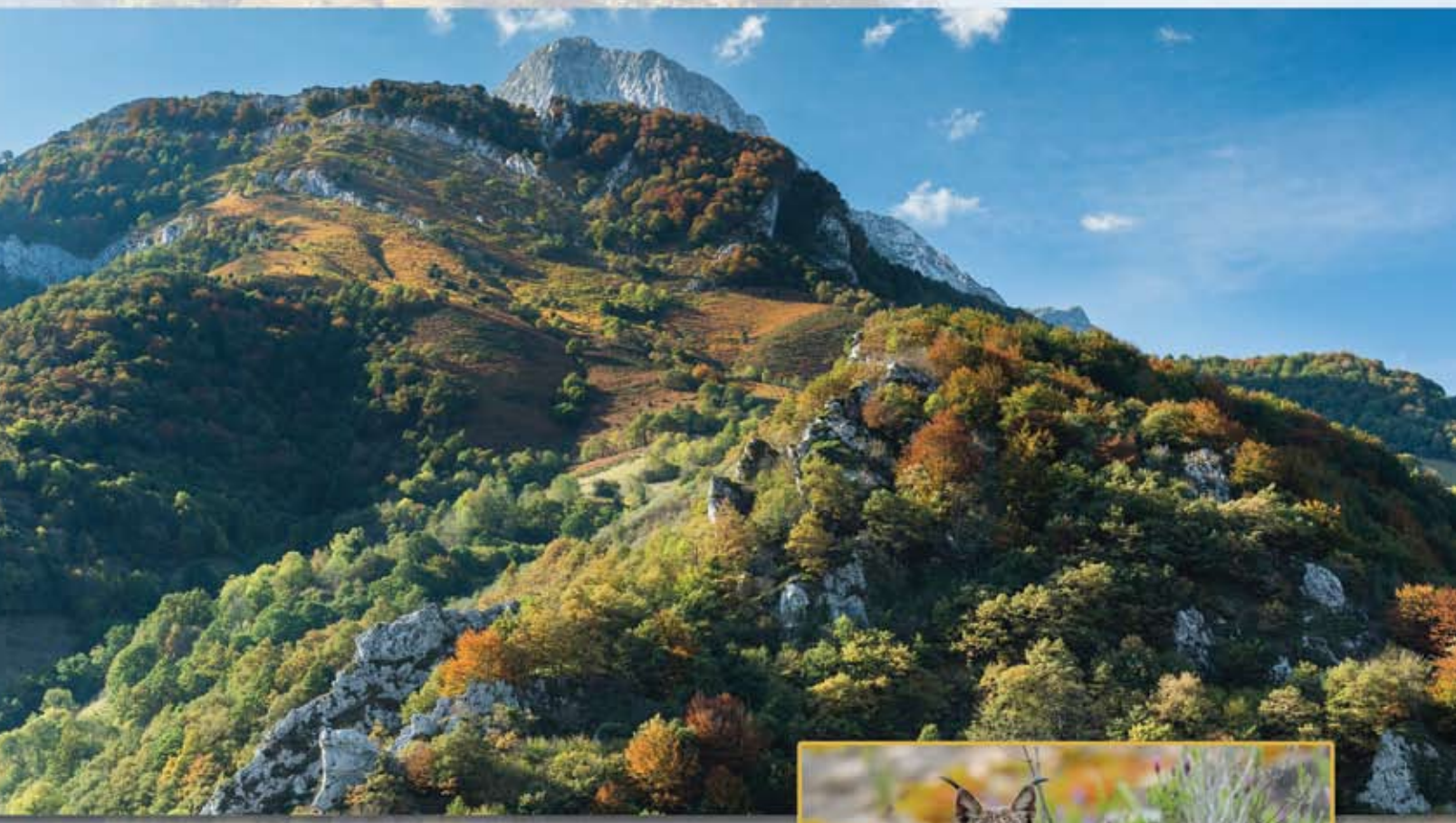
INTERNATIONAL

Journal of Wilderness



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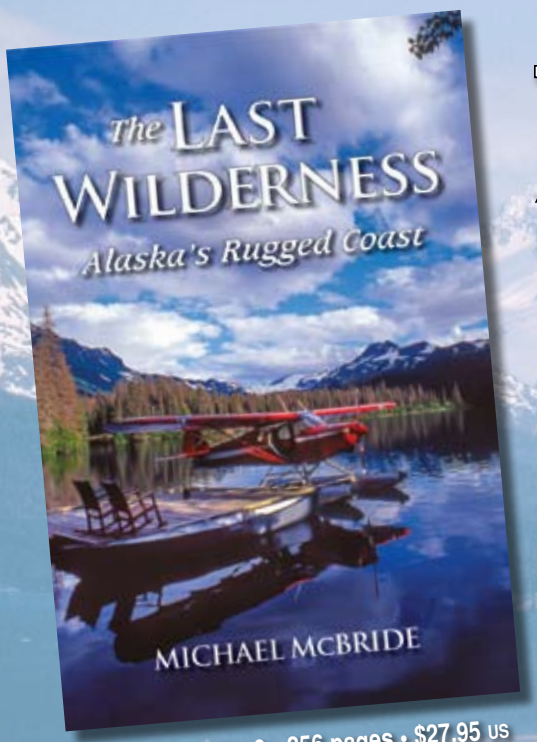

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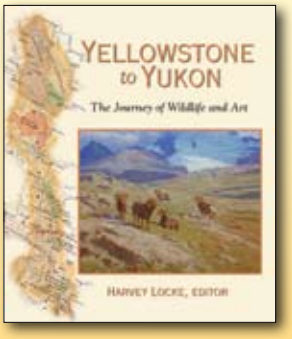

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FEATURES

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WILDERNESS DIGEST

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—John C. Hendee,
IJW Editor-in-Chief Emeritus

On the Cover

MAIN IMAGE: High biodiversity is often found in landscapes that have been influenced through traditional human uses, and is an important element in the mosaic of areas that make up Natura 2000, the "protected area" network of the European Union. This image is of the cork *dehesas* in Western Spain, a traditional human landscape shaped by cattle that sustains one of the richest biodiversities of the continent. Courtesy of Jaime Rojo.

INSET: The iconic Iberian Lynx (*Lynx pardinus*), the most endangered cat species in the world, here photographed in Doñana National Park in Southern Spain. Courtesy and © Pete Oxford/Wild Wonders of Europe

International Journal of Wilderness

The *International Journal of Wilderness* links wilderness professionals, scientists, educators, environmentalists, and interested citizens worldwide with a forum for reporting and discussing wilderness ideas and events; inspirational ideas; planning, management, and allocation strategies; education; and research and policy aspects of wilderness stewardship.

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EDITORIAL PERSPECTIVES

Wild Is …

BY VANCE G. MARTIN

The World Wilderness Congress (WWC) has been well-reported on in *IJW* over the years (see the online, free *IJW* archive, http://ijw.org/category/international-journal-of-wilderness-full-archive). This August 2013 issue goes to press just three months before WILD10 (the 10th WWC) convenes in Salamanca, Spain (October 4–10, 2013, www.wild10.org). The WILD10 planning process started soon after WILD9 (www.wild9.org), and the consultative phase determined that European NGOs and governments welcomed a WWC. The Spanish government issued an official invitation and the collaborative work began in earnest in 2011 – identifying practical and achievable conservation objectives, creating the coalitions to achieve them, and securing the funding. While financial clouds were gathering in the eurozone early in 2011, little did we know that the full recessionary storm would devastate Spain in 2012, and that today economic concerns would still be raging across Europe.

But a window of opportunity was evident. Nature conservation is seldom in sync with common (often misguided) financial models but rather is analogous to the fabled maxim about the stock market: "When blood is running in the gutters … buy!" When the economy is in recession, the development juggernaut is restrained, society shifts, nature breathes a sigh of momentary relief, and we can often extend our conservation reach. So, our partnerships continued to work, we reduced our budgets, and looked harder for funding for WILD10.

Across Europe, the current financial crisis is coupled with a 30-year trend of rural land abandonment, demographic change, and the results of better wildlife management, yielding a return of wildness to Europe that is unique in the Anthropocene. Ecological corridors are reemerging naturally or being encouraged by visionary thinkers, predators such as wolves are increasing and wandering (for example into Belgium, all the way from the Italian Appenines), megafauna such as European bison are increasing, and more. In simple terms, we can see the exciting emergence of a pan-European landscape-scale dynamic that presents the opportunity to move beyond the nature-constraint syndrome that has characterized Europe for centuries, and to augment the focus purely on species and habitat through Natura 2000, the European Union's very large system of protected areas. Therefore, a part of WILD10's global focus on wild nature is an important regional objective called "A New Conservation Vision for Europe" that articulates this opportunity and recommends actions.

Of course, as a wilderness movement expands rapidly, typical internal interorganizational and expert dynamics characterize this stage of growth in the movement: "My definition of wilderness is more pure than yours"; "What is rewilding and how is it best practiced?"; and, of course, "What is wild?" Another common characteristic of our passionate wilderness colleagues is that they may never always be right, but they are never in doubt!

WILD10 and the *IJW* are global in scope. In this and the next two issues we explore some of the objectives and outcomes of WILD10, including WILD Cities, CoalitionWILD (youth and young professionals), Nature Needs Half's "social contract", indigenous and community-based conservation models, corporate best practice, science and technology in wilderness research, rewilding, private investment opportunities in nature conservation, WILD Waters, and many more.

Both the WWC and the *IJW* explore and advance the dynamic, diverse, international manifestation of the always-challenging task of defining wilderness and how it is managed, what it means to different cultures, how to protect and sustain it while still using and enjoying it, and how to reach across political/scientific/corporate boundaries to create a social

Continued on page 47

SOUL OF THE WILDERNESS

Social HALF

The Nature Strategy for Sustainability

BY VANCE G. MARTIN and JULIE ANTON RANDALL

Social HALF is a concept that bridges the often disparate fields of nature conservation and human development. It is the human dimension complement Nature Needs Half of (NNH) – an aspirational and practical vision of sustainability (Martin 2011; Sylven 2011) based on the scientific information that keeping at least half of wild nature intact and interconnected is vital to ensuring continued life-supporting services to all species. The "half" in nature can be composed of interconnected large land- and seascapes or a connected mosaic of wild nature found in parks, forests, refuges, working lands, and waters managed with conservation as a primary value. NNH is also a cost-efficient and effective means of mitigating climate change by keeping atmosphere-altering chemicals such as carbon, methane, and others safely locked up (WILD 2009).

Social HALF is the application of NNH to conceptualize a holistic, inclusive, and rational approach to sustainable development whereby the social and economic needs of human communities are addressed by protecting a specific quantity (at least half) and quality (high-functioning ecosystems and intact biodiversity) of nature. This WILD Foundation working paper, entitled the "Nature Strategy for Sustainability" (NSS), is formulated by a network of nature conservationists and human development practitioners that prioritizes the protection of nature for its fundamental role in alleviating human suffering, enhancing human security, and promoting economic prosperity. When NSS is fully established it will support international guidelines, replicable models, and practical tools for application in policy, management, and communications worldwide.

At WILD9, the 9th World Wilderness Congress (WWC) in Mexico in 2009, The WILD Foundation and 25 early organizational endorsers presented NNH as a global vision and a new "social movement for nature conservation" to protect and interconnect at least half of Earth's lands and seas in order to support all life. In preparing for a full launch of this concept at the 10th WWC (WILD10), many collaborators have begun to organize and activate the NSS Coalition, a global network committed to Social HALF principles.

Vance G. Martin

Julie Anton Randall

A Vision of Half the World in Nature

The loss and degradation of nature's ecological services is increasingly becoming headline news. The Convention on Biological Diversity (2010) reports there are "multiple indications of continuing decline in biodiversity in all three of its main components – genes, species and ecosystems." Essentially all species assessed by the International Union for Conservation of Nature (IUCN) Red List for extinction risk are more threatened than ever. Extinction is most imminent among amphibian and coral species, mammals in South and Southeast Asia, species of birds and mammals used for food and medicine, and nearly a quarter of all plant species. Climate change exacerbates other human impacts, but the current international policy focus on climate change often obscures the more direct and immediate threats of land-use conversion, marine resource exploitation, and increasing consumption of resource materials.

Protected areas (PAs) are an important part of sustaining critical ecosystem services, but proposed PA areas are often selected based on anthropocentric reasons rather than on an

ecological basis. Although the global commitment to protecting nature and implementing sustainable development has deepened over recent decades, many nonprofit and governmental institutions adhere to that which is socially or politically acceptable, and corporations continue to follow quarterly profitability guidelines. We need to change this dynamic and shift our approach to human development. NNH proposes that, to a great degree, true sustainability of human well-being rests on the answer to a simple question: What does nature need to be sustainable?

An ecosystem provides the foundation for a healthy, stable, and prosperous human society and is defined as "a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit, of which humans are an integral part" (MEA 2005). As ecosystem size is reduced by human development and exploitation activities, there is a critical threshold after which they rapidly lose their ability to provide life-supporting services. Many scientists (Noss et al. 2011) point out that this is when ecosystems drop to somewhere between 35%–80% of their original (pre-Anthropocene) size, depending on the system. Thus, many scientists consider a minimum size of 50% of ecosystems – intact and interconnected – to be a rational, ecologically necessary, general target. This is the basis for NNH and is a precautionary approach to buffer the many uncertainties in our dynamic, rapidly changing world. The NNH strategy for each geographical area will vary depending on its degree of physical heterogeneity, endemism, conversion to development, and other factors of human impact and development.

NNH is thus a biocentric approach to safeguarding nature essential to human well-being, while also assuring viable and diverse populations of native species and ecosystem function. Critically, in today's world, the NNH approach can enhance resiliency to the inevitable and dramatic environmental change caused by ill considered human development. Further, applying NNH would mitigate the scientifically and historically documented effects of ecosystem destruction on human health and livelihoods, particularly on those people most directly dependent on nature or disproportionately impacted by its loss – often the poorest in human society.

Figure 1 – The Kayapo of the Southern Amazon have a goal of protecting (and using sustainably) virtually 100% if their 10 million hectare reserve, with biodiversity that supports all their villages. Photo by Vance G. Martin.

Loss of Nature and Its Impact on Humans

Ecosystem transformation has contributed substantial net benefits to human society in terms of well-being and economic development, but these benefits cannot be sustained as human populations increase, land-use conversions and development continue, environmental pollution continues, invasive species spread, and climate change persists. In fact, society risks irreversible declines in productivity as resource exploitation and degradation increases and fragmentation continues. Unmitigated nature loss will continue to lead to ecosystem decline, which is far costlier to reverse than if we implement steps now to protect nature's life-support services.

Ecosystem change through human development often yields initial benefits for some stakeholders (typically the affluent) while exacting costs on marginalized groups (those without the political and economic power over

Figure 2a and b – Landscape fragmentation (loss of ecological connectivity) thru fencing that destroys the ability of wild nature to support local human populations, and usually increases dependency on less-diverse and often lower-value land use. Photos by (a) Karen Ross and (b) Joe Riis

resource management decisions). Marginalized groups are most often the local poor who have very low adaptive capacity (disempowered women and children in particular) and indigenous groups stripped of traditional rights and hereditary access to assets provided more directly by nature. These groups are like an early warning detection of problems for a wider society. Ultimately, though, everyone pays the price for externalities associated with ecosystem change.

Change within an ecosystem often negatively impacts food production. Cultivated areas where at least 30% of the landscape is in cropland, shifting cultivation, confined livestock production, or freshwater aquaculture cover a quarter of Earth's surface (MEA 2005). Agriculture expansion has plowed under forests and grasslands and converted wetlands, destroying wildlife habitats and often polluting land and groundwater with nitrates and pesticides. Although altering ecosystems has helped feed the world's 7 billion people to date, ecosystem productivity cannot keep pace with the current rate of overexploitation – climate change will challenge productivity even further. With a projected 9.1 billion people by 2050, the world demand for food crops is projected to grow by 70%–85% (MEA 2005), and to double in developing countries (FAO 2002). Demand for water will increase 30%–85% (MEA 2005). Food crop production must also compete with rapidly expanding demand for land and water for biofuels production.

Nourishing the world's rapidly multiplying human population will require growing more food with less water, and improving agroecosystem sustainability and resilience. Otherwise, with more mouths to feed with less food, and food prices increasing in response, the poorest people – who spend the largest share of their income on food – will suffer most.

The juggernaut of human development continues – seemingly without understanding the need for, and acting fully enough to protect, the ecosystem size and intactness that nature needs in order to produce the ecological services that helps to provide basic human needs such as clean water and clean air. Some 1.4 billion people already live in extreme poverty. One in five inhabitants of the planet lack easy access to clean water; one in six are undernourished (MEA 2005). Disease epidemics are omnipresent. Climate change is increasing the spatial and temporal variability of agricultural production, and with it the magnitude and frequency of droughts and floods. The United Nations (UN) projects an exponential increase in environmental refugees – 50 million by 2020. More social and political conflicts will ensue as ecological services decline, natural resources grow more scarce, and human suffering intensifies.

