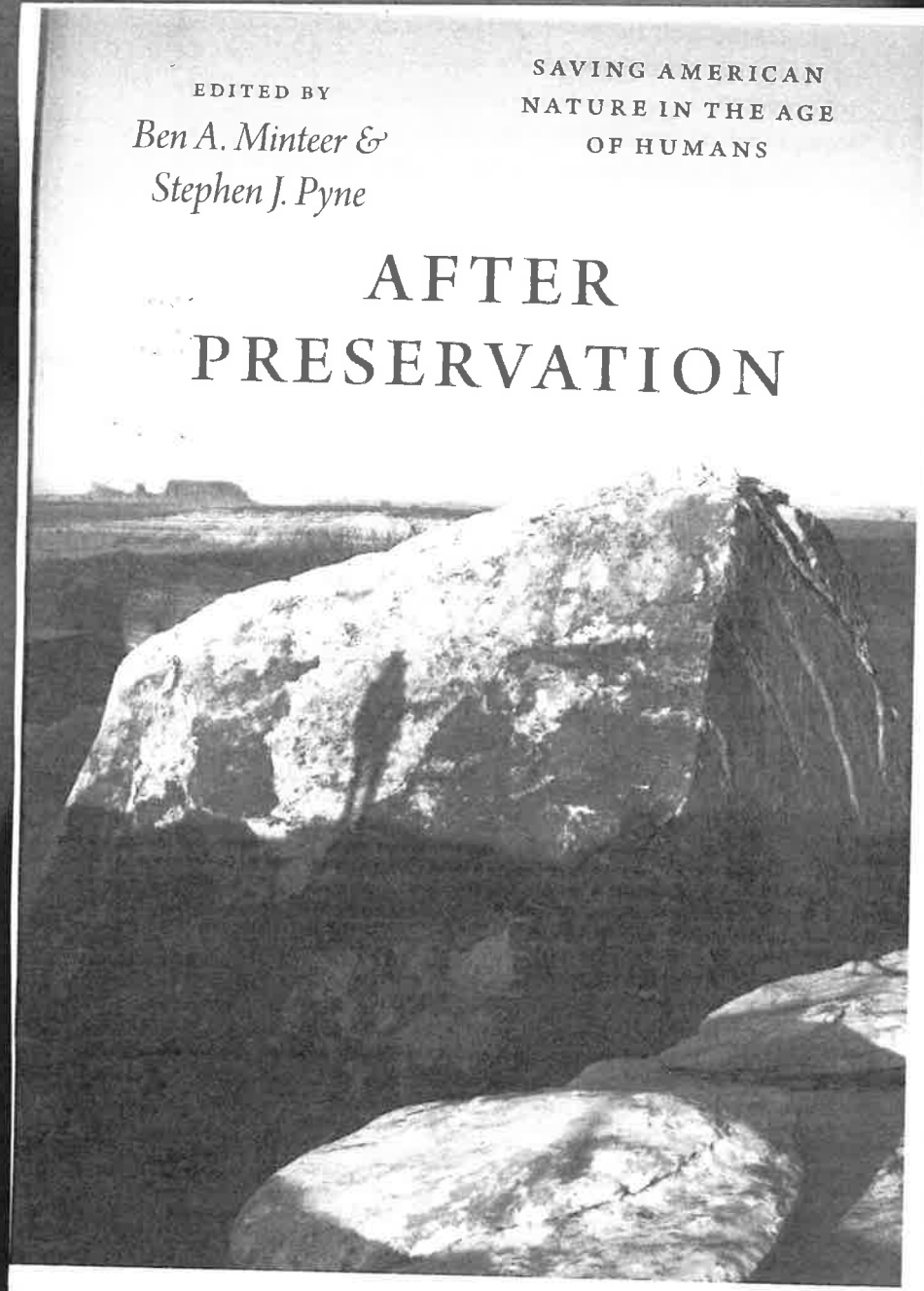

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Celebrating and Shaping Nature

CONSERVATION IN A RAPIDLY CHANGING WORLD

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Nature has become an increasingly ambiguous concept in the rapidly changing, human-dominated world in which we now live. Nature might be idealized as wilderness—a pristine landscape or seascape without people, whose dynamics are shaped only by "natural" processes, unaffected by human actions. Alternatively, nature might be viewed as everything except built infrastructure, including urban parks and the lawns and channelized streams of a suburban subdivision. I suggest that both of these conceptualizations, and everything in between, are valid representations of nature and in many cases can motivate stewardship—the shaping of pathways of change to foster social and ecological resilience and well-being. It matters much less "what nature is" than what it means to us and how this meaning influences our behavior. Let's explore the limits of naturalness, and then think about how a spectrum of views of "nature" might influence people's attitudes about stewardship and sustainability.

