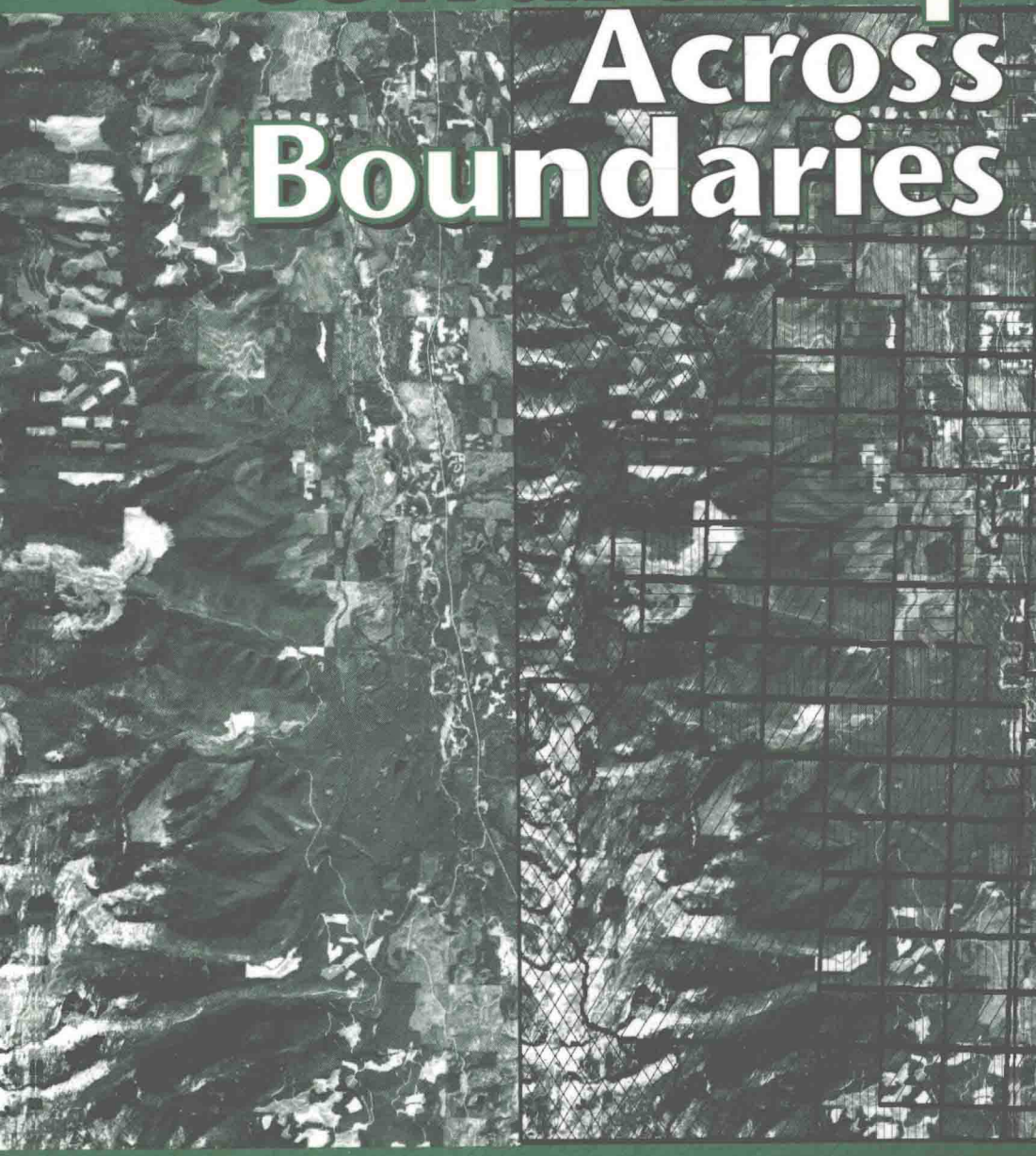
Stewardship Across Boundaries



Edited by

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Cover photos: A portion of the upper Swan Valley in western Montana. A 1989 SPOT image is on the left, and on the right is the ownership of this area overlaid on the SPOT image. Each square is one mile on a side. Ownership is as follows: horizontal lines are Montana state lands; vertical lines are Plum Creek (a timber company) lands; diagonal lines running from the upper left to the lower right are private lands; diagonal lines running from the upper right to the lower left are USDA Forest Service lands; and cross-hatched lines are Confederated Salish-Kootenai Tribal lands. These images show the variety of ownership in a relatively small area, the legacy of checkerboard ownership, and the mixed ownership of land that appears relatively contiguous on the SPOT image. Many thanks to Don Krogstad, Flathead National Forest, for his time and expertise in providing and helping to prepare these images.

