

C O N T E N T S

List of Figures and Maps xi
List of Tables xiii
List of Acronyms xv
Foreword, by Robert Ward xvii
Preface xix
Acknowledgments xxiii

Part I Introduction i

Chapter 1: Problem and Significance 3
Chapter 2: Change on the River 11

Part II Social Construction of the Crisis 27

Chapter 3: Into a Federal Nexus 29
Chapter 4: Colorado in a Federal Nexus: Defending the Water Tower 37
Chapter 5: Nebraska in a Federal Nexus: Threat to the Big House 47
Chapter 6: Wyoming in a Federal Nexus: Defending the Mountaintop 55

Part III Initiating Negotiations 63

Chapter 7: Options: Individual Consultations, Litigation, or Constructing a
Cooperative Program 65
Chapter 8: Organization of Negotiations 75

Part IV Negotiating Interests 91

- Chapter 9: Colorado's Interests 93
- Chapter 10: Nebraska's Interests 109
- Chapter 11: Wyoming's Interests 127
- Chapter 12: States, Federal Agencies, and the Water Plan 139

Part V Politics and the Roles of Science 145

- Chapter 13: Defining Success: Science as a Referee in a Game Where No One Knows the Score 147
- Chapter 14: Science as Justification for Sacrifice: The Junk Science Controversy 155
- Chapter 15: Science as Faith: Negotiating an Adaptive Management Deal for Terrestrial Habitat 165
- Chapter 16: Science as Faith: Putting Adaptive Management to Its First Test with the Sedimentation-Vegetation Problem 179
- Chapter 17: Scent of Victory and Impasse 193

Part VI Reaching Sufficiency: Wrestling with Skunks 197

- Chapter 18: Negotiating Context, 2000–2006 199
- Chapter 19: Regime of the River: Colorado and Nebraska Nightmares 213
- Chapter 20: Regime of the River—Sharing Peak Flows: Colorado and the USFWS Struggle on the South Platte 239
- Chapter 21: Regime of the River: Wyoming and Nebraska Address New Depletions 255
- Chapter 22: Regime of the River: Nebraska Confronts Its History 265
- Chapter 23: Regime of the River—Building a Federal Depletions Plan: States Confront the U.S. Forest Service 283
- Chapter 24: Regime of the River: Inserting Pulse Flows 305
- Chapter 25: Locked into an Awful Dance: Bypass Flows and Hydro-cycling 319
- Chapter 26: The Pallid Sturgeon Habitat Gamble 337

Part VII Reaching Sufficiency: Structuring Decision Making 349

- Chapter 27: Wielding the Regulatory Hammer 351
- Chapter 28: Adaptive Management: Lashing Together Conflicting Visions with a Chinese Wall 365

Part VIII Conclusions: Making a Mesh of Things 381

- Chapter 29: Search for Approval 383
- Chapter 30: Policy Implications 397
- Chapter 31: Theory Implications 407

Appendixes	429
Appendix A: Appreciation	429
Appendix B: Theory and Methods	431
Appendix C: Governance Committee	437
Appendix D: Program Milestones	439
Appendix E: Adaptive Management Advisory Consulting Team	441
Appendix F: Program Budget	443
Appendix G: Photo Gallery	445
Appendix H: Chronology	451
<i>References</i>	457
<i>Index</i>	475

Problem and Significance

In a moment utterly without drama, on October 24, 2006, negotiators representing Colorado, Nebraska, Wyoming, the environmental community, and the United States Department of the Interior—each of whom had struggled for years in Platte River habitat recovery talks—assembled in a Denver hotel conference room. The mood was quietly positive as they sat in a horseshoe arrangement at tables covered with white tablecloths studded with notebooks, laptop computers, water pitchers, glassware, and soft-drink cans. For nearly an hour they had been reviewing for one last time electronically projected editorial changes to the bulky program document. Among some good cheer and subdued laughter, the negotiators then unanimously approved sending that record of their agreement to the printer. The first audience would consist of the governors and congressional delegations of the three Platte Basin states and the secretary of the United States Department of the Interior. Something new was being birthed under the Platte River Basin sun. These representatives had agreed to govern their water commons in important new ways.

