PARTNERS AND COMPETITORS: INTERGOVERNMENTAL RELATIONS AND THE GOVERNANCE OF TRANSBOUNDARY COMMON POOLS

By

B. TIMOTHY HEINMILLER, B.A., M.A.

A Thesis

Submitted to the School of Graduate Studies

In Partial Fulfillment of the Requirements

For the Degree

Doctor of Philosophy

McMaster University

THE GOVERNANCE OF TRANSBOUNDARY COMMON POOLS

DOCTOR OF PHILOSOPHY (2004) McMaster University

(Political Science) Hamilton, Ontario

TITLE: Partners and Competitors: Intergovernmental Relations and the Governance of Transboundary Common Pools

AUTHOR: B. Timothy Heinmiller, B.A., M.A.

SUPERVISOR: Professor Mark Sproule-Jones

NUMBER OF PAGES: vii, 250

Abstract

Transboundary common pools include many natural resources that flow or roam across such vast areas that they encompass the territory of multiple sovereign jurisdictions. This creates a considerable degree of resource management interdependency for the governments of these jurisdictions, and there are many types of intergovernmental institutions that have been created to address this interdependency, ranging from governmental unilateralism to binding intergovernmental decision-making. This study investigates the impact that various intergovernmental institutions have on policy design and policy learning in transboundary common pool management by analyzing and comparing the development of water management policies in the Great Lakes Basin of North America and the Murray-Darling Basin of Australia. The empirical findings from this comparison suggest that the involvement of non-governmental actors as third party brokers and monitors in intergovernmental interactions can have a very beneficial impact on both short-term policy design and long-term policy learning in the management of transboundary common pools. Effective intergovernmental policy interactions are even further facilitated by intergovernmental structures featuring both a political level council and an administrative level commission, each with defined tasks but linked in sequential decision-making.

Acknowledgements

There are a number of individuals and organizations that deserve mention for their invaluable assistance in helping me to complete this thesis. First and foremost, I would like to thank my supervisory committee of Mark Sproule-Jones, Michael Stein and Barbara Carroll for their patience and advice, as well as the many opportunities they have afforded me during my time at McMaster. I could not have had better mentors and friends. I would also like to acknowledge the research funding I have received from the Social Sciences and Humanities Research Council (particularly the Federalism and Federations Program) and the Canadian Water Network. Finally, the most credit belongs to my wife, Ann. She never doubted.

Table of Contents

List of Acronyms

ACT	Australian Capital Territory
CAC	Community Advisory Committee
CGLG	Council of Great Lakes Governors
CPR	Common Pool Resource
GATT	General Agreement on Tariffs and Trade
IAD	Institutional Analysis and Development
IAG	Independent Audit Group
IBWT	International Boundary Waters Treaty
IJC	International Joint Commission
MDBI	Murray-Darling Basin Initiative
NAFTA	North American Free Trade Agreement
PNC	Prior Notice and Consultation
RMWA	River Murray Waters Agreement
RMC	River Murray Commission
WRDA	Water Resources Development Act
WTO	World Trade Organization

Tables and Diagrams

Introduction – The Mortality of Transboundary Common Pools

Sixty years ago, the Aral Sea in Central Asia was a thriving freshwater ecosystem that offered great potential for economic development in agriculture, fisheries, and tourism. In the 1960s, the Soviet government decided to turn the Aral into the greatest cotton-growing region in the world and undertook massive irrigation projects toward this end. Millions of acres of marginal land were put into production and the cotton industry expanded for almost two decades. However, the uninhibited demand for water put such stress on the resource that the shores of the Aral began to recede until the major rivers that fed it could no longer reach their natural destination. The Aral began to shrink rapidly and became increasingly saline, destroying the fisheries and killing much of the surrounding flora and fauna. Cotton yields went into steep decline, the fishers of the Aral were put out of business, and the thousands of tourists who once flocked to the Aral's sandy shores simply stopped coming. Today, the Aral has shrunk to less than half its original size, the water is so saline that the sea is effectively dead, and the peoples surrounding it are plagued by economic depression, malnourishment, and multiple forms of cardiovascular disease. The social and ecological problems of the devastated Aral region are so vast that the various governments who share the sea are overwhelmed and virtually powerless to rectify the situation.[1]

* * * * * * * * * * * *

[1] David Suzuki, "The Hospital at the End of the Earth," *The Nature of Things*, Television (Canadian Broadcasting Corporation, August 29, 2001).

When the first European explorers made their way to the Grand Banks in the early sixteenth century, they brought home tales of a vast ocean where the fish were so thick in the water that one needed only to drop a bucket to catch them. Even fifty years ago, the cod stocks of the North Atlantic easily met the needs of thriving fishing industries from numerous North American and European countries. However, there was little recognition of their mutual dependence on these stocks, and governments encouraged their fishers to develop new technologies and to compete for increased shares of the overall catch. In the decades after World War II, the advent of new nets, new ships, new fish locating devices, and new modes of fish processing obscured the fact that fishers were investing increasing amounts of effort for fewer returns. Cod stocks began to decline noticeably, but the exigencies of resource competition, combined with strong elements of denial and ignorance, prevented the resource from being managed for the collective good. Conflicts between fishers and between governments began to erupt more frequently, until it was finally realized that the cod had been exploited to the point of species collapse. Fishing moratoriums were imposed and local economies, many of which were entirely dependent on cod fishing and processing, declined rapidly. An entire way of life was virtually destroyed as coastal areas were abandoned and populations migrated in search of other economic opportunities.[2]

The Aral Sea and the Atlantic cod are both illustrative of the mortality of transboundary common pools in the modern world. By their nature, transboundary

[2] Michael Harris, *Lament for an Ocean - The Collapse of the Atlantic Cod Fishery: A True Crime Story*

common pools are natural resources that are finite in supply and shared by a large community of users spread across multiple political jurisdictions. The communities that utilize these resources rely on them for various social and economic goods such as food, water, energy, transportation, and recreation. In fact, transboundary common pools provide many of the basic inputs on which most economies and communities are constructed. Transboundary common pools are so vast they seem to provide an almost limitless source of prosperity. However, this perception is not nearly as accurate as it once was.

Since the Industrial Revolution, humans have progressively developed the technological capacity to manipulate, and ultimately destroy, the vast resources that are transboundary common pools. Mega-dams and factory-freezer ships are just two examples of the technology developed over the past century. In addition to an increased capacity for resource exploitation, human populations in most parts of the world have grown exponentially so that the numbers of people relying on transboundary common pools have greatly increased. This has placed a heavier burden on many resources and made them increasingly vulnerable to "death by a thousand bites." When this sort of destruction occurs, the effects are cataclysmic: entire economies, communities, and ecosystems collapse and may not recover for many generations.

In our rush to conquer nature, humans have failed to recognize that the end of this conquest is marked only by another confrontation amongst ourselves. With growing resource demand and exploitation capacity, the current problem faced by many

---

(Toronto: McClelland & Stewart Inc., 1999).

communities is to avoid the fate of the Aral and the Atlantic cod by achieving responsible and sustainable use of their common pools. In transboundary common pools, this challenge is particularly acute since the community of users is quite vast and fragmented among a number of political jurisdictions. Inter-jurisdictional cooperation is of fundamental importance to the management of transboundary common pools, but scholarly work in this area has yet to determine decisively how such cooperation is most effectively structured. It is this basic but important question which serves as the motivation for this study.

Though prohibitive lessons can be learned from common pool tragedies such as the Aral Sea and the Atlantic cod, these cases offer little insight into the preconditions of successful transboundary common pool management. Accordingly, the focus in this study is on water management in the Great Lakes Basin of North America and the Murray-Darling River Basin of Australia, two transboundary common pools that are highly developed but have not (yet) succumbed to resource destruction. The successes and failures of inter-jurisdictional cooperation in these basins are drawn out in a systematic manner in the pages that follow, always with an eye toward resource management lessons that can be applied to transboundary common pools in general. Of all the study's findings, one is most abundantly clear: tragedies such as the Aral and the Atlantic cod are not inevitable and need never happen again.

Chapter 1 – Common Pools and Common Pool Theory: Weighing the Importance of Scale

"But everything depends on what scale you look at things. Now, on the small scale the 'arth is level, but on the large scale it is round. In this manner, pools and ponds, and even the great fresh-water lakes, may be stagnant, as you and I both know they are, having seen them; but when you come to spread water over a great tract like the sea, where the earth is round, how in reason can the water be quiet?"

J. Fenimore Cooper, *The Last of the Mohicans*

1.1 Introduction

The impetus for much of the current social scientific research on common pools and common pool management can be traced to Garrett Hardin's seminal 1968 article on the "Tragedy of the Commons." This article described the social dilemmas facing the users of an open access common pool and lamented the fact that there seemed to be no attainable solution to these collective action problems.[3] Since that time, a small army of social scientists has taken up the challenge presented by Hardin and investigated all sorts of potential solutions to common pool dilemmas, from centralized management, to the invisible hand of the free market, to self-organization by resource users. Through all of these investigations, the theory of common pool management has evolved to the point where there is now a well-established theoretical framework for the study of common pool management and a widely respected body of common pool management theory.

Most of the common pool theory that has become predominant over the past fifteen years has been developed using a rational choice institutionalist theoretical approach. In particular, Elinor Ostrom and her colleagues have developed a theoretical

[3] Garett Hardin, "Tragedy of the Commons," *Science* 162 (December 1968): 1243-49.

framework known as Institutional Analysis and Development (IAD) that has been used to analyze a large number of empirical CPR dilemmas. It is from these empirical studies that the basic theory of common pool management was inductively derived, and further empirical studies have prompted revisions and additions to this theory, bringing it to its current form. The purpose of this chapter is to outline the IAD theoretical framework, discuss the current body of CPR management theory, and explore its limitations so that it might be expanded in new and significant directions. Before proceeding to any of these tasks, though, we must first clarify the nature of common pool resources as a policy good, and explore some of the basic dimensions of common pool management.

1.2 Common Pool Resources and Common Pool Dilemmas

One of the basic conceptual building blocks of common pool analysis is the distinction of common pool resources as a unique policy good. In short, a common pool resource (CPR) is a policy good that is described by the key characteristics of low excludability and high subtractability. A CPR is generally distinguished from three other basic policy goods: public goods, toll goods, and private goods (see Figure 1.2 for a diagram summarizing the key differences between these four basic types of policy goods).[4]

This typology of four basic policy goods is conceptually useful, but only as long as it is regarded as ideal typical: empirically, there is considerable variation within each of the four basic categories. Much of this variation is accounted for by what Sproule-

[4] Elinor Ostrom, Roy Gardner, and James Walker, *Rules, Games, & Common-Pool Resources* (Ann Arbor: University of Michigan Press, 1994) 6-8.

Jones calls "second-order dimensions of a good."[5] In other words, goods that share the fundamental characteristics of low excludability and high subtractibability still vary if they differ according to second-order characteristics such as abundance/scarcity, durability, renewability, flow, or measurability.[6] In reality, CPRs include a wide range of physical goods that are far from identical, even though they share important characteristics that distinguish them from other types of goods. Many natural resources, such as water, oil, mineral, timber, and animal stocks, are readily identifiable as CPRs, but CPRs may also include such human-made resources as internet web space or highway traffic capacity, for example. In all cases, however, the basic characteristics of low excludability and high subtractibility are common to those goods identified as CPRs.

Figure 1.2 – A Basic Classification of Policy Goods

Subtractability / *Exclusion*	Low	High
Difficult	PUBLIC GOODS	COMMON POOL RESOURCES
Easy	TOLL GOODS	PRIVATE GOODS

Source: Elinor Ostrom, Roy Gardner, and James Walker, *Rules, Games, & Common-Pool Resources* (Ann Arbor: University of Michigan Press, 1994) 7

[5] Mark Sproule-Jones, *Governments at Work - Canadian Parliamentary Federalism and Its Public Policy Effects* (Toronto: University of Toronto Press, 1993) 42-44.
[6] Sproule-Jones, *Governments at Work - Canadian Parliamentary Federalism and Its Public Policy Effects* 42-44.

Notwithstanding the considerable variance in their second-order characteristics, it is still useful to regard CPRs as a single type of policy good because the combination of high subtractibility and low excludability creates use incentives for these goods that are uniquely self-destructive. Any instance in which a common pool resource is being appropriated by humans is referred to as a common pool *situation.*[7] Common pool situations may exist with few problems if the number of resource users is small and/or the carrying capacity of the resource is high. However, many common pool situations degenerate into common pool *dilemmas* because new resource users can not be excluded and additional stress is placed on a resource that is already subtractible and diminishing. The dilemma occurs when resource users are faced with the choice of either restraining their individual resource extractions for the collective good, or accelerating their individual resource extractions to maximize relative personal benefits. Rational, self-interested individuals are inclined to choose the latter, but, in doing so, they put the existence of the entire resource at risk.

CPR analysts have investigated a plethora of potential solutions to the CPR dilemma, ranging from centralized management to free market exchange.[8] However, the only solution that has been consistently shown to solve CPR dilemmas is self-organization among CPR users. Self-organization is generally successful because it encourages resource users to form a collective view of the resource and then modify their

[7] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 14.
[8] Katar Singh, *Managing Common Pool Resources - Principles and Case Studies* (Delhi: Oxford University Press, 1994) 50.

individual behaviour to contribute to collective goals.[9] Unfortunately, the achievement of self-organization is not without significant challenges in itself.

1.3 Effective Common Pool Management

Fundamentally, the basic self-organization challenge in all CPR dilemmas is "...how to coordinate the actions of individual [resource] users to attain an optimal rate of production or consumption for the whole community".[10] The achievement of this "optimal rate of production" is particularly daunting because, as Garret Hardin described over thirty years ago, the incentive structure of a CPR dilemma encourages self-interested resource users to compete with each other and overconsume the resource until it is exhausted.[11] Furthermore, CPR dilemmas belong to a class of human problems that can be called "no technical solution problems" because the application of technology can not be used to permanently resolve them.[12] Given their inherent subtractibility, CPRs are finite and no existing technology can be applied to make them infinite. Thus, as Singh intimates in the above quotation, CPR dilemmas can never really be solved; they can only be managed through the development and implementation of a management regime. In other words, CPR management through self-organization involves iterated collective action problems that stretch forward indefinitely through time.

Two of the most basic collective action problems in CPR management have been described by Elinor Ostrom as the problem of provision, and the problem of

---

[9] Elinor Ostrom, *Governing the Commons* (Cambridge: Cambridge University Press, 1990).
[10] Singh, *Managing Common Pool Resources - Principles and Case Studies* 12.
[11] Hardin, "Tragedy of the Commons."
[12] Singh, *Managing Common Pool Resources - Principles and Case Studies* 15.

appropriation. While provision problems refer to the maintenance, improvement, or preservation of the resource as a whole, appropriation problems refer to the extraction of benefits from the resource and their distribution among resource users. Provision and appropriation issues both create collective action problems for resource management, but in different ways. In provision issues, the temptation for rational, self-interested resource users is to "free-ride" on the management efforts of others, so as to minimize personal costs in attaining resource benefits. In appropriation issues, however, the temptation is for resource users to extract as many of the resource benefits as possible in order to maximize personal gains from the resource.[13] Hence, the collective action problem in appropriation issues is one of establishing some sort of mutual restraint among resource users. Both the free-rider and mutual restraint collective action problems are iterated over time, and efforts at self-organization need to address both issues if effective resource management is to be established over the long-term.

In addressing the problems of provision and appropriation, CPR management is also profoundly complicated by the great complexity of the natural world and humans' imperfect knowledge of it. As Kai N. Lee has argued, the complexity of man's interaction with the natural world has so overwhelmed our current understanding that "...humans do not know how to achieve an environmentally sustainable economy," even if the collective will could be found to establish one.[14] Consequently, provision and appropriation issues in CPR management may go unresolved not because of the failure to

---

[13] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 9-14.
[14] Kai N. Lee, *Compass and Gyroscope - Integrating Science and Politics for the Environment* (Washington D.C.: Island Press, 1993) 8.

achieve collective action, but simply because those people undertaking collective action do not possess the knowledge to adequately understand and address these issues. This implies that effective resource management is not only about resolving appropriation and provision issues, but is also about increasing our understanding of the natural world.

Knowledge generation of this sort is a massive undertaking and, as a result, is yet another collective action problem in common pool management. The collective nature of this problem is clearly reflected in the term "social learning," which Lee uses to describe it. In social learning, there is also a temptation to free ride on the efforts of others by displacing the costs of knowledge generation to other resource users. Furthermore, an investment in social learning is a long-term commitment with little immediate material return, so, given this uncertainty, the temptation to free ride is especially strong. Nevertheless, failure to address the social learning problem leaves a CPR at risk, as resource users may be largely unaware of their cumulative impact on a resource.

Ultimately, effective resource management must simultaneously address three collective action problems inherent in all CPR dilemmas: provision, appropriation, and social learning. Not only is each of these problems a considerable challenge individually, but addressing one problem may have adverse (and unintended) consequences for the others. For instance, resource users may resolve an appropriation problem by increasing their respective resource use, but this may adversely affect provision. Similarly, resource users may find a mutually acceptable level of appropriation and provision, but their attachment to this level may inhibit social learning because of a reluctance to accept

change. Addressing each of the individual problems of provision, appropriation, and social learning, as well as the interdependencies between them, is the essence of effective resource management, but is very difficult to attain. Lee argues that the only way to attain this sort of effective management is through a process known as adaptive management.

"Adaptive management is an approach to natural resource policy that embodies a simple imperative: policies are experiments; learn from them".[15] In effect, Lee's advocacy of adaptive management is really an argument for a particular type of policy process that addresses the three collective action problems of CPR management and the interdependencies between them. In the policy formation and implementation stages of this policy process, appropriation and provision issues are addressed so that appropriation activities are harmonized at a level of provision that is perceived to be optimal. Then, in the policy evaluation, and agenda-setting stages, established policies are observed and assessed to determine whether the prevailing level of provision is optimal, and what changes could be made to improve subsequent policies. In short, adaptive management is about establishing sound resource policy in the short-term, and facilitating social learning in the long-term so that resource policy can adapt and improve indefinitely. Rather than aiming for a fixed end-point, adaptive management is the goal in itself, because continuous economic, social, political, and ecological change makes any fixed end-point for resource management completely illusory.

---

[15] Lee, *Compass and Gyroscope - Integrating Science and Politics for the Environment* 9.

If the process of adaptive management is the embodiment of effective CPR management, then the really important questions of CPR analysis relate to the achievement of adaptive management. Lee argues persuasively that institutions creating conditions of "bounded political conflict" are necessary for the attainment of adaptive management in any common pool, but provides little guidance beyond this general assertion.[16] Instead, a larger and more detailed body of theory on this fundamental question has been developed by a group of scholars using a rational choice institutionalist approach to CPR analysis. Most important, in this regard, has been the work of the IAD theorists, spearheaded by Elinor Ostrom.

1.4 The Rational Choice Institutionalist Approach to Common Pool Analysis

Over the past decade and a half, the most influential theoretical approach in the analysis of common pool management has been the Institutional Analysis and Development (IAD) framework created by Elinor Ostrom and her colleagues at the Workshop in Political Theory and Policy Analysis at Indiana University.[17] The IAD approach qualifies as a theoretical framework rather than a full-blown theory because it identifies a set of variables that are posited to be important in the analysis of common pools, but does not itself predict or explain actor behaviour or management outcomes.[18] Accordingly, the IAD framework has been used to structure many empirical analyses of

---

[16] Lee, *Compass and Gyroscope - Integrating Science and Politics for the Environment* chapter 4.
[17] Elinor Ostrom, "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework," *Theories of the Policy Process*, ed. Paul A. Sabatier (Boulder: Westview Press, 1999) 35.
[18] Edella Schlager, "A Comparison of Frameworks, Theories, and Models of the Policy Process," *Theories of the Policy Proces*, ed. Paul A. Sabatier (Boulder: Westview Press, 1999) 234.

common pool dilemmas, and it is from these empirical studies that much of the prevailing theory of common pool management has been inductively derived.

In broader terms, the IAD framework fits into a genus of public policy theory known as rational choice institutionalism, while rational choice institutionalism itself belongs in a class of public policy theory known as neo-institutionalism.[19] To gain a good understanding of the theoretical approaches utilized in this and other CPR studies, it is essential to grasp the basic assumptions of both neo-institutionalist theory in general, and rational choice institutionalist theory in particular.

In all neo-institutionalist theories it is fundamentally assumed that institutions, and the configurations of formal and informal rules that constitute institutions, are central determinants of policy actors' behaviour.[20] Rational choice institutionalism, more specifically, posits that policy actors act as rational utility-maximizers within the constraints, incentives, and opportunities provided by institutional rules. Furthermore, actors are not conceived to be perfectly rational, but are, instead, conceived as boundedly rational within the informational and procedural limitations of the institutional configuration in which they are situated.[21] This bounded rationality assumption distinguishes rational choice institutionalism from the historical and sociological variants of neo-institutionalism, which conceive the influence of institutions on actors as

---

[19] B. Guy Peters, *Institutional Theory in Political Science - The 'New Institutionalism'* (London & New York: Pinter, 1999).
[20] Peters, *Institutional Theory in Political Science - The 'New Institutionalism'* 35-38.
[21] Kenneth A. Shepsle, "Studying Institutions - Some Lessons from the Rational Choice Approach," *Journal of Theoretical Politics* 1.2 (1989): 134-35; Fritz W. Scharpf, *Games Real Actors Play - Actor-Centered Institutionalism in Policy Research* (Boulder: Westview Press, 1997) 19-22.

something that occurs below a conscious, rational level.[22] The assumption of bounded rationality also distinguishes rational choice institutionalism from public choice theories which assume that objective self-interest motives are the key factor in explaining policy actor behaviour. Despite these subtle, yet important, distinctions from other public policy theories, rational choice institutionalism itself encompasses a diverse group of theoretical frameworks, of which the IAD is only one.

All rational choice institutionalist approaches are fundamentally based on a core construct that incorporates all of the institutionally-based factors affecting the behaviour of policy actors. While Sproule-Jones describes this core construct as a "decision situation"[23] and Scharpf describes it as an "actor constellation,"[24] the conceptual core of the IAD framework is known as an *action arena*. To reiterate, an action arena is a conceptual construct that incorporates many variables that influence the behaviour of actors in a policy-relevant process. Accordingly, this construct serves as a useful shorthand for accounting and describing the variables that influence policy actors, and for comparing processes which, on their face, would appear to have little in common. Any action arena is composed of two sets of variables: one set relates to the *actors* evident in the action arena, and the other set relates to the *action situation* within which actors interact to complete a process.[25] Each of these sets of variables requires some detailed

---

[22] Peters, *Institutional Theory in Political Science - The 'New Institutionalism.'*
[23] Sproule-Jones, *Governments at Work - Canadian Parliamentary Federalism and Its Public Policy Effects* 26.
[24] Scharpf, *Games Real Actors Play - Actor-Centered Institutionalism in Policy Research* 12.
[25] Ostrom, "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework" 43.

discussion in order to gain an accurate understanding of all the factors accounted for by the action arena construct.

The first set of variables in any action arena relates to actors and their internal characteristics and processes. Like all rational choice institutionalist approaches, it is fundamentally assumed that all actors are goal-oriented with some kind of ordered *preferences* relating to process outcomes.[26] These preferences, then, can be expected to have a significant impact on the behaviour of actors in an action arena, but not exclusively so. The ability of many actors to act on their preferences is restricted because they lack the *resources*, in terms of time, money, or authority, to pursue them.[27] Furthermore, some actors are incapable of forming clear and ordered preferences because their internal *information-processing capabilities* are either inadequate or forced to reconcile conflicting sources of information.[28] The internal organizational form of actors is particularly important in this regard, as individual, collective, and corporate actors face different information-processing challenges.[29] Finally, actors' decisions in the formation and pursuance of preferences also depend significantly upon their cognitive *selection criteria.*[30] While some actors may behave as selfish egoists, others may have a more solidaristic orientation, and still others may act as selfless altruists.[31] Whatever cognitive orientation an actor holds, it will have a significant impact on both their preferences and their decisions to act on these preferences in an action arena. In sum, then, by

---

[26] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 33.
[27] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 35.
[28] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 33-34.
[29] Scharpf, *Games Real Actors Play - Actor-Centered Institutionalism in Policy Research* 52-60.
[30] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 35.
[31] Scharpf, *Games Real Actors Play - Actor-Centered Institutionalism in Policy Research* 60-66.

considering variables such as actor preferences, resources, information-processing capabilities, and selection criteria, one can begin to explain actor behaviour in any given action arena.

Explanations of actor behaviour only become complete in the IAD framework when actor variables are considered in conjunction with action situation variables, those variables related to the inter-actor aspects of an action arena. The fundamental assumption in any action situation is the presence of an unspecified number of *participants*, the actors involved in a given process. These participants occupy different *positions*, which are "...simply place holders to associate participants with an authorized set of actions."[32] The types of positions evident in any given action arena are determined by the context of the action arena (discussed further below), but some examples of positions include voters, regulators, monitors, referees, gatekeepers, and so on.[33] Positions not only specify permitted or expected *courses of action* for those who occupy them, they may also provide actors with varying amounts of *information* about the likely *outcomes* of their actions and the actions of other actors.[34] Whatever its source, information is important in action arenas because actors use it to calculate the *costs and benefits* of courses of action, and the outcomes expected from these actions.[35] Finally, a key variable in any action situation is the *transformation function* that translates actor interactions into process outcomes. Transformation functions may take the form of unilateralism, voting, negotiation, or centralized command, and each of these functions

[32] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 30.
[33] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 30.
[34] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 30-31.
[35] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 32.

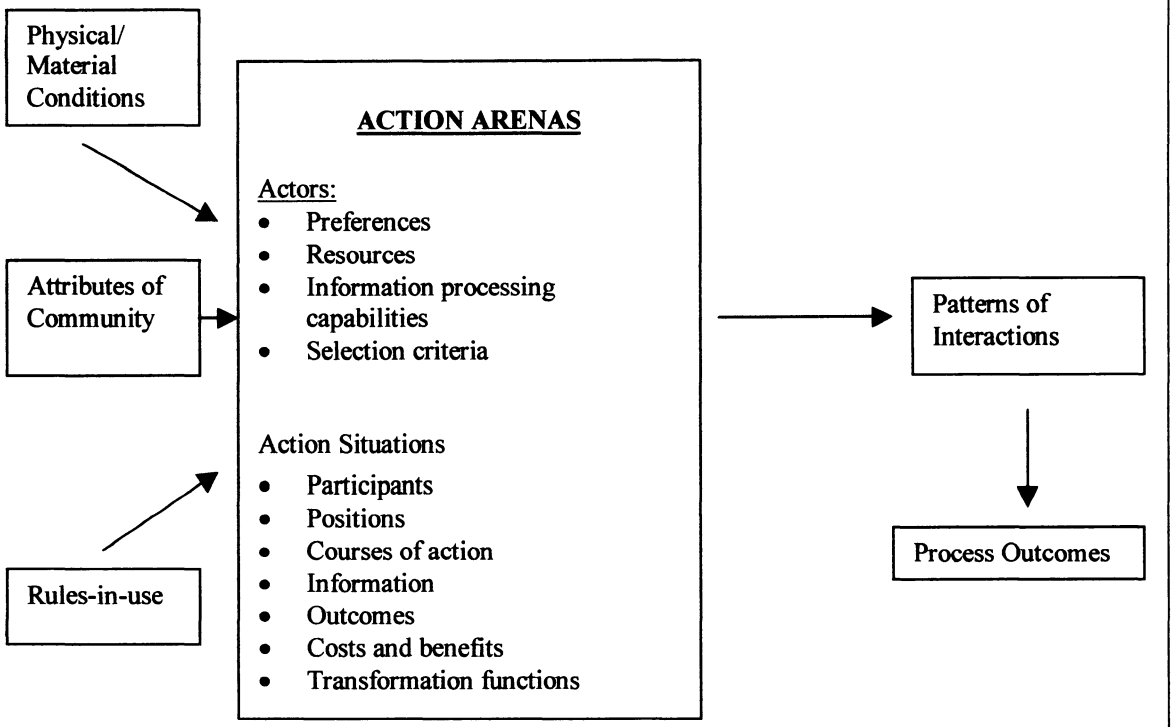
has significant implications for the kinds of outcomes likely to emerge from any action arena.[36] Overall, then, action situations are best described by a set of variables that includes participants, positions, courses of action, information, outcomes, costs and benefits, and transformation functions.

When combined, the sets of variables describing actors and action situations blend together to describe an action arena, the immediate setting within which actors interact to create process outcomes. In this way, actor and action situation variables are utilized by IAD theorists to explain, and to a more limited extent predict, patterns of actor interactions and process outcomes. All of these variables and their places in the IAD framework are illustrated below in Figure 1.4a.

As intimated above, action arenas (and all of the variables within action arenas) are themselves conceptualized as significantly affected by a number of important "contextual" variables. In short, these contextual variables constitute the physical, social, and legal-normative worlds within which an action arena is nested, and these variables explain why action arenas differ significantly in different contexts. The three contextual variables identified as most important in the IAD framework include the physical/material conditions of the natural environment, the attributes of the surrounding community, and the higher-order institutional rules-in-use. The place of each of these variables in the IAD framework is also illustrated in Figure 1.4a, and each is discussed at greater length below.

[36] Scharpf, *Games Real Actors Play - Actor-Centered Institutionalism in Policy Research.*

Figure 1.4a – The IAD Conceptualization of a Policy Relevant Process



Source: Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 29 & 37.

The physical and material conditions that shape action arenas generally refer to the laws of the natural world that constrain the universe of the possible in any given action arena. The influence of physical and material conditions is most apparent in action arenas when one considers the physical constraints inherent in any single type of policy good. In common pool resources, for instance, the laws of nature preclude actors in an action arena from reversing the subtractible and non-excludable nature of the resource. Instead, action arenas are shaped by these physical constraints and distinguishable patterns of interaction are the result. Take, for example, a group of farmers who share a pond for irrigation purposes. Because the pond is a common pool resource, its subtractibility creates difficult zero sum interactions among farmers. At the same time,

however, these farmers also rely on the sun as a shared resource for crop growth, but it is a non-subtractible resource that creates little conflict. Clearly, the prevailing physical and material conditions can have an important impact in shaping action arenas, especially the first order characteristics of subtractibility and excludability.

Among the community attributes shaping action arenas, a number of social, cultural, and demographic variables are of relevance. Foremost among these are the behavioural norms generally accepted by the community, the level of common understanding within the community, the extent of homogeneity in preferences within the community, and the level of inequality among community members.[37] In addition, a community's general perception of itself relative to other communities may also be important in terms of its internal cohesion and propensity to compete with other communities. For instance, if the farmers discussed above constituted a religious sect such as the Mennonites or Amish, as opposed to a group of modern agri-businesses, the prevailing action arenas would be profoundly different. A group of Amish farmers, who have essentially withdrawn from the modern market economy, would be much more solidaristic and moral-driven than a group of agri-businesses who are inherently competitive and profit-driven within modern markets. This contrast clearly illustrates the importance of community as a contextual variable affecting both the actors and action situations in action arenas.

As a contextual variable, institutional rules generally refer to those higher order rules that are relevant, but are not directly structuring an action arena of concern. The

impact of higher order institutional rules is well illustrated through a contrast between authoritarian and liberal-democratic states. If the farmers considered above existed in a Soviet-style authoritarian state, their production and water use decisions would likely be imposed from above, and most action arenas would be state-dominated. In a liberal-democratic state, however, the government would be further removed and farmers' production and water use decisions would be predominantly affected by prevailing regulatory and market pay-offs. The importance of institutional rules-in-use in shaping action arenas is readily apparent, and the IAD framework focuses particular attention on rules-in-use and their impact on action arenas and process outcomes.

Much of the attention focused on institutional rules-in-use in IAD common pool analyses is explained by the fact that these human-made prescriptions are the only contextual variable that is immediately accessible to human reform efforts. In most cases, the ultimate objective of rational choice institutionalist analysis is to analyze processes with the goal of improving process outcomes. As already discussed, the physical/material conditions shaping any action arena are almost immutable, and the attributes of any community may be changed over time, but not without considerable effort and social upheaval. As a result, rational choice institutionalists generally focus their analyses on institutional rules-in-use and how rules-in-use can be adjusted to shape action arenas and improve process outcomes within a given set of physical and social conditions. Of the three contextual variables, then, the only one that is usually varied in rational choice institutionalist studies is that of institutional rules-in-use.

---

[37] Ostrom, "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development

To this point, our discussion has focused mostly on action arenas and the contextual variables that shape action arenas. However, a key assertion of the IAD framework is that a single action arena is unlikely to account for all of the processes that are relevant to any given governance issue. For example, in a common pool dilemma, distinct action arenas may be evident in the day-to-day decisions of resource users, in the policy decisions of governmental officials, and in the constitutional debates of an entire polity. Each of these action arenas has the potential to produce outcomes that impact on common pool management, some more direct than others, and all of these action arenas should be considered in explanations of CPR management outcomes. Accordingly, the IAD framework conceptualizes that action arenas exist at a number of different institutional levels, referred to as the operational, collective choice and constitutional levels.[38]

As one would expect, the action arenas at each of the operational, collective choice and constitutional levels are assumed to be shaped by the three contextual variables discussed above (see Figure 1.4b). Furthermore, each institutional level is believed to be nested in the levels above and below it, creating an intricate web of action arenas and institutional rules that approximates the complexity of real-world governance. The basic action arena in any governance issue is at the operational level, where actors are involved in processes that directly affect the social and physical world. For example, in common pool dilemmas, operational level action arenas are characterized by everyday

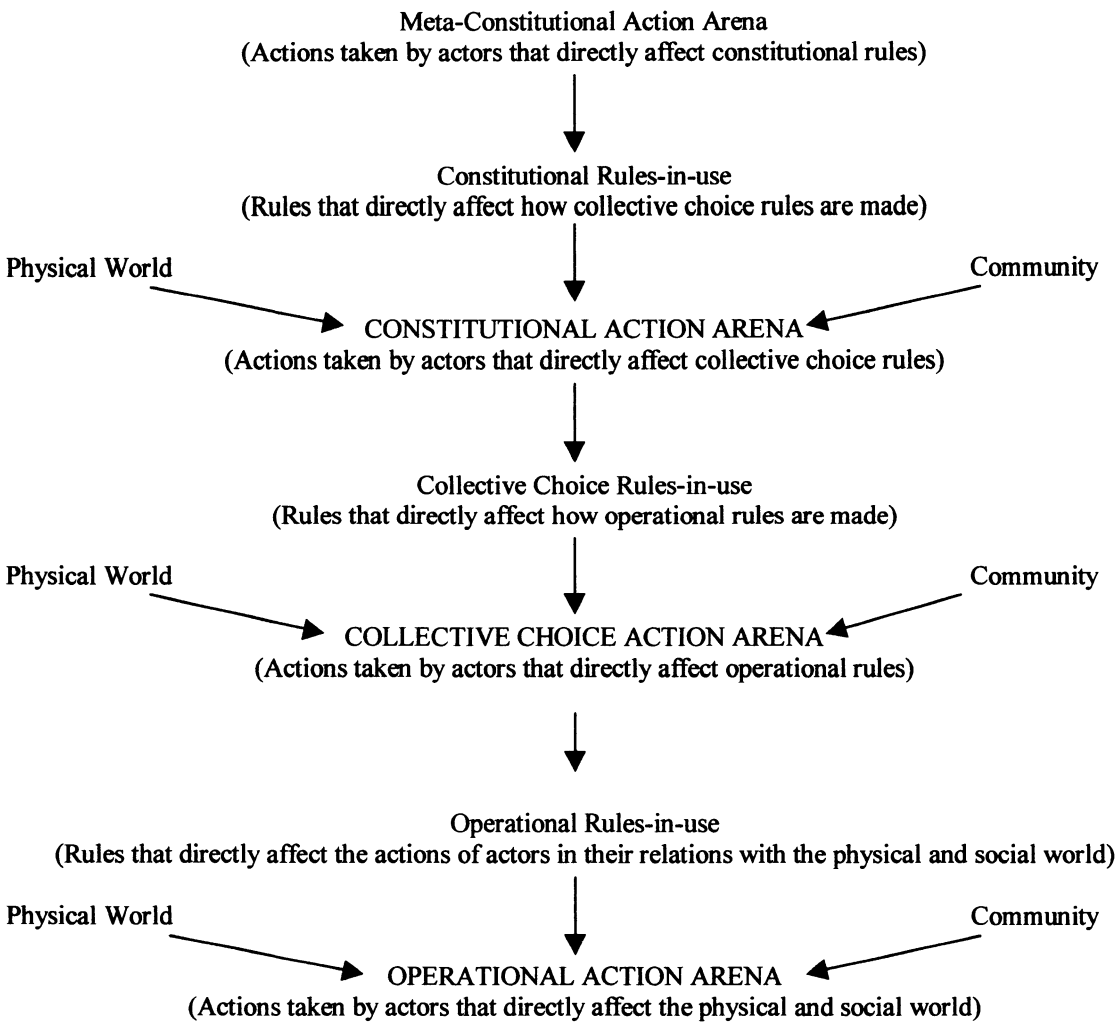
---

Framework" 57.

[38] Ostrom, "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework."

resource use decision-making by individual resource users. At the collective choice level, actors participate in processes to create or reform operational level rules. This is commonly referred to as the policy-making level, and, in the case of common pools, the issues of concern relate mostly to the regulation and facilitation of provision, appropriation, and social learning activities. Finally, at the constitutional level, collective choice level rules are the subject of debate, such as the designation of governmental jurisdiction over a particular resource. The inter-relations between the operational, collective choice, and constitutional levels are depicted below in Figure 1.4b, as are the contextual variables that impact on the action arenas at each level.

Figure 1.4b – Levels of Institutional Rules and Action Arenas



Source: Elinor Ostrom, "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework," *Theories of the Policy Process*, ed. Paul A. Sabatier (Boulder: Westview Press, 1999) 60.

Overall, rational choice institutionalist approaches, such as the one described here, have been utilized by many scholars to study common pool management situations and to analyze the effects of various management institutions on the resolution of CPR

dilemmas. It is from these empirical studies that the IAD theory of common pool management has been inductively derived, and it is to this theory that we now turn.

1.5 Common Pool Management Theory and the Relevance of Scale

Over the past fifteen years, the main research goal of IAD scholars has been to use the IAD framework to uncover the design principles that underpin effective long-term common pool management institutions. In this effort, a multitude of empirical CPR management studies have been undertaken and the results inventoried in a number of ongoing database projects. Inductive analyses have then been undertaken from these empirical results in an effort to discover common design principles among effective CPR management institutions.[39] Particularly over the past ten years, IAD theorists have incrementally developed a list of institutional design principles that is now widely accepted as a general guide for the construction of robust CPR management institutions. A summary of these institutional design principles is provided below in Figure 1.5

[39] Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources.*

Figure 1.5 – Design Principles of Effective Long-Term CPR Management Institutions[40]

1. Clearly Defined Boundaries
   - The group of actors with rights to use the common pool, and the boundaries of the common pool itself, are clearly defined.

2. Congruence
   - The benefits actors receive from resource use are roughly proportional to the costs imposed on them in managing the resource.
   - Management practices are flexible enough to accommodate variance in local conditions within the common pool.

3. Collective-Choice Arrangements
   - Most of the individuals affected by operational rules can participate in modifying operational rules at the collective choice level.

4. Monitoring
   - There are active monitors who audit the resource users' behaviour and are accountable to them.

5. Graduated Sanctions
   - Resource users who violate operational rules receive graduated sanctions, enforced by officials accountable to all resource users.

6. Conflict-Resolution Mechanisms
   - Resource users have rapid access to low-cost arenas for dispute resolution.

7. Minimal Recognition of Rights to Organize
   - The rights of resource users to devise their own management institutions are not challenged by external governmental authorities.

Though the validity and reliability of the IAD theory of common pool management has been effectively established, there are some notable limitations in this theory related to common pool size. In the development of the above institutional design

[40] This chart is based on work found in: Elinor Ostrom, *Governing the Commons* (Cambridge: Cambridge University Press, 1990); Elinor Ostrom, *Crafting Institutions for Self-Governing Irrigation Systems* (San Francisco: ICS Press, 1992); Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources*; Ostrom, "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework."

principles, there seems to have been a strong selection bias toward common pools that are relatively small in terms of resource units or resource users. This is significant because it means that the institutional design principles that were derived from these studies are really only generalizable to common pools of limited size. Many studies of large common pools do exist, but the findings from these studies have not been thoroughly integrated with the prevailing IAD theory of common pool management. In order to do so, CPR scholars would have to come to grips with the concept of scale, which is something that social scientists in general have not yet done effectively.

Quite simply, an awareness of scale is the realization that units of analysis, such as common pool resources, vary in terms of both extent and resolution. While extent refers to the size of a unit of analysis and is usually measured in terms of time, space, or number of components, resolution refers to the amount of detail focused upon within a unit of analysis, and is usually expressed in terms of precision or specificity. The relationship between extent and resolution is an interdependent one, but not absolutely so: usually, the larger an extent one chooses to analyze, the lower the resolution tends to be. In this way, the amount of detail under analysis does not become overwhelming and perspective can be maintained on the entire unit of analysis. Large extent, high resolution studies are possible, as methodological techniques such as sampling may be utilized to assist in such undertakings, but they tend to be prohibitive in terms of time, effort, and cost, and they are so complex that they are prone to research error. [41]

[41] Gibson, Ostrom, and Ahn, "The Concept of Scale and the Human Dimensions of Global Change: A Survey" 219.

In the CPR and ecosystem management literature, there is a general assertion that "scale matters" in natural resource management, but this assertion has yet to be fully investigated and understood. For instance, Robert Costanza and his colleagues argue that "[l]arge-scale ecosystems are not simply small-scale systems grown large, nor are micro-scale systems mere microcosms of large-scale systems. The driving forces and feedback mechanisms in large and small-scale systems operate at different levels and exhibit distinct patterns."[42] As well, Anders Biel has explored the collective action problems of common pools of varying scale and come to the conclusion that CPR dilemmas at different scales exhibit clearly distinct patterns of social and natural complexity.[43] Other authors have also found that scale has a significant impact on how resources are managed, but these findings have yet to be refined and incorporated into the existing theory of CPR management.[44]

Though CPR management theory remains somewhat insensitive to the exigencies of scale, the IAD theoretical framework does provide the conceptual tools necessary to correct this. Upon closer examination, it is readily apparent that the IAD framework implicitly incorporates considerations of both extent and resolution, the two core

---

[42] Robert Costanza, et al., "Ecosystems and Human Systems: A Framework for Exploring the Linkages," *Institutions, Ecosystems and Sustainability*, ed. Robert Costanza, et al. (London: Lewis Publishers, 2001) 7.
[43] Anders Biel, "Factors Promoting Cooperation in the Laboratory, in Common Pool Resource Dilemmas, and in Large-Scale Dilemmas," *Cooperation in Modern Society - Promoting the Welfare of Communities, States and Organizations*, ed. Mark Van Vugt, et al. (London: Routledge, 2000) 25-41.
[44] See, for example: Robert Paehlke, "Spatial Proportionality: Right-Sizing Environmental Decision-Making," *Governing the Environment - Persistent Challenges, Uncertain Innovations*, ed. Edward A. Parson (Toronto: University of Toronto Press, 2001) 73-124; Susan J. Buck (Cox), "Multi-Jurisdictional Resources: Testing a Typology for Problem-Structuring," *Common Property Resources - Ecology and Community-Based Sustainable Development* (London: Bellhaven Press, 1989) 127-47; Sara Singleton and Michael Taylor, "Common Property, Collective Action and Community," *Journal of Theoretical Politics* 4.3 (1992): 309-24; Steven C. Hackett, "Heterogeneity and the Provision of Governance for Common-Pool Resources," *Journal of Theoretical Politics* 4.3 (1992): 325-42.

components of scale. For instance, the extent of common pools is incorporated into the framework through the contextual variables of physical conditions, community attributes, and higher order institutional rules. Likewise, various resolutions of analysis are incorporated into the framework through the conceptualization of multiple levels of institutional activity at the operational, collective choice, and constitutional levels. This awareness of scale is important because it underscores the limitations of the existing body of CPR management theory and suggests avenues for further research.

The general selection bias in IAD studies toward common pools of relatively limited extent is important because it means that the theory derived from these studies is generalizable only to common pools at small scales. From a methodological perspective, this selection bias toward small-scale common pools is not particularly problematic; in fact, controlling extent in this way seems to have greatly facilitated the development of the existing CPR management theory. However, it is imperative that this theory is not generalized beyond the specific extent from which it was derived, a limitation that IAD theorists, unfortunately, have not always recognized.[45] To develop a similar theory on CPR management at large scales, more theoretical work needs to be done and many more empirical case studies need to be examined.