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Stewardship Across Boundaries

We dedicate this work to Aldo Leopold.
By his writings and through his intellectual descendants, a
land is being made where barriers are dimmed and lands are connected.

"It is a fact, patent both to my dog and myself, that at daybreak I am the sole owner of all the acres I can walk over. It is not only boundaries that disappear, but also the thought of being bounded."

—Aldo Leopold, *Great Possessions*

Acknowledgments

We are indebted to the chapter authors. The issue of cross-boundary stewardship is certainly not new, yet remarkably little is written about the topic. Accordingly, our authors struggled in covering familiar natural resource issues, but from the startlingly fresh perspective of peering over human-constructed lines on the land. Although the authors' services were voluntary, their sense of cooperation and dedication to this project made our work seem part of a family effort. By their actions, they reflect a new generation of those who view boundaries as opportunities rather than barriers.

Those who know Island Press and its staff will understand our debt to them for their contribution to stewardship and natural resources. Barbara Dean has been a friend and willing partner to our ideas from the inception, and Barbara Youngblood offered calm sureness with all the ten thousand details. The arduous task of copyediting was adroitly handled by Christine Paige.

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Contents

Introduction

Every piece of land, no matter how remote or untrammeled, has a boundary. Imposed on a landscape usually for administrative purposes, boundaries are lines demarcating and dividing an area into units. These lines may follow topographic and biological features, such as mountain ridges or rivers, or, more often, boundaries follow the straight lines of political dictate and compromise. Administrative boundaries almost always fragment a landscape, disrupting the ebb and flow of individuals and ecosystem processes. Alternatively, boundaries often serve important roles, such as marking the line protecting wilderness from mechanized contrivances. Cronon (1983) cites an example of the Native American "boundary fishing place" Chabanakongkomuk near present-day Worcester, Massachusetts, whose name could be interpreted as "You fish on your side, I fish on my side, nobody fish in the middle—no trouble."

Although there are several recent syntheses on ecological boundaries as ecotones and edges (Hudson 1991, Hansen and di Castri 1992, Risser 1995), remarkably little has been written on the impact of administrative boundaries and adjacent lands on natural resources and their management. For example, biological impacts of administrative boundaries and adjacent lands on national parks were first described in the scientific literature a little more than a decade ago (Newmark 1985) and were recently identified as one of the greatest threats to designated wilderness (Cole and Landres 1996), regardless of the form of activity (e.g., whether livestock grazing or subdivisions) occurring on adjacent lands (Knight and Mitchell 1997). Even more telling, boundaries are seldom listed in the indexes of contemporary books on management issues concerning the conservation of biological diversity. Forman (1995) is a notable exception to this trend, offering in-depth discussion of ecological boundaries and their policy and management implications.

How did we get to where we are today, with so many different state, federal, and local agencies and private organizations, each with differing and sometimes conflicting mandates, policies, and regulations, all searching for ways to coexist on a shared landscape? The reasons for today's fragmented management are many, but we focus on two. First, ecologically, boundaries were a necessary part of traditional vegetation descrip-

tions developed by the pioneers of ecology in the early 1900s. One of the tenets of this pioneering ecology, embodied in the phrase "a balance of nature," was that ecosystems were internally regulated and in equilibrium with climate, inexorably moving toward a single climax or stable condition. These early concepts fostered the belief that ecosystem boundaries were tangible, rather than arbitrary constructs of our intellect and desire to understand a complex world. Second, managerially, boundaries were necessary to define administrative jurisdiction and responsibility, so it was desirable for natural resource agencies to accept the notion of relatively fixed ecosystem boundaries. This combination of ecological and managerial factors led to a belief that lands managed by an agency were separate and independent from other lands, that what happened on one side of a border didn't necessarily affect what happened on the other.

