscal federalism shows that revenue structure constitutes an intervening variable that conditions the impact of federalism on fiscal responsibility (Rodden 2003); (Rodden 2006); (Wibbels 2006, 171). Thus not only is there an open question of whether federalism influences economic efficiency, but also both how and why.

Despite the fondness which generations of political scientists have expressed for federal, decentralized, and multi-level governance structures, extant comparative scholarship on the relationship between political systems and economic efficiency generally leaves open the generalizability, directionality, and causality of this relationship. In Table 1 below, I outline the propositions of extant theory with respect to each of these aspects, possible critiques, and propose a test of each aspect of the relationship between political systems and economic efficiency. In a preview of the study as a whole, these elements correspond to the pieces of the puzzle which I address, the answers I propose to them, and the means by which I attempt to validate them.

My critique of causality, printed in bold-italicized type, also encapsulates the argument of this study: the relationship between the extent of decentralization and economic efficiency is indeed generalizable; but with respect to regional-scale externalities it is durably, directionally negative rather than positive; and finally that this causality is dependent on the horizontal, spatial structure of governance as well as its vertical, functional structure. Put another way, the relationship between political systems and the efficiency with which they provide public goods and redress externalities is conditioned by how relationships between administrative jurisdictions like states and provinces are structured as well as how powers are allocated between levels of government.

	Generalizability	Directionality	Causality
Extant Theory	There exists a generalizable relationship between the extent of decentralization in a political system and its ability to realize an economically-efficient, Pareto-optimal allocation of resources	Decentralization is efficiency-enhancing because it enables differentiated public good provision to match differentiated preferences at local scale, and captures spillovers at national scales	Decentralization permits governance to be more flexible, adaptive, and responsive to local conditions and changes, permitting "tailored" public good provision and externality capture
Critique	Relationship between decentralization and economic efficiency not generalizable given the range of variation in forms of decentralization, multi-level governance, and federalism	Decentralization is efficiency-reducing because it inhibits public good provision and externality capture at regional, as opposed to national and local, scales	***Decentralization of power to Type I territorial sub-national administrative jurisdictions raises transaction costs of institutional reform such that changing spatial dimensions of public goods and externalities cannot be efficiently captured***
Test	Compare political systems which embody different degrees of functional decentralization and spatial organization. → *Drives choice of comparative method*	Examine a political-economic issue which entails regional-scale public good provision and externality capture → *Drives choice of River Basin Management as analytical lens*	Analyze detailed case studies of how various forms of functional decentralization and spatial organization across political systems influence their ability to provide public goods and capture externalities which arise dynamically → *Drives use of historical case studies*

Table 1: Theoretical Puzzle Pieces

The pieces of the puzzle which I identify, and the questions they embody, are strikingly broad. Given that decentralized, multi-level, and federal systems are a feature of many of the world's most populous, powerful, and prosperous nations, these unresolved issues constitute surprising and rather glaring lacunae in comparative political scholarship. Equally, however, these issues, though complex in their own right, cannot be addressed separately. I attempt to address them in concert by constructing a study that is comparative, empirical, and explanatory, a character embodied in the question posed at the outset, namely whether America's federal system somehow inhibits the management of river basins, while France's unitary system promotes it.

Completing the Puzzle: Comparing, Assessing and Explaining River Basin Management Outcomes across Political Systems

This study attempts to build on extant comparative political economy literatures by examining the differential capacity of different political systems to capture regional-scale externalities in the conceptually rich but under-theorized case of River Basin Management (RBM). RBM is a paradigmatic regional-scale governance challenge: it entails the creation of governance institutions to provide public goods and redress externalities, typically related to water quantity and quality, within river basins which almost always span multiple political jurisdictions. Without regional-scale institutions, river basin externalities cannot be captured, and an efficiency-enhancing resource allocation obtained. As the economist Charles Howe writes, "Many efficiency losses result from the lack of congruence of administrative and river basin boundaries…[Moreover] There is evidence that economic efficiency losses are

increasing" (Howe 2005, 28). The efficiency-enhancing political system must therefore be able to develop some RBM capabilities which effectively capture regional-scale river basin externalities.

Yet what truly distinguishes the conceptual value of RBM to this study from that of other regional-scale issues, such as transport or crime, is that river basins are hydrological units that bounds economic externalities within a discrete, identifiable spatial extent. As Hooghe and Marks note, river basins encompass "externalities that cut across existing general-purpose institutions" (Hooghe and Marks 2009, 235). As depicted in Figure 1, river basin externalities span sub-national jurisdictional boundaries, but are most often of regional rather than national extent. Addressing these regional river basin externalities therefore requires both vertical central-local cooperation of a functional nature between levels of government, as well as horizontal local-local cooperation of a spatial nature between multiple sub-national governments.

Because of this multi-dimensional nature, regional-scale issues, as exemplified by RBM, are in turn those on which "we may expect considerable differences in public policy formation between federal and unitary countries" (Braun 2000a, 18). RBM, apart from being an increasingly pressing policy issue, thus also offers a useful lens to test hypothesized differences in the efficiency-enhancing qualities of the functional and spatial organization of various political systems by assessing their ability to capture externalities at regional spatial scales.

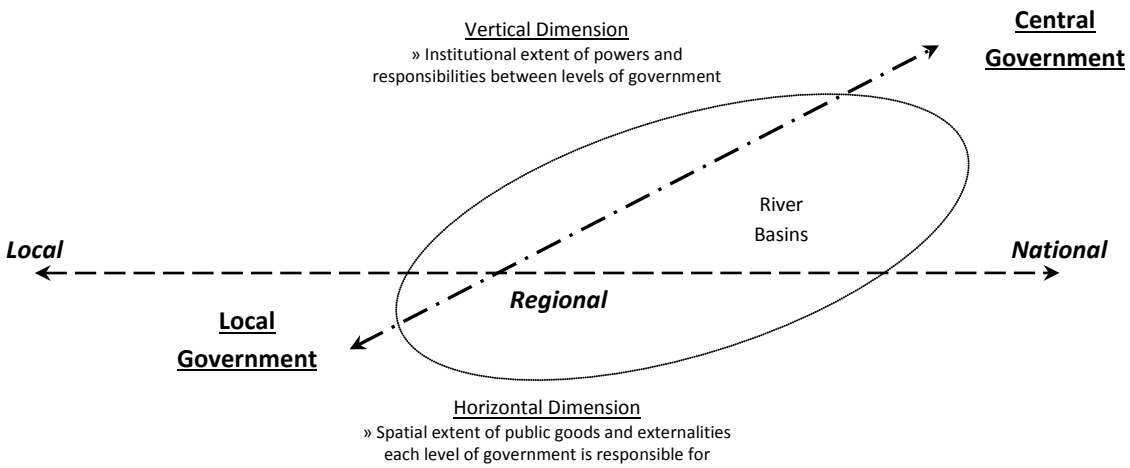


Figure 1: Schematic of the Multi-Dimensional Politics of RBM

The essence of RBM is the geographic alignment of governance with the physical drainage boundaries of a river (Teclaff 1996, 360). Nonetheless, this alignment can be accomplished through a variety of institutional forms. In principle, entire watersheds can be governed through a patchwork of local institutions, including watershed councils and Water User Associations, in a model termed "polycentric" governance (Lankford and Hepworth 2010). A second, more prevalent institutional model stems from the notion that "only an entity that has authority over the relevant ecosystem boundaries can be expected to address externalities" (Ascher 2007, 297). These more formal RBM institutions typically assume wide-ranging powers and responsibilities, including coordination and planning of economic development, financing, and project implementation functions with respect to water supply, water resource allocation, and water quality in a geographic area which encompasses the entire river basin (Alaerts 1999, 9); (Shah, Makin and Sakthivadivel 2005). Formal, regional-scale RBM institutions include river basin commissions and authorities, which are distinguished mainly by the latter having a broader remit than the former (Delli Priscoli 2007).

This range of variation in RBM institutions offers a means to differentiate the response of various political systems to public good provision and externality capture within river basins. RBM is particularly amenable to cross-national comparison compared to other regional issues because the basic externality issues of downstream water pollution and regional water scarcity are fundamentally similar in character across political systems. Moreover, because multi-lateral organizations like the World Bank have long advocated the creation of RBM institutions, they are to be found in a wide range of political systems, providing a considerable source of empirical variation (Teclaff 1996, 368); (Global Water Partnership 2009). Examining RBM outcomes should therefore expose the range of variation in the ability to of various political systems to capture regional-scale river basin externalities, if indeed meaningful variation exists.

I therefore propose to test the extent and type of decentralization across political systems as explanatory variables in determining differential institutional outcomes for River Basin Management. In operationalizing this explanatory variable, I take cognizance of the traditional, fundamental distinction between federal and unitary political systems as well as of the diversity in the type and extent of decentralization and multi-level governance in both federal and unitary systems (Kerman 2000, 197). Accordingly, I construct a categorical rather than dichotomous variable in which I classify political systems as decentralized-federal, centralized-federal, decentralized-unitary, or centralized-unitary, depending on the extent of political and fiscal decentralization at sub-national levels of government (Treisman 2007, 24).

Under this typology, I consider a federation such as the United States, in which most powers of government are exercised by sub-national governments, including the

raising of taxes and the expenditure of government funds, and whose decision-makers are selected locally, as decentralized-federal, while Pakistan, whose sub-national leaders enjoy little political or fiscal autonomy from the center, I consider to be centralized-federal (Waseem 2010). I propose to define the dependent variable, variation in RBM outcomes in the capture of basin-scale externalities, in similarly continuous terms, taking note both of quantitative and qualitative assessments of institutions and outcomes across political systems. These operationalizations are detailed in Chapter 1 which follows.

Based on this comparative analysis, I observe empirically that those political systems which feature both extensive functional decentralization and durable spatial organization in the form of Type I territorial sub-national governments, characteristics generally ascribable to federal systems, exhibit fewer and weaker RBM institutions. However, the capacity to capture river basin externalities is contingent not upon the existence of a federal system *per se* but rather a more nuanced interplay between arrangements for decentralization and relationships between sub-national territorial governments, the latter being the operative actors in determining RBM outcomes.

Analytically, I find that this divergence is explained by the ability of sub-national territorial jurisdictions to harness the powers bestowed upon them by functional decentralization to hinder the creation of institutions to capture regional-scale externalities within river basins. Motivated by parochial territorial interests, these sub-national actors resist regional governance institutions as threats to their power and autonomy. In this conclusion I echo Howe: "It seems unlikely that nations, states, and all the special districts that currently have a say in water planning and management will surrender their prerogatives to unified river basin initiatives" (Howe 2005, 29).

Consequently, regional-scale externalities in decentralized political systems instead either remain un-captured, or are inefficiently addressed through centralized bureaucracies at the national level or piecemeal at local levels. Contrary to much received scholarly wisdom and popular belief, the essence of an efficiency-enhancing political system is not its ability to cluster functions neatly and cleanly at central and local levels, but instead to continually adapt and evolve institutional responses to issues of varying functional types and spatial scales. Their differential success in doing so, moreover, stems not only from the vertical, functional allocation of powers between levels but also from the horizontal, spatial nature of relationships between sub-national territorial governments. This two-dimensional picture of political systems is critical to explaining differential responses to the challenges of governing river basins, but I also suggest that it illuminates more than watershed politics.

Picturing the Puzzle: Contributions, Clarifications, and Implications

This study strives to expand and challenge the comparative literature on federalism, decentralization, and multi-level governance, which is often undiscerning regarding the relationship between political systems and economic efficiency, and which, despite its considerable promise to increase theoretical leverage, has rarely addressed regional-scale governance in general, and never the problem of river basin governance in particular. In doing so, this study highlights the importance of the sub-national tier of governance, which receives considerably less scholarly attention than national- and international-scale governance institutions. It also sheds new light on the role of institutional path-dependency under various political systems.

This study bolsters the basic historical institutionalist claim that "Institutions constrain and refract politics but they are never the sole 'cause' of outcomes" but rather "point to the ways that institutions structure these battles and in so doing, influence their outcomes" (Thelen and Steinmo 1992, 3). Yet because institutions do influence outcomes over time, this study also stresses the need to continually evaluate the costs and benefits imposed and accrued by political institutions. It thus endorses what James March and Johan Olsen term the "historical inefficiency" view on political orders, namely that their survival over time says more about the costs of their modification than their overall efficiency (March and Olsen 1998). At the broadest level, this study suggests that more attention must be paid to the inter-temporal consequences of political institutions in comparative politics generally, and the study of comparative political economy and federalism particularly.

Nonetheless, my theoretical concern with economic efficiency does not necessarily encompass all relevant concerns regarding equity or other proper ends of government. Accordingly, I do not view my claim that federal systems are sometimes efficiency-reducing with respect to regional-scale issues as possessing the corollary that federalism is a sub-optimal form of government. There are many very good normative arguments for federalism, not least among them the protection of minority rights and pluralistic identities, which stand apart from economic considerations (Amoretti and Bermeo 2004). Moreover, federations may represent not the perceived best but rather the only political solution acceptable at the time of state formation (Feeley and Rubin 2008).

Rather than to critique federalism, then, my purpose is to enhance understanding of comparative politics by showing that it is likely to be efficiency-reducing at particular spatial scales and with respect to particular issues. This study does not impeach federalism, but merely expands the calculus of its costs and benefits, and points more than anything to the importance of its basic institutional design, and of the desirability of addressing regional issues through regional institutions. Accordingly, regional governance deserves renewed attention as part of a greater focus on sub-national politics, and as opposed to the delineation of powers between central and local levels which has historically been the focus of federalism scholarship.

In particular, I believe that uncritical views of the relationship between federal political systems and economic efficiency, such as the "assumption that a federation's 'goodness' somehow assures its survival over time" (Filippov, Ordeshook and Shvetsova 2004, 26), must be questioned. No matter how well designed, political institutions are forged in particular historical circumstances, yet continue to impose costs and constraints even as the interests of the contracting entities change and "the new, the unforeseen, and the unexpected" emerges to challenge them (Davis 1978, 143). These costs may be minor or substantial, depending on the particular issue, but the fact that they obtain remains under-appreciated, particularly in the study of federalism. Federal constitutions, as Roger Gibbons has written, "have great staying power, but not necessarily because they accurately reflect social and economic realities. Rather…federal systems persist because they exist" (Gibbons 1987, 29). This characteristic should push comparative literatures to be more critical of the idea of inherently adaptable federal and multi-level governance structures; indeed, this may be more the exception than the rule.

Of course, similar arguments to my own have previously been made. The problem of mis-matched political jurisdictions and policy problems has been extensively described by a number of environmental governance scholars (O. Young 2002); (Cash, et al. 2006). Moreover, this study's most basic findings regarding the influence of institutional structure and path-dependency in economic resource allocation essentially echo Douglass North's observation that "Institutions are not necessarily or even usually created to be socially efficient [but]…are created to serve the interests of those with the bargaining power to devise new rules" (North 1990, 16). My argument concerning the unique difficulties of capturing trans-boundary externalities within a rigid structure of durable Type I jurisdictions also echoes those of several commentators who highlight the difficulty of addressing regional, as opposed to local or national, issues in federations (Derthick 1974); (Laski 2005). Similarly, Dietmar Braun has drawn similar conclusions to my own regarding the tendency of federations to fail in allocative efficiency in response to environmental challenges (Braun 2000c, 235).

Moreover, several authors have argued more specifically that the management of river basins functions differently under federal systems (Alheritiere 1976); (Schlager and Blomquist 2008, 178), and at least two authors have made substantively the same argument in more limited form, namely that failures in the management of particular river basins (the Cauvery in one, the Missouri in the other) can be explained only with reference to the peculiarities of the federal systems in question, namely the Indian and the American, respectively (Gebert 1983); (Thorson 1994). The value added by this study is to generalize these specific claims through comparative analysis, as well as to amplify the importance of both the functional and spatial organization of governance through

engaging with broad literatures in comparative political economy, including federalism, and their theoretical foundations, particularly in historical institutionalism (see Table 2 below).

Literature	Contribution/Implication	Type of Value-Added
Institutionalism	Path-dependency of institutions; capacity for self-organizing collective action depends on parent political system arrangements for federalism	Empirical
Federalism and Inter-Governmental Relations	Sub-national jurisdictions follow a primarily territorial logic	Theoretical/Empirical
Fiscal Federalism and Comparative Political Economy	Relationship between political systems and economic efficiency conditioned by inter-jurisdictional as well as central-local relationships	Theoretical/Empirical

Table 2: Contributions of the Study

This study also aims to correct the normative bias in political economy literatures toward federalism as an efficiency-enhancing political architecture, which is exaggerated by a general failure to seek external validity by comparing federal systems not only against one another but also to unitary states as well. As one of relatively few to do so, this study identifies the incentives for sub-national government officials to cooperate with their neighbors as a key intervening variable which conditions the relationship between political systems and economic efficiency. In doing so, this study also suggests that political party affiliation does not play as significant a role in determining sub-national actor behavior as is implied by previous work, particularly in the federalism literature (Riker 1964); (Riker 1987b); (Chhibber and Kollman 2004). Although party affiliation is a notable influence on sub-national actor behavior, it is not pre-eminent in the cases which I examine in this study.

Instead, and in accordance with much recent literature on decentralization and sub-national authoritarianism in Latin America, this study argues that territorial interests, such as the urban or rural character of a constituency and its distance from national and provincial capitals, are more important determinants of sub-national political behavior than is partisan affiliation (Montero 2004); (E. Gibson 2005); (Falletti 2005). As Alfred Montero writes, "Governors and mayors have interests emanating from the offices they hold and not just the parties they represent" (Montero 2005, 9).

Pursuit of these territorial interests is also likely to inhibit inter-jurisdictional cooperation of the sort that environmental governance scholars have long advocated as a solution to high-spillover regional environmental problems such as watershed governance. As described in the Impetus section below, the literature on common-property resource management highlights the importance of institutional arrangements at all levels of political organization, from the community or village level up to the national level (Ostrom, Gardner and Walker 1994). This study indicates higher, "constitution-level" institutional arrangements, such as those which determine the structure and function of sub-national governance, may be considerably more important in environmental resource management and governance than previously appreciated (Bickers, Post and Stein 2010).

The remainder of this study is organized into three major parts. Chapter 1, which immediately follows this Introduction, constructs a conceptual framework for the study, and is itself divided into three sections. The first, titled "Impetus for the Study," critically reviews the scholarly literature on the relationship between political systems, public good provision, and economic externalities. It discusses the prevailing hypothesis

that federal systems can efficiently capture regional-scale economic externalities, and, by highlighting the salience of sub-national territorial jurisdictions in federal systems, proposes an alternative hypothesis.

The second section, "Approach of the Study," proposes to validate this alternative hypothesis by positioning RBM as an important test case for the capacity of different political systems to capture regional-scale externalities. This second section also details the methodology used to select and describe the case studies which form the core of this study. Finally, the third section, "Argument of the Study," explains the divergent outcomes identified in the case studies across political systems with reference to a model of sub-national politics at the regional scale. This model emphasizes that while preferences for water resources are generally informed by the geographical position of a sub-national political jurisdictions relative to shared waterways, its pursuit of these preferences via conflict and cooperation with its neighbors is determined by extent of political power and economic resources granted it under different institutional arrangements for decentralization, which in turn tend to differ between federal and unitary systems.

The second part of the study consists of four country case studies, each constituting a separate chapter. The six individual case studies are contained within these chapters. The third part consists of the Conclusion, which summarizes and discusses the findings of this study, extends upon its findings, and charts a path for further research to build upon this study as one of the few attempts to examine the complex and contentious politics surrounding perhaps the world's most vital resource.

Chapter 1. Framework of the Study: Theory, Methods, and a Model of Sub-National Territorial Politics in River Basins

Answering the question posed at the outset of this study, namely whether ability to capture regional-scale externalities varies across political systems according to the nature of both central-local as well as inter-jurisdictional relationships, requires addressing three subsidiary questions. Though distinct, these questions are also related by their special focus on federalism, a focus in turn necessitated by the centrality of federalism scholarship in the comparative political economy literature. First, how do central-local and inter-jurisdictional relationships vary across countries, particularly among and between federal and unitary political systems? Second, to the extent that they can be meaningfully distinguished from unitary systems, do federal arrangements differ from others in their capacity to capture regional-scale economic externalities? Third, to the extent that they exist, why do these relationships between political system type and capacity to capture externalities obtain?

In this chapter, I attempt to formulate answers to these questions. In the first section, "Impetus of the Study," I discuss extant theoretical positions on the relationship between political system type and their capacity to capture regional-scale economic externalities, again with a focus on the federalism literature. In the process, I attempt to make a case for the distinctiveness of federalism as a territorial system of governance in which inter-jurisdictional cooperation is particularly costly, making it difficult to capture externalities at regional scales. In the second section, "Approach of the Study," I outline

my methods for assessing the ability of different political systems to address regional-scale economic externalities, using RBM as a lens.

In the third and final section, "Argument of the Study," I outline a causal process by which federal sub-national actors are incentivized to follow a territorial logic which prevents the creation of numerous, powerful regional-scale governance institutions. Thus, I argue, is capacity to capture regional-scale economic externalities conditioned not only by vertical allocations of power and responsibilities between levels of government, but also by the nature of inter-jurisdictional relationships and the tensions which animate them.

Impetus for the Study: Political Systems and Externality Capture at Different Scales

Comparative political economy literatures generally espouse the belief that political systems which provide for a vertical allocation of powers between central and sub-national levels are more conducive to economic efficiency, including the capture of externalities. The vertical allocation of powers entails two general characteristics: the existence of multiple governments at both central and sub-national levels, and a distribution of powers, responsibilities, and capabilities between them that allows each level to effectively provide goods and services to citizens within their jurisdictions. Thus understood, vertical allocation balances the realities of transaction costs, information asymmetries, economies of scale, and heterogeneous preferences. Large-scale public goods and services such as defense, for example, are best provided centrally, while those like parkland are best provided locally.

This vertically-oriented conception of governance and its emphasis on central-local relations informs three inter-related literatures on multi-level governance,

decentralization, and federalism. There are important differences between these: multi-level governance literatures emphasize institutional flexibility and adaptation (Hooghe and Marks 2010), decentralization is concerned with the merits of divesting political and economic powers from central governments, and federalism is concerned chiefly with the implications of providing political, as well as fiscal and administrative, autonomy to sub-national units (Treisman 2007). What unites each of these literatures, however, is an underlying claim that the functional, vertical allocation of power between levels enhances economic efficiency, which, following a seminal definition, I use to signify a Pareto-optimal allocation of resources which maximizes social welfare (Hochman and Rodgers 1969). Yet in their primary concern with vertical allocations of power between central and local levels of government, these literatures leave open the question of whether and how political systems differ in their ability to capture externalities, such as those which occur in river basins, which both arise dynamically over time and which are of discrete spatial extent.

Accordingly, in this section I critically review several schools of thought in the political economy literature concerning the ability of different types of political systems to capture dynamic, regional-scale externalities such as those which occur within river basins. I discern three major schools of thought on this issue in the political economy literature corresponding roughly to Elinor Ostrom's three-part characterization of political economy as promulgating an efficient-market model, a government-regulation model, and a common-pool resource management model (Ostrom, Walker and Gardner 1992). Each school suggests a different means to address regional-scale externalities, but

all center on vertical allocations of power between central and local governments largely to the exclusion of inter-jurisdictional relationships.

The first, which I term the Efficiency School, holds that when central and sub-national levels of government are invested with a sufficient degree of political, fiscal, and administrative autonomy, regional-scale externalities can be captured through inter-jurisdictional competition. The second school, which I call the Institutionalist School, holds that issues which generate high spillovers, such as regional-scale externalities, should be made the responsibility of the national government, while all other issues should be devolved to sub-national levels of government. Finally, the third, which I term the Adaptive Governance School, holds that with the right set of rules and norms, governance can be accomplished through means of institutional collective action rather than market exchange or top-down regulation. In the process of examining these three schools of thought, I discuss their implications for federal, decentralized, and multi-level political systems, the degree to which they apply to dynamic regional-scale river basin externalities, and their reliance on vertical central-local relationships as the primary dimension of variation between political systems.

In the course of this analysis, I draw on recent cross-national theoretical work, a hitherto isolated literature in urban studies and metropolitan government, and a vibrant but regionally-focused empirical literature on Latin American decentralization. In doing so, I develop three assertions. First, I assert that federal systems
can be expected to differ from decentralized and multi-level unitary systems in terms of their relatively rigid and durable institutions. This is most evident in terms of the durability of Type I sub-national territorial jurisdictions, which are uniquely important

to federal systems because of their role in sustaining the autonomy of particular geographic areas. Second, I assert that all of the proposed relationships between political systems and economic efficiency can be questioned, but that a structure of durable Type I jurisdictions in particular implies difficulties for the capture of regional-scale externalities. Third, I assert that the nature of horizontal inter-jurisdictional relationships constitutes the animating and operative feature of federal political systems as compared to their unitary counterparts.

The Efficiency School: Inter-Jurisdictional Competition

Many political systems feature a constitutional allocation of powers to central and sub-national levels of government in a form originally proposed by Alexander Hamilton, James Madison, and John Jay in the *Federalist Papers*, whereby "the great and aggregate interests [are] referred to the national [and] the local and particular to the State, legislatures" (Hamilton, Madison and Jay 2005, 115). This constitutional allocation of powers serves two functions, first to efficiently divide the tasks of government, and second to create a separate sphere of action for different levels of government. This "area of action," in which each level of government has "autonomous ability" and "some guarantee of autonomy of each government in its sphere," is cited by several of the most influential scholars of federalism as constituting the defining characteristic of a federal system (Riker 1964, 11);(Wheare 1963, 5). The Efficiency School emphasizes two consequences of these separate spheres, first that the power of the central government is limited, and second that sub-national jurisdictions enjoy substantial political and economic autonomy. On the basis of these consequences, the Efficiency School holds that a constitutional inter-level allocation of powers creates the institutional equivalent of an

efficient market, in which competition between political jurisdictions provides optimal levels of public goods and externality capture.

In its enthusiasm for both a constrained central government and autonomous sub-national jurisdictions, the Efficiency School thus celebrates the federal model. However, it also largely ignores the second, more prevalent, purpose for constitutionally dividing powers between central and local levels in federal systems, namely to guarantee a durable degree of autonomy to particular geographic regions, which often reflect ethno-religious or other territorial cleavages (Feeley and Rubin 2008, 14). Consequently, the Efficiency School tends to conflate the distinctions between federal, multi-level, and decentralized political systems, to under-estimate the institutional rigidity and accompanying transaction costs inherent to federations, and to take insufficient account of the pernicious aspects of inter-jurisdictional competition.

The Efficiency School draws from the inter-level constitutional allocation of powers within political systems two implications for economic efficiency. The first is that a constitutional allocation of powers restrains the ability of actors at both central and sub-national levels to seek economic rents, which, because they are in excess of opportunity cost, result in a Pareto-inefficient resource allocation (Buchanan and Tullock 1962); (Buchanan 1980); (Rucker and Fishback 1983). Rent-seeking via lobbying is alleged to be more expensive and difficult, for example, when power is disbursed between multiple levels of government (Cheikbossian 2004); (Cheikbossian 2008). Limits on the power of the central government are believed to be particularly important in limiting its ability to engage in predatory behavior and the expropriation of private property (Weingast 1995); (Qian and Weingast 1997). In a related vein, it is often

asserted that federations feature more veto players than do unitary systems (Tsebelis 2002, 66), acting to "lock in" favorable macroeconomic policies like central bank independence and inflation control (Treisman 2000).

Moreover, the Efficiency School draws a second implication from constitutional inter-level allocations of power, namely that investing sub-national jurisdictions with both political and fiscal powers enables them to competitively offer citizens different levels and types of services. Under this model, sub-national governments effectively compete for citizens, businesses, and votes, the effect of which is to offer "the Pareto-efficient levels of output for their respective jurisdictions" (Oates 1972, 35); (Oates 1977). Competition, the argument goes, acts to discourage over-taxation if sources of revenue are sufficiently mobile to move to lower-tax jurisdictions. If they are forced to rely on their own sources of revenue, sub-national jurisdictions therefore confront "hard budget constraints" which foster fiscal responsibility (Tiebout 1956); (Conybeare 1982); (Rodden 2006). Moreover, inter-jurisdictional competition is alleged to serve the purpose of policy innovation (Tanzi 1996, 299-302). Sub-national jurisdictions which compete to offer efficient levels and types of public services are thus alleged to realize some of the benefits of private-sector competition.

Despite this logic, constitutional allocations of power are not unique to federalism. For example, a provision of the United Kingdom's Scottish devolution agreement, which carries the force of constitutional law in Britain, guarantees that Westminster will legislate on devolved matters only if asked to do so by the Scottish Parliament (Leeke, Sear and Gay 2003). The case of China raises further questions if a political system need be federal in order to limit the power of the center so as to reap the

rewards of constraining would-be Leviathans. Several prominent scholars, including Barry Weingast, argue that administrative and fiscal decentralization in China has created a form of "behavioral federalism" that restrains central power and promotes economic growth (Moninola, Qian and Weingast 1995); (Zheng 2007). Indeed, the example of China suggests that economic federalism need not coincide with the political kind: Beijing has the power to curtail the decision-making autonomy of sub-national officials, and in fact has done so repeatedly (Li 1997). Thus constitutional inter-level allocations of power do not map neatly onto a distinction between federal versus unitary political systems.

In terms of sub-national autonomy, moreover, a distinction must be made between political and fiscal powers. Empirically, political decentralization is indeed a more common feature of federal than of unitary systems (Treisman 2007, 24), and sub-national political representation in upper legislative houses is highly correlated with federalism (Samuels and Snyder 2001). Fiscal decentralization, however, is not well correlated with federalism, and as noted above China is one of the most fiscally decentralized systems in the world as measured by the sub-national share of total government expenditures (Dziobek, Mangas and Kufa 2011). Moreover, the extent of political decentralization varies enormously among federations. While Germany affords states virtual veto power over national decision-making through powerful upper-house representation, India bestows the president with the power to dismiss state governments, and Parliament the power to unilaterally re-draw state boundaries (Rodden 2004). Empirical evidence for the impact of federalism on inter-jurisdictional competition is unsurprisingly weak (Feld and Schnellenbach 2008, 47).

Apart from the question of generalizability stands the directionality of the proposed relationship between constitutional allocations of power in federal systems and their capacity to capture emergent economic externalities. Indeed, instead of efficiently assigning powers to the level of government most capable of exercising them, federal systems often assign powers in an *ad hoc* manner likely to prove unsatisfactory over time (Geys and Konrad 2010). This is because inter-level allocations of power in federal systems are often inflexible by design. Federalism is a costly form of cooperation, and federating units incur relatively high costs of federation which compel them to demand assurances that the terms of their original bargain will endure, particularly those pertaining to divisions of power between sub-national and central levels (Rector 2009, 9). These intentionally high costs, it stands to reason, inhibit the "process that assigns and maintains a distribution of authority, mindful of externalities" which is essential to adapting inter-level allocations of power in a federal system in response to changing conditions (Bednar 2009, 42).

Empirically, adaptation of inter-level power allocations in federal systems is often haphazard. In Canada, for example, the lack of clear allocations of power over the environment has meant that responsibility for environmental matters has been continually shifted between provincial and federal governments in response to environmental disasters. When one occurs, powers are centralized, but when public attention wanes in the aftermath, they are devolved (Harrison 1996); (A. Scott 2000). Such haphazard delineation of powers and responsibilities is likely to contribute to policy gridlock and "lock in bad policy" (Weaver and Rockman 1996, 32); (Wibbels 2000); (Wibbels 2006, 173).

Moreover, there are numerous empirical and theoretical accounts of rent-seeking behavior in federal systems, many of which result from a central government that is too weak rather than too strong. An entire sub-literature documents the existence of "rentier" and "protectionist" sub-national governments who enjoy rents from natural resources and inter-governmental transfers in federal systems like Russia and Argentina (Desai, Freinkman and Goldberg 2005); (Gervasoni 2010); (Sonin 2010). To these empirical accounts Hongbin Cai and Daniel Treisman add a formal model in which central capacity is weak, and conclude that "Given different endowments, local government leaders will resist investment in pro-growth policies and public good provision in favor of predation" (Cai and Treisman 2004). On the basis of this model, Cai and Treisman attribute China's economic growth not, as Weingast and his collaborators do, to fiscal decentralization but rather to political centralization which aided the diffusion of successful policies (Cai and Treisman 2006). A constitutional allocation of powers between central and local levels may not, therefore, be either unique to federalism nor be as conducive to economic efficiency as some political economists suggest.

In addition to this problem of directionality, some of the causal assumptions behind the notion of efficient federal inter-jurisdictional competition as a result of inter-level power allocations appear misplaced. Voters may not reliably reward sub-national politicians for providing optimal quantities and types of services, instead blaming them for failures in central policy (Seabright 1996); (Gelineau and Remmer 2006); (Rivlin 2012). Alternatively, electoral systems may sustain sub-national authoritarians who serve clientalistic rather than efficiency-enhancing ends (Rodden and Rose-Ackerman 1997);

(Bardhan 2002); (E. Gibson 2010). Furthermore, cooperative attempts between federal central and sub-national governments to jointly provide public goods can result in "vertical intergovernmental competition" which offsets the benefits of horizontal inter-jurisdictional competition (Scharpf 1988); (Volden 2005).

Finally, and perhaps most importantly, inter-jurisdictional competition is often thought to induce a "race to the bottom" in which jurisdictions compete for revenue and capital, producing welfare-inferior resource allocations (Filippov, Ordeshook and Shvetsova 2004, 44); (Cai and Treisman 2005). Inter-level constitutional allocations of power, and inter-jurisdictional competition, therefore seems to be neither generalizable characteristics of federalism, nor to exert a robust positive effect on the capacity of political systems to capture regional-scale economic externalities. Indeed, there are good reasons to believe the opposite.

The Institutionalist School: Spatially-Differentiated Public Good Provision and Externality Capture

A long-standing tenet of political economy theory holds that demand for many public goods varies across regions, and that consequently their optimal levels of provision must be "fitted to the different requirements of different groups" in different areas (Tanzi 1996, 298). Thus demand for public goods like education is likely to vary both quantitatively and qualitatively in New York City as compared to Fairbanks, Alaska, for example. For this reason, political economists very reasonably hold that it makes far more sense for both New York City and Fairbanks to be invested with sufficient political and fiscal power to educate their citizens according to local preferences. The existence of transaction costs to a central government in attempting to

discern these differentiated preferences is moreover held to strengthen the case for sub-national government provision according to local preferences (Alesina and Spolaore 2003); (Treisman 2007).

But such simple multi-level provision of public goods leaves unresolved the problem of inter-jurisdictional externalities. The Institutionalist School holds that these can be captured by following a general rule: if externalities are localized, they should be captured by sub-national institutions; if not, they should fall within the remit of central governments. Much like that of the Efficiency School, this Institutionalist view overstates the capacity for federal systems, organized around durable, general-purpose, non-overlapping and territorial Type I sub-national jurisdictions, to capture dynamic, regional-scale externalities within a central-local dichotomy.

The basic premise of the Institutionalist School is the influential Decentralization Theorem. This theorem holds that the central government should be responsible for addressing issues which spill over sub-national boundaries, but all other functions, which are likely to involve spatially-heterogeneous preferences, should be devolved to sub-national jurisdictions (Musgrave 1959); (Oates 1972). The Decentralization Theorem is perhaps the most explicit statement of the proposed economic benefits of a federal political system. As Robert Inman and Daniel Rubinfeld write, "For most economists, the principle of economic federalism, with its recommended institutions of…decentralized local governments and a strong central government to provide pure public goods and control intercommunity externalities, essentially defines what federalism is about" (Inman and Rubinfeld 1997, 47). Yet this economic view of federalism mostly ignores the more important political determinants of how sub-

national administrative boundaries are drawn in federal systems, and how these leave many "intercommunity externalities" unaddressed by either local or federal levels of government.

An unambiguously characteristic feature of federal systems is that they feature durable Type I territorial jurisdictions as the basis of political organization. A number of influential federalism scholars stress its origins as a means of integrating diverse groups across relatively large areas, a solution to which Type I governance, in which sub-national units enjoy relative autonomy within a defined territorial space, appears to be an effective solution. Arend Lijphart, for instance, defines federalism as "a spatial or territorial division of power in which the component units are geographically defined" (Lijphart 1999, 187), while Malcolm Feeley and Edward Rubin assert that it is "a means of governing that grants partial autonomy to a polity's geographically defined subunits" (Feeley and Rubin 2008, 150). These definitions thus add a spatial dimension to Riker's functional definition: federalism institutionalizes power spatially among territorial jurisdictions as well as allocates it functionally between levels of government.

As the name of the Decentralization Theorem implies, its logic is not uniquely applicable to federal systems. By increasingly concentrating public service provision in Type I sub-national governance institutions, even formerly highly centralized states such as China and France have followed its general dictum (Yang 2004); (Le Gales and Pinson 2009). Nonetheless, the structure of Type I federal jurisdictions seems to bear out Hooghe and Marks' observation that Type I jurisdictions "make reform costly and unusual," and "tend to outlive the conditions that brought them into being" (Hooghe and Marks 2010, 19). In addition, much recent empirical work indicates that that

political fragmentation in the form of Type I jurisdictions increases the transaction costs of institutional cooperation (Post 2004); (Berardo and Scholz 2010). The durability of federal Type I jurisdictions may therefore serve to undermine, rather than enhance, economic efficiency.

In an old critique of fiscal federalism and the Decentralization Theorem which forms its core, Samuel Beer remarked that in order to serve the principle of economic efficiency, sub-national jurisdictions must "be very flexible, indeed flexible to the point of continual change, as periodic comprehensive calculations of utility led to new combinations by polities and new partitions by their citizens in the search for a better all-round balance of welfare" (Beer 1977, 27). Vito Tanzi's overview of fiscal federalism likewise observes that technological change and a corresponding increase in mobility cause the spatial characteristics of public goods to change over time. Consequently, "either the geographical areas covered by local jurisdictions—and thus the number of these jurisdictions—should change over time, or the characteristics of public goods should be continuously reexamined in order to reallocate some of them" (Tanzi 1996, 303). Given the durability of a Type I federal jurisdiction, this adaptive capacity is unlikely to be realized.

Moreover, it is unclear that federal central governments possess adequate political incentives to address spillover effects. If mal-apportioned electoral systems enable executives to build coalitions based on "cheap" support from some regions, they may be unwilling to undertake nation-wide externality capture initiatives (Macey 1990); (Gibson and Calvo 2000); (Samuels and Snyder 2001). Even if federal systems are uniquely able to efficiently differentiate high- and low-spillover effect public good

provision between central and sub-national levels of government, it is further unclear whether they will be sufficiently adaptable to do so. The efficiency-enhancing federation, after all, "must be flexible enough to respond to certain changes, but rigid enough to provide stability" (Watts 2008, 93). If it fails in either respect, its capacity to capture regional-scale economic externalities may be inferior instead of superior to that of a unitary political system, as the Institutionalist School suggests.

The Adaptive Governance School: Institutional Collective Action

However, another branch of political economy scholarship suggests a means by which sub-national jurisdictions can efficiently capture regional-scale externalities through inter-jurisdictional cooperation rather than competition or internalization by central or local levels of government. This Adaptive Governance School and its primary component literature, known by proponents as Institutional Collective Action (ICA), grew out of the study of metropolitan governance in the United States, and like its parent literature on individual- and community-level collective action, suggests that under particular institutional frameworks effective collective action is possible in political systems without coercion or incentive from a higher-level government (Ostrom, Tiebout and Warren 1961). Under ICA, sub-national jurisdictions engage in cooperative ventures whose combined extent encompasses a regional-scale externality (Feiock and Scholz 2010).

Much like the Efficiency School asserts that federalism promotes fiscal responsibility through inter-jurisdictional competition, both individual and institutional collective action theorists tend to assume that federal systems promote the ability to "exercise local initiative" which underpins management of shared resources (Bromley

1992, 299); (Becker and Ostrom 1995). The importance of local initiative stems from the belief that when dealing with complex resource allocation issues, information asymmetries are likely to be high and lower-level political units are likely to have better and more accurate information than central governments. Arguing that such local initiative is critical in the face of the "complex adaptive" nature of watersheds, Schlager and Blomquist argue, for example, that "Polycentric structures of overlapping organizations—networks, federal systems, and other multiple-organization arrangements…increase the likelihood of checks on the persistent maintenance of maladaptive policies," while also avoiding the information distortions common to centralized political systems (Schlager and Blomquist 2008, 17).

Yet it is not clear that ICA is in fact characteristic of federal systems. This ambiguity stems partly from a lack of empirical data: ICA literature is confined almost entirely to the American context, and seems never to have been the subject of a comparative study (Feiock 2012). Some case studies of individual- and community-level collective action, however, indicate that adaptive, polycentric governance institutions can be effective under centralized political systems such as Japan (Bromley 1992, 73). Even in theory, however, prospects for collective action are generally thought to be contingent on institutional arrangements at various levels (Ostrom, Gardner and Walker 1994); (Becker and Ostrom 1995). Rather than being dependent on a particular type of political system, effective ICA may be surmised to be dependent on particular institutional features of the system at hand, rather than generalizable federal-unitary forms.

Moreover, it is unclear that federalism is as conducive to flexible institutional forms as Schlager and Blomquist imply. Unlike Type I general-purpose governments, Type II special-purpose institutions, such as the watershed management organizations they suggest, are relatively inexpensive to create and modify (Hooghe and Marks 2010). Type II jurisdictions can in theory effectively capture trans-boundary externalities by providing "services to specific areas without following the jurisdictional lines of an existing city or county," thereby presenting a useful response to "problem[s] delineated by natural features, such as a watershed" (Mullin 2009, 6). However, this very jurisdiction-spanning characteristic is also likely to provoke considerable opposition from Type I jurisdictions whose territory they encompass in federal systems.

Indeed, whatever power Type II jurisdictions may hold in federal political systems, it is vastly outweighed by that of Type I jurisdictions. The political power granted to sub-national jurisdictions is most clearly indicated by their formal representation in federal legislatures, particularly upper houses. Such representation is a characteristic feature of federal systems, and reifies the Type I political jurisdiction as a durable structure whose contours shape subsequent policy processes and decisions (Swenden 2010). Their political power, again especially in upper legislative houses, in turn tends to enhance the salience of territorial interest-bargaining in federations (Rodden 2004, 490). As Erik Wibbels notes, "Whereas unitary systems encourage the formulation of national platforms and policies, federal systems explicitly give voice to geographically concentrated interests" (Wibbels 2006, 173). This voice may be expected to be raised in opposition to regional governance initiatives which threaten to usurp Type I jurisdictions.

This durable structure of Type I political jurisdictions upends the reverence which political economists have traditionally held for federalism is rooted in a belief in its adaptive capacity. Scholars of federalism such as Daniel Elazar stress the dynamic nature of federal systems; in his influential "matrix model" he describes federalism as "a network whose loadings can be shifted from arena to arena as different power currents and messages are transmitted…Thus power does not move in a unidirectional way, but shifts in response to changing circumstances" (Elazar 1984, 7). On this model, federalism is a kind of constantly evolving institutional architecture, one that is at a minimum flexible enough to modify its function in response to exogenous change.

Similar views on what might be called "flexible federalism" include Michael Pagano's statement that "The capacity to adapt to changing political and social circumstances arises systematically in a federal system"(Pagano 2007, 4); (Clarke 2007), as well as Schlager and Blomquist's assertion that "Federalism represents an important and powerful alternative to calls for more centralized governing forms" because it "encourages innovation and experimentation because of the dynamic tension between self-rule and shared rule" (Schlager and Blomquist 2008, 152-153). Yet this reverence may be misplaced. Precisely because it must provide for multiple autonomous sub-units under a single sovereign power, federalism requires an institutional architecture that is exceptionally durable and rigid—qualities quite at odds with those of adaptability and flexibility.

This survey of comparative political economy scholarship concerning the relationship between political systems and economic efficiency suggests that federal systems may be distinguished from their counterparts, including decentralized and

multi-level unitary systems, by their relatively rigid and durable institutions for sub-national governance, which are intentionally costly and difficult to modify. State boundaries in the United States or Australia, in other words, mean vastly more than those of Sweden's counties or Thailand's provinces. In particular, the structure of durable Type I territorial jurisdictions which I ascribe to federal systems implies that it is more difficult for federations to capture economic externalities which are regional in scope.

Such an outcome differs from that suggested by the model of "flexible federalism" which I have described above. Moreover, my implication of sub-national territorial political units as the operative components of federal systems stands at odds with the emphasis placed by extant literatures on vertical allocations of power between central and local levels of government. Resolving this puzzle requires the application of a test case which entails the capture of regional-scale externalities, and which can be compared across federal and unitary political systems. In the subsequent section, I describe the management of river basins as such a case.

Approach of the Study: Premises, Methods, and Structure

In this section, I describe my approach to evaluating the capacity of different political systems to capture regional-scale economic externalities which arise over time. I assert that RBM institutions provide an ideal lens through which to evaluate this capacity, because RBM necessarily entails the capture of regional-scale economic externalities which occur within river basins. RBM therefore relates to economic efficiency in two respects. First, watershed externalities, such as uncompensated pollution of downstream areas by jurisdictions further upstream, signify that an

economically-inefficient resource allocation obtains. Second, because large watersheds almost always span sub-national jurisdictional boundaries, their spatial dimensions are regional, and capturing watershed externalities requires either the action of a higher-level government whose remit encompasses the spatial extent of the externality, or by inter-jurisdictional cooperation between units whose combined spatial extent matches that of the externality. I discuss RBM as a crucial case of regional externality capture first, followed by selection and analysis of case studies, and finally a discussion of the limitations of this approach, sources, and the structure of this study.

RBM as a Proxy for Regional-Scale Externality Capture

I attempt to address the question of whether different political systems manifest differential capacities to capture regional-scale economic externalities. Examining attempts to capture regional river basin externalities under different political systems, which I refer to as RBM, provides a means to do so in three respects. RBM not only requires the establishment of political institutions to capture externality effects but also, because RBM transcends several functional policy areas, requires cooperation between both central and local governments as well as neighboring local governments.

Investigating institutions for RBM and their function promises to betray not only the capacity of different political systems to capture regional-scale economic externalities, but also how and why this capacity arises. RBM is thus particularly well-suited to testing extant theoretical propositions which place the efficiency-enhancing or –reducing characteristics of political systems in particular aspects of their functional or spatial organization. David Lampton describes this characteristic well in writing that "Water, because it crosses administrative boundaries, forces different organizations and

administrative units to do what they most abhor—deal with each other" (Lampton 1987, 157).

The basis for my claim that RBM represents an ideal lens through which to investigate the capacity of political systems to meet regional-scale governance challenges stands on two particular facts. First, RBM entails the capture of economic externalities through the exercise of the powers of government and political processes rather than private endeavor. As Frederick Frey wrote in a seminal study of conflict over water resources, "Water has four primary characteristics of political importance: extreme importance, scarcity, mal-distribution, and being shared" (Frey 1993). Imbued with these salient political characteristics, it is exceptionally difficult to capture the economic externalities transmitted by basin water resources through economic means alone. Instead, a typical pattern emerges: socioeconomic development leads to growing conflicts between water users in a given river basin which, given the unique economic importance of water, are resolved through political instead of market mechanisms.

This process is in turn the result both of broad socioeconomic change and particular characteristics of water as a resource. River basin externalities emerge dynamically as a result of exogenous change, as illustrated in the example of nineteenth-century England, where "the diversification of industrial and urban water uses" and resulting "multiplication of legitimate users inevitably led to heightened conflict over appropriation of finite available water" (Geltzler 2004, 44). This macro-scale economic change increases the value of water resources to multiple segments of society, which in turn becomes a distributional issue since it "automatically imposes problems of sharing, and generally of water as a form of property" (Bennett 1974, 63); (Hart 1974). The

fungible nature of water makes it difficult to assign an efficient system of property rights, complicating the problem (Geltzler 2004, 43). This characteristic also makes it difficult to reach Coasean bargains wherein externalities are captured through transfer payments (Coase 1960).

Furthermore, because of these unique characteristics, water resources have "historically…lain at the limit of the sphere of applicability of the market as a social institution for allocating resources" (Bakker 2003, 33). In the place of market allocation, water resources are almost always allocated through political mechanisms. Under political allocation, the economic scarcity value of water is replaced by differential policies instituted in response to the interests of particular political constituencies (Dinar, Rosegrant and Meinzen-Dick 1997); (Boberg 2005). RBM institutions and processes thus share two characteristics across political systems, namely a politicized nature and a basis in broad socioeconomic change, thereby facilitating cross-national comparison.

On the other hand, variation in RBM outcomes can be assessed on the basis of differential success in capturing regional-scale river basin externalities. Where political jurisdictions, whether countries, states, or provinces, constitute meaningful economic units, a river which passes through more than one such unit can be viewed as a transmission agent of externality effects, which occur "whenever an action taken by some economic unit has a direct impact on the welfare or productivity of some other economic unit" (Dorfman 1974, 5). The extent to which regional-scale river basin externality effects obtain across political systems is indicated in Figure 2, which demonstrates that in only two cases do major river basins reside within a single sub-

national jurisdiction.[1] The spatial extent of watershed externalities, in other words, is almost always discontinuous with the boundaries of political jurisdictions. Instead of constituting local- or national-scale issues, river basin externalities are regional in scale. River systems transmit these externalities from one political jurisdiction to another, and thus constitute common-property resources from the point of view of these units (LeMarquand 1976, 884); (Waterbury 2002, 24).

[1] This result was obtained by visualizing river basin and administrative area shapefiles in a Geographic Information System (ArcMap 10), and using the spatial join command to append river basin data to the administrative area to which it is spatially most closely related. River basin data were obtained from shapefiles produced by the World Resources Institute and provided by the UN Food and Agriculture Organization, *WRI Major watersheds of the world delineation,* July 11, 2006, available at http://www.fao.org/geonetwork/srv/en/metadata.show?id=30914&currTab=simple (accessed April 2, 2011), while major "Level-1" sub-national administrative boundary data were obtained from the Global Administrative Areas Project, *Global Administrative Areas,* August 29, 2009, http://www.gadm.org/ (accessed April 2, 2011).

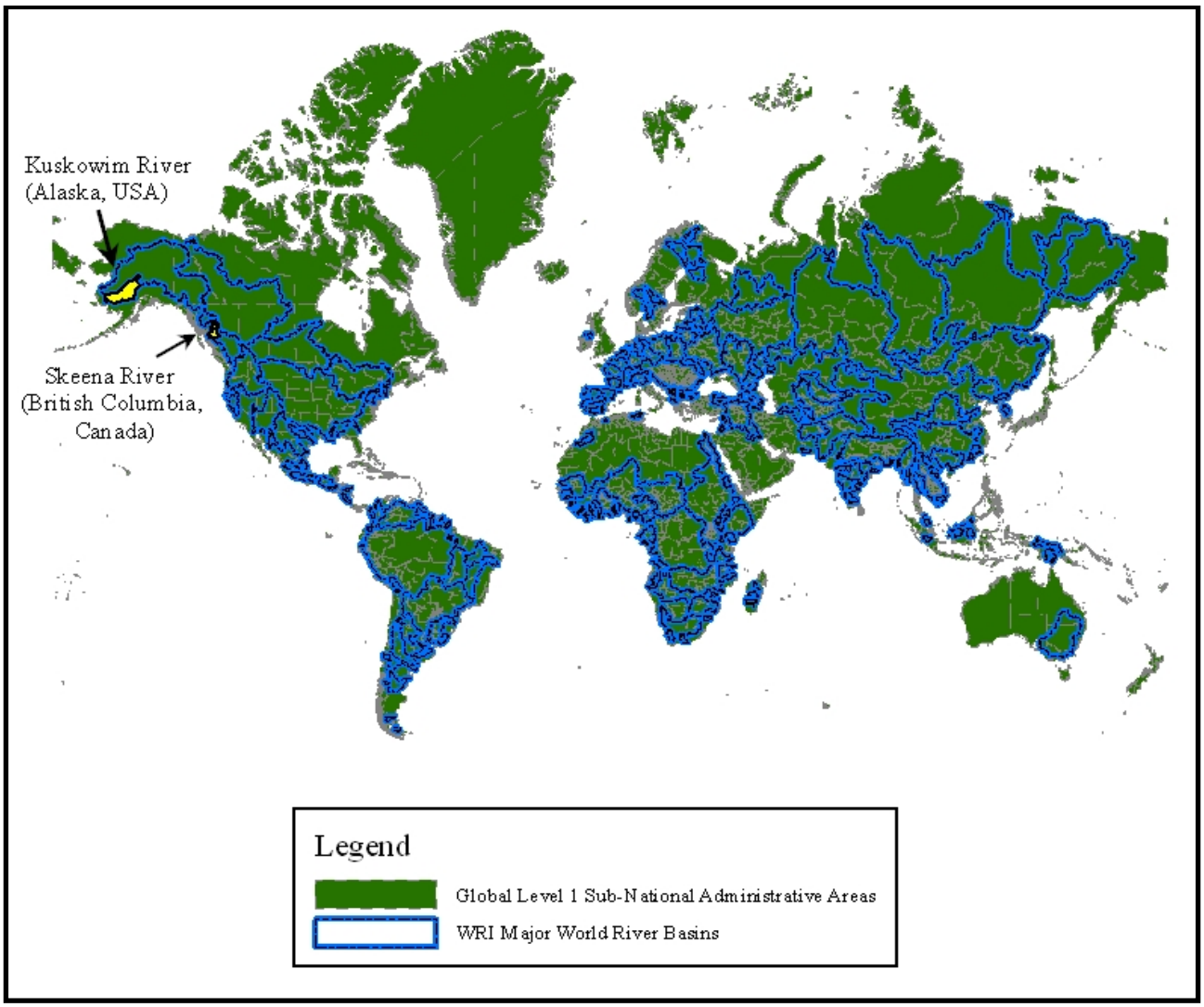


Figure 2: Global Discontinuities between River System and Administrative Boundaries

However, as common-property resources, river basins possess distinctive characteristics which generate particular barriers to regional-scale externality capture. Water resources within a river basin are excludable in the sense that, barring long-distance transfers of water, they can be exploited only by riparian political jurisdictions. Among riparian jurisdictions, however, exclusion is difficult, since water is a fungible resource that can be diverted, stored, and re-used with relative ease. Moreover, because the total quantity of water within a basin can be expected to be finite, rivalries are involved (Waterbury 2002, 24). The complexity of hydrological systems also makes

monitoring difficult (Feitelson 2006). As a result of these characteristics as a common-property resource, it is difficult to constrain over-exploitation of water within river basins (Ostrom, Walker and Gardner 1992). RBM institutions in all political systems must therefore overcome considerable barriers in order to be effective.