Though some of the institutional design principles uncovered for small-scale common pools may also be applicable at larger scales, it is reasonable to expect some differentiation given the distinctive nature of the collective action challenges experienced

at larger scales. When the extent of a common pool is vastly increased, concomitant changes usually occur in all three contextual variables. The resource itself becomes much larger and more complex so that provision issues are difficult to assess and comprehend, and the burden of social learning is significantly increased. The community of users is also much larger and it is often much more diverse and diffuse, creating new barriers to collective action. Finally, large-scale common pools are also more likely to traverse, flow, or roam across political borders, creating collective action problems among governments as well as among resource users. Clearly, a shift in extent from small-scale to large-scale brings with it a number of distinctive challenges for CPR management.

Though the general distinction between small-scale and large-scale common pools is analytically useful, extent, in reality, is an interval level variable with innumerable variance ranging from tiny village wells to the global atmosphere. Despite the evident need for studies of large-scale common pools of all sorts of extents, the focus of this study is on transboundary common pools, those common pools that transcend the borders of multiple sovereign jurisdictions, but do not encompass the entire globe. Accordingly, this study is intended to break new ground in the study of large-scale common pools, but its findings are generalizable only to those common pools at a transboundary scale.

---

[45] See, for example: Michael McGinnis and Elinor Ostrom, "Design Principles for Local and Global Commons," *The International Political Economy and International Institutions*, ed. Oran R. Young, vol. 2 (Cheltenham: Edward Algar Publishing Company, 1996) 464-93.

1.6 Transboundary Common Pools

Generally speaking, transboundary common pools tend to be comprised of resources that are fugitive in their natural condition; that is, they move or flow during the course of their natural lifecycles. Fish, water, and wildlife stocks are particularly good examples of this kind of fugitive resource. Common pools that are not fugitive, such as mineral or forestry stocks, are much less likely to be considered transboundary because they remain fixed in one place and create fewer inter-jurisdictional interdependencies. In effect, fugitive common pools are most likely to be transboundary common pools, but only if their natural flow takes them through multiple sovereign jurisdictions.

Though the IAD theorists have generally avoided transboundary common pools, there is another group of scholars that has developed a burgeoning literature on this topic. This group is far less cohesive than the IAD theorists, containing a smattering of public policy, federalism, and international relations scholars. The most prolific among them is the international regime theorist Oran Young, but a number of others, particularly Peter M. Haas and Kai N. Lee, have also made important contributions.

Most of the existing work on transboundary common pools has been undertaken using institutionalist or neo-institutionalist approaches, and much of it has been focused on intergovernmental institutions and their effects on resource management. However, there is little agreement in this literature about which intergovernmental institutions are most effective. While Oran Young has expounded a number of institutional design principles for transboundary CPR management, there are many dissenters and a wide variety of intergovernmental institutions, ranging from quasi-hierarchy to minimal

intergovernmental coordination, have been advocated. Yet, convincing evidence to support any one of these institutions has yet to be put forward. This is explained, in large part, by the fact that many transboundary CPR case studies have been analyzed, but few explicitly comparative studies have been undertaken. To make the leap from description to explanation in the social sciences, however, comparative analyses are usually necessary, and this will be the main contribution of the present study.

As the existing literature makes abundantly clear, the vast extent of transboundary common pools is significant because it distinctly shapes the collective choice action arenas where resource management policy decisions are made. Because these common pools encompass multiple sovereign jurisdictions, they are usually characterized by a high degree of fragmentation within the user group and among governmental regulators. Thus, collective action to address shared provision, appropriation, and social learning issues is hindered by both the large number of actors who have a stake in these issues, and by the political barriers between them. If this fragmentation is not overcome through some form of inter-jurisdictional cooperation, the actors involved may be unaware of their collective impact on a CPR, or they may become aware and accelerate their individual resource use. Either way, tragedies of the commons are quite possible in transboundary common pools, as the demise of the Aral Sea and the Atlantic cod grimly illustrated in this study's Introduction.

Inter-jurisdictional cooperation in transboundary common pools can take many forms, but governmental actors almost always dominate these processes. Though private governance is possible in transboundary common pools, it is unlikely for a number of

reasons. First, the collective action challenges involved in securing the cooperation of the vast number of resource users evident in most transboundary common pools are formidable, if not outright prohibitive.[46] Second, and more importantly, governments generally have strong interests in transboundary common pools which prompt them to exercise their sovereign prerogative of "final say" in resource management, trumping any efforts at private governance. Transboundary common pools are often of such economic, military, and symbolic importance that governments are careful to protect both their legal jurisdiction and their strategic position related to these resources. Consequently, catchment-wide private governance efforts are usually eclipsed by intergovernmental governance efforts, and intergovernmental relations are a main focal point of resource management in most transboundary common pools.

Intergovernmental relations has long been a topic of study for neo-institutionalists of all stripes, and most neo-institutionalists approach the study of intergovernmental relations by focusing on the institutional rules that governments use to interface their interactions. In the IAD framework, these rules exist at the collective choice level and may be collectively referred to as an "intergovernmental interface." Intergovernmental interfaces "...may consist of constitutional law, statutory law, intergovernmental agreements, memoranda of understanding, and informal conventions, but collectively they form a web of rules and norms that shape the way governments exercise their respective policy authorities" in issues of shared concern.[47] More specifically,

---

[46] Biel, "Factors Promoting Cooperation in the Laboratory, in Common Pool Resource Dilemmas, and in Large-Scale Dilemmas."

[47] B. Timothy Heinmiller, "Finding a Way Forward in the Study of Intergovernmental Policy-Making," *Canadian Public Administration* 45.3 (2002): 428.

intergovernmental interfaces are crucial in establishing the degree of intergovernmental cooperation or autonomy evident in common pool management.

The prevailing intergovernmental interface in any transboundary common pool is very important because it shapes the collective choice action arena(s) in which resource management policies are ultimately formed. In the IAD framework, this dynamic is referred to as nesting, which is best described in a simple analogy used by Elinor Ostrom:

> The nesting of rules within rules at several levels is similar to the nesting of computer languages at several levels. What can be done at a higher level will depend on the capabilities and limits of the rules (or the software) at that level and at a deeper level.[48]

The goal of this study is to uncover the capabilities and limits of different intergovernmental interfaces by investigating the resource management policies that are produced under them. Using this comparative analysis, the relative effectiveness of intergovernmental interfaces can be determined, and some institutional design principles for transboundary common pools may be developed.

1.7 Summary

In this chapter we have explored the fundamental nature of common pool resources, the theoretical framework most commonly used to study common pool resources, and the strengths and weaknesses of the existing common pool management theory. While the existing theory is generalizable only to common pool dilemmas that exist at relatively small scales, the IAD framework is quite amenable to large-scale

studies, including studies of transboundary common pools. Because they transcend multiple sovereign jurisdictions, governments are central actors in transboundary common pools and the way in which governments interface their interactions is crucial. The existing scholarship on transboundary common pools has investigated many different types of intergovernmental interfaces, but there is little consensus on which interface is optimal for resource management. This question constitutes the main research focus of this study, and is explored in much greater detail in the chapters that follow.

[48] Elinor Ostrom, "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework," *Theories of the Policy Process*, ed. Paul A. Sabatier (Boulder: Westview Press, 1999) 58.

Chapter 2 – Studying Transboundary Common Pools Empirically: An Introduction to the Great Lakes and Murray-Darling Basins

"Since the dawn of time, human beings have harnessed water to improve our lives. In some ways, the history of civilization is the story of how we made water work for us in ever more ingenious ways."

Anonymous

2.1 Introduction

At first glance, the empirical complexity of transboundary common pools is absolutely overwhelming: management activities take place amongst a diverse group of public and private actors, at multiple institutional levels and in various political forums. However, the theoretical work of the previous chapter helps us to grasp this complexity, by focussing attention on two key variables: intergovernmental interfaces and resource management policies. Resource management policies (the dependent variable) are significantly affected by intergovernmental interfaces (the independent variable) because interfaces shape the action arenas in which policies are made. The main purpose of this chapter is to outline the research methodology used in this study to test this relationship with real-world experiences of transboundary common pool management. We begin this task with an in-depth exploration of the conceptualization, operationalization, and measurement of both the independent and dependent variables.

2.2 Conceptualizing, Operationalizing and Measuring Intergovernmental Interfaces

As discussed in Chapter 1, intergovernmental interfaces are a web of institutional rules at the collective choice level that specify how governments coordinate their

concurrent sovereignties in areas of shared concern.[49] One of the defining features of any intergovernmental interface is the mode of interaction it establishes between governments. Generally speaking, this mode of interaction can take the form of either: unilateralism, negotiation, majority voting, or hierarchy.[50] These modes of interaction provide a general distinction between various intergovernmental interfaces, but, as argued below, it is the distinctions between various forms of negotiation that are most relevant to transboundary common pools.

Though unilateralism is the default mode of interaction in most action arenas featuring multiple sovereign governments, it tends to be less common in transboundary common pools. Unilateralism is problematic in transboundary common pools because it precludes collective action among governments. In some cases, this can result in inter-jurisdictional competition in resource use and lead to common pool decline in a manner reminiscent of Hardin's "tragedy of the commons." In other cases, unilateralism is problematic because intergovernmental collective action may be necessary in order to capture resource benefits. Either way, unilateralism tends to be short-lived in transboundary common pools, as governments discover advantages from some form of cooperation and reform their intergovernmental interface accordingly.

Even less common than unilateralism among governments is majority voting and hierarchy. Governments that share a transboundary common pool are often quite reluctant to submit to intergovernmental interfaces that involve majority voting or

---

[49] B. Timothy Heinmiller, "Finding a Way Forward in the Study of Intergovernmental Policy-Making," *Canadian Public Administration* 45.3 (2002).
[50] Fritz W. Scharpf, *Games Real Actors Play - Actor-Centered Institutionalism in Policy Research* (Boulder: Westview Press, 1997).

hierarchy because they are protective of their distinct interests in the resource. For instance, governments generally eschew interfaces based on majority voting because voting creates winners and losers, and few governments are willing to take the chance of becoming a loser for the sake of intergovernmental comity. A hierarchical interface is even less appealing to most governments because it means a complete surrendering of authority to the whims of another government or intergovernmental agency. Rather than surrendering the protection of their interests to an outside actor, governments tend to preserve their sovereignty over transboundary common pools, and represent their own interests in intergovernmental interfaces where negotiation is the institutionalized mode of interaction.

As intimated, negotiation is by far the most common mode of interaction between governments in transboundary common pools.[51] The predominance of intergovernmental negotiation is important because it means that the collective choice action arenas of most transboundary common pools are characterized by two-level games. In two-level games, governments negotiate with each other in an intergovernmental policy game while simultaneously accommodating domestic interests in contiguous domestic policy games.[52] Because governments are involved in intergovernmental and domestic games simultaneously, developments at one level can significantly impact the other, and considerable complexity and interdependence is the result. Though most

[51] Samuel J. Barkin and George E. Shambaugh, "Common-Pool Resources and International Environmental Politics," *Environmental Politics* 5.3 (Autumn 1996): 429-47; B. Timothy Heinmiller, "Governance of Large-Scale Common Pool Resources: A Literature Review" (McMaster University: Political Science, July 2001).

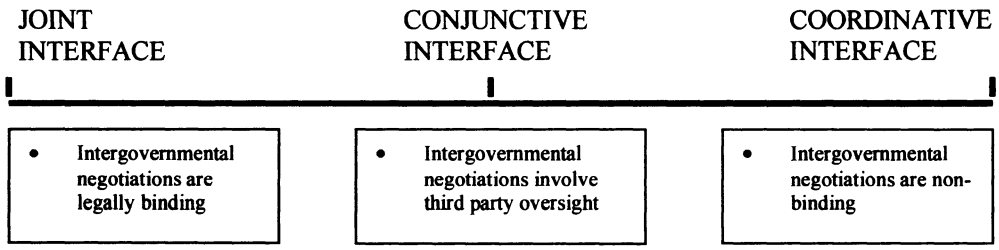
[52] Robert D. Putnam, "Diplomacy and Domestic Politics: The Logic of Two-Level Games," *International Organization* 42.3 (Summer 1988): 427-60.

intergovernmental negotiations are likely to result in two-level games, not all two-level games are exactly alike.[53] In fact, the kind of two-level game prevalent in a collective choice action arena can vary quite substantially, depending on the relative importance assigned to the intergovernmental and domestic levels.

Intergovernmental interfaces are crucial in determining the relative importance of the domestic and intergovernmental levels in two-level games because they institutionalize the degree to which intergovernmental negotiations are binding or non-binding on the participants. At one extreme, a joint intergovernmental interface creates an intergovernmental policy game where the outcomes are legally binding and domestic compliance can be judicially enforced on the participating governments. At the other extreme, a coordinative interface creates an intergovernmental policy game where the outcomes are non-binding on the participants, and compliance is entirely voluntary. In between these extremes is a conjunctive interface where outcomes at the intergovernmental level are not legally binding, but third parties are used to persuade and cajole as a means of prompting domestic governmental compliance with intergovernmental obligations. The differences between these ideal typical intergovernmental interfaces are illustrated below in Table 2.2a, which provides some indication of how the two-level games created by these interfaces would also differ.

[53] George Tsebelis, *Nested Games: Rational Choice in Comparative Politics* (Cambridge: Cambridge

Figure 2.2a – Ideal Typical Intergovernmental Interfaces in the Negotiation Mode of Interaction



The key difference between the two-level games created by joint, coordinative, and conjunctive interfaces is the extent to which governments can retreat from cooperation at the intergovernmental level to undertake unilateral action at the domestic level. In a joint interface, where intergovernmental negotiations are legally binding, governments are prohibited from retreating to the domestic level and are bound to the outcomes of intergovernmental negotiations. In contrast, a coordinative interface allows for relatively easy retreat from the intergovernmental level and there is a strong capacity for domestic unilateralism. Alternatively, a conjunctive interface allows for domestic unilateralism, but at the cost of severe criticism, and perhaps ostracism, at the intergovernmental level, brought about by third party oversight.

Clearly, the two-level games operative in intergovernmental negotiations can vary quite significantly depending on the prevailing intergovernmental interface, and one can reasonably expect that the policy outcomes associated with these interfaces to also show

---

University Press, 1990).

substantial variance.[54] In this regard, the real question of interest to this study is which of these intergovernmental interfaces is most likely to result in policy outcomes that approximate adaptive management? Existing rational choice institutionalist theory provides some direction in addressing this question, but falls short of providing a complete answer.

Among rational choice institutionalists, the policy effects of joint interfaces have been most thoroughly investigated by Fritz Scharpf in his exploration of joint decision traps.[55] While joint decision traps have generally taken on a negative connotation, it is important to emphasize that they actually have both positive and negative implications for public policy. On the negative side, joint interfaces usually result in intergovernmental policy processes that are long and drawn-out, given the extensive intergovernmental negotiations that are usually necessary to reach consensus on binding policy agreements. Furthermore, despite considerable efforts at negotiation, no policy decision may be forthcoming, or policy decisions that do emerge may be the lowest-common denominator and result in minimal policy change.[56] On the positive side, however, once a policy decision has been made in a joint interface, these policies are generally regarded as highly legitimate, and domestic defections during implementation are virtually prohibited by the binding nature of these intergovernmental commitments.[57] Thus, though it is reasonable to expect that the establishment of adaptive management

---

[54] Fritz W. Scharpf, "Introduction: The Problem-Solving Capacity of Multi-Level Governance," *Journal of European Public Policy* 4.4 (December 1997): 520-38.
[55] Scharpf, "The Joint Decision Trap: Lessons From German Federalism and European Integration."
[56] Scharpf, "The Joint Decision Trap: Lessons From German Federalism and European Integration."
[57] Tsebelis, "Decision Making in Political Systems: Veto Players in Presidentialism, Parliamentarism, Multicameralism and Multipartyism."

may be difficult under a joint interface, it may prove quite effective in maintaining it once this policy step has been taken.

Likewise, coordinative interfaces have been both criticized and praised by rational choice institutionalists, on varying grounds. Coordinative interfaces are usually criticized because they result in intergovernmental commitments that are essentially unenforceable, except on moral and ethical grounds. Thus, as a means of intergovernmental collective action, it is argued that coordinative interfaces are ineffective because they do not adequately deter governmental defections, and repeated defections can lead to the complete breakdown of intergovernmental policy commitments.[58] Consequently, any intergovernmental commitment toward adaptive management under a coordinative interface is likely to be fragile over the long-term. On the other hand, coordinative interfaces have also been praised because governments that are not constrained by binding intergovernmental commitments are free to experiment and innovate in domestic policy development.[59] If policy innovation is allowed to flourish, adaptive management may emerge in the domestic policy of one jurisdiction and spread to other jurisdictions through a process of policy emulation. Often referred to as the "California effect," the spread of socially responsible policies through policy innovation and emulation has been

[58] Ackerman, et al., *The Uncertain Search for Environmental Quality*; Paul Pierson, "Fragmented Welfare States: Federal Institutions and the Development of Social Policy," *Governance: An International Journal of Policy and Administration* 8.4 (October 1995): 449-78.
[59] Albert Breton, *Competitive Governments - An Economic Theory of Politics and Public Finance* (Cambridge: Cambridge University Press, 1998).

documented in a number of instances, and could be a plausible effect of coordinative interfaces in a transboundary common pool.[60]

Unlike joint and coordinative interfaces, rational choice institutionalists have paid relatively little attention to the policy implications of conjunctive interfaces. Fortunately, however, conjunctive interfaces have figured prominently in the work of transboundary common pool scholars such as Oran Young and Peter M. Haas. The features of these interfaces that have been of most interest to Young and Haas are the influential intergovernmental organizations that have been created in some transboundary common pools.[61] These intergovernmental organizations are important because they assist in the development of intergovernmental policy and oversee its implementation at the domestic level. In rational choice institutionalist terms, these influential intergovernmental organizations provide opportunities for adaptive management because they reduce the transaction costs of cooperative policy development and engender intergovernmental trust in policy implementation by acting as a third party watchdog over the resource and its management. Thus, there is good reason to believe that conjunctive interfaces, maybe even more so than joint or coordinative interfaces, may be a good institutional solution for the encouragement of adaptive management.

Overall, based on rational choice institutionalist theory and the prevailing scholarship on transboundary common pool management, it is reasonable to hypothesize

---

[60] David Vogel, *Trading Up: Consumer and Environmental Regulation in a Global Economy* (Boston: Harvard University Press, 1995).

[61] Oran R. Young, *International Cooperation - Building Regimes for Natural Resources and the Environment* (Ithaca & London: Cornell University Press, 1989); Peter M. Haas, "International Institutions and Social Learning in the Management of Global Environmental Risks," *Policy Studies Journal* 28.3 (2000): 558-75.

that joint, coordinative, and conjunctive interfaces could each lead to the achievement of adaptive management in transboundary common pools. The primary task of this study is to investigate these hypotheses in an effort to determine the actual impact that these intergovernmental interfaces have on resource management policy. In this way, it should be possible to determine which intergovernmental interface is most conducive to adaptive management, and the institutional design principles of this interface can be identified and incorporated into the prevailing IAD theory of CPR management.

In order to investigate these hypotheses, however, it is necessary to have an operational definition of intergovernmental interfaces, so that the various interfaces discussed above can be recognized empirically. Fundamentally, an intergovernmental interface is nothing more than a configuration of collective choice level rules. In the IAD framework, rule configurations at any given level of analysis can be operationalized according to the typology of institutional rules summarized below in Figure 2.2b. This typology breaks down institutional rule configurations into their constituent rules, which can then be measured individually. In this way, intergovernmental interfaces can be operationally defined as a set of collective choice rules comprised of the seven rule types outlined below.

Figure 2.2b – A Typology of Collective Choice Level Rules

- Membership Rules: Specify the number of participants, their attributes and resources, and the conditions of entry and exit into an action arena.
- Position Rules: Specify the positions in an action arena.
- Authority Rules: Specify the permitted or expected courses of action for different positions in an action arena.
- Scope Rules: Specify the boundaries of the action arena in terms of the range of outcomes it may effect.
- Aggregation Rules: Specify the transformation function in an action arena.
- Information Rules: Specify how information is collected and shared (or not) in an action arena.

Source: Ostrom, Gardner, and Walker, *Rules, Games, & Common-Pool Resources* 41-42.

To measure intergovernmental interfaces according to this operational definition, the technique of content analysis was utilized in this study. As mentioned in the previous chapter, the institutional rules that constitute an intergovernmental interface may be found in many empirical sources: intergovernmental agreements, constitutional law, statutory law, memoranda of understanding, unwritten practices, and others. To get at these sources, a wide-ranging investigation was undertaken that included primary documents, secondary documents, and semi-structured interviews.[62] Content analyses of all these materials were then conducted, with the analyses particularly geared to

[62] Each interview involved a standardized set of questions, but departures from these questions occurred if particularly interesting/important issues arose during the course of an interview. The interview sample was originally structured so that all governments in each basin would be represented. This ideal sample was attained in the Murray-Darling, but not in the Great Lakes. The interview sample was also structured so that all relevant intergovernmental organizations were represented. See Appendix A for a list of interviewees.

uncovering the membership, position, authority, scope, aggregation, and information rules that comprise intergovernmental interfaces. Once all of these rules were collected, a good picture emerged of a prevailing intergovernmental interface, and it was contrasted with the ideal typical interfaces outlined in Figure 2.2a to determine whether it is joint, coordinative, conjunctive, or none of these.

Ultimately, this measurement approach measures intergovernmental interfaces at an ordinal level of measurement, as the ideal typical interfaces are clearly differentiated and ranked along a single axis of variance. The use of an ordinal level variable is important because it allows for meaningful distinctions to be made between measures of the independent variable, suggesting a potential avenue of explanation, should different intergovernmental interfaces become correlated with different resource management policies in the empirical findings.

2.3 Conceptualizing, Operationalizing, and Measuring Resource Management Policy

Resource management policies can be generally defined as those operational level rules that have been created to help overcome the collective action problems of provision, appropriation, and social learning in CPR dilemmas. Obviously, the policies that are most effective in resource management are those which succeed in overcoming all three of these problems, a policy approach that has been termed adaptive management. However, while the problems of provision and appropriation can be addressed in any single resource management policy, the problem of social learning can only be addressed through a succession of resource management policies. Thus, there are both cross-

sectional and longitudinal dimensions to the effectiveness of resource management policies, and each of these dimensions must be measured and evaluated.

a) The Cross-Sectional Dimension: Addressing the Problems of Provision and Appropriation

As just described, any given resource management policy is essentially an effort by resource managers to address prevailing provision and appropriation issues in their common pool. As described in Chapter 1, the ideal resource management policy is one that "...coordinate[s] the actions of individual [resource] users to attain an optimal rate of production or consumption for the whole community".[63] In other words, the ideal CPR management policy reflects the inherent interdependence of resource users and introduces limits on individual appropriations so that cumulative appropriations can approximate an optimal level of provision, however this level may be defined.[64] Thus, the most important aspects of a resource management policy are the limits it places on individual resource use and the degree to which these limits reflect the interdependence of all resource uses.

In practice, there are many ways in which individual resource use can be limited, but all of them can be generally classified as either: unbounded, appropriator-bounded, appropriation-bounded, or provision-bounded. Unbounded policies are those which establish no restrictions on appropriators or appropriations, essentially allowing open

---

[63] Katar Singh, *Managing Common Pool Resources - Principles and Case Studies* (Delhi: Oxford University Press, 1994) 12.

[64] There are many definitions of what constitutes and optimal level of provision, and this is ultimately a choice that is made by the community of users in any given CPR.

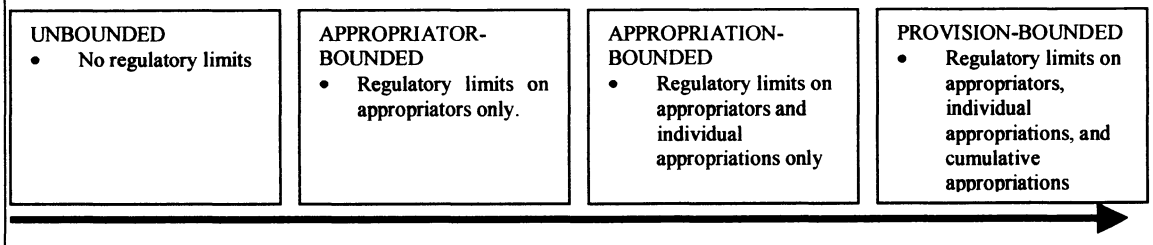
access to a common pool. In appropriator-bounded policies, open access is rejected in favour of restrictions on the number or type of appropriators in a user group, but without restrictions on the appropriations of each user. For example, the common law principle of riparian rights holds that those individuals who own property adjacent to a water source can appropriate from it without any finite limits on how much they can take.[65] Appropriation-bounded policies take an additional restrictive step by limiting both the number of appropriators and how much each can appropriate. Most statutory resource licensing systems operate in this way, though there is often no cumulative limit for all licensed appropriations. Only provision-bounded policies take this final step by establishing a provision level, such as a quota, within which all CPR appropriations must be allocated.

Among these various resource management policies, it is already self-evident that some reflect the interdependence of CPR users better than others. Unbounded policies are problematic because they do not recognize any interdependence and invite CPR over-appropriation; this is the open access scenario lamented by Hardin as inherently self-destructive. Appropriator-bounded policies recognize interdependence among resource users, but not among appropriations. Consequently, appropriations are unrestricted and over-appropriation is a likely result. Appropriation-bounded policies reflect an awareness of appropriation interdependencies, but fail to recognize interdependence in the maintenance of provision; cumulative appropriations are open-ended and the problem of provision is unresolved. Only provision-bounded policies address the problem of

[65] In practice, riparian rights are often limited by the courts to an appropriation level defined by "reasonable

provision in an effective manner by establishing a provision target and recognizing the interdependence of all appropriators and all appropriations in achieving this target. Altogether, these ideal typical resource management policies are summarized below in Figure 2.3.

Figure 2.3 – Ideal Typical CPR Management Policies



Empirically, all CPR management policies exist as configurations of operational level rules that prescribe various aspects of resource use. The operational rules that comprise CPR management policies can vary considerably, as argued above, but there are a few key rule types that are important in the operational definition of any policy. First among these are the rules that define the boundaries of the user group, or who can appropriate from a common pool. Second are the rules defining any limitations on individual resource users in terms of how much each can appropriate. Finally, are the rules relating to cumulative appropriation limits for all users of a common pool; in other words, the existence of provision targets. Collectively, these three rule types constitute

---

use." When this occurs, they effectively become appropriation-bounded rules for water withdrawal.

an operational definition of CPR management policy, a definition that is amenable to effective measurement.

Measuring CPR management policy was, once again, a matter of conducting content analyses of the various empirical sources where these policies reside. The most common empirical sources were statutory law, governmental regulations, and intergovernmental agreements, but other sources, such as press releases, position papers and informal practices, were also investigated. The material included in the content analyses included primary documents, secondary documents, and semi-structured interviews, and the analysis of these materials was designed specifically to recognize the three rule types included in the operational definition described above. If any of the rule types was not uncovered by the content analysis of a given policy, a negative result was noted, which was significant in itself. Upon completion of the content analyses, the rule configurations for each evaluated policy were then compared to the ideal typical policies outlined in Figure 2.3a to determine whether they were unbounded, appropriator-bounded, appropriation-bounded, provision-bounded, or none of these. This approach measured CPR management policy at an ordinal level, allowing conclusions to be drawn about the relative effectiveness of different policies.

b) The Longitudinal Dimension: Addressing the Problem of Social Learning

In his discussion of social learning, Kai N. Lee asserts that learning activities at all institutional levels, about all aspects of resource management are important to the perpetual improvement of resource management. Though this is undoubtedly true, such

an expansive conceptualization of the problem of social learning is somewhat beyond the scope of this study. Here we are most interested in social learning as it pertains to the improvement of resource management policy, a phenomenon that political scientists generally refer to as "policy learning." Policy learning takes place within collective choice action arenas and it occurs when the actors who make policy purposefully try to improve future policies by applying lessons learned from existing and previous policies. Empirically, policy learning can be a difficult variable to measure, but there are a couple of indicators that can be used.

The first indicator relates to policy improvements. When policy learning is most effective, lessons are drawn from past policies in order to improve future policies. Therefore, policy improvements are a likely empirical indicator that policy learning has taken place. For instance, if an appropriator-bounded policy is replaced by an appropriation-bounded policy, and then, in turn, is replaced by a provision-bounded policy, policy improvements have occurred and the presence of policy learning is indicated.[66] It is also important, however, to take into consideration a second indicator, the length of time over which the policy improvements have occurred. A series of policy improvements, such as the one just mentioned, is much more impressive over a span of twenty years than over a span of one hundred years. Thus, both the number of policy improvements and the duration over which these improvements have occurred are essential in gauging the presence of policy learning.

[66] In the interests of clarification, it is also important to point out that policy improvements occur when one provision-bounded policy is replaced with another provision-bounded policy. This is regarded as a policy improvement because provision levels are never immutable and very likely to change in light of new learning. This also reflects the fact that policy learning is an indefinite process with no fixed end point.

Instead of collecting additional data, the policy data already collected in the cross-sectional analysis was used to measure policy learning, but this data was analyzed on a longitudinal basis. For each case in this study, policy changes were plotted along the continuum in Figure 2.3 to determine if any policy improvements were evident. If a policy change resulted in a left-to-right shift on the continuum, then a policy improvement was counted.[67] Once the number of policy improvements was determined, the duration of analysis in each case was then taken into account and a ratio of policy improvements per year was calculated; the higher the ratio, the more evidence of policy learning in a given case. By measuring policy learning at the ratio level, measurements were obtained that were succinct and easily comparable between cases.

c) Identifying Adaptive Management

After evaluating both the cross-sectional and longitudinal dimensions of resource management policy, identifying those cases where adaptive management has been prevalent became quite easy. Simply put, adaptive management was only present in those cases where provision-bounded policies were combined with high levels of policy learning. This combination generally produces resource management policies that structure all resource appropriation activities toward the attainment of a provision goal while permitting the periodic redefinition of the provision goal in light of new information or altered circumstances. This is the essence of adaptive management and it

[67] Because we are dealing with common pools that have multiple jurisdictions, policy changes may occur in some jurisdictions but not others and the data had to reflect this. Accordingly, only a basin-wide policy improvement was counted as 1 policy improvement. If, for example, only 5 of 10 jurisdictions undertook policy improvements, this was counted as .5 of a policy improvement.

is the most effective approach to CPR management policy that humans can hope to achieve, given our inherent limitations and frailties. Furthermore, documented instances of adaptive management are relatively rare, so any intergovernmental interface that produces such policy must be regarded as highly effective.

2.4 Comparative Methodology

Given the reality that the governance of transboundary common pools is a subject not at all amenable to controlled experimentation, a comparative methodology is utilized in this study that draws upon existing empirical experiences in transboundary CPR management. More specifically, a 'most similar' comparative approach is used in which the cases analyzed were selected on the basis of their general similarity, so that most variables are controlled, except for the independent variable. The IAD framework is very useful in designing 'most similar' comparative studies because it suggests those classes of variables that researchers should try to control if the effects of institutions are to be isolated. You will recall that the IAD framework outlines three classes of variables that affect actors and action situations in any given action arena: community characteristics, physical conditions, and institutional rules. By selecting cases that are similar in their community characteristic and physical conditions, but vary in their intergovernmental interfaces, this study seeks to control many potential interfering factors and isolate the effects of intergovernmental interfaces on CPR management policy.

The most basic thing that can be done to control many physical conditions' variables in transboundary common pools is to compare like resources. Though

transboundary CPRs are usually non-excludable, highly subtractible, and highly fugitive, there are a number of second order characteristics on which they may vary considerably.[68] Take, for example, a fishery and a freshwater basin. While both may be described as transboundary common pools, they are likely to differ significantly in their measurability and renewability. A fishery that is scattered below the ocean surface will be much lower in measurability than a freshwater system that exists mostly above ground in a predictable flow pattern. Likewise, given the ability of fish to reproduce, a fishery will be higher in renewability than a freshwater resource that does not possess such reproductive capacity. Such variance in the second order dimensions of different transboundary CPRs are inevitable, but the potential interfering effects of this variance in a 'most similar' comparative study can be almost completely avoided by comparing like resources. This is the approach taken in this study.

Having determined to compare like resources, the selection of which resource to analyze is somewhat arbitrary. However, this study undertakes a comparison of transboundary freshwater systems, also referred to as "basins" or "watersheds," because they are one of the most common CPRs studied and this should allow for easier integration of the study's findings with the prevailing CPR literature. Before proceeding to a detailed examination of the cases selected for this study, it is first important to understand the nature of water as a CPR and the resource uses that may be found in such common pools.

---

[68] Mark Sproule-Jones, *Governments at Work - Canadian Parliamentary Federalism and Its Public Policy Effects* (Toronto: University of Toronto Press, 1993) 42-44.

a) The Inherent Subtractibility of Water

Though it seems somewhat paradoxical, water is a resource that is both renewable and subtractible. In essence, water is a resource that "...can be polluted, abused, and misused, but it is neither created nor destroyed, it only migrates."[69] Hydrologic research has shown that the total amount of water on the planet does not vary over time, yet the proportions of its various forms (solid, liquid, and gas), and its geographic distribution, vary quite considerably. Water is a renewable resource, in that it can be used and then returned to the environment to be renewed, but it is definitely not inexhaustible. It can only bear a certain amount of consumption and pollution, after which it becomes unsuitable for all human and ecological uses. Consequently, water is a renewable resource, but its renewability is subtractible.

Water, in its natural state, renews itself through a process known as the hydrologic cycle. In the hydrologic cycle, water circulates through three basic reservoirs in the hydrosphere: the groundwater reservoir, the surface water reservoir, and the airborne reservoir. Though, analytically, a distinction can be made between these three reservoirs, in practice they are intimately linked with animal and plant users of water in a continuous process of water transfer. Transfers from groundwater sources to surface water sources generally take place through underground water flows; transfers from the surface to the atmosphere take place through evaporation, sublimation and transpiration (together referred to as "evapotranspiration"); and, transfers from the atmosphere to the

[69] Marq de Villiers, *Water* (Toronto: Stoddart Publishing Co. Ltd., 1999) 29.

surface take place through precipitation.[70] The length of time that water remains in any one reservoir within the hydrologic cycle is referred to as its "residence time." Residence times vary greatly, from a low of ten days in the atmosphere, to a high of roughly 37,000 years for some water sources in large seas, glaciers, or underground reservoirs.[71] When polluted water is released back into the hydrosphere after human use, pollutants first become diluted and are then gradually leached from the water as it is transferred between and within reservoirs in the hydrologic cycle. There are, however, finite limits to this natural renewal process.

The limits on the natural renewability of water can be conceived in terms of water quality and water quantity. The finite limit of water quality renewal is known as assimilative capacity. Assimilative capacity refers to the ability of a water resource to absorb and dispense of pollutants during the hydrologic cycle. Water resources have varying assimilative capacities, depending upon their natural chemical composition and the pollutants in question, but once an assimilative capacity is reached, all additional pollutants will remain in the water and degrade it for other potential uses.[72] The issue of water quantity renewal is basically one of preserving a given amount of water within a particular hydrologic system. Though water can not be destroyed, it can be lost from one system to another, creating serious impairments for those human and ecological uses that depend on it in the 'losing' system. Whether one is dealing with the quality or quantity aspects of water renewability, both are inherently subtractible.

---

[70] de Villiers, *Water* 30.
[71] de Villiers, *Water* 32.
[72] Steven A. Kennett, *Managing Interjurisdictional Waters in Canada: A Constitutional Analysis* (Calgary: Canadian Institute of Resources Law, 1991).

Though this study focuses on the quantity dimensions of water resource management, it is important to emphasize that there is an inseparable link between water quantity and water quality. For example, the quality of any given water resource may be important in determining the quantity of usable water available, and the quantity of any given water resource is influential in determining assimilative capacity. This inherent link between water quantity and water quality will appear a number of times throughout this study, but the focus here is on the single dimension of water quantity, simply in the interests of creating a manageable study. Even governments tend to separate the issues of water quality and water quantity for management purposes because of the overwhelming complexity in trying to deal with both simultaneously. However, because both water quantity and quality are inherently subtractible, like all CPRs, the institutional lessons learned from this study of water quantity management should be applicable to water quality management, as well.

b) Water as a Non-Excludable and Fugitive Resource

The non-excludable and fugitive nature of water is also related to the hydrologic cycle, particularly the way that water "migrates" within the Earth's hydrosphere. Though there is an absolute abundance of water on Earth, about 1.4 billion cubic kilometres in one estimate, most of this water is inaccessible to human use. Almost ninety-eight percent of the Earth's water is found in saline oceans, with much of the remainder locked in polar icecaps, permanent snow, or underground reservoirs too far below the surface to be exploited. Overall, a very minute percentage (about 0.26 percent) of the Earth's water

is usable and accessible to humans in surface and underground reservoirs.[73] Yet, even these resources are constantly on the move in the hydrologic cycle and in migrations from one water system to another, so that humans seem destined to be always in pursuit of this fugitive resource. This is particularly true given that existing technology has proven ineffective in manipulating the hydrologic cycle so that water may be captured for those who need it, when they need it.

Notwithstanding the development of such technology, the natural distribution of water in surface and underground reservoirs will continue to create difficult problems for water management. The Earth's fresh water resources are very unevenly distributed both geographically and temporally, creating varied problems of overabundance and scarcity. Furthermore, the liquid property of water ensures that it spreads itself over a large area, sometimes large enough that it crosses sovereign borders, making it difficult to fence or contain. This means that many people usually have physical access to water resources and that it is quite difficult to exclude people from this resource that is so essential to everyday human life. The result is usually the emergence of multiple competing users for an inherently subtractible resource, which is the classic pattern of a CPR dilemma.

c) Uses of Water

Another complicating factor in CPR dilemmas involving water resources is the presence of multiple competing uses that may be economic, ecological, or social in nature. To list all of the potential uses of water is a nearly impossible task. The

[73] de Villiers, *Water* 30-31.

economic uses alone would span everything from aquaculture to zoo-keeping and still not get us much closer to understanding how multiple competing uses impact each other. Alternatively, by focussing on the concepts of water intake and water discharge,[74] all potential uses of water can be classified as one of three types: consumptive, withdrawal, or in-stream.[75] The distinction between these types of uses is significant because each type has distinctive ramifications for water quantity management.

Consumptive uses of water occur when water intake is much greater than water discharge. In other words, consumptive uses remove water from a system and return little of this water to the same system, either because it is severely degraded through intensive use or it is lost to another system. In most parts of the world, the major consumptive uses of water are irrigation and agricultural stock watering, though domestic human uses are also important, particularly in water systems with large urban populations. In these uses, water is consumed to sustain plant and animal life, and the only water return is in the form of plant and animal wastes.[76] Another consumptive use that has gained increasing attention is water export. This use involves the purposeful removal of water from one system to another with no built-in return. This removal could be accomplished through diversion projects or containerized transport, but the fundamental effect is the same, notwithstanding the volumes of water concerned.

---

[74] Water intake is the amount of water removed from a source for a particular activity over a specific period of time. Water discharge is the amount water that is returned to the same source over the same period of time.

[75] Government of Canada, "Water Works!" 2002, http://www.ec.gc.ca/water/en/info/pubs/FS/e_FSA4.htm (16 November).

[76] Government of Canada, "Water Works!"

Generally, the fundamental interests of consumptive users lie in preserving both the security and quality of the water resource upon which they rely. Security refers to the supply of water that users can reasonably expect to be available to them over time. Consumptive users like to maintain a steady supply of water, with as few fluctuations as possible, so that they can make long-term investments and plans to develop consumptive uses. Water shortages are always a problem for consumptive users, but overabundancies can also be problematic because they can destroy property through flooding: more is not always better in the eyes of consumptive users. Quality is related to security in the respect that a secure water resource is not much good to consumptive users if it is unfit for consumption. Hence, water quality is often considered a dimension of security, which is the overriding concern for most consumptive water users.

Withdrawal uses of water are defined as activities that result in roughly equal rates of water intake and water discharge. In these uses, water is removed from a system, is used in some kind of process, and is then returned to the same system, usually in a slightly modified form. For example, in thermal power generation, water is removed and used as a cooling agent and then returned to its source having been slightly raised in temperature. Similar processes occur in many manufacturing activities, mining activities, and municipal waste systems. However, in these withdrawal uses, the returned water is degraded in chemical quality rather than temperature.[77] Nevertheless, in all withdrawal uses, the amount of water removed is similar to the amount of water returned.

[77] Government of Canada, "Water Works!" 3-4.

Much like consumptive users, withdrawal users are mostly concerned about security issues in water management. Most withdrawal uses are for economic and public health purposes, both of which depend on stable water supplies to plan investments. Water quality is less of a concern for withdrawal users, though, because they do not consume the water themselves and degraded water will still be suitable for such purposes as cooling or waste transport. This is less true in some manufacturing processes, such as beer and soft drink production, which are actually closer to consumption than withdrawal. In both of these uses, however, security of supply remains the predominant interest.

In-stream uses do not involve any water intake at all; hence, there is no water discharge either. In in-stream uses, water is not removed from its source, but is used in its natural, or almost natural, course of flow. The activities that can be classified as in-stream uses are much more varied than those discussed above: shipping, fisheries and wildlife support, recreation, waste disposal, spirituality, and hydroelectric power generation are all uses of water that are in-stream.[78] Most of these activities use water as it naturally flows, the slight exception being hydroelectric power generation, which involves a manmade diversion through power turbines. However, none of these uses physically removes water from its source for use elsewhere, so they all qualify as in-stream uses.

Unlike consumptive and withdrawal users, in-stream users are more concerned with water levels and water flows than water security.[79] In other words, instead of a stable and dependable supply of water, most in-stream users have an interest in

[78] Government of Canada, "Water Works!" 4-5.

maintaining high water levels and continuous flows. Ships, for example, can take a deeper draft and carry more cargo when water levels are high. Similarly, hydroelectric power output is greatest when water flows are swift rather than slow. The same is true for waste disposal, which is more effective when there is a greater quantity of water to dilute pollutants, and when there is a swifter flow to accelerate leaching. Thus, in a water system with both in-stream users and consumptive/withdrawal users, the potential for conflict in resource management is ever present. The presence of these conflicting uses is almost guaranteed in most water systems, especially given that water is a fundamental requisite of life.

Among consumptive, withdrawal, and in-stream uses, consumptive uses are the most threatening to the provision of a water system because of water's inherent subtractibility. While excessive withdrawal and in-stream use can lead to ecological stress and user conflict, excessive consumptive use can lead to ecological disaster and the collapse of all uses: in other words, a tragedy of the commons. While the impact of withdrawal and in-stream uses on a water system should not be discounted, this study focuses primarily on the governance of consumptive uses. In this way, we analyze not only how governments settle conflicts among CPR users, but also how governments resolve the more general conflict between development and environment in CPR management.

---

[79] Government of Canada, "Water Works!" 4.

2.5 Case Selection: An Introduction to the Great Lakes and Murray-Darling River Basins

One of the reasons why water lends itself well to studies of transboundary common pools is the relative abundance of transboundary water systems that exist in the natural world. This provides a greater number and a greater diversity of cases than would be available in the study of most other transboundary common pools, which is particularly beneficial when undertaking comparative studies. In the 'most similar' comparative approach utilized in this study, the goal is to select common pools that are similar in their physical conditions, community attributes, and constitutional level institutional characteristics, but significantly different in their collective choice level institutional characteristics. There are a number of transboundary river basins that could be effectively compared in this way, but this study focuses on the Great Lakes Basin of North America and the Murray-Darling Basin of Australia, for a number of reasons.

Perhaps the most important reason for selecting these two river basins is the diversity of institutional configurations offered by them. While the Great Lakes and Murray-Darling basins are generally similar in important community and physical attributes, there are no less than four distinct intergovernmental interfaces that can be identified between these two transboundary common pools over the past century. From a research standpoint, this is quite advantageous because it means that a comparison using these two river basins will result in *four* cases of transboundary common pool management for comparison. These four cases are summarized below in Figure 2.5.

