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Chapter 6: Nature, Outdoor Experiences, and Human Health

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> The indescribable innocence of and beneficence of Nature—of sun and wind and rain, of summer and winter—such health, such cheer, they afford forever!
>
> —Henry David Thoreau

Purpose

Recent scientific studies from around the world identify a broad array of human health benefits associated with experiences of nearby nature. This chapter explores how the current surge in health response science can inform recreation facilities planning and programming on both rural and urban public lands, at local to regional scales. We also introduce a number of evidence-based active living and nature-for-health initiatives—both conceptually and literally—that have emerged in communities across the country and that can be implemented across the entire landscape gradient.

This collection of ideas concerning outdoor activity and human health represents a paradigm shift in several ways. First, human health response has been implicit in many recreation plans and lands, yet explicit health-centered goal setting suggests new opportunities for visitor recruitment and retention. Second, an all-lands outlook, from a human health perspective, extends connectivity of recreation facilities beyond the public land boundary into nearby neighborhoods, and into partnerships with local governments. Finally, exploring the contributions of outdoor activity to human health initiates collaborations with nontraditional partners whose work is not based in natural resources, but who can offer valuable insights into visitor benefits. Such partners include medical professionals, public health departments, and community organizers. Looking back to chapter 2 (Cerveny et al. 2020), a human health lens also shifts the notion of "recreation as leisure" to one of "recreation as human connections" and expands the notion to acknowledge the importance of nature-based activity in everyday life.

Recreation is more than leisure . . . it supports human connections and wellness.

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This chapter is anchored by research in urban settings. The *Green Cities: Good Health* website (University of Washington 2016) presents summaries representing multiple categories of nature and health benefits, based on a database of about 4,200 peer-reviewed articles plus related technical publications (fig. 6.1). The collection does not focus only on recreation, and generally does not include allied studies about human health benefits associated with more rural or wildland landscapes. Nevertheless, this nature and health literature points to trends and insights that are associated with recreation, such as increased understanding of the role of nature in active living, mental health and function, and wellness and physiology. The studies confirm the importance of being able to spend time outdoors, from everyday places to more distant public lands.