The consequences of this belief were several, including managers making land-use decisions in isolation from managers on adjoining lands, loss of species that must disperse or migrate across administrative borders, increased likelihood of threats such as alien species or pollutants moving into and compromising natural systems, and disruption of natural processes such as fire that flow across large areas of land. Ultimately, these impacts reduce the biological and social values of public and private lands. Furthermore, as noted by Forman (1995), "It is simply inept or poor-quality work to consider a patch as isolated from its surroundings in the mosaic. Designs, plans, management proposals, and policies based on drawing an absolute boundary around a piece of the mosaic should be discarded. Moreover, because we know it is wrong, i.e., we know ecological context is as important as content, the practice is unethical. Ethics impel us to consider an area in its broadest spatial and temporal perspectives."

It is time for a change in the way U.S. natural resources are managed. Today managers recognize the importance of focusing beyond as well as within their boundaries, and ecologists recognize that the 1900s view of ecosystems does not capture their spatial and temporal dynamism (Landres 1992, Pickett et al. 1992, Christensen 1995). Both managers and scientists now see that administrative and ecosystem borders are arbitrarily defined and delineated; they are not closed but leaky and experience inputs and fluxes from things as diverse as water and pollutants to migrating species and humans crossing borders to hunt, cut firewood, or picnic. Refreshingly, with this shift from the belief in "a balance of nature" to a new more realistic view embodied in the phrase "the flux of nature" (Pickett et al. 1992), there is reason to believe that natural resource

managers can be more responsive to the dynamic nature of human-dominated landscapes (Pickett and Ostfeld 1995). This new land perspective emphasizes that managers are involved with users and individuals beyond the boundaries they are responsible for because what occurs beyond their borders directly and indirectly affects what occurs within their borders.

The complex biological, socioeconomic, and managerial impacts of boundaries are a significant component of land-use decisions and practices today. Managers now face the difficult task of sustaining biological diversity while providing amenity and commodity uses from landscapes that have been delineated and affected by boundaries established in the past (Gunderson et al. 1995, Smith et al. 1995). These impacts affect lands spanning a continuum of management goals, from designated wilderness to lands devoted solely to commodity production. Boundary impacts are perhaps most difficult to manage on multiple-use lands, which lie between the ends of the management continuum, where ecosystem management strives to provide goods and services while maintaining native biological diversity, and where managers strive to balance both amenity and commodity values (Yaffee et al. 1996).

Our goals for this book are many. First and foremost we wish to draw attention to boundary impacts and stewardship across boundaries to spur open discussion between students, scientists, managers, and activists on this emerging topic. Second, we would like to provide a forum for people with legal, social, and ecological perspectives to develop their ideas on boundary impacts and cross-boundary management. Our third goal is to show how legal, social, and ecological conditions interact in causing boundary impacts and how their integration is necessary for improving land management. Our fourth aim is to promote critical thinking about boundary impacts to inspire new research that could then be used in improving management across boundaries. And the fifth goal is to provide diverse case studies illustrating a range of approaches to cross-boundary stewardship.

Part I develops a framework for understanding administrative boundaries and their effects. This section includes chapters on the ecological, social, legal, and institutional dimensions of administrative lines. The four chapters in Part II examine issues related to the type of boundary, from wilderness, to recreation, private forestry, and private–public boundaries. Part III presents a series of case studies illustrating the efforts of those who have attempted to cross boundaries and find ways to cooperate that promote land stewardship. The case studies range from New

York to Florida, from Arizona to the Rocky Mountain states. Part IV examines what it takes to build bridges across boundaries. Accordingly, there is a chapter on cooperation, a speculative chapter that explores a future where lines on the land are vanishing, and a concluding chapter integrating the book's various themes.

This book examines the complex and important issues surrounding both public and private land boundaries in the United States. We chose to restrict our topic to the United States because we wished to cover a broad and complicated topic well. We hope that the book also applies elsewhere as the subject of cross-boundary stewardship is a general one, applicable to every part of the globe.