They had been brought to the negotiating table by the requirements of the Endangered Species Act (ESA) of 1973. Since 1994—for twelve long years—negotiators had been slowly, haltingly, defensively shaping the terms and conditions under which they would voluntarily and collaboratively organize to re-time about 11 percent of the average annual surface flow of the Platte River (as measured near Grand Island, Nebraska) in conjunction with restoring 10,000 acres of critical habitat for whooping cranes, piping plovers, and least terns during the first thirteen-year program increment. In addition, they agreed to test

the hypothesis that the basin-wide recovery program would demonstrably serve the needs of pallid sturgeon further downstream, near the river's mouth on the Missouri. The parties had constructed a habitat recovery program document, well over 500 pages long, that reflected more than thirty years of struggle among contending organizational interests as they sought ways to remedy the jeopardy in which historical water-use patterns in the basin had been found to place the ESA listed species. The program would be launched January 1, 2007.

On that sunny October day, there was no ceremonial public commemoration of the moment; not even a photo was taken to be buried deep in the pages of the region's newspapers. Within each coalition of interest—water user, state government, federal government, environmental—were constituencies opposed to the deal. On the one hand, it had been clear for years that each set of negotiators wanted—even desperately needed—the Platte River Habitat Recovery Program. On the other hand, each community of interest had points it disliked about the new basin-wide habitat recovery program, and each faced the prospect of defending the program to antagonists in their divided constituencies. While proud of their work, and knowing that what they had hammered into existence could make each of their constituencies much better off than they would have been if the project had been abandoned, there was no general enthusiasm for publicly trumpeting their accomplishment. Public displays of affection over what they had wrought risked the needless taunting of those opposed.

In recent years, negotiators had worked during the deepest and most extended drought in the basin's history and had persevered despite political leadership in the three states and Washington, D.C., openly hostile to the Endangered Species Act as written. Yet the deal makers had found a way to implement the ESA on a large multi-species, multi-state, multi-government landscape-scale river basin. It was a signal accomplishment. The principals had birthed a program baby, and they would be glad to quietly claim paternity. But each preferred not to make a big show of kissing that baby in public.

QUESTIONS

Two sets of questions are paramount. First, descriptive questions need to be addressed. What were the ecosystem issues? How have water users, environmentalists, and state and federal authorities found themselves locked in a prolonged discussion on how to mitigate the problem? What were the participants' agendas? What were their options, and how did they exert themselves in problem solving? What roles did the federal regulatory process, science, and politics play?

The second question set is analytical; it will be examined at the beginning and the end of this book. The social construction of the Platte River Habitat Recovery Program is of interest not only because it constitutes an instructive story but also because it provides analysts with grist for addressing crucial the-

oretical matters having to do with the way human beings transcend their individual self-interested rationality and cooperate to produce collective/public good—in this instance, a river basin-wide environmental good. Why do rational self-seeking resource appropriators neglect environmental matters in the first place? What does it take to mobilize them to undertake concerted and collaborative action to preserve available remnants of high-quality habitat and restore degraded segments? Case studies cannot provide adequate testing of hypotheses, but they can generate propositions worthy of further consideration in sociological theory building. (See Appendix B for discussion of research methods and theory.)

Descriptive questions will be addressed part by part, chapter by chapter. Analytical questions require a brief explanation.

ANALYTICAL PERSPECTIVE

Why do individually rational resource users degrade environments? What can be done to mobilize these same users to first stop and then reverse environmental degradation? A tradition of inquiry in the social sciences has emerged, contributors to which have closely examined problems of natural resource degradation, requisites of effective mobilization to reverse matters, and attributes of the most effective long-enduring resource management organizations (Baden and Noonan 1998; Bromley 1992; Burger et al. 2001; Dolsak and Ostrom 2003; Freeman 1989, 2000; Hanna, Folke, and Maler 1996; Keohane and Ostrom 1995; McCay and Acheson 1987; Ostrom 1990, 1998; Ostrom and Ostrom 2004; Young 1982, 1997, 1999).

The essence of the matter is that rationality is multiple. What is rational for the individual may not be rational for an assembly of individuals. The reverse is also true. What is rational for society may not be in the rational self-interest of any particular individual actor. Rationality also turns out to have different implications depending upon the kind of property resource addressed.

