

**Boundaries
of Analysis**



Introduction

This is a study of what happens to technical analyses in the real world of politics. The portion of the real world we have chosen for our governing illustration is the decade-old controversy over whether to construct a dam on the Delaware River at Tocks Island, five miles north of the Delaware Water Gap. This controversy is imbedded in a tangle of interconnected problems involving floods and droughts, energy, growth, congestion, recreation, and the uprooting of people and communities. Almost all the pieces of this tangle have been staked out and studied in some fashion or other. They have been measured and modeled by economists, scientists, and planners, by exuberant technologists, committed bureaucrats, and skeptical environmentalists; and the result of all this has been a weighty legacy of technical and economic analyses, along with a decade of political stalemate regarding the fate of the dam.

The Tocks Island Dam controversy affords us an opportunity not only to measure the influence of technical studies on the political process, but also, because of the long stalemate, to observe this influence across the environmental watershed of the past several years. The Tocks Island Dam project was planned and developed in the early 1960s with scarcely a murmur of dissent. Indeed, early on, the project was considered a model of water resource planning. It was one component of the path-breaking plan of the U.S. Army Corps of Engineers for the Delaware Basin, the first comprehensive survey of a river basin undertaken under the new water resource planning guide-

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lines developed within the federal government during the 1950s; and it was a project ardently adopted by the newly formed Delaware River Basin Commission, the first federal-state river basin authority of its type ever established in the United States. The project design was not completed, however, until 1970, by which time there was in progress a subtle but striking revolution in the ways many Americans thought about their environment and about economic growth. The debate over the dam since that time has been largely a clash between the two sensibilities that lie on either side of that revolution.

The Tocks controversy has spanned still another, even more subtle, watershed, this one involving objective, systematic analysis. Both policy makers and analysts just a decade ago had high hopes that comprehensive planning, benefit-cost analysis, computer techniques, and other elements of systems analysis would contribute increasingly to the solution of social problems. These hopes by now have largely withered under the several disillusionments of the 1960s. Too often the search for objective, quantitative techniques and measures produced distortions in ways only dimly perceived by the analysts. The values that both the policy makers and the analysts most cared about were either concealed or altogether neglected in the ostensible search for objectivity. Analysts, hobbled by narrow conceptions of their disciplines and of the prerogatives of the institutions which employ them, operate in a world befogged by dogma.

These themes are indeed observable in the Tocks controversy. The technical and economic analyses did, to a substantial degree, mask the value conflicts at stake; they concealed the real political and human issues of who would win and who would lose were the Tocks Island Dam project undertaken; and they were infected by rigid categories of thought and divisions of bureaucratic responsibility. The essays in this volume are only in part about these shortcomings. Their more ambitious objective is to deal freshly with the environmental issues at stake in the Tocks Island controversy, especially by cutting across the old restrictive boundaries. Viewed as a whole, the essays try to ally systematic analysis with an explicit concern for the human values most strongly held by the protagonists of all persuasions in the struggle over the dam.

Together the essays here tell a reasonably complete and, we hope, coherent story of the Tocks Island controversy. The essays have been coordinated to minimize repetitiveness, but we have tried not to suppress their distinctive spirit and style. Although the authors have spent countless argumentative hours together, and have read and re-read each other's drafts, the reader will quickly discern the individual personalities of the authors and their noncongruent percep-

tions of the benefits and costs of the Tocks project. Despite these differences, however, our views as outsiders to the controversy are not nearly as sharply polarized as are those of the protagonists.

The Tocks Island controversy has been going on all around us. Our work place is less than twelve miles from Trenton (the site of the New Jersey government and the headquarters of the Delaware River Basin Commission) and half way between the New York Division and Philadelphia District offices of the U. S. Army Corps of Engineers. During the three years in which this book has been in the making, there has been time and occasion to get to know a number of the officials in these agencies rather well. They and many of the leading local environmentalists have read drafts of many of the chapters of this book, and the reader will find in several of the final versions here that our interactions with these men and women have become part of the narrative.

We must report how relatively little the interactions have altered the view of the dam any of the principals has held . . . or any of us has held. Those most hostile to the dam three years ago remain hostile; those most in tune to traditional arguments in favor of dam building remain skeptical that the current fashion for nonstructural alternatives is an adequate response to human frailty. To the extent that we had hoped that, by teaching the tools of the professionals to the nonprofessionals, our book would sharpen the issues and focus the discussion, we have occasionally been rewarded. To the extent that we had imagined that analyses could persuade, we have been humbled.