Figure 2.5 – Cases of Transboundary Common Pool Management Selected for Analysis

Cases	Intergovernmental Interface	Sovereign Jurisdictions Involved
Great Lakes ("Inter-basin uses" case)	Joint Interface • Formalized in the US Water Resources Development Act	• United States • Minnesota • Wisconsin • Illinois • Indiana • Michigan • Ohio • Pennsylvania • New York
Great Lakes ("Intra-basin uses" case)	Coordinative Interface • Formalized in the Great Lakes Charter and Charter Annex	• Minnesota • Wisconsin • Illinois • Indiana • Michigan • Ohio • Pennsylvania • New York • Ontario • Quebec • Canada • United States
Murray-Darling ("Early" case)	Coordinative Interface • Formalized in the River Murray Waters Agreement	• Commonwealth • New South Wales • Victoria • South Australia
Murray-Darling ("Late" case)	Conjunctive Interface • Formalized in the Murray-Darling Basin Agreement	• Commonwealth • New South Wales • Victoria • South Australia • Queensland • (ACT)

As is evident, a comparative analysis using these four cases is greatly advantaged by the fact that all three of the intergovernmental interfaces in the negotiation mode of interaction are evident among them. This combination of institutional diversity and physical/community similarity is difficult to find among other transboundary river basins.

Another reason for selecting the Great Lakes and Murray-Darling basins relates to the kinds of comparisons that can be made among the four cases found in these basins. Not only can comparisons be made between these common pools, they can also be made within them. In the Great Lakes Basin, for instance, simultaneous comparisons can be made between joint and coordinative interfaces. Meanwhile, in the Murray-Darling Basin, a pre/post comparison can be made between coordinative and conjunctive interfaces. These kinds of 'within basin' comparisons are useful because the community and physical conditions variables are almost completely controlled in these comparisons. At the same time, however, the 'between basin' comparisons help the study to avoid the inherent limitations of case study analysis.[80]

These and other aspects of comparing the Great Lakes and Murray-Darling basins are explored below as the physical, community, and institutional attributes of these comparators are outlined in some detail.

a) Physical Attributes of the Great Lakes and Murray-Darling Basins

Though the Great Lakes Basin contains a much larger volume of water than the Murray-Darling Basin, the surface areas of these basins are quite comparable and they are both dominated by significant territorial divisions of sovereignty. The Great Lakes Basin spans an area of 767,000 km^2 but it transcends the Canada-US border, two Canadian provinces, and eight American states.[81] A total of twelve sovereign governments are involved in Great Lakes water management, at least double the number in the Murray-

[80] Sartori, "Compare Why and How" 23.

Darling. Located in southeastern Australia, the Murray-Darling Basin covers 1,061,469 km^2, or about 14 percent of the country's total land area.[82] Included in the basin are parts of four Australian states and the entire Australian Capital Territory (ACT), each of which can claim jurisdiction over water resource management in their respective sections of the basin. When the Commonwealth government is then added to the mix, the total number of sovereign jurisdictions involved in Murray-Darling water management is usually five, and often six.[83] Overall, both basins cover large expanses of territory and both clearly qualify as transboundary common pools.

The Great Lakes and Murray-Darling basins also share important flow characteristics, though flow issues are more intense in the Murray-Darling than in the Great Lakes. In the Great Lakes Basin, the five Great Lakes are each fed by a number of small to moderately sized rivers throughout the basin. However, the most important flow aspects are between the lakes themselves, which flow west to east. The five lakes are linked by a number of small connecting channels so that water originating in Lake Superior flows into Lakes Huron and Michigan (which are usually regarded as one hydrologic system), then into Lake Erie, Lake Ontario, and finally the St. Lawrence River, which exits into the Atlantic Ocean (see Appendix B).[84] In the Murray-Darling Basin, the general flow is east to west, with the headwaters originating in the mountains

---

[81] Great Lakes Information Network, "Great Lakes Facts and Figures," 2003, http://www.great-lakes.net/lakes/ref/lakefact.html (23 January 2003).
[82] Murray-Darling Basin Commission, "Basin Statistics," 2001, http://www.mdbc.gov.au/naturalresources/basin_stats/statistics.htm (2 December 2001).
[83] The ACT is not usually regarded as a sovereign jurisdiction because it does not have constitutionally guaranteed protection of its sovereignty; instead, it falls under the constitutional jurisdiction of the Commonwealth. However, in recent years, in a number of policy areas (including water management), the ACT has increasingly acted with the effective autonomy of a sovereign government.

and wetlands of the eastern interior and exiting into the Indian Ocean, near the city of Adelaide. At the headwaters, water travels westward in a number of moderately sized rivers that eventually converge into the much larger Murray and Darling rivers. The Darling River also then converges into the Murray just west of the city of Mildura so that the Murray alone carries water from the basin through South Australia and into the ocean (see Appendix B). The flow differences between the Great Lakes and the Murray-Darling are most vividly reflected in the average residence times of water in these two systems. Whereas it may take over three hundred years for a drop of water to proceed from Lake Superior to the Atlantic Ocean, it takes less than one year for a drop of water to proceed through the Murray-Darling system.[85] Clearly, flow concerns are more immediate within the Murray-Darling Basin; however, there are flow concerns in both basins particularly among in-stream users.

Though both the Great Lakes and Murray-Darling basins are vulnerable to overuse and degradation, their points of vulnerability are somewhat different due to their varying geological situations. As the largest freshwater system in the world, the Great Lakes Basin is no real danger of running dry any time soon. However, the system is vulnerable to degradation because only one percent of the water in the Great Lakes is renewed annually. The other ninety-nine percent was deposited in the glacial melt of the

---

[84] Claire Farid, John Jackson, and Karen Clark, *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* (Toronto: Canadian Environmental Law Association, 1997) 15.
[85] Claire Farid, John Jackson, and Karen Clark, *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* (Toronto: Canadian Environmental Law Association, 1997) 16; Murray-Darling Basin Commission, "Surface Water Resources," 2003, http://www.mdbc.gov.au/education/encyclopedia/Surface_Water.. (23 January 2003).

last ice age and is non-renewable.[86] Thus, despite perceptions of overabundance, water mining is a real danger in the Great Lakes and, once this water is lost, the damage is irreparable. In the Murray-Darling, there is little perception of overabundance as Australia is commonly recognized as the most arid continent in the world.[87] Here, there is a real danger that water supplies can disappear or become degraded beyond use. Most important is the danger of salinity, which results from water leaching through the sodium chloride-rich soil of the Murray-Darling, a leftover from an ancient saltwater sea that once covered the area. Though their vulnerabilities are somewhat different, and are more immediate in the Murray-Darling, the specter of overuse and degradation constantly hangs over both basins.

b) Community Attributes of the Great Lakes and Murray-Darling Basins

Though the Great Lakes and Murray-Darling basins are on opposite sides of the globe and on different sides of the equator, there is a surprising degree of similarity in the communities that reside in these basins. Most evident, in this regard, are similarities in culture, which can be primarily attributed to the common social and political histories of these communities. In both North America and Australia, the original Aboriginal populations were displaced by British colonialists who 'settled' these territories through intensive immigration by predominantly white Europeans. These European immigrants brought with them broadly liberal values toward social and economic development, creating communities based on these values. As Fikret Berkes has argued, the European

[86] Farid, Jackson, and Clark, *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* 5.
[87] de Villiers, *Water* 65.

orientation to development is based mostly on an ethos of interpersonal competition, as opposed to more collectivist orientations which favour interpersonal cooperation.[88] Given their similar Anglo-European cultural roots, both North Americans and Australians share a competitive orientation toward development, making them more vulnerable than collectivist-oriented communities to tragedies of the commons.[89]

If the common cultural orientation of North Americans and Australians provide them with motivation to exploit available natural resources, then their common levels of economic development provide the opportunity. One of the best available measures of development is the United Nations Human Development Index, which incorporates such variables as life expectancy, per capita GDP, adult literacy, and education levels, among others. In the 2001 UN Human Development Index, Australia, Canada, and the United States all finished in the top six worldwide, with human development index scores of 0.936, 0.936, and 0.934, respectively.[90] Clearly, these three communities enjoy very similar and very high levels of development. This commonality has also existed for some time, as reflected in the 1975 UN Human Development Index when Australia scored 0.842, Canada scored 0.867, and the US scored 0.861.[91] One way of interpreting this commonly high level of development is to expect each of these communities to have significant technological and economic capacity for resource exploitation. Another interpretation would expect high levels of post-materialism, including environmentalism,

---

[88] Fikret Berkes, "Cooperation from the Perspective of Human Ecology," *Common Property Resources - Ecology and Community-Based Sustainable Development*, ed. Fikret Berkes (London: Bellhaven Press, 1989) 71.
[89] Berkes, "Cooperation from the Perspective of Human Ecology" 71.
[90] United Nations, "United Nations Human Development Index 2001," 2001, http://www.undp.org/hdr2001 (21 January 2003).

given the widespread affluence of these communities.[92] In reality, both of these interpretations are accurate, but, most importantly, these community attributes are evident in both basins.

In the development and use of water resources, the Great Lakes and Murray-Darling communities are fundamentally alike in the respect that withdrawal, consumptive, and in-stream uses compete simultaneously for water use. Thus, although the types and proportions of use differ between the basins, resource managers in the Great Lakes and the Murray-Darling are both confronted with the difficulty of reconciling competing economic, ecological, and social interests in water management processes.

In the Great Lakes Basin, a wide array of water uses is prevalent. Among consumptive uses, domestic supply is the largest single use followed by industrial supply, irrigation, and thermal power development.[93] These uses reflect the fact that the Great Lakes community is far more urbanized and industrialized than the more rural Murray-Darling community. Large industrial centers such as Detroit, Chicago, Toronto, Hamilton, Cleveland, Buffalo, and Milwaukee depend on the waters of the Great Lakes Basin for both domestic and industrial uses. In comparison, water usage in irrigation and thermal power development is relatively minor.[94] In-stream uses are also very important in the Great Lakes Basin, with hydroelectric power generation, shipping, and recreation all featuring prominently. For instance, while approximately 11.8 million liters of water

---

[91] United Nations, "United Nations Human Development Index 2001."
[92] Ronald Inglehart, "The Renaissance of Political Culture," *American Political Science Review* 82.4 (December 1988): 1120-30.
[93] Farid, Jackson, and Clark, *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* 22.

per day is withdrawn from the Great Lakes Basin for all consumptive uses, over 3.4 trillion liters of water per day is diverted for hydro-electric power generation.[95] At the same time, commercial shipping depends on high water levels in the Great Lakes and the connecting channels to maintain the viability of an industry that has moved over $300 billion worth of cargo since 1959.[96] Finally, the abundant presence of water is so pervasive in the Great Lakes community that many depend entirely upon it for recreational purposes such as angling, boating, and cottaging, each of which are significant tourist industries in their own right.

In the Murray-Darling, the five main uses of water are irrigation, domestic supply, industrial supply, hydroelectric power generation, and recreation. Of the two consumptive uses, irrigation is by far the largest, constituting approximately 95 percent of water consumption in the Murray-Darling Basin.[97] Irrigation is used to support such crops as cotton, wheat, rice, fruits, and vegetables, and the Murray-Darling Basin produces 41 percent of Australia's gross value of agricultural production.[98] However, domestic supply is also very important to the basin community as the city of Canberra exists entirely within the basin, and the city of Adelaide is almost completely dependent on River Murray water to supply its one million inhabitants.[99] Industrial supply is somewhat less important as most of Australia's major industrial areas are located outside

---

[94] Farid, Jackson, and Clark, *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* 22.
[95] Farid, Jackson, and Clark, *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* 22-23.
[96] Great Lakes Information Network, "Great Lakes Facts and Figures."
[97] Murray-Darling Basin Commission, "Water Use," 2001, http://www.mdbc.gov.au/education/encyclopedia/Water_Use/Water_Use.htm (4 December 2001).
[98] Murray-Darling Basin Commission, "Agriculture," 2003, http://www.mdbc.gov.au/education/encyclopedia/Agriculture.. (23 January 2003).

of the Murray-Darling Basin. Among the in-stream uses, hydroelectric power generation from massive developments, such as the Snowy Mountains scheme, provide energy to much of the southeastern corner of the country, and are fundamentally important both strategically and economically. The rivers of the Murray-Darling system also continue to play a central role in linking the rural and urban centers of the area. In earlier periods, these river linkages were a central means of commercial transportation, but today they mostly serve recreational purposes for boaters and other outdoor enthusiasts.[100] The River Murray, in particular, occupies an important place in the national imagination.

Like all natural water systems, the waters of the Great Lakes and Murray-Darling support many ecological functions, such as the maintenance of wildlife habitat and species diversity, that are best regarded as natural in-stream uses. Both basins include sensitive wetland areas and feature seasonal water flow changes that play a crucial role in maintaining water quality and supporting many diverse wildlife species. Though these uses have always been inherent in these basins, it is only in the past three decades that human actors have come to represent these uses in water management processes. Environmentalist groups are quite prominent in both North America and Australia, and are particularly active in the Great Lakes and Murray-Darling.[101] Consequently, ecological water uses are now well represented in these basins and they compete intensively for priority with the social and economic uses outlined above.

---

[99] Murray-Darling Basin Commission, "Water Use" 2.
[100] Ticky Fullerton, *Watershed* (Sydney: ABC Books, 2001) chapter 4.
[101] Fullerton, *Watershed*; Marco Verweij, *Transboundary Environmental Problems and Cultural Theory - The Protection of the Rhine and the Great Lakes* (New York: Palgrave, 2000).

c) Institutional Attributes of the Great Lakes and Murray-Darling Basins

Though the four cases of transboundary common pool management selected for analysis in this study vary according to their respective intergovernmental interfaces, there is a considerable degree of basic institutional similarity between the Great Lakes and Murray-Darling basins. For starters, Canada, the United States, and Australia are all liberal-democracies in which the rule of law and constitutionalism are in force. Consequently, most of the political actors in these countries work within a context in which they are ultimately accountable to their respective electorates. This democratic accountability is brought about through different types of democratic institutions, through parliamentary systems in Canada and Australia and through a presidential system in the United States, but it is evident nonetheless. Should this difference in democratic institutions have a significant impact on resource management processes, this will be evident in the intra-basin comparisons in the Great Lakes, and the study's findings can be adjusted accordingly.

Quite purposefully, the Great Lakes and Murray-Darling basins were selected for the fragmentation of sovereignty that exists in both basins.[102] However, there are some differences in the extent of this fragmentation that must be considered when making comparisons between them. Most obvious is the existence of an international border in the Great Lakes, but not in the Murray-Darling. This means that one of the cases analyzed in the Great Lakes includes an international border, while the other case from

[102] J. Owen Saunders, *Interjurisdictional Issues in Canadian Water Management* (Calgary: Canadian Institute of Resources Law, 1988); K.H. Bailey, "The Constitutional and Legal Framework," *The Natural Resources of Australia - Prospects and Problems for Development*, ed. J.A. Sinden (Sydney: Angus & Robertson, 1972) 308-29.

the Great Lakes and the two Murray-Darling cases do not. Methodologically, this is not problematic, though, because the Great Lakes inter-basin uses case only includes American jurisdictions, providing an effective control for the impact of the international border on Great Lakes water management. Furthermore, an international division of sovereignty is a constitutional level rule in the IAD framework, meaning that its impact is likely to be felt most directly at the constitutional level, in the formation and change of intergovernmental interfaces, rather than in collective choice level policy processes. This contention is indeed confirmed by the findings in Chapter 3 on institutional change in multi-jurisdictional settings.

Another apparent difference in the fragmentation of sovereignty among the four cases analyzed in this study is the number of sovereign jurisdictions evident in each. This difference ranges from a low of four jurisdictions in 'early' Murray-Darling case to a high of ten jurisdictions in the Great Lakes intra-basin uses case, with the other cases falling in between. This variety is methodologically useful because it allows comparisons to be drawn between the cases to determine how the number of sovereign jurisdictions involved in a transboundary common pool affects resource management, and whether intergovernmental interfaces serve to diminish this effect. Here, again, the institutional diversity among the four cases selected for analysis serves a useful methodological purpose.

2.6 Summary

Ultimately, the objective of studying and comparing the diverse intergovernmental institutions of the Great Lakes and Murray-Darling basins is to draw some conclusions about how intergovernmental interfaces affect resource management policies in transboundary common pools. In this way, we can begin to suggest some institutional design principles that promote effective CPR management at the transboundary scale. However, in order to be able to put these design principles into action, it is also important to understand how institutions are created and changed in multi-jurisdictional settings. After all, even the soundest institutional design principles are of little benefit if the processes of institutional change remain completely inexplicable. Rational choice institutionalism provides some key insights into these processes, and this approach will be used in Chapter 3 to explain where the intergovernmental interfaces of the Great Lakes and Murray-Darling basins have come from, why they have evolved into their current forms, and how they might change in the future.

Chapter 3 – The Formation and Change of Intergovernmental Institutions: A Longitudinal Analysis

"We need institutions that can sustain civilization now and in the future. Building them requires conflict, because the fundamental interests of industrial society are under challenge. But conflict must be limited because unbounded strife will destroy the material foundations of those interests, leaving all in poverty. Bounded conflict is politics."

Kai N. Lee, *Compass and Gyroscope*

3.1 Introduction

One of the criticisms most often leveled at rational choice institutionalism is its tendency to accept existing institutions without explaining key questions relating to institutional formation and change. "The general assumption... appears to be that if there is a logical need for the institution it will be created, given that actors are rational...."[103] This assumption has been roundly criticized, mostly because it "...is a highly functionalist explanation for the emergence of institutions, leaving aside almost entirely the necessity for human agency".[104] This chapter offers an alternative rational choice institutionalist approach to explaining institutional formation and change, one that explicitly incorporates human agency as a key element in institutional change.

The foundation of this approach is the recognition that institutional reform is, fundamentally, a constitutional level process. Because constitutional level processes tend to have long time cycles, they are best analyzed in a longitudinal approach rather than the cross-sectional approach traditionally used by most rational choice institutionalists.

---

[103] B. Guy Peters, *Institutional Theory in Political Science - The 'New Institutionalism'* (London & New York: Pinter, 1999) 54.
[104] Peters, *Institutional Theory in Political Science - The 'New Institutionalism'* 55.

Using a longitudinal approach, this chapter shows that it is not the assumptions of rational choice institutionalism that have inhibited sound explanations of institutional formation and change, but simply the methodological approach used by most rational choice institutionalists. In the process, this chapter also uncovers some of the key factors that help to explain the formation and change of intergovernmental institutions, findings that are very useful in the undertaking of any agenda for institutional reform in transboundary common pools.

3.2 Longitudinal Analysis in the IAD Framework

As outlined in Chapter 1, the IAD framework of analysis is based on the assumption that actors are boundedly rational utility maximizers who seek to achieve their goals within identifiable configurations of institutional rules. Most often, the objective of IAD analyses is to isolate and compare institutional rule configurations to determine what effects these rules are having on actor behaviour within a given action arena. This is the approach used in Chapters 4 and 5 of this study as various intergovernmental interfaces are analyzed for their impact on collective choice action arenas and the policy designs produced in these arenas. Using such an approach, IAD theorists generally study action arenas on a cross-sectional basis over relatively small periods of time. In these brief time periods, it is relatively safe to assume that both the rules shaping the action arena and the interests of the actors in the action arena are relatively constant, and that the strategic interactions of actors within these parameters

will produce process outcomes. If, however, the time period of analysis is extended, in a longitudinal analysis, these assumptions are no longer as valid.

Essentially, longitudinal analysis in the IAD framework involves the study of strategic interactions within a given action arena over a lengthy period of time. In this type of analysis, the basic assumptions of the IAD framework remain intact, but the iterated nature of the action arena means that some additional factors are also at work in shaping actors' interests and interactions. First, the rules shaping an action arena may be amended or reformed over time, and this can clearly result in shifting patterns of interaction. Second, contextual changes (in the community or natural conditions variables) can alter the social pressures exerted on actors, significantly changing their strategic goals. Third, iterated interactions give actors the chance to gain knowledge and experience that can also prompt them to periodically redefine their interests and goals. Finally, the objects of change in most action arenas, lower level institutional rules, are not entirely passive to change. Instead, they can provide increasing returns to actors over time, creating path dependency effects that can make them quite resistant to change.

In sum, the IAD framework, and rational choice institutionalism in general, is amenable to longitudinal analysis of rule formation and change, as long as it is recognized that there a number of longitudinal factors that can significantly impact actors' interests and interactions. The effects of these longitudinal factors are elaborated at greater length below, with particular reference to their presence in constitutional level action arenas in which intergovernmental interfaces are the object of contention.

a) Changes in Higher Level Rules

Given the extended time periods of longitudinal analysis, it is reasonable to expect that the rules shaping an action arena could be changed during the period of analysis. These kinds of rule changes are of crucial importance because they alter the incentives and proscriptions that actors face as they devise strategies for achieving their goals. For instance, in constitutional level action arenas featuring multiple sovereign governments, constitutional level rules often specify that intergovernmental unanimity is necessary for collective choice rule change to occur. This constitutes a high threshold for change in the action arena and actors have to devise their strategies accordingly. If, however, the constitutional level rules were amended to lower the threshold for change, one would reasonably expect changes in actors' strategies and interactions, as well as in decision outcomes. Generally speaking, the higher an institutional level, the less frequently rules are amended, so the constitutional level rules shaping the action arenas examined in this chapter can be expected to be reasonably stable. Nevertheless, an awareness of the potential importance of higher level rule changes is important when undertaking longitudinal analyses using the IAD framework.

b) Changes in Social Pressures

In addition to institutional rules, the IAD framework also incorporates a couple of contextual variables (community characteristics and physical conditions) that are assumed to have a significant impact in shaping action arenas. Over time, these contextual variables are bound to change in various ways, some more predictable than

others, and these changes will affect the social forces pressuring actors within a given action arena. In particular, changing social forces are likely to prompt actors to periodically redefine their interests and alter their goals. For instance, sovereign governments confronting the question of intergovernmental interface reform are likely to redefine their interests in the face of such community changes as the emergence of a new user group, or such physical changes as prolonged drought. Thus, even if the rules shaping an action arena are not substantially changed, changing social pressures can result in different patterns of strategic interaction within an action arena, over time.

c) Actor Learning

Given the rational choice institutionalist assumption that actors are fundamentally rational and strategic, it follows that actors involved in iterated interactions within an action arena also have the capacity to learn from their experiences. This assertion is supported by a modest literature on social learning, but it has yet to be explicitly incorporated into rational choice institutionalist approaches, such as the IAD framework. Surveying the social learning literature, Bennett and Howlett convincingly argue that learning takes place in all sorts of action arenas, including arenas that would be situated at the operational, collective choice, and constitutional levels in the IAD framework.[105] These learning activities are significant because they can prompt actors to reformulate their interests and goals, changing their behaviour in an action arena. For example, experience with the workings of a particular intergovernmental interface may convince a

[105] Colin J. Bennett and Michael Howlett, "The Lessons of Learning: Reconciling Theories of Policy Learning and Policy Change," *Policy Sciences* 25.3 (1992).

government that had originally supported its formation to become an advocate for reform at a later date. Clearly, actor learning, based on experience gained over time, is relevant in the calculation of actors' interests and should be incorporated in longitudinal analyses using the IAD framework.

d) Path Dependency

The idea of path dependency is important because it shows how the institutional rules that are the object of reform in most action arenas can become increasingly resistant to change over time. In making early institutional rule choices, actors also make investments in these rules that can provide them with increasing returns once the rules are in place for any length of time. There are many potential sources of increasing returns, but four are most often identified in the path dependency literature: returns from symbolic attachments; returns from large initial investments; returns from coordination effects between rule sets; and, returns from general preferences for rule stability.[106] All of these sources of increasing returns are important because they raise the short-term costs of rule change for actors, despite obvious long-term benefits of rule change. Thus, for example, governments may be content to perpetuate the existence of an intergovernmental interface that is producing sub-optimal policy outcomes simply because they are affectively attached to it, they have made significant investments in learning how it works, and they value its familiarity over the uncertainty of reform.

---

[106] Paul Pierson, "Increasing Returns, Path Dependence, and the Study of Politics," *American Political Science Review* 94.2 (June 2000): 251-67; Gerard Alexander, "Institutions, Path Dependence, and Democratic Consolidation," *Journal of Theoretical Politics* 13.3 (2001): 249-70; Kenneth A. Shepsle, "A Comment on Institutional Change," *Journal of Theoretical Politics* 13.3 (2001): 321-25.

Using these four sets of longitudinal factors to supplement and augment rational choice institutionalist assumptions about actor behaviour, the rest of this chapter analyzes the evolution of intergovernmental interfaces in the Great Lakes and Murray-Darling basins over the past century. What is made clear in this analysis is the importance of human agency in institutional formation and change. Intergovernmental interfaces for the management of these basins have not automatically appeared in response to obvious needs, but have, instead, been formed and reformed through the arduous work of enterprising political actors.

3.3 The Evolution of Intergovernmental Interfaces in the Great Lakes Basin

Though intergovernmental cooperation in Great Lakes water management started at a relatively early date, an intergovernmental institution to govern the whole of the Great Lakes Basin has yet to be developed. Instead, intergovernmental institutions in the Great Lakes have been formed to govern various functional areas of water management, some institutions developing quite early and others developing quite late. One of the earliest intergovernmental institutions was the International Boundary Waters Treaty (IBWT), formed in 1909 by the US and Canadian governments to deal only with water management issues in their shared boundary waters. By excluding non-boundary waters, a large portion of the basin's waters were left without an intergovernmental institution until the 1950s. Since that time, two distinct intergovernmental interfaces have been created for the management of non-boundary waters, a coordinative interface to manage

consumptive uses and a joint interface to manage inter-basin diversions. The formation and evolution of these two institutions is the subject of interest in this section, and each is analyzed in more detail below.

The institutional fragmentation between boundary and non-boundary waters management is mostly explained by the constitutional divisions of power in the US and Canadian federal systems. In the American constitution, the federal government has overriding powers in the interstate and international dimensions of water management,[107] giving them jurisdiction over the boundary waters of the Great Lakes.[108] Similarly, in the Canadian constitution, the federal government is designated as the main actor in boundary waters management as Ottawa has jurisdiction over international relations, navigation, and fisheries.[109] Given these constitutional rules, when conflicts between shipping and hydro-electric interests emerged in the boundary waters of the Great Lakes at the turn of the 20th century, they were addressed by the two federal governments rather than the states and provinces.

The American and Canadian governments recognized their interdependence in the management of their shared boundary waters and negotiated the IBWT in 1909. This treaty founded the International Joint Commission (IJC) and created something close to a joint interface between the two federal governments, as both were provided with vetoes

---

[107] Federal authority over interstate water issues has been affirmed in Supreme Court interpretations of the federal commerce power (see Arizona vs. California, 1963 for example). Federal authority over international relations, including water issues, is a defined power in Article I, Sections 8 & 10 of the *US Constitution.*

[108] A. Dan Tarlock, "Global Climate Change and the Law of Great Lakes Diversions," *The Lake Michigan Diversion at Chicago and Urban Drought - Past, Present, and Future Regional Impacts and Responses to Global Climate Change*, ed. Stanley A. Changnon (National Oceanic and Atmospheric Administration, 1994) 95-96.

over future diversion projects in boundary waters. However, while the IBWT created a remarkably close form of intergovernmental cooperation in boundary waters, non-boundary waters were purposefully and explicitly excluded from this institution.[110]

Though the federal governments in both the US and Canadian federal systems can intervene in various aspects of non-boundary waters management, it is the states and provinces that have predominant constitutional jurisdiction in non-boundary waters. On the US side of the basin, the states are actively involved in water management as the riparian owners of navigable waterways and the general regulators of water-taking activities.[111] Congress can legislate on interstate water issues, but this sort of intervention in state water management is somewhat extraordinary. The Canadian provinces have even more autonomy than their American counterparts, as the provinces are both the primary riparian owners and the main regulators of Canadian water resources outside of international boundaries and federal lands.[112] Though Ottawa is involved in water management through its powers over navigation and fisheries, it does not have the jurisdiction to resolve inter-provincial water conflicts, as the US Congress does.[113] In sum, the management of non-boundary waters in the Great Lakes Basin falls primarily to the states/provinces, though the federal governments are still relevant actors in this area.

---

[109] Steven A. Kennett, *Managing Interjurisdictional Waters in Canada: A Constitutional Analysis* (Calgary: Canadian Institute of Resources Law, 1991).
[110] "Treaty Between the United States and Great Britain Relating to Boundary Waters, and Questions Arising Between the United States and Canada," http://www.ijc.org/agree/water.html (12 December 2002).
[111] Claire Farid, John Jackson, and Karen Clark, *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* (Toronto: Canadian Environmental Law Association, 1997) 40.
[112] Kennett, *Managing Interjurisdictional Waters in Canada: A Constitutional Analysis.*
[113] It could be argued that the "national dimensions" interpretation of the peace, order and good government power in Section 91 of the *Constitution Act, 1867* could be used to justify federal jurisdiction over inter-provincial water issues, but this has not been affirmed by the courts.

With non-boundary waters excluded from the IBWT, unilateralism, by default, was the prevailing intergovernmental interface in these waters, and it persisted for almost the next fifty years. The persistence of unilateralism in non-boundary waters is explained, in large part, by the high threshold of agreement required to create cooperative intergovernmental institutions for these waters. Great Lakes non-boundary waters span eight American states and two Canadian provinces, with the international border further separating these two groups. Any move toward formal intergovernmental cooperation between these jurisdictions would require unanimous intergovernmental agreement and would likely involve Ottawa and Washington, by virtue of their jurisdiction over international relations, raising the threshold even further. Among the American states, formal intergovernmental institutions could be established through an interstate compact, but compacts require the consent of all participating states and the US Congress, a threshold that is also quite difficult to meet.[114]

Rather than try to achieve the formidable level of agreement required to create a cooperative intergovernmental institution, political elites in the Great Lakes states/provinces accepted unilateralism and worked within it for the first half of the twentieth century. For instance, the most important non-boundary waters issue during this time was the diversion of Great Lakes water from Lake Michigan into the Mississippi River Basin at Chicago.[115] Rather than create a cooperative intergovernmental institution

---

[114] Patricia S. Florestano, "Past and Present Utilization of Interstate Compacts in the United States," *Publius: The Journal of Federalism* 24 (Fall 1994): 13-25.

[115] From the time of its construction in 1900, the Sanitary and Ship Canal at Chicago was a matter of concern for all Great Lakes jurisdictions. While Illinois argued that the canal was necessary to flush sewage away from Chicago and to facilitate commercial transport into the American interior, the other

to address the water management issues related to the Chicago diversion, the US states, with periodic federal involvement, undertook a string of litigation that spanned from 1913 to 1967.[116] In other words, they acted unilaterally and attempted to outmaneuver each other in the courts for control of the non-boundary waters around Chicago.

Just after World War II, the community of users in the non-boundary waters of the basin went through a period of extensive change that finally prompted a serious reevaluation of the utility of unilateralism. The first major change was the construction and opening of the St. Lawrence Seaway. Though the seaway was constructed in boundary waters, it impacted the entire basin by allowing larger ships increased access to various non-boundary waters. With navigation primarily a federal concern on both sides of the border, the states/provinces were prompted to close ranks around their mutual jurisdiction over non-boundary waters in an effort to ensure that this jurisdiction was not federally usurped. The second major change was the development of vocal public concerns about declining water quality in the basin, particularly in Lake Erie. Again, the possibility that Congress could intervene, by declaring water quality an interstate issue, provided new pressures for the US states to create cooperative institutions to address non-boundary water issues.[117]

Great Lakes jurisdictions argued that the canal endangered the security of Great Lakes water and threatened to drop water levels and impair Great Lakes navigation.

[116] Stanley A. Changnon and Mary E. Harper, "History of the Chicago Diversion," *The Lake Michigan Diversion at Chicago and Urban Drought - Past, Present, and Future Regional Impacts and Responses to Global Climate Change*, ed. Stanley A. Changon (National Oceanic and Atmospheric Administration, 1994) 16-38; Daniel A. Injerd, "Lake Michigan Water Diversion: A Case Study," *Buffalo Environmental Law Journal* 1 (1993): 307-15.

[117] Michael Donahue, Telephone Interview (26 February 2003).

Given the high threshold required for formal interface reform in non-boundary waters, it is not surprising that the first cooperative institution, the Great Lakes Basin Compact, was a coordinative interface. In the early 1950s, in response to the new social pressures outlined above, a push for institutional reform was initiated by Governor Williams of Michigan. As the only jurisdiction entirely within the Great Lakes Basin, the potential benefits of intergovernmental cooperation in non-boundary waters were highest for Michigan, and they were willing to invest the political capital necessary to achieve this.[118] Nevertheless, the negotiation of the compact was difficult, as some basin states were unenthusiastic about closer cooperation, and Congress was wary of surrendering its authority over international and interstate water issues. Between 1955 and 1963, all eight Great Lakes states incrementally signed on to the compact, but Congress did not endorse it until 1968.[119] The Canadian, Ontario, and Quebec governments were later added as observing members, rounding out its membership.[120]

Under the Great Lakes Basin Compact, the Great Lakes Commission was created and given a mandate that centers primarily on research and policy advocacy rather than formal intergovernmental negotiation. The Commission is comprised of three to five commissioners from each state (associate commissioners in the case of the provinces), the commissioners acting as delegates for their respective jurisdictions. The commissioners direct the research and advocacy activities of the sizeable Commission secretariat and issue declarations and resolutions at Commission meetings, but Article

[118] Donahue, Telephone Interview.
[119] Great Lakes Commission, "Great Lakes Basin Compact," 2002, http://www.glc.org/about/glbp.html (15 September 2002).

VII of the Compact ensures that these actions are completely non-binding on the member governments.[121] Thus, although the Great Lakes Commission was the first institution of intergovernmental cooperation in non-boundary waters, this cooperation was mostly informal and entirely non-binding.[122]

A push toward closer intergovernmental cooperation in non-boundary waters did not really occur until the early 1980s when the community of Great Lakes users experienced another significant change. At this time, politicians from the American southwest revived some previously discarded proposals to divert Great Lakes water to their home states through either an expansion of the existing Chicago diversion or the construction of an entirely new pipeline or canal. Studies were undertaken to this effect at both the state and federal levels, and, suddenly, politicians in the Great Lakes states were confronted with the rise of a new user group demanding Great Lakes water, located outside of the basin. A number of Great Lakes governors viewed these potential extra-basin users as a serious threat to their collective authority over Great Lakes water, prompting them to work cooperatively. In short order, an intergovernmental consensus was reached on the creation of the Council of Great Lakes Governors (CGLG), an organization formed in 1983 to specifically address water management issues of shared concern, such as the threat of inter-basin diversions.[123]

While the CGLG added an institutional dimension that had been lacking in the Great Lakes Commission, it did not alter the essence of the prevailing coordinative

---

[120] Great Lakes Commission, "About the Great Lakes Commission," 2002, http://www.glc.org/about/about.hmtl (15 September 2002).
[121] Great Lakes Commission, "Great Lakes Basin Compact."
[122] Donahue, Telephone Interview.

interface. As summarized in Figure 3.3a, the CGLG and the Great Lakes Commission have parallel mandates with the Council acting as a forum for formal, political level coordination and the Commission acting as a forum for informal, administrative level coordination. The Commission does not take direction from the Council nor does the Council receive any direct input from the Commission in its decision processes. Thus, while the creation of the CGLG provided an additional forum for intergovernmental coordination, it did not introduce any third parties into these negotiations, nor did it make the negotiations legally binding.[124] Consequently, the introduction of the CGLG altered the prevailing intergovernmental interface in non-boundary waters, but it still remained fundamentally coordinative in nature.

Upon its formation, the CGLG created a Task Force on Water Diversions and Great Lakes Institutions with a mandate to "...examine the existing institutional mechanisms to protect the Great Lakes from diversions and to recommend ways to strengthen the ability of the Great Lakes states and provinces to collectively and individually protect their shared water resources."[125] With the Canadian provinces fully involved, the Task Force drafted a non-binding agreement between the Great Lakes states and provinces concerning consumptive uses of Great Lakes water.[126] This agreement, which became the Great Lakes Charter in 1985, pledged the signatory governments to undertake prior notice and consultation processes before permitting consumptive uses in excess of 19 million liters per day, averaged over a thirty day period. It also committed

---

[123] Anonymous, Telephone Interview (2 January 2003).
[124] Council of Great Lakes Governors, "Overview," 2002, http://www.cglg.org/overview.htm (7 September 2002).
[125] Farid, Jackson, and Clark, *The Fate of the Great Lakes* 35.

the states/provinces to cooperating in the regulation of smaller consumptive uses through a Water Resource Management Committee comprised of key water managers from each jurisdiction.[127] In effect, the Great Lakes Charter was a more detailed expression of the coordinative interface that already prevailed in the management of non-boundary waters, as all intergovernmental consultations under the Charter were explicitly designated as non-binding on the signatory governments.

Figure 3.3a – Key Collective Choice Rules in the Great Lakes Basin Compact/ Council of Great Lakes Governors/ Great Lakes Charter

Rule Type	Description
Membership Rules	• Ontario, Quebec, Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, Canada, and the United States are members.
Scope Rules	• Covers consumptive uses in non-boundary waters.
Position & Authority Rules	• Creates the Great Lakes Commission (GLC), comprised of three to five commissioners from each member government and a substantial secretariat. • GLC is a research and policy advocacy body. • Creates the Council of Great Lakes Governors (CGLG), comprised of the governors and premiers from the Great Lakes states and provinces, as well as a very small secretariat. • CGLG is an executive council.
Aggregation Rules	• Some informal intergovernmental consultations take place between GLC commissioners, while all formal intergovernmental negotiations take place within the CGLG. • GLC makes decisions by majority and super-majority. • CGLG makes decisions by unanimity. • All decisions are non-binding on the participating governments in both the GLC and CGLG.
Procedural Rules	• The GLC and CGLG operate independently of each other: GLC is not involved in executive level negotiations and CGLG does not direct the research activities of the GLC. • Charter calls for a non-binding prior notice and consultation process

[126] Farid, Jackson, and Clark, *The Fate of the Great Lakes* 35.
[127] The Great Lakes Charter, (1985)

	between CGLG members before approving consumptive uses greater than 19 million ML per day. • Charter calls for non-binding cooperation on smaller consumptive uses.
Information Rules	• GLC is an important center of data collection and dissemination.

Over the past two decades, further changes in the community of Great Lakes users have prompted the undertaking of two formal efforts to transform the Great Lakes Charter into a "more binding" intergovernmental institution, but, as yet, both have been unable to find the intergovernmental consensus required for reform.[128] In 1998, a private company known as the Nova Group sought and successfully obtained a permit from the Government of Ontario to export Lake Superior water by tanker to an unspecified destination in Asia.[129] Once again, a threatening new group of extra-basin water users had emerged in the basin and governments opposed to water exports quickly learned that the Great Lakes Charter provided them with little recourse to block them.[130] These concerns were further compounded by changes in international trade rules, in the NAFTA and WTO, that threatened to make water exports very difficult to stop once they were started.[131] In response to domestic public pressure, the Ontario government rescinded the Nova permit in December 1998, but a new social pressure for closer intergovernmental cooperation in non-boundary waters had been created.[132]

---

[128] Council of Great Lakes Governors, "A Statement on Protecting the Great Lakes: Managing Diversions and Bulk Water Exports," 1999, http://www.cglg.org/projects/water/statement.html (7 September 2002).
[129] Great Lakes United, "Comment on Canada's Proposed Regulations to Prevent Bulk Water Removal," 2002, http://www.glu.org/swft/boundary.. (10 October).
[130] Council of Great Lakes Governors, "The Governors' Letter to the International Joint Commission," 1999, http://www.cglg.org/projects/water/letter.html (7 September 2002).
[131] B. Timothy Heinmiller, "Harmonization Through Emulation: Canadian Federalism and Water Export Policy" *Canadian Public Administration* (forthcoming).
[132] Great Lakes Commission, "About the Great Lakes Commission."

The intent of the Great Lakes states and provinces to move toward a more binding intergovernmental interface was clearly reflected in a formal statement released by the CGLG in October 1999. The statement pledged the CGLG members to develop a new intergovernmental agreement that would "...bind the Great Lakes States and Provinces more closely..." in the management of non-boundary waters and develop a new common standard for assessing water removals."[133] After eighteen months of negotiations toward these reform objectives, the CGLG produced the Great Lakes Charter Annex in June 2001. The Charter Annex reiterated the governments' commitment to negotiate basin-wide "binding agreement(s)" for non-boundary waters, but otherwise left the original Charter intact.[134] Further negotiations toward this goal are still ongoing and have proven quite difficult. The creation of a close intergovernmental partnership across the Canada-US border has brought both federal governments into the negotiations, and the difficulties involved in reaching a consensus between twelve governments remain formidable.[135]

For a number of Great Lakes governments, one of the disappointing outcomes from the original Charter negotiations was the failure to specifically address the threat of inter-basin diversions, the very issue that had prompted these negotiations in the first place. In the original draft of the Charter, specific provisions were included to address the prospect of inter-basin diversions, but these were removed in the final stages of the negotiations. Michigan, in particular, came under pressure from environmentalists who viewed the Charter as "...a licensing system rather than a deterrent to the misuse of Great

[133] Council of Great Lakes Governors, "A Statement on Protecting the Great Lakes: Managing Diversions and Bulk Water Exports."
[134] The Great Lakes Charter Annex, (2001)
[135] Anonymous, Telephone Interview.

Lakes waters," and they had insisted that the provisions related to inter-basin diversions be removed from the final agreement.[136] Though inter-basin diversions are a type of consumptive use, and consumptive uses were covered under the Charter, some governments still felt that this issue was unresolved.

Around the same time, the US Supreme Court reinterpreted the constitutional rules of interstate water management in its 1982 *Sporhase* decision. Using the dormant commerce clause doctrine, the Court invalidated some Nebraska water laws that favoured in-state water uses over out-of-state water uses, setting an important new precedent.[137] Though the Court made it clear that some in-state water uses could be given priority over out-of-state uses, these protectionist provisions require the approval of Congress, which has final jurisdiction over interstate water apportionment.[138] In effect, the Court highlighted a long-neglected path for the creation of interstate water management institutions, the approval of the US Congress, which offered a much lower threshold for change than the traditional path of intergovernmental unanimity. Accordingly, those states that were disappointed with the apparent exclusion of inter-basin diversions in the Charter could now turn to Congress.

In 1985-86, the state of Illinois took the lead in pressuring Congress to regulate future diversions of water from the Great Lakes Basin, even drafting legislation that was eventually introduced into the House of Representatives. In its original draft, the Water Resources Development Act (WRDA) would have given all of the Great Lakes governors

---

[136] Farid, Jackson, and Clark, *The Fate of the Great Lakes* 35.
[137] Tarlock, "Global Climate Change and the Law of Great Lakes Diversions" 95-96.
[138] International Joint Commission, *Protection of the Waters of the Great Lakes - Final Report to the Governments of Canada and the United States* (2000), 36.

a veto on all *interstate* diversions of water from the Great Lakes Basin. However, representatives from Michigan seized upon the WRDA and succeeded in changing its wording from interstate to *inter-basin.*[139] Though seemingly minor, this change was very important. While gubernatorial vetoes on interstate diversions were intended to discourage the diversion of Great Lakes water to other parts of the continent, gubernatorial vetoes on inter-basin diversions were intended to discourage diversions even within individual Great Lakes states.[140] This change was much to the advantage of Michigan, however, as it is the only state whose territory lies entirely within the Great Lakes Basin.

Because the WRDA is a judicially enforceable act of Congress, any governor's decision to veto an inter-basin diversion is legally binding on the other states. In effect, this has created a joint interface between the Great Lakes states in the governance of all future inter-basin diversions in the US portion of the Great Lakes Basin. However, all inter-basin diversions existing prior to 1986, such as the Chicago diversion, are not subject to state vetoes, and the Canadian provincial governments have no enforceable veto power under this intergovernmental institution.

Figure 3.3b- Key Collective Choice Rules in the Water Resources Development Act

Rule Type	Description
Membership Rules	• Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin are members.
Scope Rules	• Covers all new inter-basin diversions in the US portion of the basin.

[139] Daniel Injerd, Telephone Interview (6 January 2003).
[140] Injerd, Telephone Interview.

Position & Authority Rules	• Gives all Great Lakes governors a veto on new inter-basin diversions in the US portion of the Basin. • No new intergovernmental agency is created. • The CGLG has some involvement in facilitating intergovernmental consultations for WRDA matters.
Aggregation Rules	• Decisions are made by intergovernmental unanimity. • These decisions are legally binding on the participating governments.
Procedural Rules	• Since no intergovernmental consultation process is specified in the WRDA, the Great Lakes Charter prior notice and consultation process has been adopted.
Information Rules	• Governments proposing an inter-basin diversion provide information on the proposal to other governments for consideration.