Nonetheless, federal political systems are likely to face particularly challenges in establishing RBM institutions. Federal central governments in particular rarely have any constitutionally-defined powers regarding RBM (Bednar 2009, 75). This delineation of powers in federal systems produces particular coordination and inter-jurisdictional collective action problems, since it means that shared river systems are among "those matters where the central government has no clear power [and] the states have, but because of territorial limitations cannot proceed singly" (Watts 1970, 79). Indeed, most political systems, as well as every federation which has adopted legislation specifically related to water management, and for which uniform data are available, leaves responsibility for water resource management to sub-national governments (UNFAO 2010).

Anecdotal evidence supports the presumption that RBM may be a particularly fraught issue in federal political systems. Long-simmering inter-jurisdictional river disputes, and failures to establish RBM institutions, appear to be a feature of federations. In the Colorado River basin, conflict between states, including "Arizona's attempts to prevent California from monopolizing the River" has produced "a long and bitter feud" (Getches 1984-1985, 414). Similarly, in India, "competition between Indian states for scarce resources, such as river waters" has been an important feature of India's post-Independence federal experience (Mitra 2000, 50). These observations raise the question

of whether RBM outcomes are distinctly and differentially affected by political system type, and if so, why. Moreover, these observations suggest the utility of applying RBM outcomes as a dependent variable for cross-national comparative study. In the subsequent section, I describe the selection and analysis of case studies for such a cross-national study.

Selection and Analysis of Case Studies

This study attempts to isolate an elusive explanatory variable, namely political system type in general and federalism in particular, which is moreover subject to substantial endogeneity concerns. To minimize the risk entailed in doing so, this study adopts a nested analysis research design in order to select country case studies based on the explanatory variables of interest. This design employs a large-scale quantitative analysis to select individual case studies for intensive qualitative analysis. The nested analysis approach has the advantage of integrating quantitative and qualitative techniques in order "to improve the quality of conceptualization and measurement, analysis of rival explanations, and overall confidence in the central findings of the study" (Lieberman 2005, 436). By selecting country case studies based on the large-n analysis, the nested analysis approach moreover helps to avoid selection bias and promises to add explanatory power to quantitative models.

For each country and RBM however, case study, I employ a comparative historical analysis approach (CHA), and do so for two primary reasons. Firstly, a historically-grounded approach minimizes the endogeneity problems common to studies of federalism. Many such studies, which attempt to isolate particular aspects or effects of federalism, in fact encounter the effects of broader political and economic

reforms, complicating the identification of causal mechanisms (Bardhan 2002). Given the difficulty in identifying causal mechanisms under such circumstances, I follow the advice of authors who suggest a more empirical and historical approach to the study of federalism (Oates 1999); (Rodden 2003). I believe that the study of federalism is thus well-served by "carefully constructed historical case studies" which can nonetheless credibly claim a wide scope of applicability (Beramendi 2007, 774).

Moreover, a historical approach is particularly well-suited to the study of RBM. The challenges involved in RBM, and the policy responses to them, vary significantly over time. So important is this temporal element that, in Spain for example, "Every socioeconomic period can be associated with a specific approach to water management" (Vaccaro 2008, 229). Indeed, it is virtually impossible to generalize regarding matters of water resource management, since "Each country or region has specific institutions, geography, and history that bear consideration when examining such issues" (Batterbury and Ferdando 2006, 192). Large-n, cross-national studies are likely to be of only limited utility under such circumstances.

Instead, I employ CHA to "develop, test, and refine causal, explanatory hypotheses about events or structures integral to macro-units such as nation-states" (Skocpol 1979, 36); (Amenta 2009). To facilitate this mode of analysis, I identify discrete cases of attempts to capture water quantity and quality externalities within river basins and across different political systems. Each of these cases can be described as a historical narrative which enables me to isolate the explanatory variables of interest, namely central-local decentralization and federalism. My historical case studies thus constitute

discrete cases of regional-scale externality capture nested within country case studies which correspond to different political system types.

I select case studies based on the nested analysis framework, and which in turn requires operationalization of political system type, and especially federal versus unitary political systems. Although I have suggested that federal systems can be usefully distinguished from unitary ones, the sheer range of federal forms precludes the use of a federal-unitary binary independent variable in cross-national analysis (Stepan 1999). For the purposes of the large-n analysis and country case selection, I emphasize operationalization in terms of fiscal decentralization, chiefly because adequate cross-national data on other measures of decentralization are not available. Moreover, certain measures of fiscal decentralization may be expected to proxy for political and administrative decentralization. Actual autonomy, according to KC Wheare, requires for each level of federal government control over "financial resources sufficient to perform its exclusive functions" (Wheare 1963, 93). In the fiscal federalism literature, similarly, fiscal autonomy underlies the proposed social welfare gains and losses accruing from federal government (Oates 1985); (Rodden 2003).

For the purposes of country case selection, fiscal decentralization and sub-national fiscal autonomy can in turn be effectively operationalized in the form of vertical imbalance. Vertical fiscal imbalance results when the revenues of different levels of government do not match their expenditure responsibilities. Fiscal transfers are then necessary from a revenue-collecting entity, typically the central government, to sub-national governments. The quantity of these transfers is the vertical imbalance (Hettich

and Winer 1986). Such transfers are of special interest to scholars of federalism, because they indicate the degree of fiscal autonomy of sub-national entities (Rodden 2006).

There is, in contrast, no simple source of data on the existence of regional-scale river basin externalities across countries. However, river basin externalities certainly obtain in the state of "basin closure," whereby the volume of water in the system becomes insufficient to meet the full range of social, economic, and ecological needs throughout the river basin. Basin closure represents a shortage of water resources such that not all demands for water can be satisfied (Seckler 1996); (Falkenmark and Molden 2008). Basin closure thus is likely to indicate a number of river basin externalities related to water quantity and quality. Disputes typically ensue in closed basins, because "there is simply not enough water, independent of its distribution, to meet all legitimate needs" (Haftendorn 2000, 59). Accordingly, for the purposes of case selection the existence of regional-scale river basin externalities can be operationalized in the presence or absence of a state of basin closure.

Basin closure can in turn be operationalized on the basis of Water Stress Index (WSI) scores. The WSI indicates the percentage of utilizable water in a given hydrological basin which is withdrawn for direct human use, and therefore of its economic, social, and ecological impact (Smakhtin, Revenga and Doll 2004). WSI is calculated by river basin, and is aggregated at the country level as a percentage of each country's territory which is subject to water stress, indicating the percentage of available water resources already appropriated for direct human use. WSI scores thus provide an indication of the degree to which water resources in whole countries are subject to inefficient allocation and, by extension, RBM outcomes. Although the basic unit of

analysis in this study is the river basin, the comparative political objectives of this study mean that cross-national variation is of primary interest in country case selection. Accordingly, aggregated national WSI scores are used to quantify cross-national variation in RBM outcomes.

Figure 3: WSI as a Function of Vertical Fiscal Imbalance

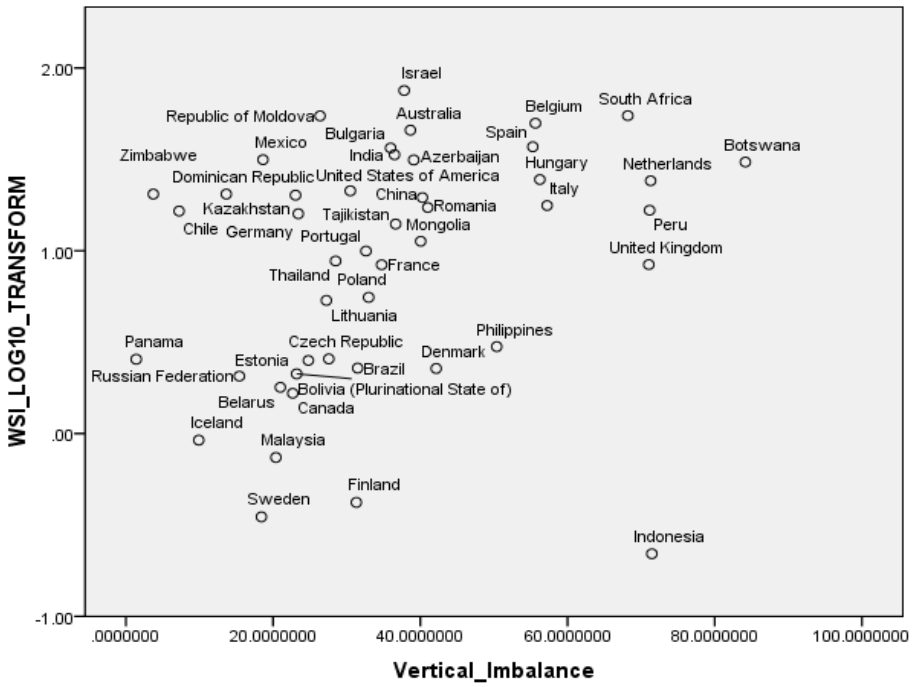


Figure 3 displays the resulting cross-national variation in the extent of decentralization across political systems, operationalized as vertical fiscal imbalance, as a function of the degree of efficiency in water resource allocation, operationalized in terms of WSI scores. Four country case studies which represent a range of variation according to this operationalization are the United States, India, China, and France, which I select as my case studies. As per the nested analysis framework, WSI scores for two of the cases, China and France, are roughly predicted by vertical fiscal imbalance as an explanatory variable, while another two, the United States and India, fit the model less

well. According to the categorization which I proposed in the Introduction, the USA represents a decentralized-federal system, India a centralized federation, China a decentralized-unitary system, and France a centralized-unitary system. Additionally, but importantly, these cases feature *de jure* or *de facto* official languages, English in the case of the United States and India, Mandarin Chinese and French in China and France, respectively, in which I possess sufficient facility to conduct research.

In combination, these country cases capture a wide range of variation in both central-local decentralization and spatial political organization. The United States is almost unanimously recognized as a relatively decentralized federation, India as a much more centralized federal system, China as a "decentralized union" which accommodates territorial diversity through a centralized political and decentralized fiscal system, and France as a unitary state which has in recent decades devolved some important powers to regional governments (Watts 2008). The United States and India also represent two very different federal forms, the former a congruent model in which demographic diversity is mostly independent of political organization, and the latter incongruent in which federal unit boundaries delineate linguistic groups (Lijphart 1999, 196). Because these country cases vary widely on a number of other possible explanatory variables, including state capacity and political party structure, they further serve isolate central-local decentralization and spatial political organization as the explanatory variables of interest.

Moreover, as prescribed by the nested analysis framework, I divide these cases into theory-building cases which "fit" the hypothesized relationship between sub-national structure as expressed by vertical imbalance and economic efficiency as

expressed by WSI, namely China and France, and theory-confirming cases which fit the hypothesized relationship less well, in this case the US and India. In order to strike a meaningful balance between descriptiveness and generalizability, I choose one theory-building country case, China, and one theory-confirming case, the US, to explore in detail, such that my analysis and discussion of these two countries is substantially longer than that of the others, and which in turn serve to substantiate my argument across a broader scope of variation. Even among these more-detailed country case studies, however, my discussion of the US serves as a baseline and benchmark to which I compare the other country cases. This reflects the historic focus of political economy literatures on American federalism, such that my attempts to engage it demand a detailed treatment of the American case.

Within the US country case, I attempt to enhance within-case variation by including multiple case studies of regional-scale river basin externality capture (King, Keohane and Verba 1994). In addition, I attempt to isolate variation on the dependent variable of interest, namely RBM outcomes, through the use of paired case studies of similar RBM institutional forms whose outcomes were nonetheless distinct across country cases. I have identified four such pairings using most-similar-systems criteria based on the RBM institutional typology described in the Introduction (see Figure 4). These pairings are: bureaucratic river basin management in the Colorado River basin, USA and Yellow River basin, China; comprehensive river basin development authorities in the Tennessee River basin, USA and Damodar River basin, India; and nation-wide river basin commissions in the USA (Title II River Basin Commissions) and France (*Agences des bassins*).

The first pairing addresses attempts to address water quality and quantity externalities in largely arid river basins over several decades, the second attempts to foster regional economic development in under-developed regions through comprehensive river basin planning and development, and the third creation of a nation-wide system of regional watershed governance institutions. Because the history of basin water resource allocation in the Colorado and Yellow River Basins is exceptionally long and complex, my discussion of these paired cases is also more detailed than of the others. This detail also serves to highlight in greater detail the territorial logic that I assert drives sub-national politics in river basins.

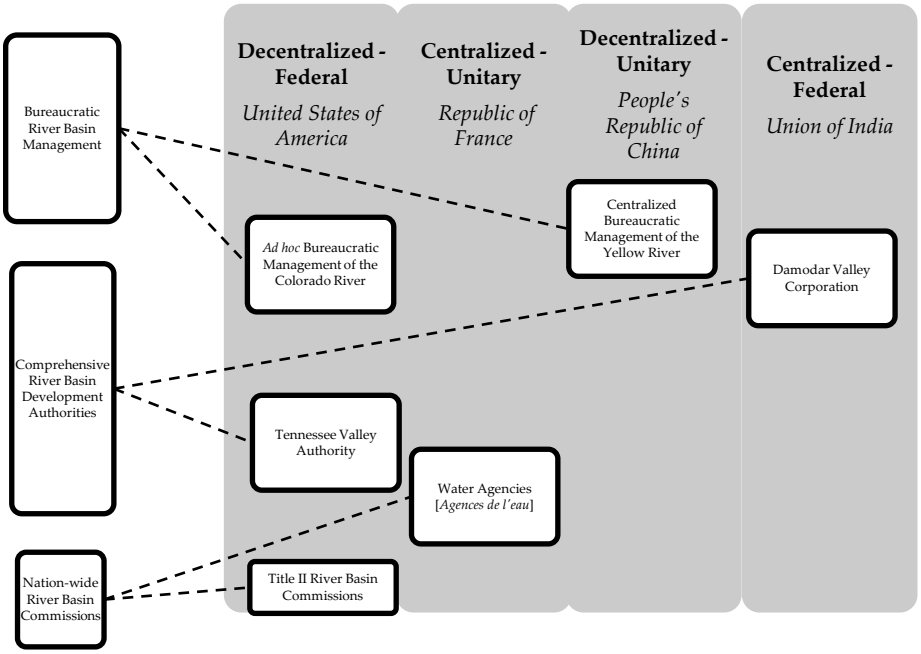


Figure 4: Diagram of Paired Case Studies and Relationship to Country Cases

Limitations, Sources, and Structure

Despite its appropriateness for my purposes, the methodology I outline has distinct limitations which must be recognized at the outset. In emphasizing detailed historical investigation of a few case studies, I have sacrificed the generalizability entailed in large-n studies. It would have been desirable, for example, to include additional unitary country cases which feature a range of decentralization arrangements, such as Denmark and South Africa. Regrettably, length restrictions prevent me from addressing these cases in this study.

Moreover, my choice of a relatively small number of cases invariably raises concerns of selection bias. As Theda Skocpol notes, "there always are unexamined contextual features of the historical cases that interact with the causes being explicitly examined in ways the [CHA] either does not reveal, or must simply assume to be irrelevant" (Skocpol 1979, 39). Though I have attempted to minimize these through application of the nested analysis framework, it does not eliminate the risk of selection bias in either my country or river basin case studies.

Finally, though it was not possible to do so in this study given length restrictions, it would be desirable to apply the theoretical framework I have developed to other regional-scale issues, such as crime and transport, in order to test its scope of applicability. These limitations certainly bound the implications of this study. However, the approach I outline also confers several distinct advantages. My use of historical case studies frees me of the need to rely entirely on cross-national data which are of dubious explanatory power with respect to complex explanatory factors. As Rodden writes, in the study of federalism and decentralization, there is an imperative for "Producers of

cross-national regressions should be modest about their claims, and consumers cautious in their interpretation" (Rodden 2004, 498).

Each case follows a uniform structure designed to facilitate comparison on the explanatory variable of interest, extent of political-economic decentralization, as well as the dependent variable, capacity to capture regional-scale river basin externalities. All cases begin with a Country Case Introduction which categorizes the political system according to a four-part classification, federal-decentralized; federal-centralized; unitary-decentralized; and unitary-centralized. It then describes the institutional arrangements for first the central government role in regional-scale river basin externality capture, and second that of sub-national governments. Following this introduction, individual case studies of river basin externality capture are presented which trace the roles of central and sub-national actors in producing differential outcomes in terms of capacity to capture regional externalities. Finally, the Country Case Conclusions generalize from each country case and compare its outcome to that of the other country cases in this study.

Within each case, RBM outcomes are operationalized as a set of attempts to capture river basin externalities. A broad range of sources is employed to trace the role of various actors and the course of attempts to capture river basin externalities. The focus throughout is on documents which elucidate the relationship between political actors at multiple levels with respect to RBM, especially the advocates and opponents of particular attempts to capture river basin externalities, how they sought allies at various levels of government, and the crucial decision-makers and interest-brokers in each case. I place particular emphasis on attempts to conclude legal agreements or establish formal

procedures to meet specific externality challenges, including the creation of RBM organizations and passage of legislation related to river basin externalities. I also analyze the role of the various actors within each case study in response to specific disruptive events, such as the construction of dams or canals, in order to understand their interests and importance.

Fieldwork and archival research was conducted for each case at libraries and archives in the United Kingdom, United States, and China. Moreover, key-informant interviews were conducted with water management specialists from each of the major case studies as well as several other countries, including Australia, which space prevents this study from fully incorporating. Sources vary considerably depending on the case at hand, but include public and legislative records, archival material, official reports, biographies, and histories. For a general record of events I rely heavily on newspapers of record, particularly *The Los Angeles Times, The Times of India,* and *People's Daily*. In all cases, however, I have based assertions and interpretations on the basis of multiple sources. In the Chinese case in particular, the uncertain validity of some official sources made it necessary to rely on relatively fewer primary sources, and so these were supplemented with around ten semi-structured key informant interviews. To characterize the spatial dimensions of the river basin case studies, including their physical characteristics, I rely on the use of freely available spatial data visualized in a Geographic Information System, namely ArcMap 10.

The methodological approach I have described also structures this study, which is divided into three parts. The first, which consists of this chapter, outlines my research question, approach, and hypothesis. The second part, which consists of four chapters

corresponding to the four case studies, provides empirical evidence for my argument. The third and final part concludes this study with a summation, statement of extensions, implications, and suggestions for further research. The remainder of this present chapter is devoted to elaborating a model of sub-national regional politics in the context of RBM, and in so doing to explain in more detailed fashion how federal systems may be expected to inhibit the institutional adaptations necessary to capture regional-scale river basin externalities relative to their unitary counterparts.

Argument of the Study: Sub-National Territorial Actors as a Determinant of Regional-Scale Externality Capture

The previous sections of this chapter have focused on the first two aspects of the question which animates this study, namely whether and how political systems vary in their capacity to capture regional-scale economic externalities, such as those which obtain within river basins. The final aspect of this question, why, is the topic of this section. First, I identify several key actors in river basin externality capture across cases, and describe their generalizable preferences. Second, I explain why the behavior of these actors in pursuit of their preferences is likely to vary between federal and unitary political systems, thereby producing differential RBM outcomes according to particular features of different political systems. Finally, I provide a preliminary empirical assessment of this proposed linkage through cross-national regression analysis.

Throughout, I build the argument that regional-scale river basin externality capture in federal systems is likely to be qualitatively distinct from their unitary counterparts, differentiated by the manner in which regional issues are channeled by a comparatively rigid sub-national structure into those addressed at the national or local

levels, and to the detriment of regional governance institutions. Put another way, regional issues like RBM are accommodated in federal systems by molding them to fit an established bifurcation of governance into central or local levels, while unitary states are more apt to create regional governance institutions to address them—usually with greater efficiency. This characteristic divergence in RBM outcomes is in turn due to the distinctive territorial behavior of sub-national actors in federal political systems.

Actors and Preferences in River Basin Externality Capture across Cases

As the foundation of my argument I specify five key political actors whose interactions, across cases, explain the success or failure of attempts to capture regional-scale river basin externalities. These actors are: environmentally-oriented civil society groups, hydro-engineering bureaucracies, central government legislatures and executives, sub-national territorial jurisdictions (SNJs), and local water user groups within individual river basins. Two clarifications regarding these actors are necessary at the outset. First, although most political systems feature several tiers of sub-national government, the first tier, which is often equivalent to province-level, assumes particular importance because lower-tier SNJs are almost always subordinate to it, and hence the province-level often plays a key intervening role between central and local levels (Goodman 1997). I therefore emphasize the role of first-tier or provincial-level SNJs. Second, each of the five actors in my model behaves as a rational utility-maximizing agent who engages in "strategic behavior"—that is, who bases decisions on the expectation of interactions with other rational actors (Buchanan and Tullock 1962); (McLean 1987, 67).

The general set of actors and processes in the model I propose is depicted in Figure 5. Solid rectangles indicate governmental actors, while the dotted rectangle indicates non-governmental actors. Uni-directional arrows indicate lobbying processes that are predominately directed at one actor by another; bi-directional arrows indicate mutual lobbying processes in which both actors are subject to significant lobbying by the other. Finally, the two thin lines at the right-hand side of the diagram indicate divergent outcomes in attempts to capture regional-scale river basin externalities. They emanate from the national legislature and executive because these authorities typically make the final decisions regarding regional-scale externality capture, although, as I have said, the role of sub-national actors is the critical determinant in their decision-making.

Despite the generalizability of this set of actors, it is important to note that cross-national variation obtains in several respects. The State Council and CCP Central Committee replace the National Legislature and Executive in the case of China, while the influence of national civil society groups is circumscribed by political and legal restrictions in the cases of China and India. Moreover, not all actors in the model are created equal. Each actor set must therefore be described in greater detail.

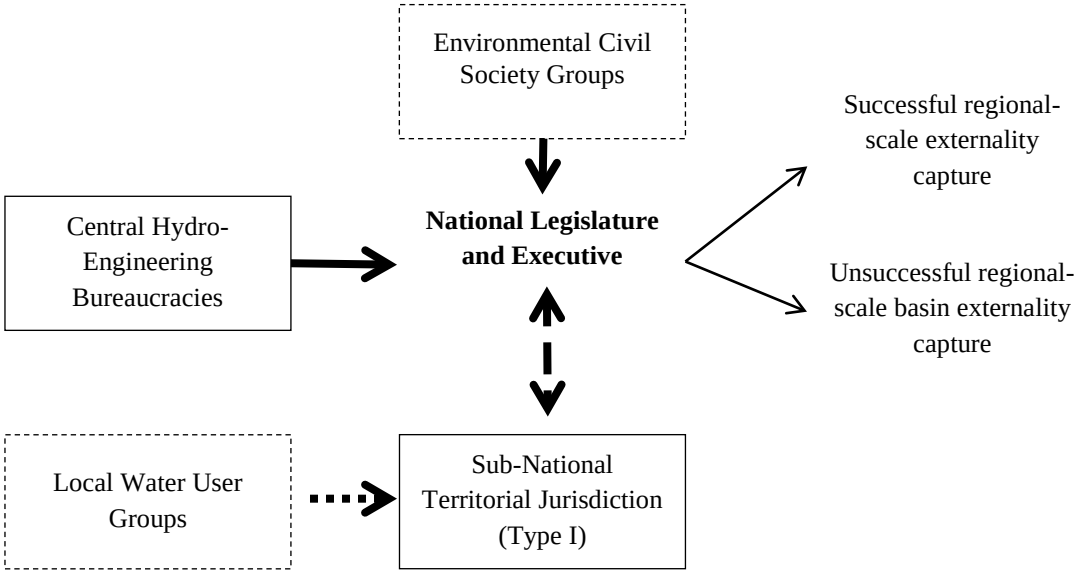


Figure 5: Actors and Processes in Regional-Scale River Basin Externality Capture

I propose that of these actors, environmentally-oriented civil society groups and hydro-engineering bureaucracies are incentivized to pursue a "top-down" approach, lobbying central legislatures and executives to capture river basin externalities, either through passage of nation-wide legislation or creation of new RBM institutions in individual river basins. SNJs, in contrast, oppose national- and regional-scale action, preferring instead to address externality issues in a localized manner reflecting the parochial interests of their respective jurisdictions. This effect is amplified because local water users, being local interest groups, tend to work through SNJs in order to effectively lobby central governments. The role of SNJs is therefore decisive in determining RBM outcomes in my model because they serve a dual purpose, first as interest-brokers for a diverse set of sub-national political actors (Tarrow 1977), and second as effective political actors in their own right (Cammisa 1995). The behavior of SNJs and the local water user groups which constitute their allies is moreover

distinguished from that of the other actors in being motivated by fundamentally territorial interests.

As noted in the Introduction, SNJs can be divided into two main types: Type I general-purpose territorial governments and Type II special-purpose, non-territorial jurisdictions. However, in practice sub-national governance in most political systems is dominated by the Type I form (Keating 1998). Accordingly, the behavior of SNJs is defined by a territorial politics in which the underlying impetus is to "Investigate territorial intergovernmental actors and their relationships in order to assess the influence of the territorial division of power on policymaking" (Braun 2000a, 19). Because in river basins these interests are closely related to geographic position along a shared waterway, SNJs generally manifest an adversarial relationship *vis a vis* the center, and follow a territorial logic that is fundamentally protectionist in orientation and parochial in objective. This characteristic obtains across countries.

In contrast, of the five primary actors, the role of civil society groups is subject to the greatest variation across cases. The importance of civil society is determined by what some scholars call the "political opportunity structure," meaning their degree of access to formal political processes. Many social-movement scholars assert that political opportunity structures are broader in federal systems because they offer multiple points of access to government at local, state, and national levels (Van der Heijden 1997); (Brannstrom 2004); (Walti 2004). I do not explicitly evaluate this claim, but observe that national-level civil society actors are of greater salience in the US and French cases than in the Chinese and Indian, even though the latter is classified as a federal system.

Across political systems, however, civil society groups share a key characteristic: they seek to enhance their influence by "expanding the sphere of conflict" to as broad a field of political engagement as possible (Mertha and Lowry 2006), and hence direct their lobbying efforts at as high a level of government as possible. Thus civil society groups lobby central-government legislatures and executives to create relatively powerful RBM institutions that aspire to nation-wide coverage of river basins, and which provide for civil-society input in governance mechanisms (Chene 2009). For this reason, civil society groups tend to advocate for RBM institutions that operate in parallel to or even supplant existing governance institutions, including river basin management organizations and authorities such as the TVA or the French Water Agencies.

Central hydro-engineering bureaucracies resemble national civil society groups in supporting regional-scale RBM institutions as a means to expand their power, but strive to limit rather than to expand participatory governance mechanisms. Perhaps because the control of water is so central to economic development, powerful hydro-engineering bureaucracies exist across political systems, particularly during stages of heavy industrial development. Although few scholarly works specifically address these organizations, those which do, such as Arthur Maas' study of the US Army Corps of Engineers, generally typify the model of rent-seeking bureaucracy (Maas 1974); (Faith 1980, 336); (Gisser and Johnson 1983); (Rucker and Fishback 1983).

The emergence of river basin externalities is likely to provoke such rent-seeking among hydro-engineering bureaucracies because river basin externalities can be expected to affect their principal outputs, usually large hydraulic works and associated water infrastructure (Downs 1967). Consequently, and in contrast to the more

participatory regional governance institutions favored by civil society, these bureaucracies favor centralized, technocratic institutions which maximize their corporate influence, such as river basin authorities. Nonetheless, hydro-engineering bureaucracies often find their interests aligned with civil society groups with respect to creating new, specialized RBM governance institutions in which their influence can be maximized. The success of such coalitions is however dependent on the relative strength of sub-national actors.

In contrast to that of civil society and hydro-engineering bureaucracies, the behavior of SNJs is characterized by "groups of territorial actors with a territorial logic" (Braun 2000a, 9). The salience of territorial politics in RBM stems from the fact that water is expensive to transport per unit volume (Bakker 2003); consequently, preferences for it is likely to be shaped by place-specific characteristics, such as proximity to a major river basin and the dominant forms of economic activity. Moreover, because water is essential to virtually any economic activity, SNJs are likely to form preferences for water resources to the extent that they possess "an encompassing interest in the prosperity of the jurisdictional unit" (Rodden and Rose-Ackerman 1997, 1544), which most presumably do. In some cases, these economic rationales may be strengthened by the local cultural significance of water (Mustafa and Qazi 2007); (Ingram, Whiteley and Perry 2008).

Importantly, this territorial logic guides SNJs in their interactions both with other levels of government and with other SNJs. When outside assistance is required to finance water-supply projects, for instance, SNJs are capable of mobilizing significant support from within their jurisdictions. As Elazar observes, in the United States "Most

states have never been able to finance the great water resource projects undertaken within their limits…In case after case, states mobilized…to seek federal assistance" (Elazar 1984, 39).

Simultaneously, however, the localized nature of water resource preferences discourages extensive cooperation with either higher levels of government or neighboring jurisdictions in the management of river basins. As Helen Ingram writes, "The key attribute of water as a political issue is its basis in locality. Both the need for water development and the possible benefit from water projects are perceived in local terms" (Ingram 1971, 103). SNJs are incentivized to present a cohesive front with respect to other jurisdictions as well as central governments, thereby "shortcutting both a general discussion of goals and a consideration of alternative means" (Ingram 1971, 105) while also discouraging the involvement of national leaders who may oppose regionally-beneficial water projects (LeMarquand 1976, 895).

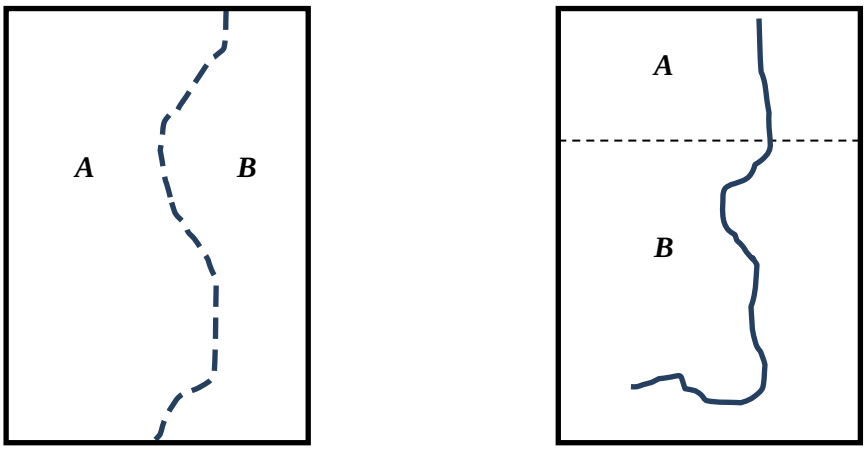
These patterns of behavior often lead local water user groups to ally with SNJs in opposition of higher-level attempts to interfere with localized water resource preferences. Thus German industrialists found common cause with *lander* along the Rhine to oppose federal water pollution regulations in the 1970s, for example, distinctly undermining the federal government's foreign-policy interests in effectively cooperating with downstream countries (LeMarquand 1976, 898).

SNJs therefore desire to maintain control over their water resources, both out of a desire to protect local economic interests but also to resist expansions of central government power at their expense. As Ronald Watts notes, water can be an especially valuable distributive resource, and one which SNJs are incentivized to keep under their

own control (Watts 2008, 112). The testimony of a Nevada Congressman in opposition to federal efforts to enhance inter-state cooperation along the Colorado River illustrates this point well: "I think the states should guard most zealously the water that belongs to them…The water is our natural resource" (US House Committee on Irrigation and Reclamation 1928, 51). In addition to discouraging vertical cooperation with central governments with respect to RBM externality capture, the value of water as a strategic resource also discourage horizontal cooperative relationships with other SNJs.

This tendency toward local protectionism manifests itself in divergent SNJ preferences for different water uses according to their geographic position within a river basin. Some water uses, notably navigation and flood control, are for the most part non-rivalrous and non-excludable among basin riparians. For these public goods, preferences are likely to converge, and cooperation may be expected regardless of geography (LeMarquand 1976, 885-886). For the most important water uses, however, geography can be expected to induce divergent preferences, as indicated in Figure 6 below. Where jurisdictional boundaries are such that units are co-riparians, as in Geometry I, water uses such as hydropower are for practical purposes non-excludable, providing a *ceteris paribus* incentive for cooperation if the actors involved are relatively few. However, in the most common situation, when unit boundaries are arranged such that rivers flow from upstream to downstream units, as in Geometry II, the most important water uses, such as industrial effluent release and non-return-flow irrigation, are both subtractable and excludable, providing little internal incentive for upstream units to redress downstream river basin externalities, such as pollution or scarcity.

Thus, in the most common set of situations involving rivalrous water uses and an upstream-downstream orientation of political jurisdictions relative to shared waterways, there are few external economic incentives for cooperation between SNJs. As LeMarquand observes, when such a situation obtains, "A state that takes advantage of its favored position on a river has no real economic incentive to alter its behavior." Therefore, generally speaking, "There is no economic incentive for cooperation" (LeMarquand 1976, 887). SNJs, in contrast to civil society and bureaucratic actors, therefore face a general incentive to oppose regional-scale attempts to capture river basin externalities. Their success in doing so, however, is dependent on peculiar features of federal as opposed to unitary political systems.



Geometry I: River Forms Boundary between SNJs

Geometry II: Upstream-Downstream Orientation

Figure 6: River Basin Political Geometries

Pursuit of Sub-National Territorial Jurisdiction Preferences under Different Political Systems

The ability for SNJs to pursue their territorially-defined preferences, and their impact on the success of river basin externality capture, hinges on the extent of

decentralization within parent political systems, which in turn may be expected to differ sharply between federal and unitary political systems. The root of this causal process is that federal systems organize sub-national governance around highly durable Type I jurisdictions which are intentionally costly to modify or supplant with other types of governance institutions, and which form a locus for territorial interest-bargaining. This process in turn crowds out the kind of civil society-bureaucratic coalitions which underpin successful regional-scale externality capture in unitary systems.

Federal political systems differ from their unitary counterparts in the combination of functional decentralization and the spatial orientation of SNJs. As Chad Rector notes, the conclusion of a federal compact is far more costly and risky than other possible forms of cooperation for would-be federating entities, including through international organizations or alliances (Rector 2009). Consequently, they are likely to demand certain guarantees, including of a permanent, non-overlapping territory, in return for accession to a federal bargain. Indeed, this is empirically the case. As Elazar observes, "Successful federal systems have also been characterized by the permanence of their constituent units" (Elazar 1987, 170). Tanzi similarly remarks that "Once a federal system is determined, local politicians and officials fiercely oppose major changes to borders and tasks" (Tanzi 1996, 303). Such permanence appears to be necessary in order to secure political space for the exercise of the semi-sovereign powers of federal sub-national governments.

Although federal sub-national governance institutions are characteristically durable, they are inevitably delineated for political rather than social advantage, and thus apt to result in a territorial structure that does not match the spatial dimensions of

economic externalities which emerge over time, such as obtain in river basins. The drawing of sub-unit boundaries is a political process that is highly sensitive to historical context (Muthien and Khosa 1995). India's post-Independence leaders, for instance, were influenced by the ethnic politics of the time to ignore geographic and economic factors in favor of drawing state boundaries on linguistic lines (Singh 2007). Although the political impetus to do so was compelling and perhaps irresistible, the formalization of ethno-linguistic cleavages through delineation of state boundaries has produced a strong brand of regionalism in Indian politics that often inhibits nation-wide policy formation and implementation (Mawdsley 2002). The spatial organization of sub-national governance in a federal system is durable by design, but generally militates against regional approaches to regional-scale issues.

Sub-national governance characterized by durable Type I jurisdictions also tends to artificially mold issues of regional importance into a set framework of territorial interest-bargaining. Elazar provides an incomparable description of this phenomenon in the United States which is worth quoting at length: "the existence of the federal system forces most sectional problems into the framework provided by the existence of the states, where they are shaped into matters of state concern," even though "most of the physiographic, socioeconomic, and cultural features distinguishing one section from another do not follow state lines precisely." More comprehensive regional action is inhibited by the fact that "The states are protected to the extent that no regional problems can be handled governmentally without making use of those formal [state] institutions. Thus the representatives of the states use the formal institutional structure

to influence federal action to handle problems in such a way as to allow the states a role" (Elazar 1987, 162).

This molding process also tends to discourage inter-jurisdictional cooperation. Joseph Zimmerman notes, for example, that "The modus operandi of most states does not encourage extensive interstate joint ventures because states, as semiautonomous entities, naturally are reluctant to engage in such ventures due to the loss of exclusive control accompanying them" (Zimmerman 2011, 201). Consequently, sub-national federal structure enhances sectionalism—a phenomenon which is often reinforced rather than constrained by federal political party structures. Instead of being efficient nation-wide preference aggregators (Bednar 2009, 115), political actors and processes at the federal level are shaped by the structural realities of sub-national governance. Instead, federalism, in supporting a sub-national structure of durable Type I jurisdictions, tends to discourage the creation or development of regional governance institutions.

Federal sub-national governance is, on this understanding, characterized by durable Type I jurisdictions who shape issues of regional and national, as well as local, importance. This carries an important behavioral implication: where permitted to do so, SNJs and their political leaders and representatives will attempt to further localized territorial interests at the expense of larger functional or electoral interests, such as may be advanced by central government bureaucracies or national politicians. This territorially-motivated behavior is likely to be exercised in a variety of ways in federal systems. Jenna Bednar discerns three types of strategic behavior endemic to federal systems: encroachment of central government powers on those of sub-national governments, shirking of duties by both levels of government, and burden-shifting from

one level of government to another (Bednar 2009, 68). The territorial division of powers, Bednar goes on to note, moderates only the first form (Bednar 2009, 105). In the United States, for example, states have adopted a "range of compliance strategies" in order to shirk or shift the burdens of compliance with federally-imposed environmental protection mandates (Scheberle 2005, 75). Federal sub-national governance thus resembles a multi-level game with multiple strategic actors, each pursuing divergent interests.

In this complex game, it is difficult to address high-spillover issues which transcend sub-national jurisdiction boundaries. Individual SNJs are likely to have varying perceptions of the costs and benefits of addressing regional-scale issues (Besley and Coate 2003); (Wibbels 2006). Yet this reticence carries a distinct cost, for much like the tendency for sub-national politicians to trade fiscal responsibility and autonomy for electoral credit documented by Jonathan Rodden, parochialism "follows a political, not an economic, logic" (Rodden 2006, 273). My model of federal sub-national governance thus portrays a structure borne of a rigid structure of Type I jurisdictions which constrains the ability of federal systems to capture regional-scale externalities. Specifically, my model implies that RBM will be more difficult in federal systems because it will encounter greater and more effective opposition from sub-national actors, thereby undermining the prospects for regional governance institutions.

In this respect, Rodden's statement that "today's [federal] institutions often reflect the outcomes of yesterday's battles and bargains" (Rodden 2006, 281) is well-founded, and distinguishes the ability of federal systems to capture regional externalities such as those entailed in RBM. This distinctiveness is manifest in two characteristic

features of regional-scale externality capture in federal as opposed to unitary political systems, namely the role played by inter-governmental cooperation and inter-jurisdictional judicial disputes.

The first of these is the prevalence of relatively weak and *ad hoc* forms of inter-governmental cooperation as a means of addressing regional-scale RBM issues. Inter-governmental cooperation often develops in response to externality effects not addressed in original federal constitutional designs, which as noted in the previous section of this chapter is often the case with water resource issues (Wachendorfer-Schmidt 2000, 7); (Agranoff 2007, 268). Because inter-governmental cooperation is largely informal and often occurs in areas of concurrent rather than clear authority for both central and sub-national levels of government, it tends to result in weak, lowest-common-denominator institutional structures which generally enhance the power of SNJs (Watts 2008, 120). A 2009 report from the Forum on Federations observes that water resources management is governed by such weak institutions across a variety of federal systems, including Ethiopia, Spain, Australia, and India (Forum on Federations 2009).

Another feature of regional-scale externality capture in federal systems concerns the role of the judiciary. In many issue areas where the powers of various levels of government are unclear, judicial review serves in many federal systems to "adapt the Constitution to the changing needs of the time" (Wheare 1963, 222). In no small part because inter-governmental cooperation so often fails to resolve inter-jurisdictional disputes and conflicts, regional-scale externality capture frequently requires judicial arbitration in federal apex courts. Judiciaries have indeed played an important role in

adjudicating water-related disputes, particularly those which occur between individual SNJs (Arizona v. California 1963); (State of Orissa v. Government of India 2009). However, the role of judiciaries is circumscribed both by the existence of multiple water-rights doctrines in several federal systems which can vary by state (Dunbar 1983), as well as by ambiguity in the role of central and sub-national governmental responsibilities concerning RBM issues. Accordingly, long-running inter-jurisdictional water resource disputes tend to be a feature of federal political systems.

Broadly speaking, the model presented above proposes three sequential elements which relate outcomes in regional-scale externality capture processes to political system type, which I summarize in schematic form in Figure 7. This model portrays federal systems as prone to considerable path-dependency as a result of their structure of durable, territorial sub-national jurisdictions. The model thus simultaneously addresses the three-part question posed in the Introduction. First, it distinguishes federalism: although decentralization and multi-level governance is not unique to federalism, the existence of durable Type I jurisdictions is distinctive. Second, it suggests why federalism is an elusive independent variable: high-spillover effects with regional dimensions are more likely to be influenced by the structure of Type I jurisdictions than are others. Third, and to return to the proximate issue addressed in this study, my argument explains why RBM remains so difficult to implement in all political systems, but in some more so than in others. Such an insight helps to explain the concern of a World Bank report that "There is broad consensus on what constitutes good water resources management, but all countries are far from managing water according to these principles" (World Bank 2004, 28), as well as the observation of a Forum on Federations

report that water management issues tend to be a pervasive challenge for federal political systems (Forum on Federations 2009).

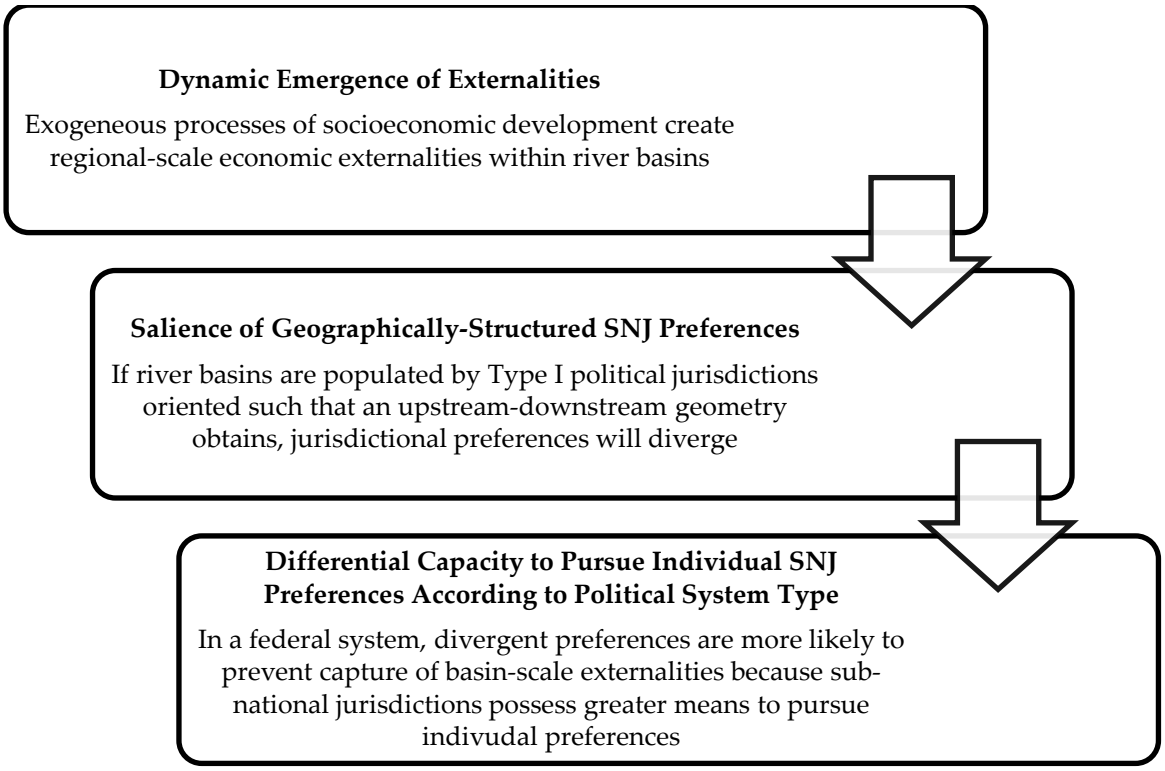


Figure 7: Sequential Model of Regional-Scale Externality Capture under Different Political Systems

Nonetheless, this description of my argument and its implications for explaining RBM outcomes is clearly not exhaustive. In particular, it omits several plausible and obvious alternative hypotheses, including state capacity and eco-agricultural factors, such as the prevalence of irrigated agriculture. I take up some of these alternative hypotheses in the section which follows by applying regression analysis. In the process, I attempt to further substantiate my choice of country case studies, more fully demonstrate operationalization of the dependent and explanatory variables, and finally to provide some initial empirical evidence for the relationship between political system type and RBM outcomes, which are further substantiated in the empirical chapters which follow.

The Relationship between Political Systems and Regional-Scale Externality Capture in River Basins: a Preliminary Empirical Analysis

The argument I have made above asserts that federal systems are efficiency-reducing with respect to RBM because they inhibit the creation and function of the regional institutions which I have argued are necessary to adequately capture watershed externalities. In this section, I make an attempt to assess this hypothesized relationship through the use of cross-national quantitative data. The most direct means of doing so would, of course, be to quantify and characterize RBM outcomes in both federal and unitary political systems. Unfortunately, the necessary data for direct measurement does not exist. Instead, I seek proxy measurements for both the candidate explanatory variables, decentralization and federalism, as well as the dependent variable, RBM outcomes. In order to operationalize the explanatory variable I again use fiscal decentralization data, while for the dependent variable I use WSI scores, which as described in the Methods section proxy the economic efficiency of water resource allocations because they indicate the extent to which sufficient water is available to satisfy all water-use requirements.

Eighteen candidate explanatory variables, grouped into four categories and listed in Table 3 below, were incorporated into a range of linear regression models. WSI scores, here employed as the dependent variable, were obtained from the Yale Environmental Performance Index (EPI) (Yale Center for Environmental Law and Policy 2010), as were a few explanatory variables. Additional explanatory variables were obtained from a variety of sources: socioeconomic data primarily from the World Bank (World Bank 2010), agricultural, water management, and eco-geographic data mainly

from the UN Food and Agriculture Organization Aquastat and Waterlex databases (UNFAO 2010), and political-economic data from the World Bank-IMF Fiscal Decentralization Database and POLITY IV (Marshall, Gurr and Jaggers 2010). Asterisks indicate explanatory variables which exhibited statistically significant effects on country WSI scores as a dependent variable; one star indicates statistical significance at the 10% level, two at the 5% level, and one at the 1% level.

Table 3: Candidate Explanatory Variables

Variable	Source
Socioeconomic	
Tax Revenue, Percentage of GDP	World Bank 2008
GINI Index	World Bank 2010
GDP Per Capita (2007 USD, PPP)	Yale EPI
Human Development Index	UNFAO Aquastat
Eco-geographic	
Average Precipitation in Volume (10^9m^3/year)***	UNFAO Aquastat 2009
Dependency Ratio (%)***	UNFAO Aquastat
Total Annual Actual Renewable Water Resources (10^9 m^3)***	UNFAO Aquastat
Population Density (persons/km^2)	Yale EPI
Political-Economic	
Combined Polity Score	POLITY IV
Sub-national Government Expenditure (% of Total)	World Bank-IMF Fiscal Decentralization Database
Sub-national Government Revenue (% of Total)	World Bank-IMF Fiscal Decentralization Database
Sub-national Government Tax Revenue (% of Total)	World Bank-IMF Fiscal Decentralization Database
Vertical Imbalance (%)*	UNFAO Aquastat
	UNFAO Aquastat
	UNFAO Aquastat
Agriculture and Water Management	
Percentage of Total Country Area Cultivated	
Percentage of Cultivated Area Equipped for Irrigation***	
Economically active population engaged in agriculture (%)	
Value added to GDP by agriculture (%)	UNFAO Aquastat
Water Legislation Type	UNFAO Waterlex

This range of explanatory variables was selected to address possible alternatives to the hypothesis advanced above, namely that features of federal sub-national

governance, as opposed to other endogenous factors, differentially impacts the efficient allocation of water resources within river basins. As is evident, country WSI scores, and the distributive impacts they represent, cannot be satisfactorily explained by common predictors of cross-national variation in political science. State capacity, in particular the ability of governments to generate revenue, is often alleged to be an important factor in explaining resource allocation outcomes (Skocpol and Finegold 1982); (Tilly 1985), but common measures of such capacity, such as Gross Domestic Product (GDP) per capita and tax revenue as a percentage of GDP (Besley and Persson 2010), fail to produce a statistically significant effect. Similarly, country WSI scores evince little sensitivity to varying levels of socioeconomic development, despite the similarly widespread use of indicators like the Human Development Index and GINI Index to assess the distribution of resources within societies (Kelley 1991); (Osberg and Sharpe 2002).

Instead, the majority of statistically significant explanatory variables concern ecological or geographic factors. The most successful model in explaining WSI variation is a linear regression model incorporating these eco-geographic and agricultural explanatory variables, namely total actual renewable water resources per year (10^9 m^3), and dependency ratio (%), along with the percentage of country cultivated land area equipped for irrigation. This model nonetheless produces an R-square value of only 0.257 (N = 84), indicating that it predicts only a minority of the variation in WSI scores.

The wide scope of this unexplained variation is illustrated by Table 4, which ranks outlier country cases according to the size of their residuals for two linear regression models (over-predicted cases, for which the residuals are highest and positive, are listed to the left of the slash-mark in each model column, under-predicted

cases, for which residuals are lowest and negative, to the right). Under-predicted cases in both models include countries as diverse as Zambia, Nepal, and Sweden. Few if any similarities appear to obtain to this wide range of cases. A similarly striking degree of variation on most measures is evident among over-predicted cases, with one exception: at least six of the ten most over-predicted country cases employ a federal system of government, with China sometimes considered a *de facto* federal state because of the substantial fiscal autonomy it has accorded local jurisdictions in pursuit of economic growth.

Table 4: Outlier Cases by Model

Country Case Rank (Residual)	Model 1	Model 2	Model 3
Model Predictors [R-Square, Number of Cases]	Total Actual Renewable Water Resources per Year (10^9 Cubic Meters) [0.170, 112]***	Total Actual Renewable Water Resources per Year (10^9 Cubic Meters), Dependency Ratio (%), Cultivated Land Area Equipped for Irrigation (%) [0.257, 84]***	Total Actual Renewable Water Resources per Year (10^9 Cubic Meters), Dependency Ratio (%), Vertical Imbalance (%) [0.316, 37]***
1	India [0.879] / Zambia [-1.96]	Spain [1.03] / Zambia [-1.98]	Spain [1.06] / Finland [-1.02]
2	Australia [0.866] / Sweden [-1.36]	Bulgaria [0.799] / Sweden [-1.10]	China [0.995] / Sweden [-0.912]
3	United States of America [0.734] / Finland [-1.33]	South Africa [0.789] / Finland [-1.09]	Mexico [0.892] / Belarus [-0.699]
4	Mexico [0.700] / Indonesia [-1.26]	China [0.714] / Nepal [-0.988]	Chile [0.868]
5	South Africa [0.695] / Haiti [-0.989]	United States of America [0.688] / Central African Republic [-0.973]	Bulgaria [0.835]
6	China [0.689] / Iceland [-0.946]	Mexico [0.649] / Uganda [-0.908]	United States [0.834]
7	Pakistan [0.644] / Nepal [-0.923]	Tunisia [0.615] / Haiti [-0.805]	India [0.772]
8	Argentina [0.644] / Denmark [-0.919]	India [0.581] / Belarus [-0.789]	South Africa [0.608]
9	Armenia [0.589] / Malaysia [-0.901]	Belgium [0.572] / Bolivia [-0.588]	
10	Somalia [0.584] / Uganda [-0.883]	Armenia [0.532] / Democratic People's Republic of Korea [-0.582]	

Indeed, including one important measure of fiscal decentralization, namely vertical imbalance, in linear regression Model 3 in place of cultivated area modestly but appreciably increases explanatory power, producing an R-square value of 0.316, though with a different sample size (N = 37). As indicated by the regression output depicted in Table 5 below, when included as a predictor of country WSI scores, vertical imbalance produced a similar effect size to overall water resource endowment. Vertical imbalance, as noted in the Methods section, is a measure of sub-national fiscal decentralization, and captures only one aspect of how "federal" a political system is in practice. However, it is considered a particularly important measure of practical sub-national autonomy. The model also fails to predict a notable class of country cases, including again the United States, China, India, Spain, and Mexico.

