Natural Resources
and the
Informed Citizen

second edition

Steve Dennis

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For the Porches

Who keep me going

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Preface

Everything on Earth can be considered a natural resource. Air, water, land, and energy combine to create a myriad of resources that we manipulate to meet our needs for survival and a quality existence. Our uses of natural resources connect to an ecological web of causes and effects. What we do creates change.

The Earth has been changing throughout its life. The alterations that we initiate occur in an environment already in a constant state of change. As we learn more about the way the world works, we gain a keener perception of how human-caused change fits into the big picture. We also gain an understanding of how we can improve our lives by working with the Earth, rather than working on it.

What we know, however, is not always reflected by what we do. We know, for example, that there are limits to the bounties of the oceans. Yet we harvest fisheries to the brink of extinction. We know that the internal-combustion engine emits gasses that are incompatible with respiration. Yet we build even more automobiles for the benefit of mobility. Why would intelligent critters like humans make these kinds of choices, before we are clear on their consequences? There is any number of answers to this question, but several factors tend to weigh strong on this paradox. One, we have incomplete information. We aren't exactly sure that a choice will have dire consequences, but we can easily envision the benefits that our action might create. So, not knowing everything, we are willing to take the chance to obtain the benefits. Two, we tend to act in self-interest. The benefit that we can derive is more important to us than the cost it might impose on something or someone else. Consequences are not always immediate, so we postpone them and hope they will go away. Three, there is never complete agreement on what we do. People differ in their points of view, and what will seem like a great idea to one group may be the most boneheaded notion ever contrived according to another. These factors influence the choices we make and the courses of action we pursue. They are part of why there is considerable disagreement about the way we should use natural resources.

Being disagreeable is not an effective means to move toward improving the condition of the world. To survive and to improve the quality of life, choices must be considered, decisions made, and actions taken. Disagreeing parties must compete and compromise. This process isn't always pretty. At its worst,

the process becomes war. At its best, the process brings about improved conditions for all.

In this modern era, we try to think through the good and bad of activities that use natural resources. We all have a large stake in the welfare of natural resources; so thinking things through is an important task. We do this thinking and communicate our thoughts to one another so our decision makers will make good choices.

We have a lot to think about. Our interactions with natural resources have many effects. Environmental and ecological effects are coupled to economic changes, social impacts, historical trends, scientific conjecture of the future, and the worldview we define through our philosophical, moral, ethical, and spiritual perspectives. These values are brought to the decision-making table by all of us: the stakeholders and barterers. What we do at that table determines our futures, and the futures of all who will follow.

In the decade since the publication of the first edition of this book, the struggle over the use, conservation, development and preservation of natural resources has continued as strongly as in the past. New or increased emphasis has been placed on the debates over global warming, depletion of fossil fuels, and the long-term sustainability of western lifestyles. Evident in the first decade of the twenty-first century is even greater disagreement, more polarization in the political processes surrounding our relationships with natural resources. This is perhaps indicative of the economic concept of scarcity. As things become scarcer they become more valuable. Human levels of consumption have only increased in the last 10 years, without a commensurate increase in the supplies of natural resources. Thus rising scarcity is magnified by continually rising needs. The values for natural resources grow stronger. The conflicts over their stewardship intensify.

The purpose of this book is to introduce some of the processes through which people make decisions about using natural resources. Every one of us has an equal stake in the decisions that are made; yet we differ greatly in our involvement in the processes. Our involvement ranges from activism to apathy. Understanding the processes makes us better thinkers and participants. We can make better decisions when we move closer to being "informed citizens."

Any book professing to engage the topic of natural resources must admit to the huge spectrum of approaches that can be taken to the subject. To study natural resources, one can pursue chemistry, biology, geology, oceanography, ecology; any conglomeration of "natural," "earth," or "geosciences"; professions from forestry and range conservation to wildlife or parks management; economics, political science, geography, history, or other "social sciences"; or humanities from philosophy to religious studies, from literature to art. One of the beauties of our worldview of natural resources is that we look at them from all of these fascinating perspectives. The study of natural resources is truly an interdisciplinary endeavor.