Despite the relatively low threshold required to change the WRDA, it has proven to be less susceptible to reform pressures than the Great Lakes Charter, mostly because it has provided increasing returns to a number of key actors. A number of state governments, especially Michigan, have come to rely on the WRDA to protect their interests in non-boundary waters, particularly because it allows them to decisively reject potentially damaging inter-basin diversion proposals. The utility of the WRDA, in this regard, was particularly underlined by the Nova water export debacle and the impotence of state governments to block water exports under the non-binding Charter. In the same way, environmentalists have also come to identify quite strongly with the WRDA and have become quite protective of it. Conversely, the WRDA has yet to obstruct any water development projects large enough to prompt serious calls for reform, so the perpetuation of this intergovernmental institution has been virtually unopposed.[141]

[141] Injerd, Telephone Interview; Dick Bartz, Telephone Interview (5 December 2002).

3.4 The Evolution of Intergovernmental Interfaces in the Murray-Darling Basin

Since the establishment of semi-sovereign colonial governments on the Australian continent in the 19th century, water management in the Murray-Darling has been characterized by three consecutive and distinct intergovernmental interfaces. A unilateralist interface prevailed in the basin from the late 1800s to 1914, a coordinative interface was dominant from 1914 to 1992, and a conjunctive interface has been evident from 1992 to today. In all three cases, these institutions have proven remarkably durable, long outlasting their original purposes. Most of this durability can be attributed to the high thresholds of agreement required for interface reform and the increasing returns that most governments have experienced from these interfaces once they have been put in place.

The emergence of a unilateralist interface in the Murray-Darling Basin during the last two decades of the 19th century was more a matter of default than design. In southeastern Australia, the British colonialists gradually devolved governance authority to three separate colonies, New South Wales, Victoria, and South Australia, each of which laid claim to various uses of Murray-Darling water. For New South Wales and Victoria, these waters were important for agricultural irrigation on an otherwise dry continent. South Australia, however, was the newest and most remote colony, and it depended on the River Murray as a transportation link with the two senior colonies.[142] If left unrestrained, these competing consumptive and in-stream uses would clearly impede on each other, threatening the fragile and developing economies of all the Australian

colonies. Though the three colonies were not long in recognizing their interdependence in the use of the River Murray, New South Wales, in particular, was very reluctant to institutionalize this interdependence in a cooperative governance arrangement.

During the 1880s, New South Wales, Victoria, and South Australia each established separate royal commissions to investigate the increasing water use conflicts in the Murray-Darling, particularly on the River Murray. One of the key recommendations emerging from these reports was the establishment of some kind of "joint trust" to manage and resolve inter-colonial water conflicts.[143] However, New South Wales' leaders, such as Sir Henry Parkes, would not consider the establishment of any kind of cooperative water management institution because New South Wales benefited greatly from the unilateralist status quo. As the upstream jurisdiction, New South Wales had first access to much of the water in the basin and they had no interest in giving the other colonies any say in their water use decisions. In fact, in its *Constitution Act* of 1855, New South Wales had been given jurisdiction over the entire course of the Murray and Parkes asserted this jurisdiction, even though the Murray formed much of the Victoria – New South Wales border and extended into the territory of South Australia. Parkes was so adamant about New South Wales' unfettered right to Murray water that "[h]e refused to attend an inter-colonial conference on the issue lest this should seem to involve an

---

[142] Don I. Wright, "River Murray - A Continuing Debate," *Journal of the Royal Australian Historical Society* 61.3 (September 1975): 165.
[143] Don I. Wright, "The River Murray: Microcosm of Australian Federal History," *Federalism in Canada and Australia: The Early Years*, ed. Bruce W. Hodgins, D. Wright and W.H. Heck (Waterloo: Wilfred Laurier University Press, 1978) 279-80.

admission that the other colonies had an equal right with New South Wales to deal with the [Murray] question".[144]

In the series of conferences that ultimately led to the federation of the Australian colonies in 1900, jurisdiction over the waters of the River Murray was a particularly contentious issue among the three most populous colonies. While the issue was debated in the Federal Convention of 1897-98 as a contest between the primacy of navigation versus irrigation, it was really a dispute about what type of intergovernmental interface the new federation should construct to govern the River Murray.[145] South Australia, led by J.H. Gordon, fervently argued that the Murray-Darling was an indivisible system beyond the competence of any individual state, and that it should be placed under the authority of the new Commonwealth government. The existing unilateralist interface was completely unsatisfactory for the South Australians and they were willing to take a chance on a hierarchical interface that would have centralized governance authority in the new federal government. For their part, New South Wales and Victoria rejected these proposals and remained determined to retain their unilateral discretion in the use of Murray waters.

While the creation of the Australian Constitution provided a clear opportunity to introduce a new intergovernmental interface for the Murray system, consensus among the colonial governments could not be reached on this issue. The division of powers entrenched in sections 51-52 of the Australian Constitution designated specific areas of

[144] Wright, "The River Murray: Microcosm of Australian Federal History" 280.
[145] Wright, "River Murray - A Continuing Debate" 169-70.

federal jurisdiction, with all non-specified areas being retained by the states.[146] Neither the ownership nor the regulation of public waters was included in sections 51-52, so both of these powers were retained by the states with the onset of federation.[147] In fact, the only real limit on state sovereignty over water was in section 51(I), the general trade and commerce power of the Commonwealth government. It was understood, as a product of the federation conferences, that the Commonwealth would use this power to protect South Australia's interest in using the River Murray as a transportation and trade link with the other states.[148] However, it was uncertain whether the new federal government would have the assertiveness or capability to use this power effectively, and there was a further limitation entrenched in section 100, which specifically protected irrigation rights from being impaired by the Commonwealth trade and commerce power.[149] Thus, state unilateralism in the governance of the Murray persisted even after the onset of federation.

In the first few years of federation, however, a combination of developments altered the perceptions of political leaders in New South Wales and Victoria, prompting them to reconsider the need for intergovernmental cooperation in managing the main stem of the River Murray. Most important in this regard was a drought of unprecedented severity across the basin that resulted in substantially decreased crop yields, particularly in the summer of 1901-02. With their governments seemingly incapable of cooperation to address drought-related problems, farmers in the basin, through the River Murray Main Canal League, held a conference in Corowa in April 1902, which the premiers from the

---

[146] Dean Jaensch, *The Politics of Australia* (South Yarra: Macmillan Publishers Australia Pty Ltd., 1997) 48.
[147] Jaensch, *The Politics of Australia* 49.
[148] Wright, "River Murray - A Continuing Debate" 170.

three Murray states were also invited to attend.[150] With the drought underlining the need for water conservation measures and farmers applying pressure on governments across the basin, the first steps toward intergovernmental cooperation were finally taken. This started with the formation of an interstate royal commission in 1902 and continued with an extended series of intergovernmental conferences from 1903 to 1914.[151] Yet, after twelve years of talks, New South Wales and Victoria, on one side, and South Australia, on the other side, still remained deadlocked over institutional reform.

Throughout this period, the Commonwealth government attended the intergovernmental conferences, but more as an observer than a participant. It was suggested again in 1904 by the federal government, as South Australia had argued in the federation debates, that the Murray management problems be resolved by devolving them to the Commonwealth, but this was immediately rejected by the states.[152] It was not until 1914 that the Commonwealth made its next major proposal in this area, which would eventually break the deadlock on institutional reform. The proposal came in the form of federal funding for the construction of works along the River Murray, which would also be governed by a new cooperative agreement involving the Commonwealth and the three Murray states. The promised funding and a commitment to preserve state sovereignty over water management eventually persuaded New South Wales and Victoria to abandon their defense of unilateralism and to take a chance on a minimal form of cooperation.

---

[149] Wright, "River Murray - A Continuing Debate" 170.
[150] Wright, "River Murray - A Continuing Debate" 208.
[151] Wright, "The River Murray: Microcosm of Australian Federal History" 281-82.
[152] Wright, "The River Murray: Microcosm of Australian Federal History" 282.

Thus, the River Murray Agreement (RMWA) was signed in September 1914, and the longstanding unilateralist interface was effectively displaced by a coordinative interface.

As the first institution of intergovernmental cooperation in Murray management, the RMWA featured a number of elements that clearly characterized it as a coordinative interface. The centerpiece of the RMWA was an inter-state allocation of the River Murray which assigned each participating state a defined yearly share of Murray water,[153] and provided for the construction of 26 new locks and weirs to facilitate the interstate allocation.[154] An intergovernmental organization, the River Murray Commission (RMC), was created to construct and operate the diversion structures, but its mandate went little beyond this.[155] The operations of the RMC were directed by a board of senior water managers from the participating governments, and a considerable degree of intergovernmental technical cooperation was undertaken among these commissioners. At the political level, however, there was no institutionalized executive council and intergovernmental cooperation remained sporadic. Altogether, these and other features of the coordinative interface institutionalized by the RMWA are summarized below in Table 3.4a.

---

[153] The division of Murray water in the RMWA is quite complex and is best described by D.I. Wright (1975, p. 175): "The flow of the Murray at Albury (including the natural or regulated flow of all tributaries above Albury was to be shared equally by New South Wales and Victoria (subject to deductions for water diverted by either State above Albury). Each of these States was to have full use of its own tributaries below Albury. South Australia was allocated a monthly provision for domestic and stock use, losses by evaporation in Lake Victoria and in lockage (but not in the lakes at the mouth), and 67,000 acre feet per month for nine months for irrigation – a total of 1,254,000 acre feet [per year] in all. After this had been supplied to South Australia, 1,957,000 acre feet to New South Wales and 2,219,000 acre feet to Victoria; the RMC could allocate any surplus as it saw fit."

[154] K. E. Johnson, "The Role of the River Murray Commission," *The Murray Waters - Man, Nature and a River System*, ed. H.J. Frith and G. Sawer (Sydney: Angus and Robertson, 1974) 284.

[155] Sanford D. Clark, "The River Murray Waters Agreement: Peace in Our Time?" *Adelaide Law Review* 9 (1983): 108-41.

Figure 3.4a – Key Collective Choice Rules in the River Murray Waters Agreement

Rule Type	Description
Membership Rules	• South Australia, Victoria, New South Wales & the Commonwealth of Australia.
Scope Rules	• Restricted to the main stem of the River Murray.
Position & Authority Rules	• Creates the River Murray Commission (RMC), comprised of two commissioners from each member government and a small secretariat. • RMC is an administrative body with a mandate to operate River Murray works to meet established state water apportionments. • State governments retain unilateral discretion in using their River Murray apportionments.
Aggregation Rules	• RMC decisions are made by intergovernmental unanimity. • Executive level decisions are made by intergovernmental unanimity. • All decisions are non-binding on the participating governments.
Procedural Rules	• RMC addresses technical issues related to state water apportionments. • There is no ministerial council, so executive level negotiations are exceptional and initiated by member governments as needed.
Information Rules	• RMC is a center for data collection and dissemination about the flow and level of the River Murray.

The coordinative interface institutionalized in the RMWA proved to be remarkably resilient, mostly because it offered Murray governments a variety of increasing returns. South Australia and the Commonwealth, for instance, made very large initial investments in the success of the RMWA, and they were not about to walk away from them. South Australia had been arguing for a defined share of Murray water for almost three decades, so they had a lot of political capital invested in the perpetuation of the RMWA. The Commonwealth investment, in contrast, was mostly monetary, and successive Commonwealth governments repeatedly invested more money into River

Murray development in order to help its original investment pay-off.[156] New South Wales and Victoria also experienced increasing returns as they designed their domestic water management institutions around the inter-state allocation in the RMWA and invested substantial time and effort into learning and utilizing the cooperative aspects of this interface to their own advantage.[157] In sum, the RMWA took on path dependent characteristics that helped perpetuate its existence over the next fifty years.

During this time period, the context within which the RMWA was institutionalized changed quite considerably. Commercial navigation declined as a contending use of Murray water, while recreational navigation and hydroelectric power generation expanded greatly. Most important, however, was the continuous expansion of irrigated agriculture in all three states. By the 1960s, high salinity levels, a product of increased irrigation, started to emerge as a perennial problem in the basin, a problem that was entirely outside the purview of the RMWA.[158] The Murray governments responded to the salinity issue by undertaking piecemeal amendments to the RMWA on seven different occasions between 1914 and 1963.[159] The RMC was given an expanded mandate to investigate salinity issues and to operate diversion structures to create dilution flows, but the fundamental features of the coordinative interface were left intact.[160]

As the salinity problem continued to grow, South Australian political elites gradually came to realize, through experience, that the RMWA was no longer working

---

[156] Sanford D. Clark, "The River Murray Question: Part II - Federation, Agreement and Future Alternatives," *Melbourne University Law Review* 8 (August 1971): 215-53.
[157] P.G. Cooper, "River Murray Water Management in South Australia," *Who Owns the Murray? A South Australian Perspective*, ed. Peter S. Davis and Phillip J. Moore (Magill: River Publications, 1985) 101.
[158] Cooper, "River Murray Water Management in South Australia" 109-10.
[159] Amendments to the RMWA were made in 1923, 1934, 1948, 1950, 1954, 1958, and 1963.

for them. In 1967-68, a severe drought affected the Murray system, and this drought was particularly traumatic for the South Australians because the resulting water shortage was compounded by increased salinity. Salinity levels were so high that they "...caused permanent damage to orchards in the lower river and particularly in the Riverland of South Australia."[161] In order to get the upstream states to address their salinity concerns, South Australian political elites realized that the RMWA had to be reformed to become a more significant and more binding partnership between the Murray governments.[162] Consequently, the South Australian government was the first to advocate wholesale reform of the RMWA and they began urging for serious intergovernmental discussions on this issue in the late 1960s.

Despite the South Australians' enthusiasm for interface reform, political elites in Victoria and New South Wales remained content with the RMWA, and the unanimity requirement for interface change meant that they could effectively block all reform efforts. In 1973, South Australia initiated a Heads of Government meeting to discuss the salinity problem, but the issue of interface reform soon dominated both the meeting and its subsequent working groups. Three years later, all of the Murray governments endorsed the working groups' recommendation for a closer form of intergovernmental cooperation, but disagreements between New South Wales and South Australia prevented

---

[160] Johnson, "The Role of the River Murray Commission" 287.
[161] Cooper, "River Murray Water Management in South Australia" 110.
[162] Sanford D. Clark and Ian A. Renard, "Constitutional, Legal and Administrative Problems," *The Murray Waters - Man, Nature and a River System*, ed. H.J. Frith and G. Sawer (Sydney: Angus and Robertson, 1974) 263-81.

any formal institutional change in this direction.[163] Similarly, in 1981, intergovernmental negotiations produced a draft agreement that would have given the RMC the authority to investigate and evaluate almost all proposed water development plans along the Murray. However, last minute objections from New South Wales scuttled the agreement in favour of yet another minor tweaking of the RMC's investigative powers.[164]

It was not until another severe drought in 1982-83 that the upstream states began to reconsider the utility of the RMWA in the face of increasing salinity and growing water shortages. In particular, the drought experience convinced the Victorian government of the necessity of closer cooperation in Murray-Darling water governance, prompting it to reverse its position on interface reform. In 1985, it joined with South Australia in endorsing an institutional reform agenda put forward by the RMC, and a series of high-level intergovernmental meetings on interface reform were subsequently held between 1985 and 1987.[165] In the wake of the drought, the government of New South Wales also became more amenable to the idea of interface reform, but the difficult task of forming an intergovernmental consensus on this issue remained.

During the 1985-87 ministerial meetings, however, a number of factors combined to create an action arena that was more conducive to interface reform than at any time before. First, Victorian and Commonwealth representatives undertook positions as brokers between the conflicting interests of South Australia and New South Wales,

---

[163] Joseph M. Powell, *The Emergence of Bioregionalism in the Murray-Darling Basin* (Canberra: Murray-Darling Basin Commission, 1993) 77.
[164] Clark, "The River Murray Waters Agreement: Peace in Our Time?" 135.
[165] Powell, *The Emergence of Bioregionalism in the Murray-Darling Basin* 78.

helping to forge common ground.[166] Second, the fortuitous existence of Labor governments in all four jurisdictions created an ideological confluence among the participants that was inherently inclined toward closer intergovernmental integration.[167] The Australian Labor Party in Australia has traditionally been an ideological critic of the classical model of federalism, favouring close partnerships between governments that are thought to facilitate the creation of redistributive policies.[168] Third, it has been remarked by various analysts that the two years between 1985 and 1987 "...probably saw more inter and intragovernmental contacts in the interests of the Murray-Darling Basin than had ever occurred before".[169] Most of these contacts were between bureaucratic actors who developed effective working relationships and personal trust with their counterparts in other governments, facilitating the search for consensus.[170]

Like many institutional changes, the displacement of the RMWA by the MDBI was an incremental process that took place over a number of years. Some of this incrementalism is explained by the piecemeal way in which the MDBI was formally created. Some of it is also explained by the fact that the actors involved had to learn what the switch from a coordinative to a conjunctive interface entailed and then try to carve out appropriate roles for themselves in the new institutional arrangement. The institutional transformation began in 1986 when a permanent ministerial council was created that included all of the ministers related to water, land, and environmental

---

[166] Powell, *The Emergence of Bioregionalism in the Murray-Darling Basin* 79.
[167] Peter Crabb, "Managing Water Resources in Interstate River Basins," *Comparative Political Studies - Australia and Canada*, ed. Malcolm Alexander and Brian Galligan (Sydney: Longman Cheshire Pty Limited, 1992) 198.
[168] Jaensch, *The Politics of Australia* 87.
[169] Crabb, "Managing Water Resources in Interstate River Basins" 198.

management in the Murray-Darling Basin. This ministerial council then successfully negotiated the Murray-Darling Basin Agreement in 1987, which was the final amendment to the RMWA.[171] In 1992, the Murray-Darling Basin Agreement was formally separated from the RMWA and given legal effect through the passage of identical legislation in the legislatures of the Commonwealth, New South Wales, Victoria, and South Australia. Queensland and the Australian Capital Territory (ACT), who had not been party to the RMWA because they have no direct access to the main stem of the Murray, were then added to the Murray-Darling Basin Agreement in 1996 and 1998, respectively.[172] Collectively, the Murray-Darling Basin Agreement and the organizations and norms associated with it are known as the Murray-Darling Basin Initiative (MDBI), a conjunctive intergovernmental interface that spans the entire basin.

The conjunctive nature of the MDBI is clearly illustrated in the institutionalized positions that a number of third party actors occupy in this intergovernmental interface. Under the MDBI, intergovernmental policy-making takes place within both the Murray-Darling Basin Commission and the Murray-Darling Basin Ministerial Council, the Commission dealing with technical and administrative issues and the Ministerial Council dealing with political issues. While the outcomes from neither of these forums are legally binding, third party actors (such as the Commission Office, the Community Advisory Committee, the independent Commission President, and the Independent Audit Group) are actively involved in the decision processes of the Commission and the

---

[170] Blackmore, Personal Interview.
[171] Murray-Darling Basin Commission, "The Murray-Darling Basin Agreement," About the Initiative, 2001, http://www.mdbc.gov.au/about/governance/agreement.htm (3 December 2001).
[172] Murray-Darling Basin Commission, "The Murray-Darling Basin Agreement."

Ministerial Council. This sort of third party access to intergovernmental policy-making is crucial because it provides a considerable degree of credibility and relevance to intergovernmental decisions, without making them legally binding on the participating governments. These and other conjunctive features of the MDBI are succinctly summarized below in Figure 3.4b.

Figure 3.4b – Key Collective Choice Rules in the Murray-Darling Basin Initiative

Rule Type	Description
Membership Rules	• South Australia, Victoria, New South Wales, Queensland, ACT and the Commonwealth of Australia are members.
Scope Rules	• Spans the entire Murray-Darling Basin.

Position & Authority Rules	• The Murray-Darling Basin Commission is created, comprised of senior bureaucrats in land and water management from member governments.
	• The Murray-Darling Ministerial Council is created, comprised of all the ministers responsible for land and water management from member governments.
	• A number of third party actors have institutionalized roles in the intergovernmental level of policy-making:
	  • The Community Advisory Committee
	  • The Independent President of the Commission
	  • The Commission Office (or MDBI secretariat)
	  • The Independent Audit Groups

Aggregation Rules	• Commission and Council decisions are made by intergovernmental unanimity. • All decisions are non-binding on the participating governments. • Third party actors have direct input into the decision processes of the Commission and the Council.
Procedural Rules	• The Commission and the Council work in tandem to resolve technical and political issues, respectively.
Information Rules	• The Commission Office and the Independent Audit Groups are key centers for monitoring, information collection, and dissemination. • The Commission Office plays a key role in public education.

Though the MDBI is too new to draw any firm conclusions about its resilience as an institution, it is reasonable to expect, considering the institutional history of the Murray-Darling, that it will persist for some time to come. Already, there is substantial evidence that governments are receiving increasing returns from the MDBI. Since its introduction, most of the states have reformed their domestic water management institutions to accommodate the MDBI, creating strong coordination effects and substantially raising the costs of further interface reform. It is also important to remember that the creation of the MDBI required substantial investments of financial and political capital, investments that governments are unlikely to walk away from in all but extraordinary circumstances. There is also evidence that political and non-political actors alike are developing a sense of pride and affective attachment to the MDBI as it is increasingly recognized as a unique and effective institution of resource management, and these sorts of attachments should not be underestimated as a source of increasing returns. When the apparent tendency of the MDBI towards path dependency is combined with the daunting intergovernmental unanimity requirement for interface reform, it seems most likely that the MDBI will persist in the Murray-Darling for at least the foreseeable future.

3.5 Summary

In sum, the preceding analysis suggests that two factors are particularly important in explaining the formation and change of intergovernmental institutions. With regard to the formation of intergovernmental institutions, there seems to be a rough correlation

between the thresholds required for institutional change and the types of intergovernmental institutions formed. Most of the action arenas analyzed in this chapter required intergovernmental unanimity for institutional change to occur and the result was the formation of a number of coordinative interfaces institutionalizing non-binding intergovernmental cooperation. The only exceptions were the formation of the conjunctive MDBI, the result of a twenty-year search for unanimity, and the joint WRDA, the product of a much lower majoritarian threshold in the US Congress. Thus, it seems that constitutional level rules play a formative role in the creation of intergovernmental institutions, with high thresholds of agreement constituting a significant barrier to the institutionalization of the more binding forms of cooperation.

At the same time, however, human agency is key in explaining most instances of institutional reform. Of particular relevance are the governments of 'uniquely situated' jurisdictions: these are the jurisdictions in each river basin which, because of their geographic location, seem to be constantly in the vanguard of the push towards institutional reform. South Australia, for instance, is the downstream state in the Murray-Darling, and South Australian governments played an instrumental role in pushing for the institutional reforms that would eventually become the RMWA and the MDBI. Similarly, Michigan is the only jurisdiction whose territory lies entirely within the Great Lakes Basin and its politicians were influential in the formation of the Great Lakes Commission, the Great Lakes Charter, and the WRDA. The unique dependence of these jurisdictions on their respective water systems, makes them more aware of the deficiencies in existing water management institutions and more likely to seek

institutional reforms. In this way, they are an important force of progressive institutional change in transboundary common pools.

Chapter 4 - The Great Lakes Charter, The Water Resources Development Act and the Regulation of Consumptive Uses in the Great Lakes Basin

"Creating a Minimum Lake Level (MLL) standard would remove the ability to continue to issue permits indefinitely since a maximum amount of water for withdrawals would be established.... The definition of an MLL must be an international decision for the Great Lakes made by the eight states and two provinces."

Stephen Frerichs & K. William Easter

4.1 Introduction

In this chapter we begin our empirical examination of intergovernmental interfaces and consumptive use regulation with a cross-sectional analysis of the governance of non-boundary waters in the Great Lakes Basin. More specifically, this chapter compares and contrasts the regulation of consumptive uses under the Great Lakes Charter, a coordinative interface, with that under the Water Resources Development Act (WRDA), a joint interface. The comparison between the Charter and the WRDA is particularly telling because these interfaces have existed simultaneously in the Great Lakes Basin since the mid 1980s. Thus, the actors in these interfaces, as well as the social pressures faced by these actors, are quite similar, providing greater certainty that any regulatory divergence between them is a function of interface differences.

4.2 The Regulation of Consumptive Uses Under the Great Lakes Charter

Prior to the introduction of the Great Lakes Charter, intergovernmental cooperation in the regulation of consumptive uses in Great Lakes non-boundary waters

was relatively sparse. The Great Lakes Commission acted as a forum of informal intergovernmental communication, but no significant intergovernmental policy commitments were undertaken through this organization. Instead, the regulation of consumptive uses took place almost exclusively at the domestic level and intergovernmental policy conflicts were resolved either by the US Congress or the courts. The Chicago diversion is a case in point, where a number of US states pursued a long series of litigation against the State of Illinois for withdrawing water from Lake Michigan and then discharging it into the Mississippi River Basin. The conflict was not settled until 1967, when a US Supreme Court decree finally placed a limit on the total amount of water that Illinois can withdraw from Lake Michigan. However, it took over sixty years and millions of dollars in litigation to reach this outcome, an outcome that is still contested and debated today.[173]

Yet, aside from a handful of exceptional cases, the regulation of consumptive uses was primarily a domestic level concern and was mainly dominated by the doctrine of riparian rights until the early 1980s. Riparians are private owners of land that is situated adjacent to a freshwater source. According to the common law, which is applicable in all Great Lakes jurisdictions but Quebec, riparians have the right to access and use any water bordering or flowing over their land. Riparian rights also exist in the Quebec Civil Code, but these rights are subject to greater restrictions if the riparian water source is one that is

[173] Stanley A. Changnon and Mary E. Harper, "History of the Chicago Diversion," *The Lake Michigan Diversion at Chicago and Urban Drought - Past, Present, and Future Regional Impacts and Responses to Global Climate Change*, ed. Stanley A. Changon (National Oceanic and Atmospheric Administration, 1994) 16-38.

deemed navigable.[174] In all jurisdictions, reliance on the doctrine of riparian rights amounted to an appropriator-bounded approach to the regulation of consumptive uses. The riparian rights doctrine defines a specific group of appropriators but does not place any finite limits on the amount of water that these appropriators can take from the common pool. The predominance of this regulatory approach can be mostly explained by the prevailing British and French legal traditions in the Great Lakes jurisdictions and the perceived abundance of water in the Great Lakes system.

In most jurisdictions, reliance on the pure doctrine of riparian rights was short-lived and incremental restrictions were introduced that began to shift policy in the direction of appropriation-bounded regulation. Riparian rights often create conflicts between water users in situations of local scarcity, and restrictions on appropriations often need to be introduced to manage these conflicts. In most Great Lakes jurisdictions, the common law doctrine of "reasonable use" was used by the courts to place limits on the appropriations of riparians, with the definition of a "reasonable use" being left to the courts' discretion in each individual case. A small number of Great Lakes jurisdictions also began introducing statutory limits on riparian rights, requiring permits for the undertaking of specified water uses. Ontario (in 1961) and Minnesota (in 1975) both introduced permitting systems for large water withdrawals but left the rights of small riparian users largely untouched.[175] These were encouraging policy shifts toward appropriation-bounded regulation, but the other Great Lakes jurisdictions did not follow

[174] Harriet Rueggeberg and Andrew R. Thompson, *Water Law and Policy Issues in Canada* (Vancouver: Westwater Research Centre, 1984).

suit. Ultimately, by the mid 1970s, consumptive use regulation in the Great Lakes Basin was "...a patchwork of diverse systems that provided little basis by which to protect the basin's water resources from unwanted in- or out-of-basin diversions".[176]

The weaknesses of this patchwork regulatory system did not become obvious until the early 1980s when a number of new inter-basin diversion proposals were seriously studied, and the security of Great Lakes water levels seemed to be threatened by potential extra-basin consumptive users. As described in the previous chapter, politicians in the Great Lakes states/provinces quickly became motivated to address this emerging threat, and the formation of the Council of Great Lakes Governors (CGLG) and the signing of the Great Lakes Charter was the result. The coordinative interface created by these complementary reforms was intended to promote regulatory improvements at the domestic level while encouraging the development of new regulatory initiatives at the intergovernmental level. These goals were most clearly laid out in the Great Lakes Charter, whose ultimate objective was to effect a basin-wide shift toward provision-bounded regulation of all consumptive uses.

Overall, the Great Lakes Charter established a two-pronged initiative for managing consumptive water uses, with a crucial distinction being made between large and small uses. Large consumptive uses, defined as those uses involving 19 million litres per day (L/d) or more, became subject to an intergovernmental Prior Notice and Consultation (PNC) process. Responsibility for undertaking the PNC process was

---

[175] David R. Percy, *The Framework of Water Rights Legislation in Canada* (Calgary: Canadian Institute of Resources Law, 1988) 75-76; Alicia A. Bixby, *The Law and the Lakes - Toward a Legal Framework for Safeguarding the Great Lakes Water Supply* (Chicago: The Center for the Great Lakes, 1986) 18.
[176] Bixby, *The Law and the Lakes* 21.

assigned to the permitting jurisdiction, and the outcomes of the process were defined as advisory only. For "small" diversions, below the 19 million L/d threshold, the Great Lakes Charter established a number of regulatory commitments. Domestically, the Charter signatories pledged to undertake the reforms necessary to establish permitting and registration programs for all consumptive uses within their respective borders. At the same time, the Charter also called for the creation of an intergovernmental Water Resources Management Program supported by a common database of water supply and water use information.[177] Altogether, the overarching goal of the Charter was to improve the regulation of consumptive uses through policy initiatives at both the intergovernmental and domestic levels. The interesting question is whether the coordinative interface created in the Charter was effective in realizing this goal.

a) Regulation of Large Consumptive Uses Under the Great Lakes Charter - The Case of the Mud Creek Irrigation District

When the Great Lakes Charter was formed in 1985, the Prior Notice and Consultation (PNC) process for large consumptive uses was the centerpiece of the agreement and hailed by the participating governments as a significant step forward in the cooperative management of the Great Lakes. The PNC process was designed in such a way that, when a consumptive use proposal exceeds the 19 million L/d trigger, the permitting jurisdiction has an obligation to notify the offices of the other Great Lakes governors/premiers and invite them to comment on the proposal. Other jurisdictions may then study the proposal and submit written objections to the permitting jurisdiction if they

[177] The Great Lakes Charter, (1985)

have concerns. In the event of an objection, an intergovernmental consultation process is initiated in which recommendations for the project are developed through intergovernmental discussions and then submitted to the permitting jurisdiction. Ultimately, individual state/provinces retain their authority to approve or reject a project, but they are obliged to consider the recommendations of their partner governments in making their final decisions.[178]

Upon its formation, the PNC process came under fire from environmentalists, mostly because they believed that the 19 million L/d trigger was far too high. They argued that very few consumptive use projects would be large enough to trigger the PNC process, and that a multitude of large consumptive uses below the trigger would be undertaken without being subjected to the scrutiny of intergovernmental consultation. In the eighteen years since the Great Lakes Charter was introduced, experience has validated these concerns as only a single consumptive use proposal has been put through the PNC process during this time. This was the Mud Creek Irrigation Project of 1993, and the Mud Creek consultations are illustrative of some of the problems associated with regulating transboundary common pools under a coordinative interface.

Located in Huron County, Michigan, the Mud Creek Irrigation Project was a proposal to withdraw 23-32 million L/d of Lake Huron water from Saginaw Bay for the purpose of irrigating a variety of commercial crops during the dry summer months. The idea of irrigating the Mud Creek area of Michigan had been circulating among the area farmers for quite some time, but it was not until the early 1990s that it first became

[178] Council of Great Lakes Governors, *The Great Lakes Charter* 4.

feasible. In 1992, an enterprising and influential Michigan Congressman successfully secured a line item appropriation from the federal agricultural budget to fund the construction of the pumps and works necessary to undertake large-scale irrigation in the Mud Creek area.[179] With federal funding secured, the Mud Creek farmers pushed to proceed with the project, but they first required the approval of Michigan's Natural Resources Commission,[180] which has superintending control over all irrigation projects under Michigan's Irrigation Districts Act, 1967.[181] In turn, the Natural Resources Commission was advised by Michigan's Department of Natural Resources that the Mud Creek proposal exceeded the Great Lakes Charter's PNC trigger and would have to be subjected to the PNC process. The process was then initiated by Michigan's Governor Engler, despite a notable lack of enthusiasm for the Mud Creek project in some parts of his administration.

Upon receiving notification of the proposal from Governor Engler in January 1993, the Mud Creek Irrigation Project was greeted with even less enthusiasm by the other Great Lakes jurisdictions. A number of jurisdictions expressed concern that the public information document included with the notification did not provide enough information to adequately evaluate the project, and there were a number of concerns expressed about the project itself. Eventually, the governments of Illinois, Minnesota,

---

[179] Jim Bredin, Telephone Interview (6 December 2002).

[180] "The Michigan Natural Resources Commission is a seventeen member public body whose members are appointed by the Governor and subject to the advice and consent of the Senate.... The Commission establishes general policies for the Department of Natural Resources." Cited from Government of Michigan, "What is NRC?" 2002, http://www.michigan.gov/dnr/.. (10 November 2002).

[181] Michigan Department of Natural Resources, Lansing, Michigan, Memorandum, to Natural Resources Commission, "Application to Establish, Construct and Operate the Mud Creek Irrigation District," January, 20, 1993.

Ontario, and Pennsylvania all submitted written objections to the Mud Creek proposal and requested an intergovernmental consultation meeting to discuss their concerns.[182] Governor Engler obliged these requests, and the CGLG organized a consultation meeting for the end of April in Detroit.[183]

During the consultation meeting, the objecting jurisdictions argued that the Mud Creek proposal was an unreasonable consumptive use of Great Lakes water, on a number of grounds. First, the projected crop yield to be gained from irrigation in Huron County was regarded as negligible and did not justify the considerable volume of water involved in the Mud Creek proposal. In fact, it was just this kind of water-intensive agriculture that governments were striving to shutdown in the American southwest, and it made little sense to replicate these inefficient agricultural practices in the Great Lakes Basin. Second, a number of jurisdictions expressed concern that approval of the project would set a bad precedent and lead to more federally-funded consumptive use projects throughout the Great Lakes Basin. Finally, Ontario, in particular, expressed concern that the project was being assessed without adequate consideration or knowledge of its cumulative impacts on the Great Lakes ecosystem.[184]

While the April consultation meeting provided the objecting jurisdictions with an opportunity to air their concerns about the Mud Creek proposal, no firm intergovernmental resolutions on the project were forthcoming. For its part, the

---

[182] Jim Edgar, Springfield, Ohio, to John Engler, March, 1, 1993; Arne H. Carlson, Saint Paul, Minnesota, to John Engler, March, 4, 1993; Bob Rae, Toronto, Ontario, to Joh Engler, June 3, 1993; Robert P. Casey, Harrisburg, Pennsylvania, to John Engler, March, 4, 1993.
[183] Roland Harmes, Lansing, Michigan, to George Voinovich, March, 25, 1993.
[184] Michigan Department of Natural Resources, "Charter Consultation: Mud Creek Irrigation District Summary of Key Issues" (1993).

Government of Michigan regarded the meeting as an act of information exchange rather than a forum for debate.[185] As concerns were expressed, they were duly recorded and addressed by Michigan's representatives, but it was clear that Michigan was only interested in following the letter of the PNC process.[186] Ultimately, the consultation was non-binding and it seemed to have little impact on Michigan's stance on the Mud Creek proposal.

Less than two weeks after the consultation meeting, Governor Engler notified the other Great Lakes jurisdictions that Michigan planned to proceed with the Mud Creek Irrigation Project, provided that the Natural Resources Commission would grant its approval. The Commission demanded some minor modifications to the proposal to ensure that it did not contribute to the spread of zebra mussels, but it approved the project and granted an official permit on June 10. The project permit placed limits on the size and number of pumps that could be constructed, as well as the acreage that could be irrigated, but left undefined the total amount of water that could be appropriated.[187] These practical limitations on the volume of water that can be withdrawn at Mud Creek reflect an appropriation-bounded approach to regulation on the part of Michigan, but this was a far cry from the provision-bounded approach that many Great Lakes governments advocated during the consultations.

Upon learning of Michigan's approval of Mud Creek, a number of Great Lakes jurisdictions continued to communicate objections to the implementation of the project,

---

[185] Bredin, Telephone Interview.
[186] Michigan Department of Natural Resources, "Charter Consultation: Mud Creek Irrigation District Summary of Key Issues."

but entirely in vain. Between June and December 1993, Governor Engler received written objections from at least four different Great Lakes governments.[188] All of the objections urged the governor to take a provision-bound approach to regulating Mud Creek, but the Government of Michigan was consistent in its response to these intergovernmental criticisms:

> The State of Michigan went to considerable lengths to follow the existing Prior Notice and Consultation procedure and to adhere to the principles for resource conservation expressed in the Great Lakes Charter.... The Charter has served as a model to other regions of the US who share water resource management responsibilities because it recognizes both the need to work cooperatively, and the sovereign authority of the State and Federal governments.[189]

In the end, the Government of Michigan set aside the concerns of its partner governments in the Great Lakes Basin and used its constitutional authority over non-boundary waters to proceed unilaterally with the Mud Creek Irrigation Project. Because the Great Lakes Charter only provided objecting governments with the opportunity to object rather than veto, there was little that they could do to block it.

As illustrated in the Mud Creek consultations, coordinative interfaces create action arenas characterized by two-level games, but these games are distinct because the domestic level is usually given priority over the intergovernmental level. Because it is relatively easy to ignore non-binding intergovernmental commitments and because domestic interests are crucial to politicians' electoral fortunes, the temptation to satisfy domestic interests at the expense of intergovernmental commitments is often

---

[187] Natural Resources Commission, Lansing, Michigan, Resolution and Order of Determination, to Mud Creek Irrigation Board, June, 10, 1993.

[188] George Voinovich, Columbus, Ohio, to John Engler, June 15, 1993; John Engler, Lansing, Michigan, to Evan Bayh, August, 16, 1993; G. Tracy Mehan III, Lansing, Michigan, to Robert Rae, December, 29, 1993; Arne H. Carlson, Saint Paul, Minnesota, to John Engler, June, 4, 1993.

overwhelming. Such was the case in the Mud Creek consultations where Michigan ignored intergovernmental demands for provision-bounded regulation and acceded to the demands of domestic irrigators. In the end, the PNC process was probably most successful in raising the scrutiny of the Mud Creek project rather than achieving any substantial change in the project's regulation.

b) Regulation of Small Consumptive Uses Under the Great Lakes Charter

In addition to the PNC process for large consumptive uses, the Great Lakes Charter also formalized a number of measures designed to improve the regulation of small consumptive uses in non-boundary waters. The first measure was a commitment by the states/provinces to reform their domestic regulations for consumptive uses. The existing patchwork of regulations was to be replaced in all jurisdictions by permitting systems for water withdrawals over 7.6 million L/d and registration systems for water withdrawals over 380,000 L/d.[190] In doing so, appropriation-bounded management would be expanded across the Great Lakes Basin for consumptive uses in excess of 7.6 million L/d, and governments would be able to collect the water use information necessary to make informed regulatory decisions in the future. The second measure was referred to as the Basin Water Resources Management Program, and its basic goal was the promotion of provision-bounded regulation through intergovernmental cooperation. Using the information collected from the domestic permitting and registration systems, a basin-wide water use and water supply database was to be developed. The states and

---

[189] Mehan III, Letter.
[190] Council of Great Lakes Governors, *The Great Lakes Charter* 6.

provinces then committed to develop "...cooperative policies and practices to minimize consumptive use of the Basin's water resources...."[191] In sum, the Great Lakes Charter established a blueprint for regulatory reform that envisioned an immediate basin-wide move toward appropriation-bounded regulation and an eventual move toward basin-wide provision-bounded regulation of small consumptive uses. All of this was to take place within the CGLG and a newly created CGLG sub-committee known as the Water Resources Management Committee.

While the Great Lakes Charter formalized an intergovernmental commitment to create permitting and registration systems for small consumptive uses, the implementation of these commitments was left entirely to governments at the domestic level. Some jurisdictions had few problems meeting their permitting and registration commitments because they already had similar measures in place and they faced little objection to the relatively minor changes mandated in the Charter. Minnesota, for example, had little difficulty meeting its Charter commitments because it already had a comprehensive permitting system that had been in place for over a decade. Illinois also had little difficulty in meeting its Charter commitments and even went beyond them. The 1967 Supreme Court decree, discussed above, limited Illinois to appropriating no more than 3,200 cubic feet per second (cfs) from Lake Michigan, the state's only water source in the Great Lakes Basin. As a result, since 1971, Illinois has operated a provision-bounded regulatory system in which all Great Lakes water use permits in the state are

[191] Council of Great Lakes Governors, *The Great Lakes Charter* 5.

granted within the 3,200 cfs cumulative limit.[192] Thus, Illinois had to make only a few minor changes to its Lake Michigan Act in order to comply with the Charter's permitting and registration objectives.

While about half of the Great Lakes states/provinces made the policy changes necessary to comply with the Great Lakes Charter in the two years following the formation of the agreement, the others lagged behind. The Charter was signed in 1985 when Great Lakes water levels were relatively low and extra-basin consumptive uses seemed a credible threat to the security of Great Lakes water. By the late 1980s, however, a series of wet years had raised water levels and diminished calls for inter-basin diversions, lending less urgency to the consumptive use regulations envisioned in the Charter. In this context, a number of Great Lakes governments became unwilling to endure domestic criticism for the sake of honouring intergovernmental commitments that looked much less compelling than they had a few years prior. As time progressed, and turnovers in many governments occurred, new actors entered the action arena who felt little obligation to honour the commitments of their predecessors, and the problem of non-compliance became more intractable as time passed.

Today, eighteen years after the Charter was signed, there are many jurisdictions in the Great Lakes Basin that have yet to live up to their Charter commitments for the regulation of small consumptive uses. As summarized below in Table 4.2, there are two jurisdictions that have failed to meet their permitting commitments, one jurisdiction that has failed to meet its registration commitments, and two jurisdictions that have failed to

[192] Changnon and Harper, "History of the Chicago Diversion" 33.

meet either of these commitments. This non-compliance has clearly stymied the Charter objective of achieving appropriation-bounded regulation across the Great Lakes Basin. Appropriation-bounded regulation has been realized in some jurisdictions, but the patchwork of consumptive use regulations that was identified as problematic in the early 1980s still remains. Many Great Lakes governments have taken advantage of the non-binding nature of their regulatory commitments in the Great Lakes Charter and pursued domestic regulatory policies tailored to satisfy domestic interests and objectives.

Table 4.2 - Current State/Provincial Intra-Basin Water Use Regulations[193]

Jurisdiction	*Permitting Requirements*	*Registration Requirements*	*Regulatory Approach*
Illinois	All appropriations of Lake Michigan water require a permit, and total permitted appropriations must not exceed 3,200 cfs.	Registration occurs with permitting.	Provision-bounded
Indiana	Appropriations greater than 380,000 L/d for public water supplies require a permit. All other appropriations are subject to riparian rights.	All appropriations greater than 380,000 L/d are required to register.	Predominantly appropriator-bounded

[193] This table is based on information extracted from the following sources: Claire Farid, John Jackson, and Karen Clark, *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* (Toronto: Canadian Environmental Law Association, 1997); Government of Illinois, "Illinois Lake Michigan Water Allocation Program," 2002, http://dnr.state.il.us/waterresources/weblm.htm (11 October); Government of Minnesota, "Water Use Permits," 2002, http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html (11 October); Government of New York, "Public Water Supply Permit Program," 2002, http://www.dec.state.ny.us/website/dcs/water/index.html (16 October); Government of Ohio, "Water Diversions," 2002, http://www.dnr.state.oh.us/water/planing/divrsion.htm (16 October); Government of Ontario, *Review Process for Permits to Take Water* (Toronto: Ministry of the Environment, 2000); Government of Pennsylvania, "Pennsylvania's Office for River-Basin Cooperation," 2002, http://www.dep.state.pa.us/river/river_basin.htm (16 October); Government of Wisconsin, "Irrigation, Diversion of Surface Water, Pumping Water," 2002, http://www.dnr.state.wi.us/org/water/fhp/waterway/irrigation.htm (11 October).

