

# An Introduction to the Problem of Boundaries in Ecological Theory and Practice



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**D**ivisions, boundaries, thresholds, and limits structure our lives, our concerns, and the world around us. Some of these boundaries are natural divisions: the shell of an egg, our own skin, or the ecotone where the forest ends and the prairie begins. Other boundaries arise from our actions and evaluations, from our investment of concern in some things rather than others. Along with the structures and boundaries of the natural world, the divisions of time and place, self and other, and of good and evil form the context of our actions, our decisions, and our lives. Although all disciplines of human knowledge and practice—and, arguably, all living things—draw and maintain boundaries, no discipline has yet developed that studies the nature of boundaries themselves. What is a boundary? What circumstances and context allow boundaries to form, to be put into play, to be defined, and to be maintained? What different types of boundaries should be distinguished, and how are they similar or different? According to what criteria might boundaries be evaluated and perhaps redrawn?

Of the many questions related to boundaries, two confront environmental activists and theoreticians more directly than the rest: (1) how do boundaries originate and function, especially the boundary between humans and nature, and (2) what is the role of boundaries in establishing a common framework for theory and practice? Attempts to deal constructively with these issues often suffer from a limiting disciplinary approach. By defining our problems as either economic or biological, political or philosophical, we reproduce the structure of the academy, but fail to appreciate the kind of essential interconnections that ecological thinking in particular has emphasized. Real, sustainable solutions to our environmental problems are far more likely to emerge from a truly interdisciplinary approach to core issues, one that remains true to the complex nature of the problems themselves.

Problems of boundary formation and negotiation recur at all levels, and coming to an understanding of the nature and types of boundaries poses a truly interdisciplinary challenge to environmental thinkers.

As the first sustained investigation of the problem of boundaries, this volume lays the foundation for a new, transdisciplinary field of study that involves the natural and social sciences as well as the humanities and cuts across the traditional division of theory from practice. The authors contribute a range of perspectives and approaches to the problem of developing a “taxonomy” of boundaries, a systematic understanding of the nature and types of boundaries relevant to environmental thinking. Although philosophical concerns with boundary questions are present in ancient and contemporary thought, this book explores a new focus that has received interest at the edge of many disciplines but little multidisciplinary treatment as a field of its own. The chapters in this volume make a case for this new approach—a case relevant to philosophy, ecology, geography, sociology, political studies, and a variety of related fields. By forging new ways of thinking about and working with boundaries within the context of an interdisciplinary dialogue, this investigation pursues the ultimate goal of developing practical and sustainable responses to our environmental problems.

The chapters in Part I address fundamental philosophical questions concerning the boundary between nature and culture, the nature of boundaries, and the question of whether boundaries exist apart from human interests and conceptualizations. These chapters feature the fundamental relationship between humans and nature: Is there a boundary to be drawn between the human and the natural and, if so, how should it be conceived? To what extent is the “environmental crisis” a consequence of our “natural” tendencies as humans, and how does this influence our strategies for responding to environmental problems? The chapters in Part II examine the formation, discovery, maintenance, and measurement of boundaries in relation to the various projects of sustainability: What roles do circumstances and context play in the institution, negotiation, and maintenance of boundaries? According to what criteria might boundaries be evaluated and perhaps redrawn? While the chapters in Part I are principally concerned with theoretical issues present in ecological thinking, those in Part II are mostly concerned with problems in ecological practice.

The first three chapters directly address what may be the most basic boundary problem of all: how to understand properly the human/nature divide. These chapters focus on the origin of the human/nature boundary, its philosophical justifications, and the implications of this boundary for environmental theory and practice. In the opening chapter, “Boundaries and Darwin: Bringing the Great Divide,” Max Oelschlaeger claims that the Great Divide—Western culture’s dominant narrative placing humanity and culture

separate from and superior to nature has become pathological and is currently leading us to disaster. Because of the Great Divide we conceptualize and address environmental problems in the wrong ways. We have spent billions on environmental litigation under the Superfund Law while only a fraction of that on pollution prevention. Several billion dollars annually are spent on fire suppression in fire-adapted public forestlands, while only a few tens of millions per annum go toward restoration projects that would re-establish fire as a natural disturbance regime.