Health, security, and prosperity of nations are affected by the loss of sustainable ecosystems:

- **Health** – The negative health effects of degraded air and water quality can affect all societies, especially the poor who are least able to replace health benefits provided freely by nature with those purchased from health-care systems. Many diseases erupt from malnutrition (especially childhood and maternal) and contaminated water (e.g., infectious diarrhea and vector-borne diseases such as typhoid and malaria, worsened by flooding).
- **Security** – Land degradation, overharvesting, and invasive species from unsustainable resource management are significant threats to human security, particularly in arid or semiarid regions – regions that often have more fragile governance. The world is less secure from impacts of climate

change (MEA 2005; CDC 2009), including higher temperatures; increased drought; accelerated erosion; variability in weather patterns affecting crop and forest production and contributing to more frequent pest and disease outbreaks; conditions conducive to invasive species; higher coastal storm surges and degradation; salinity; flooding; ocean acidification and bleaching of coral habitats impacting fisheries; and the adverse impacts on human health of increasing vector-borne pathogens and infectious diseases thriving under warmer conditions. Direct negative and destabilizing impacts are felt by local people and some will even become ecological refugees. Increasing waves of "land-poor refugees" into cities and across borders strain economic resources, political stability, and national security.

- **Prosperity** – Almost half of all jobs worldwide depend on fisheries, forests, or agriculture (UNEP 2008). Forest areas alone directly provide livelihoods for 1 billion people, and the benefits from healthy ecosystems are well documented; for example, the fishing benefits from healthy coral reefs are a potential US$5.7 billion annually (Convention on Biological Diversity 2008). As greater numbers of people abandon rural areas for supposedly better prospects in the cities, they shift from subsistence living to reliance on a money economy. Tragically, urban employment for these people (untrained and often uneducated) is scarce and low paying, and poverty is exacerbated instead of alleviated.

NNH: The Ecological Foundation of a Social Solution

The NNH vision is based on ecological conditions determined by scientists (Schmiegelow et al. 2006) to maintain biodiversity and ecological processes in large, interconnected land and marine areas:

- **Representation** – all the native ecosystems represented;
- **Viability** – viable populations of all native species maintained and allowed to fluctuate in a natural way;
- **Intact processes** – ecological and evolutionary processes (e.g., free-flowing rivers, wind, fire, herbivory, and carnivory) ensured; and
- **Resiliency** – resilience to both short-term impacts and longer-term change (such as climate change) rendered.

Achieving a NNH goal of "at least half intact and interconnected nature" requires human collaboration in order to scale up our thinking, policy, and action. NNH also requires a wide range of land and sea conservation scenarios, including formally designated protected areas (parks, refuges, forests, biospheres, tribal and community protected areas, and marine protected areas), easements, zones of limited sustainable use, and working lands, forests, and seas managed with goal of the protecting nature and its services.

The Social HALF concept helps integrate conservation and development policy and fieldwork, and it has a clear and unequivocal role in meeting the UN Millennium Development Goals: eradicate extreme poverty and hunger, ensure environmental sustainability (reverse forest loss, improve drinking water in urban and rural areas, improve lives of slum dwellers), improve maternal health and reduce child mortality, promote gender equality and empower women (especially in rural society), and combat malaria and other infectious diseases related to water and nutrition (UNDP 2013).

The Social HALF case for protecting nature rests on three factors: human health, security, and prosperity – the factors of human well-being most directly linked to what nature provides:

- **Health –** clean air and water; nutritious food**;** water for sanitation and disease prevention; fuel sources for energy to keep warm and cool**;** botanical medicines and pharmaceutical

Figure 3 – "Fair Trade", community-grown, organic coffee (here in Sierra de Juarez, Oaxaca, Mexico) is one of the best, most recent examples of integrating biodiversity conservation and sustainable rural development. Photo by Jaime Rojo.

Figure 4 – Clean, easily accessible water (here being fetched at long distance in KwaZulu Natal, South Africa) is one of the first things lost when a high-value landscape is overgrazed or otherwise converted. Photo by Vance G. Martin.

ingredients; and source of spirituality, inspiration, aesthetics, and recreation.

- **Security** – personal security (basic needs met); access to natural resources; protection from natural disasters (including those attributed to climate change); sustained social networks (especially those indigenous communities inhabiting or directly reliant on nature); avoidance of human-human conflict over scarce water, food, and raw materials; and avoidance of human-wildlife conflict.
- **Prosperity** – secure livelihoods; preservation of traditional ecological (ecosystem) knowledge; source of genetic resources for food crops (improved quality and yields) and medicines (efficacy and quantity); contribution to national economy via traded commodities and trickle-down effects; and fish and bushmeat – wild-caught protein sources.

Nature Strategy for Sustainability

Social HALF addresses basic human rights and social equity through an NNH strategy of protecting ecosystem services that provide for human health, security, and prosperity. Social HALF objectives are

1. Alleviated human suffering – Nutrition and sanitation, keys to health, decline readily when water becomes scarcer and agriculture less productive. Healthy natural ecosystems underlie agriculture and provide clean water and fuelwood. Basic necessities of food, drinking/cooking water, and energy provided by nature give especially rural people (women in particular) more time to work for income and to care for family.
2. Enhanced human security – Natural resource scarcity spawns human conflict at a local level. The physical, economic, and social impacts of nature loss flow easily across political jurisdictions and country borders. For example, poverty and war in one country can slow regional economic growth and drive conflict and refugees into neighboring countries. Dust storms and fires diminish air quality in nearby countries. Greenhouse gas emissions affecting the global climate erupt from deforestation (van der Werf et al. 2009). Wealthy countries with efficient, stable governments and strong civil societies might maintain freedom and choice for a period of time while ecosystems decline, but because forest, agriculture, fishing, and ecotourism industries are tied directly to ecosystem health, stability will deteriorate unless nature decline is reversed the world over.
3. Nature valuation in the economy – National capital asset accounts typically lack measures of renewable resource degradation and depletion. A country chops down its forests and fishes out its waters, and this shows up as a GDP gain despite loss of the natural capital. The non-market benefits of ecosystems (e.g., soil formation, water purification, flood regulation, and more) are often lost because there is insufficient incentive to invest in ecosystem maintenance and little apparent penalty for misuse. One of the first results seen is insufficient renewable fresh water per capita.

Our current economic development pattern is reactive: it requires increasing investment to restore and repair ecosystem damage. This is despite the clear evidence that, virtually always, the cost of ecosystem restoration is higher than the cost of preventing degradation and fragmentation (and, once destroyed, not all services can be restored and reconnected).

The NSS strategy for development, based on the NNH vision and Social HALF principles, is proactive and cost-efficient through safeguarding life-support systems at their source. Livelihood strategies that benefit, protect, and regenerate natural systems can create jobs while preventing ecosystem decline. Markets for ecosystem services (water, carbon, and even biodiversity) may eventually evolve to pay for conservation, while in the mean time, more immediate and essential measures are taken to protect and interconnect the needed half of Earth's land and waters.

NNH Strategies for Human Activity and Ecosystem Impact

Achieving HALF will require measures beyond formally designating protected areas (parks, refuges, forests, biospheres, and marine protected areas) and include

working lands managed with nature as a primary value. Protecting nature in such a mosaic is the only way to provide ecological and cultural services essential to meeting human needs.

Thus, the proposed NSS will require landscape-scale, complementary approaches to sustainable development that account for the impact of human activity on ecosystem function connected to these areas: agriculture, forestry, water management, marine policy, biodiversity conservation, valuing indigenous people, gender equity, ecotourism and recreation., and areas with special vulnerabilities:

Figure 5 – Oyster culture in Marismas Nacionales Biosphere Reserve, Nayarit, Mexico. Photo by Jaime Rojo.

Agriculture – Agriculture compatible with sustaining ecosystem functions and services is needed to create multifunctional ecosystems that can produce more food with less water and artificial inputs. Tenure-system constraints on the participation of women, smallholders, youth, and indigenous farmers cannot be ignored. NSS strategies will need to incorporate the benefits of sustainable intensification and methods of water-use efficiency, crop rotation, tillage, integrated systems (crops, nitrogen-fixing trees, livestock, and aquaculture), resources reuse for feed/fodder and soil fertility (crop residue, manure), integrated pest management. and use of local and adapted drought-tolerant cultivars that increase reliable yields and nutritional quality while decreasing monoculture (Conniff 2012).

Forestry – Forest covers about a third of the Earth's land surface (TEEB 2012). Experts predict that 20% of grassland and forestland may be converted primarily to agriculture by 2050 (MEA 2005). Negative hydrological consequences of deforestation include decreased rainfall (accelerating additional loss of forest), salinization, soil loss, and waterlogging. Forest clearings create vegetation edges, where pathogen, vector, and host interaction amplifies with deadly consequences for humans, livestock, and wildlife alike. NSS strategies will need to incorporate protection of existing and ecologically healthy forests (which is the most cost-efficient strategy) as well as multispecies reforestation.

Water management – Modern agriculture uses 70% of all managed freshwater sources. However, subsistence agriculture (95% of agriculture in sub-Saharan Africa) is rain fed, with low productivity because of limited or no precipitation at critical growing periods, making soil nutrients less available and increasing the occurrence of pests and diseases. NSS strategies will need to protect natural areas at river headwaters for quality and quantity water flow, while also regenerating fish habitat and stocks. NSS water management strategies in food production will need to employ low tillage methods, rotating pasturage, restoring shelter, selecting appropriate species, and more.

Marine policy – About half of all humans reside in coastal communities reliant on marine resources. Across much of the world, about 90% of the biomass of fish targeted in fisheries (including bycatch) has been lost to industrial fishing; the fish harvested are increasingly from less valuable, lower trophic levels, as higher trophic level species are depleted (MEA 2005). NSS strategies will need to protect coral reefs, sea-grass beds, and mangroves to provide coastal residents with food protein and also buffer them from climate change impacts. NSS strategies will need to include marine wilderness management areas (Randall 2012) designed to regrow fish stocks and other marine species devastated by fishing practices on the high seas.

Biodiversity conservation –Critical habitat and stopover areas for wildlife important to human communities as well as pollinators (insects and birds) essential to natural and cultivated plant propagation need to be protected. Plant genetic resources banked in NNH areas can provide fresh genetic material that is resilient or has wider

tolerance as changing conditions increase (drought, extreme temperatures, salinity), particularly those wild relatives of globally important food crops such as barley, maize, oats, potatoes, rice, and wheat. NSS strategies will need to engage local stakeholders in directly addressing the escalation of illegal harvests of wildlife, trees, plants, and marine products.

Valuing indigenous people – Currently inhabiting or holding traditional land claims for almost a quarter of the Earth's surface –roughly 36 million square kilometers or 14 million square miles – indigenous peoples currently steward approximately the same amount of wild nature as all governments and private conservationists combined. NSS strategies will need to support, assist, and involve indigenous communities whose cultural identities are tied closely to particular habitats or wildlife (e.g., artisanal coastal fishing communities, Arctic populations, traditional forest societies, and pastoral nomadic societies) and whose traditional knowledge and management can be instrumental in protecting the resources and services.

Gender equity – NSS strategies will need to empower women to participate equally in policy development, organizational development and financial assistance, and the education, training, and information and technology transfer opportunities afforded by it.

Ecotourism and recreation – Beyond a utilitarian approach, Social HALF treasures the existence, inheritance, and intrinsic value of wild nature that brings happiness and satisfaction to all people and provides unique experiential opportunities for the human body, mind, and spirit. With these values and practices in mind, NSS strategies will need to create these opportunities for personal value and local community revenue.

Areas with special vulnerabilities – Drylands comprise more than 40% of Earth's land surface, and across almost 100 countries, many dryland inhabitants depend directly on this highly variable natural resource base land for subsistence (UNEP 2013). About half of dryland inhabitants account for half of the world's poor. Pressures on dryland ecosystems already exceed sustainable levels of soil formation and water supply (MEA 2005). Also, Small Island Developing States particularly susceptible to climate change effects need targeted support. NSS strategies will need to recognize that certain communities have less capacity (e.g., political, economic) for designating protected areas but are closest to the edge of survival or sustainability.

The Social HALF concept makes the case for integrating international development and conservation objectives.

Conclusion

Because of an inherent lag in the response of ecosystems to disturbance, the result of nature's degradation will mostly impact future generations. Moreover, impacts of ecosystem degradation are often felt some distance away from where they originated (e.g., changes to the headwaters affect water flow and quality downstream, and destruction of a fish nursery results in reduced harvests out at sea). Both the inertia in ecological systems and the time and physical separation of costs and benefits of ecosystem changes mean people experiencing harm are not the same as those gaining the benefits. Increasingly, the poor will feel the impacts most profoundly.

The NNH movement needs momentum, and the Social HALF concept makes the case for integrating international development and conservation objectives. Implementing an NSS can take advantage of three international trends: (1) **digital technology** makes it easier for governments to share information with the public, and for the public to hold decision makers accountable; (2) **business and industry** have a demonstrated self-interest in advancing a green economy (UNEP 2013) for a marketable, triple bottom line of profitability for profit, people, and planet (Anonymous 2009); and (3) an **expanding international policy arena** provides more opportunities to apply NNH.

The NNH vision and the Social HALF concept, implemented through the NSS, uses science – and is the best business model – for achieving a more healthy, secure, and prosperous life for all people. It both banks and generates natural capital to meet human needs and sustains the ability to respond to economic opportunities. It is the right social contract with nature.

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Conservation Development Centre (CDC), the International Institute for Sustainable Development (IISD) and

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Long-Term Projections of Backcountry Recreation Use

BY KEN CORDELL and J. M. BOWKER*

Management of wilderness and other backcountry lands can be more sure-footed if some notion of what the future will hold is revealed. An important part of that future is recreational use of these lands. Some have argued that per capita nature-based recreation use has been declining and may continue doing so in the future (Pergams and Zaradic 2008). Harris (2012) reported that whereas total hunting and fishing participation numbers declined between 1996 and 2006, wildlife watching was on the rise. Findings from the 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation showed some recent rebounds since 2006, with number of hunters increasing by 9%, anglers increasing by 11%, and wildlife watchers increasing 2% (U.S. Fish and Wildlife Service 2012). Walls et al. (2009) used data from 1979 through 2008 to show that although total visits remained relatively stable, visits per capita on public lands have declined for about 15 years, except for national wildlife refuges. Using national household survey data from 1999 to 2009, Cordell (2012) found upward trends in participation for a number of nature-based activities, such as viewing/photographing natural scenery, hiking, and visiting backcountry areas. Bowker et al. (2006) used household recreation participation, socioeconomic, land-use, and agency-visitation count data to model and project declining per capita participation rates and per capita days of visitation to wilderness and primitive areas, while projecting increasing overall visitation. Similarly, Poudyal et al. (2008) and Poudyal et al. (2012) forecasted declines in hunting and fishing license sales per capita in the southeastern United States.

To address differing interpretations of observable trends and futures, we developed national projections through 2060 of participation for 17 nature-based activities. A detailed description of the data, methods, and resultant projections has been published (Bowker et al. 2012) as part of the Forest Service's Renewable Resources Planning Act 2010 Assessment of forest and rangelands (USDA Forest Service 2012).

J. M. Bowker and Ken Cordell. Photo by Babs McDonald.

We present projections for four of those 17 activities – those occurring mainly in wilderness or other backcountry. The backcountry activities featured are challenge activities, horseback riding on trails, hiking, and visiting primitive areas (see Figure 1). Limited results for other activities that sometimes occur in wilderness or backcountry are also presented. These other activities include viewing/photographing nature, floating (nonmotorized boating), hunting, and fishing. We present current (recent) and projected percentages of population participating in activities, total number participating, average days per participant, and total days for all participants per year. The main focus of the projections presented here is on their averages by activity across climate change scenarios that were forecasted. An "activity day" of participation is any amount of time on a single day by one person. A person can participate in more than one activity on a single day, so there may be "double" counting when days are added across activities. Hence, when considered across activities, the "days" metric is an index of participation and projected growth.

Methods and Data

Cicchetti (1973) pioneered population-level models to forecast recreation participation. Our research used Cicchetti's approach, combined with modern statistical techniques and improved data, to project participation in nature-based recreation activities (Bowker et al. 2012).

First, a logistic model was used to estimate the probability of participation in an activity. Results were combined

Senior authorship is not assigned.

Figure 1 – Hikers preparing to hike through Gorges State Park to Rainbow Falls and other falls on Horsepasture River in the Nantahala National Forest, North Carolina. Photograph by Ken Cordell.

with 2008 population-weighted baseline sample means for the explanatory variables to estimate an initial participation rate for each activity. These were recalculated at 10-year intervals out to 2060 using projected changes in the external variables. Indices were then created for the participation rates by which the National Survey on Recreation and the Environment (NSRE) 2005–2009 average population-weighted participation frequencies (2008 baselines) were scaled. The resulting indexed participation rates were combined with forecasts of population growth to yield values for total adult participants across activities.

Next, a hurdle model, combining the probability of participation and number of days of use for those participating, was used to estimate indices of activity days. Hurdle model estimates were combined with 2008 NSRE baseline participant and days estimates, projected external variables, and forecast population changes to yield values of projected days of participation by activity.

Recreation participation, socioeconomic, and supply variables for the models and projections were obtained from the NSRE database (Cordell 2012). Other supply and land-use change data were obtained from Cordell et al. (2012) and Wear (2011). Historical as well as projected climate data were from Joyce et al. (in press).