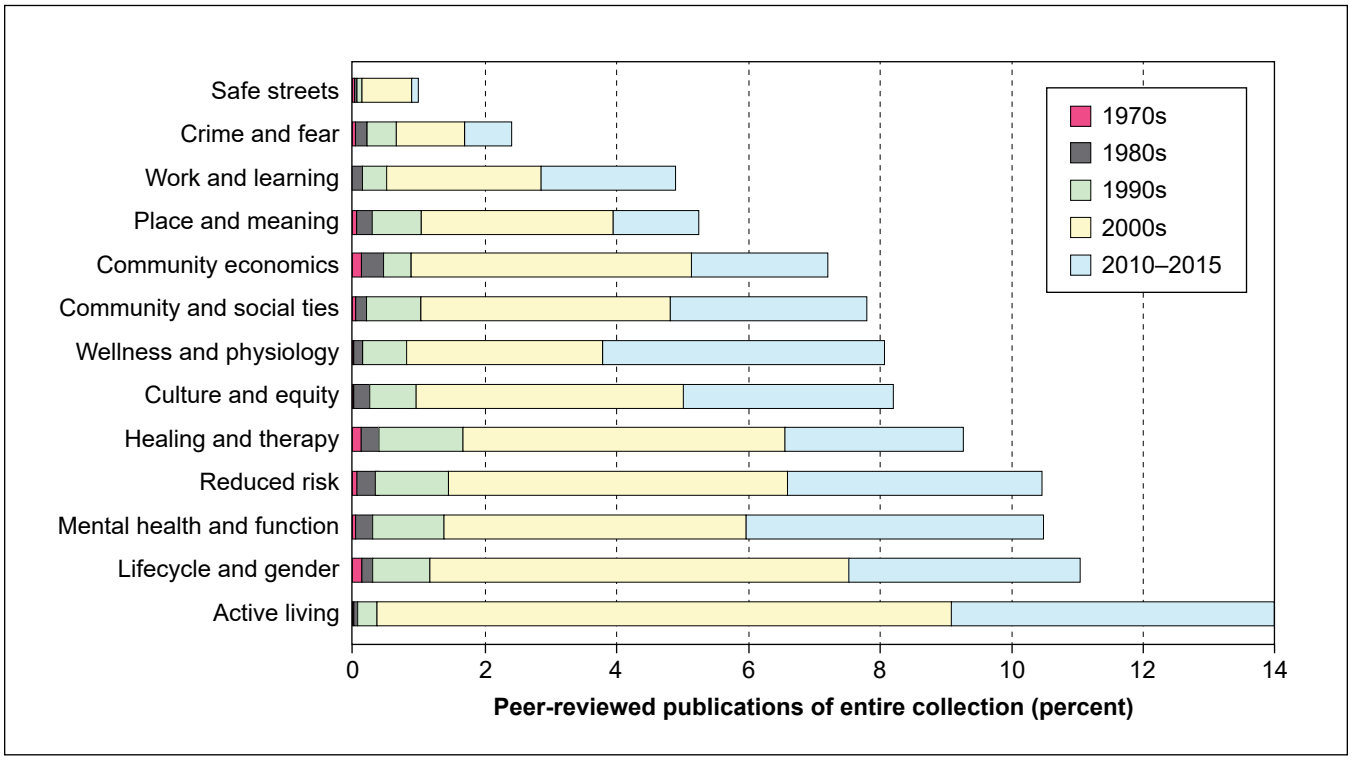

Figure 6.1—Green Cities: Good Health research review, a publications database sorted by thematic frequency and publication decades.

Dimensions and Definitions

Both the definition and attainment of good health are complex. In 1948, the World Health Organization (WHO) defined health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (WHO 2016: 1). Nearly 40 years of research have revealed an array of benefits

resulting from the experience of nature in urbanized areas. Positive outcomes include recovery from disease (such as therapy and faster healing), as well as an improved state of well-being (including stress reduction, better learning and work productivity, and improved social dynamics in communities).

Moving from definition to causal pathways, the WHO (2015: 4) and other public health officials continue to identify "the conditions in which people are born, grow, live, work, and age" as the social determinants of health. The evidence of nature-based health response suggests that nature experiences are a social determinant, with important implications across social scales, from support of individuals to community cohesion to economic costs and benefits (Wolf and Robbins 2015). Based on research findings and emerging nature access programs, we propose three key questions for consideration.

How Might Recreation Contribute to Human Health?

Nearly 40 years of studies show that nature experience is an important determinant of human health.

For centuries, insightful people have commented on nature and wellness, wisdom that may be lost to many in our modern times. Declining physical and mental well-being, substance abuse, and increased obesity are disturbing trends in U.S. public health (Moody's Analytics 2017). Poor health comes at a tremendous cost for individuals, households, and communities. In 2016, for instance, across the United States, annual health services costs exceeded $3.3 trillion, about 18 percent of the nation's gross domestic product (USDHHS CMS 2018). But social determinants, including nature experience opportunities, can improve health and reduce costs.

Studies of nature and health have included small-scale experiments involving fewer than 50 people, as well as big data, cross-section evaluations of thousands of people conducted within multiple nations. Several recent research reviews have synthesized knowledge about nature and positive health outcomes, documenting that:

- There is conclusive evidence about key pathways: improved air quality, physical activity for health promotion, stress reduction, improved social contacts (Hartig et al. 2014).
- Brief nature experiences improve mental health and function, in both general health and clinical contexts (Bratman et al. 2012).
- Nearby nature is associated with improved birth weights in children, and multiple benefits for young people (Fong et al. 2018).

Assumptions about health benefits are embedded in recreation planning and programs. Given the scope of both public health issues and nature-based benefits, how might recreation professionals be more intentional about generating health benefits?