To clarify the problem, it is helpful to distinguish three kinds of property and reflect briefly on how rationality is affected by each (Figure 1.1). Each property type produces streams of benefits, but the nature of the benefit streams varies importantly on two conceptual dimensions—rivalness and excludability:

1. Rivalness is determined by whether use of the benefit by one user denies that benefit to other potential users. If one investor pays for production of the benefit and consumes what he or she can, will that same benefit be available for others who did not invest in providing it? If not, the property is said to be highly rival. Such is the case with investing in a slice of pizza. If one person eats the piece, it is not available to another. However, some kinds of property—for example, high-quality whooping crane habitat—are non-rival. One person's knowledge that whoopers have a good place on the central

PROBLEM AND SIGNIFICANCE

Platte for their spring and fall stopovers does not interfere with another's awareness. Here, rivalness is zero.

2. Excludability is determined by whether it is easy to exclude the non-investor (free rider) from benefiting from the investment. If one invests in a type of property, can non-investors easily be excluded from sharing in the benefits produced? If so, excludability is said to be high, as would be the case with a slice of pizza. If, on the other hand, an investor invests in improved piping plover habitat in central Nebraska, the non-investor cannot be excluded from the benefits of enhanced ecosystem biodiversity. Non-investors reap as much of the benefit as those who have sacrificed to provide the improved habitat. Excludability, in such an instance, is zero.

Employing these two analytical dimensions, it is now possible to define three kinds of property and highlight implications of each for rational action and willingness to sacrifice for provision of high-quality wildlife habitat on the central Platte or anywhere else:

1. Private property (Figure 1.1a) is characterized by both high rivalness and high excludability. In matters involving private goods, investors can fully capture whatever benefit stream the property produces; they can deny non-investors the opportunity to take a "free ride" on their investment. Farmers who buy improved seed varieties capture the benefit of higher yields. Purchasers of automobiles capture the benefit of personal transport and, by controlling locks and ignition keys, exclude potential free riders. Pizza buyers literally internalize the benefit of their investments. In irrigated agriculture, a given quantity of water actually put to consumptive use on a farmer's field crop represents a private good; that would be the consumptive use fraction of the applied water that grows corn only on that field. Individual rationality works well in free markets to produce and distribute private goods. People employ their individual rationality to trade away the things they do not want in order to obtain the things they do. There is no need to organize an entire community to buy and use a pocket comb or a quantity of seeds.
2. Collective (public) property (Figure 1.1c) has the opposite attributes from private property. It is characterized by zero rivalness and excludability. A given quantity of patterned water flow contributing to quality plover habitat produces a public good. Markets do not emerge to provide collective (public) goods because the benefits that can be captured by an individual investor cannot be greater than those available to non-investors (free riders). Healthy ecosystems capable of sustaining species listed under the Endangered Species Act, in the absence of public policy and effective organizations to prevent private rationality from dominating the situation, will be degraded by people who—in the course of pursuing private rationality in market-places—exploit open access to the public and common heritage for private gain. In an open access situation, one has to be a fool or a major altruist to invest in things whose benefits will escape away and cannot be denied

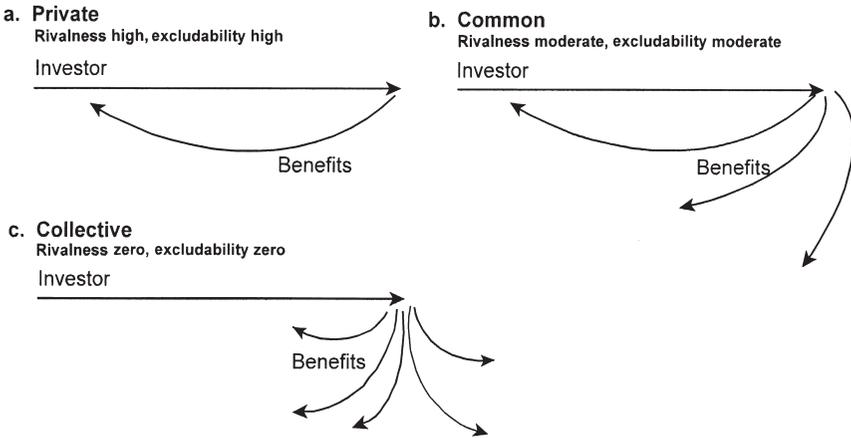


FIGURE 1.1. *Types of property.*

to non-investors. Examples of collective or public goods include national defense, flood control, police and fire protection, forest and watershed protection, and, of course, provision of high-quality habitat for birds and fish on the central Platte River.