The ten essays are divided into five major groups. In Part One, "Failures of Discourse," by Robert Socolow, several of the major themes of the overall study are introduced through a portrayal of the limitations of the conceptual categories within which policy problems are structured and analyzed. This essay especially stresses the psychological and institutional barriers to more rational and direct communication that have marked the Tocks controversy and environmental discourse more generally.

Part Two tells the political and analytic history of the Tocks Island Dam project. The first essay in this section, "Historical Currents," by Michael Reich, provides a panoramic narrative history of the ancient and not so ancient attempts to control the Delaware River, from an antidam treaty between New Jersey and Pennsylvania in 1783, through two dramatic Supreme Court Cases in the 1930s and 1950s involving the allocation of Delaware River water, to the filing of the Tocks project's Environmental Impact Statement in 1971. The essay "Conflict and Irresolution" by Harold Feiveson

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brings into focus one main theme of our study: the impact of technical analysis on the political process. It does this through a detailed study of the Tocks Island Dam controversy over the past four years, during which time the conflict over the dam was at its fiercest and pitted embittered citizens against lordly Poobahs of Congress.

The essays in Part Three investigate the demands for water, flood control, and electric power in the Basin, and, in so doing, lay bare the work of the water resource professionals and the economists. The first essay of Part Three, "Benefits and Costs, Winners and Losers," by David Bradford and Harold Feiveson, provides a somewhat unconventional summary of the benefits and costs of the Tocks Island Dam project and of its beneficiaries and its victims. This essay also undertakes a critical examination of the ability of benefit-cost analysis to contend with real problems as complex as Tocks. Frank Sinden's essay, "The Water Cycle, Supply and Demand," makes clear that the comfortable categories of supply and demand typically used in analyses of water economics are in fact deeply and subtly misleading; and the essay attempts to set forth an alternative conceptualization of water supply. Using the new framework, the essay investigates alternative ways of guarding against severe droughts. The problem of too little water has its counterpart in the problem of too much water; Allan Krass's essay, "Floods and People" presents a tutorial on floods and the variety of structural and nonstructural measures one may adopt to combat them. The final essay of Part Three, "Electric Power on the Delaware," by Thomas Schrader and Robert Socolow illuminates some of the ways in which regulation of the consumptive use of water has influenced decisions about the siting of power plants; more broadly, it illustrates how the finiteness of a regional water supply can drive technology in new directions.

The two essays in Part Four address one of the most perplexing issues on the environmental agenda; the degree to which the science of ecology, especially in alliance with modern tools of computer-based mathematical modeling, can illuminate real environmental policy problems. Robert Cleary's "Mathematical Models" grapples with the perils and promises of the computer. While sharply critical of the ways in which mathematical models were wielded in the Tocks controversy, the essay is at essence optimistic. It argues that even complex ecological questions can be understood by intelligent and patient applications of computer technology and environmental science. The essay by Daniel Goodman, "Ecological Expertise," adopts a far more gloomy and skeptical stance, however. His essay warns that the foundations of ecology are weak and that they pro-

vide shaky support indeed for many of the most cherished hypotheses of environmental interest groups.

Part Five presents the final essay of the volume, "A New Park on the Delaware," by Frank Sinden. This essay is an attempt to integrate the conventionally disjoint activities of transportation and recreation planning. Its intent is to illustrate how analysis can cut into environmental problems in a novel manner.

It is a risk, in an undertaking like this one, to tell the reader more than he or she wants to know. The essays here give considerable detail about how the environmental policy process works and about such deceptively simple topics as water demand and supply, floods, droughts, benefit-cost analysis, mathematical modeling, recreation planning, and ecology. We have written for the reader who likes such detail; large blocks of several essays are tutorials, presuming no special background of the reader, taking little for granted. The more experienced reader, we dare hope, will not be bored by these tutorials; they are generally unconventional in their approach to subject matter which is ordinarily the property of in-groups.

We expect these essays to find their way into undergraduate and graduate courses at colleges and universities. In teaching an environmental seminar at Princeton for the past three years, two of us have been struck with how little detailed illustrative material is currently available. At the present stage of environmental studies, with its intrinsically interdisciplinary character, there is a clear need for detailed case studies that capture the richness of environmental decision making and document the contribution of economics and the scientific disciplines.

We believe this book will also interest audiences outside the universities—in particular, citizens on both sides of the environmental firing line. It has been our experience that environmental policy makers and activists of all persuasions welcome the chance to stand back from the fray for a few moments, to place their own work and their beliefs in a broader context. It is our hope that these essays will provide such an opportunity.

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