Table 5: Model 3 Linear Regression Results

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.696	.261		2.667	.011
	DepRatio_Log10_Transform	.293	.127	.296	2.298	.027
	WaterResources_Log10_Transform	-.194	.070	-.357	-2.764	.008
	Vertical_Imbalance	.007	.004	.243	1.896	.065
a. Dependent Variable: WSI_LOG10_TRANSFORM						

These results entail two distinct implications. First, they establish the United States and China as outlier cases on the basis of the explanatory variable of interest, making them attractive candidates for use in model-building small-n analysis

(Lieberman 2005). If common effects can be identified across these cases with respect to the explanatory variable of interest, the analysis promises to add explanatory power to the quantitative model. Second, these results provide some preliminary empirical support for the argument that federal political systems face greater difficulties in capturing river basin externalities. This cross-national analysis therefore bolsters the case that federalism inhibits regional-scale externality capture, but says little about how and why. These questions of directionality and causality are best addressed through more detailed case studies of attempts to capture regional-scale river basin externalities through RBM under various political systems, which are the subject of the chapters which follow.

Chapter 2. Regional Governance in a Decentralized Federation: River Basin Management in the United States of America

In this chapter, I examine three distinct attempts to capture regional-scale river basin externalities within the context of America's economically, politically, and administratively decentralized federal system through three institutional models: *ad hoc* federal involvement, exemplified by the case of the Colorado River, a regional basin governance institution, exemplified by the Tennessee Valley Authority (TVA), and finally joint federal-state compact and river basin commissions, illustrated by the Delaware River Basin Commission and the so-called Title II commissions, respectively. Though these three cases represent different institutional models for regional-scale externality capture, each case evinces a common pattern: state governments, fearing threats to their functional powers and control over water resources, actively undermine or co-opt attempts to capture river basin externalities at regional scales. Despite a multiplicity of institutional forms, RBM institutions in the United States are both fewer and weaker than in other country case studies examined in this study.

Largely as a consequence of the failure of regional RBM institutions, watershed pollution externalities are handled centrally through bureaucratic regulation, while water quantity externalities are either left un-captured or ineffectually addressed through inter-state compacts or local watershed councils. The failure of regional RBM institutions is in turn a consequence of the effectual resistance of state governments to the proposals of federal bureaucracies and national-level civil society groups. This

effective opposition prevented RBM institution-building from fully becoming a truly national issue, and stunting the exercise of some forms of regional in the United States.

Country Case Introduction

The United States is generally recognized as the archetypal federal system. It is the world's first modern federation, created by the Constitution of 1787, and unlike most other federations was not created *de novo*, but rather codified colonial-era political divisions. Despite a historical trend toward greater fiscal and administrative centralization, the United States remains one of the world's most decentralized political systems, in which expenditure and revenue, policy-making and implementation in most policy areas remains overwhelmingly a sub-national responsibility. Yet the persistent decentralization of power to state, tribal, and local government under American federalism has consistently complicated attempts to capture RBM externalities. The Constitution assigns only partial and ambiguous powers to the federal government concerning most RBM issues, and successive attempts to develop institutional frameworks to capture river basin externalities, first through interstate compacts, then regional basin governance organizations such as the Tennessee Valley Authority, and finally weaker inter-state and inter-agency river basin commissions, were all defeated by state governments pursuing a territorial logic of resource- and autonomy-maximization.

In all of these cases, sub-national territorial politics proved the decisive factor in undermining regional institutional frameworks for capturing watershed externalities. Consequently, the United States features fewer and weaker RBM institutions than more centralized political systems. Where regional river basin externalities are addressed, it is not through regional entities, but rather federal regulation, as is the case with water

quality under the Clean Water Act. This general absence of regional governance institutions is due to the effective opposition of state governments, who, perhaps rightly feared the loss of power and autonomy relative to both the federal government and to other states as well.

As John Thorson writes in his study of federal involvement in the Missouri River basin, "The constitution…gives insufficient attention to the horizontal aspect of federalism—that is, the relationships among the governments of a region that share a transboundary natural resource such as water. The Constitution provides few opportunities for resolving natural resource conflicts between states or within regions, and it provides even fewer formal avenues for intergovernmental cooperation in the management of shared natural resources—particularly rivers" (Thorson 1994, 4). This failure of regional government makes it difficult to address regional-scale externalities such as those entailed in RBM, and is rooted in the structure of decentralized federalism in the United States.

Structure of Decentralized Federalism in the United States

The American federal system grants an unusual degree of autonomy to the states, providing for fewer institutional relationships both vertically, between states and the center, and horizontally, between the states themselves. Constitutionally, the powers granted to the federal government, and those reserved for the states, are unusually asymmetric. The Tenth Amendment constitutes a unique provision among federal constitutions in assigning all residual powers to state governments (Watts 2008). Within their borders, state governments are formally unitary entities, reserving policymaking, financing, and implementation powers in virtually all policy important areas (Sharansky

1970, 20); (Elazar 1984, 202), with the notable exception of relations with tribal governments (Zimmerman 2011, 11). Moreover, in comparison with other federal systems there are few formal mechanisms to structure inter-jurisdictional relationships. Perhaps most notably, the United States is the only developed-country federal system which makes no provision for deliberate inter-regional transfers of wealth (Robertson 2012, 2). In consequence of these relatively sparse provisions for vertical and horizontal interaction, and despite the growth of relationships along both dimensions over time, individual states remain "the basic decision-making arenas" within the American federal system (Elazar 1984, 9), a fact that has tended to complicate the redress of externalities which are regional, rather than national or local, in scale.

Within the states themselves, politics and policymaking follows a territorial logic that is predominantly parochial and sectional, and in which geographical proximity rather than ethnic or class affiliation constitutes the locus of political attachment. As Daniel Elazar writes, "people and their interests gain formal representation in the councils of government through the location of various interests in particular places and their ability to capture political control of territorial political units." As a result of this salience of territorial representation, state-level politics often reflects the state's distinctive characteristics. As Elazar further explains, "The particular issues that unite the states internally are deeply rooted in their respective geographical and historical settings" (Elazar 1984, 23; 47).

This tendency toward sectionalism is greatly enhanced by the political party structure. Historically, American parties have been exceptionally decentralized, and most national politicians have owed their positions to initial success within state party

organizations (Riker 1987b); (Robertson 2012). As a result, writes David Robertson, "Federalism…contributed to the development of political parties that were too broad, and pressure groups that were too narrow, to stand for a clear, wide-ranging national policy agenda" (Robertson 2012, 36).

The supremacy of state-based territorial politics has also persisted despite long-term, secular growth in the capacity, powers and responsibilities of the federal government. William Riker notes that much of this growth has been under the model of cooperative federalism in which the financing and implementation of public policies is shared with state governments, such that the federal government has grown in parallel with the states (Riker 1987, 192). Moreover, the growth of the federal government seems to have largely bolstered rather than supplanted state-level priorities. Elazar concludes, for example, that "Only in rare situations have federal grant programs served to alter state administrative patterns in ways that did not coincide with already established state policies" (Elazar 1984, 110).

Yet although states remain the locus of political, economic, and administrative function in the United States, they are constrained with respect to issues which spill over their borders. Joseph Zimmerman observes in his study of inter-state relations that, "states have broad powers whose exercise can have major extraterritorial repercussions," yet "it is apparent individual state boundaries do not encompass completely a number of important problems" (Zimmerman 2011, 14). This basic deficiency, and the incomplete institutional framework which exists for correcting it, is well-illustrated in the case of regional river basin externalities.

Ambiguous Powers and the Abdication of Federal Responsibility for RBM

America's constitution is silent on RBM, theoretically placing these issues under the remit of the states as prescribed by the Tenth Amendment. However, beginning with *Gibbons v. Ogden* (1824), the Supreme Court has interpreted the Constitutional power to "regulate Commerce…among the several states" as extending to the promotion and regulation of navigation, even on non-navigable waterways. In *United States v. Appalachian Power Co.* (1940), the Court declared that Congress could also undertake flood control, "watershed development," and hydropower projects as extensions of its navigation power. The doctrine of "navigation servitude" moreover holds that the federal government may appropriate navigable waters for public use without compensation (Taylor 1981, 462-463), bestowing it with generally greater powers over water than over land.

However, both the Court and Congress have stopped well short of asserting a uniform federal power over, and responsibility for, RBM issues. Although the Court has adjudicated many inter-state water quantity disputes, it has resisted articulating a uniform doctrine for apportioning inter-state waters. The complaints of a leading water engineer in the 1930s regarding Supreme Court efforts to allocate western waters remains equally true today: "The temporary nature of these late decisions, and their dependence on changing conditions, preclude water users of an assurance of future use" (Maddock 1932, 1663). Moreover, Congress explicitly abdicated its authority to designate water rights on public land which subsequently became part of newly created states (Hundley 1975, 64). Consequently, federal authority over RBM issues remains ambiguous and fragmentary.

Federal powers over the nation's rivers are exercised chiefly by two powerful hydro-engineering bureaucracies, the US Army Corps of Engineers (USACE) and the Bureau of Reclamation (BuRec), an agency of the Interior Department. The latter has been responsible for maintaining water flows and regulating dams on the nation's major rivers since the mid-nineteenth-century, and, since passage of the 1936 Flood Control Act has been primarily responsible for construction and maintenance of dams and impoundments (Mississippi River Commission n.d.); (US Army Corps of Engineers 2007). The 1902 Newlands Reclamation Act created BuRec, and also provided for the creation of a fund for proceeds from the sale of federal lands to fund irrigation projects, many of which it continues to operate.

Together, USACE and BuRec are the primary federal agencies responsible for water quantity issues, but they have historically been in conflict and have typified the model of the rent-seeking bureaucracy. For example, former Interior Secretary Harold Ickes decried "this willful and expensive Corps of Army Engineers closely banded together in a self-serving clique in defiance of their superior officers and in contempt of the public welfare" (Maass 1974, xiv). BuRec has similarly been assailed for funding projects which benefit small numbers of politically-influential western landowners at vast expense to the public (Rucker and Fishback 1983, 61). More significantly, however, bureaucratic conflict between USACE and BuRec has often hindered coordinated federal policy with respect to water quantity issues, and both agencies have been resolutely opposed to the creation of regional watershed institutions (Thorson 1994, 64). As a result, water quantity issues often remain either unaddressed or are dominated by one or the other agency rather than at the regional level.

Despite this general failure to develop comprehensive federal water quantity allocation policies in the nation's river basins, national environmental civil society organizations were more successful in lobbying for a federal role in water quality issues. Congress passed limited water pollution-control legislation during the nineteenth century under its navigation power, but its role in comprehensive regulation of water quality is the direct result of Progressive-era lobbying. In the 1920s, the Izaak Walton League of America, a nation-wide conservation organization, undertook a nation-wide survey of water quality, and concluded that individual state governments had little incentive to control pollution. Consequently, it began to intensively lobby the federal government for pollution control legislation (Paavola 2006, 449). Although in the interim several regional inter-state pollution control bodies were established, continued lobbying from environmentalists during the 1960s and 1970s culminated in the Clean Water Act of 1972 granting the Environmental Protection Agency (EPA) principal responsibility for licensing nearly all point sources of water pollutants (US Environmental Protection Agency 2012).

Though centralization of water quality control under EPA has resulted in significant, nation-wide improvements in water quality, EPA has completely supplanted regional RBM organizations in water quality issues, with the result that "the US lost a comprehensive structure for planning along rivers" (Delli Priscoli 2007, 11). Water quality issues are thus addressed at a national rather than a regional level, a characteristic of RBM under American federalism which is predominantly the result of the relative power of state governments.

State Primacy and the Failure of Regional Institutions for RBM

The combination of an ambiguous set of federal powers in the RBM arena and Congress' decision to leave the issue of assigning water rights in the West to newly-created states ensures balance of power in water resource issues lies with the states. Most Western states rejected the riparian doctrine used in eastern states, which holds that property owners along a watercourse possess usufructuary rights (Geltzler 2004), in favor of prior-appropriation doctrine, in which the first individual to utilize a water source acquires rights to it. This "first-in-time, first-in-right" principle was derived from the "finders-keepers" rule followed by gold prospectors, and was thought to be more suitable to a region where watercourses were few and underground water sources more valuable than in the east. Prior-appropriation was adopted by most Western and all the Colorado River basin states except California, which adopted a plural system whereby both riparian, prior-appropriation, and some elements of pre-American pueblo doctrine are recognized (Hundley 1975, 73); (US Bureau of Land Management 2001).

In practice, this doctrinal multiplicity acts to complicate federal involvement in multi-state Western water issues (Huffman 2009, 131), and the Western states have jealously guarded their prerogatives with respect to water management, such that the federal government typically has to defer to state legislation and policy regarding water use even on federal land (Tarlock 1996, 1635). Indeed, the history of RBM under American federalism is marked by continual attempts by states to undermine regional solutions to river basin externalities.

Interstate compacts are the predominant instrument employed to address both water quantity and quality externalities within inter-state watersheds (Schlager and

Heikkila 2009). Though numerous, these institutions are often weak. Most assessments indicate that compacts are of limited effectiveness in addressing trans-boundary externalities, and often lack enforcement and conflict-resolution capacities (Heikkila, Schlager and Davis 2011). Water law expert Jerome Muys once observed that "No compacts have truly succeeded in eliminating externalities because the regional governments that they establish do not coordinate well with pre-existing governments which create the compacts" (Thorson 1994, 140).

Beginning in the New Deal era, a number of institutional alternatives to the compact model were proposed, including one of regional watershed governance embodied by the TVA, joint federal-state compact commissions to which the federal government is party, exemplified by the Delaware River Basin Compact, and finally federal-state river basin commissions. Like the earlier inter-state compact model, however, these attempts to create regional-scale governance institutions eventually fell prey to the opposition of state governments. A fourth model, that of the watershed council, currently occupies most of the focus of RBM efforts in the United States. Watershed councils are grassroots organizations which feature extensive citizen and civil society involvement. Though participation is widespread, these entities typically operate at local rather than inter-state regional scales, and almost always lack financing, enforcement, and implementation powers (Delli Priscoli 2007, 10).

Institutions for capturing regional-scale externalities in river basins are mostly lacking in the United States. The few examples which do exist, including the TVA and the Delaware River Basin Commission, have been stripped of most substantive powers concerning water quantity and quality issues in favor of federal or, more typically,

individual state government regulation. Responsibility for RBM issues is therefore bifurcated such that some externality issues, notably water quality, are addressed at the federal level through nation-wide regulation, while others, such as water rights allocation, are handled primarily at the state level. Under these circumstances, many regional issues are left unaddressed, at high cost to all concerned. In his study of federal involvement in the Missouri River basin, John Thorson notes that "The most frequent method of conflict resolution…has been litigation. [Cases] may remain pending before the Supreme Court and its appointed special masters for years, and the financial cost is always significant. What often goes unnoticed in these proceedings is the hidden cost to mutual trust and long-term relationships among the states" (Thorson 1994, 4).

Although river basin externalities cannot be addressed by any individual state, the national scale is also unsuitable, for addressing issues at that level entails a degree of cost and complexity which could be avoided if regional-scale institutions were available. Perhaps nowhere is the desirability of such regional watershed institutions, and the costs of their absence more apparent, than in the case of the Colorado River controversy, which is described in the section which follows.

Ad hoc *Federal Involvement in a Regional-Scale River Basin: Management of the Colorado River*

The Colorado River is marked by inadequate allocations of water for both human and ecological use, as it has been for most of its history. For the better part of a century, the states of the Colorado River basin have attempted to construct an adequate regional institutional framework to allocate the scarce waters of the Colorado River. Despite an interstate compact and one of the longest and most complex Supreme Court cases in

history, the states have been unable to agree on a commonly-accepted allocation, let alone implement higher-order RBM planning and management functions, which have largely been ceded to the Secretary of Interior in an arrangement that is to no one's satisfaction.

In order to illustrate all dynamics of the Colorado River case, it is necessary to describe in some detail a long and complex controversy between federal and state actors as well as between the states themselves. Moreover, the controversy spans a period in which the nature of American federalism, and relationships between states and the federal government, has changed substantially. Accordingly, I divide this narrative into three time periods. In the first, 1918-1934, the role of the federal government was far more circumscribed than in later years, and the Colorado River controversy was characterized by Arizona's lone opposition to regional-scale externality capture. In the second, 1935-51, the federal role expanded significantly as a result of the New Deal and its aftermath both in the Colorado basin and the nation as a whole, even as a feud between California and Arizona prevented basin-scale externality capture. In the third, period 1952-1968, a continued national expansion of the federal government was matched in the Colorado by a partial truce between California and Arizona, only to be matched by a growing divide between the Upper and Lower basin states.

In addition to this temporal division of the long case of management of the Colorado River, I describe the behavior of the federal government and of individual state governments in separate sections, in order to highlight the manner in which each formulated and pursued individual preferences, to the detriment of regional solutions. Despite this difference, what ties all time periods and each actor section together

throughout the narrative which follows is a set of competitive behaviors informed by differential geographic positions within the basin.

Colorado River Case Introduction

The Colorado River is located in the western United States and is shared between seven American and two Mexican states, as well as several Indian tribes recognized as possessing partial sovereignty by the US government (see Figure 8). Until recently, however, the water rights of these tribes were unrecognized. Large portions of Arizona, Colorado, and Utah lie within the basin, while the remaining states contribute a smaller share of the river's flow. There are several tributaries of considerable importance to individual states: the Green in Wyoming and Utah, the San Juan in New Mexico, the Virgin in Nevada, and, most notably, the Gila in Arizona. The Colorado River basin thus manifests the Type II geometry described in Chapter 1, namely a vertical orientation in which externalities are transmitted from upstream to downstream political units. Because, as also described in Chapter 1, most water uses are rivalrous and excludable in a Type II river basin geometry, SNJs face a general disincentive to internalize externalities, and regional-scale RBM institutions are required in order to do so.

In the Colorado River case, the interstate compact constitutes the predominant approach to basin externality capture. Waters of the Colorado are apportioned by a 1922 interstate compact between an Upper Basin, which consists of those parts of Wyoming, Colorado, Utah, and New Mexico which lie within the basin above the artificially-chosen point of Lee's Ferry, Arizona, and a lower basin, constituting those parts of Arizona, Nevada, and California which lie below Lee's Ferry. 7.5 million acre-feet of water (MAF) are apportioned to each basin annually and in perpetuity by the compact. In the Upper

Basin, a 1948 interstate compact allocates 51.75% of water to Colorado, 11.25% to New Mexico, 23% to Utah, 14% to Wyoming, and 50,000 acre-feet annually to Arizona. In the lower basin, a 1964 Supreme Court decree apportioned 4.4MAF to California, 2.8MAF to Arizona, and 300,000 acre-feet annually to Nevada. Additionally, a 1944 US-Mexico treaty guarantees the latter 1.5MAF annually, subject to minor restrictions (US Bureau of Reclamation 2008). A subsequent agreement guarantees that this quantity of water will also satisfy salinity-content standards (Bennett 2000, 121). Collectively, these compacts and agreements are known as the Law of the River (LOTR).

Basin Management Institutions

However, despite the existence of the compact and associated agreements, the case of the Colorado River also exemplifies a failure to capture regional externalities through RBM. Two types of regional-scale economic externalities are operative in the Colorado River case, an over-appropriation of water resources in the Upper Basin such that not all human and ecological water demands in the lower basin can be satisfied (Booker and Young 1994), as well as water quality issues, which stem primarily from irrigation water diversions which increase salinity, and which is estimated to impose millions of dollars in costs to downstream agricultural regions (Lee and Howitt 1996). Indeed, this combination of issues constitutes a textbook example of watershed externalities. As one study of water-use allocation notes, "In addition to the Colorado River being over appropriated, there are also downstream concerns about water quality; and as such, it represents a perfect example of a classic downstream externality"(Bennett 2000, 118).

Most commentators attribute the failure to capture these externalities to the LOTR itself. One analysis suggests that the LOTR prevents economically-efficient water allocation by discouraging water-rights trading, as a result of which "externalities in the form of return [water] flows cannot be internalized" (Burness and Quirk 1980, 12). Another analysis suggests that the absence of inter-regional water transfer regimes has caused urban areas to hoard water, with the result that "An inefficiency exists in that these supplies could have been obtained from other sources more cheaply through trade and at a profit to the sellers" (Vaux and Howitt 1984, 790).

Moreover, the original compact allocation effectively ignored Native American water rights claims, and while these were later recognized in *Arizona v. California*, this omission has further exacerbated the inefficient and over-allocated LOTR regime (Price and Weatherford 1976); (D. Tarlock 1987). Finally, but perhaps most distressingly, dendo-chronological and climate-modeling data suggest that the climate of the basin is highly variable, with periodic long drought cycles. These data also suggest that the late nineteenth and early twentieth-centuries, when the Colorado River Compact was concluded, were unusually wet periods. Consequently, the core of the Colorado RBM regime, the compact itself, is based on what will likely be an unrealistic expectation of total water quantity in the basin in future decades (Miller, Rhodes and Macdonnell 1997).

In the case of the Colorado River, then, an inefficient allocation of water resources and negative regional water quality externalities are sustained by a failure of RBM. Yet this is not for lack of trying: for the better part of a century regional civil-society associations, inter-governmental organizations, and the states themselves, not to

mention Congress, the Supreme Court, and successive Presidents and Secretaries of the Interior have attempted to create an institutional arrangement that effectively and satisfactorily manages the scarce water resources of the Colorado River basin.

This failure is due to pervasive territorially-motivated strategic behavior between the states of the Colorado River basin, which compelled them to attempt to maximize both autonomy and water resources. While the former objective led some states, especially Arizona and Utah, to oppose institution-building led by the federal government or more powerful states, the latter compelled them to seek federal financing for dams, canals, and other hydraulic works. This behavior in service of discrete territorial interests makes the Colorado River a clear case of the sub-national territorial politics that I argue complicate the efficient adaptation of federal systems to capture regional-scale externalities.



Figure 8: Physical and Political Features of the Colorado River Basin

There is no overall body to coordinate governmental activity in the Colorado basin, but the 1928 Boulder Canyon Project Act designates the US Secretary of the Interior as "water master" for the Colorado, and significant water uses must be satisfied through contract with the Secretary. In 2001, the Secretary's role as water master was enhanced by brokering a new set of guidelines for Colorado River allocation in times of shortage (Boyle 2005, 32-33). The US Bureau of Reclamation (BuRec) has operational

control over water delivery and hydropower generation from most of its dams and other projects (US Bureau of Reclamation 2008).

Apart from these bureaucratic actors, Congressional representatives from western states have been avid supporters of reclamation projects, while those from eastern and Midwestern states have largely been skeptical. In the early phases of the Colorado River controversy, Presidents Coolidge and Hoover played an important role in attempting to negotiate interstate conflicts, but these efforts were usually fleeting and undermined by a persistent attempt to remain neutral. The Supreme Court played a critical but reluctant role, allocating lower basin water by decree but avoiding the articulation of general principles for the resolution of interstate water disputes. In contrast to this half-hearted federal regulation of water quantity externalities in the Colorado River basin, state governments proved to be assiduous maximizers both of water quantity and political autonomy, though all to the detriment of a regional solution to the Colorado River controversy.

Sub-National Territorial Politics of the Colorado River Basin

In each basin state, but particularly Arizona, California, and Colorado, territorial interests allied with particular branches of state governments to secure, with federal funds, the maximum quantity of Colorado River water. California exemplifies this form of territorially-motivated strategic behavior, as two sets of territorial actors sought federal funding to bring Colorado water to arid southern California. The first, consisting of the cities of San Diego and Los Angeles, sought to supply the industrial and domestic water needs of a rapidly growing population. Los Angeles was particularly aggressive in its pursuit of water: its Department of Water and Power (LADWP) had, under the

direction of its chief William Mulholland, constructed long-distance water transfer projects which had been criticized as stealing other regions' water (Nadeau 1974). In addition, agricultural interests in the Coachella and Imperial Valleys sought large quantities of Colorado water for irrigation purposes. In both valleys, powerful economic groups called Irrigation Districts were the nexus of political and lobbying activity. The Imperial Irrigation District (IID) was particularly powerful: it could issue bonds and tax farmers, and almost from the beginning employed professional lobbyists (Hundley 1975, 29).

These southern California interests enjoyed support among southern California representatives in the California assembly and in Congress, most notably with Republican Senator Hiram Johnson and Republican Congressman Philip Swing, whose constituency included Imperial Valley. The Swing-Johnson bill, advocated by both delegates in the face of fierce opposition, eventually delivered to southern California the Boulder Dam, which was intended to guarantee stream-flow and hydropower to the region, as well as the All-American Canal to bring water to the region. In addition, southern California interests allied with members of the California Colorado River Commission (CRCCA), a state agency charged with pursuing the state's interest pertaining to the Colorado. However, Colorado River issues proved divisive in California politics. Northern California citizens, politicians, and interest groups generally opposed southern California's efforts to secure water at the expense of other states, and believed its federally-funded water projects to be wasteful. This tension had little effect on moderating California's general opposition to regional RBM institution-building, however.

The geo-political divide between north and south California is paralleled in Arizona by the opposing territorial interests of the central Salt River Valley and the western Yuma area, which is bordered by the Colorado itself. The former required a complex and expensive system of dams, canals, and pumps to obtain Colorado River water, first called the High Line Canal and later the Central Arizona Project (CAP), but the latter required less extensive works. This difference was reflected in political preference: Yuma interests strongly supported the Colorado River compact as a means of securing adequate water resources for Arizona, while central Arizona interests, believing that irrigation of the arid interior of the state would require far more water, held out for greater quantities of water and federal assistance.

This geographic split was reflected in the Arizona legislature, and at times Colorado River matters split state politics along geographic lines. Central Arizona interests nonetheless secured the support of successive governors and Arizona's Congressional representatives, who sought federal reclamation funds with notable unity and perseverance. Finally, anti-compact and pro-CAP interests gained a powerful ally in the Colorado River Commission of Arizona (CRCAZ), a counterpart to the CRCCA which played a crucial role in Arizona's appeals to Congress, to the national public, and in Arizona's litigation against California, which in 1963 paved the way for Congressional authorization of CAP.

The Upper Basin states featured more diffuse territorial interests, but I treat them as a single unit because their interests coincided for most of the Colorado River controversy. As relatively under-developed areas, the Upper Basin states consented to the compact as part of a bargain to secure federal financing for future water

development projects. The exception to this unity occurred in Colorado, where the City of Denver and the Denver Chamber of Commerce consistently advocated construction of storage dams to ensure adequate water supply. The state's western slope region, which accounts for a high proportion of total Colorado River flow, demanded similar assurances. Both these interests gained an ally in the Colorado River Commission (CRCCO), which performed a similar role to CRCCA and CRCAZ. Successive Utah executives and Congressional representatives played an important role in the Colorado controversy by insisting on state ownership of natural resources. Utah insisted on claiming the bed of the Colorado River, believing that it contained significant oil and gas reserves, and temporarily withdrew from the compact to prove its point.

The peripheral involvement of the other Colorado basin states reflected relatively low agricultural, industrial, and urban water demands and their small contributions to total Colorado River flow: Nevada, which primarily allied with California, sought revenue from hydropower dams along its southern border, while New Mexico and Wyoming were concerned mainly with securing federal funding for irrigation projects on Colorado tributaries within their own states. Notably, although both these states had the least to gain from Colorado River water, they were the state parties who most consistently attempted to advance a regional solution to the controversy.

Arizona Alone, 1918-1934

During the first phase of the Colorado River controversy, the riparian states divided themselves largely along geographic lines into upper and lower basin divisions whose antagonisms would animate the Colorado dispute for the next half-century. Within the latter, a long-running feud between California and Arizona served as a

fulcrum point. California, which developed earlier than Arizona and enjoyed greater political and financial resources, fought for a sufficient share of Colorado water to supply irrigation needs in the Imperial and Coachella Valleys, as well as for domestic and industrial uses in the Los Angeles and San Diego metropolitan areas, while resisting involvement in regional institutions.

Arizona, which joined the Union in 1912, staked its future on the ability to fully utilize the waters of the Gila River, as well as to divert water from the main stream for irrigation purposes in its central region. Once these geographically-oriented positions were established, both states relentlessly competed for allies among their neighboring states and at the federal level, particularly in the Interior Department, BuRec, and in Congressional committees. Although these federal actors often pushed regional solutions to Colorado basin externalities, they became pawns in the sub-national geopolitics of the Colorado Basin.

Federal Government

Following the First World War, the federal government inserted itself anew into the west's water problems, overlaying intergovernmental conflict with inter-state disputes. Even before the New Deal expanded federal involvement further, a hydro-engineer observed that, "Today the Executive, Legislative and Judicial branches of the federal government, and also the state governments, are trying to control and distribute the benefits to be derived from using water…Naturally each of these human agencies consider themselves logically and legally entitled to assume such control; but as their ambitions conflict numerous controversies arise" (Maddock 1932, 1661). In the early twentieth century, national politicians saw an opportunity to enhance their profile by

brokering an agreement for division of water between the Colorado Basin states. A League of the Southwest had been created in 1919, with the Colorado River basin states as members, as a regional organization to promote irrigation and flood control in the basin, and by 1921 it had developed a proposal to distribute the water of the Colorado among the states by means of a compact agreement (Kruckman 1921). Because interstate compacts require the consent of Congress, national leaders discerned a role for themselves in these negotiations.

Herbert Hoover, a former hydro-engineer and the then- Commerce Secretary, was named federal representative to the compact discussions, and in 1922 gave a presidential-sounding speech declaring that "behind all the precise and commonplace language of this compact lies the greatness and romance of the West, the building of a million more homes out under the blue" (Arizona Republican 1922). Hoover continually warned wavering states that the federal government would refuse to approve or fund any developments along the river without a compact to settle interstate "quarrels" (Los Angeles Times 1925). He moreover enlisted the support of President Coolidge, who in 1923 urged "immediate completion" of the compact (Armstrong 1923).

Despite this presidential attention, the other basin states grew increasingly concerned that the Stanford-educated Hoover was partial to California, which was by far the most economically advanced, politically powerful, and water-hungry state at the time. The other basin states consequently feared a concentration of basin water rights in the Lower Basin, and particularly to California. The Swing-Johnson bill did little to ease these fears by vesting unprecedented authority for Boulder Dam and its electrical

generators in the Secretary of the Interior, again appearing to preference the Lower Basin.

This centralization was unsurprisingly supported by federal bureaucracies who stood to gain large federal appropriations as a result. Secretary Work thus urged that Congress make Boulder Dam a "national undertaking" because "no agency other than the Federal Government should be [e]ntrusted with the…distribution of its opportunities. All uses can be coordinated and the fullest benefits realized only under centralized control" (US House Committee on Irrigation and Reclamation 1928, 7). This centralization threatened key objectives of the upriver states of Arizona, Utah, and Nevada, all of which were counting on cheap hydropower to increase revenue and develop their mining industries.

No more vocal spokesman existed for the upriver effort to forestall a federal-California alliance than Governor George Dern, Democrat of Utah, who articulated a theory of state water sovereignty. At the 1927 Denver compact convention, he alleged that "Every State has the inherent sovereign right to control the uses of water, which is essential to its existence. To deprive a State of this right would be to destroy its autonomy…The theory advanced by attorneys for the Bureau of Reclamation, and embraced in the Swing and Johnson bills, that Congress has the power to allocate and apportion the waters of any western river among the States, regardless of their will, is abhorrent to our whole plan of government" (Arizona Colorado River Commission 1927, 11). Elsewhere, Dern was even more forceful, stating that "We should like to save some semblance of independent sovereignty for ourselves" (Dern 1926, 10).

In the face of such strident calls for state autonomy and control over water resources, federal officials increasingly pledged neutrality in the Arizona-California dispute. In 1929, a new federal representative was appointed to the compact negotiations, with both Coolidge and President-elect Hoover being "desirous that a seven-state pact ultimately be made and Arizona brought into the fold" (Los Angeles Times 1929). After taking office, however, Hoover assiduously cultivated an image of neutrality, and "took the position that this matter should be left entirely to the States interested, without any interference or suggestion on the part of the White House" (Los Angeles Times 1929b). When the compact finally entered force in June 1929, Hoover viewed it as a triumph for federal conciliation, stating that "It opens the avenue for some of the settlement of other regional questions as between the states rather than the imposition of these problems on the federal government" (Los Angeles Times 1929c).

This belief, however, proved too optimistic, as Arizona's continued refusal to ratify the compact necessitated federal involvement into the 1930s. In 1931, the Supreme Court rejected Arizona's claim against the federal government and the other six Colorado riparian states to block construction of Boulder Dam, which the Interior Secretary proclaimed would clear the way for full development of the Colorado (Enedict 1931). Arizona's continued refusal to permit Boulder construction, however, necessitated additional federal concessions. In 1933, the Interior Department proposed a contract with Arizona to guarantee it 2.8MAF annually, which had been the major stumbling block in compact negotiations (Los Angeles Times 1933). The other six states condemned the contract, however, and despite intensive lobbying by Arizona, Interior

Secretary Harold Ickes ultimately refused to sign it (Los Angeles Times 1934); (Francis 1934).

Throughout the first phase of the Colorado controversy, hydro-engineering bureaucracies attempted to advance RBM at regional scales through alliances with states, particularly California. At the same time, however, national political leaders attempted to broker agreement, only to be stymied by Arizona's steadfast refusal to join the compact and the Upper Basin states' continual fear of California. Judicial action during the period moreover acted to exacerbate fears that California, through the Boulder Dam, would secure preferential rights to the majority of the Colorado's flow. As a CRCAZ member alleged, "the [Supreme] court has never made a final definite equitable division of an interstate stream. It has but temporarily permitted a state to use a portion of interstate water" (Maddock 1932, 1665). Despite the expansion of federal authority during the early New Deal, Washington was subjected to the inflexible logic of territorial politics in the Colorado.

California

These territorial politics are especially evident in the case of California, which accounts for a small fraction of the Colorado basin but has historically depended on Colorado waters for urban and irrigation uses. As a 1924 report noted, "California makes no contribution to the waters of the Colorado but the stream forms her [eastern] boundary and, on account of the low lying lands within her borders can use advantageously the greater part of the water allocated to the lower basin" (Clark 1924?, 15). This dependence was rooted in California's rapid development during the mid-

nineteenth century, which outpaced that of the regions which would become Arizona and the Upper Basin states. Indeed, so rapid was California's development that, unlike its neighbors, it entered the Union without first becoming a territory (Hundley 1988, 25). Beginning in the late nineteenth century, California's fast-growing and arid southern regions, particularly the cities of Los Angeles and San Diego and the irrigated lands of the Imperial and Coachella Valleys, turned increasingly to the Colorado for their water needs, sowing the seeds of future conflict with neighboring states.

By the early twentieth century, irrigated agriculture was established in the Imperial Valley, but its farmland was continually threatened by flooding. In 1905 the valley narrowly escaped disaster, and in response to further flooding events the valley's farmers organized the IID in 1911 as the world's largest single agricultural unit. Almost immediately, the IID confronted the problem that much of its water supply was drawn from Mexico, leading to calls for an "All-American Canal" (AAC) which would both supply both water from the Colorado and flood protection by running across American territory (Nadeau 1974, 166-169). Such a project could only be completed with federal assistance, however, leading the IID to form alliances with other territorial interests in arid southern California. At a 1919 conference, the IID secured the crucial support of LA and Coachella farmers to seek congressional appropriations for the AAC, in return for which they were guaranteed Colorado water. Less than two months later, IID lobbyists were in Washington, "handing out cantaloupes produced in the valley," and conferring with California congressional delegates (Hundley 1975, 41-42). This appeal for federal assistance marked the beginning of a long alliance between California and federal hydro-

engineering bureaucracies which would place it in opposition to the other Colorado basin states.

Soon after the IID began its lobbying efforts, Congress appropriated money for a study of reclamation efforts led by BuRec Commissioner AP Davis. This was propitious, for BuRec sought a comprehensive program of development for the Colorado basin. After the resulting Fall-Davis report, which recommended constructing both the AAC and a large dam and reservoir on the Colorado upstream of California, "there was no doubt that AP Davis and Imperial Valley were on the same side" (Nadeau 1974, 171). Imperial gained a further ally when the report recommended that the dam be used for hydropower, attracting the support of the LADWP and the Southern California Edison Company, both of whom were anxious to alleviate LA's acute energy crunch (Miller 1924); (Washington Post 1925). Most importantly, however, the Fall-Davis report provided the technical basis for the Swing-Johnson bills introduced by Imperial Valley congressman Swing and Republican Senator Johnson to fund construction of Boulder Dam (California Colorado River Commission 1930, 18).

As southern California united to secure federal funding for both AAC and Boulder Dam, it was compelled to support the idea of an interstate compact to partition Colorado River waters as a *quid pro quo* for the acquiescence of the other basin states. Hoover encouraged this view by reminding wavering California legislators that the compact was "the first step in obtaining unity of action before Congress, the protection of the Imperial Valley and other works for California" (Palmer 1923). In compact negotiations, California, prodded by LA, Imperial, and Coachella interests, accordingly insisted on its right to seek a large storage dam to secure flow to the state's southern

regions (Hundley 1975, 206). On this understanding, southern California territorial interests quickly focused on securing passage of the Swing-Johnson bill, which had been congressional Republican Swing's sole campaign pledge in 1922 (Nadeau 1974, 179). Continued interstate rivalries over the compact would nonetheless force California to seek federal support.

As inter-state negotiations proceeded, California's position became increasingly warped by the territorial interests of Boulder Dam proponents. During California legislature debates on compact ratification, LA and Imperial delegates united to support the compact only if it were made conditional on passage of the Swing-Johnson bill in Congress (Palmer 1925b). Conditional ratification was eventually endorsed by an Assembly vote of 29 to 11. This victory for Boulder Dam proponents revealed important territorial interest cleavages within California, however. Northern California lawmakers opposed what they saw as a selfish attempt by southern California interests to block comprehensive development of the Colorado that would needlessly antagonize other states. However, the territorial interests of southern California, led by the IID and LA, over-rode the strong opposition of even Republican Governor Friend Richardson, for most of his life a northern-Californian, and who strongly opposed conditional ratification (Palmer 1926). The LA City Council "went on record…against unconditional ratification in order to bolster up the efforts of [Johnson and Swing]," and dispatched lobbyists to Sacramento to persuade the state legislature to vote accordingly (Los Angeles Times 1926e).

Just as Richardson and others had feared, however, conditional ratification alarmed the other basin states. New Mexico's governor warned it would result in

"ultimate failure" of the compact (Los Angeles Times 1926b). Upstream riparian states thus sought special assurances in return for supporting Boulder Dam. Beginning in 1925, Johnson offered to amend his original bill to secure support from the Upper Basin states (Los Angeles Times 1925b). In 1927, following Utah's short-lived withdrawal from the Colorado compact to protest what it saw as California's dominance of federal reclamation projects in the basin, Swing accepted amendments sponsored by a Utah congressman "to safeguard rights of his State in the proposed Colorado River development" (Los Angeles Times 1927).

Despite these concessions, California opposition prevented reaching a regional agreement on the compact, particularly with Arizona. After Arizona successfully filibustered the Swing-Johnson bill, leading California Republican Congressman Joe Crail to call for its statehood to be revoked. Complaining that Arizona was able to block the bill despite having one-sixth the population of northern California, Crail asserted the Arizona "should not be entitled to have a Representative and Senators…It should be restored to the condition of a Territory" which "would not be a necessary party to a Colorado River compact" (Los Angeles Times 1927b).

California's obstinacy relative to its upstream neighbors continued, fueled by a fear that ceding rights to Arizona would nullify California's own claims, thereby depriving it of water. CRCCA representatives insisted that "It would be very unwise for California to be dependent upon water that Arizona might at any time claim and take away," that it needed 7.38MAF of Colorado water, and that "Arizona's demands for water are exorbitant" (California Colorado River Commission 1930, 35-36). Upper Basin states, too, were angered by California's refusal to compromise on the amount of water

guaranteed to it, which in turn was prompted chiefly by southern California territorial interests. The breakdown of a 1927 Denver compact conference was attributed "to the unyielding attitude of a political element from the Imperial Valley which, in the words of a spokesman who attended all the secret conferences, refuses 'to take a chance on excess water'" (Jones 1927b). Underlining this importance, IID threatened a federal lawsuit to compel the Upper Basin states to deliver at least 4.6MAF to southern California (Jones 1927c).

Eventually, Swing-Johnson supporters were able overcome the compact dilemma by stipulating that six of the seven Colorado basin states had to ratify the compact before Boulder Dam funding could be appropriated. The bill, which, having previously passed the Senate, passed the House in December 1928 on a bipartisan vote (Christian Science Monitor 1928), was supported by the Upper Basin states. This solution, however, precluded a regional approach by excluding Arizona. In 1931, LA representatives testified thereafter before the California legislature that further attempts should be made to "dispose of a possible future adversary in Arizona" by outflanking it in compact negotiations, while IID representatives urged that Arizona not be allowed to "crowd" California's own water development agenda (Los Angeles Times 1931). California-Arizona rivalries, and the upstream-downstream positions which motivated them, thus remained the major impediment to comprehensive regional management of the Colorado.

Arizona

Irrigation from the Colorado's tributaries has always been the foundation of civilization in Arizona. Canals were built by the Hohokam people around 900AD, and

by 1892 some 120,000 acres along the Salt River in central Arizona were under irrigation. In 1904, the federally-funded Roosevelt Dam was constructed on the Salt River, and "signaled the beginning of modern Arizona" (Johnson 1977, 1-3). Interstate conflict between Arizona and California began just as early. When, in 1879, a proposal was made to irrigate the Imperial Valley with Colorado water, "Arizonans had sharply objected. They did not want to share any of their precious water with California" (Hundley 1975, 54). Such reluctance to concede any water to downstream California would persist, guided mainly by Arizona's geographic characteristics.

Perhaps the most eloquent statement of this territorially-motivated interest comes in Congressional testimony, when a CRCAZ member noted Arizona's "wider and more general interest than that of any other state. All of Arizona lies within the drainage area of the Colorado River. Every section and locality of the state is more or less directly affected by any agreement that may be entered into with respect to the waters of the Colorado River…The question is an acute one in every city, town, and hamlet" (US House Committee on Irrigation and Reclamation 1928, 32). In 1922, Republican Governor Thomas Campbell sought to address this significance in his re-election campaign, declaring that irrigation with Colorado waters would support the state economy after its rich mines were exhausted, "making profitably productive over 2,500,000 acres of now arid, desert lands" (Arizona Republican 1922).

It was recognized, however, that Arizona's topography and aridity would necessitate seeking federal funds for this project. As the *Arizona Republican* editorialized, "Arizona is so situated that it would require the expenditure of much more money to reap the full fruits of development than any other state" (Arizona Republican 1922b).

This fact, and the desire to secure sufficient water resources for future development, compelled state leaders to initially support the idea of an interstate compact. One of Arizona's compact negotiators explained the state's participation by noting that "Unless the people of the upper states...can be assured of reasonable protection…we may expect the most violent opposition to any program [of reclamation]…Four states will thus unite against us in carrying out any such program, each of whom has its delegation in Congress who may be expected to be in hearty sympathy" (Arizona Republican 1922d). Legislators from Mohave County, which sits astride the Colorado and therefore expected to benefit from its development, were particularly strident in demanding that Arizona sign the compact and "gets its full share of the cream" (St. Charles and Householder 1922).

Other territorial interests, however, grew concerned that compact participation would inhibit Arizona's control over its own water resources. In particular, agricultural and land interests emerged to attempt to ensure that sufficient water would be available to irrigate vast areas in central Arizona. George Maxwell typified these as president of an organization advocating a "High-Line Canal" to bring water to central Arizona. The compact, Maxwell charged, "was a smokescreen to cover the design of turning the waters of the Colorado over to an Asiatic colony in northern Lower California," leaving only enough to irrigate some 282,000 acres in Arizona as opposed to 900,000 in California and 810,000 in Mexico, where the Colorado emptied into the sea (Arizona Republican 1922). Maxwell gained allies among those concerned that Arizona faced a poor bargain, and after the 1923 legislative session began, rarely was "a day allowed to pass…without

an added measure designed to stave off action on the Colorado River compact" (Los Angeles Times 1923).

Partisanship played some role in these debates, as newly-elected Democrats, including Hunt, lined up to oppose Republican ex-Governor Campbell's support for the compact (Los Angeles Times 1923b). Nonetheless, legislators' views on the compact were shaped largely by territorial interests and geographic considerations instead of partisan ties. Reporters noted that "Whether Republican or Democratic, the legislators elected from Yuma, Mohave and Coconino counties will be men strongly for the compact. In nearly all the other Senatorial or Representative Districts this issue more likely will determine the result than the personality of the candidates, or even their politics" (Los Angeles Times 1924). Hunt's anti-compact position, too, was mindful of geography. As he wrote to Colorado's governor, "As I understand the matter, the reason for the Compact in the first place is caused by the self-interest of the States in the Upper Basin…to be given assurance that the development of the river in the lower basin will not hamper the development of Colorado and the other upper States. Arizona occupies relatively the same position as Colorado occupies as between the upper and lower basins. California and Mexico will inevitably be developed earlier than Arizona because of the way nature made the country. Insofar as the citizens of Arizona are concerned who are opposing the compact, they are trying to do for Arizona in the lower basin what you are trying to do for your State" (Hundley 1975, 244).

Arizona's compact negotiators reflected this territorial view, insisting that the Gila River could only be considered part of the Colorado system, as were all its other tributaries, if Arizona were guaranteed 1MAF above those waters allocated to the lower

basin. As a state official wrote, failure to secure Gila waters "means that at least a million acres of Arizona's best land…must forever remain a desert, instead of being transformed into thousands of farms, the products of which would add millions of wealth to the state" (Stevens 1928, 26). Increasingly, Arizona's opposition to the compact was based upon fear that California would capture its waters, including the Gila, for its own uses. Hunt declared that "acceptance of the Colorado River compact would be the greatest disaster Arizona could know" (Los Angeles Times 1923c). He subsequently ran for re-election in 1924 on an anti-compact platform, which only strengthened his determination to assert Arizona's sovereignty over its resources and territory (Los Angeles Times 1924c).

Sovereignty thus became Arizona's rallying cry in opposition to the compact. Hunt stunned California and Nevada delegates to a lower-basin compact conference by declaring Arizona "unprepared to negotiate" to "distribute resources from the biggest asset she has" (Palmer 1925). Over the next few years, sporadic attempts at compact negotiation foundered, according to Arizona officials, because "California representatives refused to accede to the principle that the States whose resources they proposed to use were entitled to compensation" and were instead "concentrating…forces for a drive on Congress" in order to "bring about…by whatever means, the passage of the so-called Swing-Johnson bill—a measure designed exclusively for California's benefit" (Arizona Colorado River Commission 1927, 6-7). Hunt and the CRCAZ thus feared an attempt by California to "secure through Congress…those things which she could not possibly hope to secure through agreement" with the riparian states (US House Committee on Irrigation and Reclamation 1928, 49).

Based on this interpretation of events, Arizona formulated a policy which was to guide it for decades to come, opposing the compact as long as Arizona lacked full control over its waters and revenue from power generated on its territory. The CRCAZ concluded that the compact "ignores the State's ownership of the waters within its borders, and the exclusive power to control it appropriation and use." Accordingly, the Commission sent two representatives to Congress to "champion Arizona's cause" in debate over the Swing-Johnson bill. These lobbyists proved less effective than hoped, however, which the CRCAZ attributed to the fact that "California had the political power which goes with a large number of Congressmen and an important vote in the electoral college" (Arizona Colorado River Commission 1927, 8-12). This power was, in turn, alleged to arise from the efforts of two territorially-concentrated interests, the Imperial and Coachella Valleys and Los Angeles. "So far as California's intense interest in the Colorado River problem is concerned," a commissioner complained, "these two districts, for all practical purposes constitute California" (US House Committee on Irrigation and Reclamation 1928, 33).

As debate on the Swing-Johnson bill continued, Arizona officials continued to seek guarantees of revenue from any hydropower plants constructed on their territory, and a larger share of water by proposing to re-negotiate the Santa Fe allocation (Hanson 1927). According to these officials, California prevented progress on both fronts by insisting that "we must accept the Boulder Canyon Project Act, but with their interpretation to it and also leaving out 1[MAF]" (Favour 1929, 24), while also demanding that Arizona "reduce…taxation on hydroelectric properties so California can get power cheaper" (Arizona Colorado River Commission 1928, 3). At the 1927 Denver

compact conference, however, the Upper Basin states chose to side with California, crushing Arizona hopes for such concessions (Jones 1927). Subsequently, Arizona adopted a more confrontational strategy based on both force and litigation.

Following passage of the Swing-Johnson bill in 1928, the CRCAZ recommended suing in the Supreme Court to stop construction of Boulder Dam (Los Angeles Times 1929). Arizona's suit, filed in 1930, charged that the dam "attempts to deprive a sovereign State of its natural resources without its consent" (Benedict 1930). The suit was dismissed, but Arizona continued to file motions in the Court in order to preserve the option of further litigation. In 1934, the Court denied a key evidence motion and determined that the interstate compact allocated Colorado waters "to the states of the lower basin and not specifically to Arizona alone" (Francis 1934b). This decision, fatal to Arizona's position, was met with extremism: the Arizona Legislature resolved to condemn any state official who supported compact (Johnson 1977, 17), and Democratic Governor BB Moeur declared martial law and deployed armed National Guardsmen to prevent construction of Boulder Dam (Washington Post 1934). Such was the fear stoked by Arizona's insecure geographic position on the Colorado relative to California.

Upper Basin

The geography of the Colorado basin similarly caused a marked divergence in the preferences of the Upper Basin states from those of Arizona, California, and Nevada. Moreover, these states had a history of inter-state cooperation lacking in the lower basin (Colorado River Commission 1925, 7). Being largely mountainous and lacking in navigable waterways, the Upper Basin developed later than their downstream

neighbors, with correspondingly slow growth in water use. As Delph Carpenter, the Colorado inventor of the compact idea, noted, "The topography of the Upper Basin limits the extent to which each of the upper States may go in its development and its corresponding consumption of river flow" (Carpenter 1923, 6).

Nonetheless, Upper Basin political leaders were acutely aware of the need to preserve water resources for later use. Governor Dern expressed this sentiment by warning that while Utah possessed "great agricultural potentialities in the Colorado River Basin," it was not yet "ready to develop them…When that time comes we do not want to wake up and find that we have plenty of land but no water with which to irrigate it. We do not want our future growth stunted" (Dern 1926, 6-7). This perception of shared geographic interests guided the Upper Basin states to initially seek water security through the proposed compact.

Upper Basin political leaders were increasingly persuaded that the territorial interests of their states could be secured against a federal-California alliance only through interstate compact. Indeed, Carpenter successfully argued to state and federal leaders that without an interstate compact, "The upper State has but one alternative, that of using every means to retard development in the lower State until the uses within the Upper State have reached their maximum" (Carpenter 1923, 19; 22; 32). Colorado Democratic Governor William Sweet praised the compact in his inaugural address, claiming that "It protects our development from adverse claims on account of any great reservoir or other construction on the lower river. It removes all excuses for embargoes upon our future development and leaves us free to develop our territory in the manner and at the times our necessities may require" (Sweet 1923). This was echoed by Dern,

who later reminded fellow Upper Basin governors that the compact "was reluctantly accepted by the Upper Basin states" as a means of preventing assertion of "new prior rights against the upper states" (Dern 1926, 8).

Upper Basin states grew increasingly desperate to find a means of securing their water rights against what they perceived as an alliance between lower basin states and the federal government. Utah Republican Congressman Elmer Leatherwood sought to prevent federal "paternalism" by introducing an amendment to the Swing-Johnson bill to prevent the Secretary of Interior from exercising control over Boulder Dam, as Swing originally proposed (Los Angeles Times 1926d). The California Legislature was implored by Republican Governor Clarence Morley of Colorado to grant it "that protection (by compact) which is our just due as a State of origin of the river" (Los Angeles Times 1926e). Facing California's continued failure to unconditionally ratify the compact, and seeking revenue from oil reserves, Utah began to claim sovereign ownership of its portion of the Colorado and all minerals which lay beneath it (Hundley 1975, 261).

In justification of this decision, Dern exemplified the logic of territorial politics: "It is my duty as governor of my State to have vision enough to guard its future. I have no ambition to let the people of my State a generation of two hence say…'back in 1925 we had a stupid governor who was asleep and allowed Utah's water to be appropriated by other States, and as a result our growth was stunted'" (Dern 1926, 17). Finally, at the urging of Utah's congressional delegation, which saw no hope of persuading California to ratify it unconditionally, Utah withdrew from the compact (Palmer 1927).