Recreation or Active Living?

Health benefits can result from passive encounters with nature, such as views of the outdoors from one's home, car, classroom, or workplace. Yet, a predominant theme in the research is the important role of physical activity (PA) in health response. PA is associated with reduced chronic disease, improved mental health, reduced cognitive and physical decline in elders, and increased social connections. Parks, trails, and gardens near residential areas are associated with higher levels of PA, and outdoor activity is shown to be more beneficial than indoor activity (Thompson Coon et al. 2011).

This evidence raises a key question for recreation planning. The term "recreation" implies, for many people, a leisure activity that is distinct in time and place from daily living. Recently, the health community has promoted the idea of "active living" to encourage physical activity that is associated with community design and daily lifestyles (Active Living Research 2018). The active living lifestyle includes walking or biking commutes to work or school, activity-based social gatherings, and intermittent exercise breaks while at work, as well as more extended recreation activities such as hiking and skiing (fig. 6.2). In addition, some occupations offer different types of nature exposure, which may have health benefits.

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Figure 6.2—Public lands can support recreation and active living across wildland to urban places.

Figure 6.3 is a representation of nature-based activities across the entire landscape gradient. It is intended to prompt thinking about how to integrate the benefits of nature exposure into people's lives, from daily routine encounters to the occasional peak experience or adventure. As one example, local park systems are increasingly providing introductory or feeder programs to introduce urban and suburban youth to the outdoors, and to be the educational front door in community settings adjacent to federal lands.

The active living concept blends recreation with everyday physical activity as part of one's lifestyle.