This book looks at the way we make decisions about natural resources in the United States, so it is mostly a political perspective on the subject. It is unfortunate that politics has achieved a negative connotation in this day and age. The term derives from the Greek polis, for city. City implying people, politics became the art of getting along. Webster's defines politic as "having practical wisdom." Thus it seems that a political perspective may not be such a bad way to look at things after all. To take this view, it is necessary to consider history, and to patch in some economics, law, communications, philosophy, environmental science, and fundamentals of resource management practice as employed by the resource professions. The book does not attempt to cover these areas in depth. It is an introduction, intended to create a foundation of awareness and to motivate the reader to further study and involvement. Think of reading this book as acquiring your sea legs in the early stages of a long voyage.

The book is broken into four major parts: (1) Introduction and historical background, (2) Governmental structure of resource management, (3) Citizen participation in resource management policy; and (4) Resource management practices. In part 1, chapters 1 through 4 set the stage for our dealings with natural resources by looking at how we value them and define our possession of them. Chapter 2 quickly reviews the pressures humans place on resources, assuming the reader will have ample exposure to these immense environmental issues from other sources. Chapter 3 presents the issue of outdoor recreation impact as an example of resource use with which many of us have firsthand experience. Chapter 4 takes a historical look at how America's views of natural resources have evolved over time. In part 2, chapters 5 through 13 provide an overview of how we have structured our governmental institutions to manage natural resources. Chapter 5 introduces the federal resource-managing agencies. In chapter 6, we are reminded of what we learned about the federal government in high school civics class. Chapters 7 to 11 explore the federal resource agencies in greater detail. Chapter 12 presents California's resource agency structure as an example of state authority over natural resources, and chapter 13 describes how special districts and local government play their roles in managing natural resources. Part 3 looks at how citizens become involved in the politics of resource management. Chapters 14 through 17 investigate social movements that have changed our views of natural resources and the mechanisms by which citizens influence resources policy and practice. Part 4 provides an overview of resource management practices and why they can be controversial. Chapters 18 through 22 explain the principal methods of forestry, range, wildlife, water, and minerals management. Additionally, controversial aspects of these resource management practices are described. The final two chapters of the book include a description, or profile, of an "informed citizen," and a brief essay welcoming the informed citizen to the natural resources decision-making table.

For quick reference, the book contains a glossary. Selected terms are printed bold-faced within the text on their first appearance, which denotes that the term is included with a brief description or definition in the alphabetized glossary. Additionally, in Appendix A there is a list of selected Internet sites that can provide access to information on government agencies and citizen organizations involved with natural resources.

I hope this book will stimulate your interest in natural resource and environmental issues. I have attempted to provide an unbiased view of the issues, presenting varied perspectives on those that are discussed. I admit I'm a strong believer in intelligent resource stewardship and acknowledge that the reader may notice this leaning here and there. This book is not intended to win you over to one way of thinking. The book's purpose is to start a foundation from which readers can further pursue their own interests in resources management and the environment, and become involved as informed citizens.

Steve Dennis
February 2, 2012
Chico, California

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About the Author

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chapter one

The Values of Natural Resources

We all depend on natural resources. We consume, waste, and recycle natural resources constantly. To survive, we require air, water, food, and shelter. To thrive, we require energy and mental satisfaction. The planet on which we journey through time and space has the resources we need to survive. Some are in abundance; some are scarce. Some are what we call renewable natural resources, and some are by nature nonrenewable natural resources. Renewable resources are those that are produced as well as consumed. Nonrenewable natural resources are either expended when consumed, or they are produced so slowly that they become scarce or disappear because production cannot keep pace with consumption. Fresh water is an example of a renewable resource. Coal is an example of a nonrenewable resource. What are the differences in the way these two resources are produced that make one renewable and one nonrenewable? What is the relationship of scarcity to renewability and nonrenewability? Is fresh water scarce even though it is renewable? Is coal scarce because it is nonrenewable?

We are inextricably tied to natural resources. We might live a couple of minutes without air, a few days without water, a few weeks without food, and—depending on terrestrial latitude, elevation, and season—minutes or years without shelter. Beyond basic survival, our economies are tied to the production and consumption of natural resources: the building of houses, growth and dissemination of food, and manufacture of widgets for gadgets. Further, we share an intimacy with resources that affects us as emotional and social beings. Resources can wreak havoc, such as a flood or forest firestorm, or they can delight, such as the view of Yosemite Falls, a quiet lake canoe ride, or shredding powder on a snowboard.