Michigan	Appropriations greater than 380,000 L/d require a permit. All other appropriations are subject to riparian rights.	All appropriations greater than 380,000 L/d are required to register.	Combination of appropriator-bounded and appropriation-bounded
Minnesota	Appropriations greater than 38,000 L/d or 3.8 million lpy require a permit. All other appropriations are subject to riparian rights.	All appropriations greater than 380,000 L/d are required to register.	Combination of appropriator-bounded and appropriation-bounded
New York	Appropriations for public water supplies require a permit. All other appropriations are subject to riparian rights.	All appropriations greater than 380,000 L/d are required to register.	Predominantly appropriator-bounded
Ohio	Diversions of 380,000 L/d and consumptive uses of 7.6 million L/d require a permit. All other appropriations are subject to riparian rights.	All appropriations greater than 380,000 L/d are required to register.	Combination of appropriator-bounded and appropriation-bounded
Ontario	Appropriations greater than 50,000 L/d require a permit. All other appropriations are subject to riparian rights.	No registration requirement. Permittees may be asked to undertake "certain monitoring functions."	Combination of appropriator-bounded and appropriation-bounded
Pennsylvania	All appropriations are subject to riparian rights.	No registration requirement. Periodic surveys are conducted.	Appropriator-bounded
Quebec	All appropriations are subject to riparian rights (as defined in civil law).	No registration requirement.	Appropriator-bounded
Wisconsin	All consumptive uses greater than 7.6 million L/d require a permit. All other appropriations are subject to riparian rights.	All appropriations greater than 380,000 L/d are required to register.	Combination of appropriator-bounded and appropriation-bounded

The widespread governmental failure to comply with the regulatory commitments of the Charter eventually spilled over into efforts to negotiate the Basin Water Resources Management Program and prevented it from even getting off the ground. Between 1985 and 1987, the Water Resources Management Committee met on several occasions and compiled a report on the gaps and inconsistencies in water data gathering in the Great Lakes Basin. This report was supposed to be the launching pad for further negotiations aimed at creating a basin-wide database and establishing consumptive use management objectives, but serious intergovernmental negotiations never took place. By 1987, it seemed clear that some governments had lost interest in the Charter and were not likely to comply with their regulatory commitments. These governments showed little interest in making further intergovernmental commitments to a Basin Water Resources Management Program, and the remaining governments did not really pursue the program because the likelihood of the laggard governments living up to new regulatory commitments seemed quite low. Hence, the Basin Water Resources Management Program died without a whimper, a victim of the Great Lakes governments' inability to make credible intergovernmental commitments under a coordinative interface.

The demise of the Basin Water Resources Management Program also marked the end of any chance of achieving basin-wide provision-bounded regulation of consumptive uses under the Great Lakes Charter. Thus far, Illinois is the only jurisdiction to implement a provision-bounded regulatory system for Great Lakes water use, but it was practically forced to do so by the US courts. Other jurisdictions have not emulated the Illinois policy approach because it makes little sense for them to set a cumulative limit on

their own appropriations while their neighbours refuse to do the same. Overall, while the Great Lakes Charter has resulted in some positive regulatory changes, most Great Lakes governments continue to follow policies at the domestic level that are individually beneficial but collectively dysfunctional, a dynamic reminiscent of the tragedy of the commons.

c) Emergent Regulatory Issues Under the Charter: The Case of Water Exports

Though proposals to export Great Lakes water by tanker, or some other means of bulk transport, have been around since at least the 1960s, the Great Lakes Charter did not explicitly address this issue when it was signed in 1985. At that time, no serious tanker export schemes were in the works and the issue did not seem worthy of specific intergovernmental discussion. Furthermore, the Charter already covered consumptive uses, of which water exports were merely one type, so explicit mention of water exports seemed somewhat redundant. When serious proposals for the export of Great Lakes water emerged in the late 1990s, most jurisdictions assumed that Charter principles would apply to the permitting of these schemes. For other jurisdictions, however, the Great Lakes Charter was merely an afterthought.

In March 1998, the Government of Ontario granted a water-taking permit to a private company called Nova Group, who planned to export Lake Superior water by tanker to undisclosed markets in Asia. Technically, the Nova permit was in conformity with the consumptive use provisions of the Great Lakes Charter, but normatively it was not. The permit was granted under the Ontario Water Resources Act, which meets the

appropriation-bounded permitting standards of the Charter, notwithstanding the provision-bounded standards of the stillborn Basin Water Resources Management Program. Nova's proposal called for the export of just under 14 million L/d, which was well below the PNC trigger and did not require the undertaking of any formal intergovernmental consultations prior to its approval.[194] Consequently, Ontario's decision to grant the Nova permit was unilateral and well within the bounds of formal Charter provisions.[195]

However, the decision to commence water exports from the Great Lakes Basin had such basin-wide significance that many Great Lakes governments argued that Ontario was in egregious violation of the "spirit of the Charter" by making this decision on its own.[196] The decision was particularly important in light of recent trade liberalization rules in the NAFTA and GATT/WTO. As long as Great Lakes water continued to exist in its 'natural state' it was not a tradable good and it was not subject to free trade rules. However, water export by tanker would create a tradable good subject to free trade rules that make it difficult to stop water exports once they have started.[197] Hence, there was a sense of urgency among many basin governments to preemptively stop the export of Great Lakes water, and a number of governments appealed to Ontario

---

[194] David Pugh, Sault Ste. Marie, Ontario, to M.G. Okmanas, March, 31, 1998.
[195] Donald R. Vonnahme, Ann Arbor, Michigan, to John Engler, April, 29, 1998.
[196] Kathleen Cooper and Sarah Miller, "Selling Our Water - Water Taking in Lake Superior," *Canadian Law Association Intervenor* 23.2 (April-June1998), http://www.cela.ca/Intervenor/23_2/23_2selling.htm (20 December 2002).
[197] Once water is packaged or containerized, it becomes a tradable good subject to NAFTA and GATT/WTO prohibitions on the use of export controls. Under these free trade rules, water goods are also subject to the national treatment and most favoured nation principles. Together, these principles hold that a trade opportunity extended to one country must be extended to all countries, and established trade patterns can not be interrupted by governments without a compelling public health emergency to justify such an interruption.

in very strong terms to rescind its Nova permit. Ultimately, though, the other governments could not block the commencement of water exports by Ontario, and the final decision rested entirely with the Ontario government.

The crucial factor leading to the resolution of the Nova conflict was the common front of opposition that the Ontario government faced at both the domestic and intergovernmental levels. Unlike previous regulatory conflicts under the Charter, a government was not forced to choose between conflicting intergovernmental obligations and domestic pressures. This time, pressure from both the intergovernmental and domestic levels was in the same direction, prompting the Government of Ontario to revoke the Nova Group permit in May 1998, less than two months after it was issued.[198] Nova appealed this decision in December, but ultimately lost.[199] While some hailed the revocation of Nova's permit as a victory for Charter principles, others recognized it as a 'near-miss' and tried to take policy action to specifically address the regulation, or prohibition, of water exports.

In the five years following the Nova Group controversy, a flurry of governmental activity has taken place in the regulation of water exports, but a basin-wide policy on Great Lakes water exports has not yet been forthcoming. In 1998, the Great Lakes Commission adopted a unanimous resolution opposing water exports from the basin, and, in 1999, the CGLG issued "A Statement on Protecting the Great Lakes: Managing

---

[198] Government of Ontario, News Release, "Lake Superior Water-Taking Permit Cancelled," May, 14, 1998.
[199] Great Lakes Commission, "About the Great Lakes Commission," 2002, http://www.glc.org/about/about.hmtl (15 September 2002).

Diversions and Bulk Water Exports".[200] However, neither of these declarations creates any substantive intergovernmental obligations for the regulation of water exports, and regulation in this area continues to be fragmented among the Great Lakes jurisdictions.

In Ontario and Quebec, water export policies have emerged through a process of policy emulation, but this emulation dynamic did not seep across the Canada-US border. In 1998-99, Ontario established its Water-Taking and Transfer regulation and Quebec established its Water Resources Preservation Act, both of which were modeled on a water export policy design originally created by British Columbia.[201] Though BC is well outside the Great Lakes Basin, it was also dealing with the water export issue and had designed a water export policy that successfully restricted bulk water exports while remaining compatible with international trade rules.[202] This design was replicated in Ontario and Quebec whose policies effectively banned the export of water in containers larger than 20 litres, notwithstanding some existing consumptive uses, such as the taking of ballast water by ships.[203]

In the US portion of the Basin, the Nova episode created an overriding concern that the Great Lakes Charter was too permissive in allowing the unilateral commencement of water exports, so the focus was on institutional rather than policy reform. In 2000, the US Congress passed amendments to the Water Resources

---

[200] Great Lakes Commission, "Great Lakes Commission Says "No" to Water Export," 2002, http://www.glc.org/announce/98/export.htm (15 September 2002); Council of Great Lakes Governors, "A Statement on Protecting the Great Lakes: Managing Diversions and Bulk Water Exports," 1999, http://www.cglg.org/projects/water/statement.html (7 September 2002).

[201] Ontario Water Resources Act - Ontario Regulation 285/99 (Water Taking and Transfer), (1999)

[202] Heinmiller, "Harmonization Through Emulation: Canadian Federalism and Water Export Policy."

[203] In boundary waters, Ottawa undertook amendments to the International Boundary Waters Treaty Act to prohibit the removal of boundary waters from their respective basins. This acts as an effective water export

Development Act (WRDA) that specifically defined water exports as an appropriation requiring the unanimous consent of the Great Lakes governors. This effectively removed US water exports from the coordinative interface of the Great Lakes Charter and placed them in the joint interface already created to regulate US inter-basin diversions.

Efforts were also undertaken to reform the Charter itself with the signing of the Great Lakes Charter Annex in 2001. The Charter Annex commits the Great Lakes jurisdictions to negotiating a 'more binding' agreement for the governance of non-boundary waters, including the creation of uniform standards for the regulation of withdrawal and consumptive uses. Though the negotiations are still ongoing, the successful completion of the Charter Annex would be a decisive step away from coordinative intergovernmental cooperation, the weaknesses of which became readily apparent with the emergence of the water export issue.

Lessons from the Great Lakes Charter

The Great Lakes Charter is a particularly revealing case of the effects of coordinative interfaces on transboundary common pool governance. Efforts under the Charter to regulate large consumptive uses, small consumptive uses, and water exports all point to the difficulties of undertaking effective CPR regulation in an intergovernmental interface where governmental defection is a continual concern.

Because coordinative interfaces do not bind governments to their intergovernmental commitments, governments have the option of abandoning these

---

ban from boundary waters Heinmiller, "Harmonization Through Emulation: Canadian Federalism and Water Export Policy.".

commitments and pursuing policies tailored to the interests of domestic appropriators. This was clearly what happened in Michigan's decision to pursue the Mud Creek Irrigation Project and in many jurisdictions' decisions to ignore the Charter regulatory provisions for small consumptive uses. As well, this is almost what happened in Ontario's decision to unilaterally commence water exports, though a wave of criticism at both the intergovernmental and domestic levels eventually persuaded them to do otherwise. Based on the evidence, it seems that coordinative interfaces are only effective in prompting governments to honour their intergovernmental commitments when these commitments are compatible with pressures being felt at the domestic level. When domestic pressures run contrary to intergovernmental commitments, however, domestic interests, with their electoral clout, almost always win out.

Governments operating in a coordinative interface recognize the relative ease with which their counterparts can defect from intergovernmental agreements, and this itself can make it quite difficult to negotiate basin-wide policies at the intergovernmental level. Particularly if partner governments have a history of defection, or powerful domestic interests that pressure for defection, it can be quite difficult for governments to make credible commitments and invest the necessary resources to implement basin-wide provision-bounded regulation. This explains why the Basin Water Resources Management Program never really got off the ground, and why a basin-wide water export policy has not yet been formulated, despite the intergovernmental panic initiated by the issuing of the Nova permit. The undertaking of provision-bounded regulation requires governments to restrain domestic appropriations, and they are usually unwilling to take

such measures, which are bound to be unpopular among domestic appropriators, unless their neighbours are doing likewise. In the case of the Charter, a coordinative interface succeeded in getting governments to talk about undertaking the restraints needed to introduce provision-bounded regulation, but it did not engender the mutual trust needed to implement these restraints.

4.3 The Regulation of Inter-Basin Diversions Under the Water Resources Development Act

Man-made diversions of water into and out of the Great Lakes Basin have existed since the mid 19th century, and their construction can generally be described as occurring in three distinct 'waves'. The earliest inter-basin diversions were constructed to create canals between the Great Lakes Basin and the neighbouring Ohio and Mississippi River systems in the interests of expanding commerce. This was the original purpose of the Chicago diversion, discussed earlier, and two smaller inter-basin diversions that were also constructed in New York and Wisconsin. In these barge canals, the movement of water between river basins was largely incidental to their transportation function, and governmental regulation of the water diverted through these canals was minimal, and probably best described as open access.[204]

These priorities would change during the second 'wave' of inter-basin diversions which encompassed much of the twentieth century. Instead of modestly sized canals to facilitate ship movement, the second wave of inter-basin diversions involved the movement of massive volumes of water for the primary purposes of industrial and urban

development. At Chicago, the original shipping canal was replaced with a much larger diversion that was designed to use Lake Michigan water to flush domestic and industrial waste away from the city and into the Mississippi Basin.[205] In northern Ontario, the northward flowing Long Lac and Ogoki rivers were diverted into Lake Superior in the early 1940s, as basin governments sought to raise Great Lakes water levels to increase hydroelectricity production.[206] Other proposals to divert massive amounts of Great Lakes water to the American southwest, such as the GRAND scheme, were also put forward during this period, but were not undertaken.[207]

The second wave of diversions is significant because it was during this period that the intergovernmental dimensions of inter-basin diversions first came seriously to light. The expansion of the Chicago diversion, and the various mega-projects proposing to divert water to the American southwest, made the US states aware that there were potential extra-basin threats to the security of Great Lakes water. It also made them aware that these diversion projects would have to be constructed, at least in part, in the non-boundary waters within their borders, and they began to seek out ways to tightly regulate the undertaking of such projects. However, this increased state awareness also coincided with the *Sporhase v. Nebraska* (1982) and *El Paso v. New Mexico* (1983) decisions which affirmed federal jurisdiction over interstate water issues, by virtue of the federal commerce clause, and prohibited states from favouring in-state water uses over

---

[204] International Joint Commission, *Protection of the Waters of the Great Lakes - Final Report to the Governments of Canada and the United States* (2000), 15.
[205] Changnon and Harper, "History of the Chicago Diversion" 18-21.
[206] The Long Lac and Ogoki diversions were undertaken by the Governments of Canada and the US through the International Joint Commission. Ontario gave its consent for the diversions, but was otherwise a minor player.

out-of-state water uses.[208] Thus, just as the states became motivated to deal with the potential threat posed by inter-basin water diversions, they found their policy options curtailed by the courts.

The last serious consideration of the massive diversion projects characteristic of the second wave took place during the early 1980s, just as the third wave of inter-basin diversion proposals began to appear. Third wave inter-basin diversions are generally limited in both their size and objectives. They usually propose to divert a modest amount of water to a water-stressed community or business just outside the hydrological boundaries of the Great Lakes Basin. The first of these diversion plans was a proposal put forward by a mining company in Wisconsin that wanted to use Great Lakes water to transport coal slurry through a pipeline that would extend out of the Basin.[209] This proposal, combined with lingering concerns about potential diversions to the American southwest, prompted the formation of the CGLG and the signing of the Great Lakes Charter in 1985. However, the Charter did not include any specific provisions on inter-basin diversions and the states still lacked the constitutional authority necessary to address inter-basin diversions either collectively or individually. Ultimately, the issue was taken to Congress in 1986 and the Water Resources Development Act (WRDA) was passed to create a joint interface in the governance of all subsequent inter-basin diversions in the US portion of the Great Lakes Basin.

---

[207] International Joint Commission, *Protection of the Waters of the Great Lakes* 63-64.
[208] A. Dan Tarlock, "Global Climate Change and the Law of Great Lakes Diversions," *The Lake Michigan Diversion at Chicago and Urban Drought - Past, Present, and Future Regional Impacts and Responses to Global Climate Change*, ed. Stanley A. Changnon (National Oceanic and Atmospheric Administration, 1994) 90-113.
[209] International Joint Commission, *Protection of the Waters of the Great Lakes*.

Upon closer examination, it is quite clear that the WRDA was designed specifically for the governance of third wave inter-basin diversions. The core of the act provides the governors of each of the Great Lakes states with a legally enforceable veto over any new diversion proposals that seek to divert water out of the Great Lakes Basin.[210] The original wording of the bill provided for gubernatorial vetoes on *interstate* diversions of Great Lakes water, but this was subsequently changed, through the work of Michigan representatives, to *inter-basin* diversions, whether they are interstate or intrastate. This gives the WRDA a much wider scope than originally proposed and ensures that all third wave inter-basin diversions, which are usually intrastate, are covered by the act.

Under the WRDA, state governors are free to exercise their vetoes at will, but it is not mandated that the explicit consent of all governors is required; instead, non-objection is sometimes enough for an inter-basin proposal to go forward. Though the WRDA is only enforceable in the US, convention has allowed for the participation of the provinces in intergovernmental discussions on inter-basin proposals, without granting veto authority to either of these governments. In 2001, this practice was eventually formalized in the Great Lakes Charter Annex.

Despite the need for intergovernmental consultation that seems to be implied in the establishment of mutual state vetoes, the WRDA did not establish a specific process for the intergovernmental discussion of inter-basin diversion proposals. This vacuum was later filled in 1987 with the unanimous state/provincial approval of a report titled

[210] Council of Great Lakes Governors, "Great Lakes Water Management Governance," 2002,

"Managing the Waters of the Great Lakes Basin." The report stated that the Charter PNC process should be used in any intergovernmental consultations necessary under the WRDA, and this has been the adopted practice since.[211] Hence, the pattern of intergovernmental interaction under the WRDA is similar to that under the Charter, with the very important difference that the consultation outcomes under the WRDA are legally binding on the participants. Fundamentally, it is this feature which defines the WRDA as a joint interface.

Since the introduction of the WRDA in 1986, three different inter-basin diversion proposals, all of them characteristic of third-wave diversions, have been subjected to the WRDA approval process. Each of these proposed diversions, and their eventual fate in the WRDA approval process, is discussed in greater detail below.

Pleasant Prairie, Wisconsin

The first inter-basin diversion proposal examined under the WRDA was a project put forward by the township of Pleasant Prairie, Wisconsin in 1987. Pleasant Prairie is located on the outskirts of the city of Kenosha, about 10 km outside of the Great Lakes Basin. In the mid 1980s it was discovered that the existing public water supply for Pleasant Prairie was contaminated with radium isotopes, making it unfit for human consumption. This prompted the local government to strike a deal with neigbouring Kenosha to supply Pleasant Prairie with approximately 12 million L/d of clean water through a modest extension of Kenosha's public water system. However, Kenosha draws

---

http://www.cglg.org/projects/water/index.html (7 September 2002).

its water from the Great Lakes Basin and any scheme to supply Pleasant Prairie from this water source constituted a new inter-basin diversion. The Government of Wisconsin supported the plan, mostly because there were few alternative supplies available for Pleasant Prairie, and they went about notifying the other Great Lakes governments of this pending inter-basin diversion project.[212]

Given the relatively small size of the proposed diversion and the few alternatives available to the residents of Pleasant Prairie, the Government of Wisconsin viewed the Pleasant Prairie diversion as imperative and became frustrated with the resistance they encountered during the intergovernmental consultations on the project. Wisconsin notified the other states/provinces of the proposed diversion by sending them copies of the proposal and soliciting their comments. While some states approved the project and others did not respond, the governments of Ontario, New York, and Michigan expressed concerns about the proposal and demanded more information. As a jurisdiction lacking veto power under the WRDA, the concerns of Ontario were not seriously addressed, but the concerns of New York and Michigan prompted Wisconsin to undertake bilateral negotiations with each of these jurisdictions.[213]

The governments of New York and Michigan were both concerned about the Pleasant Prairie diversion, but for different reasons. New York state law requires a formal public review of every inter-basin diversion proposal referred to the governor for approval, and the New York Governor's Office was sensitive to the criticisms that

---

[211] *Diversions and Bulk Removals of Great Lakes Waters*, International Joint Commission Reference on Consumption, Diversion and Removal of Great Lakes Water (26 August 1997), 14.
[212] Charles Ledin, Telephone Interview (22 January 2003).
[213] Ledin, Telephone Interview.

environmentalists leveled at the Pleasant Prairie proposal during these consultations. However, after face-to-face meetings with Wisconsin officials, these concerns were allayed and New York eventually agreed to lend its approval to the project. Michigan, in contrast, is the only jurisdiction whose territory is entirely within the Great Lakes Basin, and it objected to the Pleasant Prairie diversion, as it objects to all inter-basin diversions, as an unnecessary consumptive use of Great Lakes water. A number of meetings were held between Wisconsin and Michigan officials, but a firm agreement could not be reached. In the end, Michigan neither formally approved nor disapproved the project, and Wisconsin allowed Pleasant Prairie to proceed with the diversion in 1989.[214]

Wisconsin's regulation of the Pleasant Prairie diversion took an appropriation-bounded approach as a permit was issued limiting the diversion to no more than 12 million L/d. However, this appropriation of Great Lakes water did not sit well with some jurisdictions, especially Michigan. In 1993-94, the Pleasant Prairie issue resurfaced in Michigan's domestic politics, prompting the Governor's Office to take action on an issue it was accused of fumbling. Shortly thereafter, Michigan began to threaten court action against the Pleasant Prairie diversion as a violation of the WRDA. Michigan argued that Wisconsin had allowed the diversion to proceed without its formal approval, and that Michigan would not approve any diversion that resulted in a net loss of water to the Great Lakes Basin.[215]

Confronted with the threat of intergovernmental veto, and an internal study that recommended the integration of the Kenosha and Pleasant Prairie waste water systems,

[214] Ledin, Telephone Interview.

the Government of Wisconsin took action by endorsing the concept of 'full returns.' By integrating the Kenosha and Pleasant Prairie waste water systems, Wisconsin could ensure that any water diverted out of the basin would also eventually be returned to the basin, in the form of treated waste water. By establishing full returns, Wisconsin met Michigan's demand that the Pleasant Prairie diversion result in no net loss of water to the Great Lakes Basin, and this prompted Michigan to drop its threatened lawsuit.

Though the addition of full returns did not change the appropriation-bounded approach to regulation of the Pleasant Prairie diversion, this addition was significant nonetheless. Full returns make inter-basin diversions somewhat more palatable to those concerned with water conservation because it essentially transforms them from consumptive to withdrawal uses. Individually, a withdrawal use generally places less stress on a common pool than a consumptive use, but the cumulative impact of withdrawal uses can be quite detrimental and this cumulative impact must be taken into account for effective common pool regulation. Thus, while the intergovernmental negotiations on Pleasant Prairie succeeded in mitigating the impact of this inter-basin diversion by introducing the concept of full returns, they did not succeed in producing a more effective, provision-bounded approach to regulation.

Lowell, Indiana

Located approximately 50 km south of Lake Michigan and 8 km outside of the Great Lakes Basin, the city of Lowell, Indiana first made an inter-basin diversion

[215] Ledin, Telephone Interview.

proposal in 1990, with the aim of securing a safe and stable public water supply. The city's existing supply came from groundwater wells that were being contaminated by fluoride to such an extent that the Environmental Protection Agency was threatening to close them. As a result, the city government was confronted with the considerable problem of locating an alternative water source.[216] A number of proposals were put forward, but the one that offered the safest and most secure water supply was a pipeline scheme that would have brought in water from Garry-Hobart, a city located 28 km away and inside the Great Lakes Basin. The proposal planned to divert 14.5 million L/d to the Lowell area at a construction cost of about $2 million. Though the pipeline scheme promised to double the water bills of Lowell residents, it was supported by both the constituents and the city government, who then successfully secured the support of the Government of Indiana.[217]

The other Great Lakes jurisdictions were notified of the Lowell diversion proposal in 1991, and most of these governments responded to the proposal with a great deal of caution and skepticism. There was a general feeling that the proposed diversion of 14.5 million L/d was excessive and most governments demanded more information before making a formal assessment of the project.[218] For their part, officials in the Indiana Governor's Office and Department of Natural Resources realized they had little leverage over the other governments in this issue, but made a concerted effort to address the concerns of the other jurisdictions by making information on the proposal readily

[216] Jim Hebenstreit, Telephone Interview (21 November 2002).
[217] *Diversions and Bulk Removals of Great Lakes Waters* 23.
[218] *Diversions and Bulk Removals of Great Lakes Waters* 15.

available.[219] While this open and cooperative approach succeeded in securing formal approval from six of the Great Lakes governors, the two premiers and the governors of New York and Michigan continued to withhold their consent.[220]

As in the Pleasant Prairie case, the concerns of the provinces were largely set aside while the focus of negotiations was with New York and Michigan, both of which could veto the Lowell project. In an effort to secure the approval of Governors Cuomo and Engler, the Lowell proposal was revised to include a smaller diversion of 6.5 million L/d and the promise of full returns to the basin. However, these efforts at compromise were of little avail. In New York, officials in the Department of Environmental Conservation recommended that Governor Cuomo veto the proposal, though his official position remained non-committal to the end. The task of formally vetoing the proposal was ultimately left to Governor Engler of Michigan, which he did in late 1991. Michigan felt that there were viable groundwater sources in the Lowell area that could be tapped to provide a new public water supply, and that an inter-basin diversion should only be undertaken as an absolute last resort.[221] Because Michigan's veto was legally binding, Indiana had no choice but to abandon its inter-basin diversion proposal and seek out other, more local water sources for the city of Lowell.

---

[219] Hebenstreit, Telephone Interview.
[220] *Diversions and Bulk Removals of Great Lakes Waters* 15-16.
[221] *Diversions and Bulk Removals of Great Lakes Waters* 15-16.

Akron, Ohio

The city of Akron is uniquely situated on the divide between the Great Lakes and Ohio River basins and has a lengthy history of using inter-basin diversions to maintain its public water supply. Prior to the WRDA, the decision to undertake these diversions was entirely a domestic matter and did not require the approval of the other Great Lakes states.[222] However, after 1986, any extensions to the existing inter-basin diversion within Akron would require gubernatorial approval because such an extension would effectively constitute a new inter-basin diversion of Great Lakes water. Proposals for such an extension began to emerge in the early 1990s as a number of townships outside of Akron's city limits began to explore the possibility of tapping into Akron's public water supply. In 1995, an agreement was reached between Akron and some outlying townships to this effect, and the Government of Ohio found itself with a new inter-basin diversion proposal on its hands. Ohio realized that it would have to undertake a WRDA consultation on the Akron diversion, but it had learned from the previous disputes over Pleasant Prairie and Lowell and decided to make three significant changes in its approach to these consultations.

First, the Ohio Department of Natural Resources worked closely with Akron officials to develop a comprehensive diversion proposal that planned for full returns to the Great Lakes Basin from the outset. In fact, Ohio went considerably out of its way to ensure that there would be no net loss of water to the Basin. Much of the proposed 13.1

[222] *Report on the State of Ohio's Request for Approval of the City of Akron's Proposal to Divert Water from the Great Lakes Basin*, Divison of Water, New York State Department of Environmental Conservation (Albany, New York, 1997), 3.

million L/d that would be diverted from the Great Lakes Basin at Akron would be returned as treated wastewater, but the balance would be comprised of returns in a different part of the basin.[223] By ensuring no net loss of water to the Great Lakes Basin, Ohio succeeded in winning over a number of governors to the Akron proposal in the early stages of the consultations.

The second thing that Ohio did differently from the earlier WRDA consultations was to approach the Akron discussions as a two-stage process. In September 1996, before officially asking for gubernatorial approval, the Ohio Department of Natural Resources sent the Akron proposal to the other Great Lakes water agencies for "informal technical review."[224] Based on the feedback from this review, modifications were made to the proposal so that most of the key bureaucrats within the state/provincial water agencies felt comfortable endorsing it.[225] After this informal round of consultations, the Great Lakes governors/premiers were then officially notified of the Akron proposal in March 1997. Despite underlying support for the proposal within most Basin governments, the governors of Minnesota, New York, and Michigan all withheld their consent in the weeks following their official notification.[226]

Objections from some governors were not unexpected and Ohio immediately undertook a third and final measure in their effort to gain support for the Akron diversion. Intensive bilateral negotiations were initiated with all three objecting states, each tailored

---

[223] *Diversions and Bulk Removals of Great Lakes Waters* 16; Bob Downing, "Water Plan Clears Hurdle," *Beacon Journal* [Akron] 19 November 1997, D: 5.
[224] George V. Voinovich, Columbus, Ohio, to Bouchard Lucien, March, 31, 1997.
[225] Black & Veatch and Public Sector Consultants Inc., *A Report on the Proposed Expansion of the City of Akron Water System - Supplemental Report*, The City of Akron (1997).
[226] Dick Bartz, Telephone Interview (5 December 2002).

to the exigencies of the state's domestic situation. In Minnesota, a face-to-face meeting was held, and officials from Minnesota and Ohio managed to reach an understanding that would allow Governor Carlson to approve the Akron proposal. In New York, Ohio officials attended many of the state's public review meetings and were eventually successful in winning over both the Department of Environmental Conservation and Governor Pataki to the project. Even greater bilateral efforts were undertaken in Michigan, as a "technical consultant" was hired by Ohio to dispel misconceptions about the Akron proposal and to lobby the governor for his consent.[227] Ultimately, these bilateral efforts proved successful as Michigan, the last objecting state, submitted its approval for the Akron diversion in March 1998, about one year after the governors were first officially notified of the proposal.

As in the Pleasant Prairie case, the principle of full returns was central to the resolution of the Akron diversion proposal. Ohio's interest in appropriating Great Lakes water for an inter-basin diversion was counter to the interests of some other states, particularly Michigan, which favoured no inter-basin diversions at all. Under the joint interface of the WRDA, these contrary interests were compelled into binding intergovernmental negotiations where a commonly acceptable policy position was sought. Ultimately, full returns was acceptable to both opposing interests because it allowed the Akron diversion to proceed, but resulted in no net loss of water to the basin. To achieve this result, however, Ohio had to exert a considerable intergovernmental

[227] Bartz, Telephone Interview.

effort because any single Great Lakes governor could maintain the 'no diversion' status quo simply by exercising their WRDA veto.

Lessons From the Water Resources Development Act

Thus far, experience with inter-basin diversion regulation under the WRDA suggests that joint interfaces have a 'freezing effect' on the regulation of consumptive uses in transboundary common pools. In other words, joint interfaces tend to preserve the regulatory policies that are in place at the time of their formation. For example, when the WRDA was formed in 1986, the status quo for third wave inter-basin diversions was zero consumptive use; no third wave diversions had yet been constructed. Almost seventeen years after the introduction of WRDA, the total consumptive use from third wave inter-basin diversions in the Great Lakes remains near zero: the Pleasant Prairie and Akron diversions have full returns, and the Lowell diversion was rejected outright. Thus, as Fritz Scharpf found in his analysis of joint decision traps in Germany and the European Community, joint interfaces tend to preserve the status quo and inherently favour minimal policy change.[228]

In the context of transboundary common pool management, the tendency of joint interfaces to favour the status quo is not necessarily negative. As has happened with inter-basin diversions in the Great Lakes Basin, a joint interface can act as an effective brake on appropriations of questionable necessity or economic value. However, while this prevents CPR management from becoming any worse, it also inhibits it from

[228] Fritz W. Scharpf, "The Joint Decision Trap: Lessons From German Federalism and European Integration," *Public Administration* 66 (Autumn 1988): 239-78.

becoming any better. The policy stakes at the intergovernmental level are substantially raised under a joint interface because the negotiations are binding and the negotiating parties realize that any outcome will be 'locked in' for some time to come. Consequently, governments are less amenable to compromise or innovation, which explains, in large part, why the regulation of third wave inter-basin diversions has remained rooted in the appropriation-bounded approach instead of progressing to the provision-bounded approach.[229]

4.4 Summary

In this chapter, we have examined two distinct intergovernmental interfaces in the Great Lakes Basin and investigated the impact of these interfaces on the governmental regulation of consumptive water uses. While the coordinative interface of the Great Lakes Charter created problems of non-compliance and inhibited governments' ability to make credible commitments, the joint interface of the WRDA created obstacles that blocked governments' ability to move away from the regulatory status quo. In neither case was provision-bounded regulation the outcome of intergovernmental cooperative efforts, despite principled commitments to this end in both the Charter and the WRDA. Though these findings present a fairly gloomy outlook on the state of water management in the non-boundary waters of the Great Lakes, there is hope on the horizon. The ongoing Charter Annex negotiations have promised institutional reform, possibly towards the conjunctive model of intergovernmental cooperation that has proven to be quite

[229] Stefan J. Dupre, "Reflections on the Workability of Executive Federalism," *Perspectives on Canadian Federalism*, ed. R.D. Olling and M.W. Westmacott (Scarborough: Prentice-Hall, 1988) 233-56.

successful in other transboundary common pools, such as the Murray-Darling River Basin.

Chapter 5 - The River Murray Waters Agreement, The Murray-Darling Basin Initiative and the Regulation of Consumptive Uses in the Murray-Darling Basin

"The Murray-Darling Basin Initiative is about what you can do for the natural system called the Murray-Darling Basin and what you need to do collectively and cooperatively to make the system work. That's not what most other intergovernmental agreements are about. They are about national coordination, sharing, exchange, and the like.... That distinction is very important."

Murray-Darling Basin Commissioner

5.1 Introduction

In this chapter, we expand our empirical analysis of transboundary common pool management from the Great Lakes Basin to the Murray-Darling Basin where there is a long history of intergovernmental cooperation in the regulation of consumptive water uses. The Murray-Darling is a particularly interesting transboundary common pool because it has featured two distinctive intergovernmental interfaces over the past ninety years. The first was a coordinative interface formalized in the River Murray Waters Agreement (RMWA), while the second is a conjunctive interface formalized in the Murray-Darling Basin Initiative (MDBI). These successive interfaces provide a good pre/post comparison of consumptive use regulation under different intergovernmental interfaces, and the latter introduces empirical data on a new interface (the conjunctive) that was not evident in the Great Lakes Basin.

5.2 Regulation of Consumptive Uses Under the River Murray Waters Agreement

Signed in 1914, the River Murray Waters Agreement was the first intergovernmental institution for managing the waters of the River Murray on a

cooperative basis. For its time, the RMWA was a considerable achievement, having taken more than ten years to negotiate. Nevertheless, its purpose was merely to coordinate the separate policy actions of the state and federal governments; intergovernmental cooperation was non-binding and Australian governments retained considerable latitude in designing domestic policies. This was particularly true in the regulation of consumptive uses where the states were the dominant regulators, a longstanding institutional feature of Australian water management that even predates federation.

From their early efforts at settlement and expansion, the British colonizers on the Australian continent quickly came to recognize water as a crucial and scarce resource in this predominantly arid land. As early as the 1850s, Australian colonial governments began to explore different philosophies and techniques for managing water in conditions of scarcity. The natural tendency of the colonialists was to resort to common law principles of riparian rights to resolve water use issues, but this practice proved unsatisfactory and alternative water management principles were sought. In the 1880s, the Victorian government sponsored an extensive royal commission whose members traversed the world to investigate many different approaches to water use regulation. Ultimately, the Commission rejected common law principles in favour of comprehensive state licensing and administrative discretion. Victoria quickly adopted this approach and was followed by the other Murray states (New South Wales and South Australia), which

each created its own water use licensing system by the early 20th century.[230] Thus, appropriation-bounded regulation was achieved along the Murray at a very early date, though this regulation was fragmented among the three states that shared its waters.

In this context, the 1914 RMWA created an intergovernmental level of policy cooperation in which the domestic regulatory activities of the states could be coordinated, while leaving room for a considerable degree of state discretion. Two features of the RMWA, in particular, were important in facilitating continued state ascendancy in the regulation of consumptive uses. The first was an inter-state apportionment of the waters of the Murray that reinforced state 'separateness' in the regulation of its use. The second was the organizational design of the River Murray Commission (RMC) which was given a limited mandate that did not result in any form of binding decision-making at the intergovernmental level. Each of these features was fundamentally important to the operation of the RMWA and each is described in greater detail below.

While the negotiation of the inter-state apportionment in the RMWA was quite onerous, its conclusion allowed the states to preserve their separate licensing systems for the regulation of Murray water uses. Under the apportionment, South Australia, the downstream state, was guaranteed a minimum annual flow of 1.254 million acre-feet in specified monthly amounts. New South Wales and Victoria, who share the Murray along their mutual border, were each given entitlement to half of the Murray's flow at Albury and all of the tributary waters below Albury. They were also made equally responsible for meeting South Australia's annual entitlement through releases of water from their

[230] John J. Pigram, *Issues in the Management of Australia's Water Resources* (Melbourne: Longman

respective shares of the Murray or its tributaries. Overall, the inter-state apportionment was designed to ensure, on a yearly basis, that each state along the Murray would have a relatively secure supply of water from which to issue water use licenses. Though some collective action was necessary for the operation of this apportionment, the main result was to allow the states to continue the separate licensing systems they already had in place.

Responsibility for the day-to-day operation of the inter-state apportionment was assigned to the newly created River Murray Commission (RMC), an intergovernmental agency directed by a panel of water managers from the state and federal governments. The RMC's primary task was supervising the construction and operation of a number of dams, weirs, and locks along the River Murray, with the overall objective of meeting the state water entitlements specified in the inter-state apportionment. While the RMC's mandate ensured that the inter-state apportionment would be continuously enforced, it did little to encourage the states to harmonize or integrate their water use regulations. Many of the RMC commissioners were career bureaucrats[231] who were tightly controlled by their governments and had little inclination or opportunity to negotiate policy when they met. Furthermore, the RMC lacked an executive council that would have provided the "political coverage" necessary to undertake such intergovernmental policy cooperation. Hence, the RMC was largely confined to "turning the taps" on the Murray diversion

---

Cheshire, 1986) 56-57.

[231] The main exception here was the Commonwealth representative on the RMC, who was usually a minister.

works, playing little role in facilitating the intergovernmental regulation of River Murray water uses.[232]

In the years following the RMWA, the combination of inter-state water apportionment and intra-state water use regulation ensured that each state could develop its section of the Murray with little outside interference. In all three states, the main development interest was agricultural irrigation, and the number and size of irrigation projects along the entire length of the river increased dramatically during this period. Most of these consumptive uses were licensed by the states, but the licensing systems did little to restrain appropriations. Each state operated its licensing system as if its allotted apportionment of River Murray water was a provision floor rather than a provision ceiling. With all three states operating in this fashion, total River Murray appropriations steadily rose and the river eventually became over-appropriated, a fact which first became evident to the South Australians in the late 1950s. Confronted with the problem of over-appropriation, a number of Australian governments became motivated to undertake reforms, but the coordinative interface of the RMWA ensured that most of these reforms would be undertaken on a domestic rather than an intergovernmental basis.

The Chowilla-Dartmouth Controversy

By the late 1950s, irrigation development along the River Murray had become so intense that the South Australian government began to fear for the security of its defined apportionment in the RMWA. This security concern was particularly acute considering

[232] Official, Personal Interview (18 July 2002).

that South Australia relied on Murray water for both its growing agricultural sector and its water supply for the state capital, Adelaide. Within the RMWA, however, South Australia had few options to address its concerns. New South Wales and Victoria were very unlikely to agree to regulatory reforms that would encourage water conservation because the benefits of these reforms would be quite diffuse, while the costs would be concentrated on irrigators, who were both vocal and influential in the domestic politics of both states. Furthermore, even if New South Wales and Victoria would agree to regulatory reform, the non-binding nature of the RMWA made it difficult to ensure that they would actually implement these commitments. As a result, South Australian politicians began to look for unilateral measures to increase the security of their Murray water supply, and they eventually settled on a dam proposal known as Chowilla.

South Australia's preference for dam construction as opposed to internal water conservation measures was based mostly on two factors. First, the threat to South Australia's share of the Murray was defined as coming from the upstream states, and domestic water use reforms were regarded as providing minimal improvement to water security. Second, this was the era of large dam construction in the Murray-Darling Basin, and diversion works still seemed to be a reasonable solution to water security problems. A string of dams, weirs, and locks, with a total storage capacity of 15 million acre-feet, had been constructed in the three decades after the RMWA to facilitate navigation and the movement of water to meet the inter-state water apportionment, and these diversion

works had served their purposes well.[233] Furthermore, the Snowy Mountains mega-project was underway in the eastern part of the Murray, reversing a number of coastal rivers into the basin and providing increased water to New South Wales and Victoria.[234] In this context, the Chowilla project seemed a reasonable measure to most South Australians, and it was first publicly endorsed by South Australian Premier Sir Thomas Playford in 1960.[235]

Playford's original intention was to build the Chowilla dam on a unilateral basis, outside the auspices of the RMC, but this plan quickly proved impossible. The Chowilla site was selected because it was near the eastern border of South Australia and could collect Murray water as it flowed into the state, but this also meant that sizable areas of territory in New South Wales and Victoria would be flooded by the dam's reservoir.[236] Consequently, Playford was forced to consult with the two eastern states, both of which insisted that the project be sent to the RMC for review.[237] Chowilla now became an intergovernmental issue, and it would continue as such for over a decade before it was finally resolved.

The key problem that persisted in the protracted intergovernmental negotiations of the 1960s and early 1970s was the inability of governments to make lasting commitments to resolve the Chowilla issue. Twice, in 1962 and 1970, ministers from the three state

---

[233] K. E. Johnson, "The Role of the River Murray Commission," *The Murray Waters - Man, Nature and a River System*, ed. H.J. Frith and G. Sawer (Sydney: Angus and Robertson, 1974) 288-91.
[234] Lionel Wigmore, *Struggle for the Snowy* (Melbourne: Oxford University Press, 1968).
[235] Don I. Wright, "Politics, Psychology and Water: Chowilla," *The Australian Journal of Politics and History* December 1974: 370-79.
[236] According to J.M. Powell, *Watering the Garden State - Water, Land and Community in Victoria 1834-1988* (Sydney: Allen & Unwin, 1988), approximately 427 km^2 would have been flooded in Victoria and 505 km^2 would have been flooded in New South Wales by the Chowilla dam.

governments and the Commonwealth government came to formal agreements, only to have these agreements scuttled by governmental defection. In the first agreement, a deal was struck to construct the Chowilla dam with a significant degree of Commonwealth assistance; however, review of the project raised objections in both New South Wales and Victoria, and both states backed away from the agreement, demanding further review.[238] In the second agreement, a compromise was reached in which the Chowilla project would be shelved in favour of an expansion of the Dartmouth dam in New South Wales, and an increase in South Australia's Murray water apportionment. This time, the agreement was breached by South Australia where serious domestic opposition resisted ratification of the agreement, eventually bringing down the Hall government.[239] Many powerful actors in South Australia refused to give up on the Chowilla project, and they preferred to go it alone rather than accept an intergovernmental compromise that left the security of their water supply in the hands of the upstream states.[240]

While the states defended their respective defections as valid protections of their distinct interests, the defections also created an atmosphere of intergovernmental animosity that made it quite difficult to find a resolution to the Chowilla-Dartmouth controversy. Still unable to proceed with the construction of Chowilla, the newly elected South Australian government of Don Dunstan sought to renegotiate the terms of the 1970 agreement, but was completely stonewalled by the other governments. As if to

---

[237] Report by and Resolutions of the River Murray Commission on Chowilla Dam, (1961)
[238] River Murray Commission, *Statement on Proposals for Further Storage on the River Murray* (Canberra: River Murray Commission, 1968); River Murray Commission, *Reports to the River Murray Commission Relating to the Future Development of the Water Resources of the River Murray* (Canberra: River Murray Commission, 1969).
[239] Raymond Hall became Premier of South Australia in 1968.

emphasize its uninterest, New South Wales began to divert the funds it had originally set aside for the Dartmouth project to other government priorities, such as reducing its budget deficit. In the end, "...Dunstan admitted defeat and introduced a bill into the Assembly [of South Australia] to ratify the Dartmouth agreement in terms almost identical with those he had fought successfully in April 1970".[241] In March 1972, final ratification of the Dartmouth agreement was achieved in all four governments, and the project was commenced almost twelve years after Premier Playford had first raised the issue.

State Regulatory Reforms

Even while the states fought over the Chowilla and Dartmouth dam proposals, it was becoming increasingly obvious that the River Murray was reaching the benefit limit that diversion works could offer. By the 1960s, the Murray was one of the most highly developed rivers in the world, but the massive storage capacity generated by these improvements could no longer compensate for the fact that the river was being over-appropriated. Instead of constructing new diversion works, state regulators began to realize that they had to somehow restrain the consumptive uses of the River Murray if they were to maintain it as a viable water resource. Though some states came to this realization sooner than others, all of the states were eventually prompted to undertake reforms of their domestic regulatory systems.

---

[240] Wright, "Politics, Psychology and Water: Chowilla."
[241] Wright, "Politics, Psychology and Water: Chowilla" 378.