Oelschlaeger writes that changing a story that “constitutes cultural bedrock” will not be easy as it calls for a revolution in human self-understanding. He claims that even though Darwin’s work has shown that the Great Divide is scientifically untenable and ethically bankrupt it has nevertheless, “through the history of effects, become a defining characteristic of the human condition.” By recognizing the Great Divide as an artifact of language that is maintained by a categorical separation of culture and nature, reinforced by a value-hierarchical understanding of the pair, and metaphysically grounded by mind-body dualism, Oelschlaeger argues that we are able to tease this old story apart and reweave it with new themes, ultimately constructing a new legitimating narrative that begins with Darwin and ends in a transformation of human self-understanding.

In the second chapter, “Lamarck Redux: Temporal Scale as the Key to the Boundary Between the Human and Natural Worlds,” J. Baird Callicott argues that the division between nature and culture may be traced to differences between the temporal scales and cultural and biological evolution. Cultural evolution proceeds at a radically different pace from the biological evolution of species; it is much faster than the evolution fueled by natural selection because it is Lamarckian, not Darwinian. What renders strip mines, clear-cuts, and beach developments unnatural is not that they are anthropogenic—for, biologically speaking, *Homo sapiens* is as natural a species as any other—but that they occur at temporal and spatial scales that were unprecedented in nature until nature itself evolved another mode (the Lamarckian mode) of evolution: cultural evolution. This insight allows us to recognize today’s mass extinctions as a boundary violation of these differing temporal scales, to establish norms for environmental ethics, and to defend conservation biology’s classic norm of naturalness.

In the next chapter, “The Ethical Boundaries of Animal Biotechnology: Descartes, Spinoza, and Darwin,” Strachan Donnelley argues that environmental thinking must address the moral significance, integrity, and flourishing of natural communities of organisms and ecosystems. But recent biotechnology, by blurring the boundary between the natural and the artificial, raises significant theoretical problems for any attempt to safeguard what is natural. To address these issues, the roots of our current thinking must be

reexamined, and the appropriate starting point is with the traditional debate between Descartes and Spinoza. Donnelley argues that a Spinozistic cosmology, based on the notion of internal relations and a conative conception of existence, has decided philosophical advantages over the Cartesian metaphysics of separate substances that dominates contemporary thought. This alternative metaphysical perspective makes possible ethical judgments that respect the integrity and well-being of ecosystems and animal populations, as well as the naturally evolved, conative capacities and behavior of individual organisms.

The following three chapters focus on the question of what kinds of boundaries are found in nature and which sorts of boundaries are a product of human interests and conceptualizations. In chapter 4, "Cutting Nature at the Seams: Beyond Species Boundaries in a World of Diversity," Jon Jensen critically examines the pivotal role given to the category and concept of species within contemporary biology and environmental policy. Using the cases of wolves in the Northeast and Salmon in the Northwest as his central examples, he focuses primarily on two questions: (1) Is the special role allocated to the category of species consonant with a fully evolutionary perspective? (2) Is a species-based approach sufficient for protecting the full range of biological diversity and the evolutionary and ecological processes on which it depends? Jensen argues that, although species are real, they are not the basal units of either taxonomy or evolutionary theory and are consequently not "special" in the way that much science and conservation policy implies. Rather than seeing this conclusion as a threat to the Endangered Species Act, however, Jensen argues that his approach would strengthen conservation efforts by extending the focus of such efforts up to ecosystems and ecological processes and down to populations and evolutionary units.