This move alarmed Carpenter, who began to advocate passage of the Swing-Johnson bill if the bill were made contingent on ratification of a six-state compact. Carpenter explained the territorial logic of this proposal in Congressional testimony: "I think that the four Upper States should join with California in putting over the Swing-Johnson bill, because by this bill they will get water protection through the Colorado River compact…Contemplated power projects of private enterprise in Arizona or Nevada would exhaust the other two-thirds [of river waters] before the upper States could make major appropriations" (Los Angeles Times 1926f).

An eventual Senate compromise reflected these Upper Basin concerns. In 1928, Colorado's Senator Phipps introduced an amendment to the Swing-Johnson bill providing for a six-state compact, and over California Senator Johnson's stringent objections, a New Mexico-sponsored amendment limiting California's water allocation to 4.4MAF was passed, setting the stage for the approval of Boulder Dam in the Senate (Los Angeles Times 1928); (Chicago Daily Tribune 1928). The House version was passed soon thereafter, and Utah eventually re-ratified the compact, paving the way both for construction of Boulder Dam and operation of the Colorado compact. Nonetheless, the Upper Basin states remained suspicious of California's intentions, which Carpenter even in 1928 called their "greatest water enemy" (US House Committee on Irrigation and Reclamation 1928, 332).

The first phase of the Colorado controversy was marked by pure territorial politics—states sought to ensure that their geographic positions on the river did not disadvantage them with respect to future water use. For California and Arizona, this meant securing federal funds to build canals and dams as soon as possible so as to

secure priority of usage over the more slowly-developing Upper Basin states. The interests of these states similarly shaped their desire to secure future water rights through interstate compact, even at the expense of allying with California to secure approval of Boulder Dam. However, territorial politics also ensured that Arizona and California remained irreconcilable, with the result that regional solutions to the Colorado River controversy were continually undermined even as the federal government enhanced its efforts to broker agreement.

Accommodation and Appeals to National Actors, 1935-1951

In the second phase of the Colorado River controversy, Arizona-California conflict continued to prevent regional RBM institution-building. A booming post-war economy accelerated growth in water demand both for agriculture and the Southwest's rapidly expanding urban areas, sustaining a marked divergence in the territorial interests of Arizona and California. The threat of a Colorado River treaty favorable to Mexico nonetheless compelled Arizona to finally ratify the Compact in 1944, and the states of the Upper Basin, seeking federal reclamation funds, concluded a compact to allocate water between themselves in 1948. Despite this partial institution-building, and in spite of periodic continued attempts to reconcile the two lower-basin adversaries, the federal government remained largely an observer in a strategic game played out between the states of the Colorado River basin.

Federal Government

The expansions of federal power which accompanied the New Deal era, as well as the changing geopolitical demands of the Second World War, pushed the federal government into an increasingly complicated position *vis a vis* the Colorado River

controversy. National leaders, particularly successive Presidents and Secretaries of the Interior, resolved to avoid becoming ensnared in the details of resolving a bitter controversy between electorally important states. As a US Senate Committee report put it, "From the standpoint of the United States, the existing [Boulder Canyon Project] act is extremely difficult of administration. Continued operation thereunder would necessitate the determination by the Secretary of the Interior of highly controversial issues between various sections of the Colorado River Basin, on the basis of statutory provisions which are uncertain and ambiguous" (US Senate Committee on Irrigation and Reclamation 1940, 6). The albatross of inter-state geopolitics would thus continue to plague federal attempts to realize a regional solution to management of Colorado's increasingly scarce water resources. Notably, territorial affiliations proved to trump partisan ties, as Congressional representatives regularly voted across partisan lines to support their states' territorial interests.

Following the conclusion of Arizona's contract with the Interior Department to supply Colorado River water, the Department and BuRec became the subject of increasing attention by Colorado basin states seeking to preserve their water rights against a possible treaty with Mexico (Colorado River Commission of Arizona 1940, 43-44). In 1938, all seven basin states convened a conference to petition President Roosevelt to appropriate additional funds to BuRec, considered the states' foremost bureaucratic ally, to complete a study on additional water projects in the Colorado basin, as well as to serve notice to Mexico that "it was the policy and purpose of the United States to reserve for use within this country all waters of the Colorado River." Reflecting their desire to limit federal influence, however, the states also demanded that Washington withdraw

claims to federal ownership and control of non-navigable streams within the Colorado basin (Los Angeles Times 1938).

These constraints stood at odds with federal attempts to advance comprehensive regional development by bringing Arizona into the fold. In 1944, over the objections of California, Interior Secretary Ickes approved a contract delivering 2.8MAF annually to Arizona, provided that its legislature ratified both the contract and the compact, which was promptly done. Reflecting national officials' hesitancy to become embroiled in the deep-seated conflict, however, the contract "specifically provides that it does not resolve the issues between the two States and that it is without prejudice to their respective claims" (Los Angeles Times 1944).

Electoral politics played a large role in driving these attempts at maintaining neutrality. Throughout the late 1940s, national politicians and federal officials desperately sought to resolve the Arizona-California dispute, thereby permitting western reclamation projects to go ahead, while also, in deference to electoral realities, avoiding antagonizing any of the basin states. In his campaign against incumbent President Truman, Republican nominee Thomas Dewey promised Denver voters Denver that he would appoint a Secretary of the Interior "who is not in the slightest, remotest degree related to the controversy" (Los Angeles Times 1948). Simultaneously, both Dewey and Truman campaigned in Phoenix by offering vague support for Arizona's quest to obtain federal financing for the Central Arizona Project to irrigate large areas of the state (Johnson 1977, 58).

The constraints that these territorial politics placed upon federal officials became evident in the behavior of Truman's Interior Secretary, Julius Krug. In 1947, soon after a

Republican-controlled Congress cut President Truman's proposed reclamation budget in half, Krug warned the Colorado basin states that their squabbles were undermining his Department's plans for comprehensive development of the basin (Los Angeles Times 1947). Yet during Congressional debates in 1948, Klug was reportedly so anxious not to appear partial to either side that he feigned the loss of a technical report which both Arizona and California claimed supported their respective positions (Johnson 1977, 51).

Nonetheless, these pretensions of neutrality had little effect on California's resistance to regional solutions. Despite his partisan relationship to the Democratic administration, Representative Cecil King of Los Angeles scored the Department's proposals by remarking how "strange that all these visionary and untried schemes originate either in Arizona, which wants California's water, or in the Department of the Interior" (L. Francis 1949). Arizona was similarly intransigent. Once, Truman attempted to force Arizona's hand by proposing that CAP financing be withdrawn pending "measures…to bring about prompt settlement of the water rights controversy" (L. Francis 1949b). Yet a week later, Truman denied taking a stand on the issue, prompting a California observer to accuse him of "trying to carry Colorado River water on both shoulders" (W. Francis 1949). As before, national politicians were, despite their best efforts, embroiled in the territorial politics of the Colorado Basin conflict.

In the end, California's now-familiar intransigence forced the Truman administration to shelve its plans for comprehensive regional development of the Colorado basin. In 1950, Truman appeared to concede defeat in his attempts to forge a regional agreement in the Colorado basin by appointing a National Water Resources Policy Commission to review all reclamation and water resource issues. Yet instead of

charting a new path forward for federal reclamation and water resource policies, the Commission's investigation was quickly co-opted by the Colorado basin states. California was quick to seize upon the Commission's investigation as a means of delaying authorization of the Central Arizona Project (Johnson 1977, 70). The second phase of the Colorado River controversy thus concluded with the federal government obtaining no more success than in the first in developing a regional solution to the water quantity externality issues which plagued the basin and fueled persistent inter-state conflict.

California

In the second phase of the Colorado controversy, California began to perceive a divergence between its own territorial interests and those of the other Colorado River basin states and from the federal government, compelling it to develop an increasingly unilateral approach. A precipitating event in this approach was the 1944 US-Mexico treaty, which guaranteed the latter 1.5MAF, and was ratified over California's strong objections (Stanford 1945). Moreover, Arizona finally ratified the compact the same year, paving the way for the conclusion of a new contract with the Interior Department for supply of Colorado River water despite California's protests that "the proposed amount of water could not be delivered to Arizona without invading the water supplies rightfully belonging to California and other States" (Los Angeles Times 1944).

This shift in inter-state geopolitics is indicated by the fact that during Arizona's 1936 Supreme Court challenge to the Colorado River compact, the Upper Basin States and California joined together, but by 1943 California alone stood opposed to Arizona's ratification of the compact (Los Angeles Times 1936); (Los Angeles Times 1943).

California's unilateralism continued to prevent regional institution-building in the Colorado River basin, driven by unbending territorially-motivated concerns.

By 1946, southern California territorial interests were increasingly alarmed about the future of their water supply. The *Wall Street Journal* reported Los Angeles politicians' fears that "By 1964, because of lack of water, Southern California may have to close its borders to newcomers," blaming abnormally low rainfall, the US-Mexico treaty, and, most of all, the Central Arizona Project (CAP). California's Colorado River Commissioner echoed this fear, warning that "Arizona is now aggressively promoting before Congress bills to authorize two water projects…They can only be served if the Metropolitan Water District and San Diego projects in California are denied the bulk of their water" (Ainsworth 1946). State politicians responded to these territorial interests by borrowing a page from Arizona's playbook and determining to delay authorization of CAP through judicial action.

In July 1947, California's Congressional representatives proposed legislation intended to compel the Supreme Court to determine a final allocation of Colorado River water (Los Angeles Times 1947). In an apparently coordinated move, the Los Angeles and California State Chambers of Commerce held meetings devoted to the issue—the former went so far as to hold a luncheon with no water at the tables, proclaiming it a harbinger of things to come if the CAP were authorized (Johnson 1977, 55), while the latter exclaimed that CAP "will stop the growth of Southern California and halt the expansion of business and industry" (Los Angeles Times 1947b). The stakes of California's unilateral strategy were underlined when Los Angeles recorded a record

year for water use, leading MWD officials to repeat now-familiar warnings that the region's growth prospects may be seriously hindered (Los Angeles Times 1947d).

During 1948, southern California territorial interests and their Congressional allies grew increasingly shrill about the threat posed by the CAP. The LA Chamber of Commerce and Colorado River Association relentlessly attacked the alleged cost of the CAP (Los Angeles Times 1948b), while a young Republican Representative, Richard Nixon, demanded that BuRec reveal how many "land speculators" stood to gain from the project (Los Angeles Times 1948c). Later in 1948, a pair of California Congressmen, one Democratic and one Republican, secured statements from senior military leaders warning that southern California's water shortage imperiled national security (L. Francis 1948). As committee votes on California's proposed Supreme Court challenge approached, Republican Representative moreover Norris Paulson illustrated the unity of the state's Congressional delegation by advising constituents "Don't write your own Congressman—they're already solidly behind the Southern California stand—but write your friends and relatives in other States" (Los Angeles Times 1948e).

This apparent unity was temporarily shattered when a California State House of Representatives session was ended over a dispute between northern and southern California representatives which revealed the salience of intra- as well as inter-state territorial politics. Northern California representatives actually favored the CAP as part of a larger BuRec proposal which promised low power tariffs for the San Francisco region (W. Francis 1949f). Perhaps reflecting these internal California divisions, the state's assistant Attorney-General testified before the US House of Representatives

proposing that small-scale hydraulic works in Arizona should be funded, since they were "non-controversial" (W. Francis 1949e).

This attempted "compromise" was nonetheless condemned by the CRCCA, who accused the Attorney-General of betraying southern California (Los Angeles Times 1949b). As 1949 drew to a close, California Congressional leaders congratulated themselves on their unified and bipartisan prevention of a vote on CAP authorization. Nonetheless, they continued to voice fears that the Truman Administration was allying with other states against California. Truman, said Democratic Representative King of Los Angeles, had California "sold down the Colorado River" (W. Francis 1949b). Indeed, Arizona had during California's period of unilateralism steadily cultivated allies among the Upper Basin states.

Arizona

During the second phase of the Colorado controversy, Arizona sought out allies among the Upper Basin states to confront California and its sole ally, Nevada. Even as Governor Moeur maintained a state of martial law in northwest Arizona in order to prevent construction of a dam which would benefit California, the state entered a period of alliance-building in order to marginalize what it saw as an implacable adversary (Webster 1935). In its 1935 annual report, CRCAZ proclaimed that "Arizona could agree with Wyoming, Colorado, Utah, and New Mexico, but the differences between Arizona and California are fundamental and cannot be adjusted by agreement" (Colorado River Commission for Arizona 1935, 33).

Accordingly, Arizona began a campaign to win the support of the Upper Basin states. The *New York Times* reported that while Arizona's Attorney-General planned a

"good-will tour" of the Upper Basin, "No effort will be made to conciliate California" (Webster 1935b). Seeking to avoid a repeat of its 1931 Supreme Court appeal, in which the Upper Basin states joined California as co-defendants, Arizona sought to dissuade other states from joining another suit, which it filed in 1935, by arguing that California constituted a common enemy (Los Angeles Times 1935). Although the suit was later dismissed (W. Francis 1936), Arizona's new strategy of regional alliance-building defined its behavior in the second phase of the Colorado River controversy.

The essence of Arizona's prolonged conflict with California, and by extension with the other basin states, was its refusal to consider the Gila River part of the Colorado River system as defined by the compact. As the CRCAZ noted in its 1935 report, negotiations for a lower-basin agreement "always broke on the claim by California that Arizona must deduct from such amount of main stream water as might be allocated to her, the use that she was making of the Gila River" (Colorado River Commission for Arizona 1935, 15). This position was sustained largely by Arizona's geography, which dictated that Gila River waters could be tapped for irrigation at far less expense than Colorado main-stream waters (Nadeau 1974, 245). However, by the end of the 1930s, growing water demand and the prospect of a large Mexican water claim under the proposed US-Mexican boundary treaty persuaded Arizona's leaders that they required main-stream Colorado River water, which necessitated ratification of the compact (Los Angeles Times 1937).

Henceforth, the political pendulum in Arizona shifted toward ratification of the compact, though only on the condition that funding could also be obtained for its long-sought High-Line Canal, which Democratic Governor Rawghlie Stanford claimed would

permit Arizona to "become the most prosperous State in the Union" (Smith 1937). Accordingly, when the Arizona legislature finally ratified the Colorado River compact in February, 1944, it did so along with a US$ 200,000 appropriation to study the High-Line Canal project (Nadeau 1974, 246).

Indeed, Arizona's ratification of the compact was intimately tied to its internal territorial politics. Tremendous post-war economic growth combined with acute drought led Arizona leaders to view their future water supply with the same degree of severity as did California's. Accordingly, Arizona began a push for Congressional financing for a new dam at Glen Canyon in direct competition with California's proposed dam at Bridge Canyon (Hornaday 1947). Arizona's senior Senator, Democrat Carl Hayden, after comparing Imperial Valley farmers to "the Politburo in Moscow," therefore pleaded that Congress must "save the civilization" of central Arizona (W. Francis 1949i).

Despite such hyperbole, Arizona's politicians took no chances in attempting to influence public opinion throughout the country. Both states introduced competing legislation to authorize and block their respective projects and presented conflicting data to Congressional committees concerning the flow of the Colorado, as each claimed to be more adversely impacted than the other (W. Francis 1949g). Within Arizona, an entity called the Central Arizona Project Association (CAPA) representing local business and agricultural interests, began a concerted and often ingenious publicity campaign to win over public opinion to Arizona's side of the Colorado River controversy. In 1948, during one of the Congressional battles with California, CAPA arranged the use of Arizona Air National Guard planes to give national reporters a birds-eye view of California's alleged

profligate and wasteful use of Colorado River water. Arizona, CAPA representatives implied, could make far better and more efficient use of these scarce water resources. Indeed, such was the unity of Arizona's territorial interests that Arizona's newly-elected Republican Governor, Howard Pyle, joined the all-Democratic Congressional delegation in support of CAP (R. Johnson 1977, 59-72).

At the same time that Arizona Congressional representatives and territorial interest groups were mobilizing to seek support for CAP and other irrigation projects, Arizona cultivated a putative alliance with the Upper Basin states. In 1947, Arizona joined Colorado, Wyoming, New Mexico, and Utah on the Colorado Basin States Committee, from which California and Nevada had previously withdrawn. The five states formed a Legislative Committee to oppose California's Bridge Canyon project, and their now-unified opposition to California was indicated by their allegation that its behavior stemmed solely from a desire to "obtain more water from the Colorado than she is entitled to" (Christian Science Monitor 1947b). In 1949, Arizona further cemented its alliance with the Upper Basin states by ratifying the Upper Basin Compact, thereby formally recognizing the water rights of Colorado, New Mexico, Utah, and Wyoming to Colorado River waters (Johnson 1977, 61). The Arizona-Upper Basin alliance was one of the most important shifts in inter-state politics since the beginning of the Colorado River controversy, but it still failed to produce any meaningful institution-building in the basin, due not least to the divergent and territorially-driven objectives of the Upper Basin states themselves.

Upper Basin

In the first phase of the Colorado River controversy, the Upper Basin states sought to protect their rights to future water resource development by entering into the Colorado River compact with California. In the second phase, as California grew increasingly aggressive in its efforts to seek federal financing for its water projects while denying them for others, the Upper Basin grew increasingly close to Arizona, an alliance which nonetheless undermined regional institution-building by excluding California and Nevada. Arizona's support for the Upper Basin states' attempts to block the US-Mexico treaty gained it considerable favor in the upper reaches of the Colorado River basin, and in 1943-1944 this favor was repaid when all five Upper Basin states defied California by voting to approve Arizona's entry into the Colorado River compact under favorable terms (Los Angeles Times 1943). Nonetheless, the Upper Basin states' motives remained essentially territorial, attempting to preserve their autonomy and to maximize their access to water resources.

These concerns of the Upper Basin states were illustrated in 1940 Congressional testimony regarding the Boulder Canyon Project Adjustment Act, favored particularly by Arizona and Nevada, and which proposed to lower the cost of power provided by the project. Democratic Senator William King of Utah complained that "the Upper Basin States that furnish the water have gotten no benefits up to date and this bill ought to…give them some protection," a complaint echoed by Democratic Senator Joseph O'Mahoney of Wyoming, who alleged that the bill "carried a very definite and explicit provision for the protection of Arizona and Nevada. It remains to be seen whether the Upper Basin states are as effectively protected" (US Senate Committee on Irrigation and

Reclamation 1940, 34-36). By the late 1940s, the desire to secure the Upper Basins' water rights grew more acute, particularly for Colorado, which announced a US 400 million plan to channel water from the wetter western to the drier eastern portion of the state via a 20-mile tunnel under the Rocky Mountains (Pennington 1947). The need to seek federal funds to finance these projects proved a strong stimulus of Upper Basin unity, particularly in opposition to California.

Indeed, the Upper Basin states opposed virtually every action by California related to the Colorado River. In late 1947 alone, they joined with Arizona to oppose a request by California to obtain an additional 1MAF of main-stream water, as well as its Congressional legislation intended to force a Supreme Court allocation of Colorado River waters (Los Angeles Times 1947f); (Los Angeles Times 1947c). By the end of 1947, this partnership had come to define the sub-national geo-politics of the Colorado River basin. The *Christian Science Monitor* reported that "Five states of the Colorado River basin have now perfected a unified, fighting organization to oppose the stand taken by California and Nevada in regard to dividing up the waters of the Colorado River. The new thing is not the opposition, but that at a recent meeting here the four 'Upper Basin' states…submerged all differences to team up with Arizona" (Christian Science Monitor 1947b).

Even so, the Upper Basin states' own territorial interests remained paramount: at a 1948 meeting, the five Upper Basin states submitted demands totaling 116% of the river's total flow. Utah, historically the most eager to maximize its supplies of Colorado River water, demanded 28% of the Colorado's total annual flow, despite contributing only 14.6% (Los Angeles Times 1948f). Such claims illustrated the difficulties which

hindered regional accord even among the relatively well-aligned territorial interests of the Upper Basins states. Nonetheless, the external threat posed by California, combined with the need to present a unified front in appeals for federal financing, compelled the Upper Basin states to conclude an Upper Basin Compact to allocate Upper-Division waters. As the *New York Times* reported, the Upper Basin states "are hoping for greater industrialization in the ears to come. Thus the up-river water supplies they have lately been seeking are considerably larger than their originally expressed needs," hence the need for agreement between them (Goodman 1948).

The 1948 Upper Colorado River Basin Compact divided the Upper-Division waters specified in the 1922 Colorado River compact approximately in half, with one-half going to Colorado and the remainder apportioned among the remaining states. Perhaps most significantly, Article 8 of the Upper Basin compact created an inter-state commission, with representatives from each of the four Upper Basin states as well as the federal government. Although this institution-building stood in stark contrast to the Arizona-California rivalry which prevented lower-basin accord, the Upper Basin Commission was invested with relatively weak powers to collect data, undertake research projects, and issue reports. Most indicatively, the concurrence of four of the five members of the Commission was required to take any action whatsoever (US Bureau of Reclamation 1948).

The conclusion of the Upper Colorado River Compact marked a watershed in the Colorado River controversy. It expressed the well-aligned territorial interests of the Upper Basin states, and paved the way for large-scale irrigation projects which would at last allow these states to utilize their allocations of Colorado River water (Blair 1949).

However, the crucial role played by the Upper Basin states merely served to underscore the role of sub-national territorial politics in undermining efforts to manage the Colorado River in a coherent and efficient regional fashion. These issues came to a head in the third phase of the Colorado River controversy, in which the Supreme Court finally upheld Arizona's long-standing claim to an extra 2.8MAF of Colorado River basin waters, paving the way for completion of the CAP. Even this final phase was marked by bitter territorial rivalries and, as the Epilogue makes clear, achieved partial resolution of basin externality issues through a patchwork centralization that remains incomplete and ineffective to the present day.

Partial Resolution through Patchwork Institution-Building, 1952-1968

During the third phase of the Colorado River controversy, the political arena completed its shift from the southwest to Washington, DC, mirroring broader trends in the growing importance of the federal government. Consequently, the final stage in the Arizona-California battle over Arizona's diversions from the Colorado was played out at the federal level, and the involvement of federal actors was critical in resolving this long-running feud. However, the failure of regional institutions in the Colorado River basin was underscored by the growing divergence in territorial interests between the Lower and Upper Basin states. Despite resolution of the California-Arizona feud, this divergence sustained continued inter-state geopolitics which has prevented regional-scale externality capture in the Colorado River basin until the present day.

Federal Government

Federal-level actors played a critical role in the partial resolution of the Colorado River controversy during its third and final phase. By 1955, it was reported that "The

major battlefield is Washington, far removed from the Colorado. Here, the fight has been moving forward on two fronts—in the Supreme Court and Congress" (New York Times 1955). The outcome these institutions helped to forge however, which relied on a judicial allocation of water resources between California and Arizona and a system of reservoirs controlled by the Interior Department, failed to resolve the regional externality issues which plague the Colorado River basin to the present day. As in previous phases of the controversy, federal-level actors in this third and final stage dynamically attempted to forge regional solutions to the controversy, but were forced to adjust to the ever-predominant interests of state-based territorial actors.

This familiar process was indicated by the 1950 report of Truman's Water Resources Policy Commission, which proposed a new motto of "One river, one plan" in approaching future water resource development issues, and proposed canceling all Colorado River basin projects until their economic feasibility could be reviewed by an independent commission (W. Francis 1950). Almost immediately, the plan was condemned by the states as proposing "Federal domination of the nation's water resources" (Ainsworth 1950). Moreover, a few years later, Truman rejected the commission's recommendations by proposing a "record-breaking postwar appropriation" for Los Angeles-area water projects (W. Francis 1952), even as his Interior Secretary approved a new Arizona aqueduct to appropriate Colorado River water (W. Francis 1952b).

Interior Department officials became increasingly exasperated by the continued inability of the Colorado basin states to reach an agreement on allocation of basin waters—a conflict that also prevented construction of new projects favored by BuRec.

Faced with the realities of sub-national territorial politics, Interior Department officials sought a regional solution based on RBM principles. BuRec Commissioner Floyd Dominy bemoaned the fact that the 1922 compact "served to create and to emphasize a division in the basin that does not exist physically. It also served to obscure…that basin-wide planning and development has demonstrated its value" (Hebert 1960).

In 1963, Interior Secretary Stewart Udall proposed perhaps the most ambitious regional solution in the basin's history, a Pacific Southwest Water Plan (PSWP) which aimed to meet the energy and water needs of the entire western United States in decades to come by developing large dams, canals, and transmission lines throughout the western states (Dominy 1964). This regional approach, said Udall, promised to finally transcend "the outmoded concept of state lines…only regional planning and action will enable us to meet the growth needs of this area" (Sherman 1963). Despite this ambition, Udall was soon forced to acknowledge that "The rights of the individual states likewise must be respected and the aspirations of the states accommodated…Even within individual states the rights and aspirations of geographic areas must be given proper consideration" (US Senate Committee on Interior and Insular Affairs 1963, 311).

These very state and regional territorial interests eventually killed Udall's visionary PSWP. Powerful Democratic Senator Henry Jackson of Washington grew concerned about proposed water transfers from the Columbia River to the more arid parts of the southwest, and demanded that the PSWP be reviewed by an independent National Water Commission (NWC). As Washington's governor testified before Congress, "we are a downstream state within a basin whose waters have consistently been looked upon and prejudged as a source of import supply" (US Senate Committee

on Interior and Insular Affairs 1967, 631). National conservation organizations, allied with eastern Congressmen such as Republican John Saylor of Pennsylvania, also opposed the PWSP because it would "flood canyons of unique and irreplaceable beauty" (Fleming 1954); (August 2007, 105). The combined influence of these groups was sufficient to dramatically reduce the scale of the PSWP, returning the Congressional debate to projects favored by the individual states.

Even as they did so, the Supreme Court began a final adjudication of the allocation of lower-basin water between California and Arizona, which represented perhaps the last best hope for solving the Colorado River controversy. As in the parallel Congressional dispute, federal hydro-engineering bureaucracies sought to insert themselves into the Arizona-California suit virtually as soon as the former announced its intent to file. When the Justice Department joined the suit in 1953, it did so on behalf of federal agencies as well as several Native American tribes (Ainsworth 1953). Its brief reflected the exasperation of federal agencies: "the United States is in doubt as to its obligations and responsibilities…There is a pressing need for a decree by this court declaring, determining, confirming and quieting the title of all parties" (W. Francis 1953).

The invocation of Native American reserved water rights on such a scale was novel, and potentially transformative: if the federal government could assert ownership over Colorado River basin waters at the scale it proposed, it would be able to effectively quiet the controversy between Arizona and California. As in the case of PWSP, however, the federal government soon backed down in the face of pressure from the states. Its original petition to protect some 1.8MAF for Native American water use was "withdrawn after protests by officials of California, Arizona and New Mexico" (New

York Times 1953). Some news reports indicated that the governors of 11 Western states exerted coordinated pressure on the federal government to withdraw its petition (W. Francis 1953b).

The Supreme Court itself had little luck in resolving the entrenched divisions between Arizona and California. A pre-trial conference intended to seek agreement on the legal questions at issue in the suit foundered on the strength of these divisions, with the Court's Special Master exclaiming, "I give up the effort" (Los Angeles Times 1956). After a 26-month-long trial, the Special Master upheld Arizona's claim to an additional million acre-feet of Colorado River water, allocating it 2.8MAF, and reducing California's allotment by 978,000 acre-feet annually to 4.4MAF (Chicago Daily Tribune 1960). The Court itself upheld this partition in its final 1963 decision, as well as the Interior Secretary's power to apportion water among water users in the lower basin states, particularly in times of drought (Blair 1963). Even this decision and re-affirmation of federal power failed to transcend the intensely territorial politics of the Colorado River controversy, however. By refusing to specify inter-state allocation in times of drought, the Supreme Court merely "postponed the day of reckoning," since water shortages had provoked the suit in the first place (Ainsworth 1963).

Indeed, despite his newly-reaffirmed power Secretary Udall refused to become embroiled in continued controversy surrounding California's 4.4MAF, telling Congress, "It is our view that this is a matter between the states, and however they want to work this out is satisfactory so far as the administration is concerned" (US Senate Committee on Interior and Insular Affairs 1967). This abdication of federal power reflected the continuing salience of territorial politics in the Colorado, and the failure of federal

involvement to transcend the continued struggle for control over water among both Arizona and California, which continued even after the Court's momentous 1963 decision.

California

Throughout the third stage of the Colorado River controversy, California fought a two-front battle against water projects in Arizona and the Upper Basin states. The former was fought primarily in the Supreme Court, and the latter in Congress, an arena which demonstrated the importance of horizontal local-local relationships between states in determining the outcome of the long-running Arizona-California conflict. Despite its political power, California found itself marginalized in the national legislature. In 1950, California Congressmen called a special series of meetings to examine how Arizona obtained a favorable Senate vote on its proposed Central Arizona Project. As a news article described, these Congressmen were mystified as to "why and how Arizona—with only four Congress members compared with California's 25—was able to attract the votes of roughly 90% of the Democrats present and one-third of the Republicans" (W. Francis 1950b). Reflecting on this legislative setback, a Metropolitan Water District official warned Southern Californians that "California is about as about as popular in legislative circles in Washington as a good case of smallpox," due mainly to California's "brash" attitude to pursuing its interests (Los Angeles Times 1950).

Accordingly, California officials sought to improve relationships with Upper Basin states, calling for "cohesion" at a conference of western states (Brunn 1950), and blaming "certain lobbyists for Arizona" for cultivating an impression that California opposed Upper Basin development projects (Los Angeles Times 1950b). Simultaneously,

however, Southern California territorial interests undermined attempts at reconciliation by assailing the "dictatorial powers" exercised by federal officials in league with Arizona representatives (Los Angeles Times 1950c), and pledged to "fight on" against the "fantastic Arizona project" (Los Angeles Times 1951).

Stymied in Congress by the alliance between Arizona and the Upper Basin states, California's territorial interests placed their hopes on its Supreme Court suit, which asserted that California's water claims enjoyed priority over those of over basin states. In its complaint, which was filed on behalf of the state as well as IID, MWD, and other Southern California territorial interests, California charged that "Arizona has permitted and encouraged the expansion of the irrigated area…in knowledge of the inadequacy of the surface and underground water supply," which impinged upon its "senior and prior" water rights as specified by the 1922 compact (W. Francis 1953). Such was the weight given to this priority position that when Nevada, California's longtime ally in the Colorado River controversy, moved to join the suit, California challenged Nevada's claims as inferior to its own (Hartmann 1954).

This claim of priority also attempted to protect California from the impact of water diversion and storage projects in the Upper Basin states, which it feared would further reduce the amount of Colorado River water available to Southern California. California's priority claim also led it to increasingly link its legal case against Arizona with its legislative opposition to Upper Basin water storage and diversion projects. As the CRCCA warned, "These dangerous bills seek to make effective disputed questions of law," and urged California officials to "bring about the defeat of the Upper Colorado river projects" (Los Angeles Times 1955).

In this opposition effort, Southern California territorial interests led the way. The institutional guardians of Southern California interests, particularly the MWD and CRCCA, issued warnings to Congress, testifying that the Upper Colorado projects constituted "one of the greatest raids on the Federal Treasury that has ever occurred," and which forced Southern California to "gamble with the thirst of our citizens" (Shannon 1955). California Congressmen concurred, with Republican Craig Hosmer of Los Angeles going so far as to declare the Upper Colorado projects illegal under the terms of the 1922 compact. "Southern California," he exclaimed, "is the most productive area of the nation and we must have the water to which we are entitled by contract, by compact and by appropriation" (Shannon 1955b). The political salience of Southern California's thirst for water was further demonstrated in the 1958 California Senate campaign, when candidates traded accusations that the other had failed to protect the state's water rights from the other Colorado River basin states, particularly those of the Upper Basin (Blanchard 1958).

The stridency of Southern California's opposition to Upper Basin water diversion and storage projects gradually led to a rapprochement and putative alliance with Arizona in order to more effectively block these projects. After the Court rejected California's claim that the Special Master's allocation was "beyond the pale" and ruled in Arizona's favor in 1963 (Hebert 1961), most California officials and representatives accepted that the best way to guarantee Southern California's water supply was to strike a deal with Arizona and seek additional water through transfers from Northern California and the Pacific Northwest. In part, this newfound unity stemmed from a desire to defeat Udall's PSWP, which the lower basin states feared would provide

inadequate supplies of water. As an MWD official stated, "This new plan is truly regional—bigger and better than Udall's" (Hebert 1964). Southern California interests also feared that if CAP were not authorized, the requisite federal financing for water transfers from the northwest would be blocked by Arizona's powerful Democratic Senator Carl Hayden (Johnson 1977, 210).

By the late 1960s, the outlines of a California-Arizona bargain had emerged whereby California agreed to support CAP authorization if California were guaranteed 4.4MAF of Colorado River water annually. Northcutt Ely, who had long led California's opposition to Arizona, conceded with startling frankness that "We would rather reestablish our alliance with Arizona than to get involved in open warfare with you. The cement of this alliance is the recognition of our existing investments of $600 million, just as we recognize your larger aqueduct" (US Senate Committee on Interior and Insular Affairs 1967, 293). California's support for the Colorado River Basin Project Act of 1968, which authorized CAP, thus settled a nearly fifty-year dispute between California and Arizona, after both states could finally be assured that their control over vital water supplied could be ensured. It did not, however, resolve the fundamental problem of water scarcity, nor did it satisfy the Upper Basin states, who continued to seek federal financing for water storage and diversion projects.

Arizona

As in previous phases of the Colorado River controversy, in the third and final phase Arizona remained obstinately focused on its sole goal of securing federal financing for the Central Arizona Project, thereby securing the water resources which it viewed as critical to its development as a downstream state. By assiduously and

ultimately successfully pursuing CAP authorization by supporting the water-rights claims of Upper Basin states, Arizona helped to ensure that the allocation of Colorado River waters by the evolving Law of the River was both inefficient and unsustainable, relying as it did on optimistic estimates of the total flow of the river. Arizona's role in the third phase of the Colorado River controversy was marked by a sense of urgency to secure CAP authorization in Congress, driven largely by a fear that California's population growth would increase its strength in Congress. As Arizona's venerable Senator Hayden remarked in 1950, "Population estimates indicate California's membership in the House will go up in 1952…If this [CAP bill] can be postponed until then, the possibility of further delay is enhanced" (W. Francis 1950c).

At the same time, the Upper Basin states, with the support of BuRec, were preparing to launch their Colorado River Storage Project in Congress, most likely with the support of the Eisenhower Administration (Johnson 1977, 95). Arizona was thus by 1950 confronted with a critical window of at most a decade in which to secure CAP authorization, beginning with a new suit against California in the Supreme Court in which it aimed to undermine the comprehensive, basin-wide principles established by the 1922 Compact so as to gain the necessary water rights for the CAP.

Attempts to compel the Supreme Court to apportion Colorado River waters had been a keystone of Arizona strategy since the 1930s, but Arizona's suits had been rebuffed by the Court on three previous occasions, in 1931, 1934, and 1936. Nonetheless, because judicial settlement of Arizona's water claims were seen as a pre-requisite to Congressional financing, Arizona again filed suit in 1952, seeking standing based on its ratification of the Colorado River Compact in 1944. Previous suits had been dismissed in

part because the Court determined that Arizona suffered no immediate harm from California's water use. In its present suit, therefore, Arizona claimed that California was using more than its share of water under the terms of the Compact, and it asked to be awarded 3.8MAF annually from the main stream of the Colorado (Los Angeles Times 1952).

The central issue in the controversy, as in previous decades, was 1MAF which was presently utilized by California, but which Arizona claimed belonged to it because it represented the approximate flow of the Gila River which was almost entirely contained in Arizona (Los Angeles Times 1953). However, in the present suit Arizona modified its legal strategy, claiming the 1MAF under Article 8 of the 1922 Compact, which protects "present perfected" water rights. Arizona claimed such present perfected rights over the Gila based on historical usage, effectively asserting that Colorado River tributaries belonged to individual states rather than to the basin as a whole, as the 1922 Compact had emphasized (August 2007, 80-85).

This assertion of state resource sovereignty instead of a basin-wide approach was considered necessary to obtain the water rights for CAP, which Arizona state officials in turn claimed was vital to the state's economic future. Its Democratic Governor Ernest MacFarland told the Supreme Court that "the economy of Arizona would be ruined" without its 1MAF of additional water (August 2007, 65), while Senator Hayden told the Senate that "Arizona urgently needs more water, without which she faces a slowly withering economy" (US Senate Committee on Interior and Insular Affairs 1963, 3). Such strident claims nonetheless reflected narrow territorial interests concentrated in central Arizona. The admittedly partisan *Los Angeles Times* re-printed a letter from a

legislator representing Arizona's northern Navajo County which claimed that "From the very outset the Central Arizona Project has not had, nor has it now, the support of any large segment of our people. All the fire and fury has come from a few interested landowners in a small section of the valley." This opposition to CAP was because, the official explained, it threatened to disrupt the existing water claims of northern Arizona farmers (Los Angeles Times 1953b).

These territorial interests continued to shape Arizona's Colorado River policy to favor local rather than basin-wide policies. In 1958, Senator Hayden filed a joint statement on behalf of both the Arizona Power Authority and Arizona Interstate Stream Commission, otherwise mortal bureaucratic enemies, in opposition to the Interior Department's proposed Colorado River Storage Project (CRSP), which envisioned construction of several dams throughout the Upper Basin (United States Senate 1958). This opposition to regional, basin-wide policies continued even after the Supreme Court's historic 1963 decision, which upheld the Special Master's grant of an additional 1MAF annually, the historic crux of the controversy, to Arizona. As the *Los Angeles Times* reported, Arizona officials "feel their legal victory could turn to dust…on the flinty shoals of subterfuge and political power."

Even after the Court's decision, Arizona CAP advocates raised the old specter of a California-federal alliance to justify their opposition to Secretary Udall's attempts to coordinate Colorado River basin water use through the Pacific Southwest Water Plan, which they feared could be co-opted by California to delay CAP authorization (Sherman 1963). Arizona's Republican Governor Paul Fannin thus duly alleged that the "PSWP is

a plot against Arizona born in California and formalized in the Interior Department by California's undersecretary" (August 2007, 101).

California did in fact succeed in delaying CAP authorization in the House until 1967 (Irwin 1966). Faced with this opposition, Arizona's Representative Udall adopted a new tactic, opposing reclamation projects, even those entirely within California, until its support could be secured. Udall's single-minded focus on Arizona's territorial interests was indicated by the fact that while he conceded that the project in question was "a good one, and needed," he obstructed the bill because "the most desperate need in the whole west is in central Arizona" (Los Angeles Times 1967). Simultaneously, Arizona's entire Congressional delegation began a final push to secure CAP authorization in 1968, cultivating the support of Upper Basin states by including CRSP projects which they had earlier opposed, and that of Pacific Northwest states by including assurances that Columbia River water would not be tapped for transfer to the arid Southwest. Finally, and crucially, Arizona reached an agreement with California to guarantee it 4.4MAF annually in perpetuity, meaning that Arizona would bear the brunt of reduced allocations in times of drought.

The Colorado River Project Act thus spread its US$ 1.3 billion in construction benefits, one of the largest authorizations in Congressional history up to that time, throughout the western United States, and passed with the sole but telling opposition of an eastern Congressman, Republican John Saylor of Pennsylvania (Los Angeles Times 1968). Upon signing the bill, President Johnson gushed that "good and reasonable men have put aside their differences in favor of regional progress" (New York Times 1968). Nonetheless, the final authorization of CAP marked only the temporary cessation of

conflict with California, and presaged greater conflict with the Upper Basin states, the effect of which would be to continue to undermine RBM institution-building in the Colorado River basin through the present day.

Upper Basin

In the post-1945 era, the Upper Basin states sought to assert control over upper-basin water resources by realizing the promise of federally-financed water diversion and storage projects which had compelled them to accede to the 1922 Compact. As Utah Republican Senator Arthur Watkins explained, the Upper Basin states "recognized at the time of signing of the compact that the Upper Basin, because of its difficult topography, relative inaccessibility and the necessity for major storage for regulation, would develop much more slowly. The signers of the compact in the lower basin, however, pledged their support to Upper Basin development when such development was ready for construction. That time is now" (Moley and Watkins 1956, 2). The Upper Basin states were largely driven by a sense of urgency because of growing water demand in the lower basin, and the fear that if they did not begin construction of water storage projects, they would be forced to shoulder a disproportionate burden in times of drought, since the lower basin states would be able to claim higher rates of current water usage (Fleming 1951).

Because California utilized the majority of Colorado River water, the Upper Basin states viewed it as their primary opponent in seeking federal financing for water diversion and storage projects, which it bundled together as the Colorado River Storage Project (CRSP). As a member of Colorado's Colorado River Commission told a Mountain States Water Users Conference, "potent Southern California agencies" were

"again advocating reclamation policies calculated to defeat the interests of the upper-basin states" (New York Times 1950). Accordingly, these states calibrated their strategies to undermine California's Congressional delegation and their perceived allies in Washington. New Mexico Democratic Senator Clinton Anderson accordingly warned Californians that if they blocked the CRSP, "no new [reclamation] projects will be approved for California as long as I'm chairman" (Fleming 1955).

The most important element of Upper Basin strategy was a renewed though temporary alliance with Arizona. Though Upper Basin officials claimed neutrality in the Arizona-California suit before the Supreme Court, they issued calls for legal clarification which precisely echoed Arizona's claims (Los Angeles Times 1954c). Meanwhile, the Upper Basin states began an aggressive legislative campaign to secure approval for the CRSP. As the *Christian Science Monitor* reported, Upper Basin senators were "by the pressure of back-home opinion welded into a solid bloc" (Fleming 1955).

Yet this unity was directed not towards regional institution-building but instead towards curbing the involvement of national and federal actors in Colorado River matters. In 1956, Congress passed the CRSP with a statement which "re-emphasizes the obligation of the Secretary of the Interior to respect all water and power rights held by downstream users" (Shannon 1956). This attempt to curb the authority of federal actors in favor of state control over the Colorado's water resources also presaged intense opposition to Secretary Udall's PSWP in the early and mid-1960s. In 1963 Congressional hearings, Senator Anderson illustrated this opposition in questioning Udall on the PSWP. Referring to planned guidelines on the operation of Glen Canyon Dam, Anderson pressed, "I do think you recognize, don't you, Mr. Secretary, that the opening

of the gates does jeopardize the bank account in the Upper Basin states? I would recognize we have a right to try to protect our bank account" (US Senate Committee on Interior and Insular Affairs 1963, 327).

Indeed, sensing a growing threat to their control over water resources, the Upper Basin states also modified the role of the existing Upper Colorado Basin Commission to act as a "watchdog group…devoted to seeing that the upper river is developed as planned, and that its interests are protected" (Fleming 1963). The Commission increasingly turned its attention to opposing "any part in a compulsory program of overall planning for the Colorado River basin," such as was advocated by Udall via the PSWP (Los Angeles Times 1965).

Just as they opposed federal involvement in the Colorado basin for fear it would curb their water rights, the Upper Basin states also abrogated their alliance with Arizona once its rapprochement with California began to create a legislative threat to Upper Basin autonomy and water supplies. Following the Court's decision in *Arizona v. California* (1963), and California's subsequent support of CAP authorization, both lower-basin states asserted water claims that were in excess of the Colorado's total flow by the mid-1960s, raising fear that these claims would "bankrupt" those of the Upper Basin states (Christian Science Monitor 1965). As Wyoming's State Engineer explained in 1967 Congressional testimony, "As the Upper Basin develops, the water supply to the Lower Basin will progressively diminish…This begin the case, Wyoming fears that future pressures arising from the developed economies in the Lower Basin will be muscled with sufficient political strength to effectively inhibit the future development of Wyoming" (US Senate Committee on Interior and Insular Affairs 1967, 409).

In Congress, the Upper Basin opposition to California and Arizona project authorization was led by Colorado Democratic Representative Wayne Aspinall, who succeeded in blocking CAP authorization until 1968. In this the Upper Basin states were joined both by national conservation groups and the Pacific Northwest states, which feared diversions of water from the Columbia River basin to augment the Colorado's flow. In 1968, however, Aspinall brokered an agreement which financed CAP, projects in almost all the Upper Basin states, and proposed a moratorium on water transfers from the Columbia. The resulting Colorado River Basin Project Act thus satisfied territorial interests throughout the Colorado River basin states, leaving only conservationist groups and the federal government dissatisfied—the bill pointedly prohibited the Federal Power Commission from licensing new hydropower plants on the Colorado, reserving that power for Congress (New York Times 1968).

Moreover, as the *Los Angeles Times* noted, the Act failed to resolve the basic, underlying problem of water scarcity in the Colorado River basin: "within a decade the West must face up to the hard fact that the Colorado River without augmentation simply doesn't contain enough water for all of the [statutory] commitments" (Los Angeles Times 1968b). Thus in the third phase of the Colorado River controversy, as in previous stages, inter-state territorial geopolitics, shaped by territorial interests in the several states, prevented the capture of the basic trans-boundary externalities which plague the Colorado Basin. Nor, despite the resolution of the Colorado River controversy by 1968, has this basic situation been altered.

Colorado River Case Epilogue and Conclusion: A Fraying Institutional Patchwork, 1969-Present

Just as the *Los Angeles Times* predicted, the additions to the Law of the River represented by the *Arizona v. California* decision and the authorization of CAP failed to settle the basic political, economic, and ecological issues of the Colorado. Continuing inter-state disputes and changing water use demands have led the Supreme Court to issue several supplementary decisions in *Arizona v. California,* most recently in 2000. In 1970 the Interior Department issued guidelines for the operation of the Colorado's many dams and reservoirs, which assumed that California would limit itself to its statutory 4.4MAF allocation (Holburt 1982). The state proved unable to so limit its water use, however, and along with growing water demands from CAP and other sources in the lower basin, in 2001 the Secretary announced a compromise which allowed California an additional 15 years to limit itself to its statutory allocation (Anderson 2002, 7).

Although the plan proposed to protect the other basin states from drought by reducing California's industrial and agricultural use, in the past five years searing drought rendered it inadequate, and familiar inter-state bickering began anew. By 2004 the *New York Times* reported that "The uncertainty has local, state and federal officials along the 1,450-mile [Colorado] river scurrying to secure water allotments." More ominously, it also reported a growing consensus among scientists that the West was unusually wet during the past century of its development, raising fears that "the development of the modern urbanized West…may have been based on a colossal miscalculation" (Johnson and Murphy 2004).

The drought thus served to underscore the inadequacy of almost a century of efforts to capture the regional-scale externalities present in the Colorado River basin. As

political scientist Daniel McCool remarked, "The law of the river is hopelessly, irretrievably obsolete, designed on a hydrological fallacy" (Johnson and Murphy 2004). Indeed, the whole history of attempts to manage the Colorado River has merely fulfilled the predictions of explorer John Wesley Powell in 1893: "Gentlemen, you are piling up a heritage of conflict and litigation of water rights, for there is not sufficient water to supply the land" (Fradkin 1981).

Instead of the comprehensive regional institutional framework which Powell recommended, inter-state territorial rivalries ensured that an incomplete institutional patchwork incompletely addresses externalities in the Colorado River basin. The experience of the Tennessee Valley was different in being placed under a regional RBM organization, but likewise illustrates the decisive impact of sub-national territorial politics on undermining attempts to capture river basin externalities at regional scales.

Regional River Basin Governance: the Tennessee Valley Authority

The expansion of federal projects during the New Deal era was accompanied by the creation of several new regional governance institutions designed to capture regional-scale externalities, including those entailed in economically inter-linked urban areas as well as watersheds. Yet it was precisely this level of ambition provoked the ire of state governments, who both constrained the TVA's remit and defeated proposals to expand the regional governance model to other river basins.

Even among this constellation of proposed regional institutions, those organized around river basins enjoyed special prominence. River basins, the Roosevelt Administration asserted, "were more important than State lines in planning for the use and control of streams, and suggest more convenient means of cooperation between

states…and the Federal Government" (Duffus 1936). The idea of a regional governance institution organized along watershed rather than state lines came to be favored as a means of redressing river basin externalities. A 1934 report, for example, cites "conflicts over the use of available water," "the custom of using streams for disposal of sewage and waste," and "interference by local authority with navigation" as reasons that river basins "must be developed not in accordance with purely local interests, but according to a comprehensive plan" (US Public Works Administration 1934, 21).

This belief found its greatest manifestation in the creation of the Tennessee Valley Authority (TVA) to oversee comprehensive economic development of the multi-state Tennessee River basin, including the construction and operation of hydropower facilities to aid in regional economic development, as well as to redress externalities such as soil erosion and water quality. This "multi-purpose" character makes TVA the prime example of a regional RBM institution which possesses autonomous powers of government, including project financing and policymaking authority. In a message to Congress, President Roosevelt stated the need for such an entity by suggesting that "Many hard lessons have taught us the human waste that results from lack of planning…It is time to extend planning to a wider field, in this instance comprehending in one great project many States directly concerned with the basin of one of our greatest rivers" (Roosevelt 1933).

These powerful new regional governance institutions, reflecting watershed rather than state lines, held numerous attractions for the architects of the New Deal programs, including being a mechanism to facilitate project implementation as well as helping to circumvent state-based opposition. Such opposition was widespread with respect to

TVA's principal goal, expanding the supply of hydro-power, which Roosevelt stated "must be protected from private monopoly and used for the benefit of the nation" (Roosevelt 1937). Utilities vigorously opposed the TVA's role in this effort, which was championed by Roosevelt and certain key Congressional leaders, namely Independent Senator George Norris of Nebraska (Strout 1930).

The TVA thus formed a component of a larger intended program of regional planning in which regional institutions would further New Deal policy objectives in part by undermining existing political power structure. In 1937, Roosevelt requested Congress to create seven regional river basin planning and development entities modeled on the TVA, in addition to a Mississippi Valley Committee which had been established earlier to coordinate public works projects in the Mississippi River basin (Christian Science Monitor 1937). These entities' responsibilities would, Roosevelt explained, "consist chiefly in developing integrated plans to conserve and safeguard the prudent use of waters, water-power, soils, forests and other resources of the areas entrusted to their charge" (Roosevelt 1937). In order to accomplish these wide-ranging objectives, Roosevelt urged that the TVA be made largely autonomous, and the legislation which created it is unique in insulating TVA from the regular Congressional appropriations process as well as in its spare provisions for Congressional oversight (Chandler 1984, 4).

Despite Roosevelt's vision for creating a powerful organization which would pursue regional rather than state objectives, the TVA became increasingly constrained by existing state lines rather than transcending them. Instead, TVA committed itself to working through extant state and local institutions. Its directors were careful to

champion a strategy of engagement with state and country officials as well as with local farmers, cooperatives, and agricultural extension services, which they proudly termed the "grass-roots" (Selznick 1949). TVA leaders such as David Lilienthal adopted the language of decentralized federalism, stressing that the Authority represented a method of governance "whereby the administration of essential national functions shall not become so concentrated at Washington, so overpowering in size and so distant from the every-day life of ordinary people as to undermine confidence in all governmental activities" (Lilienthal 1942, 155). Moreover, rather than embracing wholesale regional economic development, TVA increasingly focused on the narrower task of power production, in which it did not supplant state governments. Despite its promise as a means of capturing regional watershed externalities, TVA was increasingly confined to niche roles in which its existence did not threaten existing state governments. As Martha Derthick notes, TVA "has not approximated a regional government, and in no important respect has it superseded the states or their local governments" (Derthick 1974, 24).

Indeed, far from constituting a new, regional tier of governance intermediate to the states and federal government, the TVA provoked a sustained effort by state governments to support alternative institutions in which their autonomy would be better protected. Proposals to create additional TVA-like entities led state governors to oppose "such a monolithic federal entity operating in their jurisdictions," and to support weaker "partnership" organizations instead (Voigt 1972, 59). Soon after Roosevelt's message to Congress concerning the regional watershed organizations, Republican Senator William Borah of Idaho proposed a constitutional amendment making regional issues the sole responsibility of state governments. Watershed issues, Borah proposed, would be

handled by interstate commissions and compacts rather than autonomous regional organizations (Christian Science Monitor 1937b).

As debate over the role of the federal government resumed following the Second World War, the dividing lines between federal advocacy of and state opposition to powerful regional watershed bodies became even more clearly drawn. In 1948, the *Chicago Daily Tribune* called the TVA "a gigantic federal enterprise" which "takes its orders from Washington. Its philosophy is federal and the states and cities it serves have no part in its operation" (Chicago Daily Tribune 1948). Such beliefs set the stage for the final defeat of the comprehensive watershed governance model represented by TVA in favor of weaker bodies in which state governments possessed greater influence.

In the postwar era, President Truman revived Roosevelt's proposal to establish TVA-like entities in other river basins, most notably the Columbia and Missouri. The proposed Missouri Valley Authority was viewed by Truman and other federal leaders as a means of alleviating fierce rivalries between BuRec and USACE in the construction of some 138 proposed water projects along the Missouri, which in turn were united only by their opposition to the proposed Authority which threatened their control over water projects in the basin (Espy 1950). State governors, however, sought to develop alternative proposals based on weaker inter-state coordination mechanisms. "Prompted by a fear that the basin might get an all-powerful authority from Congress," representatives of nine Missouri River basin states met in 1949 to issue proposals for an "interstate agency" in place of the proposed Authority. "Such a program," explained a Nebraska representative, "would avoid ultimate centralization of all economic power…in the Federal Government in perpetuity" (Blair 1949); (Blair 1952).

In forestalling such a result the states were ultimately successful: after prolonged lobbying, the Eisenhower Administration accepted the recommendations of a report which abandoned the idea of replicating the TVA. Instead, it proposed a weaker inter-agency coordinating body which would "not…replace existing agencies nor would it assume full and complete authority for every phase of Federal activity in the basin." In this recommendation died the "socialistic" TVA model of creating powerful, regional authorities capable of addressing a wide range of watershed externalities (Kennedy 1953).