3. Common property (Figure 1.1b) is characterized by moderate rivalness and excludability. For example, a given quantity of water flowing through an irrigation canal to a farmer's field represents a resource that is moderately rival and excludable. It is rival in the sense that a delivery to one farmer cannot be simultaneously delivered to another. However, an important fraction of the water delivered to the first user will run off as tailwater or percolate deep into soils and move downslope to provide "return flows" to other users who thereby also share benefits. Given leaky earthen ditches and modest field application efficiencies, a substantial fraction of one user's water will flow to others in the irrigation community, and the others cannot be totally excluded from the benefits at reasonable cost. Since many benefit from the investments of others in highly interdependent flow networks, there is no particular interest in attempting to exclude the non-payers.

It is now possible to see the genesis of environmental degradation and, in principle, a path to a solution. Rationality in pursuit of private goods, un-disciplined by higher-order organizational rationality, will generate a perverse logic that results in the destruction of collective property (such as environmental quality/biodiversity). Open access situations (defined as the absence of an organizationally viable discipline of property users' appetites) regarding collective property will produce destructive outcomes that have come to be called the "tragedy of the commons" (Hardin 1968; Ostrom 1990: 2–3). The dynamic that produces the "tragedy" has long been studied and is known as the prisoners' dilemma (Ostrom 1990: 3–5; Poundstone 1992).

The essence of the prisoners' dilemma dynamic is simple. The tragedy of the commons is a product of individual rationality that seeks to maximize individual gain in an open access resource situation. In the absence of effective social organization that empowers individual actors to discipline each other, monitor each other for compliance with rules, and share asset management costs in ways mutually accepted as legitimate, self-seeking actors will individually exploit the resource as best they can and thereby impose degradation to the detriment of all. Garrett Hardin's (1968) classic example centered on competitive grazers of cattle who put too many animals on an open access pasture, thereby so degrading the grazing commons in the name of private rationality that all were brought to ruin.

Self-seeking actors, in an unorganized open access situation, feel pressure to enter the resource extraction race so they can grab as much as possible from the commons before other, equally unconstrained, individually rational competitors do (Table 1.1). Any individual resource appropriator who exercises constraint in the name of long-run resource sustainability is thereby punished. Any actor who holds back from the race loses immediate gain while his or her competitors snatch it. In a finite world, resource exploitation races fueled by individual self-seeking rationality must inevitably bring ruin to all—the tragedy of the commons.

If the consequences of private actions place a burden on the environment external to the private goods exchange—such as toxic flows of waste products, channelization of rivers, and destruction of wetlands—no automatic constructive joint action by the players will occur to rectify matters. If player X invests in altruistic environmental rehabilitation practices on a small fraction of damaged streamside where no one else can be expected to join in, player X alone can do little to reverse the river degradation caused by numerous players. Player X finds the individual investment in restoration to be futile, and his or her investment is wasted. It is individually rational for X to defect from any proposed collaboration. If, on the other hand, all other players somehow altruistically collaborate in reversing the degradation without organizational inducement to do so, the collective task of restoration would proceed without player X's contribution. Therefore, either way the rational actor (individual or organizational)—with open access to the resource and no certainty of regulated cooperation by others by virtue of membership in an effective encompassing governance organization—will refrain from investing in a collective remedy and choose to be either a free rider on the contributions of others or a fellow competitor in the race to collective ruin. Because everybody is a self-interested, individually rational preference maximizer, everyone calculates in a similar manner, and the public/collective property is allowed to deteriorate. The open access commons is plundered. This will hold even if there is perfect knowledge of both the problem and the solutions. What is rational for the individual in such situations is not rational for the encompassing community over time.