As the downstream state, and the state most vulnerable to water security problems, it is not surprising that the first jurisdiction to reform its regulation of River Murray consumptive uses was South Australia. In the wake of the failure of the first Chowilla agreement, the South Australian government began to look more seriously at its domestic consumptive use and found, to its alarm, that considerable improvements were needed. In 1966, total Murray water use in South Australia was found to be 1,900 GL, while South Australia's apportionment under the RMWA was only 1,850 GL. The deficit was being covered by over-apportionment water in wet years and storage releases in dry years, but further water usage increases would threaten the security of all current water uses. Consequently, in February 1967, a moratorium was introduced on the issuing of new water licenses and the extension of existing licenses for the Murray. The moratorium was then enforced by subsequent governments and eventually codified in the 1976 Water Resources Act.[242] By limiting cumulative appropriations from the Murray, the licensing moratorium shifted South Australia's regulatory approach from appropriation-bounded to provision-bounded, though this transformation was undertaken more by compulsion than by design.

Similar regulatory reforms were also undertaken in New South Wales, though these reforms came later than those in South Australia. In the early 1970s, irrigators along New South Wales' portion of the Murray began to complain that their water allocations were becoming less reliable than they had been in the past. The New South Wales government investigated the situation and, indeed, found some basis for the

[242] P.G. Cooper, "River Murray Water Management in South Australia," *Who Owns the Murray? A South*

farmers' complaints. The main stem of the Murray was becoming over-appropriated, and the government responded by introducing a licensing moratorium in this area in 1975, in the hope of preserving a 70 percent reliability target for these irrigators' water allocations.[243] As other parts of the basin became over-appropriated, moratoriums were introduced in these areas as well. By the late 1980s, most of the Murray-Darling Basin in New South Wales was under licensing moratoriums and provision-bounded regulation was being achieved in an incremental, piecemeal fashion.[244]

Stringent limits on the issuing of new irrigation licenses were also introduced in Victoria during this period, but were not codified until the 1989 Water Act. Similar to South Australia's agricultural sector, Victorian agriculture is based largely on permanent plantings, such as vineyards or orchards, which require a very secure supply of water. While water shortages for yearly crops, such as cotton or wheat, can result in the loss of a season's income, water shortages for permanent plantings can result in the loss of ten to twenty years' income. Though Victoria had generally taken a more conservative approach to the issuing of irrigation licenses than its upstream neighbour, an additional cautionary step was taken with the licensing moratorium of 1989.[245]

Even the state of Queensland, which was never party to the RMWA,[246] began to undertake irrigation licensing restrictions in its part of the Darling Basin during this time. In terms of irrigation development, Queensland was a relative latecomer and, thus, did

---

Australian Perspective, ed. Peter S. Davis and Phillip J. Moore (Magill: River Publications, 1985) 104-07.

[243] A target of 70% reliability means that irrigators will receive their full water allocations in 70 out of 100 years.

[244] Kim Alvarez, Personal Interview (7 August 2002).

[245] Campbell Fitzpatrick, Personal Interview (23 July 2002).

not feel the strains of over-allocation until the late 1980s. However, after actively encouraging the expansion of irrigated agriculture during the previous three decades, the Government of Queensland sought to put a brake on such development in 1991 by applying an "administrative hold" on the issuing of new irrigation licenses in limited areas of the Darling Basin. This hold was then extended across Queensland's portion of the basin in 1995, and a water resources planning process was commenced the following year to determine exactly what the provision level for the upper Darling should be.[247] Though Queensland was involved in bilateral cooperative efforts with New South Wales in the management of their shared rivers, Queensland's administrative hold, like the other states' licensing moratoriums, was undertaken on a unilateral basis in response to domestic water security concerns.

Overall, from the mid 1960s to the late 1980s, provision-bounded regulation emerged and spread through most of the Murray-Darling Basin, under the auspices of the RMWA. The need for regulatory reform was recognized by the state governments and the coordinative interface of the RMWA proved no obstacle to the attainment of these reforms at the domestic level. Though this represented a considerable improvement in the governmental regulation of consumptive uses in the basin, serious problems remained. One of these problems was the activation of sleeper and dozer licenses,[248]

---

[246] Queensland was never party to the RMWA because the main stem of the River Murray does not flow through it and the scope of the RMWA was restricted to this part of the basin.
[247] Greg Claydon, Telephone Interview (6 August 2002).
[248] Sleeper and dozer licenses are water entitlements that were granted before the moratoriums were enacted, but were not yet activated. When the states stopped issuing new licenses, many of these unactivated entitlements were activated and water use continued to increase despite the licensing moratoriums.

which allowed new appropriations to continue, even under the licensing moratoriums. Furthermore, the provision ceilings established by the licensing moratoriums was still at a level of over-appropriation and continued to effect a serious decline in the quantity and quality of Murray water. In other words, the intra-state introduction of provision-bounded management had slowed but not reversed the overall decline of the Murray: local water shortages were becoming more frequent and salinity levels continued to rise. Intergovernmental policy measures were needed to address these provision-related problems, but the RMWA provided few opportunities or incentives for this sort of cooperation.

The Darling Development Controversy

The inability of the RMWA to facilitate effective intergovernmental cooperation in the regulation of consumptive uses was particularly evident in the late 1970s during a conflict between New South Wales and South Australia over the expansion of agricultural irrigation in the Darling region. In 1979, a group of farmers along the Darling River in New South Wales applied to the state for irrigation licenses in an effort to expand agricultural production in that area. The state replied by approving the licenses in principle and commencing the public review process that was required for all new irrigation licenses under the Water Act of 1912. When the license applications were publicized, the South Australian government became aware of them and started to express some serious concerns about further irrigation activities in this part of the Basin. The Darling River is one of the major feeder rivers to the lower Murray, and South

Australians were concerned that increased irrigation along the Darling would ultimately reduce flows in the Murray. The proposed Darling development became a salient domestic issue in South Australia and the South Australian government became motivated to do something about it.[249]

Since the Darling development was in a neighouring jurisdiction, the South Australian government sought to address the issue on an intergovernmental basis. Premier Corcoran requested that New South Wales introduce an immediate moratorium on new irrigation licenses from the Darling River and suggested an intergovernmental meeting between the Murray states to discuss the issue. Citing its constitutional jurisdiction over consumptive use regulation, New South Wales rejected both the proposed moratorium and the proposed meeting, continuing to treat the Darling license applications as an entirely domestic issue. For its part, the RMC was a spectator to this exchange, having very little authority to intervene in the regulatory activities of its member jurisdictions.[250]

Having been shutout at the intergovernmental level, the South Australian government quickly changed tactics by focusing its efforts on New South Wales' domestic politics. The South Australians found natural allies among a group of irrigators along the lower Murray in Victoria and New South Wales, who were similarly concerned with the security of their water rights in the face of new development along the Darling. Together, they involved themselves in the public review process for the proposed Darling

---

[249] Alvarez, Personal Interview; Sanford D. Clark, "The River Murray Waters Agreement: Peace in Our Time?" *Adelaide Law Review* 9 (1983): 123.
[250] Alvarez, Personal Interview; Clark, "The River Murray Waters Agreement: Peace in Our Time?" 124.

licenses.[251] The involvement of the South Australian government was crucial because it played a key role in "choreographing" hundreds of objections before the New South Wales Land Boards, where the public reviews were held. These voluminous objections ground the reviews to a crawl and constituted a serious obstacle to the granting of the Darling licenses.[252]

From this point, the Darling development controversy degenerated into a series of unilateral exchanges as each state sought to outmaneuver the other in an effort to capture the benefits of the Darling River. New South Wales quickly became aware of South Australia's involvement in its Land Board reviews and replied by amending its Water Act so that the South Australian government and many of its allies were denied standing before the boards. In response, South Australia then "...instituted proceedings under the broad standing provisions of the Environmental Planning and Assessment Act 1979 (NSW), asserting that the Act required relevant environmental plans before the proposed licenses could validly be granted".[253] The controversy finally came to a close in 1981 when intergovernmental meetings were held to discuss potential amendments to the RMWA, and South Australia agreed to drop its action during these discussions.

Lessons from the River Murray Waters Agreement

In sum, experience with the regulation of consumptive uses under the RMWA seems to suggest that this coordinative interface was repeatedly unsuccessful in facilitating cooperative intergovernmental regulation of Murray-Darling waters. In some

[251] Cooper, "River Murray Water Management in South Australia" 115.
[252] Alvarez, Personal Interview.

instances, such as the Chowilla-Dartmouth affair, the main problem was defection from intergovernmental agreements, while in other instances, such as the Darling development controversy, the main problem was a preference for unilateralism over cooperation. Both of these problems are related to the non-binding nature of intergovernmental cooperation under a coordinative interface, and both of these problems were also evident in intergovernmental interactions under the Great Lakes Charter, the coordinative interface investigated in the previous chapter.

Where the regulatory experiences under the RMWA and the Great Lakes Charter diverge significantly is in the development of consumptive use regulations at the domestic level. While most governments under the Charter have failed to move toward provision-bounded regulation of their consumptive uses, governments under the RMWA have progressively instituted this form of regulation since 1966. Accordingly, one has to conclude that a coordinative interface does not constitute a prohibitive barrier to the achievement of provision-bounded regulation at the domestic level. In fact, there may have been a process of policy emulation in the diffusion of provision-bounded regulation from South Australia to New South Wales and Victoria, and this may indeed be one of the most important benefits of a coordinative interface. However, this potential benefit must be tempered by the facts that no jurisdiction in the Murray-Darling undertook provision-bounded regulation until local water security concerns made it a virtual necessity, and the provision levels in all jurisdictions were set to a level approximating maximum possible appropriations. Thus, while the RMWA did not prevent the

[253] Clark, "The River Murray Waters Agreement: Peace in Our Time?" 125.

establishment of provision-bounded regulation at the domestic level, neither did it facilitate it.

5.3 Regulation of Consumptive Uses Under the Murray-Darling Basin Initiative

Though the RMWA was amended several times during its existence, none of these amendments altered the fundamentally coordinative nature of this intergovernmental agreement, and it was not until the late 1980s that a decisive move toward a new intergovernmental interface was finally made. The task of interface reform, though universally recognized as necessary, was difficult for the Murray governments because they had invested heavily in the RMWA and there was still some reluctance to cede domestic policy autonomy to more binding intergovernmental decision-making. In large part, this continued attachment to the RMWA explains both the scope and intensity of the interface reform that eventually took place. Rather than completely replacing the RMWA, the Murray governments built upon it by adding new mechanisms of intergovernmental decision-making and introducing third parties to these decision processes. In this way, the coordinative interface of the RMWA was successfully molded into a conjunctive interface known as the Murray-Darling Basin Initiative.

Though the Murray-Darling Basin Initiative was formally introduced in 1993, its attainment was an evolutionary process dating back to the mid 1980s. In 1985, the Murray governments created a ministerial council for the governance of the Murray, and this council provided the political coverage that had been so sorely lacking under the

RMWA for over seventy years. After the creation of the ministerial council, further interface reform efforts picked up momentum and negotiations were undertaken toward this end. The product of these negotiations was a 1987 amendment to the RMWA, which retained the RMC and the inter-state apportionment, but added a number of new institutional elements that more closely resembled a conjunctive interface than a coordinative one. This amendment was then re-packaged into a totally new Murray-Darling Basin Agreement in 1992, which was subsequently given full legal status by the partnering governments in 1993. Collectively, the Murray-Darling Basin Agreement and the organizational structure created to give effect to the agreement is referred to as the Murray-Darling Basin Initiative (MDBI).

The MDBI differs considerably from the RMWA because it institutionalizes a far more prominent role for third party actors in basin-level decision-making than existed in the RMC. Under the MDBI, all intergovernmental policy initiatives require the formal approval of the Murray-Darling Basin Ministerial Council, which makes its decisions on a consensus basis.[254] Supporting the Ministerial Council is the Murray-Darling Basin Commission, comprised of senior water, environment, and agriculture administrators from each basin jurisdiction. The Commission plays a crucial role in helping governments reach consensus agreements and is largely responsible for coordinating the implementation of Council-approved policy initiatives.[255] Though the decisions of the Ministerial Council and the Commission are not legally-binding on the member

[254] Murray-Darling Basin Commission, "The Murray-Darling Basin Ministerial Council," About the Initiative, 2001, http://www.mdbc.gov.au/about/ministerial_council/council.htm (3 December 2001).
[255] Murray-Darling Basin Commission, "The Murray-Darling Basin Commission," About the Initiative, 2001, http://www.mdbc.gov.au/about/about_mdbc/the_commission.htm (3 December 2001).

governments, third party actors are involved in the proceedings of these basin-level bodies, and they serve as the collective conscience of the MDBI, raising important issues and reminding governments of their intergovernmental obligations.

The most important third party actor in the MDBI is undoubtedly the Commission Office. The Commission Office provides secretarial, research, and analytical support to both the Ministerial Council and the Commission, with the costs of its activities shared by the basin governments on a yearly basis.[256] Though it takes direction from the Ministerial Council and the Commission, the Commission Office also has a significant degree of day-to-day independence and does not hesitate to raise issues of importance related to policy development and implementation. This is quite significant as the head of the Commission Office often has direct input into Ministerial Council and Commission proceedings. Furthermore, the input of the Commission Office is often weighed heavily because it is the only credible and politically neutral repository of data and data analysis in the basin. This gives it a crucial role in settling intergovernmental disputes and directing the focus of intergovernmental policy.

Some other third parties also have institutionalized roles in the MDBI, though their powers are more circumscribed than those of the Commission Office. For instance, at the head of the Murray-Darling Basin Commission sits an independent President who represents none of the basin governments, but is, instead, selected on the basis of his/her profile or expertise in water management. The President of the Commission brings ideas

[256] The functions of the old River Murray Commission (RMC) were also incorporated into the Commission Office in a sub-agency known as River Murray Water. Organizationally, River Murray Water is "fenced-off" from the rest of the Commission Office and continues to operate the diversion works along the Murray in compliance with the inter-state apportionment.

into the Commission and is often actively involved in brokering deals or moderating disputes between commissioners.[257] Another important non-governmental actor in the MDBI is the Community Advisory Committee (CAC) which includes representatives from five user groups and twenty-one sub-state regions, brought together for the purpose of advising the Ministerial Council of community views on proposed intergovernmental policy initiatives.[258] The Chair of the CAC attends most meetings of the Ministerial Council and has recently developed close working relationships with both the Commission and the Commission Office, so the CAC's potential influence on basin-level policy is quite considerable.[259] Finally, the most recent third party actor added to the MDBI is a two-person committee known as the Independent Audit Group (IAG). The members of the IAG are well-respected individuals in the water management field who are appointed by the Ministerial Council and charged with the tasks of monitoring and evaluating state compliance with various intergovernmental policy initiatives. The IAG then reports to the Ministerial Council, which uses these reports to call governments to account for instances of noncompliance. Though the IAG is not mentioned anywhere in the Murray-Darling Basin Agreement, it has become a recurring and important feature of the MDBI in practice.

The direct participation of the Commission Office, the Commission President, the CAC, and the IAG in the proceedings of the Ministerial Council and the Commission is very significant because it means that the basin governments no longer enjoy their

---

[257] Commonwealth Commissioner, Personal Interview (16 July 2002).
[258] Murray-Darling Basin Commission, "The Community Advisory Committee," About the Initiative, 2001, http://www.mdbc.gov.au/about/cac/cac.htm (3 December 2001).
[259] Leith Boully, Personal Interview (17 July 2002).

traditional 'cartel'[260] in the formation and implementation of basin-level policy. Rather than complete governmental dominance, the viewpoints of experts and the community at large are injected into basin-level policy processes, and the dynamics of intergovernmental negotiation are noticeably changed. Most importantly, governments negotiate and implement policy with an immediate and informed audience that usually has a basin-wide perspective and can not countenance the violation of basin-wide objectives for the sake of domestic parochialism. This can have positive effects for the development of policy, as has been the case with the regulation of consumptive uses under the MDBI.

By the time the MDBI became fully institutionalized in the early 1990s, all of the jurisdictions in the Murray-Darling Basin, with the exception of the ACT, had already taken steps to establish some sort of provision-bounded regulation of consumptive uses in their respective portions of the Murray-Darling Basin. However, as discussed above, this patchwork approach to provision-bounded regulation was problematic and the quantity and quality of water in the Murray-Darling system continued to decline because of the various shortcomings in these regulations. In contrast, under the MDBI, the basin governments started to work collectively to correct these shortcoming and produced two very significant policy initiatives that have, first, established provision-bounded regulation of consumptive uses on a basin-wide level, and second, sought to establish a basin-wide provision level that is both economically and ecologically sustainable. These two policy initiatives are known as the Cap on Diversions and the Environmental Flows

[260] See Mark Sproule-Jones, *Governments at Work - Canadian Parliamentary Federalism and Its Public*

Initiative, and the formation and implementation of these initiatives is analyzed in greater detail below.

The Cap on Diversions[261]

The formation and implementation of the Cap on Diversions is a very good example of the roles that third party actors can play in facilitating intergovernmental cooperation under the MDBI. The origins of the Cap can be traced to a paper tabled by South Australian Minister John Klunder at a meeting of the Ministerial Council in 1993. The basic thrust of the paper was to call attention to the continuing increase in consumptive use of Murray-Darling water and the concomitant water quality and water quantity declines that were correlated with this increasing consumptive use.[262] Though the Ministerial Council took no immediate policy action in response to Klunder's paper, the matter was referred for study to the Commission Office, where it was quickly seized upon as a matter of great importance.

Through their involvement in the existing Salinity and Drainage Strategy, a project aimed at reducing salinity levels in the basin, water management experts in the Commission Office had become aware of the significant problems associated with increasing consumptive use, and they were eager to address these problems when the matter was referred to them in 1993. Don Blackmore, head of the Commission Office, assembled a team from his staff which compiled an audit of existing water diversions in

---

Policy Effects (Toronto: University of Toronto Press, 1993).

[261] Unless otherwise indicated, the information in this section has been gleaned from interviews with the Australian individuals listed in Appendix A.

the Murray-Darling Basin, based on information collected from the Salinity and Drainage Strategy as well as from information gleaned from the states. The most striking part of the report was a water use model for the basin that plotted scenarios for future increased diversions and described in very clear terms what the economic and ecological implications of these scenarios would be. This was also the part of the report that Blackmore emphasized in his presentation to the Ministerial Council, and both the timing and the content of the report served to spur the Council to action.

In June 1995, the Ministerial Council agreed to set a basin-wide provision level for the Murray-Darling by establishing an overall limit on the amount of water that could be diverted for human use.[263] Somewhat surprisingly, the establishment of the Cap on Diversions was relatively uncontroversial, at least in principle. South Australia had been pushing for such a policy measure for quite some time and the Commonwealth and Victorian governments were generally supportive of this effort. New South Wales had been the reluctant hold-out, but increasing evidence of water quantity and water quality decline within the state, including a 1,000 km long bloom of toxic blue-green algae on the Darling River in 1991, convinced them that a basin-wide provision level was now a necessity. The Cap was set by the Ministerial Council at the cumulative diversion level

---

[262] *John Klunder, Cong., The Changing Demands for Surface Water in the Murray-Darling Basin* (, 25 Juned Sess.Speech 1993)

[263] While the interstate apportionment remained in effect as the *minimum* amount of water that each state could expect to appropriate from the Murray in any given year, the Cap on Diversions established the *maximum* amount of water that each state could expect to divert from their respective portions of the Murray-Darling Basin in any given year. In other words, while the inter-state allocation established a provision floor, the Cap on Diversions established a provision ceiling.

correspondent with 1993/94 levels of development.[264] However, disagreements arose over Cap definitions for each individual state, and a third party was eventually called upon to settle these differences.

In early 1996, the Ministerial Council created the Independent Audit Group (IAG) and gave it a limited mandate to investigate and recommend solutions to the dispute over state Cap definitions. Comprised of Paul Baxter and Dr. Wally Cox, two well-respected experts in the water management field, the IAG undertook a judicious investigation to determine Cap definitions that would be acceptable to state governments while halting the decline of the Murray-Darling ecosystem. In its report, entitled "Setting the Cap," the IAG defined the main objectives of the Cap as: 1) maintaining and improving flow regimes in the Murray-Darling Basin; and, 2) achieving sustainable consumptive use of basin water resources.[265] Basing their analysis and recommendations on these two main objectives, the IAG adhered to the notion of a Cap at 1993/94 levels of development, but allowed for specific, short-term exceptions in the definition of state Caps. For example, New South Wales' Cap was set at 1993/94 levels of development except in the Border Rivers valley where a dam was under construction and the Cap limit would be set upon its completion. Similar modifications were made to the Cap definitions for Victoria and South Australia, and Cap definitions for Queensland and the ACT, both of which joined

[264] This means that the basin-wide Cap "...in any year is the volume of water that would have been used with the infrastructure (pumps, dams, channels, areas developed for irrigation, management rules, etc.) and management rules that existed in 1993/94, assuming similar climatic and hydrologic conditions to those experienced in the year in question. Thus, the Cap provides scope for greater water use in certain years and lower use in other years." (Quoted from: Independent Audit Group, *Setting the Cap - Report of the Independent Audit Group*, Murray-Darling Basin Ministerial Council (Canberra: Murray-Darling Basin Commission, 1996)). See also: Andy Close and Daniel Connell, "How Does the Cap Work?" 1 January

the Cap initiative at this later stage, were postponed pending the conclusion of water resource planning exercises in these jurisdictions.[266]

The recommendations put forward by the IAG in "Setting the Cap" were accepted by the Ministerial Council in December 1996, and the state governments began to implement the domestic consumptive use restrictions necessary to meet their Cap obligations. Nevertheless, it was not until August 2000 that a formal agreement on the Cap on Diversions was finally produced by the Ministerial Council in the form of Schedule F to the Murray-Darling Basin Agreement. Part of the delay is explained by the persistent conflicts over Cap definitions for Queensland and the ACT, but most of it can be explained by the sheer magnitude of the Cap initiative. Most stakeholders in the Murray-Darling regard the Cap as "...the single most significant water resources initiative in the Basin since the establishment of the Ministerial Council in 1985," and most governments approached its formalization with a considerable degree of caution.[267] Particular attention was paid to the oversight procedures used to encourage Cap implementation by the states, but most of the provisions in Schedule F were merely reflective of practices that had been in place since the Cap was first brought into effect in 1995.

After the politically neutral input of the IAG had proven quite useful in helping to establish Cap definitions for a number of the states, the Ministerial Council decided to

---

2000, http://www.mdbc.rucc.net.au/mdbc/news_room/basin_talker/user-view.cfm?ItemNo=5 (5 December 2001).

[265] Independent Audit Group, *Setting the Cap - Report of the Independent Audit Group.*

[266] Independent Audit Group, *Setting the Cap - Report of the Independent Audit Group.*

[267] Murray-Darling Basin Commission, *Review of the Operation of the Cap*, Murray-Darling Basin Ministerial Council (Canberra: Murray-Darling Basin Commission, 2000), 9-10.

continue its existence and assign it a monitoring function in Cap implementation. Since 1996/97, the IAG, with the assistance of the Commission Office and the various state water agencies, has produced yearly reports charting the progress of all the states in meeting their Cap commitments. These reports are then submitted to the Ministerial Council, where states are forced to explain their Cap violations to their partner governments. If persistent Cap violations are found in a particular river valley, the IAG can take the additional step of performing an extraordinary "special audit" that focuses entirely on the water use activities and regulations in the non-compliant valley. Thus far, only one special audit has been undertaken, after the Gwydir Valley and Border Rivers areas in New South Wales were judged to be in persistent violation of the Cap in 2001.[268] Both the IAG yearly reports and the special audits are part of a continuous intergovernmental dialogue that is used to encourage governments to meet their Cap commitments through moral suasion and political shaming. Though this has not guaranteed full Cap implementation, it has been surprisingly effective and surprisingly popular among the basin stakeholders.

Another integral part of this intergovernmental dialogue has been the general oversight of the Commission Office, which has kept one eye on Cap implementation while keeping another eye out for policy initiatives to improve upon the Cap. In 2000, five years after the Cap was first implemented, the Ministerial Council ordered the Commission Office to undertake a review of the Cap's operation to that point. Significantly, the review was not to investigate whether the Cap was needed; it was,

[268] Independent Audit Group, *Review of Cap Implementation 1999/00* (Canberra: Murray-Darling Basin

instead, to review how the operation of the Cap might be improved.[269] The resulting "Review of the Operation of the Cap" had a significant impact at the Ministerial Council prompting both the formal creation of Schedule F and the intergovernmental discussions that would eventually lead to the undertaking of the Environmental Flows Initiative.

For an intergovernmental policy initiative that is unenforceable in the courts, there is general agreement that state compliance with the Cap has been exceptional. This is particularly true of South Australia and Victoria, both of which have been praised by the IAG for their Cap compliance. Given the early introduction of its irrigation licensing moratorium, South Australia was relatively well positioned to meet its Cap obligations, and the IAG has documented Cap compliance in South Australia in every one of its yearly reports.[270] Victoria, on the other hand, has had to reduce licensed water allocations and introduce stringent controls on water trading in some areas of the state, but its compliance with the Cap has been described by the IAG as "exemplary".[271] Victoria's domestic restrictions are all the more remarkable given that they have been undertaken despite concerted protest from some domestic user groups.

Somewhat less impressive has been the Cap compliance of New South Wales, though its Cap violations have challenged the IAG's interpretation of the Cap rather than the continuation of the Cap itself. While New South Wales readily acknowledges that its

---

Commission, 2001).

[269] Murray-Darling Basin Commission, *Review of the Operation of the Cap.*

[270] Independent Audit Group, *Review of Cap Implementation 1996/97* (Canberra: Murray-Darling Basin Commission, 1997); Independent Audit Group, *Review of Cap Implementation 1997/98* (Canberra: Murray-Darling Basin Commission, 1998); Independent Audit Group, *Review of Cap Implementation 1998/99* (Canberra: Murray-Darling Basin Commission, 1999); Independent Audit Group, *Review of Cap Implementation 1999/00* (Canberra: Murray-Darling Basin Commission, 2001); Independent Audit Group, *Review of Cap Implementation 2000/01* (Canberra: Murray-Darling Basin Commission, 2002).

Cap level is the amount of water diverted at 1993/94 levels of development, it operationalizes this level differently from the IAG and the Commission Office. New South Wales argues that Cap compliance can only be determined by a long-term average of yearly water usages because climatic changes cause water usage to fluctuate greatly from year-to-year. In contrast, the IAG argues that New South Wales must try to stay within its Cap every year, and in those years where water usage exceeds the Cap, a "water debt" accumulates that must be paid back to the environment in subsequent years. Using its operationalization of New South Wales' Cap, the IAG has found three river valleys in the state to be in violation of the Cap, and has even undertaken a special audit of two of these valleys. New South Wales has countered by claiming that these valleys are well in compliance according to its accounting methods, and it has defended its definition of the Cap at both the Commission and the Ministerial Council. Despite this controversy, however, Cap compliance is relatively widespread throughout New South Wales and few stakeholders in the basin regard New South Wales as threatening the continued existence of the Cap.

Perhaps more threatening to the Cap's existence is the continued lack of formal Cap definitions for Queensland and the ACT. In Queensland, there is a general perception that a Cap at the 1993/94 level of development unnecessarily penalizes them because they developed their water resources much later than their southern counterparts, and, hence, had not reached a comparable level of development by 1993/94. Queensland argues that there is nothing "magical" about the 1993/94 figure, and that they would be

[271] Independent Audit Group, *Review of Cap Implementation 1999/00* 17.

much better served by a Cap set through comprehensive state water resource planning. This planning process has been underway since 1996, and appears to be nearing completion. However, the IAG and a number of Murray-Darling governments have expressed considerable frustration with repeated delays in the process, all while new development has been allowed to continue throughout the state. The Queensland government is in a particularly difficult position because many of its irrigators are quite militant and simply object to the Cap in principle. For instance, in the summer of 2002, the Queensland government tried to put itself in a position of perpetual Cap compliance by buying out the water license of Cubbie Station, the largest irrigation project in the Murray-Darling Basin. However, public protest at the resulting loss of jobs in the area forced the government to retreat from this plan, and the issue of Queensland's Cap definition remained unresolved.

In comparison to Queensland, the debate about the ACT's Cap definition is far less acrimonious. While the ACT argues that its Cap level should be set at 55 GL to allow for future growth, most other governments favour a Cap level of 38 GL, which is much closer to the ACT's actual water usage at 1993/94 levels of development. The matter has been brought before the Ministerial Council on at least one occasion, but no consensus has yet been found. Because the amounts of water in question are relatively small, and because the ACT has proven to be a responsible water manager without a formal Cap definition, the dissensus on this issue has not yet become intergovernmentally divisive.

Overall, the Cap on Diversions must be regarded as a uniquely successful example of provision-bounded regulation, particularly among the consumptive use regulatory policies investigated thus far in this study. Through the Cap initiative, a basin-wide provision level has been established for the Murray-Darling, and the basin governments have conformed with this provision level to a very considerable degree in their domestic regulatory practices, even when restraints on domestic consumptive uses were necessary. Though instances of Cap non-compliance remain, particularly in New South Wales and Queensland, they have been addressed by basin governments and do not seem to threaten the continuation of the Cap throughout the rest of the basin. Nevertheless, despite the general acceptance and stability of the provision level established by the Cap, this provision level was still near maximum appropriation levels and the need for improvement was widely noted. This, in essence, was the motivation behind the second effort at provision-bounded regulation undertaken under the MDBI, the Environmental Flows Initiative.

The Environmental Flows Initiative[272]

Similar to the Cap on Diversions, the impetus for the Environmental Flows Initiative can be traced to the work of the Commission Office and the interjection of its input at the Ministerial Council. At the Council's direction, the Commission Office conducted a five-year review of the Cap's operation in early 2000 and presented its findings in August of that year. While the report lauded the achievements of the Cap,

such as an increase in the security of water rights in the Basin, it also made clear that the Cap had only slowed the ecological decline associated with high salinity and low river flows, but had not reversed it. The next step in restoring the Basin's riverine environment was to allocate water specifically to the environment by reducing the overall level of the Cap.[273] Though this recommendation was quite contentious, it received a sympathetic ear from some members of the Ministerial Council, particularly the Commonwealth Minister of the Environment, Robert Hill. As a result, the matter was referred to the Commission to determine if an intergovernmental consensus on a Cap reduction could be forged.

The Commission addressed the environmental flows issue by creating a project board, comprised of a sub-committee of Commission members, which debated a number of options for improving river flows that were mutually acceptable to the participating commissioners. Most of these options involved only slight reductions in the Cap level and focused mostly on improving the operation of diversion works so that some of the storage water in the Murray-Darling system could be allowed to flow more freely. When these suggestions were submitted to the Ministerial Council in March 2001, however, they were immediately rejected by South Australia and Minister Hill as entirely inadequate. Hill is himself a South Australian and he is deeply concerned about Murray-Darling water issues, particularly the closing of the Murray Mouth.[274] Instead of

---

[272] Unless otherwise indicated, the information in this section has been gleaned from interviews with the Australian individuals listed in Appendix A.
[273] Murray-Darling Basin Commission, *Review of the Operation of the Cap.*
[274] The Murray Mouth is the point at which the River Murray empties into the Indian Ocean. In recent times, water flows from the Murray have been so low that sand has accumulated in the Murray Mouth and completely disconnected the Murray from its natural ocean outlet.

tinkering with the operation of the diversion works, Hill proposed an immediate reduction of 200-300 GL in the Cap level, all of which would be allocated to the environment. Though Hill's proposal was rejected by the Council as "radical" and "impractical," there was substantial agreement that an Environmental Flows Initiative should be pursued. Accordingly, a series of broad objectives was formulated for the initiative and it was once again referred to the Commission for further discussion.

Since March 2001, the Commission has proceeded with the Environmental Flows Initiative through two consecutive processes that have involved significant input from non-governmental actors. First, an Expert Reference Panel of hydrologists and engineers was formed to provide the Commission with quantitative estimates of the environmental flows needed to meet the broad program objectives established by the Ministerial Council. These estimates were then presented to the Council in March 2002 and the Council decided that public consultations should be undertaken to obtain community feedback on three proposed Cap reductions: 350 GL, 750 GL, and 1,500 GL. Interestingly, all three of these reductions would be larger than the "radical" one put forward by Minister Hill only a year previously. In the second process, a Community Reference Panel was established and began basin-wide public consultations in July 2002. Though a somewhat raucous affair in many parts of the basin, these consultations will be used by the Ministerial Council in deciding a final environmental flows allocation, a decision that is scheduled to be made by October 2003.[275]

[275] *Independent Community Engagement Panel, Murray-Darling Basin Ministerial Council, The Living Murray - A Discussion Paper on Restoring the Health of the River Murray* (2002)

Though the implementation of a basin-wide environmental flows regime would be an impressive feat, its successful conclusion is far from inevitable. Regardless of the environmental flows allocation eventually decided upon, a number of contentious intergovernmental issues remain to be resolved. Foremost, in this regard, is the interstate division of the environmental flows allocation, expressed in terms of state Cap reductions. To provide the greatest flow benefits, the upstream states would have to bear the bulk of the environmental flows allocation and, thus, reduce their Caps the most. Not surprisingly, however, New South Wales and Queensland resist this notion because the political and fiscal costs[276] involved promise to be formidable. In Victoria and South Australia, there is also some concern that the upstream states have not yet made the domestic policy changes necessary to realistically comply with an Environmental Flows Initiative. Given New South Wales' alleged Cap violations and Queensland's reluctance to set a state Cap definition, there may indeed be some substance to these concerns. As one participant in the MDBI put it, "...the Cap has been the major decision of the Ministerial Council, but it will likely be dwarfed by the Environmental Flows Initiative. Even a decision to stay at the status quo will be monumental."

Lessons from the Murray-Darling Basin Initiative

Thus far, experiences with the Cap and the Environmental Flows Initiative seem to indicate that conjunctive interfaces can facilitate the undertaking of effective, provision-bounded policy in transboundary common pools. Of particular importance, in

[276] Meeting environmental flows allocations could cost governments a very substantial amount of money if

this regard, are the third party actors that are directly involved in policy formation and implementation at the intergovernmental level. In the formation of policy, these actors can help to generate the intergovernmental trust that is necessary for governments to commit themselves to basin-wide provision-bounded policies. For example, the Commission Office greatly facilitated intergovernmental agreement on the Cap by providing politically impartial evidence that this initiative was ecologically necessary and not an attempt by the downstream jurisdictions to usurp water from the upstream jurisdictions. Furthermore, in the implementation of the Cap, third parties were crucial in holding governments accountable for their actions, but without compelling compliance. In particular, the IAG has used public reporting and political shaming to prompt a considerable degree of Cap compliance, while still allowing governments some leeway. The end result is a basin-wide provision-bounded policy that is quite impressive when compared to the policies that preceded it.

5.4 Summary

In sum, the development of consumptive use regulations in the Murray-Darling Basin has been quite distinct from those in the Great Lakes Basin, discussed in Chapter 4. While most Great Lakes jurisdictions have struggled to implement even appropriation-bounded policies, the Murray-Darling jurisdictions implemented appropriation-bounded policies early in the twentieth century and have haltingly pursued provision-bounded policies since the late 1960s. Though there is not a perfect correlation between the

---

they are forced to purchase existing irrigation licenses in order to find water to meet these allocations.

various intergovernmental interfaces and different resource management policies, some important findings can be gleaned for the Great Lakes – Murray-Darling comparison, thus far. First, coordinative interfaces do not prohibit the development of provision-bounded policies by any given government, but they are much less successful in establishing provision-bounded policies on a basin-wide basis, either through intergovernmental cooperation or diffusion. Second, joint interfaces seem to exhibit many of the negative features associated with joint decision traps, including lowest common denominator policy outcomes and difficulties in achieving policy change. Third, the only interface that has produced basin-wide, provision-bounded policy is the conjunctive interface. All of these findings are important to keep in mind as we proceed to the next stage of this study, in which each of the cases will be examined for its capacity to resolve the perpetual collective action problem of policy learning.

Chapter 6 - Policy Learning in Transboundary Common Pools

"Social learning is most urgently needed in large ecosystems; territories with a measure of ecological integrity that are divided among two or more governing jurisdictions."

Kai N. Lee, *Compass and Gyrsocope*

6.1 Introduction

In the long-term management of any common pool, one of the fundamental collective action problems faced by managers is the undertaking of effective learning activities. Because human knowledge of common pools is imperfect and because humans' interactions with common pools vary over time, resource management policies need to be adaptable, and effective learning processes are crucial in allowing policy adaptation to occur. Hence, policy learning was identified earlier in this study as one of the three main collective action problems inherent in any common pool dilemma. Policy learning, however, is a phenomenon that can only be studied by analyzing a succession of public policies, so the analytical orientation of this chapter shifts from the cross-sectional approach used in Chapters 4 and 5 to the longitudinal approach used in Chapter 3. In the sections that follow, quantitative and qualitative evidence of policy learning in the Great Lakes and Murray-Darling basins is presented and then critically analyzed in an effort to explain why some intergovernmental interfaces seem to be much more effective than others in the facilitation of policy learning.

6.2 Evidence of Policy Learning in the Great Lakes and Murray-Darling Basins

As discussed in Chapter 3, rational choice institutionalism, as a theoretical approach, is quite amenable to longitudinal analysis. However, given the iterated nature of action arenas in a longitudinal analysis, four additional factors have to be considered that are not really incorporated into cross-sectional analyses: changes in institutional rules; changes in social forces; social learning; and path dependency. Because the longitudinal analysis of this chapter, though, is purposefully designed to compare policy change patterns within defined intergovernmental interfaces, institutional rule change is not particularly relevant here. Instead, the rule configuration in each case is held constant and changing social forces, social learning, and path dependency are conceptualized as the contending factors in explaining patterns of policy change. In particular, the aim of this chapter is to uncover those intergovernmental interface(s) that facilitate social learning relative to the influence of social forces and path dependency.

To be precise, it is not social learning in general that is the primary interest of this chapter, but a specific sub-type of social learning that is widely known as policy learning. You will recall from the discussion of social learning in Chapter 3 that political scientists have recognized learning processes in a wide array of action arenas, ranging from the operational to the constitutional. What fundamentally distinguishes these learning processes is the object of learning, or the lessons that are drawn. At the constitutional level, for instance, learning can occur about the strengths and weaknesses of the collective choice institutions within which policy is made. Evidence of this kind of

learning was presented in Chapter 3 as actors in the Great Lakes and Murray-Darling basins identified weaknesses in prevailing intergovernmental interfaces and made efforts to reform them. Learning can also occur in collective choice action arenas as existing public policies are evaluated and the findings used to improve future policies; this is the type of learning commonly referred to as policy learning. Finally, social learning can occur at the operational level and is related mostly to techniques and processes of resource appropriation and provision. For example, the advent of a new technology, such as a more efficient irrigation technique, would be a good example of operational learning in water management.

Though effective learning at all levels is important, the focus in this chapter is primarily on policy learning in collective choice action arenas. Policy learning is crucial to effective long-term common pool management in two ways. First, effective policy learning ensures that resource management policy will progress from policy types that are less effective towards provision-bounded policy. So, even if the current policy is appropriator-only, for example, effective policy learning will ensure that resource management policy will eventually progress toward provision-bounded policy. Second, policy learning is important even after provision-bounded policy has been achieved because it allows policy to be adapted to changing natural and social conditions. For example, should climatic changes or a shift in community values alter the perceived optimal level of provision for a common pool, effective policy learning will allow the newly defined provision level to be incorporated into policy. Overall, whether encouraging the adoption of a more effective policy type or facilitating adaptation to

changing definitions of provision, policy learning is a requisite for indefinite policy improvement in common pool management.

Though the considerable benefits of effective policy learning are uncontroversial, the achievement of policy learning is another problem altogether. Particularly in common pool dilemmas, policy learning is a collective action problem that can be difficult to overcome: individual actors are often reluctant to bear the costs of policy learning activities because the returns are usually uncertain and diffuse. This is evident in both the policy evaluation and agenda-setting aspects of policy learning. To determine the strengths and weaknesses of existing policies, policy evaluation is necessary. However, the collection and analysis of data can be a formidable task, particularly on a basin-wide level where provision questions are addressed. Furthermore, even with sound policy evaluations, policy learning can still be inhibited if the findings are not used to shape subsequent policy agendas. This is also a considerable collective action problem, as agenda-setters occupy a very powerful position in the development of policy and the temptation for these actors to be self-serving, in response to social pressures or the increasing returns of policy path dependency, may be difficult to overcome. Nevertheless, in order for effective policy learning to occur, unbiased policy evaluations must be undertaken and the findings from these evaluations must exercise considerable influence in the setting of subsequent policy agendas.

As intimated above, the ultimate empirical outcome of effective policy learning is policy improvement. A policy improvement occurs when either a less effective policy is replaced by a more effective policy, or when a provision-bounded policy is replaced by

another provision-bounded policy (one that reflects a new awareness of what the provision level of a CPR should be). In operational terms, a policy improvement is readily apparent when a policy change results in a rightward shift on the policy typology outlined in Table 2.3. Since all of the policies that were formed and implemented under the intergovernmental interfaces included in this study were already outlined in the previous two chapters, the task now is to analyze policy change trends to determine how many policy improvements have been evident, over time, under each interface.

This also indicates a second factor that is important in empirically evaluating the presence of policy learning, the factor of time. The presence of policy improvements is not as relevant in absolute terms as it is in relation to time. For example, two policy improvements in twenty years indicates a much higher degree of policy learning than two policy improvements in two hundred years. Thus, policy learning is most accurately operationalized and measured as a ratio level variable, and this is the approach taken here. The policy learning ratios listed below in Table 6.2 were calculated by dividing the total number of policy improvements under any given intergovernmental interface by the number of years which the interface has existed. In this way, the numbers listed in the right-hand column represent the average number of policy improvements per year for each interface, thereby providing a succinct and comparable measure of policy learning.

Table 6.2 - Empirical Evidence of Policy Learning in the Great Lakes and Murray-Darling

Cases	*Policy Improvements*[277]	*Time Frame*	*Policy Learning Ratio*

Great Lakes Charter	• Shifts from appropriator-bounded to appropriation-bounded regulation for small consumptive uses in:
	  • Indiana (1/10)[278]
	  • Michigan (1/10)
	  • Ohio (1/10)
	  • Wisconsin (1/10)
	• Shifts from appropriator-bounded to appropriation-bounded regulation for water exports in:
	  • Ontario (1/10)
	  • Quebec (1/10)
	• Total Policy Improvements = 6/10 or 0.6
		2002 - 1985 = 17 years	0.6/17 = **0.035**

Water Resources Development Act (WRDA)	• No evident policy improvements • Total Policy Improvements = 0	2002 - 1986 = 16 years	0/16 = **0**

River Murray Waters Agreement (RMWA)	• Shifts from appropriation-bounded to provision-bounded regulation for consumptive uses in:
	  • South Australia (1/3)
	  • Victoria (1/3)
	  • New South Wales (1/3)
	• Total Policy Improvements = 1
		1992 - 1914 = 78 years	1/78 = **0.013**

Murray-Darling Basin Initiative (MDBI)	• Basin-wide shift in the accepted provision level through the Cap on Diversions (1) • Total Policy Improvements = 1	2002 - 1992 = 10 years	1/10 = **0.10**

[277] To be considered a policy improvement, the following three conditions had to be satisfied: 1) there had to be evidence of a policy change; 2) the policy change had to result in the replacement of a less effective policy with a more effective policy, or the replacement of one provision-bounded policy with another provision bounded policy; and 3) the policy change had to be actually implemented, not just formally introduced.

[278] These bracketed numbers indicate the absolute value of any individual policy improvement. Since we are dealing with transboundary common pools, basin-wide policy improvements are assigned a value of 1 and domestic policy improvements are assigned a fractional value commensurate with the number of jurisdictions in that particular common pool.

As you can see, the policy learning ratios in Table 6.2 reveal significant variance in policy learning between the cases examined in this study. Overall, policy learning was highest under the MDBI and lowest under the WRDA, with the Great Lakes Charter and the RMWA falling in between. These results reflect important differences in the extent to which different intergovernmental interfaces facilitate policy learning, and these differences are explored in greater detail in the three sections that follow. First, however, some comments are warranted on the calculation of the policy learning ratios that illustrate these differences.