Resources are essential. Resources can be scarce. The management of natural resources is critical to the quality of our lives.

Consider the "Resources-Needs" Matrix...

	Air	Water	Food	Shelter	Energy	Quality of Life
Air	Respiration	Evaporation and precipitation	Refrigeration	Heating and air conditioning	Wind electrical generation	Air quality
Water	Evaporation and precipitation	Potable water management	Irrigation	Waste management	Hydroelectric generation	Water-based recreation
Land	Oxygen production (photosynthesis)	Water distribution systems	Agriculture	Forestry	Fossil fuels power generation	Parks
Energy	Ventilation systems	Desalinization	Cooking	Heating and air conditioning	Solar power generation	Transportation

Figure 1.1. The Resources–Needs Matrix provides examples of how we use, manipulate, and protect earth resources to meet human needs.

Forests and rivers exemplify renewable natural resources.
(David E. Simcox Collection)

The interaction of humans and natural resources is as simple as the way the items in the left column are manipulated to meet the needs across the top of the matrix. Once you start thinking these interactions through, however, the complexity expands in a hurry.

Think of the history of humanity's struggles to obtain natural resources. Hunter-gatherers relied on the uncontrollable supply of wild game and vegetation for food, the seasonal vagaries of climate for water, and the availability of natural structures or materials for shelter. Scarcity of these resources immediately equated with death, so hunter-gatherers learned to tap the abundances of resources: moving along migration routes of important game and occupying areas of plentiful water supplies. Learning of these patterns helped people come to understand the opportunities presented by planned agricultural practices, diversion of waters, and the benefits of a less nomadic existence. The eventuation of civilization required this learned harnessing of natural processes, the hand of the human in manipulating resources to his desires.

But scarcity has always plagued people. The distribution of natural resources has never been even, or consistent. Resources could never be fully harnessed, never fully cooperative with human needs. And then there were those who had, and those who did not. Portable resources such as foodstuffs, stones, shells, and other items that could be pulled, or packed on head or back, became trade goods, allowing for the movement of resources among and between peoples. But those resources that could not be easily moved, such as water, soil, and favorable climate, became the bounty of some, while others fought the battle against scarcity. It is no small wonder that most of history's wars have been for the conquest of lands, trade routes, and power over ownership and distribution of natural resources. The haves protecting the security of their resources base, and the have-nots struggling to obtain resources for themselves. On a scale ranging from a farmer's rights to diverted creek water, to World War II, the struggle for control of natural resources is a fact of our lives. It is the way we handle these struggles that will mark our success as a species.

Mineral resources are considered nonrenewable. (David E. Simcox Collection)

The moral of the story at this point is simply this: We (that's all of us) need to be effective **long-term** stewards of *our* natural resources.

So who owns natural resources? One of the most interesting aspects of natural resources is the concept of their ownership, and the implications that ownership carries for the ways resources are managed. Some resources are what we refer to as common. These are resources that are essentially owned by all of us. The easiest examples of common resources are solar energy, air, and the oceans' waters. Another form of ownership is state owned or managed. These would be resources controlled by governments. Examples of state ownership here in the United States include the National Forests, minerals beneath government-managed lands, and wildlife. The third form of resource ownership is private, including corporate possession. Examples of private ownership include title to property such as a private residence, rights to a water supply, or lands owned and managed for timber by a corporation like Weyerhaeuser.

Ownership does not mean absolute control. Instead it refers to a **bundle of rights.** Owners possess certain rights not enjoyed by non-owners. But owners do not possess all rights to specific resources. Let's look at the three main types of ownership to learn how the bundle-of-rights concept operates.

Property ownership has become a focal point for natural resource issues.
(Steve Dennis)

Common resources are owned by all, but their use can be regulated by governments, blurring the distinction between common and state ownership. Air is a common resource. We all use air to breathe, and we could not survive without it. But what other uses do we make of our air? We use air for combustion in automobiles. In that process we produce toxic materials that are released into the air. Air is thus used as a waste treatment mechanism, and we must regulate the release of pollutants in an attempt to maintain good air quality. We use air as a means of travel for planes and regulate its use for safety and national defense. Water in the oceans is common to all of us, but nations maintain zones of control over fishing rights, dumping of waste, and treaties over the harvest of marine mammals and other species. So even though common resources are shared by all people, they are not completely unregulated. The degree and enforcement of regulations, however, varies widely among countries.