Projections for Backcountry Activities

Challenge activities, often associated with young and affluent adults, include caving, mountain climbing, and rock climbing. About 11% of adults (25 million of those 16 or older) currently engage in these challenge activities, a rate forecast to increase by 15–20%, depending on which climate change assumptions are used. Averaged across climate change scenarios, the projected number of challenge activity participants is projected to grow by more than 80%, to about 43 million by 2060 (see Figure 2). Days per participant is projected to remain almost unchanged at just under five days per year per participant, but coupled with population growth, total annual challenge activity days is projected to grow from 121 million in 2008 to around 210 million days by 2060.

Riding horseback on trails was an activity pursued by around 7% of American adults (17 million) in 2008. This percentage is forecast to increase to between 8 and 9.4% by 2060 (depending on climate change assumptions). With population growth

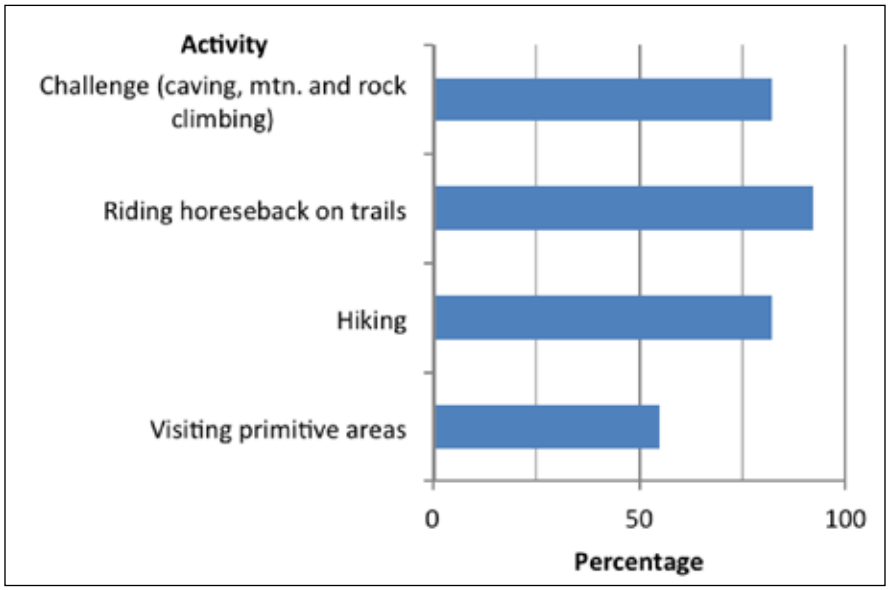

Figure 2 – Projected percentage increase in number of people 16 or older participating in backcountry activities by 2060.

included, projected annual number of participants rises by more than 90% (see Figure 2) to just over 32 million. The projections show an average decrease in number of horse trail days per participant annually by about 9%, down about 1.5 days per year. With this drop, projected population growth to 2060 leads to increases in total days of horseback riding on trails of between 40 and 92%, depending on climate assumptions. If climate is incorporated, the absolute increase in trail riding days averages 166 million days by 2060, which reflects the growth-dampening effect of projected days per year greater than 35°C .

Hiking is the single most popular backcountry activity in the United States. About a third of American adults, or about 79 million, hiked in 2008. The percentage of Americans hiking is expected to increase by 4–10% by 2060. Hiking is popular among Hispanics, thus rapid growth in numbers in this segment of the population – plus substantial population growth overall – pretty well assures that hiking participation will rise in the future. Over all scenarios, and considering climate change, the number of adults hiking should rise by more than 60% (see Figure 2) – from 79 million currently to around 129 million by 2060. Annual days of hiking per participant are virtually identical across scenarios, increasing about 6% when averaged across climate change assumptions, or about 1.5 days per year by 2060. Thus, the rate of growth of total annual days of hiking will slightly exceed that of population growth, going from about 1.8 billion in 2008 to more than 3.2 billion by 2060.

Visiting primitive areas consists of activities such as backpacking, primitive camping, and visiting a wilderness or other primitive area. This composite of backcountry activities accounted for more than 90 million participants in 2008, about 38% of all adults. The percentage of the adult population participating in this category is expected to decline by nearly two percentage points by 2060. Increased population density, declining wilderness acres per capita, and declining forest/rangeland per capita appear to be influencing this decline. However, because of population growth, overall numbers participating in these activities is expected to increase by about 50% (see Figure 2) to more than 135 million by 2060. Annually, average days visiting primitive areas are projected to decline by about one-half day per participant by 2060. Hence, total annual days of primitive area visitation will increase at a rate slightly less than population growth, but increase nonetheless from more than 1.2 billion in 2008 to almost 1.8 billion by 2060.

Projections for Other Activities Sometimes Occurring in Backcountry

Other activities for which we provide projections include viewing/photographing nature, floating (nonmotorized boating), hunting and fishing. These activities mostly do not occur in backcountry. For example, viewing/photographing/studying nature often takes place in backyards. In addition, fishing often occurs in farm ponds or in hydroelectric reservoirs.

Viewing/photographing/studying nature is very popular among Americans. This composite includes activities such as birding, wildlife watching, photography of wild flowers, fish watching, gathering natural materials (e.g., pine cones), or any number of related nature appreciation activities. The number of adults participating in birding is projected to rise from 82 to nearly 130 million by 2060. Total days are projected to rise from more than 8 billion to more than 12 billion. *Floating* is nonmotorized boating (such as canoeing, kayaking, rafting, tubing, etc.). In recent years, the percentage participating in floating has been around 17%, or about 40 million participants, annually. Projections indicate growth to about 53 million participants by 2060. Total days are projected to grow from 262 to 345 million by 2060.

Nature-based outdoor recreation activities will remain a key part of the social and economic fabric of the United States.

Hunting and fishing have remained popular with about 28 million annual adult hunters and 73 million annual adult anglers in recent years. However, on a per capita basis, these pursuits have shown some decline from past decades (Cordell 2012; Walls et al. 2009; Harris 2012). The annual adult *hunting* participation rate – nearly 12% in 2008 – is projected to decline between 24 and 35% across scenarios, with climate included. However, with population growth, the number of hunters should increase from 28 to 32 million by 2060. Total days of hunting, however, are projected to drop by 8 million by then. *Fishing* of any type is showing a similar future trend. The percentage of adults participating in fishing is expected to drop during the next five decades. However, with population increasing, the number participating is projected to increase from 73 to 103 million. Fishing days per participant are forecast to decline by about a day per annum, but total days are projected to increase by almost 400 million by 2060.

Observations and Discussion

Presented above are U.S. participation projections for four backcountry outdoor activities and four other activities that sometimes occur in backcountry. As illustrated in Figure 2, growth is projected, but rates will vary across activities. Figure 3 shows the combined projected growth trend for a broad range of nature-based outdoor recreation, including backcountry activities (Bowker et al. 2012). This is important context because it indicates a general condition of rising demand pressures for access to increasingly scarce land, water, and other resources. If our projections are showing anything near what the future has in store, then the recreation use pressures across the spectrum of public and private land, water, and other resources and across the spectrum of nature-based activities of interest to people will intensify.

Future per capita supply – To examine this very important point, related research has been completed to look at per capita supply of lands and other resources in a future where increasing population is assured. The resources examined included federal and state park land, water, nonfederal forest, nonfederal range and pasture, ocean and Great Lakes coast, mountains, area with snow cover, specially designated federal lands, and private recreation businesses (Cordell et al. 2013). Looking at just two of the resources examined, we see that there is likely to be only about two-thirds of the current 2.1 acres (0.85 ha) of federal and state park lands per capita by 2060. The western regions will continue to far outpace the eastern regions by 2060 in acres per capita. At the same time, however, these regions will experience the largest declines in per capita acres because their populations are growing very rapidly.

With regard to designated federal lands, often considered prime places for backcountry recreation activities, projected per capita area shows a similar general pattern of decline. The designated lands examined include the National Wilderness Preservation System, National Park System, and National Recreation Areas. Per capita acres of specially designated federal land in the 50 states are projected at about 0.35 acre (0.13 ha), down from the current 0.52 acre (0.21 ha). Excluding Alaska, per capita acres of specially designated land in the Intermountain subregion of the West will drop to almost half the current 1.6 acres (0.65 ha) per person to almost 0.8 acre (0.32 ha) by 2060. Figure 4 maps the county pattern of proportions of per capita acres of designated federal lands anticipated in 2060 relative to 2008. Most counties are projected to have fewer acres per capita by 2060, especially those in the West.

The influence of climate change – Participant numbers and days of participation were projected for scenarios both with and without associated climate change. Overall, projections for 14 of 17 activities indicate fewer *participants* in the future when climate change is considered. The general effect of climate change on projections of *total days* is similar. Overall, 14 of 17 activities showed declines in total days of participation when climate change is considered. Activities that could show an increase in total days under projected climate changes include interpretive site use, challenge sports, and off-road driving.

The influence of other factors – The variables making up the forecasting models resulting from this research showed that demographic variables in part determine participation in backcountry recreation. For example, males are more apt to participate in backcountry activities, in hunting, in fishing, and in floating than are females. Females are more likely to participate in the viewing activities and in horseback riding. Ethnicity is also important. Minorities, including African Americans, Hispanics, and Asians, were

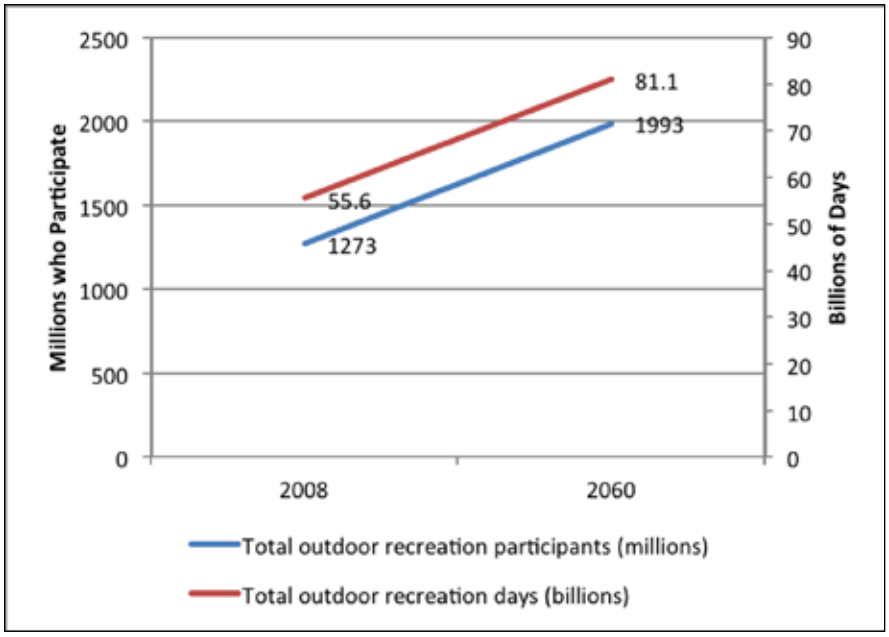

Figure 3 – Projected growth indices of nature-based outdoor recreation activity participation from 2008 to 2060. Number of participants and days are summed across the full 17 nature-based activities and do not account for potential double counting, thus they represent a growth index.

less likely than whites to participate in backcountry activities. One notable exception is hiking, where Hispanics were more likely to participate than either whites or other minority ethnicities. Another exception is that American Indians were more likely than whites to participate in hiking or horseback riding on trails.

With regard to other factors, the greater the education level, the greater the likelihood of participation in backcountry and viewing activities. However, for fishing and hunting, more education lowered the probability of participation. Income was positively associated with participation and days of use across all activities, although for birding, hiking, and hunting, the effect was small. Because place of residence in large part determines local per capita land and water availability, it is an important factor in determining participation. Hence, declines in wilderness lands and so forth induced projections of declines in spatially extensive activities, such as horseback riding on trails.

Population change is perhaps the most influential factor in projections. Depending on which futures scenario one selects, population is projected to rise in the United States from just over 300 million to nearly 500 million by 2060. If people continue to be interested in nature-based and backcountry recreation – and we believe that will be the case – in less than 50 years there will be between 100 and 200 million more Americans, which will surely translate into greater nature-based recreation demand.

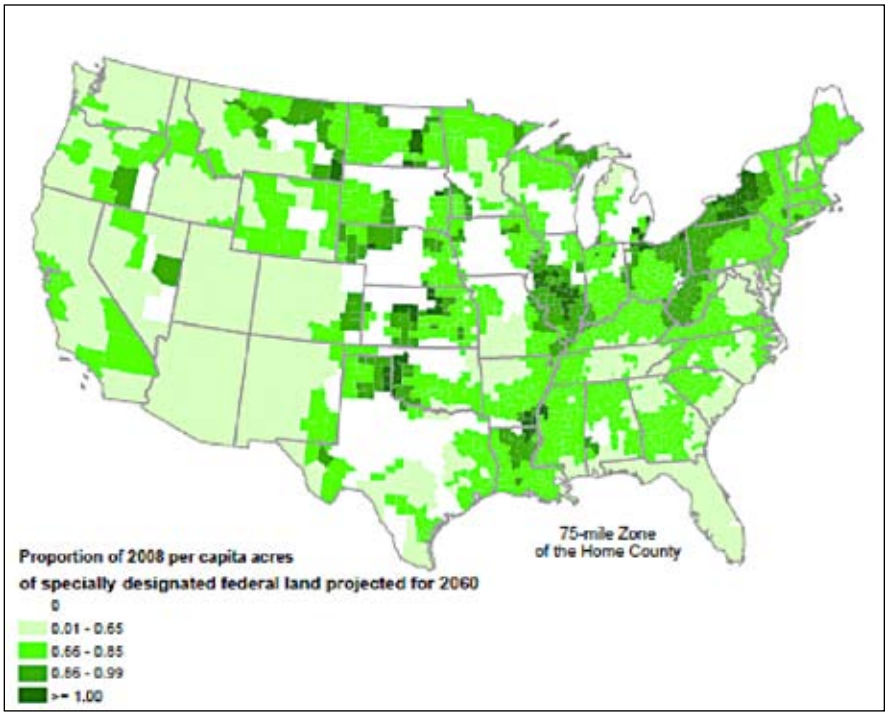

Figure 4 – Proportion of 2008 per capita acres of specially designated federal land projected for 2060, within the 75-mile distance zone of county centers. Sources: USDA Forest Service (2008), USDI National Park Service (2008), Wilderness Institute (2009).

Implications

Under nearly all of the considered future population, demographic, land-use, and climate conditions, total recreation participant numbers and days are expected to grow. Thus, nature-based outdoor recreation activities will remain a key part of the social and economic fabric of the United States. Assuming the public land base remains more or less stable, increasing population and participation will result in decreasing per capita recreation opportunities across most of the country. Although many other factors are involved, recreation resources, both natural and human-made, likely will become somewhat less "available" as more people compete to use them. In the case of privately owned land, this increased competition for recreational resources could mean rising access prices due to increased demand relative to supply. On public lands, where access fees cannot be adjusted easily to market or quasi-market conditions, increased congestion and possible declines in the quality of the backcountry recreation experience are likely to present important challenges to management.

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Should Wilderness Be Natural or Wild?

Bridger Wilderness Visitors' Attitudes about Management of Disturbance

BY ANDREA DAVIDSON AND TROY E. HALL

Abstract: On-site surveys assessed Bridger Wilderness visitors' attitudes about the management of five current disturbances, including invasive species and unnatural fuel buildup. Alternatives included managing for wildness (taking no action) and managing to restore natural conditions. Attitudes varied depending on the scenario, although visitors generally preferred actions to restore naturalness. Preferences were based on different value priorities and ethical positions, but there was little reference to provisions of the Wilderness Act. Findings suggest a divergence between public and managers' understandings of how natural systems respond to disturbances, as well as a need for communication about both wilderness policy and changing ecosystems.

Introduction

Managers must protect the wilderness character of designated wilderness, and recently the natural and wild (untrammeled) qualities have received increased attention (Cole and Yung 2010). Naturalness refers to maintaining primeval species composition and processes, while wildness refers to the goal of maintaining lands free from human manipulation and control (Landres et al. 2005). In the face of invasive species, climate change, and recreational impacts, managers may consider taking actions to reestablish natural conditions, such as removing exotic species with herbicides, liming rivers to mitigate acidity, or mechanically reducing unnatural fuel loads. These actions are in direct conflict with keeping wilderness wild. Should wilderness managers act as guardians? Or should they act as gardeners?

Supporters of wildness argue that humility is warranted, partly because activities to restore natural conditions can have unpredictable effects (Cole 1996; Landres et al. 2000). Furthermore, if managers choose to manipulate ecosystems with the objective of restoring pristine conditions, wildernesses will simply become a reflection of what current managers think is natural. This position is also based on philosophical commitments to let nature be.

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Supporters of actively managing for naturalness claim that historic ideas that intact ecosystems are static with impermeable boundaries are misguided (Graber 2003). Instead, they argue, no place on Earth today is free of anthropogenic influence. Therefore, a hands-off approach to keeping wilderness untrammeled could never achieve its goal of an environment free from human influence. Consequently, this position argues that continued manipulation is necessary to keep ecosystem components and functions healthy.