In the case of the Great Lakes Charter, the policy learning ratio was relatively low because there were few actual policy improvements. Though the Prior Notice and Consultation Process for large consumptive uses and the Basin Water Resources Management Program for small consumptive uses offered the prospect of basin-wide policy improvements, few of these prospects were realized. The Prior Notice and Consultation Process has been used only once, with no discernible policy improvement, and many jurisdictions have failed to implement their regulatory obligations under the Basin Water Resources Management Program. Of all the Great Lakes jurisdictions, only Indiana, Michigan, Ohio and Wisconsin undertook policy improvements as a result of this program. Illinois' provision-bounded policy predates the Basin Water Resources Management Program, as does the appropriation-bounded policies of Ontario and Minnesota; the remaining jurisdictions simply abandoned their policy improvement obligations (see Table 4.2). Regarding water export, only Ontario and Quebec undertook policy improvements in this area, while the US states sought institutional reform (in the

form of amendments to the WRDA) instead of policy improvement.[279] When all of these factors are considered together, it becomes evident that surprisingly few policy improvements have been achieved under the Great Lakes Charter, despite the considerable number of policy initiatives undertaken. Consequently, there is only limited empirical evidence of policy learning.

There is even less evidence of policy learning under the WRDA, which is starkly revealed in its policy learning ratio of zero. Once again, this is a reflection of the difficulties that actors experienced in achieving policy improvements under this interface. Of the three instances of policy formation under the WRDA, one (Lowell) resulted in no policy change at all, while the other two (Pleasant Prairie and Akron) resulted in the status quo policy type. Prior to WRDA, inter-basin diversions such as Pleasant Prairie and Akron were subject to state permit, an appropriation-bounded policy. Under WRDA, appropriation-bounded policies were also formulated, but at the intergovernmental level; hence, there was no evident policy improvement. Admittedly, a policy learning ratio of zero somewhat underestimates the aggregate social learning that took place under the WRDA. For example, proponents of inter-basin diversions quickly learned that 'full returns' was a virtual requisite for approval, and the Government of Ohio learned from earlier experiences in utilizing a three-stage approach to seeking approval for the Akron diversion.[280] Nevertheless, neither of these constitutes a policy improvement, which is the uniform standard used to evaluate policy learning for all cases in this study.

---

[279] The amendment of WRDA to include water exports may be an example of institutional learning (at the constitutional level) but it is not policy learning and can not be counted as such.

[280] Again, Ohio's use of a three-stage process in its effort to gain approval for the Akron diversion may be an example of institutional learning.

Under the RMWA, policy learning was also quite low, but not because of a lack of policy improvements. South Australia, Victoria, and New South Wales each incrementally switched from appropriation-bounded policies to provision-bounded policies, so that a basin-wide policy improvement was evident over the course of the RMWA's existence. However, the RMWA existed for about 78 years, and the achievement of a single policy improvement in this vast time frame is much less impressive than it would be in the much smaller time frames of the other cases. Consequently, the policy learning ratio for the RMWA is quite low, reflecting a relative dearth of policy learning in River Murray management for much of the twentieth century.

Clearly, the most impressive policy learning ratio is that of the MDBI, and it is even more impressive when one considers that, in all likelihood, it underestimates the extent of policy learning under this interface. The policy learning ratio for the MDBI is relatively high because the implementation of the Cap on Diversions achieved a basin-wide policy improvement in the short time frame of ten years. Recent efforts to formulate the Environmental Flows Initiative, which would redefine the provision level of the Murray-Darling Basin to reflect new ecological objectives, could result in a further basin-wide policy improvement, pushing the policy learning ratio for the MDBI even higher. However, because the Environmental Flows Initiative is not yet implemented, it was not counted as a policy improvement and it is not reflected in the policy learning ratio outlined above. Nevertheless, knowledge of the Environmental Flows Initiative provides even greater confidence that the MDBI is well deserving of the highest policy learning ratio among the cases examined here.

While the policy learning ratios in Table 6.2 reflect significant variance in policy learning among different intergovernmental interfaces, the reasons for this variance are not immediately obvious. The remainder of this chapter is devoted to exploring these reasons by delving behind the numbers in a qualitative exploration of how conjunctive, coordinative, and joint interfaces facilitate or inhibit actors in addressing the collective action problems of policy learning. Particular attention is focused on policy evaluation and agenda-setting, the two stages of the policy process in which most policy learning activities take place.

6.3 Policy Learning Under a Conjunctive Interface - The MDBI[281]

As indicated above, the policy learning evident under the MDBI is distinct from the policy learning evident under the other intergovernmental interfaces. More specifically, policy improvements under the MDBI seem to be more frequent and seem more likely to be achieved on a basin-wide basis. Considering that the MDBI is only about ten years old and that only two policy improvements (one achieved and one in progress) provide evidence to support this contention, one must be wary of making hasty conclusions. Nevertheless, experiences with the development of the Cap on Diversions and the Environmental Flows Initiative suggest that conjunctive interfaces can greatly facilitate policy learning in transboundary common pools. Of particular importance, in this regard, are the third party actors who participate at the intergovernmental level of

[281] Unless otherwise indicated, the information in this section is taken from interviews with the Australian individuals listed in Appendix A.

policy-making, and who play important roles in both policy evaluation and agenda-setting.

In conjunctive interfaces, third parties are very often assigned policy oversight functions in an effort to ensure that governments fulfill their intergovernmental policy obligations. These oversight responsibilities also mean that they are particularly well-positioned to undertake policy evaluation activities: they already gather data in their policy oversight functions, and many of them possess the expert knowledge necessary to interpret and analyze this data. Under the MDBI, the Commission Office and the Independent Audit Group have clearly taken on policy evaluation functions, acting as both coordinators and instigators of policy evaluation. The Commission Office, in particular, has become the informational hub of Murray-Darling water management, collecting and disseminating information to the states, and undertaking independent evaluations when mandated. This has both reinforced and expanded policy evaluation activities in the basin, overcoming what is usually a difficult collective action problem.

When the Commission Office and the Independent Audit Group are highly involved in policy evaluation activities, these evaluations tend to be more reflective of basin-wide perspectives and they tend to be more frequent. Placing a basin-wide perspective on policy is one of the basic elements in the mandate of the Commission Office, and many participants in Murray-Darling governance recognize the importance of having such a perspective in policy evaluation. In the words of one participant:

> Having a whole-of-basin perspective on knowledge generation and research and so on is quite important. I think it would be very difficult for the states independently to commission research which they could then crash together and

> gain a basin-wide perspective. The Commission Office provides this needed perspective and a considerable degree of expertise.[282]

Ultimately, this basin-wide approach to policy evaluation provides evaluations that are more likely to be trusted by basin governments as objective and accurate. In turn, this generally accepted body of policy information reduces intergovernmental conflict, because policy information is less contested, and generally leads to more informed policy discussions. The continuous presence of the Commission Office and the Independent Audit Group also means that evaluations are ongoing and information is relatively up-to-date. The Independent Audit Group conducts its evaluations on an annual basis, and the water management experts in the Commission Office are constantly on the lookout for emerging problems.

The important roles of the Commission Office and the Independent Audit Group in policy evaluation were quite evident in the lead-up to both the Cap on Diversions and the Environmental Flows Initiative. For instance, the genesis of the Cap can be traced to the Commission Office evaluations of the Salinity and Drainage Strategy in the early 1990s. The Salinity and Drainage Strategy was a program introduced in 1993 with the aim of reducing salinity levels throughout the basin. Though evaluations of this program charted some progress, they also pointed to the need for a basin-wide limit on diversions if salinity was to be brought under control, thus sparking the idea of a Cap. Similarly, the current the Environmental Flows Initiative directly owes its existence to the five-year "Review of the Operation of the Cap" undertaken by the Commission Office in 2000. This report outlined the considerable achievements of the Cap, but also explained that

[282] Commonwealth Commissioner, Personal Interview (16 July 2002).

further basin-wide diversion reductions would be necessary for the Murray-Darling to approach an ecologically-sound provision level. This, in essence, is what the Environmental Flows Initiative tries to do. Overall, the pattern that emerges under the MDBI is one in which the findings and recommendations from policy evaluations seem to be reflected in subsequent policies, due, in part, to the legitimacy accorded these evaluations by key governmental actors.

Given the important role that the Commission Office plays in the generation, collection and dissemination of information under the MDBI, it should not be surprising that it also has the capacity to act as an agenda-setter in the formulation of Murray-Darling water management policy. This agenda-setting capacity is evident, to some extent, at both the intergovernmental and domestic levels of policy-making. Most significantly, the Commission Office has a direct avenue into the Commission and the Ministerial Council in its reporting activities, and it can frame discussions in these venues through its control of information flows. As well, the Commission Office can release information to the public and to user group representatives who can then take action and try to force issues on to domestic policy agendas. Ultimately, the Commission Office, and the Independent Audit Group to a lesser extent, control powerful informational levers that can manipulate policy agendas at both levels of policy-making, which, in turn, can significantly shape policy outcomes.

While the thought of placing this kind of agenda-setting influence in the hands of a group of non-elected bureaucrats is somewhat repugnant in terms of democratic accountability, this arrangement has had positive effects in terms of policy learning. By

allowing the Commission Office significant control of agenda-setting, a basin-wide perspective is interjected into the policy process at an early stage and parochial interests are forced to participate in a policy debate that is framed in terms of basin-wide objectives. Furthermore, because it is non-elected, the Commission Office has a constant presence in the collective choice action arena that can be contrasted with the more transient presence of governmental actors subjected to the uncertainties of periodic re-election. Providing the Commission Office with a degree of agenda-setting authority thus facilitates continuity between successive policies, which is a prerequisite to any successful effort at policy learning.

The important agenda-setting role that the Commission Office has occupied under the MDBI is readily apparent in the discussions that led to both the Cap and the Environmental Flows Initiative. Though the idea for a basin-wide limit on diversions was expressed in South Australia, it was not until the Commission Office conducted a basin-wide water use audit that the Cap was squarely placed on the political agenda. In particular, participants from all governments pointed to a single graph within the water audit report as the galvanizing point of discussion. The graph summarized existing water uses in the basin and contrasted them with available water supplies; both trends were then projected into the future, and significant shortfalls were predicted. Shortly thereafter, the Cap was placed at the top of the Ministerial Council's agenda. Similarly, the Environmental Flows Initiative was introduced to the Ministerial Council's agenda as a result of another Commission Office report, this one a five-year review of the operation of the Cap. Once again, the Commission Office focused the attention of political

decision-makers on an issue of basin-wide concern, something directly attributable to its agenda-setting capacity.

Overall, experiences with policy learning under the MDBI suggest that conjunctive interfaces can successfully facilitate continuous policy learning on a basin-wide basis, particularly by assigning policy evaluation and agenda-setting roles to capable third-party actors, particularly intergovernmental organizations. These actors can facilitate policy learning by developing a body of policy-relevant knowledge that is relatively uncontested by governmental actors, and by interjecting this knowledge onto policy agendas, in the continuous pursuit of policy improvement. The Commission Office, in particular, seems to have been quite successful in these tasks under the MDBI, but they have also benefited from a sympathetic ear on the Ministerial Council, among the South Australians. Though the Commission Office did the necessary research and legwork to get the Cap and the Environmental Flows Initiative on the Council agenda, it was South Australians who kept them there. Ultimately, the Commission Office's main influence is its control of information flows, and it remains with the politicians to accept and act on this information in the direction of policy improvement.

6.4 Policy Learning Under a Coordinative Interface - The RMWA and The Great Lakes Charter[283]

As described above, the policy learning ratios for the RMWA and the Great Lakes Charter, both coordinative interfaces, were significantly lower than the policy learning

[283] Unless otherwise indicated, the information in this section is taken from interviews with the individuals listed in Appendix A.

ratio for the conjunctive MDBI. This quantitative indicator of difference is even further reflected in important qualitative differences. When compared to the MDBI, policy learning under the RMWA and the Great Lakes Charter was more piecemeal and sporadic: policy improvements occurred at the domestic level and tended to develop in relative isolation from each other. Proponents of coordinative interfaces have argued that these interfaces can facilitate policy learning at both the intergovernmental and domestic levels, through separate processes of cooperation and emulation. However, the policy learning patterns evident under the RMWA and the Great Lakes Charter suggest that neither of these processes were particularly prevalent.

Generally speaking, cooperative learning processes involve the undertaking of collective action by governments to gather, analyze, and apply data in the formulation of policy. This is the type of policy learning process that was evident under the MDBI, and we have seen how third party actors can play a crucial role in this process by overcoming collective action problems in both policy evaluation and agenda-setting. In contrast, cooperative learning processes were much less evident under the RMWA and the Great Lakes Charter, mostly because the intergovernmental actors in these interfaces lacked substantial agenda-setting power. Thus, while the RMWA and the Great Lakes Charter both featured intergovernmental actors with effective policy evaluation capacity, these same actors lacked any agenda-setting authority and could not interject important policy information into intergovernmental policy processes. Consequently, efforts at cooperative learning in these interfaces repeatedly stumbled at the agenda-setting stage.

For much of their existence, the RMWA and the Great Lakes Charter were both relatively successful in the undertaking of effective basin-level policy evaluations. In both cases, policy evaluation activities were centered in intergovernmental commissions where a considerable degree of water management expertise was concentrated. Much like the Commission Office under the MDBI, these commissions acted as central agencies in the collection and analysis of water management data. This not only facilitated the sharing of information between governments, it also concentrated some of this information at the basin level where it could be analyzed from a basin-wide perspective.

The River Murray Commission Secretariat, especially in the last three decades of its existence, grew into a sizable agency where data on both water quantity and water quality was gathered and analyzed. Among the policy incidents discussed in Chapter 5, the policy evaluation functions of Commission Secretariat were most evident in the Chowilla-Dartmouth affair, as Commission experts were asked on several occasions to supply political decision-makers with their analyses of the various dam sites under consideration.[284] The Commission Secretariat also undertook ongoing evaluations of water quantity and flow in the Murray system, mostly in an effort to ensure that the Murray states would receive their respective shares of the established inter-state allocation. From most accounts, these evaluations were widely respected, a finding that is reinforced by the fact that most of the various amendments made to the RMWA were

[284] Don I. Wright, "Politics, Psychology and Water: Chowilla," *The Australian Journal of Politics and History* December 1974: 370-79.

made to incrementally enhance the informational levers at the disposal of the secretariat.[285]

Under the Great Lakes Charter, a similar information collection and analysis role has been taken on by the Great Lakes Commission Secretariat. Though the Council of Great Lakes Governors (CGLG) has a small secretariat, its policy evaluation functions are dwarfed by the Great Lakes Commission Secretariat which has more than three times as many employees and much greater water management expertise working on its behalf.[286] One of the relatively few tangible outcomes from the Great Lakes Charter has been the creation of the Great Lakes Water Use Database, which was created by state and provincial officials in 1988 and has been maintained by the Great Lakes Commission since 1989.[287] The information in the Database is collected from state/provincial permitting and registration data, and yearly reports[288] are produced by the Commission Secretariat in an effort to track cumulative water use in the Great Lakes Basin.[289] Since August 2000, the Commission Secretariat has also been at the center of an effort to create a Water Resources Management Decision Support System for the Great Lakes governments. The Decision Support System would expand upon the Water Use Database by collecting quantity and quality information on available water resources and by

---

[285] K. E. Johnson, "The Role of the River Murray Commission," *The Murray Waters - Man, Nature and a River System*, ed. H.J. Frith and G. Sawer (Sydney: Angus and Robertson, 1974) 282-300.
[286] Great Lakes Commission, "Great Lakes Commission Staff," 2002, http://www.glc.org/staff/staffa.html (15 September 2002).
[287] Claire Farid, John Jackson, and Karen Clark, *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* (Toronto: Canadian Environmental Law Association, 1997) 36.
[288] Given the fact that the Database is dependent on state/provincial information that is widely criticized as incomplete and inaccurate, there is some question as to the validity of these yearly reports.
[289] Great Lakes Commission, "Commission Projects That Address Water Quantity in the Great Lakes Region," 2002, http://www.glc.org/waterquantity/ (15 September 2002).

explicating the ecological impacts of existing uses on these resources.[290] Clearly, in both the Water Use Database and the emerging Decision Support System, the Great Lakes Commission has played an important role as a central data repository and a basin-level evaluator of water use in the Great Lakes Basin.

Despite the evident policy evaluation capacities of the secretariats of both the River Murray Commission and the Great Lakes Commission, these intergovernmental organizations had little agenda-setting influence and few of their evaluations had much influence in the development of subsequent policy. Because neither secretariat had direct input into political forums at the intergovernmental level, they had little opportunity to frame the issues discussed in these forums. Instead, they were on the outside looking in, relegated to a lobbying role, but without the financial or electoral clout of most other lobbyists. Governments could solicit data and policy evaluations from the commission experts, but these experts were in no position to interject their policy evaluations onto political agendas.

Though the River Murray Commission Secretariat was well respected as a bastion of knowledge on River Murray management, its involvement in the development of policy was minimal. Under the RMWA, the Commission Secretariat lacked any independent agenda-setting influence for two reasons: first, there was no political level council to which it could report; and, second, it was barred access to domestic policy agendas. For the Commission Secretariat to have substantial influence on policy development, its participation had to be invited by the Murray governments.

---

[290] Great Lakes Commission, "Water Resources Management Decision Support System for the Great

Occasionally, the secretariat's participation was invited, as in the Chowilla-Dartmouth controversy, but usually it was not, as the Darling Development controversy illustrates. Thus, the policy improvements that occurred under the RMWA were primarily the result of state governments responding to changing domestic social pressures. South Australia made the switch from appropriation-driven to provision-bounded regulation because of looming water shortages and the lobbying of domestic irrigators, and the other Murray states followed suit because of similar pressures.[291]

Under the Great Lakes Charter, the Great Lakes Commission Secretariat has occupied a similarly weak position with regard to agenda-setting in water management policy processes. Though the CGLG does provide a political level council for the Great Lakes, the Commission Secretariat does not have direct access to this council and has little influence within it. Consequently, at both the intergovernmental and domestic levels, the Great Lakes Commission can influence policy agendas only in an indirect manner, through its lobbying and public education efforts. For instance, in the controversies over the Mud Creek irrigation proposal and the Nova Group water export proposal, the Commission Secretariat had valuable data and policy evaluations, but limited means of influencing the policy debate. Similarly, the Commission Secretariat hosts and maintains databases which contain information that could be key in encouraging the states/provinces to improve their consumptive use regulations, but these governments must access this information voluntarily. The mere availability of basin-

---

Lakes," 2002, http://www.glc.org/waterquantity/wrmdss (15 September 2002).

[291] P.G. Cooper, "River Murray Water Management in South Australia," *Who Owns the Murray? A South Australian Perspective*, ed. Peter S. Davis and Phillip J. Moore (Magill: River Publications, 1985) 104-05.

level data has not encouraged governments to undertake sustained policy improvements, as the considerable number of defections from the regulatory provisions of the Great Lakes Charter and the aborted Basin Water Resources Management Program clearly illustrate.

While efforts at cooperative policy learning have been generally unsuccessful in the RMWA and the Great Lakes Charter, efforts at policy learning through emulation have not fared much better. Many proponents of coordinative interfaces argue that the considerable degree of domestic level independence that governments enjoy under these interfaces is beneficial because it allows them to innovate in the development of policy.[292] When multiple governments are actively involved in policy innovation, the odds that one of them will hit upon an effective policy are greatly increased. When an effective policy is found, the other governments are then free to emulate it, thereby resulting in the widespread diffusion of a policy improvement. Though there was some evidence of this type of policy learning under the RMWA and the Great Lakes Charter, policy emulation was not widespread because other governments' policy models, no matter how attractive, could not displace domestic interests and concerns on domestic policy agendas. In general, governments only emulated others' policies when domestic conditions made this imperative.

Under the RMWA, the closest example to policy emulation was the emergence of provision-bounded regulation in South Australia and its halting diffusion to the other Murray states. Though policy emulation is indicated by the general similarity of the

licensing moratoriums established by the three states, this emulation took place over the course of twenty years and was due, in large part, to the emergence of similar domestic social pressures rather than any purposeful effort at learning. Many participants in the development of these policies point to domestic water shortage concerns as the most influential factor prompting the adoption of the licensing moratoriums, and it simply took over twenty years for these concerns to spread upstream. The fact that these policies were relatively similar was just a matter of coincidence or convenience, not a matter of purposeful study and imitation.

Evidence of policy emulation is similarly sparse under the Great Lakes Charter, with only one clear, but limited, instance of learning through emulation in evidence. In this case, Ontario and Quebec both based their water export policies on a policy model already developed by the Government of British Columbia in the mid 1990s.[293] However, this policy improvement did not diffuse into the American states, as the US Congress opted for institutional change, instead. Beyond this single instance of policy learning through emulation, little evidence of policy emulation can be found under the Charter. The policy improvements that various states undertook in the regulation of small consumptive uses were a product of their common Charter commitments rather than a process of emulation. Even more telling is the example of Illinois, which has had a provision-bounded regulatory policy since 1971, in order to meet the conditions of a

---

[292] Albert Breton, *Competitive Governments - An Economic Theory of Politics and Public Finance* (Cambridge: Cambridge University Press, 1998).
[293] B. Timothy Heinmiller, "Finding a Way Forward in the Study of Intergovernmental Policy-Making," *Canadian Public Administration* 45.3.

Supreme Court consent decree, but has had no emulators.[294] Contrary to the expectations of policy learning through emulation, no other jurisdiction has followed Illinois' lead by developing provision-bounded policies of their own, mostly because this policy example can not compete for priority with the interests of key domestic user groups.

In sum, experiences with policy learning under the RMWA and the Great Lakes Charter suggest that coordinative interfaces facilitate neither cooperative nor emulative processes of policy learning in transboundary common pools. Cooperative learning processes tend to break down because intergovernmental organizations, who often have significant policy evaluation capabilities, lack the agenda-setting influence necessary to frame intergovernmental policy discussions in the direction of policy improvement. Likewise, policy learning through emulation is generally ineffective because governments tend to tailor their policies to domestic interests rather than emulate policy improvements in other jurisdictions. The general ineffectiveness of both potential processes of policy learning explains why policy improvements under the RMWA and the Great Lakes Charter were piecemeal and sporadic. It also suggests that coordinative interfaces, in general, are unlikely to facilitate effective policy learning in transboundary common pools.

---

[294] Stanley A. Changnon and Mary E. Harper, "History of the Chicago Diversion," *The Lake Michigan Diversion at Chicago and Urban Drought - Past, Present, and Future Regional Impacts and Responses to Global Climate Change*, ed. Stanley A. Changon (National Oceanic and Atmospheric Administration, 1994) 33-34.

6.5 Policy Learning Under a Joint Interface - The Water Resources Development Act[295]

As the data in Figure 6.2 clearly illustrate, the intergovernmental interface with the least propensity to facilitate effective policy learning is the joint interface. In fact, policy learning under the WRDA, the only joint interface in this study, was so low that it registered a policy learning ratio of zero. Though this statistic should not be taken to imply that joint interfaces never allow for policy learning, it does indicate that they establish some significant barriers to policy learning. Because joint interfaces create a single policy process at the intergovernmental level, opportunities for domestic policy innovation and emulation are almost entirely unavailable, and the only viable process of policy learning is the cooperative one. In general, however, joint interfaces do not facilitate cooperative policy learning because the high stakes nature of binding intergovernmental negotiations causes governments to closely guard their informational and agenda-setting advantages in the policy process, therefore encouraging parochialism over cooperative policy learning. These difficulties are well illustrated in experiences with policy development under the WRDA.

Generally speaking, policy evaluation activities under joint interfaces fail to encourage policy learning because policy information is a source of intense conflict rather than cooperation. Unlike many conjunctive and coordinative interfaces, where third party actors take on significant policy evaluation functions, the participation of third parties in joint interfaces tends to be quite sparse. Instead, governments reserve most policy evaluation functions to themselves in an effort to keep a tight rein on policy

[295] Unless otherwise indicated, the information in this section is taken from interviews with the Canadian

information that will be used as currency and leverage in intergovernmental negotiations. Quite often, policy information is a major source of disagreement in joint negotiations, as governments point to their conflicting evaluations of a common policy issue, all of them with a pretense to objectivity and the protection of the public interest. The end result is an action arena in which rival policy evaluations are conducted on a domestic basis, but policies are formulated on an intergovernmental basis. This makes it unlikely that governments will agree on the nature of the policy problem under debate and even more unlikely that they will agree on the appropriate policy remedy.

The contested nature of policy information in joint intergovernmental negotiations was repeatedly evident in the development of inter-basin diversion policies under the WRDA. In all three cases (Pleasant Prairie, Lowell, and Akron), the intergovernmental policy negotiations were primarily characterized by a contest of competing state policy evaluations. Those states proposing inter-basin diversions relied on domestic evaluations that purported to show the minimal impact that their respective diversions would have on Great Lakes water levels. At the same time, those states opposing inter-basin diversions put forward their own evaluations which claimed to show the damage that would be caused by these diversions. These conflicting evaluations were obviously tied to the conflicting interests of their proponents, but there was no intergovernmental actor that could authoritatively settle these conflicts and help to forge a common frame of reference. The CGLG and the Great Lakes Commission have undertaken a number of studies on inter-basin diversions, but these intergovernmental agencies were entirely

---

and American individuals listed in Appendix A

peripheral to the WRDA negotiations. Without a common frame of reference, the cooperative process of policy learning was doomed at the outset because the direction toward policy improvement was contested and unclear.

Joint interfaces also inhibit effective policy learning because they prompt governments to protect their agenda-setting authority, denying third parties the chance to push governments in the direction of policy improvement. Because the outcomes of joint negotiations are legally binding on the participating governments, they are usually quite wary of becoming 'trapped' in a policy outcome that is contrary to their interests. To avoid such an unpleasant outcome, governments may try to preempt contentious issues at the agenda-setting stage, before they become a matter of negotiation. In effect, governments will position themselves as the 'gatekeepers' of the policy agenda, deciding which issues will be negotiated and how these issues will be framed. In their gatekeeping roles, however, governments are generally preoccupied with the protection of their positions rather than the pursuit of policy improvements, and policy learning suffers greatly, as a result.

Though the WRDA did not establish a formal process of intergovernmental negotiation, it is interesting to note how the Great Lakes states quickly positioned themselves as the gatekeepers of the intergovernmental policy agenda, by adopting significant elements of the Prior Notice and Consultation Process from the Great Lakes Charter. Thus, when the city governments of Pleasant Prairie, Lowell, and Akron wanted to undertake inter-basin diversion projects, their proposals had to be put forward by their respective state governments in order to get on the WRDA policy agenda. Furthermore,

in all these cases, the issues put forward for negotiation were very narrowly framed, focusing almost entirely on the exigencies of each particular diversion proposal. Though the general policy principle of 'full returns' emerged as a result of these successive policy debates, the narrow framing of the inter-basin diversion issue has also resulted in some seemingly arbitrary policy outcomes: Pleasant Prairie and Akron were approved and Lowell was rejected, even though all were based on the full returns principle. This sort of disjuncture and inconsistency between successive policies is hardly conducive to effective policy learning, in which continuous policy improvement is the ideal.

Overall, the fundamental problem with policy learning in joint interfaces is the fact that they are designed to resolve policy issues rather than manage them. Given the long-term implications of binding policy negotiations, governmental actors in joint interfaces perceive the high stakes nature of the policy process and behave accordingly. Rather than cooperating in the evaluation of policy and allowing outside access to policy agendas, governments tend to protect their evaluation and agenda-setting powers as instruments of self-preservation and self-advancement. Policy information becomes highly contested and only a select number of narrowly framed issues actually make it onto policy agendas. In this context, there is little linkage between successive policy issues, opportunities for policy improvement are often lost, and effective policy learning is the exception rather than the rule.

6.6 Summary

This chapter has tried to build on the cross-sectional analysis of the previous two chapters by analyzing intergovernmental interfaces on a longitudinal basis, specifically on their capacity to facilitate policy learning over time. In sum, the quantitative and qualitative evidence seems to show that conjunctive interfaces are the most effective in facilitating high levels of policy learning in transboundary common pools. This finding is significant in itself, but it is even more significant when considered in conjunction with the findings of chapters 4 and 5. Of the three intergovernmental interfaces analyzed in this study, conjunctive interfaces seem to be the most effective in terms of both policy design and policy learning. The implications of this finding are explored in much greater detail in the next, and final, chapter.

Chapter 7 - Conclusion: Institutions and Adaptive Management in Transboundary Common Pools

"Reality leaves a lot to the imagination."

John Lennon

7.1 Introduction

At the outset, the primary goal of this study was to uncover those institutions that facilitate effective CPR management at the transboundary scale. Given the inherent presence of multiple sovereign jurisdictions in transboundary common pools, much of this study has focused on institutions of intergovernmental cooperation, particularly intergovernmental interfaces. In Chapter 3, intergovernmental interfaces were treated as a dependent variable and some of the key factors in the formation and change of these institutions were investigated. In the subsequent chapters, intergovernmental interfaces were treated as an independent variable, as the effects of various intergovernmental interfaces on CPR management were assessed in terms of both policy design and policy learning. In this concluding chapter, the results from these various lines of investigation are brought together in an effort to determine some principles for the effective management of common pools at the transboundary scale. First, the research results from the empirical chapters in this study are summarized and synthesized in order to get a clearer picture of the relationship between intergovernmental interfaces and adaptive management. From these results, a number of institutional design principles for effective resource management at the transboundary scale are then explicated. Finally, these institutional design principles are viewed in light of the ongoing efforts to reform the

Great Lakes Charter, and some suggestions are made for the future direction of institutional reform in the Great Lakes Basin.

7.2 Intergovernmental Interfaces and Adaptive Management

Whether analyzed as a dependent or an independent variable, most of the empirical analysis in this study has focused on intergovernmental interfaces and their role in transboundary common pool management. The major findings from this empirical analysis are outlined below and, collectively, they provide some key insights into the relationship between intergovernmental interfaces and the achievement of adaptive management.

In Chapter 3, the intergovernmental interfaces of the Great Lakes and Murray-Darling basins were treated as dependent variables and a longitudinal analysis was used to uncover some key factors in their formation and change. Between the two basins, four instances of significant institutional change were examined and a common pattern emerged. In most cases, reforms of intergovernmental interfaces were initiated and pushed by governmental actors from jurisdictions that are "uniquely situated" in each basin. In the Great Lakes, for instance, state and Congressional actors from Michigan, the only jurisdiction located entirely within the basin, were instrumental in pushing for the adoption of the current coordinative interface for consumptive uses and in shaping the joint interface adopted to manage inter-basin diversions. Similarly, the downstream state in the Murray-Darling system, South Australia, was the prime motivator behind the adoption of both the RMWA in 1914 and the MDBI in 1992. Because they are most

reliant on the resource and most vulnerable to the problems associated with resource degradation, governmental actors in uniquely situated jurisdictions are usually the most willing to make the efforts necessary to overcome institutional path dependency and high thresholds of institutional reform, often placing them in the vanguard of progressive institutional reform in transboundary common pools.

Given this indication of how intergovernmental interface reform is often achieved in transboundary common pools, the remaining empirical chapters were devoted to investigating which interfaces are most conducive to adaptive management. As outlined in chapters 1 and 2, the concept of adaptive management recognizes that human knowledge of the natural world is imperfect and is likely to remain that way. It also recognizes that the social and natural worlds are constantly changing and that humans need to adjust their interactions with the natural world in order to adapt to changing circumstances.[296] Human interactions with the natural world are significantly shaped by public policy, so policy is at the center of adaptive management. In an adaptive management process, humans strive for effective policy designs while learning from successive policies in order to correct policy failures and adapt policy to social and natural changes. In this regard, resource management under each intergovernmental interface was analyzed in terms of both policy design (chapters 4 and 5) and policy learning (Chapter 6) in an overall effort to determine which intergovernmental interfaces facilitated the achievement of adaptive management.

---

[296] Kai N. Lee, *Compass and Gyroscope - Integrating Science and Politics for the Environment* (Washington D.C.: Island Press, 1993).

In Chapter 4, the coordinative Great Lakes Charter was compared with the joint WRDA in order to discern how each of these intergovernmental interfaces shaped the design of consumptive use regulations. Significant policy variations between these two interfaces were uncovered, though neither seemed particularly conducive to provision-bounded regulation. Under the non-binding Charter, the Great Lakes governments took tentative cooperative steps toward the achievement of basin-wide provision-bounded regulation, but the non-binding nature of these commitments allowed governments to defect when they encountered domestic resistance. Consequently, the Charter provided little or no improvement in most jurisdictions' domestic policies, and subsequent intergovernmental cooperation was thwarted by their apparent inability to make credible commitments. Under the legally binding WRDA, defection from intergovernmental policy commitments was not a concern, but problems associated with the joint decision trap were. Because governments realized that decisions under WRDA would be binding on them into the foreseeable future, the stakes of the negotiations under this interface were high and any agreement on policy change proved quite difficult. As a result, the status quo was generally preserved and the bold policy measures necessary to achieve provision-bounded regulation were not undertaken.

Chapter 5 introduced a conjunctive interface into the empirical analysis through a pre/post comparison of consumptive use regulations under the RMWA and the MDBI. Important variations in policy design were uncovered between these coordinative and conjunctive interfaces, though both seemed to be more conducive to provision-bounded regulation than the interfaces of the Great Lakes. During the eight decade existence of

the RMWA, appropriation-bounded regulations existed in most states for much of this period. However, beginning in the late 1960s, provision-bounded regulations began to appear incrementally as resource degradation became an immediate and pressing problem. Though provision-bounded policies eventually emerged in all of the Murray states, these policies were achieved on a unilateral basis without the intergovernmental cooperation necessary to create a basin-wide provision goal. This was not achieved until the replacement of the RMWA with the MDBI in the early 1990s. New forums of intergovernmental cooperation were created and influential third party actors, such as the Commission Office, the IAG, and the CAC, were given access to these forum, taking on important roles as brokers and monitors of intergovernmental policy. The end result was the adoption of basin-wide provision-bounded policies, such as the Cap on Diversions and the Environmental Flows Initiative, the most effective policy designs encountered in this study.

In Chapter 6, the analytical focus was shifted from cross-sectional comparisons of policy formation and implementation to longitudinal comparisons of policy learning. All four intergovernmental interfaces were evaluated quantitatively and qualitatively for their propensity to facilitate policy learning and some important differences emerged. Quantitatively, the policy learning ratios clearly showed that the conjunctive MDBI was much more effective in facilitating policy learning than any of the other interfaces. The reasons for this became clearer in light of the qualitative evidence, which once again emphasized the important role of third party actors. Under the MDBI, the Commission Office and the IAG, in particular, have come to play important roles as policy evaluators

and agenda-setters in intergovernmental policy processes. These roles allow them to learn from past policies and interject these lessons into the early stages of the policy process, framing subsequent policy debates and greatly facilitating policy learning. In contrast, third party actors in the coordinative interfaces also had some policy evaluation functions, but the lessons from these evaluations were often lost in the development of subsequent policies because these actors did not have the capacity to interject them onto policy agendas. Under the joint WRDA, information flows were found to be even more dysfunctional as governments tended to undertake independent policy evaluations and use the information generated from these evaluations as bargaining resources in policy negotiations. Based on these findings, then, it was concluded that conjunctive interfaces are most conducive to effective policy learning in transboundary common pools.

In sum, the empirical evidence from the Great Lakes and Murray-Darling basins seems to suggest that conjunctive interfaces are most successful in facilitating both effective policy design and effective policy learning – in other words, adaptive management. This, by itself, must be considered the main result of this study. However, this result can be further elaborated by considering some of the specific aspects of the conjunctive interface that are particularly well-suited to the facilitation of adaptive management. After all, a conjunctive interface, like all institutions, is a complex configuration of rules that affects the behaviour of policy actors in variegated ways. Some of the more positive features of conjunctive interfaces are highlighted below, styled as institutional design principles for common pool management at the transboundary scale.

7.3 Institutional Design Principles for Transboundary Common Pools

From all of the existing research on small-scale CPR management, the most impressive and most enduring product has been a set of institutional design principles for the construction of effective CPR management institutions. These design principles were derived from a large number of small-scale CPR management studies and they have been repeatedly validated by subsequent research. Following this example, a number of institutional design principles for effective CPR management at the transboundary scale are outlined below, though these principles are based on a much smaller volume of research and should be regarded as neither exhaustive nor final. Accordingly, the principles outlined here are phrased as testable propositions that may be used as a guide for future research rather than a definitive guide to institution construction. The first four principles relate to the design of collective choice level rules, while the fifth principle speaks to the design of constitutional level rules. All of them, however, are quite distinct from the design principles established for small-scale common pools, which once again emphasizes the importance of recognizing the relevance of scale to social science research.

- *The effective participation of intergovernmental (and, to a lesser extent, non-governmental) actors in intergovernmental level policy processes can be important, and the mandates of these actors may include brokerage, monitoring, information collection and analysis, and agenda-setting functions.*

As repeatedly shown throughout this study, intergovernmental agencies can play a crucial role in the facilitation of adaptive management in transboundary common pools, if

they are provided with an appropriate mandate. Two aspects of this mandate are of particular importance. First, though all intergovernmental agencies are ultimately accountable to the governments they serve, an effective agency must, in normal circumstances, be able to act independently from the direct control of its member governments. This heightens the perception that intergovernmental actors are neutral in intergovernmental conflicts and allows them to be proactive in their various functions. Second, an effective intergovernmental agency should also be allowed direct input into at least a few stages of the intergovernmental level policy process. Intergovernmental agencies can undertake important brokerage, monitoring, information processing and agenda-setting functions, and direct access to intergovernmental policy negotiations is essential for these functions to be fulfilled effectively. With a mandate that includes significant degrees of both independence and participation, intergovernmental agencies can become a physical representative of basin-wide interests, helping to offset the frequently parochial interests of individual governments.

Among the cases analyzed in this study, there were clear differences in the capacity and effectiveness of various intergovernmental agencies. While the Commission Office and the Independent Audit Group acted as periodic brokers, continuous monitors, proactive agenda-setters, and important repositories of water management information in the MDBI, their counterparts in the RMWA and the Great Lakes Charter did not. The secretariats of both the River Murray Commission and the Great Lakes Commission housed important water management information and expertise, but these actors had little influence on policy because they were peripheral to their

respective policy processes. Other social scientists, such as Peter M. Haas and Oran Young, have also remarked on the potential for intergovernmental agencies to facilitate effective resource management at large scales, and this is a line of investigation that deserves even further study.[297]

- *Governments can be held accountable to their intergovernmental policy commitments, but they may also need an 'escape route' from these commitments in case of dire circumstances.*

One of the features of conjunctive interfaces that seems to facilitate effective CPR management is their tendency to hold governments accountable to their intergovernmental policy commitments without locking them in the straightjacket of legally binding policy. Coordinative interfaces can produce intergovernmental policy agreements, but there are often serious problems with defection and non-compliance in the policy implementation stage. Conversely, joint interfaces ensure that established policies will be implemented, but the legally binding nature of these policies makes governments wary of these commitments, and policy agreement can be quite difficult. Conjunctive interfaces seem to provide an effective solution to the trade-off between accountability and discretion by producing policies that are not legally binding but supervised by third party actors. This provides adequate assurance that governments will honour their intergovernmental policy commitments in normal circumstances while leaving governments an 'out' from these commitments if dire circumstances should arise.

---

[297] Peter M. Haas, "International Institutions and Social Learning in the Management of Global Environmental Risks," *Policy Studies Journal* 28.3 (2000): 558-75; Oran R. Young, *International Governance - Protecting the Environment in a Stateless Society* (Ithaca: Cornell University, 1994).

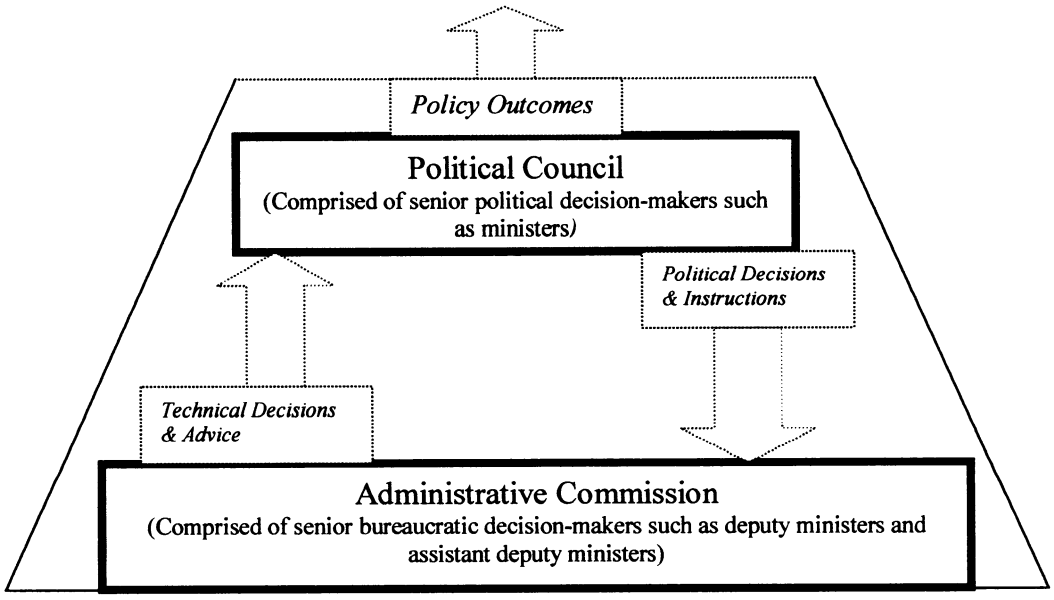
As experience under the MDBI has shown, the availability of an escape route from intergovernmental commitments has greatly facilitated the adoption of adaptive management, even if this escape route has never really been used. The adoption of the Cap on Diversions and the Environmental Flows Initiative were both made possible by the fact that the implementation of these agreements would be heavily monitored, but remain non-binding on the signatory governments. While New South Wales and Queensland have explored their escape routes in the face of intense domestic pressures, intergovernmental agreement was achieved and governmental compliance has been widespread, thus far. In contrast, this kind of policy development was not evident under the RMWA and the Great Lakes Charter, where compliance problems were widespread, nor under the WRDA, where agreements on significant policy change were inhibited by the high stakes of binding intergovernmental negotiations. Thus, the emphasis in any intergovernmental interface should be on policy monitoring rather than policy resolution, and policy monitors, such as intergovernmental agencies, should be persistent in their efforts without threatening the fundamental viability of the governments' escape route.

- *Intergovernmental interfaces may be most effective when they create a 'funnel' of linked intergovernmental interactions, with administrative commissions forming the wide part of the funnel and political councils forming the narrow part of the funnel.*[298]

In addition to an independent and proactive intergovernmental agency, another apparent feature of effective transboundary CPR management is the presence of both an administrative commission and a political council, each with defined responsibilities but

linked interactions. The presence of each of these organizations is important because an effective division of labour can be struck between them: water managers on administrative commissions can address outstanding technical issues between governments, reserving only the outstanding political issues for the time-constrained attention of their political masters. Equally important is a strong linkage between the commission and council. Issues that remain unresolved in the commission can be sent for discussion to the council, and issues that need further investigation or technical debate can be sent from the council to the commission (see Figure 7.3). In this kind of structured interaction, intergovernmental issues are discussed by those actors with the appropriate expertise and authority to resolve them. In the end, this can have positive impacts on both policy design and policy learning.

Figure 7.3 – A 'Funnel' of Structured Intergovernmental Relations



[298] Credit for this funnel analogy must be given to one of my interviewees from the Government of

The importance of this 'funnel' of linked intergovernmental interactions was repeatedly evident in the cases examined in this study. Under the RMWA, an effective administrative commission was formed, but continually experienced difficulties in resolving intergovernmental issues because there was no political council to which it could refer politically contentious issues. In the Great Lakes Basin, the CGLG has provided a suitable political council and the Great Lakes Commission has provided a suitable administrative commission, but the two organizations have parallel mandates and the advantages afforded by an administrative-political division of labour and structured interaction are continually lost. Only under the MDBI has the necessary funnel of linked intergovernmental interactions been clearly evident, and to great effect. The Murray-Darling Basin Commission and the Murray-Darling Basin Ministerial Council address different aspects of prevailing resource management issues, and often refer issues back-and-forth when the need arises. In this way, engineers deal with engineering issues and ministers deal with regulatory and legislative issues, facilitating a degree of expertise and coherence that is often missing in traditional intergovernmental negotiations.

- *Intergovernmental interfaces may be most effective when they create a political sub-system with a degree of political integrity reflective of a transboundary common pool's ecological integrity.*

Though the design of the organizational structure and the formal institutional rules of an intergovernmental interface are very important, a sense of stand-alone public legitimacy also seems fundamental to the success of intergovernmental management

---

Australia who wishes to remain anonymous.

efforts in transboundary common pools. In other words, those interfaces that are most successful in facilitating adaptive management also seem to command some degree of public loyalty by themselves, apart from the governments that comprise them. There may be many ways in which this kind of public legitimacy can be cultivated, but three seem most important: the existence of avenues for public participation in intergovernmental policy processes; the cultivation of a modest media profile; and, the development of a reputation for expertise and integrity. These three factors are clearly related to the democratic nature of the polities analyzed in this study, as public legitimacy is closely related to public participation and accountability. A sense of stand-alone public legitimacy can be very important for intergovernmental institutions because governments will pay a higher reputational cost for abandoning intergovernmental commitments, and governmental compliance will therefore be encouraged. Furthermore, resource users may be less apt to resist the implementation of intergovernmental policy initiatives when the intergovernmental institutions that produce them are regarded as reputable and legitimate.