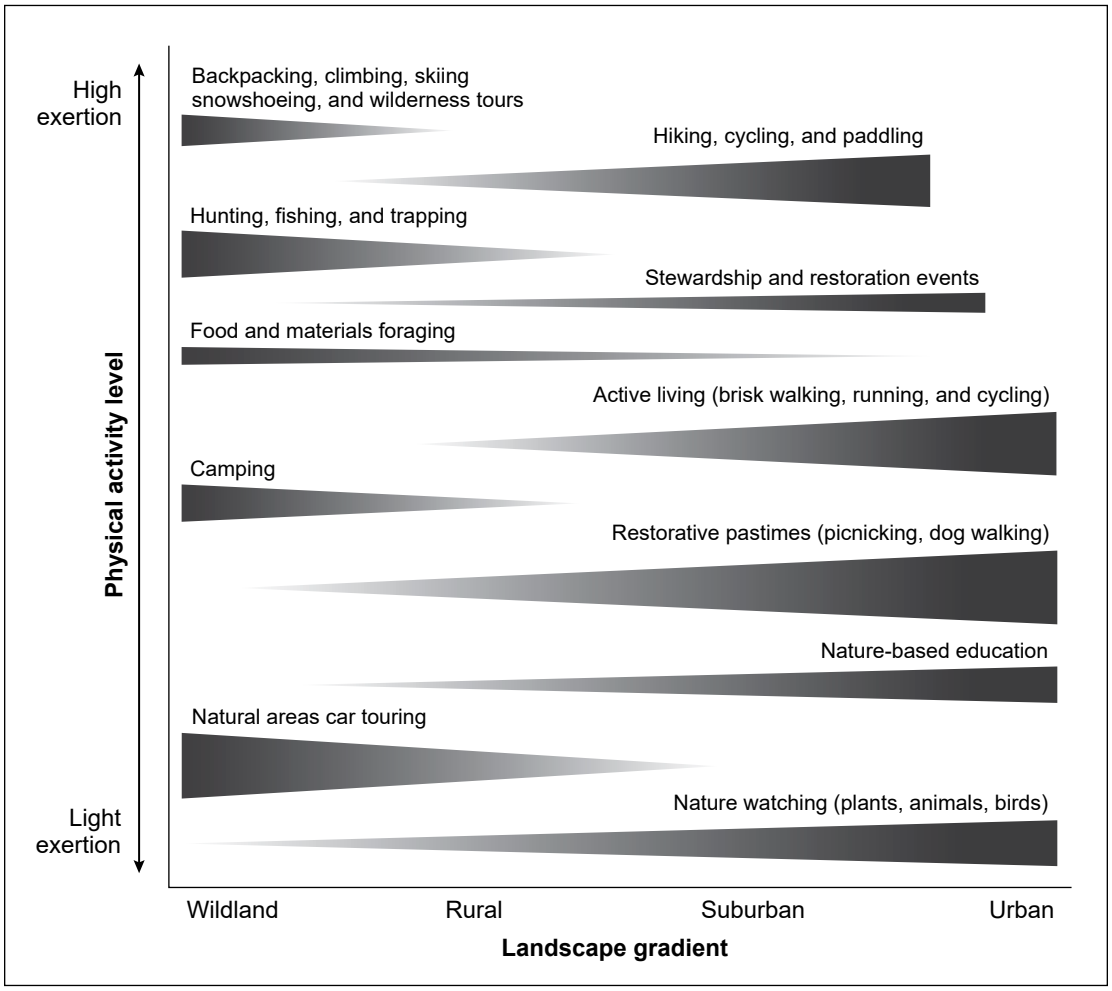

Figure 6.3—Nature-based activities that span the urban to wildland landscape gradient, considering level of exertion.

Human Health Across All Landscapes?

Our nation is becoming increasingly urbanized; more than 80 percent of the U.S. population now resides in cities and towns. At one time, the U.S. settlement pattern was in the form of urban centers surrounded by working landscapes and wilderness. The urban-wildland interface concept acknowledges that most American landscapes are now a heterogeneous blend of urban to rural conditions, with public lands interspersed within. Once distinctly separated from cities, many large, federal public lands are within or near growing metropolitan areas.

The combination of land use conversion, expanded road networks, and increased awareness of nature and health benefits suggests that public lands recreation should be viewed as one type of health-promoting opportunity along both a landscape and nature experience continuum. Rather than envisioning a visit to public lands as a distinct experience, managers are working with regional and local jurisdictions to plan and implement recreation and active living amenities across the landscape, from the urban core to the wilderness.

An outdoor activity for health outlook supports new programs and partnerships across landscapes and places.

Several major nonprofit organizations with a historical focus on working landscapes and wildland conservation, such as the Wilderness Society, The Nature Conservancy, and the Trust for Public Land, have initiated programs in urban communities. Interest in programs that blend ecosystem health and human health is shaping such efforts. In addition, some metropolitan areas have, or are creating, broad alliances composed of federal, state, and local agencies; public land managers; regulatory agencies; and nonprofit organizations to implement more seamless projects and programs across broad landscapes. Examples are the Intertwine Alliance (Portland, Oregon), the Emerald Alliance (Seattle, Washington), and the Metro Denver Nature Alliance (Denver, Colorado). Public health is a key interest, leading to participation by hospital systems and health insurers such as the Lone Star Family Health Center (Conroe, Texas) and Unity Health Care (Washington, D.C.).

Challenges, Barriers, and Opportunities

This section presents challenges and barriers, with a focus on opportunity.

Lifestyle Trends

Popular authors and scholars alike have observed the increase in sedentary lifestyles and screen time for people of all ages, both factors in disconnecting people from nature in the United States (and worldwide) (Kellert et al. 2017). The Mayo Clinic maintains that long periods of sitting create the same level of health risk as smoking or obesity (Laskowski 2018). The allure of technology is particularly strong for young people. Their growing affinity for smartphones, tablets, and the

like may provide opportunities to design and develop digital devices or applications that encourage more engagement with nature.