Public sentiment is an important consideration in decision making, but little is known about how the visiting

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public understands and values naturalness and wildness. Most related research has addressed the role of fire, with two studies finding moderate levels of support for letting lightning-caused fires burn in wilderness (Borrie et al. 2006; Watson et al. 1996), another study finding opposition (Manning and Valliere 1996), and a fourth finding mixed support (Knotek et al. 2008). A few studies have investigated attitudes about fish stocking, finding that visitors generally support the practice (Manning and Valliere 1996; Virden and Schreyer 1988) or have mixed views (Cole et al. 1995). The extent to which such attitudes are based on considerations of wildness, naturalness, or simply self-interest is unclear. Nevertheless, some evidence suggests that visitors support actions to restore naturalness, such as reintroducing extirpated predators (Manning and Valliere 1996) or revegetating impacted areas (Brown et al. 2008; Virden and Schreyer 1988). However, Brown et al. (2008) documented strong opposition for closing an "entire area to all recreation use until it is restored to wilderness conditions," suggesting that the scale of the action may shape attitudes. To address the lack of research on attitudes toward naturalness and wildness, we present findings from an exploratory study of how visitors prioritize naturalness and wildness in considering management alternatives.

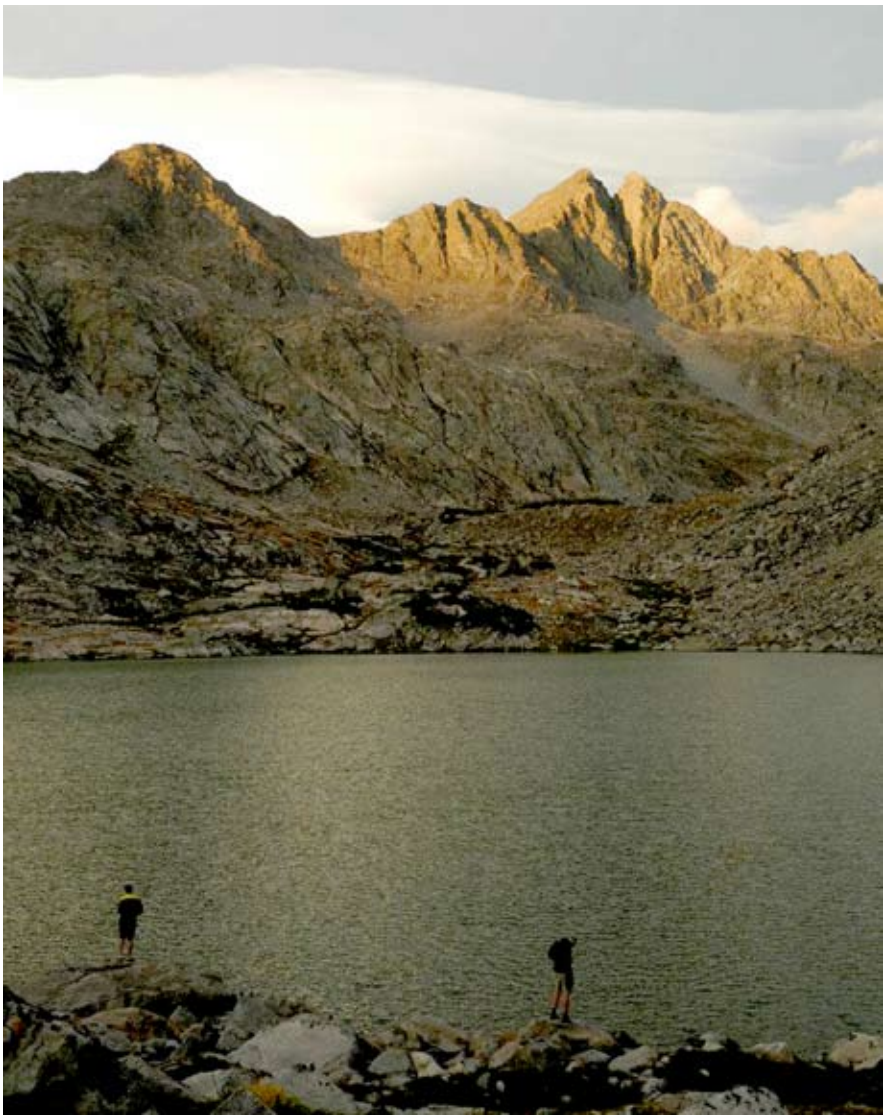

Figure 1 – Bridger Wilderness in Wyoming includes numerous high altitude lakes that are often visited for recreation. Photo by Andrea Davidson.

Methods

The Bridger Wilderness (Wyoming) is nearly 500,000 acres (202,429 ha), with large glaciers, high peaks, lakes, and rivers accessed by 570 miles (919 km) of trails (Fig. 1). In the summer of 2010, we sampled adult visitors at eight trailheads, four high-use trailheads (each sampled eight times), and four low-use trailheads (each sampled four times). The response rate was 91.8%, and 135 visitors completed questionnaires.

We presented scenarios for five management issues and asked respondents to select their preferred management alternatives. The scenarios and responses were real issues facing Bridger Wilderness managers: (1) whitebark pine decline due to an introduced fungus, (2) invasive spotted knapweed, (3) fire suppression effects on fuel loadings, (4) nonnative mountain goats, and (5) stocking of nonnative fish. They varied in the magnitude of the disturbance, the rarity and vulnerability of what would be restored, and the complexity and duration of the potential restoration methods. Each scenario was presented in a brief paragraph about the cause and consequences of the disturbance. Possible management responses always included a "no management" option that represented wildness ("Nature should be allowed to take its own course and the wilderness area should remain free from direct human control and manipulation"). The options for restoring naturalness were presented with a brief summary of effectiveness and known side effects.

Respondents were asked to state the reasons underpinning their preferences. In discussing the results, *we use excerpts from these narrative responses to illustrate people's reasoning*.

Results

Whitebark Pine

This scenario explained that whitebark pine is a slow-growing, ecologically central species in subalpine ecosystems, which provides food for many species. It is being significantly affected by nonnative white pine blister rust, which spreads rapidly and to which it has little resistance. The survey included only one naturalness option, which was endorsed by 63% of visitors: "Efforts should focus on restoring whitebark pine populations by introducing whitebark pines that are genetically resistant to infection." Many visitors viewed humans as the likely cause of whitebark pine decline and felt it was ethically necessary "for measures to be taken to restore the ecosystem to an unadulterated state." Others argued that intervention is necessary regardless of the cause, because "nature sometimes needs a little help." Some visitors noted that human change is so pervasive in all ecosystems that there is no practical alternative to active management. Visitors agreed that nonnative species "throw off the balance of an ecosystem" or could "have a chain effect on other key species." Likewise, whitebark pine was considered so essential, and wilderness ecosystems to be sufficiently rare, that people felt something should be done. Although ecological reasons were most common, some people expressed personal reasons for wanting pine restoration, such as averting a loss of scenery and negative effects on recreation opportunities.

Visitors who endorsed the wildness option expressed concerns about the suggested approach to restoration, namely possible "unintended consequences." As a result, some felt that managers should "let nature take care of itself." Interestingly, few visitors expressed concerns specifically about introducing genetically resistant trees, although some took this to mean genetically modified and therefore opposed such restoration activities on principle. Other supporters of taking no action believed that "nature can manage herself better in this case" or that forests have declined in the past and recovered. They argued for allowing "natural selection to proceed."

Figure 2. Visitors to the Bridger Wilderness were interviewed during their trips there in the summer of 2010. Photo by Andrea Davidson.

Nonnative Cutthroat Trout

This scenario explained that the exotic stocked species of non-native cutthroat trout is considered a threat to native cutthroat trout, but that many wilderness visitors enjoy fishing for it. In this case, the wildness option would be to discontinue stocking fish, which was endorsed by 52% of visitors. The option to maintain current practices to provide fishing was endorsed by 27% of visitors, whereas 21% agreed that "rotenone, a fish poison, should be used to remove the non-native fish" and "a pure strain of native cutthroat trout should be reintroduced in the wilderness."

Most of those who preferred to continue stocking enjoy fishing and simply "don't care what kind of cutthroat trout" they catch. Moreover, some saw fishing as a way to increase public support for wilderness. Those who preferred to stop stocking thought "it was a mistake to stock them in the first place," but we should "let nature take its course" rather than poison the nonnative fish. Proponents of both ceasing stocking and reintroducing native fish felt that "it's not really good to introduce non-native animals" because of the impacts to native species. Some of those who supported poisoning did express concerns about the effects of rotenone on native species, but they thought "we need to get the native species back."

Spotted Knapweed

This scenario described spotted knapweed as "an aggressive, invasive weed, producing more than 25,000 seeds per plant, that rapidly invades habitats and out-competes native species," has little forage value, and is spread by humans. The scenario asked for respondents' preference if the plant "took over a whole valley in the Bridger Wilderness." Only 18% of visitors endorsed the "no management" option. They were mixed in their reasoning, although there was shared concern about the potential side effects or ineffectiveness of the possible management actions.

The 82% of people who agreed "action should be taken to control spotted knapweed to maintain native habitat conditions" were asked which of five management options they would support (see Table 1). People who supported mechanical removal generally thought other options had worse side effects. Those who preferred grazing largely opposed "chemicals" and thought that grazing would be "less invasive and damaging." Supporters of fire thought that this would be "the most natural way" to deal with the problem, and might be "good for the forest." As one person noted, "even though fire may damage native plants, they will regenerate in time." People who supported biological control emphasized the effectiveness of this option and were opposed to "chemical control." Proponents of herbicide were swayed by the efficiency and effectiveness of this method to maintain the "integrity of the wilderness."

Table 1 – Support for management actions to control spotted knapweed among respondents who prefer naturalness.

Action	Percent support
Mechanical treatment (i.e., pulling the weeds by hand). This is not a very effective method, takes a lot of time, and requires seven to eight years of repeated pulling. People can suffer from allergic reactions, so gloves should be worn. No chemicals are used.	17.6
Introduce a biological control agent such as a seed-eating weevil. This has been shown to be very effective in reducing seed production; however, negative side effects (such as increased mice populations) are not known.	18.5
Apply herbicide. Herbicides applied during bud growth in early June have been shown to be the most effective treatment. However, this creates environmental dangers and risks to people applying the chemical.	19.4
Management-ignited fires. Such fires can reduce infestations by 5%–90%. Only very hot, intense burns are effective, and these may damage native plants.	29.6
Grazing by domestic goats and sheep (the only animals that can destroy knapweed seeds). This is a fairly effective, yet very slow treatment method because it requires repeated seasons of grazing until it takes effect. Often, populations rebound after grazing stops. Animals need to be enclosed in a fence because they prefer to eat nearby grasses.	41.7

Fuel Buildup

The fourth scenario stated that "fire has played an integral role in natural ecosystems of the area" and is an important natural disturbance. It explained that fire suppression has led to "older, homogeneous vegetation and artificially high levels of burnable material, which contributes to unusually large and intense fires." Only 12% of respondents believed that "management should continue fire suppression to prevent unusually high intensity and large fires." They generally were concerned about the possibility of large fires. The wildness option ("naturally ignited wildland fires from lightning should be allowed to burn, even if this results in fires that are more intense and larger than what historically took place") was endorsed by 29% of visitors. These visitors thought this would "allow nature to take its course" and "do its natural thing." Even if a fire were large, "the land will recover in its own way" and "long-term correction will occur."

The majority, 59%, agreed that "efforts should be made to restore fire regimes to historical patterns to improve wildlife habitat and re-establish biodiversity in the ecosystem." Visitors endorsing this naturalness option were asked which of two practices they would support: "management-ignited fires" to "control the size and intensity of the fire" (58% support) or "naturally ignited fires from lightning" being allowed to burn, following "selective thinning used to lower fuel loads to encourage less intense and smaller fires" (42% support). People who supported the first option thought this would "help to restore natural patterns through incremental steps," and some pointed out "controlled burns have worked in many other areas." For them, natural fire was "not an option because of large fuel build-up." On the other hand, supporters of the second option focused on the promise of smaller and less intense fires. For instance, one person noted that this seemed like "a good compromise of natural cause and some control of size," while another commented that it is "more natural but doesn't burn the entire forest." Interestingly, no one mentioned concerns about cutting trees in wilderness. In fact, the general sentiment seemed to be captured by the statement, "If we are trying to get the

forest back to what it was, we should let it do what it's always done, but help it get there first."

Mountain Goats

The fifth scenario stated that mountain goats were introduced to Wyoming in 1969 and are considered an exotic species that may impact native subalpine plant communities and native bighorn sheep populations through disease and competition for forage. The majority of visitors (62%) supported naturalness, agreeing that "controls should be taken to remove mountain goats to improve conditions for native bighorn sheep and maintain native plant communities," whereas 38% endorsed the wildness option of taking no action. These visitors had various reasons for their choices, including that they "enjoy seeing wildlife," they thought that the goats had "been there for a long time" and become "part of the ecosystem," or we should let "the two species duke it out." They noted "nature will take care of the problem on its own."

Those who supported control were asked which of three actions should be taken: (1) relocation of goats to an area where they are native (49% support), eradication of the goats through a state-managed hunt (43% support), or management eradication of the entire population (8% support). Most people were clearly uncomfortable with the idea of killing the goats, especially without an open hunt. Relocation was seen as the "most humane" response that would still maintain the "integrity of the land in a way that lets wildlife live," especially because it was not the goats' "fault they were introduced." Having an open hunt was supported by people who enjoyed hunting, as well as those who thought hunting could "generate revenue" for the state or land management agencies. It would also "require the least resources to manage," while creating "recreation opportunities."

Discussion

Visitors' opinions about how to address anthropogenic changes revealed different value orientations and considerable variation, depending on the specific scenario (Fig. 2). However, visitors favored naturalness in all but one scenario (the nonnative fish scenario), and only one person selected the "wildness" option for all five scenarios. The most common reasons given for choosing an action to restore naturalness revolved around the notion that intervention, in some form, is necessary, due to a moral responsibility, nature needing help, the disturbance having been human caused, or the need to protect natural processes. Such findings suggest that active management, particularly when explained as restoration of anthropogenic changes, may meet with general public acceptance.

Whereas many visitors thought intervention was necessary to restore natural conditions, they had varying interpretations of what constitutes naturalness. Many assumed conditions to be natural if they were similar to historic conditions. Others mentioned ecosystem health as an indicator for natural conditions. There was widespread belief in the "balance of nature" and that nature can "fix itself." This confidence seems at odds with current scientific understanding about how climate change and other human influences are altering trajectories of natural systems.

Many visitors who preferred the "no management option" were not trying to protect wildness per se. Some either thought that there was no real problem or did not like the alternatives, even though they were not opposed to active management in principle. That visitors' reasoning contained almost no explicit discussion of wildness as a wilderness value may be problematic, because the untrammeled quality distinguishes designated wilderness from all other federally managed land. It appears that visitors were not aware of this important value of wilderness.

Active management, particularly when explained as restoration of anthropogenic changes, may meet with general public acceptance.

Only four visitors explicitly mentioned wilderness policy in their answers, and only one person overtly recognized the naturalness versus wildness dilemma. Thus, most visitors did not acknowledge the legal definition of wilderness when deciding which management option to endorse. Many factors that should, in principle, be of concern (e.g., logging, constructing a fence, or using rotenone) were virtually ignored in visitors' reasoning. Such alternatives go against some provision of the Wilderness Act and, therefore, would require major consideration and justification before they were ever implemented.

This exploratory study generates some tentative conclusions and raises several questions. Support for management of disturbances appears to be dependent on the nature and origin of the disturbance, as well as the details of

Continued on page 47

Countdown to the 50th Anniversary of the Wilderness Act

BY LISA EIDSON

September marks the 49th anniversary of the Wilderness Act of 1964 and begins the one-year countdown to the 50th anniversary in 2014. Several years ago, the 50th Anniversary National Wilderness Planning Team (Wilderness50), a coalition of more than 25 wilderness nonprofits, academic institutions, and all four wilderness management agencies, began spearheading a myriad of events, projects, and partnerships. Efforts resulted in a robust suite of wilderness awareness, education, and stewardship initiatives that will be implemented at local, regional, national, and international levels.

Author photo: Lisa Eidson visited the Oceanside, Oregon, beach in August 2012, which boasts a spectacular view of the Three Arch Rocks Wilderness in the background. Photo by Marijka Haverhals.

National Events

In September 2014, the Wilderness Forever photography exhibition will open in the Smithsonian National Museum of Natural History in Washington, D.C. This exhibition of 40–50 large-format wilderness photographs will capture the best landscapes, wildlife, people, and special experiences found in America's wilderness areas. The images will be selected from this summer's Wilderness Forever national photography contest, running until September 3, 2013, and conducted in partnership with Nature's Best Photography. The exhibition will be designed to help make the visiting public more aware of the National Wilderness Preservation System, but it will be done in a way that does not "overadvertise" any one specific wilderness area (see Figure 1).