We hope that this book will be useful in both the classroom and the meeting room and that it will be used by all those diverse individuals and entities who share concern for the land that nurtures us.

References

Christensen, N.L. 1995. Fire and wilderness. *International Journal of Wilderness* 1:30–34.

Cole, D.N., and P.B. Landres. 1996. Threats to wilderness ecosystems: impacts and research needs. *Ecological Applications* 6:168–184.

Cronon, W. 1983. *Changes in the land: Indians, colonists, and the ecology of New England*. Hill and Wang, New York.

Forman, R.T.T. 1995. *Land mosaics: the ecology of landscapes and regions*. Cambridge University Press, Cambridge, England.

Gunderson, L.H., C.S. Holling, and S.S. Light, editors. 1995. *Barriers and bridges to the renewal of ecosystems and institutions*. Columbia University Press, New York.

Hansen, A.J., and F. di Castri, editors. 1992. *Landscape boundaries: consequences for biotic diversity and ecological flows*. Springer-Verlag, New York.

Hudson, W.E., editor. 1991. *Landscape linkages and biodiversity*. Island Press, Washington, DC.

Knight, R.L., and J. Mitchell. 1997. Subdividing the West. Pages 272–274 in *Principles of conservation biology* (G.K. Meffe and C.R. Carroll, editors). Second edition. Sinauer Associates, Sunderland, MA.

Landres, P.B. 1992. Temporal scale perspectives in managing biological diversity. *Transactions of the North American Wildlife and Natural Resources Conference* 57:292–307.

Newmark, W.D. 1985. Legal and biotic boundaries of western North American national parks: a problem of congruence. *Biological Conservation* 33:197–208.

Pickett, S.T.A., and R.S. Ostfeld. 1995. The shifting paradigm in ecology. Pages 261–278 in *A new century for natural resources management* (R.L. Knight and S.F. Bates, editors). Island Press, Washington, DC.

Pickett, S.T.A., V.T. Parker, and P.L. Fiedler. 1992. The new paradigm in ecology: implications for conservation biology above the species level. Pages 65–88 in *Conservation biology: the theory and practice of nature conservation preservation and management* (P.L. Fiedler and S.K. Jain, editors). Chapman and Hall, New York.

Risser, P.G. 1995. The status of the science examining ecotones. *BioScience* 45:318–325.

Smith, G., C. Robinson, and M. Shannon. 1995. *Crossing over the lines: multi-jurisdictional, multi-ownership, multi-party, multi-problem landscape management strategies*. Report of the Eastside Ecosystem Management Strategy Project, Columbia River Basin Assessment, USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

Yaffee, S.L., A.F. Philips, I.C. Frentz, P.W. Hardy, S.M. Maleki, and B.E. Thorpe. 1996. *Ecosystem management in the United States: an assessment of current experience*. Island Press, Washington, DC.

PART I

UNDERSTANDING ADMINISTRATIVE BOUNDARIES AND THEIR EFFECTS

A broad perspective is needed to comprehend how boundaries delineate landscapes that, in turn, define humans and societies. Our introductory section takes this approach with chapters that address the human, ecological, and legal and institutional aspects of boundaries. We begin with an insightful chapter by Eric Freyfogle titled "Bounded People, Boundless Land." This chapter explores the seeming contradictions within our society that impose boundaries on our lives and our affairs, yet at the same time require cooperation across boundaries for individuals and communities to flourish.

Using Robert Frost's poem "Mending Wall" and Wendell Berry's short story "The Boundary," Freyfogle explores the contradictions created by walls and fences. With "Mending Wall" Freyfogle reflects on our culture's fascination with walls. Yet, using Frost's poem as a metaphor, Freyfogle suggests that nature has a different view, "The frozen-groundswell spills the upper boulders in the sun and makes gaps even two can pass abreast." "Something there is, that doesn't love a wall . . . that wants it down." The singular beauty of this powerful poem, however, is how it illustrates that the stone wall, the boundary between two neighbors, also unites them in community. It requires them to cooperate each year, to walk the wall, each on his own side, and to put back the stones that nature has spilled during the winter, with one neighbor commenting that "Good fences make good neighbors."