The TVA represents by far the most ambitious attempt in the United States to capture regional-scale river basin externalities, a task which most assessments concur it has fulfilled rather successfully (Espy 1950); (Chandler 1984). However, its principal objective was always hydropower development, and its more ambitious attempts at promoting economic development were curtailed by state opposition. Perhaps its greatest influence was abroad; as William Espy wrote in 1950, the TVA "set the minds of men in every retarded region of the world afire with the dream of bettering their lot through grand-scale river valley development" (Espy 1950), not least in India, where the Damodar Valley Corporation was consciously created in the TVA's image.

In the United States, however, the TVA model failed to spread, again hindered by the opposition of state governments which set aside other disputes in order to prevent what they viewed as federal encroachments on their authority and autonomy. The TVA, in short, represents the ability of state government to "demonstrate powers of survival" (Derthick 1974, 6). Indeed, the TVA model came to represent something of a specter which continues to haunt federal attempts at RBM institution-building. Following the

defeat of the proposed Missouri Valley Authority, RBM in the United States became dominated by weaker inter-state and inter-agency institutions which originated as alternatives to the more threatening TVA.

Joint Federal-State Compacts and River Basin Commissions: the Delaware and Susquehanna River Compact Commissions and the Title II River Basin Commissions

Following the demise of the TVA model of comprehensive river basin planning and development, new efforts began to create comprehensive institutional frameworks for RBM in the United States. State governments increasingly favored a joint federal-state compact model, in which the federal government would join several states as parties, as an alternative to the TVA model of regional governance in which their powers would be better protected. In a contemporaneous development, the 1965 Water Resources Planning Act (WRPA) established several new inter-agency river basin commissions for each of the country's major watersheds, known as Title II commissions after the provision which created them.

Despite this flowering of RBM efforts, attempts to create a comprehensive RBM institutional framework for the United States eventually failed due to a combination of federal and state strategic behavior in which each institutional model was undermined. Only two compact commissions, the Delaware and Susquehanna River Basin Commissions (DRBC and SRBC, respectively), were eventually created, while the WRPA Title II commissions were later judged to have had "no effect on the existing and deeply rooted system of water allocation and planning" and were "effectively repealed" in 1981 by Executive Order which cut off all federal funding (Huffman 2009, 130).

Both the Title II and compact commissions followed earlier institutional precedents. An inter-agency body known as the Mississippi River Commission was formed as early as 1879 as an executive body reporting to the Secretary of War, with representatives from USACE and the Geodetic Survey, to provide for navigation safety and flood control along the river (Mississippi River Commission n.d.). Similarly, the Interstate Sanitation Commission was founded in 1936 with representatives from New York, New Jersey, and Connecticut as part of a Tri-State Compact to combat pollution in New York Harbor (Hess 1946). Though some of these inter-state bodies proved effective in abating water pollution, many lacked enforcement provisions, and ultimately proved "not sufficient to transform the quality of interstate waters" (Paavola 2006, 454).

Water quality and quantity externality problems continued to worsen towards the middle of the twentieth century, increasing pressure for the creation of new RBM institutions at a national scale in order to capture these externalities. The federal Natural Resources Board, created in 1935, issued several reports concluding that state water pollution control legislation often included debilitating exceptions for entire industries and metropolitan areas, and moreover failed to empower state agencies to enforce legislative provisions (Crohurst 1936, 177). Similar problems became apparent with respect to water quantity issues. Inter-state disputes over shared water resources grew increasingly acrimonious, particularly in the Delaware River basin, which an inter-state commission proved incapable of resolving (Advisory Commission on Intergovernmental Relations 1972, 100).

The Title II and compact commissions arose largely as a response to these earlier institutional failures to redress RBM externalities. Though each enjoyed partial success,

both efforts to comprehensively and effectively manage America's rivers were undermined by a combination of states that feared a loss of autonomy and a federal government wary of becoming embroiled in inter-state conflicts, with the result that the United States now lacks a uniform RBM framework.

Interstate compacts were historically the principal means of addressing regional watershed externality issues in the United States, but during the New Deal era the idea of federal-state compact organizations gained credence as an alternative to greater federal involvement, which state governments viewed as a threat to their autonomy. Two such federal-state compact organizations were created in the postwar era, the Delaware River Basin Commission (DRBC) and Susquehanna River Basin Commission (SRBC). State governments' support for these commissions was borne of a desire for "a method for settling disputes that would be more accessible to their influence and less fraught with uncertainty than resort to a judicial institution of the federal government" (Derthick 1974, 48).

Like the TVA and the Title II commissions, however, the compact commissions were consistently undermined by both vertical rivalries between state and federal government, and horizontal ones between states themselves. During initial SRBC negotiations, for example, Governor Scranton of Pennsylvania opposed the state's participation because he feared that the other three proposed state members could "gang up" on the Commonwealth and outvote it (Voigt 1972, 149). Similar reticence was evidenced by state officials in California, Texas, and other large riparian states in refusing to accede to interstate compacts which their influence, formidable on the national stage, could be diminished within RBM institutions (Derthick 1974, 152).

Yet if states preferred compact organizations in order to strengthen their influence *vis a vis* both other states and the federal government, Washington opposed them as a constraint on its own powers. Secretary of the Interior Stewart Udall warned that the DRBC would constitute a "third form of government" and that "It is our bedrock position that cession [to DRBC] is the very essence of your proposal and that this would end up by operating river basins under sort of an Articles of Confederacy and that the constitutional system that we have simply does not permit that" (US Department of the Interior 1961). A proposed federal-state river basin commission in the Columbia River valley was likewise attacked as an attack on the existing federal system, which Representative Ben Jensen of Iowa "the recommendation and hope of the Communist Party of America" (Foster 1984, 6). More prosaically, the Office of Management and Budget, responsible for coordinating the actions of the executive branch, was consumed by concern that RBM organizations like the DRBC not usurp agency powers, and "not be a medium for making federal commitments, not make jurisdictional claims that conflict with the duties of federal agencies, and not bypass or anticipate normal processes of authorization and appropriation" (Derthick 1974, 66).

This concern with maintaining federal agency prerogatives, which threatened to render RBM organizations impotent, in large part reflected the power and prestige of hydro-engineering bureaucracies, especially the Army Corps of Engineers. In the case of the SRBC, the Corps and other agencies insisted on removing the Commission's proposed power to approve federal projects, thereby substantially decreasing its power (Voigt 1972, 230). In a 1972 report, the Advisory Commission on Intergovernmental Relations (ACIR) noted that these "reservations relating to regulatory agencies in the

region were drafted so as to resolve problems of concurrent jurisdiction in the national government's favor."

Moreover, the ACIR concluded, these reservations were so stringent and so calculated to preserve the power and autonomy of federal agencies that they "establish[ed] conditions under which the federal government need not be in substantial compliance with the rules and regulations of the compact" (Advisory Commission on Intergovernmental Relations 1972, 104; 108). Similar reservations were insisted upon by federal agencies in the proposed Northeastern river basin compact, which was supported by the New England states but was opposed and defeated in Congress by hydro-engineering bureaucracies who feared that it would "interfere with the jurisdiction of the United States and the powers and prerogatives' of federal agencies" (Voigt 1972, 62).

Just as state governments favored the compact commissions over TVA-like entities, federal hydro-engineering bureaucracies, fearing dilutions of their power and autonomy, supported the weaker inter-agency Title II commissions created by WRPA. As Martha Derthick notes, the Title II commissions "are the form of river basin organization most acceptable to the federal executive departments," chiefly due to the fact that "they have no operating or management authority [and] they do not threaten to supersede the federal agencies" (Derthick 1974, 134). Unlike the compact organizations, the Title II commissions "tend to be heavily oriented to federal water resource planning interests," while being only minimally responsive to input by state and local governments (Advisory Commission on Intergovernmental Relations 1972, 206). The creation of the Environmental Protection Agency dealt a further blow to both compact

organizations and the Title II commissions, as the new Agency sought to aggressively expand its powers in the field of water pollution control, thereby supplanting the role of inter-state bodies in this field (Foster 1984, 149). Increasingly, these organizations thus became the victims not only of federal agencies eager to protect their bureaucratic turfs, but also individual state governments seeking to expand their own powers.

Indeed, the role of the states was crucial in the eventual collapse of the Title II commission structure, and with them prospects for comprehensive RBM institution-building throughout the United States. State preferences were shaped and pursued out of desire to maximize their individual interests relative to both other states and to Washington. Participation in Title II commissions offered states a mechanism to more effectively oppose federal actions which harmed their interests. Even the ACIR acknowledged that the states "retain interest in Title II operations so that they may scrutinize Federal regional water resource planning and operations" (Advisory Commission on Intergovernmental Relations 1972, 97). At the same time, however, state participation in the Title II commissions was informed by a desire to constrain the actions of other states as well as the federal government. Martha Derthick observed, for example, that "Most states appear to join [river basin] commissions for defensive purposes, on the chance that they may be able to veto federal actions that threaten them, such as diversions of water. They seek defenses against one another as well as against federal action" (Derthick 1974, 151).

Moreover, even when states consented to participation in the Title II commissions, they withheld effective participation unless the new organizations directly engaged individual state interests, thereby undermining the ability of the commissions

to address regional-scale challenges. The New England River Basin Commission (NERBC), regarded as the sole successful example of the Title II commissions established failed to secure support among state leaders. As former staff member Charles Foster observed, "The New England governors' view of the commission…was that of a fuzzy regional study group at best, and an ineffectual body at worst. Unlike the New England Regional Commission, which had supplemental federal funds to distribute within the region, NERBC could do little to help the governors. It was, therefore, difficult even to get their attention" (Foster 1984, 150).

Indeed, the NERBC's efficacy in the view of outside observers was largely due to the fact that it sacrificed a comprehensive, river-basin-wide planning approach in favor of developing individual state implementation strategies rather than, which more directly addressed state goals and priorities (Derthick 1974, 155). Much as federal bureaucratic opposition undermined the compact commissions, then, state government opposition weakened the Title II river basin commissions. This weakness made the commissions tempting targets for elimination in budgetary battles.

In her authoritative study of the attempt to create river basin compact organizations in the 1960s and 1970s, Derthick observed that although "In a massive report, the National Water Commission in 1972 found the federal-interstate compact commission to be the preferred institutional arrangement for water resources planning and management in multistate regions, only two such compacts exist, the compact commissions have had a hard time getting established, [and] the executive branch opposed both of them" (Derthick 1974, 5). This outcome, though puzzling given the degree of consensus on the superiority of the federal-state compact approach, is

explained by territorially-structured strategic behavior on the part of actors at both the state and federal levels, who were concerned with maintaining their own powers and privileges.

Such an explanation is supported by subsequent assessments of attempts to implement RBM from the mid-1960s to mid-1970s. A 1981 Government Accounting Office (GAO) report is indicative in concluding that "River basin commissions have not emerged as the principal coordinators of Federal, State, interstate, local, and nongovernmental plans for the development of water and related land resources" because "State and Federal members do not want or view the commissions as principal coordinators, Federal agencies continue to control the water planning and development purse strings, and States continue to cling to this traditional source of financial support" (US General Accounting Office 1981, 12).

This duality, in which both vertical rivalry between states and the federal government and horizontal rivalry between the states themselves together weakened the compact and Title II commissions, is the dominant narrative in RBM institution-building in the United States. Federal agencies were hesitant to assist RBM organizations they felt were dominated by the states, even when, in the case of the federal Water Resources Council, they had a statutory role in doing so (US General Accounting Office 1977, 8). State water resource officials, the GAO found, in contrast "believe that river basin commissions should serve as a forum for State interests and should [merely] coordinate interstate issues." At the same time, state officials "agreed that individual State water requirements take precedence over those agreed on collectively in river basin commissions" (US General Accounting Office 1981, 13).

Successive attempts to create comprehensive institutions for RBM in the United States, first along the TVA model and subsequently through the federal-state compact and Title II commissions, have ultimately proved unsuccessful. Although the TVA, DRBC, SRBC, and several inter-state water resource coordinating committees have survived and enjoyed some success, notably in the Potomac River basin, there is no uniform policy or institutional framework through which to address river basin externality issues in the United States. Moreover, these extant bodies are normally quite weak, lacking formal planning, enforcement, or financing powers (Delli Priscoli 2007, 14). Attempts to create such frameworks have been undermined both by federal bureaucratic opposition to creating independent fora in which their objectives might be compromised, but even more importantly by states themselves, which play a two-level game, seeking to maximize resources and autonomy relative to each other and to the federal government. This sub-national territorial politics distinguishes attempts to address RBM under the decentralized federal structure of the United States.

Country Case Conclusion

The United States is one of the world's most politically, economically, and administratively decentralized countries, and its federal system is defined by a generous grant of autonomy to state governments. However, this structure means that the management of river basins constitutes a regional-scale issue that cannot be adequately addressed by individual states, yet also falls only partially and ambiguously within established federal powers. Attempts to develop regional-scale institutions to capture river basin externalities have consistently been defeated and undermined by sub-national territorial politics. Contrary to conventional wisdom, the federal government

has been hesitant to expand its powers in the sphere of RBM, doing so only piecemeal in efforts led by single agencies.

State governments, on the other hand, have successfully opposed virtually all attempts at creating regional governance institutions for fear that doing so would usurp their autonomy. This is most clearly expressed by the ACIR: "Recent regional developments have not resulted in radical changes in the American polity due to their peculiarly functional quality and the composition of the existing levels to guard what they deem to be their fair prerogatives. Thus, most regional problems of an economic or natural character have been adapted to a mode of unifunctional administration…This has presented less of a threat to the traditional levels and produced commissions that are controlled by these levels" (Advisory Commission on Intergovernmental Relations 1972, 4).

Far from being the victim of an expansionist federal government, states have been the architects of America's fragmentary institutional landscape for river basin management, in which regional-scale institutions are both fewer and weaker than in more centralized systems. Most consequently, however, the United States lacks a regional scale of governance to address regional-scale externalities. In France, a different reality obtains where a densely integrated central-local hierarchy allowed a civil society-bureaucratic coalition to overcome local opposition by making regional control of pollution a national political issue.

Chapter 3. Regional Governance in a Centralized Unitary State: Regional River Basin Governance in the Republic of France

This chapter discusses the model of regional river basin governance embodied in the French Water Agency system, which exercises a wide range of planning, enforcement, and financing powers throughout the country's major river basins, in the context of France's unitary and largely centralized state. Unlike the American case, the Water Agencies have permitted capture of watershed externalities through regional governance institutions which have proven remarkably durable and successful. The Water Agencies arose as attempts to address widespread water pollution, which as in the case of the United States was attributable largely to the failure of local governments to enforce regulations on powerful local industries. Also as in the American case, nation-wide civil society groups led an effort to create national policies to capture pollution externalities.

Unlike the American case, however, these groups were able to forge a coalition with hydro-engineering bureaucracies and national politicians, who in turn were able to co-opt key local elites, notably the *prefets*, to support implementation of a comprehensive national policy for regional-scale river basin externality capture. In France, then, political nationalization of water pollution externalities provided the impetus to developing effective regional governance—a nationalization which was possible only because of the dense vertical and horizontal ties which link central and sub-national governments and the elites which run them within France's centralized unitary system.

Country Case Introduction

If the United States is often viewed as an archetypal federal system, France is often justifiably viewed as the model of a centralized unitary state. Though administrative decentralization has advanced in recent decades, and some overseas territories now enjoy substantial autonomy, France remains fundamentally centralized. The prominence of regional governance is therefore all the more striking, particularly with respect to the manner in which watershed externalities, especially those related to pollution, have been addressed.

By the middle of the twentieth century, water pollution had become a major political issue in France. Facing a perceived loss of control over industries at the local level, the French government modified a system of regional planning adopted after the Second World War to create a new, intermediate regional river basin governance structure, the Basin Agencies. The 1964 Water Law created one such Agency for every major river basin in metropolitan France, and their powers and responsibilities have been expanded through subsequent legislation. Though opposed by local governments as a threat to their customary authority in the field of water management, the Basin Agencies were eventually implemented nation-wide, and have become powerful, multipurpose institutions in their own right—and in stark contrast to the experience of the United States. This contrast is largely due to the extent to which the central government could re-organize governance in France to meet new regional governance challenges, while forestalling the exercise of effective opposition by actors at lower levels of government.

Structure of Centralized Unitarianism in France

In sharp contrast to the United States, the French state is organized almost entirely along vertical lines in which central and local governments are deeply intertwined. The architects of modern France believed, as Suzanne Berger writes, that "justice requires that the republic be one and indivisible, and requires uniformity" (Berger 1974, 8), and consequently the French state has historically been organized in a strict hierarchy designed to bind sub-national governments closely to Paris. Although the French state does feature decentralization to sub-national governments, this is chiefly of the administrative rather than political or fiscal kind. For most of France's history the principal elements of sub-national governance consisted of *communes* responsible for municipal services such as trash collection, and *departments* which are responsible for local education, social services, and infrastructure.

This historical structure was modified after the passage of a Decentralization Law in 1982, since when the *communes* and *departments* have been joined by *regions* vested with some expenditure powers and policymaking powers in the fields of economic planning, environmental protection, and regional infrastructure. All levels possess locally-elected mayors and legislative councils, but political autonomy is sharply curtailed through the institution of the *prefet*, who functions as a representative of the center, enjoys broad powers of oversight and who can govern through administrative order in key areas such as public safety and security. The salience of these vertical central-local relationships, in contrast to the horizontal, territorial tensions which mark federal systems in the United States and elsewhere, has provided the French central

government with greater leverage to address regional issues than has been the case in the United States.

Partick Le Gales and Gilles Pinson, prominent scholars of central-local relations in France, write that its politics "remains profoundly territorial, rooted in regions, rural communes, small towns and cities" (Le Gales and Pinson 2009, 223). Yet territorial politics in France takes a profoundly different character than in the United States, and have historically been dominated by local elites which serve as intermediaries between center and periphery.

This role has proved crucial in the history of politics in metropolitan France, where central-local relations have often been animated by tensions between a conservative rural periphery and more progressive urban constituencies (Le Gales and Pinson 2009, 209). Elites at the periphery have often proved capable of diluting central policy objectives at the local level, but are also closely inter-linked with the center, making the process more one of mediation and negotiation than of direct opposition (Smith and Heywood 2000, 5-6). The structure of French political parties is centralized in character, quite in contrast to the United States. Moreover, because local elected officials serve partially as conduits for policy implementation, they often develop reciprocal relationships with central officials. Thus although local elites are capable of resisting and occasionally defeating central policies at the local level, they are also prone to co-optation by the center, and it is this malleability which permitted the French central government to tilt a perpetual conflict between central and local actors in its favor through creation of regional governance institutions in the postwar era.

Following the Second World War, regional issues, and new models of regional governance to address them, became a fixation of urban elites in France. The concept of a regional mode of governance was borne of the belief in the immediate postwar period that France was becoming increasingly polarized between a dynamic, prosperous Parisian urban region and a backward, impoverished hinterland, a concept popularized by the geographer Jean-Francois Gravel as "*Paris et le desert francais*" (Gravel 1947). To tackle this perceived problem, the French government divided the nation into regional economic planning zones, eventually consolidated under the *Delegation interministerielle a l'amenagement du territoire et a l'attractivite regionale* (DATAR). As DATAR's name implies, the construction of regional governance was built upon a core principle of inter-ministerial coordination within government, and inter-sectoral collaboration within industry (Ghiotti 2006, 11).

Building on the DATAR model, and quite in contrast to the American experience, regional governance in France was successfully developed and evolved as a means for addressing new regional-scale policy challenges through creation of a new tier of governance intermediate to central and local government. Constitutional reforms in 2003 have codified the status of the regions, and provided for a certain degree of policy experimentation (Le Gales and Pinson 2009, 219). Moreover, regional urban governance institutions have proliferated in recent years, and have come to be viewed as a model for other European states (Smith and Heywood 2000). The success of regional-scale governance in France is perhaps best illustrated, however, in the development of the nationwide system of Water Agencies (*Agences de l'eau*) for the management of river basins.

Dominant Central Role in RBM

Water resource issues in France have long been dominated by centralized hydro-engineering bureaucracies. In the seventeenth century, Louis XIV expanded the remit of a state bureaucracy called the *Administration des Eaux et Forets* to all the country's navigable rivers, setting a precedent whereby large water-engineering projects helped "consolidate royal authority into absolute monarchy" (Pritchard 2011, 30). Throughout the course of France's subsequent history, control over water became a symbol of the centralizing French state via the *grands corps*, the elite engineering bureaucracies which were responsible for building much of France's infrastructure (Ghiotti 2006). One of these, the *Genie Rural*, was responsible for irrigation works, while the famed *Corps des Ponts et Chaussees* was responsible for bridges, dams, and other hydrological works. Together, they represented a formidable nexus for the involvement of the French state in control of the nation's rivers. The *grands corps* continued to play a dominant role in the administration of the Rhone River, for example, even after the *Compagnie Nationale du Rhone* was established with a wide-ranging mandate to manage the river more effectively (Pritchard 2011, 4).

By the 1960s, however, the scale of water pollution appeared to have outstripped the French central government's administrative capacity to control it. In a 1964 session of the *Assemble Nationale*, a deputy asked whether the French state and people had become "slaves to industry," and incapable of controlling pollution (Journal Officiel 1963, 3146). In large part, legislative concern with water pollution reflected intensive lobbying efforts by civil society groups. Playing a role similar to that of the Izaak Walton League in the United States, sports fishermen's associations provided dramatic

testimony of acute water pollution and its effects on the ecology of rivers and streams. Through a nationwide federation, these associations also proved to be highly effective lobbyists, and became instrumental in raising water pollution to the top of the French political agenda in the mid-1960s (Birch 2009).

However, the French government faced the very significant political problem that redressing water pollution was likely to be prohibitively expensive. Deputies of the *Assemblee Nationale* were quick to note this impediment, suggesting that wastewater treatment alone was likely to cost 8-10 billion francs (Journal Officiel 1963, 5180). This provoked legislators to consider an alternative mode of financing and of institutional control—the creation of a new tier of government empowered to levy taxes on water users and employ the proceeds for constructing water-treatment projects.

In attempting to control water pollution in this manner, the French state also, despite its history of centralization, faced a problem of incomplete control over local authorities in the implementation of laws and regulations pertaining to pollution. There was a general sense in the postwar period that Paris was losing control of the *prefets*, the central government's administrators located in the various *departements*. As the political scientist JES Hayward wrote of the period, prefects were not content merely with "representing the national interest but have assumed in very substantial measure that of representing the regional interest" (Hayward 1969, 49).

This perception is well-evidenced in parliamentary debates concerning water pollution. The government's rapporteur for an early draft of the 1964 Water Law alleged that "prefects don't apply pollution regulations, and have not for some time" (Journal Officiel 1963, 5181). A deputy from the Rhone region offered a corresponding example

of local prefects who refused to fine companies for water pollution because they had become persuaded of the companies' economic importance to their jurisdictions (Journal Officiel 1963, 7227). Local pollution regulations, in fact, were said to "reflect more the local balance of power than pollution realities" (Brun 2009). As in the American case, then, attempts to capture water pollution externalities were an outgrowth of alliances between sub-national governments and powerful local water user groups. Unlike the case of the United States, however, the French government created a nation-wide tier of regional governance institutions to address these pollution externalities, in the process overcoming strenuous local opposition.

Malleable Local Authorities and the Adoption of Regional Institutions for RBM

The creation of the Basin Agencies was part of a broader regionalization of governance in postwar France in which the central government sought to tackle new policy issues, such as pollution, while also re-asserting power over local authorities. Its ultimate objective was to "restore the authority of the regional agents of government" (Hayward 1969, 51). Yet in order to do, it needed to accommodate and form alliances with new economic interest and advocacy organizations. An unwieldy coalition therefore emerged between civil society groups and central bureaucracies, particularly DATAR, in favor of creating a new regional tier of government. As Le Gales and Pinson write, "The Gaullist regime faced the resistance of local interests. It therefore aimed…to promote new groups of interests and new territorial levels to implement and support the modernization strategy" (Le Gales and Pinson 2009, 214). This coalition possessed a strong and shared interest in uprooting entrenched local elites, who were perceived to

have become unresponsive to both central direction and calls for attention to new policy challenges which arose in the postwar era (Ashford 1982).

This alliance between civil society and central bureaucracies in favor of regional governance had a common reason to fear the power of local elites and the local governments which often formed their political bases of power. Several attempts on the part of the central government to merge or re-organize the *communes* were defeated by the combined opposition of these sub-national actors, and instead of realizing a hoped-for improvement in the efficiency of local government instead "gave evidence of the capacity of the French territorial system to resist any rationalization imposed by the government" (Le Gales and Pinson 2009, 214).

As one might expect given this history, local elites and governments were initially strongly opposed to the re-organization of governance along regional lines. Even the *prefets* who supposedly served as agents of the center resisted the creation of proposed regional institutions. However, the importance of the vertical institutional linkages and relationships which so thoroughly bind central and local governments in France finally permitted the center to persuade *prefets* that regionalization could enhance rather than to diminish their powers, by facilitating the expansion of government into new policy and issue areas (Ashford 1982, 93). This was particularly true with respect to the pollution issues which became a major political issue in France in the 1960s, and which, like other new policy areas, were subsumed within a regional governance framework.

The French government's solution to the problem of pollution externalities was the 1964 Water Law, which created six *Agences des bassins* (Basin Agencies), based on

river basins, which covered the entire territory of metropolitan France. These Basin Agencies were given a broad mandate, including the control of pollution, the construction and maintenance of hydrological public works, and, perhaps most importantly, the ability to collect fees and royalties from water users. Governance was to be vested in basin committees composed of representatives from local and state governments as well as "water users" (LegiFrance 2004).

This 1964 Law thus represented a stark departure from traditional French modes of governance, both in terms of including civil society groups and also in supplanting the traditional institutions of local government, the *departments* and the *Councils Generaux*, who were viewed as unresponsive to the central government (Hayward 1969). The effort to pass the 1964 Law reveals the ability of the French state to redress pollution externalities which resulted in large part from the unwillingness of local officials to restrain powerful polluting enterprises. Unlike in the United States, however, the French approach to solving this problem relied on constructing a regional governance architecture in the face of local opposition which was ultimately weaker and less successful than in the American case.

Regional River Basin Governance Organizations: the Basin and Water Agencies

The creation and subsequent evolution of the Basin Agencies was primarily shaped by vertical conflict between central and local levels of government. The assertion of greater state control over water resources was complicated by the fact that in 1884, municipalities were granted control of water supply and sanitation activities (Fradin 2007, 91). Accordingly, the debate over the 1964 Water Law was framed largely as an attempt to "complete and modernize" these nineteenth-century laws (Journal Officiel

1963, 5181). However, as with attempts to consolidate the *communes*, the attempt to assert centralized state power by infringing on the powers and privileges of local government was strongly resisted by local governments, local elites, and sympathetic members of the *Assemblee nationale* (Pinson and Le Gales 2000, 7).

Resistance in the national legislature took a number of forms. Edmond Garcin, a Communist deputy from Aubagne, in the Rhone River valley, expressed concern that any revisions to the Napoleonic *Code rural* would threaten existing water rights, which in rural areas had traditionally belonged to riparian landowners (Journal Officiel 1963, 5182). Marcel Massot, a Socialist deputy from Provence, similarly alleged that existing laws were already sufficient to combat pollution, and that revision threatened agricultural riparian water users (Journal Officiel 1963, 5195). In the Rhone River valley, which possessed a long history of strong state involvement, primarily in the form of the *grands corps*, local opinion was particularly skeptical of greater state intervention in water resources management (Pritchard 2011, 173).

There was also significant concern that the proposed Basin Agencies would supplant the traditional duties of local governments. One deputy remarked that the Law Commission, which vets proposed legislation to ensure it conforms with existing constitutional provisions, did well to "temper state power over water," especially in terms of the regulation of industry and agriculture (Journal Officiel 1963, 5183). A Deputy Privat, of the Communist party, remarked that, while it was clear that pollution needed to be controlled, this should be done at a local level rather than through the creation of new institutions (Journal Officiel 1963, 5186). On another occasion, Privat admitted that "We fear some state control of water at the expense of local communities,

including the loss of rights that are sometimes centuries-old" (Journal Officiel 1963, 3147). Deputy Garcin, who evidently took a keen interest in the proposed reforms to water governance in France, urged that local government departments and municipalities be empowered with greater financing to undertake their own pollution control initiatives, rather than to rely on centralized direction (Journal Officiel 1963, 5182).

Some deputies voiced the related concern that the Basin Agencies might threaten the democratic legitimacy of local governments. A Deputy Barbet, a Communist representative of the Seine region, warned that the proposed Basin Agencies threatened to remove from local elected officials "the power of control and the exercise of [their] rightful power" (Journal Officiel 1963, 5193). Michel de Grailly, a member of the Union for a New Republic, and also representing the Seine region, similarly claimed that the 1964 Law exceeded the government's constitutional regulatory powers and would not be "consistent with the separation of powers" (Journal Officiel 1963, 7231). These concerns illustrated the profound changes which the 1964 Water Law proposed for governance in France, both of water and more generally. However, despite acute concern that the Basin Agencies would threaten the interests and legitimacy of existing local institutions of governance, the French state succeeded in creating comprehensive RBM institutions which permanently altered the landscape of sub-national authority in France.

The perceived challenges of curbing local protectionism, and the water pollution which it fuelled, were easily subsumed within the regional planning framework, and the regional approach to river basin management was portrayed by national politicians as an ideal means of combating pollution. In a 1963 session of the *Assemblee nationale*, Marc

Jacquet, the Minister of Transport and Public Works, expressed the view that territorial management and planning could not be effectively accomplished without taking into account water quality (Journal Officiel 1963, 5180). Government ministers likewise expressed a desire to attempt the "integrated management" of both water and land-use under a single, comprehensive framework (Journal Officiel 1963, 5181). In a later response to a proposal to eliminate the proposed regional framework in favor of strengthened pollution-control authority at the national level, Jacquet made the striking statement that efficiency and coordination were best served by regional instead of national integration, and that to be effective, "the fight against pollution must be handled at a regional level" (Journal Officiel 1963, 7221-7222).

Such enthusiasm can be explained chiefly by the fact that regional river basin authorities offered the French state "an alternative spatial framework to the nation-state that had dominated the early postwar era" (Pritchard 2011, 191). Within this framework, regional river basin organizations offered the French state the ability to pursue twin strategic goals, both enhancing its own control over local governments while also accommodating new political interest groups, as exemplified by the environmental advocacy groups. In this respect, the chief attraction of the basin agencies is that they "were not linked to a pre-existing tier of government, they facilitated a broad approach to both water quality and water quantity management that went beyond abstraction and discharge controls, and they were sufficiently large to generate appropriate levels of fiscal revenue" (Buller 1996, 242). In incorporating new powers to raise revenue, the Basin Agencies thus promised a new institutional form through which to enhance both

the political and financial powers of the central government relative to entrenched local governments.

The Basin Agencies were in fact subtly portrayed by the government as constituting a "new deal" for local water users, ensuring a fairer distribution of water resources by bypassing existing local governance structures. In introducing the 1964 Water Law to the *Assemblee nationale*, Jacquet proclaimed that its twin objectives were to fight pollution as well as to ensure a better and fairer distribution of water resources through consolidation of government powers (Journal Officiel 1963, 5180). Following implementation of the Water Agencies, this "the language of distribution" remained a key means of cloaking the steady erosion of local control over water resources (Richard and Rieu 2008, 3) as a result of regional reforms.

This strategy enabled the Basin Agencies to incorporate a number of civil society groups, such as the fishermen's associations, into a new decision-making structure which circumvented previously-existing local governments. This approach was reflected by the "largely political" composition of the basin committees, which attempted to carefully balance representatives from central and local government, industry, and other water user groups (Barrque 1995, 443).

Apart from the carefully controlled composition of the basin committees, certain provisions of the 1964 Water Law ensured that the state maintained significant control over the actions of the Basin Agencies. The strong legacy of bureaucracies such as the *grands corps* persuaded the government to retain virtually all enforcement powers in the central state administration rather than in the Basin Agencies (Meublat and Le Lourd 2001, 381). Moreover, land-use and economic planning authority remained vested in

central government bureaucracies, particularly DATAR (Barrque 1995, 450). Central government representatives in the individual departments were accorded *ex officio* seats on the basin committees (Notte and Keesen 2009, 5).

Perhaps most indicative of the central government's desire to assert greater control over local authorities and water resources through the Basin Agencies is the fact that the number of Agencies, six, was determined so that *de facto* control over them could be evenly apportioned among the *grands corps* (Barrque 1995, 442). Even in the Rhone River basin, which had a longer history of regional planning and partial autonomy than any comparable area of France, the *grands corps* remained the dominant political influence towards the end of the twentieth century (Pritchard 2011, 78).

In the decades since they were first implemented, the Basin Agencies have become established actors in the French system of government, and firmly embedded in the vertical structure of power. Members of the *Assemblee nationale* continued to complain that the Water Agencies failed to consult with local officials regarding planning decisions (Journal Officiel 1994, 2207), and the basin commissions continue to fall prey to "a long tradition to let the [central] government decide" matters (Barraque, Maurel and Raymond 2004). Yet the Water Agencies have also developed into genuinely participatory institutions. A 1992 Water Law strengthened the powers of the Basin Agencies, and aimed to increase the accessibility of the "Water Agencies," as they are now called, to civil society participation (Barrque 1995, 445). The Water Agencies have become a significant political force in their own right, and have become loci for regional government activity (Dubois 2001); (Richard and Rieu 2008, 11).

Most significantly, however, the Water Agencies have secured broad legitimacy in French politics by succeeding in capturing regional watershed externalities. In 1992, the Environment Minister was quoted as saying that the river basin agencies were "an original concept that brings together civil servants, engineers, elected officials, and industry. It works so well that Eastern Europe wants to copy us" (Paris L'Express International 1992). The Water Agencies have also been featured as model institutions by the French government abroad (Agence d l'Eau Seine-Normandie 2003). In its present form, the Water Agencies are tasked with developing basin master plans, and include a "water parliament" with representatives of the central and local governments as well as water users. The Parliament advises the technical staff of the water agencies on the development of basin plans as well as water usage tax levies and revenue expenditures.

In this way, the Water Agencies constitute something close to a regional government in parallel with the *regions*. As Jerome Delli Priscoli concludes in his global survey of RBM institutions, "This system is remarkable for its longevity, in how it tries to formalize representation…and perhaps most important, how it has attempted local and decentralized water management within the centralist state tradition in France" (Delli Priscoli 2007, 17). Yet it is not in spite of but rather because of this centralist tradition that the French government was able to create a new regional governance system to capture watershed externalities in the face of strong ties between local governments and industries, and in a manner which maximizes public participation. The strength of vertical relationships in the French unitary system permitted this re-organization, and stymied horizontal opposition among local governments.

Country Case Conclusion

Despite similar underlying political forces and the similar influence of hydro-engineering bureaucracies and environmental advocacy organizations, the French case represents a stark contrast to that of the United States: the central government was able to prevail in undertaking a large-scale reorganization of local government for the purpose of capturing regional-scale river basin externalities. Though opposition was widespread among local governments, the center was able to deny opponents a political arena in which territorial politics could predominate. Instead, this conflict played out at the national level, where local opposition could be more effectively combated.

Moreover, central bureaucracies were able to utilize vertical relationships to co-opt local elites and undermine horizontal inter-jurisdictional alliances thereby, avoiding a reprise of the center's defeat in the *commune* reorganizations. Rather than view regional re-organization as a fundamental threat, these elites came to accept that regionalization could enhance their own powers even as it did those of the center. In a rather ironic twist, however, the French attempt to capture watershed externalities illustrates the importance of constraining sub-national rather than central-level actors in order to control pollution, and the ability of a centralized unitary state to create more powerful, widespread regional governance institutions than its federal counterparts.

Chapter 4. Regional Governance in a Decentralized Unitary System: Centralized Bureaucratic River Basin Management in the People's Republic of China

In this chapter, I examine a case of centralized bureaucratic river basin management in the form of the Yellow River Conservancy Commission (YRCC; *Huanghe Shuili Weiyuanhui* 黄河水利委□会) and within the context of the People's Republic of China's distinctive combination of political centralization and fiscal and administrative decentralization. The Yellow River itself resembles the Colorado River in the United States both in terms of its geomorphic characteristics as well as the acute strains which intensive irrigated agriculture and urban development place upon water availability in the basin. Yet the success of attempts to capture water quantity externalities in the Yellow River basin has been powerfully shaped by the handling of regional-scale issues within the Chinese political system. In the United States, state rivalries consistently undermined attempts to address basin water quantity externalities at regional scales, requiring the Secretary of the Interior to act as a reluctant, *de facto* allocator of Colorado River water. This awkward arrangement, in which neither state nor federal levels possess adequate authority or incentives to capture externalities at a regional, basin-wide scale, continues to exacerbate water scarcity in the Colorado River basin.

In China, on the other hand, the YRCC, a component of the central Ministry of Water Resources (MWR; *Shuili Bu* 水利部), has consistently been able to leverage China's structure of hierarchical political control to address certain basin-wide externality issues, namely those such as flood control, involving the provision of public goods and where the disincentives for inter-jurisdictional cooperation are minimal. However, extensive

fiscal decentralization has led to widespread shirking and non-compliance with centrally-formulated water quality and quantity regulations, in which local officials attempt to shift the cost of compliance to neighboring jurisdictions. This dichotomy illustrates, perhaps more clearly than in any other case, the salience of sub-national territorial politics, and particularly, inter-jurisdictional relationships, in determining the ability of a political system to efficiently capture regional-scale basin externalities. When decentralization has fostered the emergence of divergent, locally-specific interests, management of the Yellow River has suffered, but when the central government has functioned as an effective facilitator of provincial-level action, basin externalities have been effectively addressed.

Country Case Introduction[2]

The People's Republic of China is by far the world's most spatially extensive and populous political system not to employ some form of federalism, Taiwan, Hong Kong, and Macau notwithstanding.[3] Instead, the People's Republic is organized in hierarchical form, with province-, county-, and township-level Type I general-purpose and territorial jurisdictions being both responsible for each subordinate level and responsible to each superior level (Chung 2010). Although autonomous regions enjoy the Constitutional right to legislate in areas such as education and culture, their functional independence is tightly circumscribed by additional legislation and by the inter-locking Chinese Communist Party (CCP) structure, which functionally controls decision-making within

[2] Much of this section is adapted from Scott Moore, "Hydropolitics and Central-Local Relations in China: The Pursuit of Localized Preferences in a Centralized System," *The China Quarterly* [Forthcoming].

[3] Even in the case of Hong Kong policymaking is constrained by mainland supervision. See (Cheung 2007).

each jurisdiction. Type I jurisdictions thus serve goals of administrative expediency rather than political representation or preference aggregation. Accordingly, the Chinese system provides exceedingly few formal mechanisms for inter-jurisdictional cooperation or territorial interest-bargaining between and among Type I jurisdictions. Instead, and in contrast to the American tendency to channel regional issues through a state-based territorial political organization, regional issues in China are accommodated within a vertical, central-local hierarchy dominated by functional-bureaucratic actors.

Although this process results in frequent local non-compliance with central directives, it also presents greater scope for regional-scale externalities to be addressed through consensus-building among elites rather than inter-regional bargaining *per se*. One of the few scholarly studies of Chinese water resource management prior to the 1990s, for example, concludes that "The local party and management committees have dealt with the great majority of…water conflicts on a rather informal basis," and that "By tradition all kinds of conflicts in Chinese society (including water conflicts) have been solved on an informal basis, founded on the striving for consensus" (Gustafsson 1984, 153; 174).

In the field of RBM, this propensity is reflected in the establishment of river basin commissions as "dispatched organs" (*paichujigou* 派出机构) of the central Ministry of Water Resources. These commissions, which include the YRCC, represent an institutional mechanism which in theory provides for efficient capture of regional-scale externalities through basin-wide institutions under the supervision of centralized bureaucracies. However, this potential has been undermined in the Chinese case by the process of economic reform and opening after 1978, as a result of which a variety of

regionally-divergent economic interests have emerged which the Chinese system provides few formal mechanisms to reconcile.

Structure of Decentralized Unitarianism in the People's Republic

From a comparative perspective, the People's Republic of China represents perhaps the world's most distinctive combination of political centralization and fiscal and administrative decentralization. The basic unity of the state, referred to as *Dayitong* (大一统), has long been viewed as the organizing principle of both ancient and modern governance in mainland China, and takes pride of place in Chinese political thought as the basis for the extraordinary longevity of the Chinese state (Y. Wang 2009). At the same time, however, Chinese rulers have always employed extensive delegation of authority to local agents, and the balance of power between central and local political authorities has constantly shifted along with the organization of administrative units (Mostern 2011).

The structure of the contemporary People's Republic embodies this basic dichotomy. Though formally a unitary state, modern China in fact exhibits an exceptionally complex system of sub-national governance shaped by both vertical and horizontal institutional relationships, referred to as *tiao-kuai* (条-块), in which officials at lower levels of government are responsible both to line control by functional bureaucracies, such as the various ministries, as well as to territorial government leaders, including mayors and provincial governors, and to equivalent officials within the parallel CCP structure (Mertha 2005). The relative importance of *tiao* and *kuai* relationships have shifted over time, largely in response to changing central government

policy (L. C. Li 1997), but the overall trend has been toward increased fiscal and administrative decentralization within the context of political centralization.

This trend has altered the character of Chinese central-local relations, adding a distinctly lateral dimension to a fundamentally hierarchical system. The prevailing understanding of Chinese politics and policymaking has been the Fragmented Authoritarianism (FA) model, in which policy represents the results of bargaining, negotiation, and consensus among factional interests concentrated at the central government level, many of which correspond to bureaucratic units (Lieberthal 1992); (Mertha 2008, 5). Although the original description of the model relied strongly on bargaining between functional-bureaucratic interests within the central government, more recent articulations emphasize the greater though still limited role of peripheral officials, media, and non-governmental organizations in certain policy areas (Mertha 2009). An important though largely un-appreciated aspect of this increasing pluralization of Chinese politics and policymaking is the growing role of sub-national officials and the horizontal ties which bind them.

To some extent, these officials have always played a critical role in governance under the People's Republic. Maoist principles of implementing centrally-formulated policies while being sensitive to local conditions (*yindi zhiyi* 因地制宜), combined with the practice of non-interference in subordinate-level administration, have always resulted in substantial variation and deviation in policy implementation, for example (Remnick 2002); (Donaldson 2010). Sub-national officials have moreover consistently demonstrated their capacity and willingness to manipulate central policymaking. Throughout the 1960s and 1970s, provincial governments regularly mis-reported

statistics to justify larger budget requests from the central government, and many recent accounts emphasize the selective implementation of policies at local levels (Donnithorne and Lardy 1975); (O'Brien and Li 1991).

These tendencies have been greatly enhanced, however, by the post-1978 process of economic reform, under which revenue and expenditure powers have been progressively transferred to sub-national levels of government. Local governments were granted a wide berth with respect to enterprises in their own jurisdictions, creating new revenue streams and fostering horizontal relationships outside the vertical state hierarchy (Oksenberg and Tong 1991); (Oi 1995); (D. Yang 2004). This process has created an acute symbiosis between local government officials and the enterprises within their jurisdictions, particularly the many which are state-owned. A recent news report on pollution in a large town in Anhui Province, for example, describes a situation in which regulation is lax because "the government and the town's largest employer are all but indistinguishable" (Stanway 2012). The fiscal and administrative independence of local government has been partially circumscribed since 1978 by the practice of directly financing some localities from the central treasury (*jihua danlie shi* □划□列市), as well as a 1994 reform which re-centralized the majority of revenue collection while leaving expenditure mainly in the hands of sub-national jurisdictions (Solinger 1996); (Naughton 2007). Overall, however, China remains one of the most fiscally decentralized countries in the world (Dziobek, Mangas and Kufa 2011).

This fiscal decentralization has created a growing problem of central control at local levels, driven largely by increasingly divergent economic interests. As Dali Yang notes, "The theory of agency predicts that once local governments are given de facto

possession of property rights, including part of the fiscal revenue stream, they would pursue local interests" (D. Yang 1997, 44). There are two major sources for this tendency. First, because a fiscally decentralized system requires the expenditure of sub-national funds for policy implementation, leaders are often called upon to justify these expenses in local political contexts (Hendrischke 1999, 14).

Second, the close relationships between local governments and enterprises encouraged under economic reform create a political imperative for sub-national leaders to be receptive to economic interests in their jurisdiction. As Yumin Sheng argues, "Other things being equal, a regional government tends to be sympathetic with the dominant economic interest in its jurisdiction because of the latter's vital role in the regional economy…they thus should enjoy a more 'privileged' political status in the region" (Sheng 2010, 30). These localized economic interests are evident in the increased incidence of lobbying by provincial officials seeking preferential treatment in major policy decisions (Holbig 2004), and broadly correspond to spatial variation in Chinese economic activity.

Such spatial variation represents the combined effect both of differential natural resource endowments and conscious economic policy decisions. China's water resources, in particular, are plentiful in the south and northeast but scarce in the north and north-west, with the result that irrigation and cropping patterns created a historic north-south economic divide (Nickum 1998). More recently, China has intentionally adopted a growth-pole strategy for economic reform, in which development is expected to diffuse from the coasts inland, creating a stark discrepancy in economic development levels (Hoiki 2005). In concert, this spatial variation has the effect of reinforcing local

economic protectionism and stimulating the emergence of regionally-distinctive territorial economic interests. These are particularly acute with respect to critical resources such as water. As Yehua Wei explains, "Decentralization and different economic systems stimulated direct regional conflicts in economic development. Considering themselves unfairly treated by the central government, local governments…use their increased administrative powers to protect their resources and markets," in some cases provoking "resource wars" (Wei 2000, 94).

Nevertheless, the Chinese system attempts to contain such localized interests, and the potential for central-local preference divergence which they represent, through a system of vertical control (X. Wang 2002). As Pierre Landry writes, this system "organizes a de-concentration of powers away from the center, but falls well short of granting true local autonomy" (Landry 2008, 54). This system of vertical integration is underpinned by several specific central control and supervision mechanisms. First, the central party leadership controls the appointment and advancement of leaders immediately below, who in turn control personnel management for successive subsidiary levels (Burns 1994); (Brodsgarrd 2002); (Landry 2008, 50-57). Moreover, higher-level cadres are periodically rotated to different jurisdictions in an attempt to discourage them from building independent local power bases (O'Brien and Li 1991, 173). Thus, despite the emergence of distinctive and divergent local economic interests, central-local preference divergence is highly circumscribed.

This effect is strengthened by a second central control mechanism, namely the elaborate system for evaluating cadres on the basis of centrally-formulated performance targets, a practice known as *kaohe* (考核), which guides local administration and

expenditure decisions and provide a means of fulfilling central priorities even in the absence of direct control (Tsui and Wang 2004). The net effect of these mechanisms is to exclude consideration of local preferences in the selection of leaders at all but the lowest levels (Bo 2002); (Shih, Adolph and Liu 2012), and to severely limit their incentives and ability to develop preferences which diverge from those of the center (Huang 1995); (Z. Yang 1996); (Edin 2003). Recent shifts in the political emphasis of hierarchical *tiao* relationships relative to localized *kuai* ties help to ensure that sub-national leaders are "firmly integrated into the ruling establishment" (Lam 2010, 341). These central control mechanisms act to contain the emergence of distinctive regional politics, but do little to address the increasingly divergent territorial interests which have emerged in the period of economic opening and reform after 1978.

Water Resource Management as a Core Central Government Function in China[4]

In contrast to the American case, the Chinese central government retains firm legal, functional, and political control over water resource management issues. Nonetheless, fiscal and administrative decentralization has resulted in major difficulties in capturing regional-scale water quantity and quality externalities. Only when the center has exploited its extensive political control mechanisms to facilitate inter-regional bargaining has it overcome these challenges. This observation is particularly notable in light of the fact that construction and operation of water works, most notably for flood control, has been a core central government function in China for centuries and perhaps even millennia (Chi 1963). Such strong involvement of the central government in water resources has persisted into the modern era. A particularly disastrous 1938 flood, which

[4] Much of this section is adapted from Scott Moore, "Water Resource Issues, Policy and Politics in China," *Brookings Issue Brief*, February 2013.

killed nearly a million people, weighed heavily on both Nationalist and Communist leaders, ensuring that water resource issues received special attention in postwar policymaking (Gustafsson 1984, 67).

After 1949, the newly-established People's Republic expanded earlier Nationalist regional economic development plans by proposing a profusion of new dams, reservoirs, and other waterworks in major river basins (Kirby 1990). Perhaps the best example is a 1954 Yellow River basin development plan (*Huanghe Zonghe Liyong Guihua Jishu Jingji Baogao* 黄河□合利用□划技□□□□告), which proposed a number of dams for hydropower generation, flood control, and irrigation along the upper and middle reaches of the Yellow (Xinjiang Weiwuer Zizhiqu Dangwei Xuanquanbu Zhuban [Xinjiang Uighur Autonomous Region Party Committee Propaganda Office] 2009). Planning and construction of several of these waterworks represented some of the Communist government's most important activities during the 1950s and 1960s.

During the past decade, water pollution and dam construction have emerged as social issues, and media and civil society groups have been occasionally successful in influencing policy decisions regarding these two issues (Mertha and Lowry 2006); (Mertha 2008). In large urban areas and increasingly in rural areas as well, the private sector constitutes an important source of investment in the water sector, and in some cases is directly responsible for the operations of water supply and treatment systems (Qi 2011, 67). Nonetheless, water resource management remains overwhelmingly dominated by bureaucratic actors at both the central and sub-national levels of government.

The most important of these actors is the central Ministry of Water Resources (MWR), formerly the Ministry of Water and Power. As this re-naming suggests, at various times in its history the ministry has been responsible for energy and electricity production, but its present responsibilities include the planning, finance, and construction of major water infrastructure projects, including dams, reservoirs, and irrigation systems, the formulation of plans and regulations concerning water use and allocation, providing input on water quality issues, overseeing the implementation of water pricing, collecting and maintaining hydrological data, soil conservation, and flood control (Ministry of Water Resources 2012). The Ministry of Environmental Protection (MEP; *Huanjing Baohu Bu* 环境保护部) has general responsibility for pollution control, while various other bureaucracies play minor roles in particular river basin externality issues. For instance, the Ministry of Agriculture provides input on irrigation systems, the Ministry of Commerce on navigation issues, and the State Forestry Bureau has implementation responsibilities for soil erosion control.

In practical terms, however, sub-national bureaucratic entities are of equal importance. Indeed, province-level governments possess the same status as central ministries like MWR. Every province-level government has a water resource management bureau whose functions broadly match those of the central MWR, and most county-level governments also possess a functional bureaucracy whose responsibilities typically encompass water resource conservation, protection, flood control, irrigation, and water supply (Liu and Speed 2010, 12). Less commonly, these local entities possess water resource management and planning functions (Ministry of Commerce 2002). In addition to these Type I jurisdictional entities, various water-related

Type II special-purpose jurisdictions exist, including dike maintenance committees, irrigation and reservoir district committees, and water user associations, though these usually feature representation from Type I jurisdictional officials (Hubei Sheng Huanggang Diqu Shuili Dianli Ju [Huanggang Prefecture, Hubei Bureau of Water Conservancy and Electric Power] 1977). It is important to note that despite this multitude of local-level actors, a recent trend towards administrative and fiscal centralization at the provincial level means that provincial governments are the principal sub-national actors in RBM (Mertha 2005).

Equally important, however, is the importance of gaining approval from the center for all major policy decisions, particularly those concerning water resource project construction. All such decisions must be approved both by the formal state apparatus as well as be sanctioned by a parallel and inter-locking but more informal CCP structure. Within the formal state structure, the principal entity is the State Council (*Guowuyuan* 国务院), which is analogous to a cabinet, and major projects must also be approved by the State Planning Commission (*Guojia Jihua Weiyuanhui* 国家计划委员会) or its successor, the National Development and Reform Commission (NDRC; *Fagaiwei* 发改委). The largest, most important, and contentious water resource issues, including the Three Gorges and South-North Water Transfer Projects, are also ratified by the CCP Politburo or its Standing Committee (*Zhongguo Gongchandang Zhongyang Zhengzhi Ju* 中国共□党中央政治局), each of which is composed of the most senior Party leaders. Though primarily consultative bodies, the National People's Congress and the China People's Political Consultative Committee, collectively known as the "two congresses," (*lianghui* 两会) occasionally play a notable role in water resource issues. Sub-national authorities

have occasionally employed them as lobbying fora, and in 1989 renegade People's Congress delegates came close to de-railing the Three Gorges project (He and Si 1994, 25). Unlike in the American case, the judiciary plays almost no role in water resource issues.

Since 1978, legislative and institutional reforms have generally strengthened the center's role in water resource management. Article 9 of the 1982 Constitution provides that water is the property of the State, as well as in the development of institutions intended to coordinate the development of specific river basins under central direction. The YRCC was created in its present form in 1950 under State Council mandate as the People's Republic's first river basin governance institution, and was placed directly under the central government out of a desire that it "be free of entanglements and squabbles between provincial governments" (Greer 1979, 41). Similar commissions were established in China's other major river basins as well as in Lake Tai, the last established in 1984.