State-owned or -regulated resources are managed to control the problems presented by scarcity. Scarcity really means two things: (a) if unregulated, resources can quickly be exploited to ruin or loss and (b) scarce resources can be highly valuable. Wildlife is a good example of a state-regulated natural resource. Years ago, as uncontrolled hunting and harvest of wildlife increased its scarcity or led to extinctions of certain species, governments stepped in to control the taking of wildlife, and acquired title to lands to manage as wildlife refuges. People still fish and hunt, but the amount of these harvests is controlled in order to maintain sustainable populations. Poaching (illegal harvest) remains a severe threat to wildlife despite governmental controls. Another good example of a state-owned or -managed natural resource is a national park such as the Grand Canyon. The Grand Canyon is scarce, because there aren't many comparable ditches of this magnitude. It is also a surprisingly fragile resource, so the National Park Service regulates what people can do there. But the flow of water through the Grand Canyon is controlled by another federal agency (the Bureau of Reclamation); private companies own most of the permits to float through the canyon on the Colorado; and tourist air charters enjoying the scenery from the air are regulated by the Federal Aviation Administration (FAA). Although complex, state ownership of the Grand Canyon has preserved the resource, preventing damage from mining, further hydroelectric development, and an overabundance of tourist attractions.

Private ownership implies that an individual or corporation has most of the bundle of rights associated with a resource or property. It is important to remember that this does not imply that the private owner possesses all rights. Home ownership provides a good example of private property rights. Certain rights to most private property are regulated by the state. In a California subdivision, I may not be able to operate a boat yard, even though I have room. Under a regulation mechanism called **zoning**, the local government has the power to prevent such a use of my yard, basically for my neighbors' sake. This action underscores the concept that the **welfare of the community** is more important than my individual desire to operate a boat yard. Similarly, I'd like

to sit down to a venison dinner from the deer that has enjoyed our vegetable garden this summer. Even though the deer is on our property, I don't own it and can't legally shoot it. Deer run a little unclear on the concept of trespass. Throw in the fact that the true owner of our home is actually a rather faceless mortgage corporation, and you can begin to see the complications of ownership. It is enough for now to say that the struggle between individuals for their rights to private property, and governments for their rights to regulate the use of that property, is one of the major themes of this book. Understanding this struggle and how it operates is a crucial step for a citizen to take in becoming an effective resource steward.

Values are another force shaping our definition of natural resources. We value (or place importance) on natural resources for a wide variety of reasons. These values can be categorized as strategic, commodity, aesthetic, and moral. What makes this fun is that we don't all share the same values. One person's commodity value for trees as timber is likely in conflict with another person's value for trees as an aesthetic resource. The decline in salmon populations in the Pacific Northwest is partially blamed on timber harvest practices, thus there is a conflict in values over forests as commodities, and as part of the mechanism of water quality. Our values for natural resources define the ways we'd like to see them used. Between 50 and 60 years ago, people's value for water and hydroelectric power was such that plans were drawn up to build dams on the Colorado River inside Grand Canyon National Park. People who valued a Grand Canyon bottomed by a river rather than a reservoir fought the dam-building faction and kept dams out of the Grand Canyon. Glen Canyon, however, was dammed in the 1960s, backing Lake Powell for 195 miles up the Colorado, northeast of the Grand Canyon. Glen Canyon was not as well known nor as highly valued as the Grand Canyon. The construction of Glen Canyon Dam was an expression of values for those resources in the 1950s and 1960s. It is perhaps unlikely that the same dam and reservoir would be built today. Values change. The maintenance of ecosystems and the protection of biodiversity are more highly valued today than they were a couple of generations ago. Let's take a closer look at some values for natural resources.

Strategic values include views that certain resources must be managed as part of some strategy to maintain or improve some condition. The strategy could be to maintain control over a resource such as oil. Oil is strategically important, as so much of our commerce and electrical supply is dependent on it. A wildlife refuge is likely strategically valued as a habitat for one or more species.