Freyfogle concludes his evocative chapter with an examination of Wendell Berry's short story "The Boundary." Here, an aging farmer, Mat Feltner, is taking one last walk along his farm's fenced boundary. Freyfogle writes, "The fence, he worries, might have fallen into disrepair and gone unnoticed. The younger men, rushing to get the harvest done, per-

haps have been too busy to check the fence and mend it. So cane in hand Mat sets out to inspect his physical boundary, with a weariness in his bones that, for the moment, he seems to shake." Mat finds the fence in good repair, a reminder that he had no reason to fear, for those who will remain on the farm after he has died are imbued with the same love and responsibility for the farm that he has. Freyfogle uses this story to illustrate the positive values of boundaries. Berry, Freyfogle argues, speaks highly of private land ownership carefully bounded. Berry says that "land cannot be properly cared for by people who do not know it intimately, who do not know how to care for it, who are not strongly motivated to care for it, and who cannot afford to care for it." And so, Freyfogle suggests, bounded people may feel a responsibility for land within fences that, in time, allows them to feel responsibility for people and land across their own borders.

By reaching to the humanities and drawing forth writings by those as thoughtful and gifted as Frost and Berry, Freyfogle introduces the often contradictory nature of boundaries. Initially one might think that boundaries are bad, that they blur and distort the real lines across the land that nature bestows, those created by watersheds and vegetation. But Freyfogle sees the uncertainty inherent in this thinking as humans also inhabit these lands and inevitably draw their own lines. Freyfogle offers questions that later chapters address in greater detail. Are artificial lines bad? Do bounded lands also delineate levels of responsibility for people that might, in turn, foster stewardship and responsibility? Can people promote community by working together along their shared edges?

The three chapters that follow Freyfogle's chapter explore boundaries from ecological, social, and legal and institutional views. Collectively these chapters address the natural and human constructs that comprise our book. Peter Landres and his coauthors begin with a chapter titled "Ecological Effects of Administrative Boundaries." Intentionally or otherwise, "When different land-use practices are imposed on either side of the thin line of the administrative border, a distinct ecological boundary zone is inevitably created that can filter, block, or concentrate the movement of such diverse things as animals, plant seeds, fire, wind, water, and nutrients."

This chapter introduces a conceptual model that examines the boundary zone and its structural and functional attributes. Structural attributes describe the physical aspects of a boundary and include such things as the width, height, and length of the boundary zone. Functional attributes describe the flows that occur across or along a boundary and include such things as animal movements as well as nutrients, seeds, spores, and soil that are transported in air or water. Because the boundary zone differs from the area further away from the line, these flows and movements may be impeded or accelerated, but in any case, the boundary usually acts as a selective filter.

Initially boundaries do little more than delineate responsibilities and ownership. Over time, however, the effects of different land-use practices produce different ecological effects on either side of the line. Landres et al.'s model stresses that (1) management goals and actions are the primary cause of these boundary effects, (2) altered flows either into or out of an area will likely be detrimental to that area, (3) boundary effects follow a distinct temporal sequence, and (4) once established, these effects may have long-term consequences.

These long-term consequences can affect the land along the boundary (called "boundary habitat"), as well as the area away from the line (called "isolation impacts"). For example, differing land-use practices on either side of a boundary delineating a forest multiple-use area from a wilderness area may result in quite different species composition, soil erosion levels, and microclimatic conditions on either side of the line. In addition to changes in this boundary habitat, isolation impacts occur far from the administrative border. These changes may alter the overall size of the core area, affect ecological processes, and also have an impact on plant and animal populations. Changes in fire management illustrate how administrative lines can have impacts far beyond the borders. By stopping fires at administrative boundaries, plant succession, species composition, and other ecological processes are altered far from where the fires are suppressed.

The chapter offers an agenda for boundary-related research that focuses on four topics: boundary structures, fluxes and gradients along and cross these structures, filtering mechanisms affecting these fluxes, and the ecological effects both along and away from the borders. The chapter concludes with an appeal to land-use planners to be aware of the ecological effects of administrative borders and the need to develop a landscape-scale perspective when formulating policy.