Although not regulatory agencies like the French Water Agencies, the legal authority of the River Basin Commissions (RBCs) has been progressively strengthened, including via the 1997 Flood Control Law and the 2002 Water Law, which granted the RBCs the authority to develop basin-wide water resource development and water allocation plans. In addition, an extensive infrastructure exists for emergency management in the case of drought, flooding or other emergencies, in which the central government can bypass the standard hierarchy and take charge of local authorities (Zhonghua Renmin Gongheguo Zhongyang Renmin Zhengfu [Central People's Government of the PRC] 2006). Notably, in a further reflection of the center's strong role

in water resource issues, the RBCs do not include provincial government representatives, despite possessing authority over them (Shen 2009, 488-492). The establishment of these RBCs under the authority of MWR has ensured that the central government retains formal, functional bureaucratic control of water resource issues, in stark contrast to the American case.

Somewhat paradoxically, this centralized orientation has been accompanied by a strong bias toward regional-scale institution-building, an aspect which again contrasts with the American case. This regional bias has been especially pronounced with respect to water quality issues -- less than half of river water can be treated to the point where it is safe for drinking, and a quarter of surface waters are so polluted that they are unfit even for industrial use (Stanway 2012b). In response, the Ministry of Environmental Protection has established Regional Supervision Centers in order to supervise province-level governments in particular geographic areas (Moore 2010/2011), while joint MWR-MEP water quality bureaus have been created within the RBCs in order to more effectively supervise provincial-level authorities within river basins (Shen 2009, 495).

In addition, the 2008 Water Pollution Law mandated water resource planning on a regional rather than jurisdiction-by-jurisdiction basis (Wouters, et al. 2004); (Shen 2009), and recent attempts to develop inter-provincial pollution compensation mechanisms reinforce the central government's attempts to tackle regional-scale externalities (Xinhua 2012). This regional-scale orientation, though marked, reflects less a deliberate central strategy than a reaction to pervasive problems of local control and inter-jurisdictional disputes regarding water resources.

Central-Local Preference Divergence and Inter-Jurisdictional Water Resource Disputes[5]

These tensions are most evident in a growing number of trans-boundary water disputes (*kua xingzheng quyu de shuishi jiufen* 跨行政区域的水事纠纷) between administrative jurisdictions, which have arisen chiefly as a result of divergent economic interests (Li, Liu and Huang 2010). As a Wuhan University Law School study remarks, these disputes are characterized by "a close relationship to local economies and local-benefit thinking on the part of some local governments [*bendi liyi de kaolu* 本地利益的考虑]" (B. Zhang 2009). These locally-divergent economic interests are the product of several aspects of fiscal decentralization and economic reform. Local governments, which typically bear operational responsibility for water pollution control and water allocation, are generally reluctant to enforce regulations strictly since industrial enterprises typically compromise the majority of the local government revenue base (Jahiel 1997); (Ge and Ma 2008, 41). Consequently, the preferences of the central and local levels regarding certain water resource issues, especially those related to water quality, increasingly diverge, as do those between administrative jurisdictions themselves.

Such regional conflicts are especially evident in trans-jurisdictional water quality disputes, which are pervasive in all developed areas of China. Such disputes arise from an "insufficient impetus to local pollution control and a tendency towards transferring pollution cost to lower reaches" (Y. Wang 2007, 402), which some commentators advocate addressing by "making environmental law enforcement as hard as iron" (*huanbao zhifa yaoxiang gangtie yiyangying* □保□法要像□□一□硬) (Ge and Ma 2008, 42).

[5] Much of this section is adapted from Scott Moore, "Hydropolitics and Central-Local Relations in China: The Pursuit of Localized Preferences in a Centralized System," *The China Quarterly* [Forthcoming].

Yet disputes persist largely because of the lack of formal mechanisms for basin-wide, inter-jurisdictional cooperation, communication, and bargaining within the Chinese political system. China's principal water resource legislation articulates only general principles for resolving inter-governmental disputes through "negotiation and consultation" (RMIT International 2003, 51-52), and the National People's Congress has developed special instructions on dealing with trans-jurisdictional water pollution disputes which indicate that higher-level governments should issue binding directives only when efforts at informal negotiation fail (Guojia Renda [National People's Congress] 2002).

The weakness of these provisions means that local authorities rarely conclude agreements regarding trans-jurisdictional disputes, instead adopting an attitude of 'sweeping only their own doorstep' [*zisaomenqianxue* 自□□前雪] (H. Peng 2009, 37). Attempts to promote cooperation through establishing inter-governmental "Leading Groups" in the Huai and Song-Liao Basins have generally been ineffective in arresting local protectionism (Y. Wang 2007, 406). Such divergent local behavior is overcome only by determined central involvement in resolving inter-jurisdictional water resource disputes.

In the Hai River basin, for example, Beijing and Hebei Province had long been at odds over both water quantity and quality issues upstream of the capital's primary drinking water reservoirs. The direct and sustained involvement of the State Council, stimulated by special status of Beijing as the capital city as well as the need to secure water supplies for the Olympics, resulted in the creation of an eco-compensation scheme in which Beijing spent some 100 million RBM to finance water conservation and

pollution control projects in Hebei. In particular, farmers in the headwaters regions were paid to abandon water-intensive modes of irrigation as well as fertilizer use. Critically, however, these initiatives were adopted and sustained as a result of pressure from the State Council (Svensson 2010, 31-38).

Centrally-facilitated inter-regional bargaining between divergent local preferences for water is even more dramatically illustrated by the Three Gorges Project (*Sanxia gongcheng* 三峡工程). This gigantic engineering project was very nearly de-railed by conflict both between elements of the central bureaucracy, but also between provincial governments. While downstream provinces, including Hubei and Hunan, strongly supported a single high dam for flood control reasons, Sichuan preferred a series of smaller dams further up the river to reduce the area of the province which would be inundated (Lieberthal and Oksenberg 1988); (Lieberthal 1993); (P. Zhou 1994). Sichuan provincial leaders only agreed to support the project in exchange for an $18.5 billion central government investment in the province (Hong 1997, 215).

A similar role has been played by the center with respect to the South-North Water Transfer Project (SNWTP). Many of the water-exporting regions complained about the costs imposed by the project, and as a result the central government has financed water infrastructure projects to augment water supplies in exporting regions as well as to install pollution control systems along the water transfer routes (Zhongguo Huanjingbao [China Environment Report] 2008). Only through such measures has the acquiescence of local authorities in centrally-formulated water resource policies been secured.

In spite of the success of such centrally-directed inter-regional bargaining, its costs are obvious. Arbitration between competing regional demands is arduous and time-consuming, and in the case of major projects can represent a very considerable investment of resources on the part of the central government. As David Lampton writes, "Leaders of superordinate territorial units are reluctant to impose severe costs on subordinate levels. Consequently, in water policy, where the effect of any decision to take, divert, impound, or allocate water or its derivative products inevitably affects a multitude of territorial units, one finds policy and projects slowed down by the need to build a consensus among the affected units" (Lampton 1987, 170).

Despite China's intensive political centralization and the center's long history of functional bureaucratic control over water resource issues, fiscal and administrative decentralization has induced a divergence in preferences between the center and local levels, and undermined the former's ability to capture regional-scale basin externalities. Only when the center has deliberately facilitated inter-regional bargaining have such issues been addressed, a point illustrated in the history of centralized bureaucratic management of the Yellow River basin.

Centralized Bureaucratic Management of the Yellow River Basin

The Yellow River is the dominant natural feature of the arid North China Plain, an area that has long been regarded as the cradle of Chinese civilization, and which remains the nexus of political activity under the People's Republic. In its morphology and economic characteristics the Yellow bears striking resemblance to the Colorado River. As with the Colorado, the threat of flooding provided an initial impetus for government involvement in Yellow River basin management, which has in more recent

decades been superseded as a basic management issue by acute water scarcity as a result of intensive irrigation.

Unlike in the American case, however, the Chinese central government has long been intimately involved in management of the Yellow River basin as a whole, exercising basin management functions through an arm of a central bureaucracy, the Ministry of Water Resources (MWR). A powerful, long-standing basin-scale governance institution under MWR, the Yellow River Conservancy Commission (YRCC) has played a leading role in addressing basin-scale externalities since the creation of the People's Republic. In recent years, however, fiscal and economic decentralization has created greater problems of central control over local authorities, which increasingly pursue divergent economic interests along an upstream-downstream axis.

As in the case of the Colorado River, I describe this case in multiple time periods, corresponding to the two major epochs in the political and economic history of the People's Republic: 1949 until the inauguration of economic reform and opening in 1978, and the recent period of economic reform, 1979-2009. I address recent developments up to the present in an Epilogue. This partition indicates that divergent, geographically-defined local interests have always existed, but have become far more pronounced as a result of fiscal and administrative decentralization. Also as in the American case, I describe the behavior of the central and provincial-level governments separately in order to address both central-local and local-local relationships.

Following conventional practice, I further divide provincial-level jurisdictions into three categories: Lower-Reaches (*xiayou* 下游), including Shandong, Henan, and Hebei Provinces as well as Beijing and Tianjin Municipalities, which I include because of

their importance in light of the SNWTP; the Middle-Reaches (*zhongyou* 中游), including Henan, Shanxi and Shaanxi Provinces; and finally the Upper-Reaches (*shangyou* 上游), including the Inner Mongolia and Ningxia Autonomous Regions as well as Gansu, Sichuan, and Qinghai Provinces (Giordano, et al. 2004, 2). Henan, uniquely, bestrides both the Lower and Middle Reaches, and so is addressed in both those sections. As in the Colorado case, these regional groupings are differentiated primarily by geographically-defined economic interests, but the impact of this preference divergence on basin externality issues has been mediated by the role of the YRCC in facilitating inter-regional bargaining.

Yellow River Case Introduction

The Yellow River basin, though entirely contained within the People's Republic of China, spans seven provinces and two autonomous regions, with the basin as a whole encompassing about 10% of China's population (Cheng 2008, 189). The Upper and Middle Reaches contribute the majority of the Yellow's flow, with the dominant contribution being made by Qinghai Province. The basin produces the majority of China's wheat, approximately half its coal, some 25% of its oil, and encompasses the country's principal north-south and east-west land transport links (Giordano, et al. 2004, 5-6). The two largest tributaries, the Wei and Fen Rivers, are also of considerable economic importance to Shaanxi and Shanxi Provinces, respectively. As a whole, the Yellow River basin constitutes a Type II geometry, with basin political jurisdictions oriented on an upstream-downstream basis (see Figure 9).

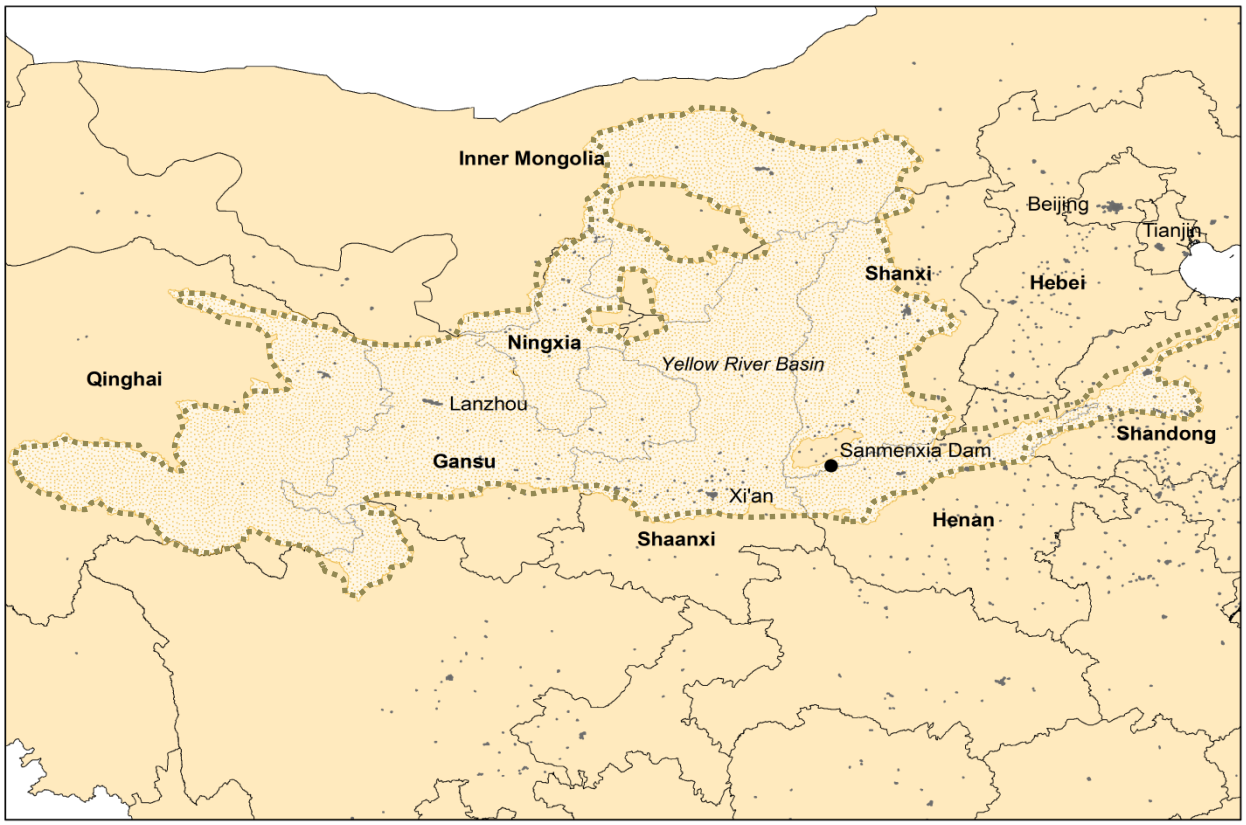


Figure 9: Physical and Political Features of the Yellow River Basin

The river also forms the boundary between Shaanxi and Shanxi Provinces, thereby manifesting a Type I geometry with respect to these two jurisdictions. In general, however, the Type II geometry of the Yellow River basin has created basin-wide negative externality issues in which sediment transport and non-return-flow irrigation on the middle reaches has created problems of acute water scarcity and quality in the lower reaches, requiring regional-scale institution-building to address.

In this geo-political configuration, the Yellow River basin bears several important similarities with the Colorado. Both rivers depend on snowmelt for a large a large portion of its total flow, and both drain low-lying, arid to semiarid basins which are prone to erosion and sedimentation. The two basins are also similar in size and in the number of large reservoirs each possesses, though precipitation and sediment discharges

are substantially higher in the Yellow than in the Colorado River basins (Osterkamp and Gray 2003, 1-3). These high sediment loads have shifted the river's course over time, leading farmers dependent on the rich alluvial soils to build an elaborate system of dikes which has in turn elevated the bed of the Yellow relative to the surrounding farmland, and has created a substantial risk of flooding. Consequently, flood control has traditionally been the dominant externality issue in the Yellow River basin, with government intervention historically focused on ensuring the durability of dikes and water diversion works (Giordano, et al. 2004, 4; 10).

Nonetheless, similarities between the two basins in terms of water use have also produced corresponding sets of coupled water quantity-quality externality issues. Water resource distributions are highly uneven along the length of each river, basin water resources are extremely limited in comparison to the populations which depend on them, and irrigation water use accounts for approximately 80% of total withdrawals in both the Yellow and Colorado River Basins (Giordano, et al. 2004, 3); (Boyle 2005, 15). As in the Colorado, intensive irrigation and increasing aridity have led to the emergence of significant water scarcity issues, which also serve to exacerbate water pollution by preventing dilution of pollutant loads. These externalities are most dramatically illustrated by a phenomenon known as "desiccation of the Yellow" or *Huangehe duanliu* (黄河断流), in which the Yellow fails to reach the sea. From 1995-1998, the Yellow failed to reach the sea for about 120 days each year, and did not even reach Shandong Province, devastating riverine ecosystems in the lower reaches (Giordano, et al. 2004, 19). Recent institutional reform in the Yellow River basin has focused on addressing these coupled water quantity-quality basin externalities.

Basin Management Institutions

In another parallel with the case of the Colorado River, water scarcity issues in the Yellow River Basin have been addressed principally by allocating water resources between provincial-level jurisdictions. Unlike the Colorado case, however, this task has been undertaken in the Yellow River basin through centralized bureaucratic management rather than inter-jurisdictional bargaining and conflict. Instead, political conflict in the basin took the form of functional-bureaucratic disputes within the central-local hierarchy. As Charles Greer, one of modern China's earliest observers of water resource politics, writes, "Administrative problems arose because the YRCC superseded provincial governments, but it came into conflict with other agencies of the central government…Its various project bureaus were little more than advisory adjuncts to project bureaus of the Ministry of Water Conservancy or the State Council. Thus the YRCC functioned more as an interagency coordinating unit than as a strong and autonomous executive unit for basin development" (Greer 1979, 75).

Nonetheless, this position enabled the YRCC to conclude a durable inter-provincial basin water resource allocation agreements. Beginning in the early 1980s, increasing tensions between water users in the Yellow River basin led the central government to attempt to devise an inter-provincial water allocation plan. The basis of this plan, which was formulated by the then-Ministry of Water and Power (MWP) and approved by the State Council in 1987, were extensive consultations with provincial governments on present and projected water needs (see Figure 10) (Guowuyuan [State Council] 1987); (D. Li 2010).

Figure 10: Yellow River Available Water Quantity Allocation Plan (Prior to SNWTP) (Hundred Million m³)

Area	Qinghai	Sichuan	Gansu	Ningxia	Inner Mongolia	Shaanxi	Shanxi	Henan	Shandong	Hebei & Tianjin	Total
Annual Water Quantity	14.1	0.4	30.4	40.0	58.6	38.0	43.1	55.4	70.0	20.0	370.0

Such measures, pursued chiefly by centralized bureaucracies led by the YRCC, have successfully addressed some of the Yellow River basin's most long-standing and pressing issues; disastrous flooding has been avoided, and the desiccation of the lower Yellow River has been effectively halted, with the river reaching the sea every year since 1999. However, this mode of centralized bureaucratic management has been possible only because water resource management in the Yellow River basin is almost entirely a state function; all dams and reservoirs on the main stem of the river are state-owned, and flow rates are maintained through administrative orders issued to dam and reservoir operators by the YRCC without economic compensation, despite the high costs thereby imposed (Yang and Jia 2008, 270). Management of the Yellow River Basin therefore represents a nearly pure example of addressing basin-wide externality issues through centralized functional-bureaucratic management.

Despite the basic success of this approach, some basin externality issues remain un-captured. Basin water resources remain over-allocated, meaning that projected increases in water demand for urban and energy production uses must be accommodated through reductions in other uses. Ecological flows are virtually non-

existent, constituting a further water quantity externality issue (Giordano, et al. 2004, 20). The difficulty of efficiently allocating basin water resources is due at least in part to circumvention of water allocation regulations by local governments. Inter-jurisdictional cooperation issues are an even more significant barrier to redressing water quality externalities. An Asian Development Bank (ADB) report, for example, blamed the "overwhelming protectionism exercised by local governments" for the Yellow River's acute water quality issues, with over 60% of monitored sections of the river at or below Grade V, the lowest level of water quality (RMIT International 2003, 27; 6).

It is telling that the primary difficulties in addressing basin externalities through centralized management arise where the center's control is weakest, namely in inter-jurisdictional relationships between province-level governments in the basin. This observation indicates that despite the almost complete formal control possessed by the state over all aspects of water resource management in the Yellow River basin, inter-jurisdictional relationships have been most determinative in mediating basin management outcomes. This familiar dynamic, in which water resources are allocated through political rather than economic means, echoes the case of the Colorado River, where once again divergent preferences are defined primarily by geography.

Sub-national Territorial Politics of the Yellow River Basin

The *tiao-kuai* system ensures that functional-bureaucratic rivalry plays a larger role in the case of the Yellow River than that of the Colorado. In particular, early dam and reservoir construction was marked by bitter infighting between various central bureaucracies. MWR's predecessor was called the Ministry of Water Resources and Electric Power (MWP), and those elements of the Ministry concerned with water

quantity issues typically opposed those concerned with hydropower production; indeed the durability of such conflicts led to the creation of MWR and the transfer of the energy portfolio to other bureaucracies (Lieberthal and Oksenberg 1988, 284). Unlike the American case, moreover, there is essentially no divergence between national- and sub-national water resource legislation, and those elements of provincial- and county-level government concerned with water resources are formally subject to central bureaucratic supervision and direction (Shaanxi Province General Office 2008).

Nonetheless, territorial politics are very much in evidence, with provincial-level jurisdictions in the Upper, Middle, and Lower Reaches pursuing divergent preferences which have mediated outcomes in Yellow River basin management. As an ADB report remarks, "Due to the lack of consideration of local characteristics in local legislation, the water resource protection systems of the upstream, middle stream, and downstream of the Yellow River lack variety that reflect local river conditions and therefore have detrimental effects on the water resource protection of the Yellow River basin" (RMIT International 2003, 67-69).

As in the Colorado River basin, the basis of divergent local preferences lies in an upstream-downstream dichotomy. The dominant concerns for the Lower Reaches have traditionally been flooding and siltation (Greer 1979, 14), as well as water scarcity and quality in recent decades, which increasingly involve urban drinking water demands for Beijing and Tianjin. For the Middle and Upper Reaches, water quantity issues are pre-eminent. Both regions have witnessed dramatic increases in consumptive water demand for all water uses, but particularly for industrial and domestic purposes. In the Middle Reaches, industrial water use grew from 0.38 to 1.6 billion m^3 from 1988-2004, while

domestic consumption increased from 0.28 to 1.37 billion m^3 over the same period. Similar increases were recorded for the Upper Reaches (Yang and Jia 2008, 269). Hydropower is a particularly important issue for the Upper Reaches in light of a number of proposed hydroelectric power plants and the central government's Great Western Development strategy.

These regionally-divergent economic interests have produced durable and distinctive behaviors on the part of provincial-level actors. Lower-Reach leaders tend to oppose project development on the Upper and Middle Reaches, and to complain about flooding and siltation issues. In recent years, major planned developments in the Upper Reaches have produced a similar oppositional dynamic between it and the Middle Reaches, within which Henan in particular sees itself as the political, economic, and cultural heart of the Yellow River basin (Bian 2008). This basic geographic divide has been modulated only by the extent of central government involvement in Yellow River basin management issues.

The means by which the sub-national governments of the Yellow River basin pursue these geographically-differentiated interests is through informal lobbying rather than the visible confrontations evident in the Colorado River case. As noted above, the Chinese system provides very few formal mechanisms for inter-regional bargaining, and as a result regional water resource interests are addressed primarily through informal bargaining within the CCP (Gustafsson 1984, 153). Accordingly, the crucial actors are sub-national leaders, who act as preference-aggregators within their jurisdictions.

Though not directly accountable to particular interests within these jurisdictions, the *kaohe* system as well as revenue-decentralization ensures that local leaders do

prioritize economic constituency interests, particularly those of state-owned enterprises, with which local leaders often form clientalistic ties (Z. He 2000, 247). This phenomenon is also illustrated by the comments of a Ningxia deputy to the National People's Congress. Though unelected, the deputy claimed to be "duty-bound [*zewu pangdai* □无旁贷] to help advance Ningxia's socioeconomic development" (Ningxia Ribao [Ningxia Daily] 2010).

Sub-national leaders in China also generally function as output-maximizers, seeking to secure the highest possible outlays from the central government for public works projects within their jurisdictions. This is particularly evident in the case of water resources projects, wherein provincial-level leaders enthusiastically lobby elements of the central bureaucracy, especially MWR and the National People's Congress, for money to fulfill national development objectives (Xinhua 2012). Thus despite the tremendous differences between the American and Chinese political systems, the geographically-differentiated interests of sub-national government actors have critically shaped the outcome of attempts to capture regional-scale externalities in the Yellow River basin as well as in the Colorado.

Constructing a Socialist State by Conquering the Yellow: 1949-1978

During the first phase of Yellow River management under the People's Republic, the basin was the locus of a large and politically resonant effort to provide public goods in the form of flood control, address the downstream externalities created by excessive siltation, and to promote economic development through a program of multi-purpose water project construction. Because of the historical and cultural importance of the Yellow River basin, CCP leaders devoted special attention to achieving these goals in a

comprehensive, integrated manner, and under its direct supervision. From a central-local relations perspective, this objective should have been achievable. Not only was policymaking integrated within a basin-wide institution, the YRCC, which enjoyed precedence over sub-national governments, but the center was particularly strong in the early period of the People's Republic. As John Donaldson remarks, during the Maoist era the provinces' "primary function was to serve as a conduit for central decrees" (Donaldson 2010, 23).

Yet despite this model of intensive central bureaucratic management, the center relied heavily on provincial- and local-level governments to pursue its objectives. Provinces in particular, being left largely to their own devices in the implementation of central policies, both developed their own preferences with respect to water resource control and management, and evolved substantial capacity to pursue these individual preferences even within the central-local hierarchy.

PRC Central Government

Building on a long history of public financing for irrigation and water control systems, the new PRC government viewed water resource development as the foundation of economic development for what Party leaders called "New China." In 1949, Premier Zhou Enlai, proclaiming China to be an "agricultural superpower," told a water conservancy conference that "to enrich the nation and benefit the people, we must start constructing water conservation works" (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 82). At the same time, the Yellow River basin emerged as a special focus of CCP leaders' attention. CCP Chairman Mao Zedong, who as a military commander had fallen victim to the deliberate inundation of floodplains along the Yellow River by both

Japanese and Nationalist forces during the Second World War, was known to harbor a particular interest in controlling the river's waters.

This experience was bolstered by the cultural symbolism of the Yellow River as the cradle of Chinese civilization, with which Mao was well acquainted. In 1947, Mao exclaimed that "Without the Yellow River we don't have our race!" Building on such sentiments, by the time the People's Republic was established Mao had determined that the new regime's legitimacy would be greatly bolstered by developing the Yellow River basin (Huanghhe Shuili Weiyuan Hui Huanghezhi Zongbian Shi [YRCC] 1994, 201-202).

The tremendous political significance of Yellow River basin development for the PRC central government carried over into several conferences in the early years of the People's Republic, which articulated basic central policy objectives in the basin. A 1949 water conservancy conference in Beijing outlined a principle of coordinated, integrated development in which flood control, irrigation development, and hydropower development should all be undertaken through basin-wide planning and multi-purpose project construction. At the same time, a 1950 conference placed specific emphasis on addressing the politically important issues of flooding and irrigation, proposing that the object of Yellow River development should lie in "turning the Yellow from a river of disaster into one of benefit" (*bianzaihe dao lihe* □灾河到利河). Following the Korean War, development of the Yellow River basin gained even greater political salience as a means of "Bringing peace and stability to the country" (*anbang dingguo* 安邦定国) (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 82; 85). The intimate involvement of the CCP leadership in Yellow River development is indicated by the fact that special emphasis

was placed on dam construction because of Mao's intense personal interest in the subject (W. Wang 2002, 90).

Because the CCP leadership sought not only to control flooding but also to make the Yellow River basin a showcase of socialist development policy, they were adamant that river basin externality issues be tackled in an integrated manner and under centralized bureaucratic direction. An early official publication expressed the need to "find a thorough and comprehensive solution" to the problem of flooding and siltation through "large state investments, the support of the masses, and all-round cooperation between government and people" (Teng 1955, 24-28). In 1954, the State Planning Commission commissioned a report on the comprehensive development of the Yellow River, which proposed the construction of 46 dams along the whole length of the river for flood and erosion control, irrigation and hydropower development. A YRCC history leaves little doubt as to the scale of these ambitions, and the priority to which the PRC central government attached to them: "In short, we wanted to conquer the Yellow, and transform the Yellow Basin's natural condition…in order to satisfy with Yellow River resources the demands of socialist construction and the coming Communist transformation of the national economy" (Huanghe Shuili Weiyuanhui [YRCC] 1991, 121).

Given these transformative objectives, the PRC central government undertook to establish integrated, regional-scale institutional mechanisms for management of the Yellow. In 1950, MWR issued directions stipulating that the YRCC would act as a basin-scale management institution (*liuyuxing jigou* 流域形机构), with the governments of the riparian provinces acting subject to its direction (Shuilibu Huanghe Shuili Weiyuanhui

[YRCC] 2006, 83). The organization of the YRCC in the year 1950 reveals much about the manner in which relationships with the provinces were intended to be managed (see Figure 11). Particularly evident is the importance given to the Lower Reaches, with both Shandong and Henan Provinces being granted their own dedicated bureaus. Project management bureaus were created for planned major developments in the Middle and Upper Reaches, along with a range of administrative offices and sections. Also worthy of note is the creation of a Technical School, which would play a significant role in future debates over site selection and construction of dams in the Middle and Upper Reaches. Thus constituted, the YRCC in 1950 represented a technocratic bureaucracy focused on capital project construction throughout the basin.

This emphasis on basin-wide institutional management was strengthened by a 1952 State Council decision calling for basin-wide planning (*liuyu guihua* 流域□划) (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 83-87). The central government also formulated a tiered, areal system of responsibility for RBM, with basins larger than 10,000 square kilometers, as well as important tributaries, to be developed directly by the center, and provinces responsible for smaller basins. In a further testament to the importance of the new RBM institutions, although the center specified a functional distribution of responsibility for hydropower generation to MWR and irrigation to the Ministry of Agriculture, in the Yellow and Yangtze River basins operational authority was ceded by both line ministries to the YRCC and its counterpart, the Yangtze River Planning Office, respectively (US Joint Publications Research Service 1965, 155). These institutions represented a triumph of the integrated, technocratic, basin-wide

management model of RBM. Nonetheless, the center relied heavily on administrative delegation to provincial authorities to accomplish its objectives.

The central government expected little difficulty in implementing its comprehensive plans for Yellow River development. A 1955 publication confidently declared, for example, that "Naturally the people in the provinces…in the Yellow River basin itself will make the greatest contribution towards carrying out the [1954 comprehensive development] plan…the people's councils of these provinces, their counties and hsiang [an old unit of local administration], the members of local organizations at all levels of the Communist party…have an important responsibility in carrying out this plan…We believe that in their own interest, in the interest of the localities concerned, and in the interest of the people of the whole country, they will shoulder their responsibility" (Teng 1955, 48). Driving home the point, a 1955 edition of People's Daily, the Party's primary propaganda tool, celebrated the "warm welcome" given by the people of the Yellow River basin provinces to the 1954 plan, and quoted

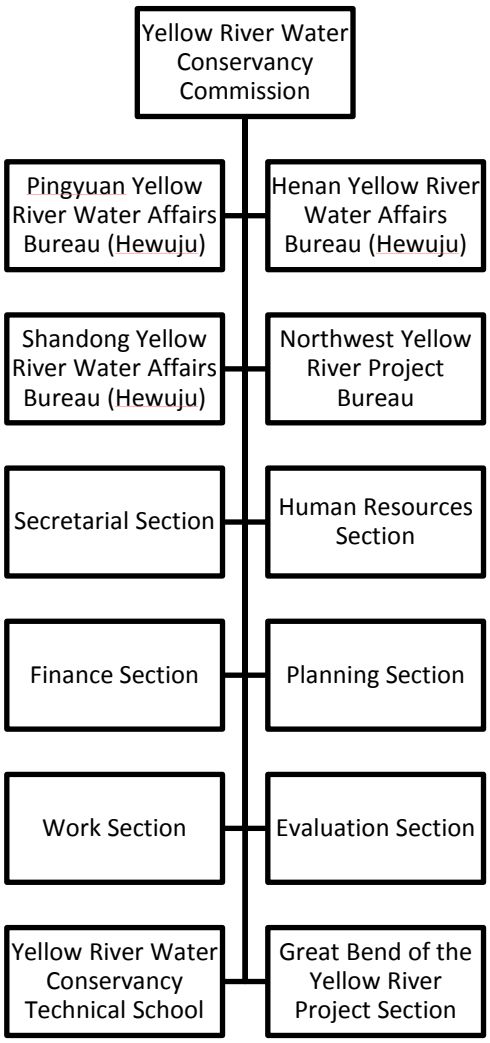


Figure 11: YRCC Organization Chart 1950 [Adapted from YRCC 1986, 384]

citizens who pledged to "struggle" and "spare no effort" to help accomplish the plan's objectives (Renmin Ribao [People's Daily] 1955).

On the basis of these expectations, the central government delegated extensive project formulation and implementation functions to provincial- and local-level government. The 1954 Yellow River development plan, as well as similar plans drawn up for the Yangtze River Basin, was formulated on the basis of input from provincial governments, and provincial governments were vested with responsibility for water resource allocation, subject only to maintaining the minimum flows necessary to sustain navigation on the Yellow (US Joint Publications Research Service 1965, 78; 136).

The most important central priorities, particularly flood control, also resulted in the re-organization of local administration. By 1955, every riparian county and township in Shandong had established a dike protection committee (*hudi weiyuanhui* □堤委□会), and, in an indication of their importance, county-level committees were chaired by the second-highest-ranking official in the county (Huanghe Shuili Weiyuanhui [YRCC] 1995, 346). Despite the extent of this delegation, the center took pains to develop institutional control over local authorities, particularly regarding politically sensitive tasks such as flood control. The State Council maintained a special staff office to oversee the YRCC, and it established a separate National Flood Control Headquarters with branches in each province which were to report directly to the central level (Greer 1979, 75); (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 87).

Nonetheless, the center's dependence on sub-national governments to implement its objectives opened the door to these objectives being warped by sub-national interests, a phenomenon illustrated by the saga of the Sanmenxia Dam. The dam, on which

construction was begun in the late 1950s at a site in Henan province, was intended to simultaneously control flooding and siltation in the lower reaches, and enjoyed Mao's personal support and patronage. However, despite warnings from eminent hydraulic engineers and instructions to "coordinate the whole operation" between design, planning, and construction functions (*quanju yipanqi* 全局一口棋) (Huanghe Sanmenxia Shuili Shuniu Zhibian [Yellow River Sanmenxia Water Conservancy Project Editorial Committee] 1993, 79), the sedimentation rate was greatly under-estimated, and within four years of commencing operation sediment filled half the reservoir, prompting the hydropower plant to be taken out of operation (W. Wang 2002, 90).

In 1964, Zhou and the State Council convened a special meeting on the Sanmenxia problem. This meeting has gained some notoriety in Chinese political history as emblematic of Cultural Revolution-era conflicts between the views of MWR bureaucrats, which emphasized soil erosion control, and Maoist ideologues who supported the construction of additional sluice gates which would alleviate pressure on the dam but result in greater sedimentation downstream, which Sanmenxia was initially supposed to reduce (Renmin Ribao [People's Daily] 1974); (Huanghe Shuili Weiyuanhui [YRCC] 1991, 161-162). Yet sub-national officials played a critical role even in this paradigmatic example of factional-bureaucratic conflict.

Despite the pretense of central control and direction, the dispute over construction of the Sanmenxia Dam was ultimately shaped by sub-national officials. Remarkably for a period in which, as a result of the Cultural Revolution, bureaucratic hierarchies were upended and replaced by ideologues fiercely loyal to Mao (Huanghe Shuili Weiyuanhui Huanghezhi Zongbianjishi [YRCC Yellow River History Editorial

Office] 1986, 388), an official history complained that efforts to address Sanmenxia's sedimentation problems were hindered by the "local self-interest" of downstream provinces which required Zhou's personal intercession to resolve (Shuixinxi Wang [Water Information Network] 2011).

Perhaps seeking allies against these interests, the State Council entrusted the Henan Province Party Chairman to convene a conference in 1969 of all concerned provinces regarding Sanmenxia, including MWR, YRCC, and Sanmenxia Project Office representatives. This trusted sub-national official achieved what Zhou himself could not, and the meeting agreed on principles of safeguarding Xian in the Middle Reaches and the downstream reaches from flooding as the fundamental principles of management, along with devoting greater efforts to flood control and lowering the water level in Sanmenxia Reservoir, but at the price of reducing power generation capacity (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 227).

As a result of these consultations, a seasonal flow principle of "store clean water and drain the muddy" (*xuqing paihun* 蓄清排□) was adopted in which during winter, when sediment loads were low, Sanmenxia's gates would be closed, while during the silt-heavy spring flows they would be open (Renmin Ribao [People's Daily] 1974). This principle alleviated pressure on the dam and the risk of flooding to Xian and the Middle Reaches, but increased siltation in the Lower Reaches, which as it may be recalled was one of the Dam's original objectives.

Such trade-offs indicate the frustrations which the center faced in attempting to address river basin externality issues in an integrated, comprehensive manner given the divergent territorial interests of the Lower, Middle, and Upper Reaches. Indeed, as early

as 1957, an official noted that "In many provinces the shortage of water is keenly felt…several provinces demand channeling water from the Yellow River and other rivers in attempting to promote the development of agricultural production," and therefore recommended a development plan which "is convenient for management because it can be adjusted to different administrative jurisdictions" (US Joint Publications Research Service 1965, 76; 82). Even during the initial period of intensive, bureaucratic centralization of Yellow River basin management, divergent sub-national interests shaped central policy. During this first period of Yellow River development, this phenomenon was especially evident with respect to the politically salient Lower Reaches.

Lower Reaches

Partially because it was one of the first economically-significant areas to be occupied by the Communist forces, the Lower Reaches held special significance for the new PRC regime, and consequently attracted the attention of its leaders to a greater extent than the other regions of the Yellow. Control of flooding in the Lower Reaches in particular was seized upon as a symbol of the new regime's compassion, capacity, and legitimacy. A YRCC history notes that "The lower reaches of the Yellow became some of the most politically important liberated areas for the CCP" (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 2-3), and this importance was reflected in early policy pronouncements regarding Yellow River development. A 1955 publication proclaims, for example, that "With the coming of People's Democracy, a remarkable change has been brought about in the lower reaches. A stubborn fight against the calamities caused by the river has been waged by the masses under the leadership of the Chinese

Communist Party and the People's Government" (Teng 1955, 14). Control of flooding in the Lower Reaches of the Yellow River thus became a national priority in the early period both of the river's development and of CCP rule.

To achieve this objective, the center relied on extensive administrative delegation to provincial governments. Beginning in 1950, Shandong Province issued extensive instructions regarding flood-control work, specifically citing directions from YRCC (Shandongsheng Renmin Zhengfu [Shandong People's Government] 1950). These provincial regulations addressed the maintenance of flood-control dikes, forbade the modification or damage of dikes without provincial-level supervision, and authorized local police to administer punishments for violations. A remarkably detailed set of records kept by the Henan Yellow River Affairs Bureau displays a similar relationship, with a steady stream of instructions issued from both the YRCC, the provincial government, and the Bureau itself concerning dike maintenance, flood control, and project construction (Henan Huanghe Hewuju [Henan Yellow River Affairs Bureau] 1993). The center's reliance on provincial-level authorities to pursue its policies is evident not only in the mobilization of very substantial resources by local authorities, but also the re-organization of local administrative bodies to pursue Yellow River basin development efforts.

These re-organizations were wide-ranging. As a YRCC history observes, "Because administrative boundaries had been adjusted many times, river control organizations were subordinated to many changes." Even before the establishment of the PRC, in 1946 Water Control Bureaus (*Zhihe Banshichu* 治河□事□) were established under province-level River Affairs Bureaus (*Hewuju* 河务局) in both Shandong and

Henan (Huanghe Shuili Weiyuanhui [YRCC] 1995, 386-399). Peasants and cadres from the agricultural collectives were mobilized into dike-protection committees, and the Shandong Government even established a resource-redistribution mechanism to ensure parity among the dike sections (*diduan* 堤段) (Huanghe Shuili Weiyuanhui [YRCC] 1995, 347-348).

Such central-local cooperation was crucial to the completion of Yellow River basin projects and the initial control of flooding. In 1951, the People's Daily carried a report lauding the close cooperation between the YRCC, CCP and provincial government officials, and provincial Yellow River Affairs Bureaus throughout the lower-reaches, which together marshaled some 200,000 peasants to aid in the annual spring dike-repair and maintenance work (Xinhua 1951). Similar plaudits were repeated into the 1960s in praise of spring flood-control work in the Lower Reaches (Renmin Ribao [People's Daily] 1962).

Yet the reliance of central authorities on provincial- and local-level government to pursue their objectives for Yellow River project development also created substantial independent capacity among the provinces to formulate and implement project construction according to their own policy objectives. In 1966, during the height of the Cultural Revolution, the Henan River Affairs Bureau issued a "Report on Yellow River Irrigation" to the Henan People's Committee which proposed construction of a dozen irrigation projects around the province to prevent drought, resulting in an increase of

irrigated land from some 886,000 *mu*[6] of farmland in 1967 to 1.2 million in 1972 (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 262).

These projects were undoubtedly undertaken with the full support of the center; a 1974 People's Daily editorial lauded the Lower Reaches for sustaining agricultural production even in the face of adverse climactic conditions, for example (Renmin Ribao [People's Daily] 1974). But the ability of provincial-level government to undertake such projects, even during the tumult of the Cultural Revolution era, illustrates their ability to pursue objectives which diverged, even in subtle ways, from those of the center.

Indeed, despite the People's Daily image of local authorities diligently carrying out the center's directions, the Lower Reaches provinces repeatedly attempted to shape central investments in pursuit of individual interests. During the initial period of planning for Yellow River development, the downstream provinces collectively proposed an irrigation water requirement of 2860 million cubic meters, in addition to 3200 million cubic meters for industry and navigation. These demands were both disproportionate and wildly unrealistic: the Yellow and its major tributaries supplied only about 500 million cubic meters to the downstream sections (Huanghe Shuili Weiyuanhui [YRCC] 1991, 142). Nor did the implausibility of these demands prevent the Lower-Reaches provinces from appealing to the national interest in constructing projects which served chiefly their own interests, a point well-illustrated construction of the patriotically-named "People's Victory Canal" in the early 1950s (*Renmin Shengli Qu* 人民口利渠) (Cheng 2008, 194). As one of the earliest water diversion projects under the

[6] *Mu* is the traditional Chinese measurement unit for land area, equivalent to approximately 0.07 hectares.

People's Republic, the Canal enjoyed Mao's enthusiastic support, but was constructed primarily on the initiative of Henan and Shandong provinces, and conveniently served the economic interests which had historically united them, namely irrigation and navigation (Peng, Feng and Li 2008, 313).

Indeed, the Lower-Reach provinces continued to be successful in securing preferential investment and attention from the center during the initial period of Yellow River development. In 1958, at Zhou's personal instruction, the YRCC issued a "Lower Reaches Comprehensive Development Plan" focused on reducing sedimentation and expanding irrigation in the area (Huanghe Shuili Weiyuanhui [YRCC] 1991, 298). As a YRCC history records, the benefits of the initial period of Yellow River development accrued primarily to the lower reaches of the Yellow River (Huanghe Shuili Weiyuanhui [YRCC] 1991, 141), a preference which continued into recent times. In 1973, a conference on lower-riparian management issues was convened under the chairmanship of a Yellow River Water Control Leading Group, with Shandong, Henan, and 13 municipalities represented. The conference recognized that the Lower Reaches region faced "new situations and problems," and proposed to improve flood control in the region, while also increasing agricultural productivity by providing irrigation flows according to the time-honored principle of "one flood, one wheat harvest" (*yishui yimai* 一水一麦) (Huanghe Shuili Weiyuanhui [YRCC] 1991, 179); (L. Li 2007, 92).

Despite the tendency for its policies to favor Shandong and Henan, the center's continued involvement in development of the Lower Reaches masked growing inter-regional conflict. By the mid-1970s, largely as a result of increased irrigation water uses in the Lower Reaches, water scarcity became a significant problem. As a result of these

growing pressures, diversions began from the Lower Reaches for drought relief in the North China plain, particularly to aid urban water users in Tianjin Municipality (Renmin Ribao [People's Daily] 1974). From 1972 to 1973, the State Council ordered diversion of some 1.6 million cubic meters from Henan to Tianjin, which became "Henan province's responsibility alone to bear" (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 263). The disproportionate incidence of this burden would present a growing challenge for the center's attempts to capture Yellow River basin externalities in a comprehensive, integrated fashion, particularly as the Middle and Upper Reaches pursued their own distinctive territorial interests.

Middle Reaches

For the Middle Reaches, the initial period of Yellow River development under the People's Republic centered on two inter-related issues, the construction of several large dams and reservoirs, and control of flooding and siltation. The Middle Reaches, as the primary source of sediment flows, became the focus of integrated efforts to address both externality issues. In its initial development planning, the center proposed to control flooding through construction of barrages (*lanheba* □河□) while formulating elaborate plans to reduce soil erosion (*shuituliushi* 水土流失) at its source (Huanghe Shuili Weiyuanhui [YRCC] 1991, 121). Accordingly, a 1955 "Resolution on the Multiple Purpose Plan for Permanently Controlling the Yellow River" instructed the provincial governments of Shanxi, Shaanxi, and Gansu to formulate plans for the "systematic" conservation of water and soil in the Middle Reaches under the guidance of the State Council and MWR (Teng 1955).

The centerpiece of this integrated development plan was the Sanmenxia Dam near the border of Henan and Shanxi Provinces. The dam was proposed as part of the 1954 comprehensive plan, and as the first major water control project undertaken under the People's Republic, became a pet project of Party leaders including Mao and Zhou (W. Wang 2002). Yet as with the new regime's attempts to control flooding in the Lower Reaches, province-level governments bore the brunt of project construction and policy implementation. As construction began in 1957, People's Daily continually lauded the "support and assistance" (*zhiyuan* 支援) lent by provincial authorities, on one occasion praising "Henan party leaders at all levels" for hosting numerous technical conferences (Renmin Ribao [People's Daily] 1957). Provinces also had to bear the costs of resettlement efforts; Shaanxi Province was responsible for re-locating over 1000 people displaced by dam construction to Gansu, which in turn bore the costs of providing infrastructure to house them (Renmin Ribao [People's Daily] 1957b).

Provincial- and local-level support was also critical during the later phases of construction and renovation of the Sanmenxia Dam. Praising methods of "independence and self-reliance" in Yellow River project construction, a 1974 People's Daily editorial celebrated the fact that "The broad masses and party organs at every level are ensuring the smooth execution of the rebuilding of the [Sanmenxia] works through seeing the situation from an unselfish point of view…and struggling side-by-side" (Renmin Ribao [People's Daily] 1974). As this plaudit suggests, the central government relied on province-level officials for political as well as material support. When sedimentation threatened to render the dam unusable, CCP leaders circumvented MWR bureaucratic officials, reaching instead for the support of lower-level leaders. A 1977 People's Daily

editorial reported for example, that "Premier Zhou Enlai and the Henan Provincial Committee comrades took primary responsibility for…ensuring the success of the second renovation plan, and by 1973 victory had been achieved." Thus Sanmenxia, which the same editorial lauded as "a great victory for Maoist thought" (Renmin Ribao [People's Daily] 1977), in fact owed much to the political and material support of Middle Reach provincial resources.

In a similar vein, central policy-making often broke down at provincial and local levels, as evidenced by the case of soil erosion control. A 1957 People's Daily piece proclaims that "In order to give full play to the Sanmenxia Reservoir work we must take seriously soil conservation work throughout the Upper [and Middle] Reach provinces" (Renmin Ribao [People's Daily] 1957c). Nonetheless, provincial efforts on soil erosion control fell considerably short of the center's expectations. The same year, People's Daily admonished the provinces of the Upper and Middle reaches for their "extremely sluggish progress" on soil conservation work (J. Zhou 1957). A similar charge was repeated in 1959, when another People's Daily editorial singled out the Middle Reaches provinces, urging each to improve its efforts by formulating individual strategies and convening special leading groups (*lingdao jigou* 领导机构) at the provincial level (Renmin Ribao [People's Daily] 1959).

Provincial governments also openly pursued preferences which ran counter to those of the center, forcing the center to yield, as illustrated by Shaanxi's involvement in the Sanmenxia Dam dispute. Shaanxi Province, fearing an increased risk of flooding to its capital, Xian, and knowing that it would be primarily responsible should this occur, opposed the policy of "storing water and flushing silt"(*xushui, lansha* 蓄水□沙) set by

MWR starting in the early 1960s. In 1962, the province's representatives to the National People's Congress presented a plan to lower the water height in Sanmenxia Reservoir, which they proceeded to submit to Mao himself. Although Shaanxi officials were marginalized in the Sanmenxia Dam disputes of the mid-1960s in favor of those from Henan, MWR granted the province a concession by modifying its management policy to one of "slowing flooding and draining silt" (*zhigong, paisha* 滞洪排沙).

This initial victory was cemented by greater concessions during the remainder of the 1960s, when the center displayed increasing deference to the interests of the Middle Reach provinces. In 1964, the State Council convened a conference where Zhou put forward a policy of "protecting both the Lower Reaches and Xian," (*quebao Xia You, quebao Xi'an* 确保下游, 确保西安) which was followed in 1969 by another conference which put forward a "Four-Province-Conference Principle" (*sisheng huiyi yuanze* 四省会议原则) in which flows from the two major reservoirs on the Middle and Lower Reaches, Sanmenxia and Huayuankou, would be managed in concert and on the basis of consultation between Shanxi, Shaanxi, Henan, and Shandong provinces (C. Zhang 2008, 269). Such cases illustrate the extent to which regionally-differentiated provincial interests drove central government policy within the Yellow River basin. Nonetheless, divergent provincial interests were even more consequential, and certainly more detrimental to coordinated and integrated development, in the Upper Reaches.

Upper Reaches[7]

The provinces of the Upper Reaches were especially proactive in attempting to secure preferential state investment in the form of dam construction for hydropower and irrigation development. In the early years of the People's Republic, the Upper Reaches were one of China's most under-developed areas, and provincial governments viewed the new regime's plans for comprehensive development of the Yellow River basin as one of the most promising means of promoting regional development. In a sign of this enthusiasm, Qinghai Province prepared a set of "Recommendations of the initial plans for the upper reaches of the Yellow River Basin" calling for no fewer than six sets of terraced dams on the Upper Reaches (US Joint Publications Research Service 1965, 61). Many of these proposed projects were included in the 1954 Yellow River comprehensive development plan, but inter-provincial rivalry prevented its full implementation throughout the period 1949-1978, and indeed all the way up to the present day.

The prime example of this inter-provincial rivalry on the Upper Reaches consists of several competing proposals for construction of dams near the border of Gansu Province and the Ningxia Hui Autonomous Region (Xinjiang Weiwuer Zizhiqu Dangwei Xuanquanbu Zhuban [Xinjiang Uighur Autonomous Region Party Committee Propaganda Office] 2009). Despite the inclusion in the 1954 comprehensive plan of a dam in Gansu, in 1958 the Ningxia Communist Party issued an "Opinion on the Development of the First Stage of Heishanxia and Daliushu" calling instead for a single high dam at a site within Ningxia called Daliushu so as to irrigate more farmland within

[7] Much of this sub-section is adapted from Scott Moore, "Hydropolitics and Central-Local Relations in China: The Pursuit of Localized Preferences in a Centralized System," *The China Quarterly* [Forthcoming].

its borders (Huanghe Shuili Weiyuanhui [YRCC] 1991, 268-269). The Gansu provincial government in turn objected to this proposal, insisting that the original dam was needed in order to complement several smaller dam projects proposed in the province (Gansu Shui Han Zai Hai Bianweihui [Gansu Flooding and Drought Disasters Publications Committee] 1996). Despite a central government directive to the two provinces to produce a joint report, and MWR's insistence that no dam would be built without agreement (Huanghe Shuili Weiyuanhui [YRCC] 1991, 269), inter-provincial rivalry on this issue has proved remarkably durable.

The intractable nature of the dispute stemmed from the fundamentally divergent territorial interests of Ningxia and Gansu. Construction of a single high dam at Daliushu would irrigate a large area in Ningxia, but would inundate a substantial portion of Gansu, an area which the Gansu government moreover claimed represented its most productive farmland. Gansu's favored dam location would likewise favor power production while minimizing the inundated area, but would provide little benefit to irrigation development in arid Ningxia (Huanghe Shuili Weiyuanhui [YRCC] 1991, 268). Nor was Daliushu the sole example of Upper-Reach attempts to promote project construction within individual provincial boundaries: Qinghai Province lobbied MWR vigorously and successfully for construction of dams within its borders. A 1968 joint letter from the Qinghai Province government and MWR to the State Council, for example, suggested that "we hope to start early on construction for the Longyangxia dam, and hope to include it in the 1969 [national development] plan" (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 247). Indeed, these individual interests informed tensions which persisted throughout the first period of Yellow River development, with

both province-level governments attempting to subtly manipulate central government policy, particularly in terms of lobbying central government bureaucracies, to pursue individual, territorial interests.

In 1966, MWR's Northwest Research Institute issued a report which appeared to support Gansu's favored dam location. A 1972 report bolstered this conclusion, finding that while Daliushu would have a greater water storage capacity, the cost and project-construction risk would be high, again favoring construction of dams within Gansu. In a 1974 meeting convened by MWR, however, a Ningxia representative stated that "Ningxia comrades demand consideration" of water projects in the autonomous region, and the following year Ningxia's delegate to a meeting of Upper Reaches provinces gave a speech in which he urged re-consideration of the Daliushu project, thereby making irrigation the primary development priority instead of hydropower production. In 1978, the Ningxia government sent a letter to the MWR Minister and the Vice-Premier arguing that a dam at Daliushu would "Utilize Yellow River water resources to transform the northwestern drought belt, and be the best means to develop agriculture and forestry." Sensing the political sensitivities involved, the Vice-Premier opted not to directly favor one side over the other, but simply ordered MWR and the Upper Reaches provinces to "earnestly study" and resolve the dispute (Huanghe Shuili Weiyuanhui [YRCC] 1991, 270-271).