Many traditional conservation programs have focused on the wilderness end of the spectrum, seeking to minimize the human footprint. Within the United States, Alaska, where I live, might be considered the epitome of wilderness. However, people have been an integral component of Alaskan ecosystems for at least 10,000 years, just as in other North American ecosystems prior

to Euro-American colonization. Both deliberate efforts to eliminate or displace Native Americans and inadvertent depopulation through exposure to new diseases radically reduced Native American population density. The settling of the West was, in part, intended to fill and use these "empty" lands and later to set aside some of them as wilderness "untrammeled by man, where man himself is a visitor who does not remain," in the words of the 1964 Wilderness Act. However, the emptiness of these lands was largely an artifact of colonization. A more representative description of wilderness over the last 10,000 years would be lands inhabited by people who depend on and interact with those lands for food, shelter, and cultural identity. Wilderness management that builds a sense of human connection to these places, rather than protecting them from people, would seem like the most appropriate framework for stewardship. Prehistorically, many of these wildlands had areas of very low population densities, where management to minimize human impact would still be appropriate. Here the challenge is to foster a sense of place and respect for nature that connects people to these lands in a nondestructive way. This might be done by encouraging hiking, canoeing, and widespread exposure to films that allow people to experience and appreciate these lands respectfully with minimal impact on the capacity of these lands to adjust to inevitable environmental changes such as changes in climate or disturbance regime.

At the opposite extreme, people living in cities are surrounded by built infrastructure that covers the land and invisibly channels waters beneath impermeable surfaces. The built infrastructure is the primary focus of people's activities, although lawns, parks, cemeteries, and gardens, mostly dominated by exotic species that are well adapted to urban environments, can be important places for family activities, community interactions, or sources of memories that tie people to the landscapes of their historical roots and therefore to their sense of identity. Conservationists largely ignore urban and suburban nature, which falls within the

domain of landscape architects who tend to treat it as an aesthetic or functional extension of the built environment, whose primary purpose is to serve societal needs. Here the challenge is to encourage the more regular engagement of people with these natural elements and to provide a complement to built infrastructure as a venue for life's experience. Urban gardens and parks, suburban trails, and stream cleanup projects provide opportunities for people to engage in urban nature.

Other parts of the United States are intermediate, with forests that regenerated after logging, agriculture, or mining and channelized streams and farm ponds that are later left to their own devices. The functioning of these ecosystems often has a strong legacy of their earlier human impacts, with a plow layer beneath a forest soil or a forest organic layer beneath a pond. In these places, species composition is likely to be a hybrid of many former ecosystem types, or the composition may be largely novel. Yet this is where most American kids fish and find frogs, families go on picnics, and lovers look for solitude—if they interact with nature at all. Much of the nature that surrounds the San Francisco Bay area, for example, is dominated by Australian *Eucalyptus* and European grasses, but it is highly valued by urban people seeking to spend time in nature. The challenge in these ecosystems of intermediate human impact is to celebrate their current ecological beauty and function and their current and future capacity to envelope people in nature. In terms of the area of nature in the United States and total number of people who are likely to experience and identify with nature, these may be the most important opportunities for stewardship. These areas provide opportunities for all people to interact with nature and allow us to learn from the huge number of human, environmental, and biotic "experiments" that have altered these landscapes and seascapes in the past and will continue to do so in the future. This provides many pathways to introduce or strengthen the ties between people and the rest of nature and to learn from these interactions.

Natural ecological processes, such as disturbance, competition, predation, nutrient cycling, and energy flow shape the species composition and functioning of ecological systems across the entire spectrum of naturalness, although with quite different controls and dynamics. In developed areas, there are islands of relatively unmodified ecosystems in a matrix of novelty. In areas with sparse human population, there are islands of human disturbance in a matrix of "wilderness." Across this spectrum the islands and matrix interact, so that each changes the other. Superimposed on these novel landscape mosaics are changes in climate and development, which increase the likelihood of species introduction and movement and therefore the interactions between island and matrix. These dynamics suggest that no ecosystem is likely to maintain its historical structure or function and that those ecosystems with which people are most familiar are likely to have changed substantially from their historical analogues. At the same time, the dynamics of ecosystems across this spectrum are products of fundamental ecological and cultural processes and are therefore a potential source of understanding and of connection of people with the rest of nature.