The third week of September 2014 marks the beginning of the D.C. Wilderness Week. Wilderness Week offers grassroots wilderness advocates from across the country the opportunity to connect with peers, learn from experts, and meet with representatives of Congress. Briefings from wilderness nonprofit organization staffs, federal employees, and Capitol Hill staff; learning and training sessions; receptions honoring congressional champions; and face-to-face meetings with congressional staff are likely to fill the agenda. The week will culminate with a celebratory gala on Wednesday, September 17, 2014.

Finally, the 50th celebration year peaks with the National Wilderness Conference, held October 15–19, 2014, in Albuquerque, New Mexico. This conference will be a multiday event that includes presentations, panel discussions, exhibits, field trips, skill development workshops, and opportunities to network. During this premier forum for debating the growing challenges of perpetuating the values of wilderness in a time of unprecedented environmental and social change, participants will share ideas, celebrate recent successes, discuss emerging issues, deepen their engagement, and enable their effective involvement in the challenging wilderness stewardship decisions that lie ahead. In additional,

Figure 1 – The Wilderness Forever photography exhibition, similar to the yearly Nature's Best Photography Windland Smith Rice Awards exhibition pictured above, will open on September 3, 2014, in the Smithsonian National Museum of Natural History. Photo by Kristi Odom.

wilderness-oriented teacher workshops and outreach educational programming will be accomplished with an array of underserved audiences.

Local Events

National events will inform many people in the already-engaged wilderness community and inspire them to renew their commitment to future wilderness stewardship, but it is local events that will allow outreach to a broader public. Throughout the entire year of 2014, hundreds of local events will take center stage in communities across the country. Some events will be narrowly wilderness focused, whereas others will incorporate wilderness themes into broader-scope events, such as National Public Lands Day. Regardless of their flavor, local community events embody the diverse expressions of how different communities value wilderness and can include outings and service trips; museum, airport, or visitor center exhibits; speakers; interpretive programs; trainings or workshops; photography or writing contests; art shows; music or dance programs; book or poetry readings; film or video showings; stewardship projects; wilderness blogs; social media educational activities; and more.

September marks the 49th anniversary of the Wilderness Act of 1964 and begins the one-year countdown to the 50th anniversary in 2014.

Similar to the 40th anniversary celebrated in 2004, one of the most popular type of event will be Walks for Wilderness (WFW). These WFW are 1- to 5-mile (1.6 to 8 km) symbolic marches conducted in communities rather than in congressionally designated wilderness (see Figure 2). They can follow parade routes, park trails, or go through appropriate city or county open spaces and are often combined with other types of events, including speakers, crosscut saw and horse-packing demonstrations, booths, food, raffles, and music. Many local community events, such as WFW, are being organized through the leadership of state 50th planning teams, which Wilderness50 is helping to convene. These state teams are planning a variety of 50th events, and many, including teams in Colorado, Montana, Wyoming, Utah, and Alaska are emerging as leaders in crafting diverse and unique event lineups.

International Involvement

Although most 50th celebratory events will be domestic in nature, the anniversary also provides momentum for international audiences to further their own wildlands conservation causes. At the 10th World Wilderness Congress (October 2013) in Salamanca, Spain, there will be sessions on the 50th anniversary of the Wilderness Act, the International Year of Wilderness, and the progress that has been made on wilderness preservation around the world. In addition, there will be three working sessions for writers, photographers, filmmakers, artists, and other creative people, and a number of wilderness books will be introduced.

The International League of Conservation Writers (ILCW), with members from 26 countries, is a forum for bringing authors together who are writing to promote wilderness, nature, and conservation to protect and restore natural areas, habitats, flora, and fauna. ILCW members will be writing on the Wilderness Act anniversary throughout 2014. In support of its membership, ILCW has established the David Brower Office of Conservation Writing, which is available for writers who wish to spend time in Golden, Colorado, researching and writing on wilderness and conservation.

Education and Youth Engagement

The 50th anniversary of wilderness occurs at a time when today's youth are more disconnected from nature than ever before. In an attempt to begin offsetting this troubling detachment, efforts to incorporate wilderness into existing education and interpretive programs in public schools has become a high priority. Through two-day teacher workshops, a new K–12 curriculum, Wilderness Investigations, is being deployed nationwide. Wilderness badge programs for both Girl and Boy Scouts are under way, and the Leave No Trace Center for Outdoor Ethics (LNT) will put its primary youth education program in more than 200 elementary and middle schools across the country throughout 2014 (see Figure 3).

Figure 2 – Walks for Wilderness attract a variety of participants. These two young girls walked hand-in-hand at a Walk for Wilderness in Rapid City, South Dakota, in 2004 in support of wilderness during the 40th anniversary. Photo by Ralph Swain.

Figure 3 –LNT's PEAK (Promoting Environmental Awareness in Kids) program teaches elementary age youth about minimizing their impacts when recreating outside. Using fun, interactive activities to convey traditional Leave No Trace skills and ethical practices, PEAK provides an engaging resource for anybody working with youth. Photo courtesy of LNT.

Awareness Media

International, national, local, and educational efforts are being supported by a far-reaching wilderness awareness media campaign. An active 50th Anniversary of the Wilderness Act Facebook page and @wild50th Twitter feed feature updates, current events, spectacular imagery, trivia, giveaways, and more. The official 50th anniversary website, www.wilderness50th.org, hosts a comprehensive event map, including program and registration information for the National Wilderness Conference, and shares event information with other websites and mobile apps for wider event publicity. The Wilderness of the Week enhanced podcast series, broadcast both online on the 50th website and on radio stations beginning in 2014, will highlight the individual wilderness areas that local 50th community events on the map honor. A 50th anniversary commemorative magazine, wall map, and poster will also be produced. Celebrity endorsements as well as integration of wilderness messages into the Ad Council's Discover the Forest campaign will ensure broad, multimethod outreach.

3 … 2 … 1 … Wilderness!

As we count down to September 3, 2014, Wilderness50's hard work is gaining traction, and the collection of events, educational programs, and media projects is overwhelming when viewed collectively. It's hard to believe there's still work to be done. However, readers who aren't yet involved still have time to lend a hand by contacting Wilderness50, their state planning teams, or their agencies or employers. Don't miss the opportunity to be part of this historic moment in history that will raise public awareness of wilderness, engage youth and underserved communities, and further unite the wilderness community to foster effective wilderness stewardship for the next 50 years.

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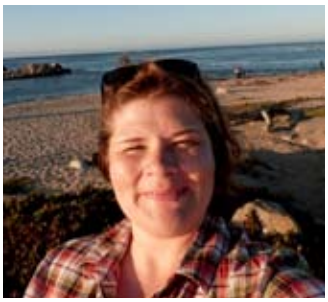
Night as an Influence on Wilderness

A Broadening of Scope

BY J. ADAM BEECO, JEFFREY C. HALLO, and BRANDI L. SMITH

J. Adam Beeco at Sock-em Dog on the wild and scenic Chattooga River, South Carolina. Photo by Eric Owensby.

Jeffrey C. Hallo at Denali National Park, Alaska. Photo by Martha Manning.



Brandi L. Smith at John Denver Beach, Pacific Grove Marine Gardens State Marine Conservation Area, California. Photo by Brandi L. Smith.

Intangible wilderness resources are largely based on the aesthetic, cognitive, and emotional value that we place on them as an individual or society. For example, solitude and naturalness are well-established intangible (i.e., perceived) characteristics that help define wilderness (White and Hendee 2000). However, these perceived constructs have been translated into measurable and manageable forms in the context of wilderness management. Duriscoe (2001) eloquently proposed and supported the notion that the right to view the night sky, and protection of night sky as a resource, was a duty assigned under the Wilderness Act. He asserted that the trespass of light from human-caused sources or the glow of the sky associated with distant urban areas was a direct threat to wilderness character. Leading governmental and nongovernmental organizations have also supported this notion. Wilderness.net (2012) lists light pollution – brightening of the natural night environment – as a threat to wilderness. Also, the National Park Service's (NPS) Night Sky Team (NST) indicates on their website that night skies and landscapes free of human-caused light are fundamental to four essential qualities of Wilderness: untrammeled, natural, undeveloped, and opportunities for solitude.

An overwhelming majority of management efforts and research regarding night in parks and wilderness areas has focused on the night skies and related impacts to night sky viewing. The NST is part of the NPS's Natural Sounds and Night Skies Division. As its name implies, the NST is focused largely on night skies. Other major organizations are similarly focused on night skies. The StarLight Foundation's (2007) Starlight Initiative is intended to create international action in defense of the values associated with the night sky and the general right to observe the stars. Also, UNESCO has an initiative that links astronomy with world heritage and provides an avenue for recognition and protection of night skies. The IUCN's World Commission on Protected Areas has formulated a Dark Skies Advisory Group. Also, the International Dark-Sky Association (2006) has a program whose goal is to "identify and honor protected public lands with exceptional commitment to, and success in implementing, the ideals of dark sky preservation and/or restoration."

This sole focus on night skies and night sky viewing within the NPS and other major organizations implies that night skies are the only recreation resource that should be considered and managed in regard to the nighttime environment in wilderness (see Figure 1). This is further supported by the NPS's almost exclusive focus on natural lightscapes and dark skies contained within their management policies (NPS 2006). Yet night may have a direct connection with other wilderness values, or in itself, night may be a considered a resource that offers new or unique experiences for wilderness visitors (Beeco et. al 2011). Our intention in this

Figure 1 – The night sky above the wild and scenic Chattooga River. Photo by Daniel McKinney.

article is to add to the largely undeveloped consideration of night as a resource and form of recreational enjoyment in wilderness. We limit our consideration of night in wilderness to those aspects beyond the night sky and night sky viewing, as these topics are well covered in other sources.

Night as an Influence on Wilderness Experiences

As mentioned, night may influence the essential characteristics of wilderness as untrammeled, natural, undeveloped, and opportunities for solitude. Specifically, night limits the distance one can see, creating a veil of darkness. This inherently masks signs of human influences (at least those not artificially lit) and forces one to focus on the immediate space that surrounds them. Darkness prevents a visitor from observing signs of human use often present even in wilderness, such as other groups and resource impacts. Darkness may even mask signs of one's own intrusion on wilderness – such as tents and packs. At no other time does a wilderness visitor get to so easily escape the modern world or escape other members of their travel party. By stepping a few feet into the unlit night of a wilderness area, one can immerse oneself in an unparalleled sense of natural solitude.

This veil of darkness brings a mystique to the wilderness. Nighttime's air of mystery – and its associated sounds and creatures – have been widely used by wilderness-related writers such as Jack London to captivate readers with the dangers and unknowns of wilderness. In particular, natural sounds become more noticeable in the quiet stillness of night and the associated limited dependence on vision. Some sounds – such as the chirping of crickets – are only present at this time. Likewise, night is a period when some animals that are often widely associated with wilderness become most active. For example, bats and owls hunt throughout the night, and the howl of a wolf may be considered a true wilderness resource or experience in itself. Other unique or rare animals are also prevalent and observable at night in wilderness, such as synchronous fireflies or sea turtles in the wilderness areas of Congaree National Park and Cumberland Island National Seashore, respectively.

Night creates a condition where human use and intrusions in wilderness may become more obvious too. Human-caused lights – such as campfires, headlamps, or distant lights of towns or buildings – may be observed from many miles away. Such lights make the presence and movement of other people more noticeable in the dark. Also, human-caused sounds reverberate through the night. Conversations between members of a distant wilderness hiking group, likely unnoticeable during the daytime, seemingly escalate into an unwelcomed cacophony at night. Lakeshores and open topography in some wilderness areas make human-caused light and sound even more obtrusive.

Night also has a cultural and historical dimension in wilderness. It is difficult to imagine historical treks or adventures into wilderness, or recount them, without considering the added dangers and fears that night brought to these events. Likewise, cultural or spiritual practices sometimes occurring in wilderness, such as storytelling or Native American ceremonies, are dependent on night, the absence of electrical lights, and night-related events such as campfires. Also, natural and well-documented but rare lights such as will-o'-the-wisp (spontaneously ignited methane over swamps and bogs), foxfire (bioluminescent fungi), and the northern lights are often highlighted in wilderness-related folklore.

Night as Wilderness Recreation

Most wilderness recreation activities may be done either during the day or night – or across many days and nights. However, nighttime recreation offers visitors new or different ways to experience wilderness. Night potentially

provides additional ways for recreationists to challenge themselves, increase their self-reliance, increase risks, experience different wildlife resources and soundscapes, and most important, gain a different perspective of one's surroundings and nature.

Hiking is typically done in the daytime, but nighttime hiking frequently occurs either intentionally or unintentionally. Hikers may seek out a nighttime hike as a way of experiencing wilderness or a trail differently, just as a hike may be perceived differently if going in one direction versus another. Sometimes the desire or need to reach a destination or peak may create the necessity for hiking at night. Such hikes may occur with or without electrical light sources, providing two distinct types of night hiking experience. Hiking a trail in wilderness at midnight by moonlight or by headlamp can create an unforgettable experience (see Figure 2).

Figure 2 – Moon photograph from Yosemite National Park. Photo by Brandi L. Smith.

In addition to hiking, whitewater kayaking is also an activity commonly associated with daytime wilderness recreation. When writing about the relationship between kayaking and wilderness, Sean Bierle wrote, "I believe it is the feeling of being slightly out of control, with elements that are foreign and unforgiving" that promote the feeling of wilderness when kayaking (2010, p. 7). An unpublished quote from a participant in the Beeco et al. (2011) study connects wilderness and kayaking with nighttime boating on the wild and scenic Chattooga River.

> At first it was, not really scary, but kind of you are on your toes, and you are paying attention and you are adjusting to things, but once you get used to it … you are able to see the "trail" in front of you. But paddling with the full moon at least you can still see the whitewater in front of you and it is not white but more silver. It is a bit more adventurous.

The adventure, challenge, and sense of discovery discussed in this quote are fundamental to the concept of wilderness, especially on a stretch of river that was frequented by the participant.

Camping is another typical wilderness recreation activity, and it is one that is fundamentally connected to the condition of night. This is strongly supported by frequent descriptions of trips or definitions of wilderness that describe the number of nights spent by an individual. For many individuals, the social experiences associated with camping, often enhanced through communal interactions around a campfire or while preparing food, become some of the most memorable aspects of their wilderness visit (see Figure 3). Some aspects of camping do occur during the day, but it is unlikely that any wilderness camping experience would be enjoyable if natural night conditions (e.g., an absence of external light pollution, natural night soundscapes) did not predominate.

Night in wilderness also provides otherwise unavailable or truly different forms of recreation. Night offers the opportunity to hear or call to an owl or to encounter strictly nocturnal animals such as raccoons, skunks, opossums, or moths. In fact, all species of bats, most smaller carnivores, most rodents (with the notable exception of squirrels), 20% of primates, and 80% of marsupials are nocturnal (Beier 2006). Likewise, hunting of nocturnal species only occurs at night. Night bike riding, fishing, photography, and snowshoeing and skiing are among other activities that have been documented to occur on public protected lands (Smith and Hallo, 2011).

Night hiking and other night activities may not be suitable or permissible in some wilderness areas due to conflict with wildlife and other users. For example, Yellowstone National Park's backcountry guide strongly discourages hiking at night due to bear activity (NPS 2010). Furthermore, areas with a high level or

density of camping may not be recommended for night activities due to user conflict. Beeco at el. (2011) also found that visitors were unclear of recreational areas policies regarding night recreation, later pointing out that "the ambiguity about the legality of night recreation may create a desirable management condition – in some circumstances – where either only select visitors (likely well informed, more committed to the activity, and more responsible) participate in night recreation or where night recreation is allowed but discouraged due to safety, staffing, resource management, vandalism, or liability concerns" (p 85).

A Personal Reflection

A natural night environment created, independently, some of the most profound wilderness experiences of the authors. For example, during a trip to a Utah wilderness area the second author had the opportunity to camp under a rock outcropping elevated above the desert floor. By the light of a campfire, he discovered pictographs on the surrounding rock wall and pottery shards indicating that ancestral Puebloans had once used the same outcropping for shelter. His discovery of these ruins at night combined with an absence of human-caused light over an expansive and uninhabited desert landscape created a sense of mystery, spirituality, and history that remains palpable years later. Later that night, however, this sense was greatly impacted by his observation of lights highlighting the presence and movement of hikers on a distant trail. The potential for night and light to substantially enhance or detract from wilderness became blatantly evident. Our conversations with others have produced countless stories about night and nighttime experiences in wilderness (see Figure 4). It seems obvious that a natural night environment is a fundamental and highly valued intangible characteristic of wilderness, yet more needs to be done to ensure the protection of this resource, and where appropriate, to promote responsible recreational use of it.

Nighttime recreation offers visitors new or different ways to experience wilderness.

Figure 3 – Campfire in Massaii Mara National Reserve Research Station, Kenya. Photo by Brandi L. Smith.

A Call to Action

Experienced visitors may see the linkages between night and wilderness as well known or intuitive. Yet focused and substantial attention toward night and night-dependent recreation in wilderness seems lacking. This is problematic because an incompletely or incorrectly understood resource or recreational activity cannot be managed, protected, or fully appreciated. For example, many backpacking permits quotas are based on camping permits, allowing night hikers a loophole for gaining permitless, deeper access into wilderness.