Spanning Disciplines

Public health officials focus on disease incidence and the epidemiology of illness. Physicians and other health care professionals are committed to quality diagnosis and treatment of health concerns. Government agencies are committed to environmental health, expressed by the vigilant search for and regulation of toxins and risks in communities. Professionals engaged in public and environmental health and land management are now expanding programs to embrace the salutogenic health effects of nature. Increased collaboration among green space and public lands managers and health professionals can assure more effective health promotion from recreation opportunities (Buckley and Brough 2017). Land managers often provide anecdotal stories of health outcomes from children's programs or wilderness therapies, but do not have the expertise or capacity to conduct analyses. Collaboration among health professionals and resource managers could lead to better planning for and analysis and documentation of health outcomes.

Equity

Many studies have identified disparities in the distribution of trees, parks, and gardens within cities. The general pattern is that underserved communities do not have the same quantity or quality of green amenities enjoyed by more affluent communities (Floyd et al. 2009, Rigolon 2016). Studies have also demonstrated that communities in greater need often respond more positively to the presence of green spaces, suggesting that nature has a mitigating effect in the face of the full range of social determinants of health (such as poverty, inadequate housing, and less access to education and jobs).

Equity may also be a challenge with regard to socioeconomic status and nature access outside the city. No matter where they live, people with limited time (e.g., because they are single parents or hold multiple jobs) or limited mobility (e.g., do not own a car) are less able to access public lands. To this end, a King County, Washington, program called Trailhead Direct works with local transit systems to offer transportation to visitor centers and trailheads. Feeling welcome and comfortable upon arriving can be another challenge (Ortiz 2018), and facilities traditionally oriented to White middle-class visitors may not have universal appeal. There are also opportunities to engage with nontraditional users to assess more culturally responsive amenities and to address potential negative cultural associations of forests and wild spaces.

Equity is important. All people should have safe and accessible outdoor activity opportunities.

Programs

New, innovative programs enable and encourage people to be more active and to engage with nature.

Early research on physical activity and city green spaces focused on proximity, that is, the distance between a residence and a park edge or green space. More recent and detailed studies have explored site facilities (ranging from ball fields to natural areas) and programming in relationship to use preferences of people of different ages and cultural backgrounds (Cohen and Han 2018, Cohen et al. 2016). Local organizations and agencies, recognizing this research and the broader evidence of nature and health, are launching a variety of nature-based programs that enable and encourage people of all ages to be more active and to engage with nature.

Table 6.1 presents examples of nature-based programs in the United States that promote human health outcomes. Some of the listed activities may not be regarded as traditional outdoor recreation, but they are becoming part of an expanded lifestyle orientation to being outdoors. There are opportunities for cross-programmatic learning and collaboration across the activities listed in this table. For example, wilderness therapy programs might benefit from integrating horticulture therapy into their practices. *Walk with a Doc* style programs could be adapted to become *Camp with a Doc*. There are opportunities for traditional recreation researchers to collaborate with urban planners specializing in active living policy and design to provide opportunities for leisure and transit across the spectrum of public lands, from urban parks and greenways to wildland and remote areas.

Stewardship

Across the landscape spectrum, and in most regions, increased use of public land exceeds available maintenance and management resources. Staff and budget appropriations rarely meet the needs of sustaining popular landscapes and developed recreation facilities. Many landscapes are in need of ecological restoration. Stewardship programs engage volunteers and paid workers in land care activities, and a few studies have explored the associated human health benefits for participants (Husk et al. 2016, Wolf and Housley 2017). There are opportunities to merge land stewardship programs with health-oriented programs. Recreation then takes on added purpose, providing a net benefit to ecosystems and favorite places. Outdoor recreation businesses (such as REI Coop)[2] can be engaged to promote, facilitate, or support such programs.

[2] The use of trade or firm names in this publication is for reader information and does not imply endorsement by the U.S. Department of Agriculture of any product or service.