In chapter 5, "Respect for Experience as a Way into the Problem of Moral Boundaries," Charles S. Brown argues that the contents of our moral experiences, if studied seriously rather than dismissed as irrational sentiment, offer clues for the development of a moral rationality inherent in our moral intuitions, and that this moral rationality points toward new ways of including the nonhuman within the boundaries of the moral community. According to Brown, our thinking is currently dominated by an instrumental rationality that dismisses moral sentiments as subjective and private, thereby making moral philosophy in general and environmental ethics in particular impossible. The theory of moral rationality that Brown develops provides an alternative to this instrumental thinking, and he explores the consequences of this new rationality for ecological philosophy and environmental ethics.

In the final chapter of Part I, entitled "Boundarylessness: Introducing a Systems Heuristic for Conceptualizing Complexity," Beth Dempster develops a boundaryless system model, which she terms "sympoietic," as an alternative

to traditional systems heuristics that emphasize the importance of boundaries. Avoiding the tendencies toward binary opposition and restriction of focus that accompany traditional system heuristics, the sympoietic system is complex, boundaryless, and collectively producing. Dempster contrasts the sympoietic with the autopoietic system proposed by Maturana and Varela while arguing that the sympoietic system is more productive for understanding self-organizing systems like the West coast temperate rainforest and the wasp/orchid symbiosis. Her search for richer metaphors to describe the interconnected and interdependent nature of social-ecological systems lead her to examine Deleuze and Guattari's "decidedly sympoietic" notion of "rhizome."

These chapters are concerned with the nature/culture boundary as well as the boundaries within nature that affect the practical goals of conservation, including the way we construct the boundaries of the moral community, and finally with the prospect of creating a boundaryless system heuristic to better conceptualize complexity. In the next group of chapters, the emphasis on the conceptualization and construction of boundaries that affect ecological practice recedes while the concern with practical and value issues stemming from the interaction of human communities with the natural world comes to the fore. The next four chapters explore how the generation, maintenance, and negotiation of boundaries inform our understanding of the natural world and our place in it. These chapters address the relationship between the natural world and community practices and values, as these practices and values are shaped by religious, economic, scientific, and political considerations. The final three chapters focus on problems of global environmental accounting and food production, with a view toward developing alternative cultural and social practices that support an ecologically sustainable future.

In "Boundaries on the Edge," Irene J. Klaver focuses on the "edge" of boundaries—the functional dynamic of boundaries as places of potential transition, transformation, and translation. She explores this insight through Wittgenstein's notion of understanding as the "seeing of connections" and his emphasis on the importance of intermediate cases in this process. In working out various strategies to develop intermediate cases as boundary processes she shows how boundary objects as diverse as ecotones, watersheds, corridors, the Berlin wall, coyotes, green eyes, and bird migrations facilitate understanding and collaboration across heterogeneous groups. She argues that the oxymoron, as a co-presence of two mutually exclusive meanings, challenges dualistic modes of thinking and is mirrored by the ecotone, the area where two different ecosystems meet. Her focus is not on the boundary as simply a line of division but on the power of boundary as an area of co-constitution.

In "Remapping Land Use: Remote Sensing, Institutional Approaches, and Landscape Boundaries," Firooza Pavri surveys current approaches to

conceptualizing landscape boundaries using imaging technology and institutional techniques. She develops an original framework for linking the information generated by both approaches to arrive at a more ecologically and institutionally meaningful understanding of the boundaries that emerge in land use and management. Pavri argues that while satellite imaging data has proven invaluable for resource management that aims to maintain ecological stability and safeguard local livelihoods in sensitive forest areas, such data is of limited value without a firm understanding of the institutional factors affecting forest use, as revealed by the complex socioeconomic interaction patterns of forest use and extraction observed on the ground. Her chapter discusses the promises and challenges of using remote sensing technology to monitor changing land use and land cover patterns in the forest regions of developing countries.