Given the strong human signal in all ecosystems, what actions can be taken to foster a more sustainable future, and how might this vary across a spectrum of naturalness? People's interactions with nature are influenced by interactions among what we are allowed to do (laws and regulations), self-interest (e.g., balance of economic costs and benefits), and what we want to do.

For the most part, laws and regulations constrain unsustainable behavior that might otherwise occur when people or businesses seek to maximize short-term individual benefits and leave society to cover the environmental costs. Regulations that restrict the release of pollutants to air or water, for example, protect these public goods from the actions of individual polluters. Similarly, zoning restrictions on development in areas with scenic or wilderness value protect these areas for society as a whole, both today and in the future. Regulations are generally

important but insufficient for the stewardship that shapes trajectories toward a more sustainable future.

Economic incentives often prioritize short-term benefits to individuals despite longer-term costs to society. People often choose to purchase, for example, products that cost less but have greater environmental impacts than more costly, environmentally friendly products, or voters may favor developments that provide jobs over the protection of an area to preserve its natural qualities. Alternatively, conservation and agricultural easements that reduce taxes in rural areas with rising property values allow landowners to maintain indefinitely those qualities of the land that contributed to their own sense of identity and connection to nature. Quantitative assessment of ecosystem services is another approach to incorporating natural values in trade-off calculations (e.g., provision of clean water by forests, reduced spread of pests across ecological buffers, storage of carbon in forests). The market exerts a powerful influence over choices that people make, so an ecosystem services framework that incorporates the economic value of these services in land-use decisions increases the likelihood of environmentally friendly decisions.

People often interact with nature because they want to, whether this is to barbeque on their lawn, weed their garden, walk in the park, purchase a home in a pretty place, go camping in the mountains, kayak in a remote fjord, or derive satisfaction from habitat protection for an endangered species that they will never see. Although these cultural or aesthetic values can be incorporated into an ecosystem-services framework, they are more simply viewed as a sense of connection to nature. Sense of place is "the collection of meanings, beliefs, symbols, values, and feelings that individuals and groups associate with a particular locality." Sense of place can contribute to the sense of identity of individuals and groups associated with a place, build attachment to that place, and help frame environmental debates surrounding that place. Places that people care about can create a

spectrum of potential responses to resource issues, as often seen in debates over conservation versus development among people who feel strongly about a particular place. The challenge in using sense of place as a motivation for stewardship actions is to draw on those attributes that unite people in their commitment to place and to negotiate acceptable solutions to those political, ideological, and social issues that are contested and create conflicts about how people should interact with these places.

If a broadly shared sense of place can be an important motivation for stewardship, how can it be fostered, and how should the approach vary across a gradient of human modification? In general, shared experiences, stories, or education that strengthens personal and cultural attachment to place can build a sense of connection. For example, a community garden in a vacant lot or a school project to clean up a polluted stream can turn areas of neighborhood hazard and avoidance to a source of community cohesion. At the less human-modified end of the spectrum, actions that identify vulnerabilities or reduce threats (e.g., removal of invasive species, monitoring of endangered species, or zoning to restrict development) may provide a similar sense of connection and commitment to particular places.

I suggest that nature should be celebrated across a broad spectrum of naturalness and that landscapes be conserved and protected across this spectrum in ways that foster human connection and identity with the nature that each provides. The rapid urbanization that is occurring globally and in the United States provides opportunities for building these connections in both rural and urban areas.

Population declines in rural areas provide opportunities for protection of the ecosystems that occur there and the opportunities for people to interact with and participate in nature in these places. Conservation easements, tax incentives that enable ranchers to maintain "working landscapes," and zoning that focuses development in some corridors and protects wildlands in other areas provide opportunities for people to connect with

(relatively) wild nature, while protecting people's homes and other infrastructure from wildland fires.

Urbanization generally involves replacing or building new infrastructure every several decades. Most of the urban infrastructure of 2050 is yet to be built! These redevelopment actions are opportunities to allow urban nature to develop and flourish in a landscape that fosters regular interaction with the people that inhabit this land—as forests and grasslands, parks, gardens, and other open spaces. These places are particularly important because they constitute the nature with which most people will interact.

In both rural and urban areas it is important that people interact with nature in ways that improve their understanding of how nature responds to human and other disturbances. These activities might include building birdhouses, fishing, gardening, farming, participating in prairie or stream restoration, or any of a myriad of interactions. Only by becoming part of nature, through recognizing how nature affects us and how we affect nature, can we identify with nature and move beyond the notion of nature as a museum that has no direct connection to our lives.