An intrinsic connection between natural night conditions and wilderness underscores the growing importance of action to better recognize and manage this resource. This management includes light pollution but must also extend to other wilderness attributes, including sounds and the opportunity for visitors to seek out the night in search of unique experiences.

Within a wilderness area light pollution may be greatly reduced by policies that restrict the type, timing, or location of artificial lights used by visitors. For example, unshielded lights (such as most lanterns) might be prohibited because they contribute to light pollution by scattering light in all directions as compared to a headlamp or flashlight that directs light only to specific, intended areas. However, outside of light management there has been little advancement in how the night experience can be more

effectively managed for visitors in both wilderness and nonwilderness settings. Wilderness experiences are likely more sensitive to nighttime disturbances in sound or by group encounters due to goals and expectations, yet there is no definitive answer to this question. Additionally, although there is no doubt that night recreation in wilderness and nonwilderness areas occurs, the number of people who participate and the types of activities that visitor engage in are still unclear.

Thus, we suggest that as researchers and managers progress on issues related to night as a resource, considerations should be broadened beyond just the night skies. This broadening of scope will be a more comprehensive approach to the management of night. A comprehensive approach is particularly important for night because many of the unique and desirable aspects of night are also some of the most sensitive to disturbances. For example, as visitors embark on night experiences, soundscapes are arguably more easily disrupted by human-caused sounds, which affect wildlife, opportunities for solitude, and cause possible conflict with other camping visitors. Current research (although very limited) suggests that to effectively manage night conditions, researchers and managers should specifically consider the effects of artificial lights (lanterns, headlamps, or no light restrictions), night soundscapes, opportunities for solitude, adverse effects of wildlife, and visitor use patterns. Through this more broad and comprehensive approach to night research and management, new and innovative strategies for managing the unique aspects of night may emerge.

Figure 4 – Sunset at Tioga Pass, Yosemite National Park. Photo by Brandi L. Smith.

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Rewilding France via Feral Nature

BY JEAN-CLAUDE GÉNOT and ANNIK SCHNITZLER

Protected Areas – Biodiversity More Than Naturalness

France has a network of protected areas composed of national parks and natural reserves. The core areas of the 6 national parks represent 0.64% of the country, and the 372 natural reserves represent 0.31% (Lefebvre and Moncorps 2010). An estimated 1.23% of the French territory is covered by strict conservation measures. In 2009, a new program was established to help meet the next decade at 2% of the territory, including the previous conservation measures. Core areas of the national parks are classified in category II of IUCN; the natural reserves in category IV. Only a few forest reserves are classified in category Ia, and in 2010, about 1.5% of the public forest were integral reserves (category Ia) (Génot and Schnitzler 2010).

In mainland France, protected areas management was until recently focused on biodiversity rather than naturalness, except in some integral forest reserves. This trend to manage protected areas is influenced by the Mediterranean culture, which supports the idea that humans play an essential role in nature (Dudley 2011). References to biodiversity were associated with the harmony and beauty of rural landscapes (e.g., mosaics of meadows, pastures, ponds, and small forests) resulting from traditional agriculture, forestry, and grazing in the 18th and 19th centuries (Schnitzler et al. 2008). The largest French integral forest reserve covers 2,000 hectares (4,940 acres), and another is planned in a new forest national park that is under preparation and will cover 3,000 hectares (7,410 acres). This is less than some protected areas in Romania, with 5,250 hectares (12,968 acres) in the Nera Natural Reserve (Giurgiu et al. 2001), or in Germany in the Bavarian Forest National Park with almost 25,000 hectares (61,750 acres) as wilderness area (Sinner 2010). Fortunately, France has territories overseas, with the largest strictly protected areas for naturalness: a natural reserve of 22,700 square kilometers (8,762 sq. miles) in Antarctica and a national park of 20,300 square kilometers (7,836 sq. miles) in Guyana.

Jean-Claude Génot

Annik Schnitzler

In mainland France, as in most of western Europe, human activities for centuries have modified the natural landscape with agriculture, forestry, hunting, fishing, industrial development, building, transportation, and energy production. In fact, unmodified natural landscapes do not exist across large areas in Europe, and particularly not in France. It is a myth to think of primeval or pristine nature in Europe; however, to quote the ecologist Nigel Dudley, "Cultural landscapes that rely on human intervention are a useful management strategy in crowded, long-settled areas but the idea that biodiversity 'needs' humans is flawed" (Dudley 2011). The end of pristine nature is not an appropriate argument for refusing to implement the concept of naturalness in nature conservation. More than ever, naturalness is a relevant concept in a changing world, but it needs explanation. In Europe, naturalness is a kind of adaptation of the wilderness concept. In eastern Europe, some protected areas of great ecological value can qualify as wilderness, such as the Carpathian mountains of Romania (Stanciu 2008). Wilderness can be seen as having a high degree of naturalness. However, there is much debate on the definition of wilderness applied to the European context (Barthod 2010). Until now, French ecologists understood naturalness as untouched nature and spoke of old-growth forests or their remains (Vallauri et al. 2010). But more and

more, the concept of naturalness incorporates other characteristics, such as unmanaged, dynamic, and uncontrolled nature, which means that naturalness can include anthropogenic heritage, including former land uses or exotic species. Some ecologists speak about ferality and novel ecosystems (Höchtl et al. 2005; Marris 2009). According to Emma Marris (2011): "Novel ecosystems are altered by human activity but are not actively managed"; these alterations can be plantations, pastures, or agricultural fields "then left to go feral". Kowarik (2005) speaks of two types of naturalness: the "retrospective naturalness," with a composition of vegetation that existed before humans changed the natural ecosystems, and the "prospective naturalness," with self-establishing species, including neophytes. The biodiversity concept – a tool of the marriage between science and technology – stresses that nature cannot survive without humans. This concept of naturalness has a land ethic

Feral nature is an opportunity for rewilding France and is a sign of our trust in the future.

foundation that respects autonomous nature as much as possible and is spontaneously inspired by a feeling of nature, including the idea of humility developed by philosophers, artists, and thinkers such as Aldo Leopold, Arne Naess, Henri-David Thoreau, and Robert Hainard.

Something has changed in the world of the French conservationists during the last decade. Management of biodiversity was criticized from scientific, economic, and ethical points

Figure 1 – The pass of the Allier River in central France where the forest came back after earlier grazing activity. Photo by Jean-Claude Génot.

of view (Génot 2008). Some ecologists began to realize the importance of naturalness, in particular, in the last old forests of the "green" eastern range of France (mountains of Vosges, Jura, and the Alps). Two important meetings organized by WWF (World Wide Fund for Nature) France included one on deadwood took place in 2004 and one on naturalness of the forest in 2008. An NGO called Wild Forests was created in 2006 to buy forestland and keep it untouched, and also to write a web newsletter, "Naturalness", which has been a success. In the framework of the European Parliament, a report on wilderness areas was adopted in 2009, and an NGO called Wild Europe was created, showing that, more than ever, the question of wild nature and naturalness is taken into account in Europe as well as France.

Fallow Lands: The Novel Wild Nature

While the conservationists' debate between biodiversity and naturalness in protected areas continues in France, the French landscape has been changing and uncontrolled nature is increasing (see Figure 1). There is now fallow land that has been abandoned by farmers over the years, and large areas of fields are returning to forests. In France today there are about 2 million hectares (4.9 million acres) of fallow land that since 1945 have become spontaneous forests (Derioz 1999). These young forests are between 10 and 130 years old, and they were born from events such as war, economic crisis, farmland abandonment, and the European Union agricultural policies. The areas covered by regenerating forests have no comparison with the land used by humans because they are spectacular and concentrated in certain regions, such as the mountains (Alps, Pyrenees, Massif Central) and the Mediterranean portion of the country where they total 2%. This fallow land phenomenon also exists in Europe, and an assessment has been drawn up for each country with trend analyses (Keenleyside and Tucker 2010). The parts of Europe that could be affected

Figure 2 – A new forest with birch and pine in eastern France in what was once a meadow. Photo by Jean-Claude Génot.

by agricultural abandonment are the following: Finland, Sweden, northwest Spain and Portugal, some mountains of Germany including the Czech Republic border, the Apennines in Italy, and possibly the Carpathians.

It is difficult to identify the trend that will occur in the near future. Several predictive models have been developed, with the conclusion that land abandonment will occur on more than 0.7% of the area by 2020 (Scenar 2020 Regionalisation Scenario) and up to 6.7% by 2030 (EURURALIS Global Co-operation Scenario). An average estimation of about 3%–4% seems to be reasonable, which means 126,000 to 168,000 square kilometers (48,636 to 64,848 sq. miles) by 2030.

The ecological consequences of this change in land use in France are numerous (see Figure 2). The spontaneous return of trees and bushes in the Alps leads to several advantages, both for nature and for humans, such as reduced soil erosion, better regulation of water flow, decrease in the occurrence of avalanches, and possible return of more natural and diverse forests, currently reduced by forestry in places accessible for harvesting. Thanks to the agricultural abandonment in the 21st century, natural conditions at the subalpine stage can be found again after having been modified for at least 5,000 years (Schnitzler and Génot 2012).

The new ecosystems, which are a mosaic of meadow, heathland, fallow land and forest, can shelter rare species such as wild vine (*Vitis sylvatica*) in Mediterranean areas and yew (*Taxus baccata*) in Brittany (western France). Some trees that appear in regenerating fallow land bring nitrogen to the soil, such as green alder (*Alnus viridis*) in the Alps and golden chain (*Cytisus scoparius*) in the Massif Central.

Some forests have also returned to floodplains, such as in the Loire Valley, with willow, poplar and many exotic species. Deadwood can naturally accumulate in areas where hardwood forests still remain. Land abandonment has greatly improved the landscape qualities in floodplains (see Figure 3). In some floodplains along the Loire and a few tributaries of the Rhône River in France, along the Rhine in Germany, and in Austria along the Danube, the progression of fallow land has produced a significant mass of stored deadwood on curved banks and islands and within the main channel, restoring the natural river functioning and providing habitats for aquatic fauna (Piegay and Gurnell 1997).

These regenerating forests and fallow lands provide opportunities for nature, through redevelopment of forest soils and the diversity of plants, fungi, animals (e.g., bats, insects, birds), and deadwood, such as in the former chestnut orchards in Ardèche, Corsica, and Cévennes.

Fallow land very quickly reaches interesting trophic levels, sometimes after only 50 years of natural development. In the natural reserve (1,575 ha/3,890 acres) of the gorges of the Ardèche (Rhône-Alpes and Languedoc-Roussillon regions), spontaneous young oak forests show an amazing diversity of saproxylic insects, which are very rare in managed forests. A recent census revealed 186 species of saproxylic beetles, which include the giant capricorn beetle (*Cerambyx cerdo*) and the European stag beetle (*Lucanus cervus*). These forests represent some of the most diverse in France. The return of forest species into the spontaneous forests, such as bats, deer, woodpeckers, birds of prey, and also some carnivores, is a good sign for the future. The flagship species of this return of wild nature in France is the wolf, which came from Italy to France in 1992 and is present in all the "green" eastern mountain ranges and numbered 250 animals by 2012.

For economic and philosophical reasons, fallow land and unmanaged feral nature is seen as a negative condition by rural people and by many

scientists and conservationists (Schnitzler and Génot 2012). As stated by François Couplan, a French ethnobotanist, many of the people are like the farmers during the post-Neolithic period, refusing the concept of fallow land because this means the death of agriculture and a beautiful managed landscape. But something has changed in the minds of the population, because people from the cities agree with the concept of fallow land, and they see this phenomenon as a normal return of domesticated nature to the wild (Guisepelli 2001).

Learning to Love Feral Nature

Before the 18th century, French people accepted fallow land, the remains of the former agricultural system. After the French Revolution, there was a switch in values, and fighting against wild nature was considered a modern movement – in particular, the destruction of wetlands. By World War II, the ecological values of wetlands and less managed agricultural areas were recognized. In the face of the industrialization of agriculture and the decrease in biodiversity linked to the traditional open areas, conservationists made efforts to save patches of managed nature fashioned by agriculture (e.g., grazing, mowing). This conservation strategy did not stop the loss of many species on a large scale, and, without adopting another type of agriculture, these islands of biodiversity are still threatened. At the same time, however, nature continued spontaneously, and many forests were growing without the help or interest of conservationists. It is now time for the third cultural revolution, involving recognition of the ecological, scientific, pedagogical, and philosophical values of feral nature. Feral nature is present in large areas, but until now it has not been taken into account in conservation strategies, and more than ever it is threatened by tree harvesting for energy, building, crops for fuel, and recreational use. We need artists, philosophers, and journalists to speak about the values of feral nature. Conservationists must change the current attitude, which is either to protect the remains of naturalness, or to manage some patch of open land for biodiversity. Feral nature is a balance between naturalness and human heritage, but for some it is not valuable enough to be protected because they see it as a threat to species of open land.

However, feral nature is an opportunity for rewilding France and is a sign of our trust in the future. And today large areas of feral nature already exist. Nature knows better than humans what is best. The strategy for rewilding needs to give nature space and time for the natural recovery process. Within this framework, the conservationists' work should be focused on monitoring, research, learning, and education.

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Figure 3 – A protected area along the Moselle River in eastern France where new forest came back on the bank of the river. Photo by Jean-Claude Génot.

How Can Wolf, Bear, and Lynx Persist in the Cultural Landscapes of Central Europe?

BY TILL MEYER, STEFANIE JÄEGER, and CHRISTINE MILLER

The term *wilderness* is often associated with free-ranging carnivores. The *German Dictionary* of the Grimm brothers (Grimm 1961) sites examples from literature, where a wilderness is considered uninhabited, characterized by dense woods, frequently in mountainous country, and where there is imminent danger of being ripped apart by wolves and bears. Currently the campaign Rewilding Europe (Sparmann 2011, p. 80) gives large carnivores a gentler image and uses these predators as evidence for the often-welcomed renaissance of wilderness in Europe.

The trend for some predator populations is increasing (Sparmann 2011). From 1995 to 2005, the number of Eurasian lynx *(Lynx lynx)* in Europe has increased 1.2 times, gray wolves *(Canis lupus)* 1.4 times, (1970–2005), and brown bears *(Ursus arctos)* 6 times (1980–2005). According to The Large Carnivore Initiative for Europe (Linnell et al. n.d.),

> wolves have recolonized Scandinavia, Germany and the Alps. Relict populations in Iberia, Italy, the Balkans and the Baltics have dramatically expanded. Eurasian lynx populations have reoccupied most of their former distributions in Scandinavia, the Baltics and the Carpathians, and reintroductions have returned them to many parts of the Alps and central Europe. Bear populations in Scandinavia, the Balkans and the Carpathians have reached record sizes.

Large Carnivores in a Cultural Landscape

The increase of the three carnivore species can be attributed to various improvements in legal agreements on the national and European level over several decades. On the European level, this includes the Bern Convention on Conservation of European Wildlife and Natural Habitat (adopted in 1979 by the European Union [EU]), the Bonn Convention on the Conservation of Migratory Species of Wild Animals (adopted in 1983 by the United Nations), and European Habitats Directive NATURA 2000 (adopted 1992 by the EU). The national and regional laws often were adopted as a reaction to the protective status at the EU or international level. But how does the return of large carnivores relate or even depend on wilderness and wildness in Europe? The Large Carnivore Initiative for Europe "was established in 1995 by WWF [World Wide Fund for Nature] International together with partner organizations and experts in 19 European countries and its mission is 'to maintain and restore, in coexistence with people, viable populations of large carnivores as an integral part of ecosystems and landscapes across Europe'" (Boitani 2003).

Till Meyer. Photo by Berny Meyer.

Stefanie Jäeger. Photo by Thorsten Zeppenfeld.

Christine Miller. Photo by Thorsten Zeppenfeld.

For the purpose of this article, we are concentrating on the populations in southern Germany and the neighboring alpine resource regions, which serve as an example of the fate of large carnivores in a cultural landscape. Each of the three species – wolf, bear, and lynx – had been extirpated from the region as pests during the 19th century. Their renaissance is due to the aforementioned jurisdictional improvements and combination of natural occurring in-migrations from neighboring countries and to reintroductions of live-trapped animals. As these animals slowly expanded their territory, discussions flared as farmers argued there was no more

wilderness to support these species in Bavaria or Austria.

Some authors (Obermeier 2011; Promberger 1998) deny that there is a dependence of large carnivores on wilderness and cite examples where wolf, bear, and lynx easily fit into the cultural landscape in Europe, often faring quite well in modern agricultural landscapes and close to human settlements. Many wolves in Spain seem to prefer hunting, mating, and raising their pups in corn fields; bears in Italy that raid orchards – as the story goes – can be easily deterred by an angry landlady throwing apples at them. From Romania we hear about a female wolf regularly seen in the city center of the town Brashov (pop. 280,000), where she searched for food for her pups and was evidently mistaken for a stray dog.