Though stand-alone institutional legitimacy is difficult to gauge, and was not one of the variables measured in this study, it is probably fair to say that the MDBI enjoyed much greater public legitimacy than any of its counterparts. Though some participants are critical of its structure and role in the intergovernmental policy process, the Community Advisory Committee provides for direct participation in policy-making for a wide range of stakeholders in the Murray-Darling Basin. There was no comparable structure in either the RMWA or the Great Lakes Basin. Furthermore, owing to Australia's geographic insularity, the importance of the Murray-Darling as a key water

resource for the continent, and the Commission Office's own public relations efforts, the MDBI enjoys a media profile that far exceeds those of the other interfaces. Along with this profile has come a reputation for water management expertise that started with the River Murray Commission but has continued to grow - when academics and the media seek information on basin developments, the first place they usually turn is the Commission Office.[299] In contrast, though the Great Lakes Commission has a fine reputation for water management expertise in some circles, this reputation has not yet permeated the basin's public consciousness, particularly in Canada.

- *Intergovernmental interfaces of all types tend to be resistant to change because of institutional path dependency and high thresholds for institutional reform, but governmental actors from uniquely situated jurisdictions are usually responsible for initiating or pushing interface reforms, when they occur.*

As shown in Chapter 3, intergovernmental interfaces are valued not only for the content or design of their institutional rules, but also for the general stability of these rules. Particularly in transboundary common pools, where the presence of multiple sovereign governments can breed a fair degree of suspicion and uncertainty, intergovernmental interfaces can serve as a normative-legal constant within which resource management and resource utilization can take place. For this reason, intergovernmental interfaces are generally well entrenched, often protected by intergovernmental unanimity, and they tend to exhibit strong path dependent tendencies. When reforms occur, however, they are usually the result of a reform process initiated

[299] Ticky Fullerton, *Watershed* (Sydney: ABC Books, 2001); John Peet, "Priceless," *The Economist* 19 July 2003: 13-14.

and pushed by governmental actors from uniquely situated jurisdictions. These jurisdictions, because of their geographic location or political economy, are particularly sensitive to weaknesses in prevailing interfaces, and they usually have the most motivation to seek interface reform, despite the evident barriers. This is important because it generally takes a considerable amount of time, effort, and bargaining to achieve interface reform, and these actors are the only ones willing to absorb these substantial costs. Thus, if the path dependence of a prevailing interface is to be overcome, these are the actors who will do it.

The considerable resilience of intergovernmental interfaces is clearly reflected in the fact that only four interface reforms have taken place over the past century in the Great Lakes and Murray-Darling basins combined. In most of these cases, it was the work of governmental actors from uniquely situated jurisdictions that was the impetus behind the reforms. State and Congressional actors from Michigan, for instance, were key players in the formation of both the Great Lakes Basin Compact and the WRDA, which were particularly important to Michigan as the only jurisdiction lying entirely within the Great Lakes Basin. Similarly, it was the tireless work of governmental actors from South Australia, the downstream state in the Murray-Darling, that led to the eventual formation of both the RMWA and the MDBI. This knowledge of the important roles that uniquely situated jurisdictions play in interface reform is important because it makes these reform processes more explicable, and provides a potential course of action for non-governmental advocates of reform.

Together, the five institutional design principles summarized above constitute the bulk of what has been learned in this study about institutions and adaptive management at the transboundary scale. While these principles are useful in themselves, opportunities to apply them to real-world common pool dilemmas should not be overlooked. Of the two basins analyzed in this study, one seems to have found an institutional design that is quite effective, while the other is still struggling with this issue. Though there remain some disaffected participants in the MDBI, and though the MDBI will have to grapple further with public participation and accountability issues in the near future, this intergovernmental interface seems to be well accepted and quite effective. In contrast, the Great Lakes Charter is currently the subject of negotiations aimed at interface reform, and substantial barriers remain to any effective outcome. Past reform efforts, such as the Charter Annex, have proved disappointing and current reform efforts seem to be leading towards more of the same.

7.4 Institutional Design for the Management of Great Lakes Non-Boundary Waters

The impetus for the current interface reform negotiations can be traced to Ontario's approval, and eventual withdrawal, of a permit to export Great Lakes water by tanker from Lake Superior in 1998. The unilateral granting of a bulk water export permit was a traumatic event for many actors in the basin, and it served to highlight the inadequacies of the prevailing Great Lakes Charter for many governmental actors. The commencement of bulk water exports was opposed by most governments in the basin, but they were impotent to stop the Government of Ontario, apart from the blunt instruments

of private persuasion and public criticism. Though moral suasion and political embarrassment ultimately worked in this case, a number of governmental actors realized that the coordinative interface of the Great Lakes Charter would offer little barrier to a Great Lakes government truly determined to commence water exports.[300] With this new awareness, the short-term costs of interface reform seemed trivial when compared to the long-term benefit of providing governments with instruments to block bulk water exports, and negotiations to reform the Great Lakes Charter were initiated in 1999.

The initial product of these negotiations was the Great Lakes Charter Annex of 2001, but it was more a promise of further negotiation than a substantive agreement on interface reform. In the Charter Annex, a general consensus is evident that the prevailing intergovernmental interfaces for the management of Great Lakes non-boundary waters need to be reformed, and some small steps are taken in this direction. For instance, the US states made a commitment to involve the Canadian premiers in future inter-basin diversion consultations under WRDA, but without the binding vetoes enjoyed by the state governors. Commitments were also made to develop the Water Resources Management Decision Support System (discussed in Chapter 6), and this program seems to have gotten off the ground. Nevertheless, there was no decisive interface reform plan offered in the Charter Annex, as the governments simply committed themselves to negotiate "binding agreement(s)" over the following few years[301]

---

[300] *Project Management Team, Water Resources Management Decision Support System, Great Lakes Commission, Meeting Minutes* (25 September 2000)
[301] The Great Lakes Charter Annex, (2001)

Since the conclusion of the Charter Annex, a new round of negotiations has begun and a new negotiation structure has been utilized. The newly created structure is known as the Annex 2001 Working Group. "The Working Group consists of a project management team (includes Michigan, Ohio, provincial representatives and [CGLG] staff), a larger working group (includes two to three people for each of the ten parties), and three subcommittees (working on a decision making standard, inter-state and provincial relations, and a revised compact)[sic]".[302] In addition, at the insistence of Governor Taft of Ohio, an Advisory Group comprised of environmental groups, industry representatives, technical experts, and municipalities was formed to increase public input into the negotiations.[303] The original goal of the Annex 2001 Working Group was to have draft agreements available for wider discussion by the end of 2002. However, this deadline has come and gone, and the negotiators still remain mired in substantive disagreements and harmonization problems.

Most of the substantive problems in the current negotiations are centered around the difficulty of achieving a binding agreement between the two provinces and eight states. It is widely assumed that a binding agreement should be legally enforceable against the basin governments, once it is put into effect, and herein lies the problem. Essentially, the objective is to create a joint interface, not unlike WRDA, in the management of all non-boundary water uses, and many governments are quite wary of this. By entering into a joint interface, governments would subject themselves to binding

---

[302] *Project Management Team, Water Resources Management Decision Support System, Great Lakes Commission, Meeting Minutes*2-3 (17 May 2002)
[303] *Project Management Team, Water Resources Management Decision Support System, Great Lakes Commission, Meeting Minutes*3-4 (27 June 2001)

intergovernmental policy processes, leaving them little room for maneuver at the domestic level. Consequently, there has been a tendency to narrow the range of non-boundary water uses that will be covered in the binding agreement, and significant institutional reform is threatened, as a result.

In addition, since the Annex 2001 Working Group commenced discussions in 2001, it has become increasingly apparent that formalizing a binding agreement between ten sub-national governments across an international border involves harmonization problems that are almost insurmountable. To make an agreement binding on all participating governments, it must have comparable legal enforcement on both sides of the Canada-US border. One proposed way of achieving this is to create a new interstate compact between the US states and a parallel compact between the Canadian provinces.[304] Unfortunately, however, there is nothing comparable to interstate compacts in Canadian federalism: while US interstate compacts are approved by Congress and enforceable in US courts, there is no mechanism for binding intergovernmental agreements in Canada.[305] The closest that the provinces could come to this would be to pass identical legislation in their respective legislatures, but this would not provide a forum for the binding resolution of future disputes. The idea of parallel interstate and inter-provincial compacts also ignores the fact that the federal governments on both sides of the border should be involved in the signing of any binding international agreement,

---

[304] Anonymous, Telephone Interview (2 January 2003); Great Lakes Commission, "Project Management Team" 4.

[305] This is based on the longstanding constitutional principle that provincial governments are both part of the sovereign Crown and the Crown can not make a binding contract with itself. Canadian governments can designate the Federal Court to rule on disagreements related to intergovernmental agreements, but this is still not comparable to US interstate compacts.

given their respective constitutional jurisdictions over international relations. In this regard, some consideration has been given to developing a binding agreement centered around the IJC, but this is unlikely given that state/provincial jurisdiction over non-boundary waters could be threatened by such an agreement.[306] Ultimately, some imaginative treaty writing will be necessary if a binding agreement that suits the interests and harmonizes the legal systems of the twelve sovereign jurisdictions involved is to be completed.

What is most remarkable about this interface reform effort, considering the findings of this study, is its misdirection. Instead of pursuing a joint interface, which will be difficult to obtain and is unlikely to lead to adaptive management, the Great Lakes governments would be much better off to negotiate a conjunctive interface. Agreement on a conjunctive interface is quite feasible, considering three important factors. First, many of the organizational elements necessary for a conjunctive interface already exist in the basin and would merely need to be reconfigured: the mandates of the CGLG and the Great Lakes Commission could be revised to create the necessary 'funnel' of linked intergovernmental interactions; the Commission Secretariat could be empowered with brokering, monitoring, information processing, and agenda-functions in the intergovernmental policy process; and, the Advisory Group, created as an ad hoc body during the current negotiations, could be retained to increase public participation. Second, by abandoning the pursuit of a legally binding agreement, many harmonization problems would also disappear. A relatively informal agreement, similar in nature to the

[306] Great Lakes Commission, "Project Management Team" 4.

Great Lakes Charter, would be sufficient to create a conjunctive interface because the locus of policy enforcement would be the Commission-Council, rather than the domestic courts, making the harmonization of enforcement a moot issue. Third, a conjunctive interface would preserve governments' escape routes from intergovernmental policy commitments, and they may be more conducive to this kind of reform rather than confining themselves in binding intergovernmental procedures. In sum, reorienting the current negotiations toward the formation of a conjunctive interface would simply require a shift in objectives from a *binding* agreement to an *obligatory* agreement. However, if any significant interface reform is to be achieved it must happen soon because the window of opportunity created by the water export controversy may be closing quickly.

7.5 Summary

Overall, the five institutional design principles outlined above have the potential to serve as the basis for a theory of CPR management at the transboundary scale, but much work remains. These principles need to be tested in other transboundary common pools and expanded or revised based on this larger sample of cases. This was how the theory of small-scale common pool management was developed and improved, and there is really no methodologically sound way around this labour-intensive task. This study provides a good methodological, empirical, and theoretical basis on which to conduct future studies, but it is only a first step on the long road of theoretical development.

Appendix A – Interviewees in Canada, the United States, and Australia[307]

Canada & the United States

Interviewee	Government or Organization
Anonymous	Council of Great Lakes Governors
Anonymous	Council of Great Lakes Governors
Anonymous	Government of Minnesota
Anonymous	Government of New York
Anonymous	Government of Ontario
Anonymous	Government of Wisconsin
Bartz, Dick	Division of Water, Department of Natural Resources, Government of Ohio
Bredin, Jim	Office of the Great Lakes, Government of Michigan
Donahue, Dr. Mike	Great Lakes Commission
Hebenstreit, Jim	Division of Water, Department of Natural Resources, Government of Indiana
Injerd, Daniel	Lake Michigan Programs, Division of Water Resources, Department of Natural Resources, Government of Illinois
Ledin, Chuck	Watershed Management Bureau, Department of Natural Resources, Government of Wisconsin
Miller, Sarah	Canadian Environmental Law Association & Great Lakes United

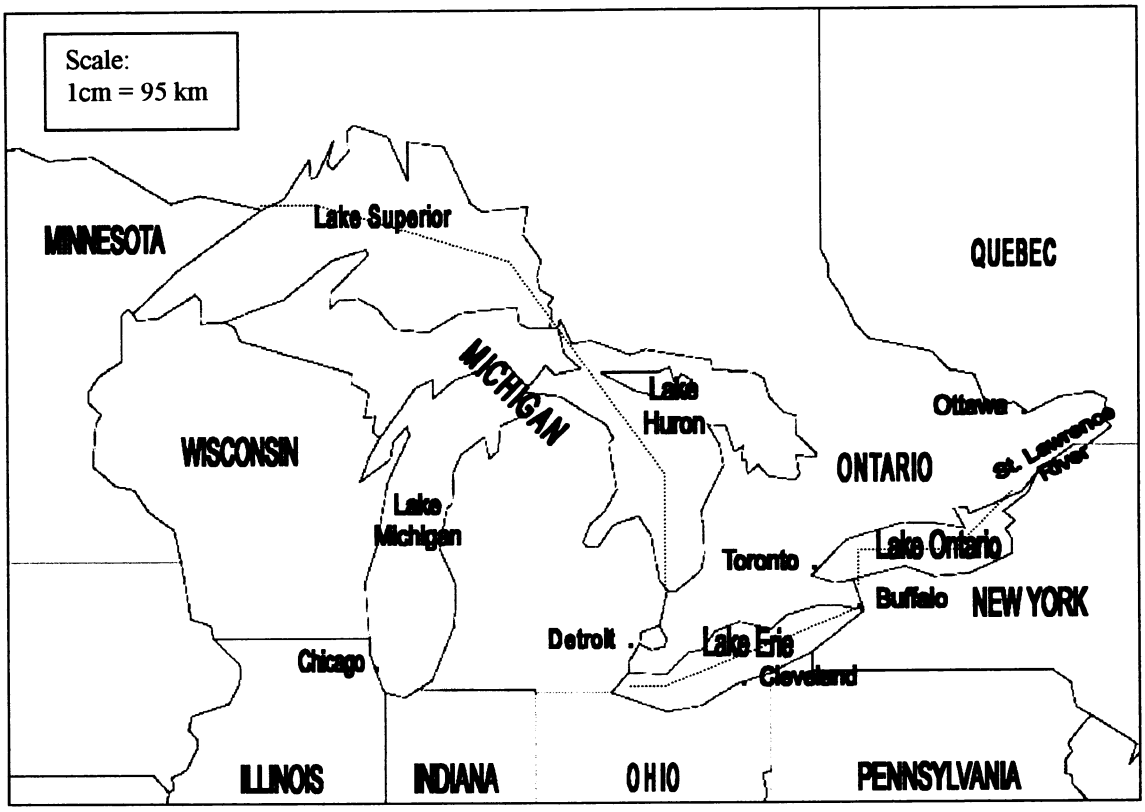
Australia

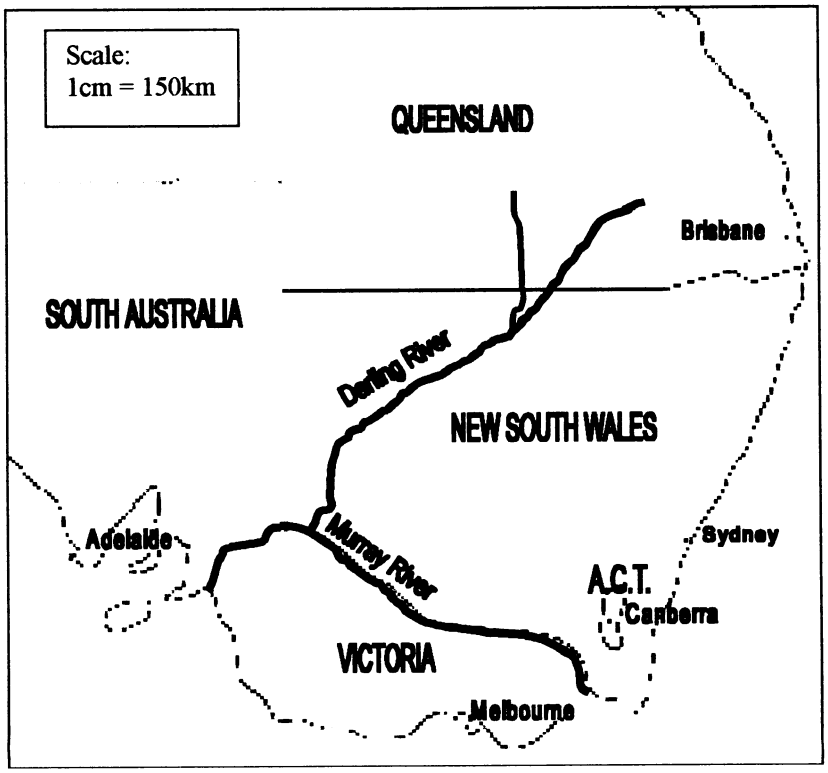
Interviewee	Government or Organization
Alvarez, Kim	Department of Land and Water Conservation, Government of New South Wales
Anonymous	Government of Australia
Anonymous	Government of Australia
Anonymous	Government of Australia
Anonymous	Government of Australia
Blackmore, Don	Murray-Darling Basin Commission Office
Boully, Leith	Community Advisory Committee
Claydon, Greg	Department of Natural Resources, Government of Queensland
Close, Andy	Murray-Darling Basin Commission Office
Donnelly, Peter	Environment Protection, Government of the ACT
Fitzpatrick, Campbell	Department of Natural Resources and Environment, Government of Victoria
Gordon, Les	Community Advisory Committee

[307] Anonymity was at the discretion of the interviewee.

Hoey, Peter	Department of Water, Land and Biodiversity Conservation, Government of South Australia
James, Barry	Department of Natural Resources and Environment, Government of Victoria
Lewis, David	Department of Natural Resources and Environment, Government of Victoria
McLeod, Tony	Murray-Darling Basin Commission Office
Sutherland, Peter	Department of Natural Resources and Environment, Government of Victoria
Swan, Paul	National Competition Council

Appendix B - Political Maps of the Great Lakes and Murray-Darling Basins





Bibliography

Ackerman, Bruce, et al. *The Uncertain Search for Environmental Quality*. New York: The Free Press, 1974.

Alexander, Gerard. "Institutions, Path Dependence, and Democratic Consolidation." *Journal of Theoretical Politics* 13.3 (2001): 249-70.

Alvarez, Kim. Personal Interview, 7 August, 2002.

Anonymous. Telephone Interview, 2 January, 2003.

Bailey, K.H. "The Constitutional and Legal Framework." *The Natural Resources of Australia - Prospects and Problems for Development*. Ed. J.A. Sinden. Sydney: Angus & Robertson, 1972. 308-29.

Barkin, Samuel J., and George E. Shambaugh. "Common-Pool Resources and International Environmental Politics." *Environmental Politics* 5.3 (Autumn 1996): 429-47.

Bartz, Dick. Telephone Interview, 5 December, 2002.

Becker, Nir, and K. William Easter. "Conflict and Cooperation in Managing International Water Resources Such as the Great Lakes." *Land Economics* 75.2 (May 1999): 233-45.

Becker, Nir, and K.W. Easter. "Water Diversion from the Great Lakes: Is a Cooperative Approach Possible?" *Water Resources Development* 13.1 (1997): 53-65.

Bennett, Colin J., and Michael Howlett. "The Lessons of Learning: Reconciling Theories of Policy Learning and Policy Change." *Policy Sciences* 25.3 (1992).

Berkes, Fikret. "Cooperation from the Perspective of Human Ecology." *Common Property Resources - Ecology and Community-Based Sustainable Development*. Ed. Fikret Berkes. London: Bellhaven Press, 1989. 70-88.

Biel, Anders. "Factors Promoting Cooperation in the Laboratory, in Common Pool Resource Dilemmas, and in Large-Scale Dilemmas." *Cooperation in Modern Society - Promoting the Welfare of Communities, States and Organizations*. Ed. Mark Van Vugt, et al. London: Routledge, 2000. 25-41.

Bixby, Alicia A. *The Law and the Lakes - Toward a Legal Framework for Safeguarding the Great Lakes Water Supply*. Chicago: The Center for the Great Lakes, 1986.

Black & Veatch and Public Sector Consultants Inc. A Report on the Proposed Expansion of the City of Akron Water System - Supplemental Report. The City of Akron. 1997.

Blackmore, Don. Personal Interview, 15 July, 2002.

Boully, Leith. Personal Interview, 17 July, 2002.

Bredin, Jim. Telephone Interview, 6 December, 2002.

Breton, Albert. *Competitive Governments - An Economic Theory of Politics and Public Finance*. Cambridge: Cambridge University Press, 1998.

Buck (Cox), Susan J. "Multi-Jurisdictional Resources: Testing a Typology for Problem-Structuring." *Common Property Resources - Ecology and Community-Based Sustainable Development*. London: Bellhaven Press, 1989. 127-47.

Carlson, Arne H., Saint Paul, Minnesota, to John Engler. June, 4, 1993.

---, Saint Paul, Minnesota, to John Engler. March, 4, 1993.

Casey, Robert P., Harrisburg, Pennsylvania, to John Engler. March, 4, 1993.

Changnon, Stanley A., and Mary E. Harper. "History of the Chicago Diversion." *The Lake Michigan Diversion at Chicago and Urban Drought - Past, Present, and Future Regional Impacts and Responses to Global Climate Change*. Ed. Stanley A. Changon. National Oceanic and Atmospheric Administration, 1994. 16-38.

Clark, Sanford D. "Inter-Governmental Quangos: The River Murray Commission." *Quangos - The Australian Experience*. Ed. G.R. Curnow and C.A. Saunders. Sydney: Hale & Iremonger, 1983. 154-72.

---. "The River Murray Question: Part II - Federation, Agreement and Future Alternatives." *Melbourne University Law Review* 8 (August 1971): 215-53.

---. "The River Murray Waters Agreement: Peace in Our Time?" *Adelaide Law Review* 9 (1983): 108-41.

Clark, Sanford D., and Ian A. Renard. "Constitutional, Legal and Administrative Problems." *The Murray Waters - Man, Nature and a River System*. Ed. H.J. Frith and G. Sawer. Sydney: Angus and Robertson, 1974. 263-81.

Claydon, Greg. Telephone Interview, 6 August, 2002.

Close, Andy. Personal Interview, 11 July, 2002.

Close, Andy, and Daniel Connell. "How Does the Cap Work?" 1 January 2000. http://www.mdbc.rucc.net.au/mdbc/news_room/basin_talker/user-view.cfm?ItemNo=5 (5 December 2001).

Commonwealth Commissioner. Personal Interview, 16 July, 2002.

---. Personal Interview, 11 July, 2002.

Commonwealth Official. Personal Interview, 16 July, 2002.

Cooper, Kathleen, and Sarah Miller. "Selling Our Water - Water Taking in Lake Superior." *Canadian Law Association Intervenor* 23.2 (April-June1998). http://www.cela.ca/Intervenor/23_2/23_2selling.htm (20 December 2002).

Cooper, P.G. "River Murray Water Management in South Australia." *Who Owns the Murray? A South Australian Perspective*. Ed. Peter S. Davis and Phillip J. Moore. Magill: River Publications, 1985. 98-123.

Costanza, Robert, et al. "Ecosystems and Human Systems: A Framework for Exploring the Linkages." *Institutions, Ecosystems and Sustainability*. Ed. Robert Costanza, et al. London: Lewis Publishers, 2001. 3-20.

Council of Great Lakes Governors. . "The Governors' Letter to the International Joint Commission." 1999. http://www.cglg.org/projects/water/letter.html (7 September 2002).

The Great Lakes Charter Annex, (2001).

The Great Lakes Charter, (1985).

---. "Great Lakes Water Management Governance." 2002. http://www.cglg.org/projects/water/index.html (7 September 2002).

---. "Overview." 2002. http://www.cglg.org/overview.htm (7 September 2002).

---. "A Statement on Protecting the Great Lakes: Managing Diversions and Bulk Water Exports." 1999. http://www.cglg.org/projects/water/statement.html (7 September 2002).

Crabb, Peter. "Managing Water Resources in Interstate River Basins." *Comparative Political Studies - Australia and Canada.* Ed. Malcolm Alexander and Brian Galligan. Sydney: Longman Cheshire Pty Limited, 1992. 189-206.

de Villiers, Marq. *Water.* Toronto: Stoddart Publishing Co. Ltd., 1999.

Diversions and Bulk Removals of Great Lakes Waters. International Joint Commission Reference on Consumption, Diversion and Removal of Great Lakes Water. 26 August 1997.

Donahue, Michael. Telephone Interview, 26 February, 2003.

Donnelly, Peter. Personal Interview, 17 July, 2002.

Downing, Bob. "Water Plan Clears Hurdle." *Beacon Journal* [Akron] 19 November 1997: D: 5.

Dupre, Stefan J. "Reflections on the Workability of Executive Federalism." *Perspectives on Canadian Federalism.* Ed. R.D. Olling and M.W. Westmacott. Scarborough: Prentice-Hall, 1988. 233-56.

Edgar, Jim, Springfield, Ohio, to John Engler. March, 1, 1993.

Engler, John, Lansing, Michigan, to Robert Bourassa. November, 4, 1992.

---, Lansing, Michigan, to Richard Bartz, and et al. May, 7, 1993.

---, Lansing, Michigan, to Evan Bayh. August, 16, 1993.

Farid, Claire, John Jackson, and Karen Clark. *The Fate of the Great Lakes: Sustaining or Draining the Sweetwater Seas?* Toronto: Canadian Environmental Law Association, 1997.

Fitzpatrick, Campbell. Personal Interview, 23 July, 2002.

Florestano, Patricia S. "Past and Present Utilization of Interstate Compacts in the United States." *Publius: The Journal of Federalism* 24 (Fall 1994): 13-25.

Frerichs, Stephen, and K. William Easter. "Regulation of Interbasin Transfers and Consumptive Uses from the Great Lakes." *Natural Resources Journal* 30 (Summer 1990): 561-79.

Fullerton, Ticky. *Watershed.* Sydney: ABC Books, 2001.

Gibson, Clark C., Elinor Ostrom, and T.K. Ahn. "The Concept of Scale and the Human Dimensions of Global Change: A Survey." *Ecological Economics* 32 (2000): 217-39.

Gordon, Les. Personal Interview, 25 July, 2002.

Government of Canada. "Water Works!" 2002. http://www.ec.gc.ca/water/en/info/pubs/FS/e_FSA4.htm (16 November).

Government of Illinois. "Illinois Lake Michigan Water Allocation Program." 2002. http://dnr.state.il.us/waterresources/weblm.htm (11 October).

Government of Michigan. "What is NRC?" 2002. http://www.michigan.gov/dnr/. (10 November 2002).

Government of Minnesota. "Water Use Permits." 2002. http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html (11 October).

Government of New York. "Great Lakes Water Withdrawal Registration Program." 2002. http://www.dec.state.ny.us/website/dow.bwp/withdrawal1.html (16 October).

---. "Public Water Supply Permit Program." 2002. http://www.dec.state.ny.us/website/dcs/water/index.html (16 October).

Government of Ohio. "Water Diversions." 2002. http://www.dnr.state.oh.us/water/planing/divrsion.htm (16 October).

Government of Ontario. News Release. "Lake Superior Water-Taking Permit Cancelled." May, 14, 1998.

Ontario Water Resources Act - Ontario Regulation 285/99 (Water Taking and Transfer), (1999).

---. *Review Process for Permits to Take Water*. Toronto: Ministry of the Environment, 2000.

Government of Pennsylvania. "Pennsylvania's Office for River-Basin Cooperation." 2002. http://www.dep.state.pa.us/river/river_basin.htm (16 October).

Government of Wisconsin. "Irrigation, Diversion of Surface Water, Pumping Water." 2002. http://www.dnr.state.wi.us/org/water/fhp/waterway/irrigation.htm (11 October).

Great Lakes Commission. "About the Great Lakes Commission." 2002. http://www.glc.org/about/about.hmtl (15 September 2002).

---. "Commission Projects That Address Water Quantity in the Great Lakes Region." 2002. http://www.glc.org/waterquantity/ (15 September 2002).

---. "Great Lakes Basin Compact." 2002. http://www.glc.org/about/glbp.html (15 September 2002).

---. "Great Lakes Commission Says "No" to Water Export." 2002. http://www.glc.org/announce/98/export.htm (15 September 2002).

---. "Great Lakes Commission Staff." 2002. http://www.glc.org/staff/staffa.html (15 September 2002).

Project Management Team, Water Resources Management Decision Support System, Great Lakes Commission, Meeting Minutes (17 May 2002).

Project Management Team, Water Resources Management Decision Support System, Great Lakes Commission, Meeting Minutes (25 September 2000).

Project Management Team, Water Resources Management Decision Support System, Great Lakes Commission, Meeting Minutes (27 June 2001).

---. "Water Resources Management Decision Support System for the Great Lakes." 2002. http://www.glc.org/waterquantity/wrmdss (15 September 2002).

Great Lakes Information Network. "Great Lakes Facts and Figures." 2003. http://www.great-lakes.net/lakes/ref/lakefact.html (23 January 2003).

Great Lakes United. "Comment on Canada's Proposed Regulations to Prevent Bulk Water Removal." 2002. http://www.glu.org/swft/boundary. (10 October).

Government of New York, Cong., Great Lakes Water Withdrawal Registration Regulations (1995).

Haas, Peter M. "International Institutions and Social Learning in the Management of Global Environmental Risks." *Policy Studies Journal* 28.3 (2000): 558-75.

Hackett, Steven C. "Heterogeneity and the Provision of Governance for Common-Pool Resources." *Journal of Theoretical Politics* 4.3 (1992): 325-42.

Hanson, James, Arthur Woldorf, and Leonard Black. *An Overview of Ohio Water Withdrawal Law*. 1991. 2. Ohio Department of Natural Resources, Division of Water.

Hardin, Garett. "Tragedy of the Commons." *Science* 162 (December 1968): 1243-49.

Harmes, Roland, Lansing, Michigan, to George Voinovich. March, 25, 1993.

Harris, Michael. *Lament for an Ocean - The Collapse of the Atlantic Cod Fishery: A True Crime Story*. Toronto: McClelland & Stewart Inc., 1999.

Hebenstreit, Jim. Telephone Interview, 21 November, 2002.

Heinmiller, B. Timothy. "Finding a Way Forward in the Study of Intergovernmental Policy-Making." *Canadian Public Administration* 45.3: 427-433.

---. "Governance of Large-Scale Common Pool Resources: A Literature Review." Political Science, McMaster University, July 2001.

---. "Harmonization Through Emulation: Canadian Federalism and Water Export Policy." *Canadian Public Administration* (forthcoming).

Hoey, Peter. Personal Interview, 29 July, 2002.

Independent Audit Group. *Review of Cap Implementation 1996/97*. Canberra: Murray-Darling Basin Commission, 1997.

---. *Review of Cap Implementation 1997/98*. Canberra: Murray-Darling Basin Commission, 1998.

---. *Review of Cap Implementation 1998/99*. Canberra: Murray-Darling Basin Commission, 1999.

---. *Review of Cap Implementation 1999/00*. Canberra: Murray-Darling Basin Commission, 2001.

---. *Review of Cap Implementation 2000/01*. Canberra: Murray-Darling Basin Commission, 2002.

---. *Setting the Cap - Report of the Independent Audit Group*. Murray-Darling Basin Ministerial Council. Canberra: Murray-Darling Basin Commission, 1996.

Independent Community Engagement Panel, Murray-Darling Basin Ministerial Council, The Living Murray - A Discussion Paper on Restoring the Health of the River Murray (2002).

Inglehart, Ronald. "The Renaissance of Political Culture." *American Political Science Review* 82.4 (December 1988): 1120-30.

Injerd, Daniel A. Telephone Interview, 6 January, 2003.

---. "Lake Michigan Water Diversion: A Case Study." *Buffalo Environmental Law Journal* 1 (1993): 307-15.

International Joint Commission. *Protection of the Waters of the Great Lakes - Final Report to the Governments of Canada and the United States*. 2000.

Jaensch, Dean. *The Politics of Australia*. 2nd ed. South Yarra: Macmillan Publishers Australia Pty Ltd., 1997.

James, Barry. Personal Interview, 23 July, 2002.

Johnson, K. E. "The Role of the River Murray Commission." *The Murray Waters - Man, Nature and a River System*. Ed. H.J. Frith and G. Sawer. Sydney: Angus and Robertson, 1974. 282-300.

Kellow, Aynsley. "The Murray-Darling Basin." *Intergovernmental Relations and Public Policy*. Ed. B. Galligan, O. Hughes and C. Walsh. Sydney: Allen & Unwin, 1991. 129-45.

Kennett, Steven A. *Managing Interjurisdictional Waters in Canada: A Constitutional Analysis*. Calgary: Canadian Institute of Resources Law, 1991.

Klunder, John. "The Changing Demands for Surface Water in the Murray-Darling Basin." Speech, 25 June, 1993.

Ledin, Charles. Telephone Interview, 22 January, 2003.

Lee, Kai N. *Compass and Gyroscope - Integrating Science and Politics for the Environment*. Washington D.C.: Island Press, 1993.

Lewis, David. Personal Interview, 23 July, 2002.

McGinnis, Michael, and Elinor Ostrom. "Design Principles for Local and Global Commons." *The International Political Economy and International Institutions.* Ed. Oran R. Young. Vol. 2. Cheltenham: Edward Algar Publishing Company, 1996. 464-93.

McLeod, Tony. Personal Interview, 15 July, 2002.

Mehan III, G. Tracy, Lansing, Michigan, to Robert Rae. December, 29, 1993.

Michigan Department of Natural Resources, Lansing, Michigan. Memorandum, to Natural Resources Commission. "Application to Establish, Construct and Operate the Mud Creek Irrigation District." January, 20, 1993.

---. "Charter Consultation: Mud Creek Irrigation District Summary of Key Issues," 1993.

Miller, Sarah. Telephone Interview, 17 April, 2003.

Murray-Darling Basin Commission. "About the Basin." 2001. http://www.mdbc.gov.au/naturalresources/about/about_basin.htm (2 December 2001).

---. "Agriculture." 2003. http://www.mdbc.gov.au/education/encyclopedia/Agriculture. (23 January 2003).

---. "Basin Statistics." 2001. http://www.mdbc.gov.au/naturalresources/basin_stats/statistics.htm (2 December 2001).

---. "A Brief History of the Murray-Darling Agreement." About the Initiative. 2001. http://www.mdbc.gov.au/about/governance/agreement_history.htm (3 December 2001).

---. "The Community Advisory Committee." About the Initiative. 2001. http://www.mdbc.gov.au/about/cac/cac.htm (3 December 2001).

---. "The Murray-Darling Basin Agreement." About the Initiative. 2001. http://www.mdbc.gov.au/about/governance/agreement.htm (3 December 2001).

---. "The Murray-Darling Basin Commission." About the Initiative. 2001. http://www.mdbc.gov.au/about/about_mdbc/the_commission.htm (3 December 2001).

---. "The Murray-Darling Basin Ministerial Council." About the Initiative. 2001. http://www.mdbc.gov.au/about/ministerial_council/council.htm (3 December 2001).

---. *Review of the Operation of the Cap.* Murray-Darling Basin Ministerial Council. Canberra: Murray-Darling Basin Commission, 2000.

---. *Salinity and Drainage Strategy Ten Years On, 1999.* Canberra: Murray-Darling Basin Commission, 1999.

---. "Surface Water Resources." 2003. http://www.mdbc.gov.au/education/encyclopedia/Surface_Water. (23 January 2003).

---. "Water Use." 2001. http://www.mdbc.gov.au/education/encyclopedia/Water_Use/Water_Use.htm (4 December 2001).

Murray-Darling Basin Agreement, (1992).

Natural Resources Commission, Lansing, Michigan. Resolution and Order of Determination, to Mud Creek Irrigation Board. June, 10, 1993.

Official. Personal Interview, 18 July, 2002.

Ostrom, Elinor. "Community and the Endogenous Solution of Commons Problems." *Journal of Theoretical Politics* 4.3 (1992): 343-51.

---. *Crafting Institutions for Self-Governing Irrigation Systems.* San Francisco: ICS Press, 1992.

---. *Governing the Commons.* Cambridge: Cambridge University Press, 1990.

---. "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework." *Theories of the Policy Process.* Ed. Paul A. Sabatier. Boulder: Westview Press, 1999. 35-72.

Ostrom, Elinor, Roy Gardner, and James Walker. *Rules, Games, & Common-Pool Resources.* Ann Arbor: University of Michigan Press, 1994.

Paehlke, Robert. "Spatial Proportionality: Right-Sizing Environmental Decision-Making." *Governing the Environment - Persistent Challenges, Uncertain*

Innovations. Ed. Edward A. Parson. Toronto: University of Toronto Press, 2001. 73-124.

Painter, Martin. *Collaborative Federalism - Economic Reform in Australia in the 1990s*. Cambridge: Cambridge University Press, 1998.

Peet, John. "Priceless." *The Economist* 19 July 2003: 1-16.

Percy, David R. *The Framework of Water Rights Legislation in Canada*. Calgary: Canadian Institute of Resources Law, 1988.

Peters, B. Guy. *Institutional Theory in Political Science - The 'New Institutionalism*. London & New York: Pinter, 1999.

Pierson, Paul. "Fragmented Welfare States: Federal Institutions and the Development of Social Policy." *Governance: An International Journal of Policy and Administration* 8.4 (October 1995): 449-78.

---. "Increasing Returns, Path Dependence, and the Study of Politics." *American Political Science Review* 94.2 (June 2000): 251-67.

Pigram, John J. *Issues in the Management of Australia's Water Resources*. Melbourne: Longman Cheshire, 1986.

Pigram, John J., and Warren F. Musgrave. "Sharing the Waters of the Murray-Darling Basin: Cooperative Federalism Under Test in Australia." *Conflict and Cooperation on Trans-Boundary Water Resources*. Ed. Richard E. Just and Sinaia Netanyahu. Dordecht: Kluwer Academic Publishers, 1998. 131-51.

Powell, Joseph M. "Murray-Darling Basin." *A Century of Water Resources Development in Australia 1900-1999*, 1999. 201-15.

---. *The Emergence of Bioregionalism in the Murray-Darling Basin*. Canberra: Murray-Darling Basin Commission, 1993.

---. *Watering the Garden State - Water, Land and Community in Victoria 1834-1988*. Sydney: Allen & Unwin, 1988.

Pugh, David, Sault Ste. Marie, Ontario, to M.G. Okmanas. March, 31, 1998.

Putnam, Robert D. "Diplomacy and Domestic Politics: The Logic of Two-Level Games." *International Organization* 42.3 (Summer 1988): 427-60.

Rae, Bob, Toronto, Ontario, to John Engler. June 3, 1993.

Report on the State of Ohio's Request for Approval of the City of Akron's Proposal to Divert Water from the Great Lakes Basin. Divison of Water, New York State Department of Environmental Conservation. Albany, New York, 1997.

River Murray Commission. Report by and Resolutions of the River Murray Commission on Chowilla Dam, (1961).

---. *Reports to the River Murray Commission Relating to the Future Development of the Water Resources of the River Murray.* Canberra: River Murray Commission, 1969.

---. *Statement on Proposals for Further Storage on the River Murray.* Canberra: River Murray Commission, 1968.

Rueggeberg, Harriet, and Andrew R. Thompson. *Water Law and Policy Issues in Canada.* Vancouver: Westwater Research Centre, 1984.

Sartori, Giovanni. "Compare Why and How: Comparing, Miscomparing and Comparative Method." *Comparing Nations: Concepts, Strategies, Substances.* Ed. Mattei Dogan and Ali Kazancigil. Oxford: Basil Blackwell, 1994. 14-34.

Saunders, J. Owen. *Interjurisdictional Issues in Canadian Water Management.* Calgary: Canadian Institute of Resources Law, 1988.

Scharpf, Fritz W. *Games Real Actors Play - Actor-Centered Institutionalism in Policy Research.* Boulder: Westview Press, 1997.

---. "Introduction: The Problem-Solving Capacity of Multi-Level Governance." *Journal of European Public Policy* 4.4 (December 1997): 520-38.

---. "The Joint Decision Trap: Lessons From German Federalism and European Integration." *Public Administration* 66 (Autumn 1988): 239-78.

Schlager, Edella. "A Comparison of Frameworks, Theories, and Models of the Policy Process." *Theories of the Policy Proces.* Ed. Paul A. Sabatier. Boulder: Westview Press, 1999. 233-60.

Shepsle, Kenneth A. "A Comment on Institutional Change." *Journal of Theoretical Politics* 13.3 (2001): 321-25.

---. "Studying Institutions - Some Lessons from the Rational Choice Approach." *Journal of Theoretical Politics* 1.2 (1989): 131-47.

Singh, Katar. *Managing Common Pool Resources - Principles and Case Studies*. Delhi: Oxford University Press, 1994.

Singleton, Sara, and Michael Taylor. "Common Property, Collective Action and Community." *Journal of Theoretical Politics* 4.3 (1992): 309-24.

Sproule-Jones, Mark. *Governments at Work - Canadian Parliamentary Federalism and Its Public Policy Effects*. Toronto: University of Toronto Press, 1993.

---. *Restoration of the Great Lakes: Promises, Practices, Performances*. Vancouver: UBC Press, 2002.

---. "Restoring the Great Lakes: Institutional Analysis and Design." *Coastal Management* 27 (1999): 291-316.

Sutherland, Peter. Personal Interview, 23 July, 2002.

Suzuki, David. "The Hospital at the End of the Earth." *The Nature of Things*. Television. Canadian Broadcasting Corporation, 2001. August 29.

Swan, Paul. Personal Interview, 26 July, 2002.

Tarlock, A. Dan. "Global Climate Change and the Law of Great Lakes Diversions." *The Lake Michigan Diversion at Chicago and Urban Drought - Past, Present, and Future Regional Impacts and Responses to Global Climate Change*. Ed. Stanley A. Changnon. National Oceanic and Atmospheric Administration, 1994. 90-113.

"Treaty Between the United States and Great Britain Relating to Boundary Waters, and Questions Arising Between the United States and Canada." http://www.ijc.org/agree/water.html (12 December 2002).

Tsebelis, George. "Decision Making in Political Systems: Veto Players in Presidentialism, Parliamentarism, Multicameralism and Multipartyism." *British Journal of Political Science* 25 (1995): 289-325.

---. *Nested Games: Rational Choice in Comparative Politics*. Cambridge: Cambridge University Press, 1990.

United Nations. "United Nations Human Development Index 2001." 2001. http://www.undp.org/hdr2001 (21 January 2003).

Verweij, Marco. *Transboundary Environmental Problems and Cultural Theory - The Protection of the Rhine and the Great Lakes*. New York: Palgrave, 2000.

Vogel, David. *Trading Up: Consumer and Environmental Regulation in a Global Economy*. Boston: Harvard University Press, 1995.

Voinovich, George V., Columbus, Ohio, to John Engler. June 15, 1993.

---., Columbus, Ohio, to Lucien Bouchard. March, 31, 1997.

Vonnahme, Donald R., Ann Arbor, Michigan, to John Engler. April, 29, 1998.

Water Resources Development Act, (1986).

Wigmore, Lionel. *Struggle for the Snowy*. Melbourne: Oxford University Press, 1968.

Wright, Don I. "Politics, Psychology and Water: Chowilla." *The Australian Journal of Politics and History* December 1974: 370-79.

---. "River Murray - A Continuing Debate." *Journal of the Royal Australian Historical Society* 61.3 (September 1975): 165-84.

---. "The River Murray: Microcosm of Australian Federal History." *Federalism in Canada and Australia: The Early Years*. Ed. Bruce W. Hodgins, D. Wright and W.H. Heck. Waterloo: Wilfred Laurier University Press, 1978. 277-86.

Young, Oran R. *International Cooperation - Building Regimes for Natural Resources and the Environment*. Ithaca & London: Cornell University Press, 1989.

---. *International Governance - Protecting the Environment in a Stateless Society*. Ithaca: Cornell University, 1994.

"Wisconsin Official," Madison, Wisconsin, to B. Timothy Heinmiller. November, 18, 2002.