Table 6.1—Health-oriented nature-based programs (U.S. examples)

Type of program	Examples of providers	Web address	Description (purposes, target audience)
Wilderness and outdoor therapy	Open Sky Wilderness Therapy	https://www.openskywilderness.com/	Wilderness and outdoor therapy programs are generally structured as expedition-style and water-based programs for teens, young adults, families, and veterans with social, psychological, and physical challenges.
	Warrior Expeditions	https://warriorexpeditions.org/	
	International Surf Therapy Organization	http://www.intlsurftherapy.org/	
Children's forests and nature connection	Children and Nature Network	https://www.childrenandnature.org	Various organizations are committed to creating the programs and spaces that support health-promoting experiences for children, including physical activity, mental health, learning environments, good nutrition, and disease prevention. Many include goals of connecting children to nature. Some have more of an explicit health mission than others.
	Forest Service Children's Forests	https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5387242.pdf	
	National Environmental Education Foundation Prescription for Outdoor Activity	https://www.neefusa.org/resource/rx-outdoor-activity	
Horticultural therapy	American Horticultural Therapy Association	http://www.ahta.org/	Horticulture-based therapy is used as part of physical and mental health treatments, using evidence-based healing approaches for individuals or groups undergoing physical/vocational rehabilitation, often in hospitals, nursing homes, and hospice care facilities.
	Therapeutic Landscapes Network	http://www.healinglandscapes.org/	
Forest bathing	Shinrin Yoku	http://www.shinrin-yoku.org/programs.html	Forest bathing programs provide guided wellness experiences centered on the benefits of immersive time in forests, including reduced anxiety, stress, and hypertension, and improved psychological mood (Li 2018).
	Association of Nature and Forest Therapy Guides and Programs	http://www.natureandforesttherapy.org/	
	International Society of Nature and Forest Medicine	http://www.infom.org/	
Healthcare provider/parks promotion	Park RX	http://www.parkrx.org/	Park prescription programs are designed to increase well-being by connecting medical professionals with land managers, and provide resources that help providers encourage patients to engage in physical activity in public parks and green spaces.
	Walk with a Doc	https://walkwithadoc.org	
	#Rx2Move	https://www.kpihp.org/rx2move/#sthash.gf2aGHl0.dpbs	
	Park RX America	http://parkrxamerica.org/	
Urban policy, planning and design for active living	National Complete Streets Coalition	https://smartgrowthamerica.org/program/national-complete-streets-coalition/	Urban policy and planning programs are designed to create, implement, evaluate, and share policies and practices that improve urban design to improve parks, address environmental equity, and create public spaces that encourage active living and active transit.
	Active Living Research	https://www.activelivingresearch.org/	
	Robert Wood Johnson Foundation	https://www.rwjf.org/en/how-we-work/building-a-culture-of-health.html	
	National Recreation and Parks Association	https://www.nrpa.org/	

New Conceptual Approaches

Duration and Dosage

Future research questions include "dosage," influences of outdoor experiences from wild to urban, and who benefits.

Authors and reviewers typically call for additional research at the intersection of nature and health (Frumkin et al. 2017). Public health officials are particularly concerned about the increase in chronic diseases that influence quality of life and illness across a person's lifetime. What specific nature benefits are afforded to people of different ages across the human life cycle, from children to elders? Most of the studies to date are cross section, or one-time measure studies, but research is now providing recommendations at the population level. Questions remain around application to public lands settings, such as what dosage is needed to initiate and sustain health benefits, including type of nature, frequency and duration of experience, and what are the unique needs of specific beneficiary populations (fig. 6.4)?

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Figure 6.4—Walks and hikes promote health, but questions remain as to how long they need to be, and how often.

Landscape Context

Earlier, we suggested that public lands outside the city offer recreation experiences that are one expression or opportunity of active living. As nature's role in health research and programs expands, it would be valuable to understand the specific health benefits associated with experiences across an entire landscape and activity spectrum. How might brief nature experiences near home compare to peak experiences in wilder landscapes? As a metaphor, the public land experience might be the occasional feast, while daily nearby nature might be the routine of everyday meals. What are the respective benefits of each, and how do we make each more "nutritious?"