Table 1.1. Logic of the Prisoners' Dilemma and the Tragedy of the Commons

Actor X	<i>X Invests, Y Invests</i>	<i>X Invests, Y Defects</i>
Decisions Regarding Collective Good	Best outcome	Worst outcome
	Collective good produced by joint action Tragedy of the commons avoided	X's investment wasted Tragedy of the commons sustained
Actor Y	<i>X Defects, Y Invests</i>	<i>X Defects, Y Defects</i>
Decisions Regarding Collective Good	Worst outcome	No collective solution
	Y's investment wasted Tragedy of the commons sustained	Both players suffer Tragedy of the commons sustained

Obviously, human beings in many societies have known a solution for thousands of years. People organize themselves such that any one investor can be assured that others will make coordinated and proportionate sacrifices to ensure that the collective good—in this case, the water commons—will be protected and enhanced (Bromley 1992; Freeman 1989; Ostrom 1990; Ostrom, Schroeder, and Wynne 1993). The organized work of all resource appropriators can produce and sustain collective property—the commonwealth. If actor X is a member of an organized community in which it is clear that all members will refrain from uncontrolled exploitation of the commons, will sacrifice proportionately so that one does not gain undue advantages over another, and will contribute to sharing costs of maintaining the commons, actor X can invest in collective property knowing that an organization is in place that will prevent free riders from eroding what organized restraint in resource use has gained.

The solution to the common pool resource problem, especially the pure collective property problem, raises two strategic questions: (1) under what conditions will individual self-seeking actors mobilize themselves to organize, and (2) what are the attributes of successful long-enduring social organization that empower people to transcend their individual rationalities and produce common and collective property? This study centers on the first question. The second question has been, and continues to be, addressed elsewhere (Dolsak and Ostrom 2003; Freeman 1989, 2000; Ostrom 1990). Inquiry into the design of such organizations, and the mobilization of actors to create them, should be a centerpiece of environmental and natural resources sociology.

The central message is that individual, private, self-seeking, mutually beneficial exchanges in marketplaces—as important as they are to a good society—necessarily take place within an organizational common property and collective goods context. Furthermore, while it may be perfectly rational for any particular actor to take out un-priced mortgages against the river water commons, never intended to be repaid, a historical accumulation of such unpaid mortgages in

pursuit of individual private agendas can threaten important components of the commonwealth—in this case, represented by an ecologically degrading river system. Important components of a viable society cannot be captured in marketplace exchange and by their summation in gross national product accounts. At some point, in recognition of this truth, people must mobilize themselves through their representative governments and local common property management organizations to address matters by investing in the commons. In doing so, we add to our collective capacity to govern ourselves on our landscapes.

The Platte River Habitat Recovery Program negotiations are of interest precisely because they promise to build an organized set of collective governance arrangements that will permit water users and environmentalists in three states and the federal government to transcend their more limited traditional organizational agendas and cooperatively and voluntarily mobilize at the river basin level to produce a new form of collective/public property: quality habitat for threatened and endangered species.

To produce this new governance system for the environmental restoration and sustenance of this collective property, the players have had to agree to transcend and adapt their particular private and historical agendas. After years of wrangling, they have proposed to invest in creative solutions of their own making to produce a product from which they will capture no more benefit than anybody else in the basin, the nation, or the world. Like others, they did not know the value of a plover, a tern, a whooping crane, or a pallid sturgeon. Whatever that value, it is not to be measured in market exchange of private goods. They knew there was no private profit in sustaining these umbrella species and the life forms that flourish with them. They knew that to enhance the environment, their customers and members must pay a little more for an acre foot of water and a kilowatt hour of electricity and must accept a little less drought protection afforded by some basin reservoirs. They knew they would not have undertaken to produce this collective good if left alone. They now know they were capable of negotiating a new social organizational regime that will reflect somewhat more accurately the costs production and consumption of private goods have placed on the river and on other living things that depend on it. They had to adjust their former organizational rationalities to make room on the basin's rivers for a new collective agenda to enhance the Platte ecological commonwealth. All in all, the attempt to establish a basin-wide, multi-state, state-federal cooperative species habitat recovery program is an astounding development—undertaken by virtually no other society—that is well worth investigating.