Owing to modern telemetry and sophisticated monitoring systems such as SCALP – Status and Conservation of the Alpine Lynx Population – we have learned that in Switzerland,

> radio-tagged lynx stayed close to human settlements or main roads if they were able to find secure day resting places. It was not uncommon to locate lynx close to logging sites, next to a mountain restaurant, ski lifts or recreational areas. The lynx seemed to be aware of the human activities, whereas people very rarely noted the presence of the elusive cat. (Zimmermann 2007)

Does this mean that wilderness is not really necessary for the welfare of large carnivores? A conclusion such as this would certainly take an important argument away from wilderness lobbyists across the globe.

To help evaluate the role that wilderness could play for large carnivores, a look at specific definition of *wilderness* in Europe is useful (Finck and Riecken 2012): "A wilderness is an area governed by natural processes. It is composed of native habitats and species, and is large enough for the effective ecological functioning of natural processes." Wolves, bears, and lynx currently live in 22 of 27 states of the European Community (EC) and are considered native species that should benefit from wilderness protection. The extent of wilderness in Europe is estimated to total about 1% of the continent's entire land area (Vancura 2012). The vast majority of the wilderness areas in Europe are smaller than 100 square kilometers (38.6 sq. miles) each. Considering the large home range required by lynx (50–900 sq. km /19–347 sq. miles) and migrations over long distances (100–1,000 km/62–620 miles) that young adult wolves and bears regularly take searching for the proper mate and home range, the real scale for conserving carnivores emerges.

"Wolf, bear, and lynx have a good chance to subsist in Europe.

The spatial dimensions increase even more when the aspect of minimum viable population (MVP) is taken into account. MVP is the smallest number of individuals of a species needed to interact in order to ensure the genetic fitness and to buffer possible demographic and environmental disasters and stochastic events, while at the same time maintaining survival probability of 95% for a 100-year-period (Knauer 2003). For lynx, this figure was calculated to be 500 (Trinzen 2011), with 60 for bears (Knauer 1993), and 150 for wolves (Liberg 2002). Even though the time span is debated, MVP estimates help wildlife managers judge whether a population needs to be supported by improving connectivity to neighboring resource regions or even by releasing additional individuals. MPV figures also inform decision making on removal, culling, or even recreational hunting of large carnivores.

Parameters such as genetic fitness, home range, and mate searching strategies are having effects on the natural processes described in the EC definition of *wilderness*. Its effective ecological functioning can hardly ever be contained in its entirety by any wilderness in Europe. Therefore, it is likely that natural processes that require space will eventually spill into nonwilderness periphery and cause conflict with humans.

Such was the case when a young brown bear named JJ1 by scientists and Bruno by the tabloid press wandered from Italy across Austria into Bavaria on May 20, 2006. Zigzagging through the Bavarian Alps for 35 days and covering several hundred kilometers, the bear killed 31 sheep, raided 3 beehives, 2 chicken-coops, and 1 rabbit stall (Meyer 2006) before he was shot on recommendation of the World Wide Fund for Nature and by order of the Bavarian Environmental Ministry. This episode triggered a media storm and prompted a report that was leaked out of the American Embassy in Munich in 2010 (Fischer and Neukirch 2010). The report, in part, mocked Bavarian ineptitude for dealing with wildness:

> Perhaps the greatest insight from the whole Bruno affair might be that despite the veneer of 'greenness' extolled by German society, modern Germany in fact coexists uneasily with untamed nature. True wilderness, even in mountainous Bavaria, hasn't really existed in Germany for generations – nature is good, as long as it is controlled, channeled, and

Figure 1 – Cattle belong to the cultural landscapes of the Alps just like wolves, bears, and lynx. Photo by Luca Corlatti.

> subdued. The strategy of reintroducing wild bears to the Alps, at least the German Alps, may be doomed to failure – that is, unless the bears are willing to cooperate by not being too wild.

The smug sarcasm in this report depicts well what many had thought at that time, and the notion that large carnivores might be too wild for the German Alps requires some consideration. On the one hand, considering the MVP figures of wolf, bear, and lynx, the argument that not even in the Alps is there any wilderness left to support this species seems plausible. Indeed, considering the sizable home ranges of these animals against human population densities of Alpine countries such as Switzerland (188 sq. km/72.5 sq. miles) and Austria (100.3 sq. km/38.7 sq. miles), other European countries such as Sweden (20.6 sq. km/7.9 sq. miles), Finland (16 sq. km/6.2 sq. miles), and Russia (8.3 sq. km/3.2 sq. miles) seem to be much more appropriate countries to support viable large carnivore populations.

On the other hand, a recent press release (GWS 2013) reported wolf packs in eastern Germany regions where human populations were 224 persons per square kilometer and some regions in the Austrian and Italian Alps had resident bears where human populations were 70 to 75 persons per square kilometer. In looking at historical records of carnivores in the Alps, the presence of humans hardly ever seemed to have been a limiting factor for their existence. To the contrary: wolf, bear, and lynx often fared better with human inhabitants around. This somewhat puzzling conclusion has to do with the ancient land-use exercise of transhumance, which is the seasonal movement of people with their livestock from the low altitude winter pastures toward the high summer pastures (see Figure 1). Unlike many other mountain ranges, the Alps have been a cultural landscape for several thousand years, often providing even better livelihoods for its inhabitants than for the people who lived year-round on the plains.

In his comprehensive inventory of present and historical land use in the Alps, Arthur Ringler (2009) shows that alpine farms supported biodiversity for centuries as it kept the pastures open and helped support certain shrubby and herbal vegetation, while keeping trees and forests out of pastures. Several thousand years provided enough time in many parts of the Alps for livestock, grazing, and vegetation to evolve into quite stable – albeit seminatural – ecological systems with distinct habitat types. Quite a few of these plant communities have acquired protective status within the EU Habitats Directive, such as mountain hay meadows, alpine and subalpine calcareous grassland, and siliceous boreal grasslands.

In earlier centuries, large carnivores were considered a matter of course. In 1525, for instance, mountain farmers in some regions were required by law to keep one or two shepherd dogs against bear, wolf, and lynx predations (Ringler 2009). Today, top-level predators are recognized as vital to the health of ecosystems. Ringler (2009) argues that large carnivores in the Alps help existing forests, as they keep browsing damage by red deer and chamois down much more efficiently than hunting. With such a long tradition of mutual interdependence, the cultural landscapes of the Alps show attributes similar to wilderness, at least in as much as they are governed by natural processes "composed of native habitats and species, and [are] large enough for the effective ecological functioning of natural processes" (Dudley 2008).

The wild side of these cultural landscapes was became increasingly rare, as large carnivores were extirpated in many regions in the process of making Alpine farming more cost effective. Ancient herding systems were abolished along with the costly

shepherd staff. The tradition of producing "milk and cheese from mountain meadows" as the catchy advertising slogan goes, was moved to air-conditioned stables in the valleys. The cattle that are still kept on the slopes during the summer are mostly beef cattle that are not milked. The downside of the efficient grazing systems is that cattle stay unguarded all summer and frequently damage sensitive plant communities.

Despite the damage done by modern mountain pasture farming, its products are still considered a "haven of biodiversity and they are home to many farm activities with deeply rooted methods of production" (EC 2013), according to Dacian Cioloş, commissioner for agriculture and rural development of the EU. Mountain farms are one of the most heavily subsidized businesses because of "poor accessibility, lower land productivity and adverse climatic conditions result in additional difficulties for farmers and the food industry" (EC 2013). In the current process of "greening" the Common Agricultural Policy for the years 2014 to 2020, many agricultural practices will be reviewed. Labor-intensive chores such as herding are expected to receive better benefits that may eventually reflect on the acceptance of large carnivores.

Figure 2 – Bear (*Ursus arctos*). Photo by Miha Krofel.

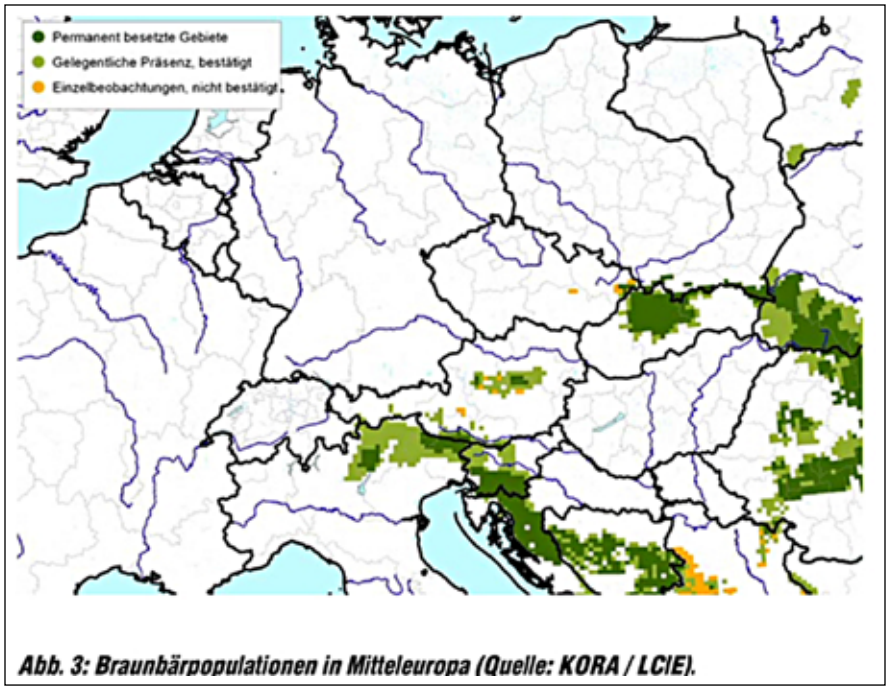

Figure 3 – Map of bear populations in southern Germany. Courtesy of KORA/LCIE.

Bears: Until 1990, the last ancestors of the ill-fated Bruno had lived in the northern Italian province of Trentino in the Brenta Mountains, where a relic population of not more than three autochthonal bears existed. In order to prevent these last individuals from vanishing, 10 bears were trapped in Slovenia and Croatia and released in Italy, where a small population of 35 bears now exists (see Figure 2). Young males start exploring new areas and wander into adjacent alpine regions (see Figure 3).

Dispersal habits of migrating young male bears can be generalized as follows: Triggered by juvenile wanderlust and often also adverse conditions near their place of birth, the bears choose a direction to take. They frequently follow natural routes that are easy to walk, with convenient food sources and quiet retreat areas to rest for the day or night. Once the general direction is established, the bears seem to carry on unwavering to explore the world in that one single direction – not even faltering at barriers, such multilane highways, crossing their path. On their way, they learn how easy – or difficult – it is to pick up food close to humans.

Bruno the bear traveled northward to the Bavarian Alps, where plenty of untended sheep and unprotected beehives assured that he would not starve. The farmers quickly removed the bloody carcasses, and the bear was forced to find other prey. This practice of removing livestock carcasses – which are also frequently victimized in the mountains due to reasons other than carnivores – is mandated by the

Figure 4 – Gray wolf (*Canis lupus*). Photo by Miha Krofel.

veterinary hygiene regulations in most Alpine countries. It is considered one of the reasons certain carrion-eating birds of prey such as the griffon vulture (*Gyps fulvus*) and the bearded vulture (*Gypaetus barbatus*) have been vanishing. This practice is expected to be revised in order to support rare vultures but also to benefit returning large carnivores in the future.

Wolves: In May 2006, the same month that Bruno first touched Bavarian soil, a young wolf was killed in a car accident about 70 kilometers (43.5 miles) from Tegernsee. And it was not the only wolf to take interest in Bavaria (see Figure 4). Four years later, in the same alpine farm region near Tegernsee, a wolf made the news when it was photographed with a camera trap near a deer feeding station. Since wolves can easily disperse as far as 500 kilometers (311 miles) away from their native area, this particular animal could have come from any of three plausible source populations: the west alpine French-Italian population, the saxonian-west Polish population, or the wolves from the northern dinaric range.

Presently there are two or maybe three more reproducing families in northern Italy close to Verona, in Switzerland, and possibly in the very eastern hills of the Alps in Austria (see Figure 5). Subsequent genetic probing could verify that the animal came from the French population about 800 kilometers (497 miles) from the Bavarian border. During his sojourn in Bavaria, the wolf had killed 28 sheep, and the farmer were reimbursed 3,675 euros for the damage suffered from this single wolf. The farmers might have done themselves and the wolf a favor if carcasses were allowed to remain and the wolf allowed to return to that food. Instead, the farmer's union published a brochure insisting on the danger of wolves to humans, and that in case of wolf recolonization, all the mountain farms in Bavaria would need to be fenced in, requiring about 5,000–6,000 kilometers (3,100–3,728 miles) of fence.

Contrary to what the American Embassy's report had insinuated, the Bavarian authorities were reasonably quick to react in favor of large carnivore requirements. In April 2007, the Bavarian State Ministry of Environment and Health published a *Management Plan for Brown Bear in Bavaria*; in December 2007, a *Management Plan for Wolves in Bavaria*; followed a half a year later, in April 2008, with a *Management Plan for Lynx in Bavaria*. These plans mainly regulate the procedures that are to be undertaken in order to mitigate and compensate for damages from accidental in-migrations of large carnivores from neighboring countries.

Figure 5 – Map of wolf populations in southern Germany. Courtesy of KORA/LCIE.

Lynx: The World Wide Fund for Nature (WWF) of Germany expects large carnivores to be more than accidental visitors in Bavaria and that these animals will eventually reside permanently in the Bavarian Alps. For this reason, the WWF has established a project office related to large carnivores near Tegernsee in order to manage conflicts by disseminating information on the protection of livestock from large carnivores. Another function of this project office is to inform people about the lynx in the region. The alpine population of these wild cats is estimated to be between 136 and 179 (Molinari-Jobin et al. 2012) (see Figure 6).

There are two separated populations in the northwestern and eastern part of the Alps (see Figure 7). This is leaving a large trapezoid-shaped lynx vacancy in the center of the Alps of approximately 175,000 square kilometers (68,568 sq. miles) – which is of about half the size of Germany. Taking the minimum viable population of 500 into account and the mean dispersal rate of the species of 25.9 to 63.1 square kilometers (10 to 24 sq. miles) (Zimmermann et al. 2005) – which is considerably less than wolf or bear populations – the chance for the alpine lynx populations to survive this century is considerably worse than that of the wolf or bear in the Alps. The mandate of the EU Habitats Directive to strive for a "favorable conservation status" of this species is particularly pressing. Experts (WÖLFL 2013) doubt this can be achieved by natural recolonization. Other lynx populations in northeastern Bavaria show that the prevalent limiting factors to natural recolonization are traffic fatalities and illegal killings (poaching). Therefore, the permeability of the landscape for large carnivores is a structural problem as well as a societal challenge.

Landscape Connectivity

Landscape fragmentation is certainly not limited to Europe. The American ecologist Aldo Leopold (1949) recognized that "the National Parks do not suffice as a means of perpetuating the larger carnivores, witness the precarious status of the grizzly bear and the fact that the park system is already wolfless."

Figure 6 – Lynx (*Lynx lynx*). Photo by Miha Krofel.

It took decades for the conservation community in the United States to get to the core of the problem. In the 1970s, the Greater Yellowstone Ecosystem was designated, which now encompasses 80,000 square kilometers (30,888 sq. miles) in order to contain the roaming carnivores, ungulates, and other wildlife within Yellowstone National Park (8,987 sq. km/3,470 sq. miles).

The same idea – improving permeability and connectivity for wildlife – lies behind the Yellowstone to Yukon Conservation Initiative (1.2 million sq. km/0.46 million sq. miles), which was introduced by Locke (Y2Y 2013). More recently and for similar reasons, the National Landscape Conservation System (NLCS) – encompassing 90,000 square kilometers (34,749 sq. miles) – was given legal status by President Barack Obama in 2009. Bruce Babbitt, the interior secretary credited for "creating" the NLCS, remarked: "I immediately saw that a lot of National Park Service units had been drawn without knowledge of conservation biology. If you want to really protect it, you must look at the entire system."

In Germany, the ambitious Ecological Corridor of South Brandenburg near Berlin is enabling animal migration routes between Poland and Germany and helping to pave the way for seven wolf family units (i.e., packs) that have established residence in this state. Systematic monitoring of the corridor shows some spectacular results, such as an increase in ground-dwelling beetles (Carabidae) that, in turn, had positive effects on the breeding success of birds, such as the red-backed shrike *(Lanius collurio)*. The "corridor for biodiversity" according to Mader (2013) is a

> result of a concerto of instruments that work well together: features in the landscape such as edges, linear structures and stepping stones connected by way of

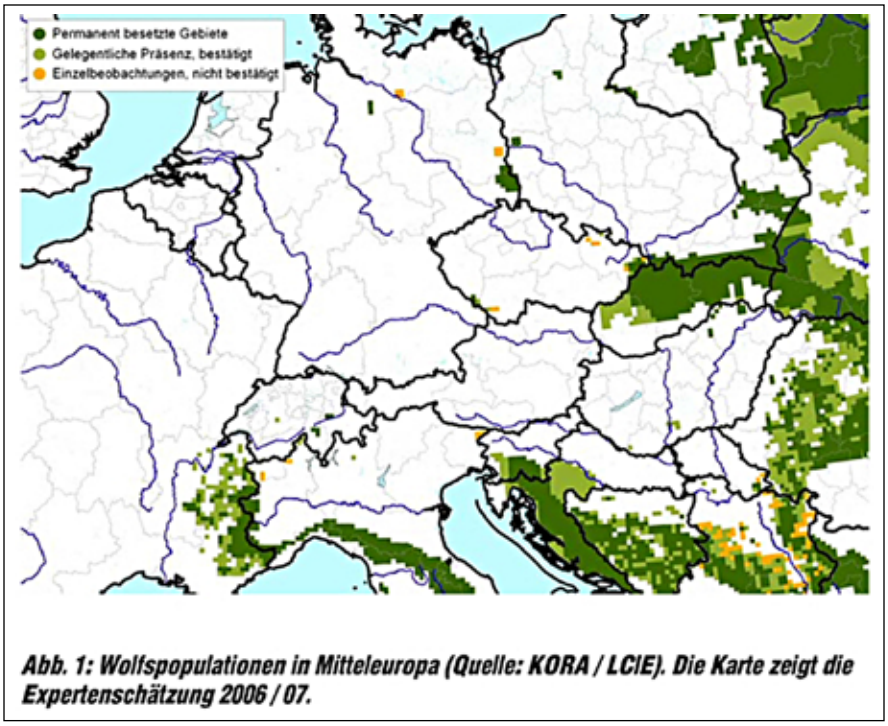

Abb. 1: Wolfspopulationen in Mitteleuropa (Quelle: KORA / LCIE). Die Karte zeigt die Expertenschätzung 2006 / 07.