The Daliushu dam dispute thus represents one of the earliest manifestations of a process that would become familiar during later stages of the center's attempts to develop the Yellow River basin: the center's extensive delegation of project and policy implementation to provincial-level governments created both the incentive and capacity

for sub-national governments to shape central policies to fit their own objectives, which diverged on a regional, upstream-downstream basis. The center, despite its abundance of both formal and informal control mechanisms, often chose simply to remain neutral in these disputes. As these examples suggest, inter-provincial relations would become increasingly significant in shaping the outcome of the center's attempts to capture externalities throughout the Yellow River basin in the subsequent period of economic opening and reform.

From Conquest to Competition: Political Conflict, Water Scarcity, and Water Quality Degradation, 1979-2009

If the first period of Yellow River basin management under the People's Republic was marked by problems of central control as a result of extensive administrative delegation, the period after 1978 was marked by direct competition between central and local levels, as well as between riparian jurisdictions. The root cause of this new dynamic was the proliferation of economic and political interests which resulted from the liberalization of the Chinese economy, known as "reform and opening" (*gaige kaifang* 改革开放). This process is reflected in two distinct phenomena in Yellow River basin management. First, inter-jurisdictional tensions regarding water resource allocation and project construction were accentuated, and in the Upper Reaches morphed into more or less open political conflict. Second, water quality issues became much more pronounced, primarily because both central and local governments possessed insufficient regulatory authority and incentives over newly independent polluting enterprises.

The center reacted to these developments by progressively expanding its legal authority and institutional capacity in river basin externality matters, particularly by strengthening the YRCC. These efforts, building on prior efforts during the first period of Yellow River development, had mostly eliminated flood hazards and the desiccation problems of the lower Yellow by the early 2000s. However, the looming completion of the SNWTP's East Route has created growing regional-scale externality issues which the center has been unable to efficiently capture in an era of diminished sub-national fiscal and administrative control.

PRC Central Government

After the initiation of economic reform, the YRCC continued to practice the integrated, comprehensive, and basin-wide management model which had been emphasized from the earliest years of the People's Republic. The YRCC's organization as of the year 1984 provides some indication of how it had, as an institution, grown in size, complexity, and capacity since its foundation (see Figure 12). New technical offices, in particular the creation of several experimentation stations, illustrate the YRCC's significantly greater water resource monitoring capabilities. Similarly, the creation of dam and reservoir management bureaus reflects the Commission's expansion into the business of directly operating important waterworks along the Yellow. However, the 1984 structure also indicates the sprawling, vertically-integrated nature of many Chinese institutions at the time, with the Commission operating a hospital and even a middle school. Designed to provide virtually all social services within a single institution, this

"work-unit" system (*danwei* □位) was incompatible with principles of economic

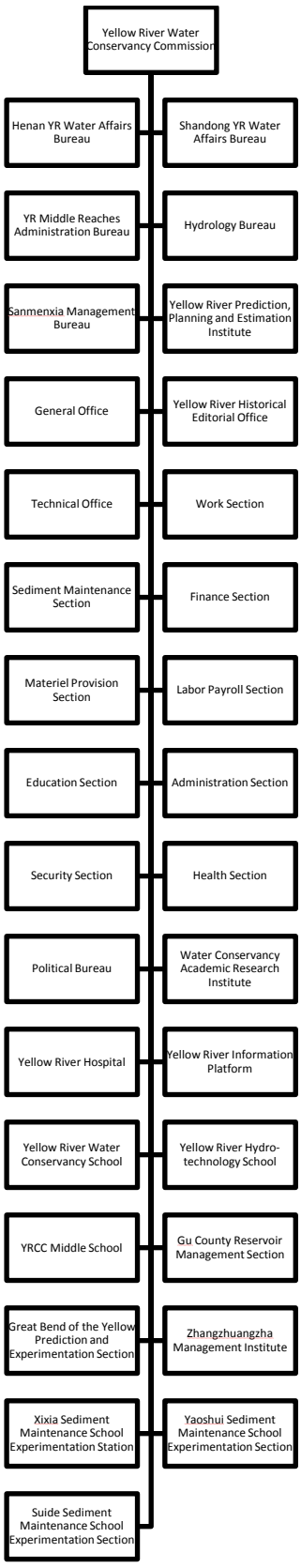


Figure 12: YRCC Organization Chart 1984 [Adapted from YRCC 1986, 390]

liberalization, and was progressively dismantled throughout the 1980s, creating new challenges for the YRCC and Yellow River basin management.

Indeed, for the PRC central government, the period since 1978 has been marked by a series of efforts to overcome increasing challenges to local policy implementation of water resource policies, at the same time as it has faced more complex economic externality issues in the Yellow River basin related to both water quality and scarcity. The fundamental reality of the post-1978 period for the center has been its decreased fiscal and administrative control over local authorities. The extent of the change from the Maoist period is indicated by the YRCC's plan, announced in 1987, to sign formal contracts with local authorities for water infrastructure control and maintenance, replacing the long-standing practice of direct administrative control. Instead, the YRCC would simply become a "supervisory" (*guanl*i 管理) entity (G. Li 1987). These centrifugal processes in Chinese political relations both exacerbated inter-jurisdictional economic externality issues within the Yellow River basin, and heightened the challenge of inter-jurisdictional cooperation and relations.

Simultaneously, however, economic interests had proliferated to the extent that the center 's actual role become one of convener rather than conductor, particularly in the case of water quantity issues. Rapid economic growth increased pressures on the Yellow River's water resources to the extent that by the early 1980s not all water use demands could be satisfied. MWR and the YRCC reacted by returning to the integrated, comprehensive, basin-wide management structure which defined the center's approach to river basin externalities in the 1950s, but which had foundered during the Cultural Revolution era. Stressing that "all parts of the river are intimately related" (*jinmi guanxi*

□密关系), China's central hydro-engineering bureaucracies initiated an ambitious effort to revise earlier inter-provincial water resource allocations to reflect new economic realities (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 300). Accordingly, the YRCC engaged provincial governments in extensive consultations regarding present and future water demands, attempting to account for factors such as Shanxi's demand for water for coal extraction and processing (D. Li 2010).

Underlining the center's relatively diminished control over province-level governments in the Yellow River basin, these consultations were both extensive and deferential to the views of sub-national officials. Initial discussions on an inter-provincial allocation took place at a 1984 conference of all Yellow River basin provinces intended to produce a plan to "fully utilize" the Yellow's flows. Employing common practice for important policy issues, MWR established a "leading group" to produce a report based on these consultations, which eventually resulted in the Yellow River Water Quantity Allocation Plan which was approved by the State Council in 1987. A similar consultative process was undertaken by YRCC regarding the "Revised Yellow River Administration and Development Plan" which was discussed at a major conference in 1988 and which proposed to accelerate development throughout the Yellow River basin. Reflecting the increased willingness of central hydro-engineering bureaucracies to defer to views of sub-national leaders, only after the agreement of provincial officials that the plan was "basically correct" were implementing instructions for the plan issued (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 298-299).

Despite this extensive consultation and the efforts of central hydro-engineering bureaucracies to develop a comprehensive water resource allocation plan, water

demands continued to rise rapidly, and by the late 1990s the desiccation of the Lower Reaches had become an acute problem, imperiling urban drinking water supplies and oil production in the Middle Reaches (Shuilibu [MWR] 1999). These water scarcity challenges induced the center to adopt a practice of greater direct control and supervision, which it pursued by formulating a successor to the 1988 Revised Yellow River Administration and Development Plan which rivaled the 1954 comprehensive basin development plan in scale and proposed to simultaneously address flooding, siltation, as well as the more recent challenge of water scarcity. The resulting "Yellow River Framework Plan for Administration and Development," issued in 1997, codified the principle of centralized bureaucratic control over water resource allocation. Though it retained earlier policies related to flood and siltation control, the plan's water resource provisions stressed "overall control, active administration, and strict supervision" (E 1999).

Throughout the late 1990s and early 2000s, the central government progressively expanded its direct operational control over water resource allocation within the Yellow River basin. In 1998, MWR, under orders from the State Council and the powerful National Development and Reform Commission, issued new regulations in response to the desiccation of the Yellow which gave YRCC authority to adjust inter-provincial allocations based on current and predicted flows, including by issuing monthly water usage guidelines to provincial authorities and requiring them to submit water usage requests and reports (Guojia Fazhan Jihua Weiyuanhui [National Development Planning Commission] / Shuilibu [Ministry of Water Resources] 1998). Though intended to manage basin flows "according to a theory of balance," (*dui pingheng lilun* 对平衡理论),

the system relies on strict hierarchical control, with annual water usage requests being submitted first by provincial governments to YRCC, and then from YRCC to MWR (G. Li 1999, 54); (Shen 2012, 589). These legal reforms have been complemented by a 400 million RMB "digital Yellow River" project (*Shuzi Huanghe* 数字黄河) which includes installation of a network of sensors that permits near-real-time monitoring of water quantity and quality along the Yellow's course, promising to improve supervision of actual water use at provincial boundaries (Xinhua 2006).

As the center's substantial investment in this system suggests, however, the riparian jurisdictions along the Yellow attempt to escape the center's water resource allocations by regularly exceeding their allocated withdrawals. This over-appropriation is accomplished by camouflaging actual water use in the main stream as well as over-abstraction of water from tributaries. Referring to the 1998 regulations, a 2011 YRCC report admitted that "In implementing the Yellow River water quantity regulations, there exist some localities which do not put into practice the water quantity allocation and dispatch plan, and exceed the allocation limits in using water resulting from inter-provincial flows not according with control limits" (Huangshuihui [YRCC] 2011). An MWR report more obliquely notes that "a small number of local governments and departments use administrative measures to interfere with normal management, making it difficult for Yellow River water administrative entities to control and regulate" water use (Henansheng Huanghe Hewuju [Henan Provincial Yellow River Water Resource Bureau] 2011).

A recent news report, though, is far more direct, asserting that provinces skirt Yellow River allocation rules by extracting water from tributaries of the Yellow before it

enters the main stream. "Tributary water quantity allocations are not clearly defined," the report notes, "meaning that each province can utilize water before it enters the Yellow River, and before it becomes part of the Yellow River water quantity allocation limits" (Caijing [Finance and Economics] 2011). Thus for all its renewed attempts to address basin externality issues in a comprehensive, coordinated fashion, the center has faced distinct challenges of central-local control during the period of economic reform.

These central-local conflicts in water resource management have moreover increasingly been matched by inter-regional tensions, particularly as a result of long-distance water transfers under the South-North Water Transfer Project (SNWTP). The idea of easing water scarcity in the Yellow River basin and North China Plain by transferring water from the south originated with Mao, who is said to have proposed that "since the south has a great deal of water, and the north very little, perhaps we should borrow a bit of it" (Renmin Ribao [People's Daily] 1979). Planning for long-distance, inter-basin water transfers began as early as 1959, when a research and evaluation workshop was convened in Beijing with representatives from the YRCC and several Upper-Reaches provinces (Xinhua 1959).

However, serious discussion of construction of the SNWTP began in the late 1970s, as water scarcity pressures in the north became more acute. The SNWTP became an official part of the center's economic development policy at the 1978 Party Conference, when it was decided to construct three separate water-diversion channels, termed the Eastern, Central, and Western Routes. The Eastern Route was to be constructed first in order to alleviate Tianjin's pressing water shortage, and was also intended to stimulate commerce because it would entail the renovation and expansion of

the ancient Grand Canal which had historically linked the north and south (Hua 1978); (Renmin Ribao [People's Daily] 1979b).

In its conception, the SNWTP thus reflected the center's long-standing predilection for multi-purpose water infrastructure projects to expand supply rather than to reduce demand for water. Almost from the outset, however, the center recognized the potential for inter-regional conflict as a result of large-scale water transfers. A 1979 People's Daily editorial acknowledged that "some may see the SNWTP as robbing Peter to pay Paul," and called for "comprehensive, all-around planning" to alleviate such concerns (Renmin Ribao [People's Daily] 1979b, 3).

Nonetheless, in subsequent decades externality issues entailed in long-distance water transfer proliferated. In particular, water pollution threatened to render transfers along the Eastern Route useless for meeting urban drinking water demands. By the late 1980s, the People's Daily began acknowledging that water conservation would be necessary to meet higher-than-anticipated urban water demand along the Eastern Route (Renmin Ribao [People's Daily] 1989), and by 1992 the State Council had expressed concern that water pollution risked rendering water diverted from the south unfit for human consumption (Renmin Ribao [People's Daily] 1992). Similar warnings were issued regarding the increased risk of flooding as a result of the transfers in the southern provinces which would supply water for the Eastern Route (Renmin Ribao [People's Daily] 1991).

The center has reacted by establishing new institutions and mechanisms to attempt to address these externalities. In 1996, an expert group recommended that SNWTP construction be financed on a principle of "whoever benefits, invests,"

(*sheishouyi, sheitouzi* □受益 ,□投□) as a result of which the center has levied special taxes on water-receiving regions in North China, principally the Beijing region (Renmin Ribao [People's Daily] 1996). In order to coordinate the project, an office was established directly under the State Council, with parallel offices in many of the provinces (Jiangsusheng Nanshuibeidiao Bangongshi Zonghechu [Jiangsu Province SNWTP Office General Department] 2005). This office has engaged in extensive consultation with provincial-level leaders (Shuilibu Nanshuibeidiao Guihua Sheji Guanliju [MWR SNWTP Planning, Design, and Management Bureau] 2011), and helped to establish a "clean water corridor" (*qingshui zouliang* 清水走廊) designed to forestall trans-boundary pollution issues along the heavily-populated Eastern Route (Zhongguo Huanjingbao [China Environment Report] 2008). These institutional attempts to capture the regional-scale externalities engendered by the SNWTP represent the center's continued engagement in addressing externality issues within the Yellow River basin. However, the sheer scale of these externalities, combined with dramatic increases in the number and types of water users, have created governance challenges that have so far outstripped institutional responses.

Lower Reaches

In the period of economic reform and opening, river basin externalities grew more severe at the same time that greater fiscal and administrative decentralization stoked divergent territorial interest formulating. This process is well-illustrated in the case of flood control policy on the Lower Reaches in the years following 1978. During a major 1982 flood, the central government exercised its historic role as emergency water manager by summoning the Governors of Henan and Shandong to Beijing to formulate

an anti-flood policy. The MWR also activated the National Flood Control Headquarters, which exercised direct control over provincial, local, and military entities across the Lower Reaches to strengthen flood control devices (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 277). The close central-local cooperation which had characterized flood control efforts prior to 1979 continued, with the Shandong government issuing a steady stream of directives in response to YRCC policy to ensure that flood control works were properly maintained (Huanghe Shuili Weiyuanhui [YRCC] 1995, 347). However, by the mid-1980s, these relationships changed dramatically with the spread of contract agreements which replaced the former system of direct, hierarchical administrative control.

This process is particularly well-illustrated in the reform of flood control and water infrastructure maintenance in Shandong Province in the early years of economic reform. In 1981, the Shandong River Affairs Bureau issued a directive intended to abolish direct administration and financing of local water-affairs bureaus and committees. These practices were replaced three years later by a contract system under which villages and dike protection committees would be paid to maintain flood-control works in their jurisdictions, rather than simply directed to do so. The new system immediately encountered substantial difficulties because many jurisdictions simply appropriated contact money for other purposes, while some considered it outside their purview and refused to bid for contacts. Reflecting the new tendency toward administrative delegation rather than direction, however, the YRCC issued a 1985 decision making the Shandong and Henan Water Affairs Bureaus "fully autonomous," and therefore responsible for contracting within their respective jurisdictions (Huanghe

Shuili Weiyuanhui [YRCC] 1995, 385). In subsequent decades, the Lower Reaches provinces placed a strong emphasis on building capacity in the Water Affairs Bureaus, such that by the late 1990s Shandong's alone employed some 10,000 people (G. Li 1999, 56).

This capacity-building strengthened the Shandong and Henan provincial water resource bureaucracies relative to YRCC and MWR, but was outstripped by the proliferation of private and increasingly powerful state-owned enterprises, all of which contributed to growing water quality challenges. In response, bureaucratic units were invested with new powers. As early as 1972, the Henan Provincial Health Bureau established a group responsible for pollution control, and in 1978 it established a water quality monitoring center. These putative environmental protection bureaucracies were gradually empowered with the ability to administrative orders to prevent pollution, install pollution control technologies, and to institute financial penalties for non-compliance (Huanghe Shuili Weiyuanhui Huanghezhi Zongbianjishi [YRCC Yellow River History Editorial Office] 1986, 325-327). This general trend toward greater reliance on provincial- rather than central-level responsibility for addressing water quality issues was mirrored in Shandong, where by the late 1990s the River Affairs Bureau devoted much of its energies to monitoring pollutant emissions from local enterprises (G. Li 1999, 55).

Yet just as the focus of water resource management in the Lower Reaches shifted to the provincial level, inter-regional water scarcity issues emerged which, because they depended on large-scale water transfers, only central hydro-engineering bureaucracies could effectively address. Beginning in the late 1970s, the YRCC had regularly diverted

water from the Lower Reaches to meet urban water demands in Tianjin, but in 1981 diversions from the Yellow River basin were suspended for a short period of time because of drought in the Lower Reaches and surrounding catchment areas (Renmin Ribao [People's Daily] 1983). Though short-lived, this incident indicates the extent to which the center was compelled to perform a delicate balancing act between water uses in the Lower Reaches, which continues to depend heavily on Yellow River waters for both urban and agricultural uses (G. Li 1999, 54).

Indeed, the center has continued to be largely deferential to Lower-Reaches interests. The YRCC paid special attention to drought conditions in the Lower Reaches, releasing 4.1 million m^3 for Henan Province and 5.1 million m^3 for Shandong from the Sanmenxia Reservoir during a single 1992 drought (S. Liu 1992). Moreover, the center involved Lower Reaches provinces to an unusual degree in planning water diversions from the Yellow River to the northeastern urban areas. In the late 1980s, continuing shortages for Tianjin and other urban areas in the northeast led MWR to entrust the Shandong government with investigating water transfer schemes to meet this added demand (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 359). The general deference shown by the center to the territorial interests of the Lower Reaches provinces is also suggested by its continued refusal to revise the outdated 1987 Yellow River allocation plan, despite rapidly increasing water demands on the Middle and Upper Reaches.

Middle Reaches

The challenges of addressing both previously-existing and emergent externality issues within the context of fiscal and administrative decentralization are also evident in

the Middle Reaches. Excessive soil erosion continued to imperil dams and reservoirs throughout the Middle and Upper Reaches as a result of accelerating agricultural production on the fragile soil (Gao 1981). In addition, the rapid development of industry on the Middle Reaches created acute pollution issues. Urban areas like Xi'an and Lanzhou experienced particularly rapid growth, creating large clusters of highly-polluting industries. In the Lanzhou stretch of the river alone, some 500 million tons of pollutants were released annually by the early 2000s (Gansu Dizhi Kuangchan Bao [Gansu Geological and Minerals Report] 2004). Middle-Reaches jurisdictions faced substantial difficulties in exercising adequate control over these polluting enterprises. A 2000 Shaanxi Provincial Government report, for example, noted the need for "close cooperation" between administrative jurisdictions in order to protect Yellow River ecosystems (Shaanxi Zhengfu [Shaanxi Government] 2000, 16).

Challenges of regional externality capture in the Middle Reaches were most pronounced, however, with respect to water scarcity issues. After 1978, the Middle Reaches faced a severe decrease in water availability above the Sanmenxia Reservoir as a result of the need to maintain adequate downstream flows to prevent the desiccation of the Yellow River in its Lower Reaches (Shaanxi Zhengfu [Shaanxi Government] 2000, 16); (G. Li 2002). These conflicting water demands in the Middle and Lower Reaches created a number of inter-regional tensions and strained the original 1987 inter-provincial water resource allocation in the Yellow River basin to its limits. Because the plan reflected the pattern of economic development in the early 1980s, it disproportionately favors the downstream provinces, particularly Shandong (Zhongguang Wang [China Radio Network] 2006), and is increasingly outdated. As a

result of such economic growth in the Middle Reaches, climate change, groundwater depletion, and other challenges, many commentators assert that the 1987 allocation is in need of revision and replacement (Pan, et al. 2011).

Nonetheless, and despite protestations to this effect by Middle Reaches provinces, the present beneficial allocations for the Lower Reaches remain in place, an accommodation the center appears disinclined to disrupt. As a recent news report notes, "Although the water allocation limits for each province are insufficient, MWR and the YRCC have not expressed a desire to modify the original water quantity allocation plan" (Caijing [Finance and Economics] 2011). Interviews with academics and government officials familiar with water resource issues indicate that this hesitancy is due to the difficulty of negotiating with provincial governments, particularly those which, like Shandong, benefit disproportionately from the present quantity allocations. As an MWR official explained, such negotiations are "a game, and it's very difficult [for the central government] to play" (P. Wang 2012). The territorial interests of the Lower Reaches, and the center's disinclination to contravene them, thus sustain acute water scarcity issues in the Middle Reaches of the Yellow River which are unlikely to be resolve until the Middle and Western Routes of the SNWTP are constructed. However, inter-jurisdictional territorial conflict in the Upper Basin suggests the challenges facing these mammoth projects, and casts doubt on their ability to capture the externalities which plague the Middle and Upper Reaches.

Upper Reaches

The Upper Reaches are the least-developed portion of the Yellow River basin, and since the outset of comprehensive basin planning the Upper Reaches provinces have

viewed water control projects as a linchpin of their economic development. Several dams, most notably Longyangxia in Qinghai Province, were constructed during the 1960s with strong provincial support, but were primarily intended to regulate flow to the more populous and economically-important Middle and Lower Reaches (Shuilibu Huanghe Shuili Weiyuanhui [YRCC] 2006, 247). Long-standing issues like flooding persisted after 1978, however, strengthening the case for additional dam construction in the Upper Reaches (Renmin Ribao [People's Daily] 1981).

Prospects for large-scale water project development in the Upper Reaches were improved during the period of economic reform by the advent of proposals for massive state investment in the western provinces beginning in the 1980s (J. Wang 1988). Rather than stimulating construction of water infrastructure projects, however, this investment served simply to exacerbate existing conflicts between the Upper Reaches provinces, particularly between Gansu and Ningxia regarding the proposed Daliushu dam. This dispute grew during the 1980s to include Inner Mongolia, and increasingly pitted different sections of the central bureaucracy against one another. Indeed, the Daliushu dispute represents perhaps the purest example of inter-provincial territorial geopolitics in the Yellow River basin, and strongly resembles those which characterize the Colorado case.

The Daliushu dam dispute had largely disappeared during the Cultural Revolution era, but was resurrected in the late 1970s as Ningxia officials lobbied the center for construction of the dam (please see previous Upper Reaches section). In 1981, MWR's Northwest Research Institute issued a report in response to this renewed lobbying highlighting the danger of earthquakes at Daliushu, thereby implicitly

strengthening Gansu's opposition to the project. Ningxia reacted in turn with a letter to the State Council in which is acknowledged the utility of constructing a high dam at Gansu's favored site of Xiaoguanyin for power production, but alleged that this alternative site would endanger agriculture throughout the Upper Reaches. "If you build a reservoir at Xiaoguanyin," the letter warned, "the principal thing it would do is to resolve the power production problem, but you can say it does nothing to alleviate the drought-affected situation of Ningxia, Inner Mongolia, northern Shaanxi, and the surrounding countries of Gansu" (Huanghe Shuili Weiyuanhui [YRCC] 1991, 271).

Ningxia's lobbying strategy also included forging an alliance with the neighboring jurisdiction of Inner Mongolia. Its case against Xiaoguanyin was decisively strengthened when the same year, in 1981, the government of Inner Mongolia sent a message to the State Council stating that "We agree with the opinion of the Ningxia government," and that "after completion of the Longyangxia project [in Qinghai], we should turn our attention to beginning the Daliushu project." This alliance between Inner Mongolia and Ningxia was sufficiently strong to persuade Gansu to modify its own position, and the provincial government soon notified the State Council that it supported a two-stage project involving construction of dams at both Xiaoguanyin and Daliushu. With the Upper Reaches provinces seemingly and finally in agreement, MWR convened a work conference in Beijing to resume planning on Upper Reaches development. Once again, however, the meeting split into factions favoring the development of hydropower at a site further upriver, and those favoring water storage and irrigation with a reservoir at Daliushu. The meeting failed to reach consensus, and

MWR, reluctant to resolve the dispute, quietly shelved the project for the time being (Huanghe Shuili Weiyuanhui [YRCC] 1991, 272).

Given this temporary abdication of central leadership, inter-provincial relationships came to dominate the Daliushu dispute. Shortly after the 1981 conference, in 1982, Ningxia officials commissioned several studies in response to Gansu's two-stage dam proposal. One resulting report, prepared by the well-respected Chinese Academy of Sciences, concluded that the two-stage proposal put forward by Gansu had both benefits and drawbacks, but that on a strict cost-benefit basis the advantages of the Daliushu dam were clearer (Huanghe Shuili Weiyuanhui [YRCC] 1991, 272-273). The Ningxia government rather unsurprisingly registered its whole-hearted agreement with the report's conclusions, and its position was further strengthened by several additional reports which discounted the risk of earthquakes at Daliushu (Huanghe Shuili Weiyuanhui [YRCC] 1991, 273). Nonetheless, these additional studies failed to persuade MWR's Northwest Institute, which instead of concurring with these findings announced in 1984 that it endorsed Gansu's two-stage proposal (Huanghe Shuili Weiyuanhui [YRCC] 1991, 272). By the late 1980s, therefore, both Gansu and Ningxia could point to authoritative scientific and technical analyses to bolster their respective positions in the Daliushu dam dispute. This raised the political costs to MWR of choosing one side over the other, and extended the dispute into the 1990s.

The stakes of the dispute were again raised in the late 1990s as a result of the center's Great Western Development Program (*Xibu Dakaifa* 西部大开□), which promulgated a national strategic development plan to improve infrastructure, economic opportunities, and living standards throughout the north-central and north-western

provinces (Holbig 2004). In 2001, Gansu contracted the China Hydropower Consulting Group to conduct a study on its proposed two-stage dam as part of a renewed push to secure inclusion of the project in the Program's investment plans. The resulting report endorsed the two-stage proposal and repeated the Northwest Institute's concern about the potential for a large reservoir at Daliushu to induce earthquakes. More recently, the Gansu government has become even more strident, warning that constructing a single high dam at Daliushu would inundate scenic areas of the upper Yellow River, be detrimental to the beneficial use of the river's waters and, perhaps most critically, cause "grave social problems" (*yanzhong de shehui wenti* □重的社会□题) because it would inundate Gansu's most productive agricultural land, thereby angering peasant farmers (Gansusheng Heishanxia shuidian kaifa gongcheng lingdao xiaozu bangongshi [Office of the Leading Group for Power Development in Heishanxia, Gansu Province] 2006).

As Gansu's appeal to social stability suggests, both provinces have attempted to legitimize their positions by appealing not only to scientific and technical issues but also to high-level national development priorities. Ningxia argues, for example, that the Daliushu project is vital to improving regional water security and to poverty alleviation and socioeconomic development (Lei 2006); (Ningxia Ribao [Ningxia Daily] 2008). To make the point, Ningxia has courted visiting State Council delegations by organizing tours of impoverished villages which it argues will be irrigated as a result of the Daliushu project (Ningxia Xinwen Wang [Ningxia News Network] 2008). More generally, Ningxia asserts that the project will promote full implementation of the Yellow River and the Great Western Development Plan (Xu 1998); (Ningxia Xinwen Wang [Ningxia News Network] 2008); (Meiri Gansu Wang [Gansu Daily Network]

2008). One article on the Ningxia government's Daliushu even asserts that construction of Gansu's favored two-stage project would represent a "long-term error in decision-making" (*changyuan de juece shiwu* □□的决策失□) (Ningxia Xinwen Wang [Ningxia News Network] 2008). Gansu, for its part, asserts that the two-stage project is necessary to meet increasing energy demand in the northwest region, fulfill domestic energy saving goals, and to fully implement the National Renewable Energy Plan (Xinhuawang Gansu Pindao [Xinhua Net Gansu Channel] 2009b).

The success of these lobbying strategies has sustained the Daliushu dispute as a political issue, but has also prevented its resolution. In 2007, Ningxia's representatives to the National People's Congress publicly petitioned for inclusion of the Daliushu dam in the Eleventh Five-Year Plan, for example (Ningxia Xinwen Wang [Ningxia News Network] 2007). Although the State Council called in 2008 for "accelerating the time-frame for construction of the Daliushu project" (Zhongguo Jiancai Wang [China Building Materials Network] 2011), it does not appear to have made a final decision to begin construction, and Ningxia continues to promote the views of experts who favor it over alternatives (Yi 2012); (Zou 2012). Thus despite the passage of a half-century, and repeated attempts by MWR to persuade two provincial governments to settle their differences, the vision of a high dam at Daliushu remains consigned to the planning stage.

Indeed, the dispute between Ningxia and Gansu regarding the Daliushu dam has prevented full implementation of the center's objectives for comprehensive development of the Upper Reaches of the Yellow River basin for nearly as long as similar inter-jurisdictional disputes have plagued both the Colorado and Damodar River basins. The

longevity of these disputes, the ability of sub-national units to manipulate central bureaucracies, and the territorial roots of these units' opposing views, demonstrates that despite China's system of political centralization, territorial politics constrain the center's ability to manage the Yellow River basin in a comprehensive manner, and undermines its ability to capture regional-scale externalities, despite the existence of a powerful regional-scale basin institution, namely the YRCC, which attempts to do so. Although central-local relations have been a key factor in the history of Yellow River basin management under the People's Republic, inter-jurisdictional relationships and rivalries have also been important and occasionally decisive.

Yellow River Case Retrospective and Epilogue: A Precarious Balance in the Yellow, 2010-Present

For over fifty years, the control, development, and management, of the Yellow River basin have been important undertakings of all levels of government in the People's Republic. As a result of their efforts, an impressive institutional structure has been created centered around the YRCC, which both directly controls water resource allocation and also plays a coordinating and convening role between and among provincial-level water affairs entities. Substantial progress has been achieved regarding the two major externality issues of historical importance, siltation and flooding. Some measurements suggest that siltation has been reduced by least 300 million tons annually, while the threat of flooding along the Yellow, once one of China's greatest natural hazards, has been largely eliminated thanks to diligent monitoring and extensive construction and maintenance of flood-control works. (Giordano, et al. 2004, 27; 36). In addition, the "holistic water management" measures implemented by the YRCC have

halted the desiccation of the Yellow's Lower Reaches, even if ecological flows remain minimal and flow rates are insufficient for sediment removal (Yang and Jia 2008, 270).

Many observers attribute these notable if partial achievements in addressing basin externality issues to the sustained and direct involvement of central bureaucratic actors, particularly the YRCC. In 2010, an international water resource management panel appointed by the Singapore government awarded the YRCC a major prize, with the Asian Development Bank's chief water resource specialist citing "The work of the Yellow River Conservancy Commission [which] has resulted in a reversal of a disastrous trend of over-exploitation of the river by the riparian provinces which resulted in zero flow in the downstream portion and estuary for a number of years. Through the work of YRCC…implemented by the provinces in consultation with YRCC, the river has flowed again throughout the year" (Singapore International Water Week 2010). The contrast between this strong central bureaucratic involvement in basin externality issues and the case of the Colorado River, where the US federal government's attempts to address basin externalities were repeatedly stymied by inter-state rivalry, could hardly be more marked.

Nonetheless, the model of centralized bureaucratic management of the Yellow River basin has not fully captured the regional externalities which plague it. As an International Water Management Institute (IWMI) report concludes, "From its founding to the present, the YRCC has not had power to act as a true basin authority…national, provincial and local agencies have been able to place varying claims and priorities on the river's resources and development" (Giordano, et al. 2004, 35). Consequently, attempts to address basin-scale water quantity and quality externality issues remain plagued by

both inter-bureaucratic and inter-jurisdictional conflicts. These challenges are perhaps most visible with respect to water quantity, where "the political negotiation and bargaining process between provinces within the basin" undermines efficient allocation (Yang and Jia 2008, 270). Inter-jurisdictional issues also impede capture of growing pollution externalities. Water pollution in the Yellow River basin increasingly stems from agricultural non-point source pollution and industrial discharges from Township and Village Enterprises (TVEs) which, as enterprises directly affiliated with local governments, are largely unregulated (Giordano, et al. 2004, 31).

The mis-match between the central scale on which policies regarding Yellow River basin issues are formulated, the provincial and local levels on which they are implemented, and the regional scales at which they occur, are likely to pose increasing challenges to Yellow River basin management. In particular, inter-regional conflict is likely to increase as water shortages become more pronounced. The current inter-provincial allocation of water resources in the Yellow River basin is inadequate, and future demand can be met only through expanded water transfer under the SNWTP (Yang and Jia 2008, 273). Even then, however, it will be necessary to achieve dramatic gains in water use efficiency, which the government is attempting through higher water usage fees, water rights reform, and other market mechanisms (Zhonggong Shuilibu Dangzu [MWR Party Committee] 2008). These measures will be much more difficult to implement, because they entail operation by private-sector and local-government entities within a centrally-formulated regulatory and legal framework, which has presented China's model of centralized bureaucratic management and hierarchical control with its greatest challenges.

Indeed, the failures of this model with respect to the Yellow River basin have occurred where the center's political control is weakest: over private enterprises and local administrative jurisdictions, which do not respond solely to hierarchical political control. These actors are likely to become more salient as Yellow River basin issues turn more from issues of water quantity control and augmentation to those of allocation and redistribution. Such issues are both more contentious and also less amendable to hierarchical administrative control. As the IWMI's report concludes, "The YRCC was established primarily to defeat the threat of flooding and develop irrigation. While it has had much success in this regard, the problems today are much broader with less easily definable solutions or even preferred outcomes" (Giordano, et al. 2004, 35). It is with respect to these more amorphous, regional-scale issues, which possess broader political and governance dimensions, that the Chinese system of central political control juxtaposed with fiscal and administrative decentralization, poses the greatest challenges to the efficient capture of river basin externalities.

This conclusion augurs ill for the latest shift in Chinese government policy toward water resources in general, and the Yellow River basin in particular, which attempts to reduce localized preference divergence in water resource policy through uniform national-level regulation. In 2010, the Communist Party Central Committee and State Council announced the establishment of "Three Red Lines" (*santiao hongxian* 三条红线) intended to establish clear and binding limits on water quantity usage, efficiency, and quality. In early 2012, the State Council announced, as part of the annual No. 1 Policy Document, which is somewhat analogous to the American State of the Union Address, that the "three red lines" policy would limit total national water consumption

to less than 700 billion cubic meters per year, amounting to approximately three-quarters of China's total annual exploitable freshwater resources. In addition, the policy mandates that 95% of tested water must meet national water quality guidelines and that an increase in irrigation use efficiency of 60% both be achieved by 2030 (State Council 2012).

The Three Red Lines policy represents the centralized bureaucratic management model of regional externality capture at its apogee. As an MWR official states, "There are no other countries that have set such detailed targets to restrict their own development by limiting usage of water resources" (Wu 2012). Yet even this highly centralized policy contains an implicit recognition of the crucial role of sub-national preference divergence. To ensure that the targets are being met at local levels, the government announced a plan to establish some 14,000 monitoring stations throughout the country to continuously monitor water quality and quantity (China Daily 2012).

Country Case Conclusion

China is of particular theoretical significance to this study because it is politically very centralized, and features few formal mechanisms for inter-regional bargaining or dispute resolution, yet is fiscally highly decentralized. Although fiscal and administrative decentralization has exacerbated inter-regional economic conflict, continued political centralization means that these issues are addressed in an informal, hierarchical manner. This process is reflected in the history of Yellow River basin development and management under the People's Republic. The case of the Yellow indicates that despite the traditional focus of Chinese political scholars and analysts on functional-bureaucratic conflict and central-local tensions, inter-jurisdictional conflict

and regional, local-local tensions have been of comparable importance, and are even more important in explaining the successes and failures of efficient capture of river basin externalities.

The case of centralized bureaucratic management of the Yellow River yields three important lessons for this comparative study. First, in comparison to the similar case of the Colorado, territorial interests and disputes are evident, but are pursued in a more subdued and more informal manner. Instead of the open policy disputes, litigation, and legislative conflict which marked the Colorado case, the province-level jurisdictions of the Yellow River basin pursued territorial interests primarily through subtle manipulation of central government development policies and lobbying of central bureaucracies. However, sub-national jurisdictions have also pursued divergent interests through non-compliance with central policies and regulations regarding both water quantity and quality—the over-abstraction of Yellow River flows and the failures of local jurisdictions to adequately enforce pollution regulations stand as the foremost examples of this non-compliance.

Moreover, the growing prevalence of non-compliance suggests a second lesson, namely that the difficulties of addressing basin externality issues have increased along with fiscal and administrative decentralization after 1978. As economic interests diversified and diverged, particularly between the various riparian regions of the Yellow River basin, the model of centralized bureaucratic management has been increasingly taxed. This directional trend is opposite to that illustrated in the Colorado case. There, the growing relative power of the federal government over time resulted in relatively more effective RBM policies as the center's role grew relative to those of the states. In

the case of the Yellow, however, the converse is true: broader trends toward fiscal and administrative decentralization have increasingly constrained the center's role in river basin externality capture. The YRCC's fundamental character as an instrument of central bureaucratic control rather than inter-jurisdictional coordination, cooperation, and bargaining, have increasingly limited its effectiveness to particular issues, such as flood control and halting the desiccation of the Lower Reaches, where hierarchical administrative control could be effectively exercised.

Finally, and as this observation in turn suggests, the Chinese model of centralized bureaucratic management has been least effective in capturing basin externalities where the propensity for inter-jurisdictional conflict has been highest. This mirrors the Colorado case, where the federal government's role has been most contentious with respect to water resource allocation issues. In the Yellow River basin, the center has effectively addressed externality issues which broadly entail the provision of public goods, such as flood and siltation control, but has been least successful where upstream-downstream territorial conflict is most pronounced, particularly pollution and water diversion from upstream jurisdictions. Overall, despite a general centralization of powers and responsibilities for RBM and the existence of a powerful, basin-scale institution in the form of the YRCC, central-local relationships have not been as important in explaining the efficiency of externality capture in the Yellow River basin as have been the divergent and often conflicting interests of riparian sub-national governments.

Chapter 5. Regional Governance in a Centralized Federation: Comprehensive River Basin Development in the Union of India

This chapter examines how regional-scale river basin externalities have been addressed within the context of India's distinctively centralized federal system. In particular, it looks at the case of the Damodar Valley Corporation (DVC), a comprehensive river basin development authority explicitly created in the image of the Tennessee Valley Authority. The case of the DVC constitutes a puzzle, because despite the many differences between the American and the Indian federal systems, the fate of the DVC is virtually identical to that of the TVA. In particular, an organization created explicitly to by-pass coordination problems between states which share a river basin instead became ensnared by inter-state rivalries, and ultimately failed to address regional-scale river basin externality issues as a result.

This outcome is especially perplexing because, unusually for federal systems, the Indian Constitution assigns the central government a strong role in regional externality capture generally, and RBM particularly. The DVC itself enjoyed an unusual degree of fiscal and administrative autonomy. Despite these provisions, and as in the American case, the resistance of state governments has stymied regional-scale river basin externality capture, and yielded numerically few and qualitatively weak regional-scale governance institutions.

Country Case Introduction

The Union of India represents an accommodation of British colonial influence, in particular the idea of federalism, and India's indigenous governance traditions, which

tend toward a greater role for the central government. This uneasy accommodation results in a particular dichotomy. Structurally, India is one of the world's most centralized federal systems, with the central government possessed of unusual powers to constrain independent action at the state government level. At the same time, India's ethno-linguistic heterogeneity has promoted the emergence of state-based ethnic politics and the decentralization of political and economic power (Diksit 1975).

These fractious sub-national politics have sustained numerous inter-state river disputes and undermined attempts to address regional-scale issues such as those which obtain within river basins, which the center has proved inexplicably unable to resolve, given the extent of its powers. As John Wood remarks, "One would think that these powers would be adequate to enable the central government to play an active mediating role in an inter-state river water disputes…But the central government's maneuverability is often no greater than that of the states" (Wood 2007, 40). Indeed, these inter-state disputes are so acute that the former head of India's water resource engineering agency, the Central Water Commission, warned in an opinion-editorial that "hydro-politics is threatening the very fabric of federalism" (M. Menon 2003).

Such warnings suggest the importance of India's particular brand of federalism in explaining RBM outcomes, but also the general importance of water resource issues to state, society, and economy in India. Agriculture and the rural economy of most Indian regions have long depended on irrigation, which in turn shaped social and political structure in many parts of the subcontinent (Mosse 2003, 4). Water resource management was also a focus of the British Raj. One of the principal undertakings of the colonial state was to greatly expand irrigation systems in order to generate greater

revenue for the various British-administered jurisdictions (Walch 1899); (S. Singh 1997, 40).

As a result of this historical legacy, the Indian government's formal role in water resource management issues has always been stronger than in the United States, and indeed than in most countries. The difficulties of managing water, and particularly entire river basins, were in turn very much on the minds of India's constitutional architects. For all their efforts to create a centralized federation capable of addressing these regional-scale issues, however, the primacy of state interests has prevented successful addressing of regional-scale river basin externalities.

Structure of Centralized Federalism in India

The architects of India's federal system were greatly concerned with the prospect that the country's ethnic, religious, and linguistic heterogeneity might "promote sub-nationalism in a manner that tends to strengthen divisive forces and weaken the unity and integrity of the country" (Commission on Centre-State Relations, 1988, p. 15). The Constitution thus includes several centrist provisions not found in other federal systems, including granting the central executive power to seize control of state governments, and the central legislature the power to re-draw state boundaries without the state's consent. Administratively, the center enjoys an unusually strong role in policy implementation in the form of the Indian Administrative Service, whose members are appointed and paid by the center but who are responsible for implementation at the state level (Rao & Singh, 2005, p. 65; 105).

These features have produced a unique federal system substantially different from the classical model exemplified by the United States. As an early Indian

government report put it, "Unlike the United States of America…the Indian Union is not an 'indestructible Union composed of the indestructible states' in that the Union alone is indestructible but the individual States are not" (States Reorganization Commission (India), 1955, p. 9). The later Commission on Centre-State Relations adds the equally enlightening observation that "The Constitution…has important federal features but cannot be called 'federal' in the classical sense. It cannot be called 'unitary' either. It envisages a diversified political system of a special type" (Commission on Centre-State Relations, 1988, p. 8).

Despite this structural distinctiveness, Indian federalism, like its counterparts elsewhere, has been characterized by a changing balance of power between central and state governments over time. As Harihar Bhattacharyya writes, "Since 1950 federalism in India has been subject to many shifts and turns marked by centralization, assertion of States' rights and a return to the status quo" (Bhattacharyya, 2012, p. 27). In the first few decades of Independence, both central and state governments were dominated by the Congress party, a fact that led to considerable centralization in policymaking and the relative minimization of central-local tensions. As Bidyut Chakrabarty notes, the broad-tent Congress party system "was a mechanism of integrating new elites…which facilitated resolution of disputes." This system "made states mere appendages of the center" (Chakrabarty, 2008, pp. 99-100).

Nonetheless, even during the period of Congress party dominance and relative centralization, the states remained important political arenas and the basis of political patronage (Rao & Singh, 2005, p. 96). Importantly, and in contrast to the experience of the United States and France, civil society movements related to water resource issues

have until the present day been a marginal influence at the national level, instead operating mainly at the state level (Wood, 2007).

In recent decades, the balance of political power in Indian federalism has shifted toward the states as a result of both economic change and the growing salience of ethno-linguistic politics. The shift from what Chakrabarty calls "Westminster-like parliamentary" government to a more dynamic balance of power between central and state levels has been primarily a product of developments since 1989 (Chakrabarty, 2008, p. 85). Federalism became a major issue in Indian politics in that year, when the National Front included a demand for greater state autonomy in its platform (Saez, 2002, p. 93). Subsequently, the rise of state-based political parties drawing support from particular ethno-linguistic groups has changed the political calculus in favor of supporting states' rights and their general autonomy in policy- and decision-making (Bhattacharyya, 2012, pp. 27-37).

This political shift has been reinforced by fiscal reforms which have increased state-level taxation powers, and codified by a number of Supreme Court decisions in which the ability of the center to interfere in state government has been curtailed and "The status of the states as constitutional entities…clearly affirmed" (Bhattacharyya, 2012, p. 32); (Dasgupta, 2001, p. 65). The growing power of the states was partially offset by 1992 constitutional reforms which mandated the creation of local *panchayat* governments, but in practical terms the local tier has not supplanted the powers of state governments (Bhattacharyya, 2012, p. 35). Accordingly, as in the United States, state governments remain the principal sub-national political arenas, and the one through which most political bargaining is channeled.

State governments have also benefited from economic liberalization policies adopted in India after 1989, but which have enhanced regional economic differentiation and sustained increasingly divergent economic interests between the states. Following common practice around the world, New Delhi has relied heavily on state governments to implement economic reforms (Bhattacharyya, 2012, p. 37). But resulting central-local tensions have increasingly undermined mechanisms for inter-governmental cooperation and coordination between the center and the various state governments.

Previous efforts at fostering such cooperation, including proposals for regional "Zonal Councils" representing multiple state governments, as well as the Inter-State Council established by Article 263 of the Constitution have reached a state of virtual irrelevance as a result of these processes of economic liberalization and fiscal decentralization (Rao & Singh, 2005, p. 90). Given this paucity of horizontal, inter-state coordination mechanisms, tensions and rivalries between the states tend to animate Indian federalism. More significantly, however, they also constrain the center's response to regional-scale issues such as river basin management, despite the central government's substantial formal powers in this arena.

The Center's Truncated Role in RBM

The relative power of the central government in RBM issues is a legacy of colonial-era legislation intended to support extensive diversion of river waters for irrigation purposes. The Northern India Canal and Drainage Act of 1873 established the state's eminent domain over water resources and provided the legal basis to pre-empt water rights claims of the princely states (Gulhati, 1972, pp. 31-32). This power persisted until promulgation of the Government of India Act 1935, which shifted most

responsibilities related to rivers and water resources to provincial governments, with the exception of navigation, which was designated as a concurrent responsibility (Government of India Act, 1935, pp. 304-307). Nonetheless, the principle of central supremacy over water resources remained strong enough that in 1942 the Indus Commission, formed to negotiate water rights in the Indus River basin, cited the belief that "a Province cannot claim to do whatever it likes with the water of a river regardless of the injury which it might inflict on other Provinces or States lower down" (Gulhati, 1972, pp. 31-32).

India's present Constitution manifests this legacy, with the center possessing a general power to address regional-scale economic externalities, particularly those which obtain within river basins. The central government is imbued with the power both to declare rivers as "national waterways" subject to its jurisdiction, as well as to "provide for the adjudication of any dispute or complaint with respect to the use, distribution, or control of the waters of, or in, any inter-State river or river valley." The center is also granted the power, under the Constitution's Seventh Schedule, concerning "regulation and development of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest." States, in contrast, are granted more pedestrian powers regarding "water supplies, irrigation and canals, drainage and embankments, water storage and water power." In 1992, the addition of the Eleventh Schedule to the Constitution bestowed the *panchayats* with responsibilities regarding "Minor irrigation, water management, and watershed development," as well as drinking water (Ministry of Law and Justice (India), 2011).

The central government, acting on these substantial Constitutional powers, passed several important pieces of legislation in the years following Independence intended to address certain river basin externalities, particularly those related to water scarcity. Chief among these is the River Boards Act of 1956, which empowered the center to establish special bodies to coordinate development of inter-state rivers. As India's Third Five Year Plan, promulgated in the early 1960s, explained, "River basins, especially those of the larger rivers, naturally extend beyond the boundaries of individual states. For integrated and economic development of water resources, arrangements for inter-state cooperation are therefore essential. The setting up of River Boards for important river basins, as envisaged in the River Boards Act, 1956, would enable a coordinated view to be taken of the needs of a river basin as a whole" (Rao D. S., 1998, p. 38). A separate Inter-State River Water Disputes Act (IRWDA), also passed in 1956, enables the central government to set up Tribunals empowered to adjudicate inter-state water resource disputes, and to allocate river waters among states (Gulhati, 1972, p. 41).

This neat division of powers and legislative infrastructure, though painstakingly constructed, nonetheless encountered vexing challenges soon after Independence. The States Reorganization Commission, established to re-consider the colonial-era boundaries of the Indian states, noted that "The provisions of the Water Disputes Bill and the River Boards Bill also do not appear to confer on the Central Government adequate powers in respect of projects which are of an inter-State character" (States Reorganization Commission (India), 1955, p. 56). Such was the salience of these regional-scale economic development coordination problems that the Commission

considered amalgamating states expressly to reduce inter-state water resource conflicts. It noted, for example, that in the case of two rivers in Peninsular India, "if one independent political jurisdiction…can be eliminated, the formulation and implementation of plans in the eastern areas in these two great river basins will be greatly expedited" (States Reorganization Commission (India), 1955, p. 104). Despite this concern, the Commission ultimately determined that linguistic homogeneity should be the primary consideration in the drawing of state boundaries (Singh G. , 1966, p. 29). As a result, inter-state river disputes intensified rather than were ameliorated in the decades following Independence (Dwivedi, 2006, p. 65); (Singh N. , 2008, p. 35).

Subsequently, efforts to address RBM issues at the central level have been stymied by the *ad hoc* manner in which inter-state river disputes are handled. The Commission on Centre-State Relations commented unfavorably, for example, that "the Constitution does not itself provide for a machinery for adjudication of water disputes. It leaves it to Parliament…In contrast, the Government of India Act 1935 itself provided that if a Province (or a State) felt that it was likely to be adversely affected due to distribution or control of water from any natural source, it could complain to the Governor General" (Commission on Centre-State Relations, 1988, p. 487). A report from the Central Board of Irrigation and Power likewise alleges that "Had there been some basic provision of constitutional law that would have applied directly to the contesting claims on the subject of appropriation or apportionment of the inter-State waters… the conflicting subnational passions that rage at times over our inter-State river waters would have been smoothened and pacified" (Valsalan, 1997, p. 21). Indeed, the center has preferred to settle RBM issues as they arise through negotiation with the states,

rather than to act on the legislative provisions contained in the 1956 bills (Administrative Reforms Commission, 1968, p. 225).

Resolution of inter-state water disputes is further hampered, as in the United States, by the structure of water rights regimes. However, the problem stems not so much from the legal pluralism which exists in the USA as in the lack of any dominant, well-developed water rights regime at all. In particular, neither states nor the federal government owns the "corpus" of water resources in India (Gulhati, 1972, p. 39). As a result of this lack of legal clarity, "Various alternate doctrines…causes an anarchic situation which means that in most cases there is no clarity about who can use what amount of water" (Briscoe & Malik, 2006, p. 21). Under this anarchic situation, upstream states have no general legal obligation to take account of water use in downstream states (Gulhati, 1972, p. 63). Upstream state governments frequently exploit this legal lacuna to refuse to recognize downstream water rights, claiming absolute "territorial sovereignty" over their water resources (Dwivedi, 2006, p. 83).

Yet as in the American case, the more serious issue surrounding the central government's role in capturing river basin externalities is an intentional abdication of its powers and responsibilities in tackling these regional-scale governance challenges. The center's role in RBM issues is meant to be exercised through a ministerial-level hydro-engineering bureaucracy, formerly known as the Ministry of Irrigation and Power (MIP) and since 1985 as the Ministry of Water Resources (MWR). Many Indian observers characterize these hydro-engineering bureaucracies as mere rent-seeking entities (Singh S. , 1997, p. 172); (D'Souza, 2006), but perhaps their most notable characteristic is a marked reluctance to exercise functions which entail coordination between state

governments. The Central Water and Power Commission (CWPC), which was established under MIP to formulate development plans for major river basins, is a sterling example of this abdication. The Commission, a later report concluded, simply "lost interest in the matter" of coordination between state governments (Ministry of Irrigation and Power (India), 1972, p. 353).

Even more puzzling, however, is the center's failure to utilize the legislative provisions included in the River Boards Act and the IRWDA to address regional river basin issues. The 1988 Commission on Centre-State Relations concluded, for example, that although "It was expected that these Boards would help in coordinated and optimum utilization of the river waters…the provisions of this Act have not been put to use all these years and the Act has remained a dead letter (Commission on Centre-State Relations, 1988, p. 488). Instead of exercising these powers to create regional river basin governance and management institutions, the center has preferred to adopt a reactive position in response to inter-state disputes. When it does so, however, it avoids extensive, politically costly involvement in negotiations, electing instead to refer these issues to judicial tribunals (Iyer, 1994). As in the United States, then, the role of central bureaucracies is circumscribed in favor of judicial involvement. Unlike in the United States, however, this limited central role in India reflects an intentional abdication of formal powers and responsibilities rather than the absence of constitutionally-enumerated powers.

Importantly, the source of this puzzling reluctance on the part of the center to exercise its constitutional and statutory powers appears to be rooted in the calculus of central-local relations under Indian federalism. An early assessment of the problem of

inter-state river water disputes in India concluded, for example, that the center's tendency to refer disputes to tribunals rather than become directly involved represented "the path of lowest political costs" as it could thereby "escape having to make unpopular decisions in the disputes and avoid the risk of alienating some or all of the states involved" (Gebert, 1983, p. 33). Rao and Singh more recently observe that in the Indian federal system, "The wide scope for discretion, the extensive bargaining, and the multiplicity of potential vetoes work in tandem to undermine the clarity and transparency needed for speedy dispute resolution" (Rao & Singh, 2005, p. 230). This concern for the political costs of central decision-making reflects the power of the Indian states, and the difficulty of reconciling their divergent interests. As in the American case, long-running inter-state river disputes are sustained by the particular dynamics of sub-national geopolitics.