Biodiversity and Complexity

Recent studies in urban settings suggest that a heightened positive health response is associated with more biodiverse landscapes, but early results are inconclusive. These studies have focused on mental health outcomes (Carrus et al. 2015, Wolf et al. 2017). Although people may not recognize ecosystem biodiversity, they may be responding to comfortable levels of complexity in their surroundings, an effect long noted by environmental psychologists. Future research can continue to explore how healthy landscapes can promote healthy people.

Targeted Tharapies

Many people are aware of Ulrich's hospital study (1984), in which recovering surgery patients healed more quickly if they had a window with a view of trees. Some of the earliest and most recognized health benefits studies involved people with clinically diagnosed illness or disease and some form of nature therapy. Examples include treatment of depression, attention deficit hyperactivity disorder, and autism. There are also multiple nature-based veterans' stress treatment programs. Better defined treatment programs for specific illnesses might encourage health insurers and others concerned with rising health costs to financially support recreation resources and programs on public lands.

Measures and Metrics

Across all these questions and needs are opportunities to develop efficient and effective measurements. Carefully designed measures can help describe and verify health benefits for all visitors, including special populations. Having standard metrics can enable comparison of benefits over time within a single site or across multiple sites. Measures can be used to demonstrate benefits that are of interest to nontraditional organizations, in an effort to engage them as partners and political champions.

Economic Valuation

Finally, measures can be designed to inform economic values of benefits to support funding requests and to recruit health sector financial support. Up to 11 percent of total health care expenditures are linked to inadequate physical activity, some proportion of which could be saved if people were able to access more active living opportunities (Carlson et al. 2015). Few studies have explored the monetary value of nature-based health outcomes and even fewer have attempted to monetize increased physical activity (Buckley and Brough 2017, Wolf et al. 2015).

Compelling Questions

1. How are nature benefits experienced differently across the human life cycle, from children to elders? How can managers use these insights to promote benefits across age groups?
2. What is the dosage needed to initiate and sustain health benefits, including characteristics of the natural environment, frequency and duration of experience, types of physical and mental engagement in activities, and the unique needs of specific populations?
3. How do brief experiences of nearby nature compare to more distant peak experiences in more wild landscapes in terms of both therapeutic and general wellness health benefits?
4. Are positive human health responses more strongly associated with biodiverse and species-rich landscapes? Do encounters with conserved and restored ecosystems promote better mental and physical health?
5. How can nature-based therapeutic interventions be better defined and coordinated to encourage health insurers and healthcare providers to support or fund recreation programs, facilities, and resources for public lands?

Conclusions

Nature for health opportunities should include all landscapes. New collaborations can support landscape connectivity for active living.

The purpose of this chapter is to expand conceptions of recreation and leisure in future public lands research and to support a new paradigm proclaiming the importance of outdoor experiences as a social determinant of human health. This outlook is supported by an extensive research knowledge base that is expanding rapidly, with much of the science being conducted within urban contexts. Nature and health opportunities span the landscape gradient from urban to wild land, with recreation being but one facet of active living. Active living advances opportunities for frequent, accessible physical activity to promote human health. Planning and programming, across the entire span of nature-based activities, can integrate leisure and lifestyle, and include planning for equity, inclusiveness, and stewardship. The

nature and health arena is of increasing interest to the private sector (e.g., outdoor equipment vendors, health care firms, and health insurance companies); conservation groups (The Nature Conservancy, Wildlife Society, Trust for Public Land); organizations leading therapeutic programs, and local governmental jurisdictions. Shared interests in human health are leading to nontraditional collaborations between public health and public lands professionals. Researchers and practitioners might consider elevating goals of human health benefits and outcomes in lands planning and management to address the supply, demand, and need for nearby nature. Planning and investment for new parks and open space can incorporate strategic land assets and linkages, becoming health interventions where they are most needed across the landscape gradient.

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