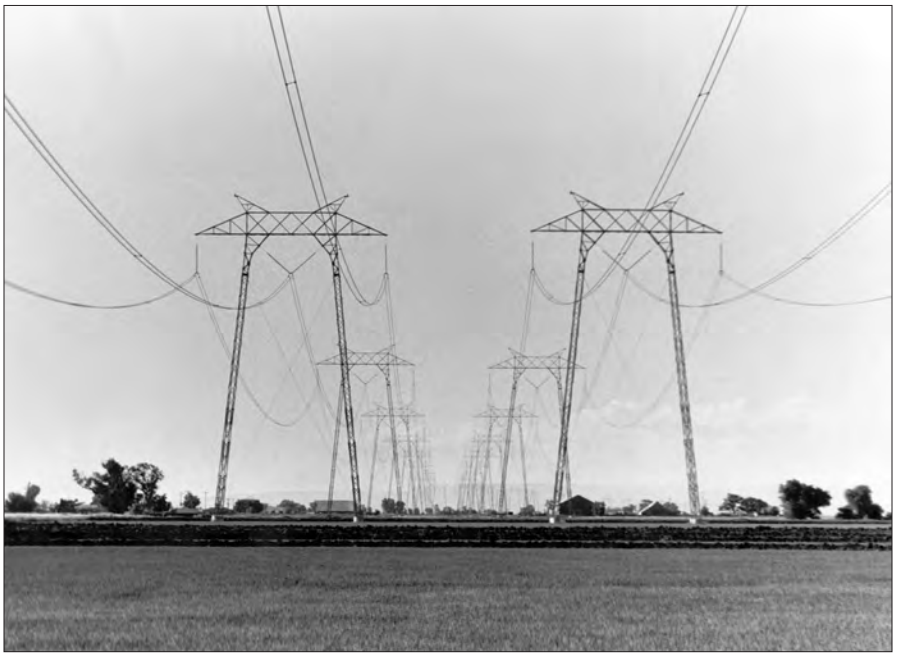
Commodity values consider resources as goods that can be developed for products. This set of values recognizes the utility of resources as raw materials. A commodity value for a forested area would be to believe that a stand of trees in that forest would be best used as lumber to build houses. A commodity value for a river would be to see its energy as potential for hydroelectric power generation, and its water as irrigation for agriculture.

Glen Canyon Dam on the Colorado River created the second largest reservoir in the United States, backing waters 195 miles upriver.
(David E. Simcox Collection)

Aesthetic values see resources for their beauty. It is often aesthetic values that prompt efforts to preserve resources as parks and preserves. An aesthetic value for a forested area would be to prefer its use for hiking, camping, and nature study. An aesthetic value for a river would be to see its best use as a fishing area, as a waterway for canoeing or kayaking, or as a vista suited for scenic contemplation.

Moral values for resources include a broad array of perceptions that resources should be treated ethically and morally. Moral values view resources not only for their utility to humans, but also for their importance as elements of the earth. Moral values can include conflicting points of view. One view might hold that it is wrong to kill animals, while another may hold that the killing of animals is appropriate as part of humans' "dominion" over nature. Moral values include the ethical standard that we must save resources for future generations. An expression of moral values is found in the adage: "We do not inherit the earth from our ancestors; we borrow it from our children."

Values for natural resources are constantly changing, ranging from apathetic to vehement, and always providing conflict. We all see resources as what we want from them, whether that is economic gain, spiritual refreshment, or hope for our grandchildren. When values are strongly held by large numbers of people, the bundle of rights implied by ownership can become more flexible, and negotiation may rearrange ownership rights to more closely match the values of groups other than the owners or managers. Even private property rights can be adjusted, though not without constitutional consequences. This is a really important concept to keep in mind. This is the way our National Parks were set aside. Citizens, through their congressional representatives, changed



Electrical energy is produced using both renewable and nonrenewable resources. (John Cowan Collection)

the bundles of rights to lands that were declared to be National Parks. Through similar action, our National Parks could be irreversibly changed in the future.

We are all just temporary stewards of our lands, waters, and resources. Ownership comes and goes as lands are purchased, taken by conquest, set aside "for the people," or redefined for special purposes. In peacetime, most resource ownership exchanges take place as purchases and redefinition through litigious, legislative, and regulatory processes. People, citizens, are the players in these processes. We are all affected by the decisions over stewardship of natural resources, and we all have roles to play in this drama throughout our lives.