State Primacy and the Failure of Regional Institutions for RBM

The central government's refusal to exercise its powers in the field of River Basin Management has created a situation in which inter-state water disputes have both festered and proliferated. India's Administrative Reform Commission predicted in the 1960s that "Jealousies and wrangles over rights over waters will increasingly become a source of friction and acrimony between states" (Administrative Reforms Commission, 1968, p. 222), a prediction which proved prescient in light of a federal official's 2006 comment that "I really am not Minister of Water Resources but Minister of Water Conflicts" (Briscoe & Malik, 2006, p. 20).

The center's abdication of its authority for regional issues in favor of that of the states has indeed greatly impeded the regional governance of India's river basins. In

1972, an MIP report concluded that "In formulating schemes the States have not always paid due attention to the overall needs of river basins. Projects have at times been formulated to meet a single purpose without adequate attention to its likely effect elsewhere in the basin. This fragmented approach inevitably creates difficulties. The agency responsible for a major project, whether irrigation or hydro-power, tends to neglect such important functions as water-shed management, pollution abatement, etc." (Ministry of Irrigation and Power (India), 1972, p. 88).

In a situation familiar from the case of the Colorado River, the pre-eminent role played by state governments results in each state attempting to maximize its access to water resources with little regard to basin-wide water quantity or quality externalities. As a World Bank report concludes, "The lack of clear, permanent allocations means that states often spend more time and resources over 'securing our future rights' than they do to using what is theirs" (Briscoe & Malik, 2006, p. 22). Again as in the case of the Colorado River, this resource-maximizing strategic behavior is rooted in the states' divergent economic interests. The MIP noted in the 1970s, for instance, that "Many States compete with their neighbors in the industrial, commercial and agricultural sectors. This competition often lies at the root of disputes regarding inter-State rivers" (Ministry of Irrigation and Power (India), 1972, p. 346).

This view was echoed by Indian legal scholar Dodda Rao in the 1990s: "In view of the influence of the water resources on economic/industrial development of a state…[water] disputes become disputes between the Governments of the basin states" (Rao D. S., 1998, p. 19). This competition is particularly acute in the field of irrigation given the outsized economic and political importance of agriculture in most of India's

states. According to one of India's authorities on irrigation, "Each State government is keen to be seen as an active promoter of irrigation for the benefit of as many of its constituents as possible," and as a result, "there is naturally a desire on the part of every State to appropriate as much water as it can" (Vaidyanathan, 1999, p. 109).

This resource-maximizing strategic behavior manifests itself as part of the upstream-downstream dichotomy so prevalent in the cases of the Colorado and Yellow River basins. The MIP report once again draws attention to this critical fact: "Because of the fact that rivers take their birth in the highlands of an area, the natural lie of the land implies that the resource…is usually with the Upper Basin, though the inhabitants of the lower basin too are heavily dependent on it. It is this situation which frequently lies at the root of inter-State river disputes" (Ministry of Irrigation and Power (India), 1972, p. 340). This geographically-oriented pattern of conflict replicates itself throughout India's major inter-state river basins.

States situated downstream of others almost inevitably develop antagonistic postures toward their upstream neighbors, seeking to manipulate water resources through construction of water works (Ramana, 1992). As one legal scholar notes, "The harnessing of the waters of such an inter-state river, always remains a difficult proposition, because every State, through which the river flows, claims to be the owner of its waters. The States which are located along such a river on its downstream, do not allow the upper States to create storages in their territories, fearing that the upstream State will not release water as and when required by the downstream State." Indeed, perhaps the most dramatic example of the sub-national geopolitics of RBM in India is a dispute between the colonial-era provinces of Hyderabad and Madras over the

Tungabhadra River, which ended only when the river was placed entirely within the new state of Karnataka as a result of the re-drawing of state boundaries (Garg, 1999, p. 5; 76).

The salience of upstream-downstream geographic positions in explaining state behavior is moreover dramatically illustrated by state governments' varying responses to the question, raised by the 1988 Commission on Centre-State Relations, of whether the center's Constitutional authority in the field of RBM and water resource management should be increased. While downstream states favored greater central government involvement to wrest water resources away from their upstream neighbors, upstream states criticized the involvement of the center as an encroachment on its legitimate powers. Thus upstream Punjab, embroiled in a dispute with its downstream neighbor Haryana, chastised the center for its "unnecessary intrusion into the rights and responsibilities of the Punjab State." Haryana, for its part, predict favored the creation of a national water resource allocation council for cases like its where, as it alleged, its upstream neighboring state failed to execute provisions of water resource agreements (Commission on Centre-State Relations, 1988b, pp. 66; 181-188).

Yet the divergent preferences of state governments have had their most deleterious effect when they have induced state governments to actively thwart attempts by the central government to address regional-scale externality issues in river basins. State resistance effectively undermined early attempts by the central government to establish River Boards in several inter-state river basins (Gautam, 1976, p. 1064); (Iyer, 1994, p. 193). As the MIP reported, "Eventually it was decided to set up River Boards for a number of inter-State rivers. But differences had already arisen between some States

over sharing river waters and several of them withheld their consent to the formation of the Boards." More insidious still is the fact that state governments have deliberately withheld information related to water resources from central authorities. The Central Water and Power Commission faced such difficulties in obtaining this information that it abandoned its attempts to craft comprehensive river basin development plans as early as the 1950s (Ministry of Irrigation and Power (India), 1972, p. 88). By the time of the MIP's report in the 1970s, the situation had scarcely improved: "Whatever data is collected by the States is maintained for their own purposes, and is not published by one authority, or in one place. Some data is not published at all" (Ministry of Irrigation and Power (India), 1972, p. 282).

The result of the states' effective resistance to these attempts to capture regional externalities has been that despite the center's formal powers RBM issues exist in a vacuum in India. Water quantity issues are typically addressed through judicial action rather than political processes, with the result that externalities are not effectively addressed. As an eminent legal scholar contends, "Disputes relating the sharing of the water of a river cannot be satisfactorily resolved by a judicial decision…at best their awards provide a starting point" (Vaidyanathan, 1999, p. 110).

Similarly, the River Boards which were meant to function as regional-scale governance institutions to address river basin externality issues have proven almost entirely ineffective: "River boards have been set up only for a few rivers, and even these are ad hoc bodies. They have scarcely any role or responsibility for actual planning, and the various studies prepared by them do not enter in any significant way in determining

the strategy, priorities, or project selection of the concerned States" (Vaidyanathan, 1999, p. 126).

Bereft of regional-scale institutions and dominated by inter-state disputes, RBM in India produces sub-optimal outcomes. A striking example is provided by a World Bank report: "The Government of Tamil Nadu does not make investments in improving water efficiency in the water-starved lower Cauvery Basin, because it perceives that any demonstration of greater efficiency would weaken its bargaining power vis-à-vis Karnataka during the next Cauvery Tribunal award" (Briscoe & Malik, 2006, p. 22).

Even in the rare cases of central involvement to resolve such disputes, the political bargains necessary to appease divergent state interests lead to inefficient outcomes. According to a recent econometric study, inter-state water resource disputes "foster the inefficient use of water and…encourage inefficient, non-cooperative investments in dams" which, while "rational from the perspective of a state that has failed to reach an agreement with another state divert investment resources and thereby retard economic growth"(Richards & Singh, 2002, p. 612; 618). These economically inefficient outcomes are deeply rooted in the space provided to states to exercise divergent strategic behaviors by the Indian federal system, a process illustrated by the case of the Damodar Valley Corporation.

Comprehensive River Basin Development Authority: the Damodar Valley Corporation

As in the case of the American TVA, the comprehensive river basin development model represented by the DVC envisioned a technocratic, regional-scale governance institution that encompassed and was in many ways superior to state-level governments. A National Planning Committee report illustrates the Indian government's radical view

of this institution: "Our conception of the jurisdiction of existing administrative units must change, and a river should be regarded as one natural economic unit for the benefit of the whole community it can serve, in the full development of which political frontiers must not be allowed to interfere" (Franda, 1968, p. 47). This desire to create regional institutions focused on river basins promised to transform Indian central-local relations. As Ramesh D'Souza comments in his history of dam construction in eastern India, in conceiving the DVC the government "was able to initiate an altogether new legal and executive context for instituting supra-regional authorities. These bodies were designed to fundamentally realign the relationship between the central authority and the provinces in order to accommodate the logistics for multi-purpose river valley development" (D'Souza, 2006, p. 191). The DVC, perhaps more clearly than any other institution in India, therefore represents an attempt to create special-purpose, Type II governance institutions to internalize a regional-scale river basin externality. Yet as in the other cases explored in this study, the extant structure of Type I territorial governments proved the dominant influence on outcomes in the management of river basins.

Case Introduction: Regional Externalities and Solutions in the Damodar Valley

The DVC, like the US TVA, was intended to mount a coordinated institutional response to several regional-scale river basin externalities. For much of the colonial period, the Damodar River Valley, a sub-basin of the Ganges manifesting a Type II basin geometry across Bihar and Bengal provinces in northeastern India, was a fashionable resort area for Calcutta's elite. However, beginning in the mid-nineteenth century the valley was devastated by a number of serious floods. Periodic flooding disasters

continued to ravage the river basin for the next hundred years, until a 1943 government commission "mooted, for the first time, the idea of tackling the problems of the Damodar basin on the model of the Tennessee Valley Authority of the USA" (Damodar Valley Corporation, 1956, p. 4); (Publications Division, Ministry of Information and Broadcasting (India), 1961, p. 7).

In 1944 the Indian government commissioned a TVA engineer to prepare a report, which rather unsurprisingly recommended establishment of a TVA-like entity in the Damodar basin (Damodar Valley Corporation, 2005). The proposal was taken up by a 1945 conference between representatives of the central government, Bihar, and Bengal at which it was decided that "all relevant information having a bearing on the unified development of the Damodar basin should be collected and a preliminary memorandum prepared" (Damodar Valley Corporation, 1956, p. 6). Thus at Independence, India's leaders inherited a well-developed proposal to tackle externalities in the Damodar River Valley through a TVA-like comprehensive river basin development authority.

Presented with this ready example close at hand, India's post-Independence leaders proceeded to adapt the DVC proposal into an institution for regional economic development. A 1948 DVC report illustrates the scale of these ambitions: "In its industrial potentialities the Damodar Valley has the same significance for India as the Ruhr Valley for Germany and the Monangehala Valley for the USA" (Damodar Valley Corporation, 1948, p. 6). The following year, the DVC's annual report proclaimed that the Corporation's functions would be to develop irrigation, water supply, and hydropower, as well as to improve flood control, navigation, and "the promotion of public health and the agricultural, industrial, economic and general well-being in the

Damodar Valley and its area of operation" (Damodar Valley Corporation, 1949, p. 1). Such wide-ranging aims reflected not only the ambition of the Corporation, but also the importance India's leaders attached to the development of the Damodar. Nehru himself employed no small dose of hyperbole when he remarked in a speech that "A new India is being born in the [Damodar River] valley. It is the India of our dreams" (Publications Division, Ministry of Information and Broadcasting (India), 1961, p. 24).

In order to realize this dream, however, India's leaders sowed the seed of future conflict between the center and state governments by attempting to subsume the realities of India's factious, state-based federal system under a single comprehensive river basin development institution. As Marcus Franda concluded in an early study of Indian federalism, "Perhaps the major reason why the TVA idea was so overwhelmingly supported was that it offered some kind of a solution to the numerous problems that would arise in a country of diversity when an attempt was made to develop areas crossing state boundaries." The TVA model also carried a distinctive implication for central-local relations in India, Franda goes on to note, because it "was seen as a device whereby large-scale regional projects could be undertaken, with considerable financial and technical assistance from the central government and with little or no provincial or state involvement" (Franda, 1968, p. 71).

This marked distinction in the role of central versus state responsibilities was codified by a 1949 inter-Ministerial summit at which it was agreed that for minor projects "local initiative should be encouraged and provinces and states should be allowed to have a free hand in their execution" but that all major river valley

development schemes "should be sanctioned and controlled by the central government" (Central Waterpower, Irrigation and Navigation Commission, 1949, p. 9).

Yet despite this agreement, in the case of the DVC the center's primacy and the ideal of a regional governance institution was almost immediately undercut by inter-state rivalries. State governments consented to the center's role and the DVC's relative autonomy because, according to Franda, neither Bihar nor West Bengal was "willing to trust the other with large amounts of control over an important measure that affected the whole of the eastern region." The states were moreover guaranteed the right to control the distribution of hydropower generated by DVC projects, as well as to control irrigation flows, in practical terms preserving their sovereignty over the Damodar's water resources (Franda, 1968, pp. 74-75). The states' subversive role in undermining regional governance in the case of the DVC is especially notable because during its formative period the governments of Bihar and West Bengal as well as the Union government was under Congress rule (Wood, 2007, p. 77) Despite this partisan attachment, as Franda notes, "Political leaders and groups in West Bengal were not constrained to accept central government decisions concerning either state matters or constitutionally central matters, even during that period when the Congress party was in power at both central and state levels" (Franda, 1968, p. 6). State leaders employed this freedom to undermine the DVC, much like their counterparts in the American South successfully opposed the TVA's regional governance functions.

A Stunted Central Role in Damodar River Management

In principle, the establishment of the DVC represented a triumph of central government involvement in attempts to redress economic externalities and promote

economic development in the Damodar River Valley. As a 1961 Ministry of Information and Broadcasting report explained, "It had often happened in the past that when a river valley project affecting two or more States was taken up, clash of opinions and interests hampered smooth execution of work and resulted in wasteful delay. This sort of thing could happen because there was no adjudication machinery for settlement of disputes relating to the use, distribution and control of the waters of the rivers for which projects were planned" (Publications Division, Ministry of Information and Broadcasting (India), 1961, p. 11). The DVC, the report went on to note, was intended to avoid this situation by effectively subsuming state-level politics within a single, regional-scale organization. Nonetheless, as Franda notes, "State politicians were able to regain a great deal of their independence in policymaking activities concerning the Corporation, despite the fact that the central government had initially passed the legislation creating the Corporation" (Franda, 1968, p. 63).

Yet this success was achieved despite the fact that the DVC represented a new approach to regional-scale governance in India. In sponsoring what became the Damodar Valley Corporation Act 1948 before the Union Parliament, the Minister for Works, Mines, and Power "described how the conception of the Damodar Valley Project was inspired by the romance of the TVA, which had ushered in an era of prosperity in the Tennessee Valley by taming the wayward Tennessee river in the USA" (Damodar Valley Corporation, 1956, p. 7). Like the TVA, the DVC was intended to combine the "facilities of Government departments and agencies" with "the flexibility and initiative of a private enterprise" (Damodar Valley Corporation, 1956, p. 17).

The DVC Act therefore provides for the Corporation's fiscal autonomy, its ability to take out and make loans and to acquire property, and also bestows upon it the right to establish regulations regarding most water issues in the Damodar River basin. Moreover, the DVC is empowered to establish punishments and sanctions for individuals in breach of its regulations (Damodar Valley Corporation, 2005, pp. Part V, Sections 48-49; 60). In addition to these specific provisions, the Act includes a sweeping clause granting the DVC "power to do anything which is necessary or found expedient for the purpose of carrying out" its enumerated responsibilities (Damodar Valley Corporation, 1956, p. 8).

Yet for all its statutory privileges, the DVC was intended to operate under firm central supervision and direction. Its enabling legislation was guided by a firm belief that, because states lacked the necessary financial and administrative resources to complete large river valley development projects, "central control and direction" was required (Damodar Valley Corporation, 1956, p. 7). As a 1956 DVC report put it, "Although the Corporation is an autonomous body and enjoys a high degree of independence in framing its own policy, plans, and programme, it is subject to the control of, and direction by, the Central Government" (Damodar Valley Corporation, 1956, p. 10).

Moreover, although funding was to come from both central and state governments, the center was to account for the largest share. Accordingly, the DVC Act specifies that "In discharge of its functions the Corporation shall be guided by such instructions on questions of policy as may be given to it by the Central Government," and that in the event of any dispute between the Corporation and the Central

Government, the latter's decision "shall be final" (Damodar Valley Corporation, 2005, pp. Part V, Section 48). During the years following its establishment, the central government attempted to exercise these powers of supervision and control over the DVC, even as the limitations of its actual power became apparent.

At the conclusion of the agreement between the central government, West Bengal, and Bihar to establish the DVC, a member of the Union Parliament, CH Bhabha, congratulated state representatives for engaging "in the closest possible co-operation with one another and with no thought of scoring provincial points against the larger interests of valley development." As a result of such cooperation, Bhabha went on to say, the members of the DVC would possess "no divided loyalties" between the central and state governments (Times of India, 1947). Less than three years passed, however, before the Corporation's loyalties to both levels of government were put to the test.

In 1950, the Union Parliament announced an investigation of the DVC in response to allegations that it "without any reference to the Finance Ministry, preceded to the United States and negotiated directly with World Bank officials for a loan." This move offended the central government because it had been negotiating for a separate World Bank loan to fund a thermal power plant in the Damodar region instead of the hydropower plant DVC officials wished to help fund. The state governments of West Bengal and Bihar expressed similar dissatisfaction with the DVC for failing to consult an Advisory Committee on which they, along with the central government, were represented (Special Representative, Times of India, 1950).

In response to this dissatisfaction, the central government attempted to increase its leverage over the DVC. In 1950, it launched an effort to "ensure effective general and

financial control over the activities of the Corporation by the Centre." The same year, a conference was convened among central, West Bengal, and Bihar representatives which proposed to amend the Damodar Valley Corporation Act "in order to leave no loophole about the Centre's decisive voice in it" (Times of India, 1951). In 1957, the Union Minister for Power and Irrigation similarly promised "revolutionary changes" in the composition of the DVC's Board in order to improve its efficiency (Times of India News Service, 1957). The Union Parliament also sought to expand its oversight of the Corporation. At the prompting of Parliament's Estimates Committee, which expressed "severe criticism" of the Corporation, the government appointed several Inquiry Committees into the affairs of the DVC. In 1953, the government announced it would conduct periodic reviews of the Corporation's implementation of various development projects (Times of India, 1953).

The central government nonetheless faced considerable difficulties in improving the DVC's performance. In 1952, the central government appointed an entity known as the Rao Committee, which was tasked with issuing recommendations to reform the DVC, including the composition of the Corporation's board (Times of India, 1954). The Rao Committee findings indicated that the central government had interfered with the Corporation's operations (Franda, 1968, p. 90), but this was ignored by Parliament. The Lok Sabha's Estimates Committee, in particular, continued to push for statutory modifications to increase the central government's power of appointment over DVC officials (Times of India, 1954).

Dissatisfaction towards the DVC continued to grow in other quarters, with the Governor of Orissa charging that it had been " a colossal waste of public money" (Times

of India, 1957). In 1961, moreover, the failure of one of the DVC's hydropower generating plants led to extended power outages in Calcutta (Times of India News Service, 1961). Following these incidents, a Union Parliament committee charged the DVC with "failure to make proper use of consulting engineers," and adopting a "general lackadaisical approach" to management. In one case, the committee alleged, the DVC had taken some five years "in coming to a decision regarding the mode of transporting a boat" up the Damodar River (Times of India, 1961b).

Such episodes illustrate the general failure of central government control over the operations and performance of the DVC and its attempts to improve the Corporation's efficiency. Throughout the 1960s, Lok Sabha committees continued to censure the Corporation for mis-management, delay, and financial irregularities. Yet these complaints fell on largely deaf ears. As a 1963 *Times of India* editorial explained, "The [Lok Sabha Public Accounts] Committee has reason to be sore, for the Corporation has ignored its repeated directives…It will be scandalous to allow this state of affairs to continue any longer" (Times of India, 1963).

Importantly, however, the chief source of these complaints were not the DVC's insulation from central government control, but rather the disproportionate influence of state governments over the Corporation. A second 1963 *Times of India* editorial faulted the "partisan interests of the State Governments" for the DVC's failures, and advocated that it be "free from the State financing system" (Kamalesh, 1963). Although the central government would continue to periodically attempt to exercise control over DVC decision-making processes (Times of India News Service, 1963), state governments and

their rivalries became the dominant factor in attempts to capture externalities in the Damodar River basin.

The Salience of the States in Damodar River Management

For all the formal power of the Union government over both river basin management issues in general and the DVC in particular, its role was almost immediately circumscribed in practice by the maneuvering of the state governments. This behavior is particularly notable in light of the fact that most government officials at both central and sub-national levels during the early period of the DVC's history belonged to the Congress Party. As Franda records, "when the original DVC bill…was placed before the Constituent Assembly in December 1947, it was immediately referred to a Select Committee dominated by state legislators and political leaders, who proceeded to modify the provisions of the bill in many important respects" (Franda, 1968, p. 76). Because the DVC was financed partly by contributions from the states, the governments of West Bengal and Bihar pressed for establishment of an Advisory Committee through which all important Corporation decisions could be vetted. As a DVC report noted, the two governments "were naturally interested in the Project not only for what it can achieve for them, but also because all the expenses would have to be borne by them" (Damodar Valley Corporation, 1949, p. 17).

Yet this apparently natural and justifiable interest in supervising the DVC's activities quickly betrayed the strategic behavior and inter-jurisdictional rivalries familiar from the cases of the Colorado and Yellow Rivers. An early indication of the key role sub-national governments would play in the regional governance of the Damodar came in 1953, when the Bihar Legislative Assembly issued a demand to move

the DVC's headquarters from Calcutta in West Bengal to a site within Bihar, complaining that Biharis were insufficiently represented within the Corporation (Times of India News Service, 1953). West Bengal, however, was even more strident in pursuing its interests against those of Bihar, the central government, and the DVC. The state's representatives in the Union Parliament presented a united front in relations with both the central government and the Corporation, such that by 1954 a *Times of India* news article recorded that an inter-state conference convened to consider the recommendations of the Rao Commission had to be postponed because "The West Bengal Government too had wanted time to consider the matter fully and the Government of India naturally could not take a unilateral decision even if it had so desired" (Times of India News Service, 1954).

West Bengal state politicians grew increasingly dissatisfied at what they viewed as the Corporation's failure to address externality issues in the state, including flood control and the provision of adequate hydropower to aid the state's industrial development. Consequently, throughout the late 1950s the West Bengal government and its representatives in the Lok Sabha attempted to increase its leverage over the DVC. During 1957 debates in the West Bengal Assembly, the Chief Minister complained that the Damodar Valley Corporation Act was "iniquitous so far as this State was concerned" and demanded amendments to the Act "giving the State Government a measure of control over the Corporation's affairs" (Times of India, 1957). Significantly, West Bengal's Parliamentary representatives acted in close concert, with both Congress and Communist Party members expressing "grave disquiet" at the central government's oversight of the Corporation (Times of India, 1958); (Times of India News Service, 1959).

In Bihar, meanwhile, concerns regarding the state's influence over the DVC were channeled into growing demands that the Corporation's headquarters be moved to a site within Bihar. Opposition members in the State Assembly declared in 1959 that the state "had derived little benefit" from the DVC, and even a Congress Party member called upon the government to "make the shifting of the headquarters of the DVC from Calcutta to Maithon a prestige issue" (Times of India, 1959). Such discontent grew severe enough that by 1962 the central government appointed a former state Chief Justice to serve as arbitrator between the DVC and West Bengal and Bihar (Times of India, 1962). Despite the involvement of such an eminent neutral party, however, the headquarters issue remained an emotive issue in Bihari politics and ultimately was left unresolved (Times of India, 1963), stoking continued discontent into the 1960s.

During the decade of the 1960s, this discontent within the states of West Bengal and Bihar led the states to strip the DVC of its multi-purpose developmental functions. In a process virtually identical with that of the TVA, as a result of state government pressure the Corporation was denuded of virtually all its statutory functions, and left to focus almost exclusively on hydropower generation. This process was led by West Bengal, which responded to the protests of several state assembly members that the DVC failed to serve the needs of poor farmers by lobbying the central government to transfer the Corporation's irrigation and canal system back to state control (Times of India News Service, 1963). In 1963, for example, a Congress Member of Parliament from West Bengal declared that "hopes over the DVC have turned illusory and it should now be scrapped. The power and irrigation schemes should be handed over to the different

states" (Franda, 1968, p. 104). The strength of these objections eventually persuaded the central government to divest the DVC of its regional planning and governance functions.

By 1964, pressure from the state governments moreover convinced the center to dissolve the DVC as a tri-partite partnership between the central government, West Bengal, and Bihar. This division of authority, a central official stated, had "resulted in a plurality of authority, conflicting interests and claims" which "adversely affected the functions of the Corporation" (Times of India News Service, 1964). The center's plan for reform clearly bore the imprint of state interests. As a 1964 *Times of India* article records, the Union government's original proposal was to transfer the DVC's flood control and irrigation functions to the West Bengal government, and afforestation and soil conservation to Bihar (Times of India, 1964). Yet even this proposal, immensely favorable to the state governments, was met by opposition at the sub-national level. West Bengal continued to object to the DVC's monopoly over hydropower generation and its continued control of the operation of major dams along the Damodar River (Times of India News Service, 1965). By the mid-1960s, therefore, inter-state rivalry had succeeded in transforming the character of the DVC as an institution for regional, basin-scale governance into a purely technocratic institution focused almost exclusively on hydropower generation. Bereft of such a regional governance institution, management of the Damodar River Basin devolved into a set of territorial rivalries between the states of West Bengal and Bihar.

Indeed, the collapse of the DVC as a regional planning and coordination mechanism created a gap in the governance of the Damodar River basin that was filled by increasingly acrimonious disputes between the two states. In 1973, an "apparently

innocuous question" regarding an agreement with Bihar for the supply of water from a DVC reservoir created a storm in the West Bengal Assembly, when a Communist member complained that "thousands of acres in my district are going dry" (Times of India News Service, 1973) for want of Bihar's water. In the midst of these inter-state confrontations, the DVC turned to the center for support, which was denied because of pressure from the states (Special Correspondent, Times of India, 1980). In 1980, near-riots developed between the DVC's Board and its staff association (Special Correspondent, Times of India, 1980b), during which the West Bengal government made statements of support for the staff, in turn forcing the Union Energy Minister to warn that "if the West Bengal government does not allow the proper functioning of the…office in Calcutta, its headquarters will be shifted from Calcutta to Bihar" (Times of India, 1980).

In the decades since, the functioning of the DVC has remained hobbled by the opposition of state governments. In 1982, the Corporation bowed to pressure from the West Bengal government to release over 100,000 acre-feet from storage reservoirs, despite protestations that the state was exceptionally inefficient in its water use (Times of India, 1982). Bihar, for its part, refused to pay the DVC for the power it consumed from Corporation hydropower plants (Times of India News Service, 1992), and rivalry with West Bengal continued to guide its position toward the DVC. In 1992, a Bihar government commission concluded that the DVC "had not brought any benefits to the state." Moreover, the report concluded, the state's cooperation with West Bengal had failed to secure Bihar's interests. Despite 82 percent of the Damodar River basin lying

within the state of Bihar, the report alleged, the state was permitted to use only 11.9 lakh-acre-feet, against 32.1 utilized by West Bengal (Times of India News Service, 1992).

Despite the original conception of the DVC as a regional-scale institution operating under the direction of the central government, such inter-state rivalries ultimately proved the dominant influence in the management of the Damodar River basin. As MVV Ramana records, "The experiment of the Damodar Valley Corporation was, therefore, a failure because of the strained relationship between the states and the Corporation" (Ramana 1992, 68). In 2011, a bill was passed in the Indian Parliament to correct these deficiencies by adding three "independent experts" to the DVC's Board in order to provide impartial input free from competing state interests (PRS Legislative Research, 2011). At the time of writing, however, this reform had exerted little impact on the capture of externalities in the Damodar River basin. Just as in the case of the TVA, inter-state rivalries undermined attempts to capture regional-scale externalities within the Damodar River basin through the agency of the DVC.

Country Case Conclusion

The Union of India is one of the world's most centralized federal systems, and one which bestows the central government with unusually strong powers on matters of regional governance. These powers were initially exercised in the establishment of the Damodar Valley Corporation as a comprehensive river basin development authority. Yet instead of addressing basin-scale externality issues like flood control, the operations of the DVC became ensnared in rivalries between the central and state governments, as well as between the states themselves. Indeed, as in other river basins where a Type II political geometry obtains, the behavior of Bihar and West Bengal states was almost

always oppositional and rivalrous, ultimately resulting in the failure of the DVC as a regional-scale governance institution.

Notably, central-local and local-local rivalry occurred and persisted despite shared Congress Party affiliations on the part of most decision-makers. Franda's account of the DVC emphasizes the especially decentralized nature of the Congress party system in West Bengal (Franda, 1968, p. 221), which may help to explain this outcome. Nonetheless, it is a striking fact that in the case of the DVC as in others explored in this study, the behavior of sub-national governments was more durably explained over time by geography than by partisan affiliations.

Instead, the territorial structure of the Indian Union plays a key role in fomenting and sustaining the inter-jurisdictional disputes which in turn inhibit efficient capture of river basin externalities. In choosing to draw state boundaries around ethno-linguistic groups, India's post-Independence leaders followed a realistic and expedient organizing principle for Indian federation, but also one which has exacerbated inter-jurisdictional natural resource conflict. The paucity of regional-scale governance institutions to ameliorate this conflict in turn sustains continued tensions in center-state relations. As a prominent Indian economist notes, "Yet another area where the centre should come to the aid of the states is [where] the rivers are natural resources which…[do] not synchronise with political boundaries of the states" (Narayan 1996, 95).

Although calls persist for the central government to take a greater role in water resource issues in India (Menon M. , 2009), sub-national territorial politics is likely to play a greater role in determining outcomes in addressing regional-scale externalities than has previously been appreciated. The Indian case thus conforms to the others in

this study to suggest that the capacity of political systems to efficiently capture regional-scale externalities varies considerably according to their territorial structure and the intensity of the sub-national territorial politics which occur within it.

Conclusion: River Basins, Regional Governance, and the Efficiency of Political Systems

This study employs the governance of river basins as a means to evaluate the differential capacity of political systems to capture regional-scale economic externalities. In the process, it draws attention to the categorization of political systems along different measures of decentralization, and asserts that comparative political economy literatures have focused too heavily on vertical relationships between central and local levels of government. The critical determinant of outcomes in the case of regional-scale river basin externalities is the manner in which horizontal, inter-jurisdictional relationships are structured. Assessed on this basis, federal political systems can generally be presumed to produce sub-optimal outcomes with respect to capturing regional-scale economic externalities such as those which occur within river basins, because federal systems feature durable structures of Type I general-purpose territorial governments whose dimensions typically are mis-matched with those of the externalities themselves, and which are empowered to resist regional-scale governance institutions.

Federal systems and the durable, sub-national territorial jurisdictions which represent their defining characteristic are designed for political, not social, advantage. Though this feature often reflects political realities at the time of federal compact, the territorial structure of federal systems continues to constrain the ability of both central and sub-national governments to capture regional-scale externalities across time. In this Concluding section, I first summarize the content of this study, reprising its theoretical critique of federal adaptive capacity, its use of RBM as a lens to examine regional-scale

externality capture, and its findings from this historical case studies; second, extend the findings of the study to outline a new political economy of regional governance, taking into account the differential impact of federal and unitary political systems; and finally propose some directions for future research.

Discussion: Political Systems and the Dilemma of Regional Governance

This study, as outlined in the Introduction, consists of three primary elements. First, it is animated by what I have called the dilemma of regional governance: how to address political-economic issues which possess a spatial dimension that is mis-matched with that of national and sub-national governance institutions. More formally, it discerns in the literature on comparative political economy strong theoretical reasons to question the general presumption that federal political systems enhance economic efficiency relative to alternatives, and specifically their capacity to capture dynamically-emergent, regional-scale economic externalities. Second, the study proposes that the case of the river basin is an ideal one to illuminate the ability of different political systems to capture regional-scale economic externalities. This is first because most river basin externalities arise dynamically and largely exogenously as a result of economic change, and second because they flow reliably downstream, thereby assuming naturally regional dimensions. Third and finally, the study examines paired case studies describing how different political systems have approached common challenges imposed by regional-scale river basin externalities, and assessing their differential success in addressing these externalities. On this basis, it argues that the role played by sub-national, general-purpose territorial jurisdictions in influencing the success or failure

of regional-scale externality capture is more significant than has previously been assumed by many political scientists.

The Introduction to this study raised three inter-related questions concerning the relationship between political systems and their capacity to address regional-scale externality issues. The comparative political economy literature broadly holds that this relationship is generalizable, directionally positive, and causally based on the multi-level decentralization of political and economic power inherent in federal systems. In contrast, this study questioned whether this relationship can be truly generalizable given the range of variation in specific federal arrangements. In addition, this study questioned whether the relationship between political system type and economic efficiency is directionally positive, as the comparative political economy literature suggests, given the emergence of regional-scale economic externality issues which appear to require significant institutional adaptation to capture. Finally, this study questions the causal mechanism which relates political system type to economic efficiency, namely central-local constitutional allocations of power..

In addressing these questions, this study in turn argues that with respect to regional-scale economic externality issues such as those which pertain in river basin management, federal systems can under many circumstances be expected to realize sub-optimal outcomes because powerful sub-national administrative jurisdictions, acting according to parochial, territorial interests, are able to raise the transaction costs of capturing these externalities. However, it is worth revisiting each element of these claims in light of the case studies which form the core of this study.

Country and River Basin Case Studies	**United States of America** • *Bureaucratic River Basin Management* (Colorado River) • *Comprehensive River Basin Development Authority* (Tennessee Valley Authority) • *Nation-Wide River Basin Commissions* (Title II Commissions)	**Union of India** • *Comprehensive River Basin Development Authority* (Damodar Valley Corporation)	**People's Republic of China** • *Bureaucratic River Basin Management* (Yellow River)	**Republic of France** • *Nation-Wide River Basin Commissions* (Water Agencies)
Generalizability: *How do outcomes vary across political system types?*	Decentralized – Federal	Centralized – Federal	Decentralized – Unitary	Centralized – Unitary
Directionality: *Were attempts to capture river basin externalities successful?*	Effective capture of water quality externalities through centralized bureaucratic action; ineffective capture of water quantity externalities through regional-scale governance institutions	Ineffective capture of water quality and quantity externalities through regional-scale governance institutions	Partly effective capture of water quantity externalities through centralized bureaucratic action; ineffective capture of water quality externalities through centralized bureaucratic action	Effective capture of water quantity and quality externalities through regional-scale reorganization of governance
Causality: *What factors were responsible for the success or failure of attempts to capture river basin externalities?*	Opposition from state governments undermined regional governance institutions	Opposition from state governments undermined regional governance institutions	Opposition from provincial governments undermined centralized bureaucratic actions to address regional-scale externalities	Local governments unsuccessfully resisted centralized bureaucratic actions to create regional-scale basin governance institutions

Table 6: Evidence from Case Studies in Relation to Driving Questions

Table 6 above describes the findings of the case studies in relation to these three driving questions behind the study. The question of generalizability is addressed through the range of variation in political system type captured between the four country cases, while the questions of directionality and causality are addressed through qualitative evaluation of the river basin institutional case studies. In terms of generalizability, it is clear that neither the institutional models employed to address river basin externalities, nor the outcomes, map neatly onto either a federal-unitary distinction or onto a spectrum of more or less politically decentralized systems. The institutional models employed by the decentralized-federal American political system, the decentralized-unitary Chinese system, and the centralized-unitary French system all proved capable of effectively capturing some river basin externalities, though of these the French case was most successful and the American and Chinese systems less so. Additionally, and in contrast to the cross-national quantitative evidence examined in Chapter 1, the efficacy of river basin externality capture appears to be unrelated to the extent of fiscal decentralization. Fiscally-centralized France is able to effectively capture river basin externalities, while similarly centralized India generally is not.

The lack of a clear generalizable relationship between the extent of decentralization in a political system and the efficacy of river basin externality capture also generally undermines the case for a directionally positive relationship between federalism, decentralization, and multi-level governance and economic efficiency. A better measure may be within-case variation in the extent of political, fiscal, and administrative decentralization, but analysis on this metric also suggests a directionally negative relationship, where one exists. In the American and Chinese cases, for example,

river basin externality capture was most effective during periods of higher political and administrative centralization. In the Indian case, a similar though weaker relationship obtains. In the French case, the efficacy of river basin externality capture has remained largely independent of changes in fiscal and administrative decentralization, though it is notable that the Basin Agencies were established during a period in which the historical administrative centralization of the French state was being slowly eroded in favor of greater decentralization. In sum, though the evidence is mixed across country cases, the relationship between the extent of political and administrative centralization and the efficacy of river basin externality capture appears to be directionally negative.

This conclusion raises the third and final question of what causal mechanisms relate political system type and their capacity to capture regional-scale externalities. It is with respect to this question that this study's signal finding comes into sharp relief: the relationship between political system type and the efficacy of river basin externality capture is dependent on the differential success of regional-scale governance institutions. Across cases, the success or failure of regional-scale governance institutions is in turn dependent on the differential role of Type I sub-national, general-purpose, and territorial administrative jurisdictions. In both federal country cases, opposition from state governments consistently undermined all forms of regional governance intended to capture basin-scale externalities. However, this same process is evident, only to a lesser degree, in the decentralized-unitary Chinese political system, where provinces consistently undermine central policies intended to address river basin externality issues.

Only in the French case, where specialized Type II governance institutions were established with active central government involvement, have river basin externalities been consistently and effectively captured. The relationship between political system type and regional-scale externality capture is thus mediated by the territorial structure of different political systems, specifically the role of Type I versus Type II jurisdictions in the regional-scale governance of river basins. But as a causal mechanism, the decisive role I ascribe to sub-national administrative jurisdictions is in need of further specification, for which the case studies provide additional insight.

Extension: Political Systems and Sub-National Territorial Politics

As highlighted in Chapter 1, river basin externality issues are exceptionally complex and contentious, encompassing many political actors across a variety of issue areas. For all this complexity, however, this study has consistently found that sub-national administrative jurisdictions are the key operative actors. When the governance of river basins is centered around Type I jurisdictions, a territorial politics obtains. Type I administrative jurisdictions formulate preferences concerning shared river basins based primarily on their geographic position within the river basin, and as a result horizontal, inter-jurisdictional relationships become the animating force in regional-scale governance. But because most administrative jurisdictions are positioned along shared rivers along an upstream-downstream axis, which this study has referred to as a Type II political geometry, rivalrous behaviors predominate, consistently undermining regional-scale river basin governance institutions. Importantly, this effect obtains regardless of which type of river basin governance institution is employed. The interaction of Type I administrative jurisdictions and Type II river basin geometries durably explain outcomes

in the efficacy of river basin externality capture in the American, Indian, and Chinese cases. However, the salience of sub-national administrative jurisdictions implicated in this study maps onto political system type in important ways, which require further elaboration.

Figure 13 below depicts notable features of the case studies according to those which pertain to federal versus unitary political systems, and those which appear to obtain independently of a federal-unitary distinction. The federal-unitary distinction is meaningful in distinguishing the character of regional governance. In particular, the role of the central government in river basin governance is much more periodic and selective in the federal systems examined in this study than in the unitary systems, where central government involvement in the unitary systems was much more sustained and pervasive. A related feature is that sub-national inter-jurisdictional disputes concerning water resources are handled primarily through informal political relationships in the unitary political systems, reflecting the relative strength of central government involvement. In the federal systems examined in this study, however, the general reluctance of central governments to arbitrate between competing state interests means that disputes are handled through the judiciary. The third and final meaningful feature of the federal as opposed to unitary political systems examined in this study is that federations feature fewer, generally weaker regional governance institutions than do their unitary counterparts. However, the American case did feature a greater diversity of institutional forms for regional governance than did the other country cases.

This conclusion adds an important corrective to the general tendency in comparative political literatures to assume that federal political systems promote

adaptive governance. This supposition is common even among comparativists who specialize in the study of unitary political systems. Suzanne Berger, a prominent scholar of French politics, wrote in the 1970s for example that "The diversification of urban problems in the United States has…produced a multiplication of new governmental bodies: model-city boards, metropolitan districts, commissions, interstate commissions, port authorities, and so forth. In France, in contrast, there has been little institutional innovation because of the limits set by the hierarchical system in which authority is exercised. The institutional rigidity of the system makes it difficult to cope with new problems" (Berger, 1974, p. 13).

The case studies examined in this study suggest that Berger's analysis is correct on the first point, but rather too broad on the second. Indeed, soon after Berger's book was published, France began a process of administrative and fiscal decentralization which created the present regional governments, and endowed them with substantial powers over matters such as transport and planning. Federal political systems may indeed support a greater diversity of institutional forms for regional governance than do their unitary counterparts, but there are fewer of them, and they are less powerful. Consequently, the ability of federal political systems to effectively address regional-scale externality issues like those which define the management of river basins is likely to be weaker than commonly assumed.

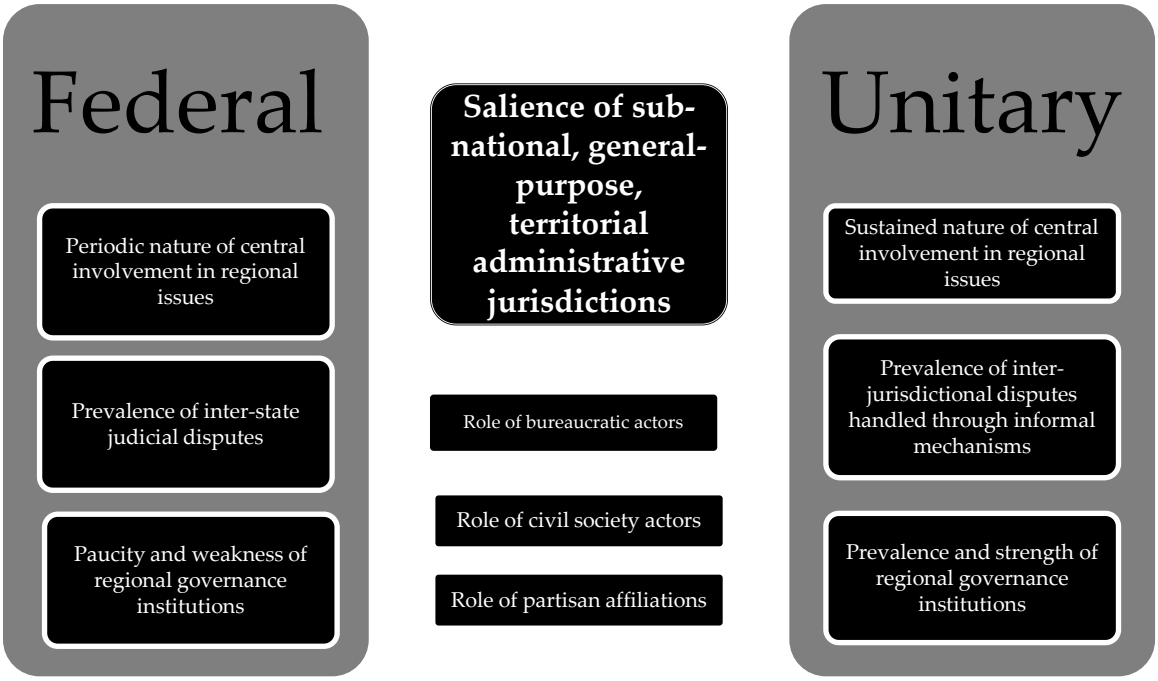


Figure 13: Case Study Evidence Regarding Distinctions between Federal and Unitary Political Systems

The interesting question is why this should be the case, and the case study evidence examined in this study provides an answer, namely that Type I jurisdictions possess more and broader avenues to pursue their own divergent objectives in federal political systems, which in turn tends to undermine regional governance institutions. These actors differ considerably in the extent to which their behavior holds constant across cases. Civil society groups and bureaucratic actors display similar behaviors across country cases. Civil society actors seek to expand the sphere of conflict by pursuing their objectives at the highest possible level, usually national legislatures, while bureaucratic actors seek to expand their sphere of authority. In the American and French cases, civil society and bureaucratic actors formed coalitions to lobby the central government to address basin-scale externality issues. Their behavior in doing so appears

to be unrelated to political system type, but instead represented social responses to economic change, and particularly increasing water quality problems as a result of industrialization.

However, across the cases examined in this study, the most salient actors are Type I sub-national administrative jurisdictions. More precisely, across the cases examined in this study, sub-national governments are the crucial determinants of whether attempts to address regional-scale basin externalities succeed or fail. This general salience holds across political system type. In the two federal country cases examined in this study, inter-state rivalries undermined attempts to address regional-scale basin externality issues in the absence of determined, sustained federal government involvement. A similar if more attenuated process is evident in the Chinese case, where although political centralization dramatically constrains central-local preference divergence, the resistance of provincial-level authorities to implement centrally-formulated policies has prevented the effective capture of some externality issues, particularly related to trans-boundary water quality. In the French case, only the success of the central government in co-opting warring local elites prevented the existence of similar sub-national rivalries regarding shared water resources. Indeed, across cases, the single best determinant of whether river basin externalities were effectively captured is the nature of horizontal, inter-jurisdictional relationships.

These relationships were moreover defined by similar dynamics across the cases examined in this study. In all examined cases, the single best predictor of sub-national governmental behavior is geographic position within a river basin. Where sub-national political jurisdictions are oriented such that one is upstream of the other, which this

study has referred to as a Type II geometry, as in the Colorado, Yellow, and Damodar River basins, rivalrous and conflictual behaviors have predominated. Where jurisdictions are oriented such that they share a river as a common border, however, as in the Delaware River basin, cooperative behaviors are more likely, particularly when they entail issues such as pollution where both jurisdictions are more or less equally affected.

This geographically-rooted behavior animates a base layer of sub-national geopolitics that occurs in the American, Chinese, and Indian cases examined in this study. Only in the French case, where the spatial dimensions of river basin governance institutions were precisely aligned with those of the river basins themselves, were these sub-national geopolitics absent. Across cases, then, this study finds that the behavior of sub-national administrative jurisdictions, and the relationships which exist between them, are critically determined by their relative geographic positions within shared river basins.

Although this salience of sub-national, territorial jurisdictional actors holds across cases, particular aspects of inter-jurisdictional relationships do vary by political system type. In the two federal cases, state governments possessed a number of avenues to pursue their interests, most notably suing one another, which their counterparts in unitary systems did not. State governments in federal systems, in short, both possessed and utilized more and broader avenues to pursue their individual interests. In addition, in both federal cases examined in this study, representation in the national legislature is structured by state, such that the political cost to federal executives for favoring individual state interests over others is considerably higher than in the two unitary

systems. The calculus of these political costs, in which on one hand state governments have greater capacity to oppose institutional reform, and on the other the federal government has fewer incentives to pursue such institutional reform, has the net effect of raising the transaction costs of establishing regional-scale governance institutions. In consequence, this study's central argument is that any issue which arises dynamically and whose spatial dimensions are mis-matched with those of sub-national administrative jurisdictions, is more difficult to capture in federal than in unitary political systems. Under these circumstances, and in the case of capturing river basin externalities, federal political systems can be expected to be efficiency-reducing relative to their unitary counterparts.

Implications: Toward a Political Economy of Regional Governance

Traditionally, political scientists of all stripes, but particularly scholars of federalism, have fixated on vertical relationships between central and local levels of government. The allocation of power between these levels, particularly various arrangements for political, fiscal, and administrative decentralization, has been one of the most fruitful areas of inquiry in political science. Yet this focus on vertical relationships has obscured the importance of horizontal relationships between sub-national political jurisdictions in determining political and economic outcomes. The significance of horizontal relationships is to some extent mediated by political system type, and can generally be expected to be greater in federal than in unitary political systems. But inter-jurisdictional relationships exist and effect political processes in all political systems which feature any meaningful level of political, fiscal, or administrative decentralization.

Re-focusing attention on the sub-national tier in general, and inter-jurisdictional relationships in particular, also charts a path toward the study of regional governance—namely, institutions which exist to address issues which require cooperation between sub-national jurisdictions, but which do not entail the provision of public goods, like defense, at national scales. Many emergent policy issues, particularly the management of river basins but also challenges of urban development, crime, and economic integration, possess these regional dimensions. The task of this final section is to sketch the outlines of a research agenda to better understand the political economy of these regional governance issues and challenges, and the institutions which attempt to address them.

Based on this study, I propose that such a research agenda should begin from two fundamental premises. The first is that the formal assignment of powers to various levels of government is merely a starting point for understanding the influence of political system institutional arrangements on specific political and economic outcomes. As this study has demonstrated, these powers are not a reliable indicator of the behavior of political actors at central and sub-national levels with respect to river basin management issues, whereas in contrast geography is a reliable predictor of sub-national actor behavior. Where geography is a more important driver of sub-national actor behavior, the key set of institutional arrangements in a political system consists not of those which structure vertical relationships between central and local governments, but rather those which structure horizontal relationships between governments at the same level. As noted in the Introduction, there is little scholarship detailing these relationships in individual country cases, and virtually no scholarship which attempts to

compare these arrangements across political systems. Accordingly, a fruitful topic of future inquiry would be to conduct a comparative study of institutional arrangements for inter-jurisdictional cooperation. Although this study has attempted this task in limited fashion, future work should both construct and analyze a large-n, cross-national data set in order to expand the descriptive country case studies examined in this study.

The second fundamental premise of the research agenda I propose is to make scale considerations explicit in the study of particular political and economic outcomes. As this study has emphasized, many phenomena of interest to political scientists possess distinctive spatial dimensions, whether national, local, or regional. The distinction among these scales relates directly to institutional arrangements. This study has indicated that regional-scale issues like the management of river basins is inefficiently addressed at national or local levels, but instead requires the generation or adaptation of governance institutions at intermediate, regional scales. For any given political or economic issue, phenomenon, or outcome of interest, the spatial dimension and scale should be carefully considered, identified, and discussed. The resulting body of work will be well-positioned to facilitate identification of what is distinctive about regional issues as opposed to those which predominantly engage political institutions at the local and national scales which have historically been the focus of political science.

Making the distinction between national, regional, and local issues is a critical component of this study, for example, and forms the basis upon which it has sought to explain the fact that while river basin management appears everywhere to be problematic, it is more so where barriers to regional-scale, inter-jurisdictional cooperation are higher—namely, as this study has argued, in federal systems.

Distinguishing between the scales at which given issues operate thus points the way toward a better understanding not only of regional political economy itself, but also in relation to the political economy of national- and local-scale issues.

In closely related fashion, future institutionally-minded political economy work should seek to compare political and economic outcomes across a range of issue areas which span multiple spatial dimensions. A hypothetical research design might, for example, compare the extent of bureaucratic autonomy in a case of national public good provision, such as defense, with one of chiefly local relevance such as education, as well as a regional-scale issue such as river basin management or urban development. Such a design would facilitate more precise isolation of the scalar effect which this study has asserted is an important element of explaining political and economic outcomes across different political systems. It would also be useful to include in such a study a range of issue areas which are often thought of as paradigmatic regional issues, including crime, transport, and air pollution.

More complete analysis of the means by which these issues are addressed in the context of different political system types promises to add a new dimension to the comparative analysis of political systems. A key insight promised by this line of research is an understanding of how different arrangements for political, fiscal, and administrative decentralization influence the capacity of political systems for institutional adaptation and self-organizing institutional collective action. Though these processes are areas of dynamic inquiry among political scientists, the end result should and must include a comparative study across political system types. It is to be hoped that this study takes a partial step towards this larger, longer-term objective.

Post-Script: The Long View of Federalism and the Comparative Study of Political Systems

This study began by asking whether some structural feature of a federal political system made it more or less efficient in addressing a particular regional-scale issue, namely the management of river basins, relative to a unitary one. What makes this question worth asking is that it encapsulates the challenge of comparative political science, namely to demonstrate how and why it is that differences in political institutions and behaviors reliably influence political and economic outcomes. Given the great diversity in political institutions and behaviors across countries, this has always been a formidable task. For every near-universal rule, it seems, there is at least one glaring, maddening exception. So it is with the study of federalism—no doubt had this study considered the whole universe of federal political systems, some whole or partial exception to its assertions could be found. Yet there is something special about federalism. A federal political system is born in complex or difficult circumstances; otherwise there would be no reason for a polity not to join together as wholly one, or never to cohere in the first place. Its institutional architecture is similarly complex, and often dramatically shaped by competition and compromise.

Yet, at this study has argued, comparative political science can be more precise in articulating the meaning and function of federalism in comparison to other architectures of government. All political systems, save perhaps for the very smallest, divide the exercises of government both functionally, according to task, as well as spatially, according to geography in the form of state, provinces, prefectures and the like. Judged on the former, functional basis, federal political systems do not differ greatly on the basis

of discrete political or economic outcomes from their unitary counterparts which feature extensive decentralization. Assessed from a spatial perspective, however, federal political systems possess a defining and unique characteristic. They are organized around durable, territorial, general-purpose governments which represent the locus of political power and activity. Even in the most functionally centralized federation, rulers must contend with state boundaries, and are obliged to draw other meaningful boundaries, whether for finance or administration, around them. In the unitary political system, in contrast, rulers are far less constrained at the sub-national tier. For many political and economic outcome variables, this distinction may not especially matter. But in explaining the varying efficacy with which different political systems address regional-scale river basin externalities, it is of crucial importance.

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