Anna L. Peterson's "Boundaries, Communities, and Politics" examines the concept of community, its political implications, and the role that common frameworks and boundaries play in the constitution of actual communities. To this end, she describes in detail two religiously grounded rural communities: the repopulated communities in northern El Salvador and the Amish and Mennonite communities in the U.S. Midwest. These descriptions concentrate in particular on each community's relation with the natural world and with structural social change, as well as the role religion plays in shaping these relations. On the basis of her descriptions, Peterson explores the similarities and contrasts in how each community constructs and maintains boundaries, when and how these boundaries are crossed, and if and how the communities manage to address urgent political, economic, and environmental problems that they face.

The following chapter, "The Moral Economy and Politics of Water in the Arid American West," by T. Clay Arnold continues the theme of human communities' relations to the natural world by arguing that a proper understanding of the role of water in the arid American West requires recognition of water's value above and beyond its economic utility. He contends instead that water must be understood as a "social good" because it establishes, reproduces, and symbolizes important individual and collective senses of self. As a social good, water carries politically significant normative features that inform westerners' determinations of the legitimacy or illegitimacy of water-related practices and policies. Consequently, the case of water demonstrates the need for a conception of "moral economy" lacking on the current horizon of political theory. Through a detailed analysis of the historical and current treatment of water in western culture and policy, Arnold contrasts the moral economical account of such community practices with standard explanations in terms of elitist, pluralist, institutional, and market culture dynamics and imperatives.

Wes Jackson and Jerry Glover argue in “The Need for a Taxonomy of Boundaries” that we currently lack a formal language that bridges the middle ground between the bookkeepers of business, concerned with profits according to standard economic models, and global accountants, those whose task must be to measure the impact of our extractive economy on the depletion of the earth’s natural capital. This formal language must be developed starting from a “taxonomy of boundaries,” specifying in particular the gap between our boundaries of consideration—what we consider relevant in making a decision or taking an action—and the boundaries of causation, the effects that our action will actually have over time. For Jackson and Glover, traditional models of accounting fail to address this “middle ground” between our economic system and the global environmental crisis, as they are caught up in a “knowledge-as-adequate” worldview that overestimates our ability to predict the long-term effects of our industrial and agricultural activities. Jackson and Glover put forward the example of egg production to explore what may be learned from this project of middle-ground accounting, comparing the wild, domestic, and industrial egg production systems to discover what boundaries and costs each system masks.

In “How to do Things with Food: A Plea for Multiple Ontologies,” Bruce Hirsch explores changes in the foundation world that are opening new directions for philanthropic support of research into ecologically sound agriculture and food production systems. In order to have an effect on environmental policies and agricultural practices, Hirsch notes, it is first necessary to have an adequate conception of social change and its relation to individual values and priorities. Drawing on Heidegger’s account of human existence as “being-in-the-world,” Hirsch develops an account of our relation with the world that emphasizes the role of our performative and public acts of disclosure—acts by which our identity is formed and the world is disclosed to us from a certain perspective, but of which we are not necessarily self-consciously aware. Hirsch explores ways that philanthropic organizations, by recognizing this disclosive aspect of our relation to the world, can encourage a change in social practices that would, in the long run, shift the human relationship with nature toward a more sustainable pattern.

Ted Toadvine’s final chapter, “Culture and Cultivation: Prolegomena to a Philosophy of Agriculture,” identifies agriculture as the fundamental boundary or point of transmission between nature and culture. Examining the etymology of the word “cultivation,” he discloses a fundamental ambivalence toward agriculture, as the origin of culture that is, simultaneously, excluded from culture. Toadvine seeks the fundamental meaning of the agricultural way of life, first by exploring the symbolism of the seed, which marks an alteration in the human orientation toward temporality and death. Turning then to the work of Joseph Campbell, Gilles Deleuze, and

Félix Guattari, he investigates the notion of animal and plant modes of life, as expressed by the different relations that human societies adopt toward death and the natural world. Drawing on these resources, Toadvine suggests a “rhizomatic” agriculture that might serve as an alternative to our traditional seed-based agriculture (and culture more generally). A rhizomatic approach, he suggests, would be nondualistic and essentially multiple, encouraging both diversity and sustainability.