Figure 7 – Map of lynx populations in southern Germany. Courtesy of KORA/LCIE.

underpasses, culverts, green bridges, riparian strips and fish ladders. Great results can often be achieved by working with and enhancing existing structures. This and the continuing support of the people of Brandenburg help to constitute the underlying matrix where wildness can perpetuate itself.

The idea of a large landscape conservation system as a matrix to help wilderness perpetuate itself is especially relevant to large carnivores. As we have seen for wolf, bear, and lynx, these species occasionally do tend to prefer hideouts with little or no disturbance or interference by humans. This is especially the case during times of feeding, mating, and when tending to the young. When engaging in activities such as travel and hunting, large carnivores seem to be more oblivious to nearby human presence. Often small roads are preferred routes of travel for them. They also tend to learn quickly that the availability of prey such as roe deer, wild boar, and livestock tends to increase in agrarian landscape structures such as fields and pastures interspersed with forests and hedges.

Wilderness for large carnivores often works best if the periphery provides enough functional attributes for their sustenance. Many examples in Europe show that these attributes need not consist of wilderness. Looking at the IUCN Guidelines for Applying Protected Area Management Categories (Dudley 2008) this fact is at first not dealt with adequately – as wilderness areas are expected be "retaining intact predator-prey systems" including large mammals. Given that predator systems are large and dynamic, no such system can be retained by any one wilderness alone. The further wording that wilderness should maintain "ecological processes" and "ecological refugia" suggests that the makers of the IUCN guidelines recognized that wilderness should have enabling and supporting functions – rather than standing for and by itself. IUCN Category 2 is even more direct on this subject and states that national parks should "contribute in particular to conservation of wide-ranging species, regional ecological processes and migration routes."

Such a landscape-wide approach can also be seen in the first wilderness legislation on the globe – the Wilderness Act of the United States – which states that in wilderness the community of life should be "untrammeled by man." Untrammeled means that communities of life should not be constrained, restricted, or confined. This holds true especially for human-made borders of wilderness. Bears, lynx, and wolves should not be expected to stay contained in wilderness.

Despite all the recent misfortune in large carnivore protection in Europe – poaching, legal culling, and outbursts of intolerance from local communities – large carnivores will continue to persist and possibly even thrive on the Old Continent. The entire system of a culturally grown landscape matrix interspersed with little islets of wilderness tends to be quite resilient if all the "cogs and wheels" (Leopold 1991) are in place. The upcoming Greening of the Common Agricultural Policy as well as the expected improvement of wilderness legislation across the EC will benefit large carnivores. Therefore, wolf, bear, and lynx have a good chance to subsist in Europe.

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Continued on page 48

Announcements

COMPILED BY GREG KROLL

Welcome Robert Dvorak as a New *IJW* Board Member

Robert Dvorak is an associate professor in the Department of Recreation, Parks, and Leisure Services Administration at Central Michigan University (CMU). He received his undergraduate degree from the University of North Dakota in wildlife biology and anthropology, and his master's and PhD from the University of Montana in recreation management and forestry. At CMU, Bob teaches courses in park and natural resource management, wilderness issues and policy, and research methods and evaluation. Bob's research interests include wilderness and protected area planning and management, examining visitor use issues, and understanding the relationships and attachments people form with wilderness areas. He has conducted research in Zion National Park, the Boundary Waters Canoe Area Wilderness, and Sleeping Bear Dunes National Lakeshore. Born and raised in North Dakota, Bob has spent much of his life hiking, camping, and fishing in the Midwest. He gained a great love and appreciation for the outdoors at a young age. In particular, he has a strong attachment to the Boundary Waters Canoe Area Wilderness and the north woods of Minnesota. Both are his favorite wilderness and backcountry areas in the country. He is a Wilderness First Responder, ACA Canoe instructor, and Leave No Trace Master Educator. He is also the secretary on the board of directors of the Society for Wilderness Stewardship. In his spare time, Bob enjoys camping, canoeing, hiking, and playing disc golf with his wife, Lisa, and three sons, Ben, Aiden, and Emmett.

Dr. Robert Dvorak in Great Smoky Mountains National Park.

Dr. Ian Player Honored with First Anton Rupert Award

Dr. Ian Player, founder of South Africa's Wilderness Leadership School, the World Wilderness Congresses, and other wilderness conservation organizations in the United States, the UK, and South Africa, has been honored as the recipient of the first Anton Rupert Award for Lifetime Achievement in Conservation. The award is conferred by the Peace Parks Foundation, which promotes the establishment of conservation areas that straddle international borders and furthers peace between humans and animals. The foundation was created in 1997 by Dr. Anton Rupert, who was also a founding member of the World Wide Fund for Nature. The Anton Rupert Award consists of a certificate signed by Peace Parks Foundation chair, Johann Rupert, and a monetary component donated by the Rupert family.

Dr. Player has had a distinguished career both in the formal and private conservation sectors. Together with his colleague and mentor Magqubu Ntombela, he has brought together people from all walks of life and regions of the world to experience how wilderness and conservation of natural resources are an integral part of living. Dr. Player joined the Natal Parks Board (South Africa) in 1952 and was posted to Zululand. While he was warden of the iMfolozi Game Reserve, he spearheaded two important, far-reaching initiatives. The first was Operation Rhino, which saved the few remaining southern white rhinos that were on the brink of extinction. The second was the designation of the iMfolozi and St. Lucia Wilderness Areas in the late 1950s, the first wildernesses to be zoned on the African continent.

In addition to the many awards he has received in recognition of his contributions to conservation, Dr. Player is the recipient of two honorary doctorates: doctor of

Submit announcements and short news articles to GREG KROLL, *IJW* Wildernss Digest editor. E-mail: wildernessamigo@yahoo.com

philosophy, honoris causa, from the University of Natal, and doctor of law, from Rhodes University. (Source: www.peaceparks.org)

Website Launched to Celebrate the 50th Anniversary of the Wilderness Act

The 50th Anniversary National Wilderness Planning Team has launched a new website, www.wilderness50th.org. The website

- catalogues all local, regional, and national events, meetings, programs, and projects leading up to the act's 50th anniversary in 2014. Event hosts and organizers are encouraged to enter their events on the map and calendar.
- provides resources and materials for individuals and organizations interested in hosting or organizing 50th anniversary local community events. Possible events include Walks for Wilderness; outings and service trips; museum, airport, or visitor center exhibits; speakers; interpretive programs; trainings or workshops; photography or writing contests; art shows; music or dance programs; book or poetry readings; stewardship projects; and more.
- provides information about the National Wilderness Conference to be held October 15–19, 2014, in Albuquerque, New Mexico, USA. The event will be Wilderness50's premier forum for discussing the growing challenges of perpetuating the values of wilderness in a time of unprecedented environmental and social change.

Sally Jewell to Head Interior Department

Sally Jewell, chief executive officer of Recreational Equipment Inc. (REI), has been appointed by President Barack Obama to head the U.S. Department of the Interior, replacing Ken Salazar, who served as interior secretary during Obama's first term. Jewell, 56, will oversee the National Park Service, U.S. Fish & Wildlife Service, and the Bureau of Land Management, among other agencies. She has been a key supporter of President Obama's America's Great Outdoor Initiative and has lobbied for full funding for the Land and Water Conservation Fund.

Jewell, who has never held public office, is a native of the Seattle, Washington, area and a graduate of the University of Washington with a degree in mechanical engineering. She began her career as an engineer for Mobil Oil Corp. in southern Oklahoma, then spent two decades as a corporate banker. As CEO of REI since 2005, Jewell managed the cooperative with more than 100 stores and nearly US$2 billion a year in sales.

The new interior secretary is an avid climber and hiker. She scaled Antarctica's highest peak two years ago and has repeatedly climbed Washington State's Mt. Rainier. Doug Walker, who chairs the board of The Wilderness Society, says Jewell is a "can-do, activist-type manager" who will focus on inspiring Americans to care about public lands. The biggest challenge that conservationists face, Walker said, is "really reconnecting these federal lands to the broad swatch of American people, not just elderly white people." (Sources: *The New York Times*, February 6, 2013; *The Washington Post*, February 6, 2013; E&E Daily, March 4, 2013)

INTERPOL Launches Project LEAF to Combat Illegal Logging

According to a recent report published by the United Nations Environment Programme (UNEP), up to 90% of tropical deforestation can be attributed to organized crime, which controls 15%–30% of the global timber trade. Authored by Christian Nelleman, the report reveals that rates of illegal logging have been rising. Common ploys include forging permits, hacking trade databases, bribing officials, concealing timber's true origin, and hiding illegal timber amid legal stocks. With corruption, violence, and even murder tied to illegal logging, this type of crime can also affect a country's stability and security.

The majority of deforestation and illegal logging takes place in the tropical forests of the Amazon Basin, Central Africa, and Southeast Asia, including in many formally protected areas. Deforestation seriously contributes to climate change by releasing carbon dioxide back into the atmosphere, accounting for 17% of global carbon emissions – a percentage nearly 1.5 times greater than from all the world's air, road, rail, and shipping traffic combined.

To combat all aspects of forestry crime, including illegal logging and timber trafficking, INTERPOL has launched Project LEAF (Law Enforcement Assistance for Forests), a partnership between INTERPOL and UNEP, with financial support from the Norwegian Agency for Development Cooperation. David Higgins, INTERPOL's Environmental Crime Programme manager, said, "The world is recognizing that illegal logging is neither simply a moral nor a national issue. … Project LEAF will ensure these global laws are supported by global enforcement and that the criminals responsible are brought to justice – no matter their location, movements, or resources."

INTERPOL, founded in 1923, has developed a network of 190 member countries, extensive criminal

intelligence databases, and dedicated international communication tools supported by a vast array of knowledge, experience, and expertise from coordinating international investigations and operations. (Sources: www.interpol.int, June 5, 2012; *New Scientist*, October 1, 2012)

Federal Plan Aims to Help Wildlife Adapt to Climate Change

The administration of President Barack Obama has launched a plan to help wildlife adapt to threats from climate change. The plan, called the National Fish, Wildlife, and Plants Climate Adaptation Strategy, was developed along with state and tribal authorities. It seeks to preserve species as global warming alters their historical habitats and, in many cases, forces them to migrate across jurisdictional boundaries.

Over the next five years, the plan establishes priorities for what will probably be a decades-long effort. One key proposal is to create wildlife corridors that would allow animals and plants to move to new habitats. U.S. Fish and Wildlife Service director Daniel Ashe said such routes could be made through easements and could total much more than 1 million acres (400,000 ha). The plan does not prioritize species to target, although "the polar bear is the poster child" of wildlife threatened by global warming, according to Ashe. The plan does not provide an estimate of the cost. (Source: *Los Angeles Times*, March 27, 2013)

Cables to Remain on Yosemite National Park's Half Dome

The hike up the granite monolith Half Dome in Yosemite National Park, California, is one of the iconic experiences in the national park system. Over the past decade, the route has been inundated with up to 1,200 hikers a day. Congestion on the dome has made it difficult for hikers to descend when lightning storms strike, as often occurs on summer afternoons.

The dome, which rises 5,000 feet (1,500 m) above the valley floor, was considered to be inaccessible until the Sierra Club, in 1919, placed the first cables along the 400 foot (120 m) final ascent. Since then, the National Park Service (NPS) has installed braided steel cables and stanchions each summer to facilitate visitor access. At least five people have died on the cable route since 2006, nearly all with rain as a factor. Park officials want visitors to be able to descend the slick granite in 45 minutes if they have to escape the fast-forming storms, and limiting numbers is the only way to do that, they decided.

In 2010, an interim plan was instituted to allow 400 permits per day through a lottery system. Meanwhile, a Half Dome Trail Stewardship Plan was under development. The preferred alternative that was recently adopted limits the number of hikers to 300 per day, beginning in the summer of 2013. To the dismay of some wilderness advocates, however, the cables will be allowed to remain, even though they lie in designated wilderness. Wilderness supporters point out that NPS management policies state that "park visitors need to accept wilderness on its own unique terms. … The National Park Service will not modify the wilderness area to eliminate risks that are normally associated with wilderness." Nevertheless, the preferred alternative states that the decision "provides the optimum visitor experience while protecting wilderness character along the trail." (Sources: *The Huffington Post*, January 4, 2013; National Parks Traveler, January 7, 2013)

Judge: USFS Must Include Snowmobiles in Travel Management Plans

A federal judge in Idaho ruled that the U.S. Forest Service (USFS) broke the law when it exempted snowmobiles from its travel management plans. U.S. district magistrate judge Ronald Bush gave the Forest Service 180 days to revise its 2005 travel management rule and draw up regulations designating areas of use and nonuse by all off-road vehicles, including snowmobiles, on USFS lands.

In the lawsuit brought by the Idaho-based Winter Wildlands Alliance, Judge Bush wrote, "The Court finds that the 2005 Travel Management Rule is arbitrary and capricious to the extent that it does not require designations for the use of OSVs [over-snow vehicles] upon the national forest lands." The decision applies to forests in Idaho but could also prompt forests across the West and other regions to revisit their off-road policies. The U.S. Attorney's office in Idaho, which represented the USFS in the case, has not yet determined if an appeal is appropriate.

Idaho's snowmobiling community expressed disappointment. Sandra Mitchell, public lands director for the Idaho State Snowmobiling Association, said she was prepared to take part in the process of drafting a new rule. "Obviously we want to ride in a responsible way, and be in places where we don't have negative impacts. But we also want to ensure that opportunities exist not just now but for future generations. Snowmobiling brings thousands of people to Idaho to recreate, and that's a huge driver for economies in the winter for rural Idaho." (Source: Associated Press, April 1, 2013)

Concessionaires Press for Expanded Cell Phone and Internet Services in National Parks

The National Park Hospitality Association (NPHA), representing concessionaires who operate lodges, stores, and other commercial outlets inside U.S. national parks, is leading the effort to dramatically expand visitor access to cell and Internet signals. NPHA laments that "in many of America's national parks, prized smart phones are little more than cameras because cell and data service, even at visitor centers and lodges and other developed sites, is poor – or worse." NPHA claims that "visitors will not find poor cell and data service understandable or attractive – and in fact it may be an irritant that adversely shapes memories of a park visit."

In strategy sessions, National Park Service (NPS) leadership is working with NPHA to consider

- providing Internet access "at all major, developed visitor areas in the national park system" and "basic cell phone service at all major visitor areas in national park units, as well as along most roads and at major sites such as trailheads";
- "delivering timely, park-focused information within national parks through smart phones, tablets and computers … to deliver interpretation and other important information to park visitors"; and
- in order to be "financially sustainable," providing the concessionaires "the opportunity to develop and operate these systems" in which they would charge fees for services beyond free "landing pages."

NPS deputy director Peggy O'Dell has invited NPHA to nominate the first five parks to be wired. (Sources: www.peer.org, January 31, 2013; National Parks Traveler, January 31, 2013)

World's Largest Natural Sound Library Is Now Online

The Macaulay Library at the Cornell Lab of Ornithology has completed a 12-year project to digitize its entire collection of archived analog recordings, and they are now available online and free of charge. The collection, which dates back to 1929, contains nearly 150,000 audio recordings representing about 9,000 species. There's an emphasis on birds, but the collection also includes sounds of mammals, reptiles, amphibians, arthropods, and fish.

The recordings, accessed at macaulaylibrary.org, are used by researchers and birders as well as in museum exhibits, movies, and commercial products. "Our audio collection is the largest and the oldest in the world," according to Macaulay Library director Mike Webster. "Now, it's also the most accessible. We're working to improve search functions and create tools people can use to collect recordings and upload them directly to the archive. Our goal is to make the Macaulay Library as useful as possible for the broadest audience possible."

Searching for specific audio files on the site is easy and fast by simply typing the animal's common name in the "search recordings by species" box. Users can also browse by taxonomy. Numerous video files are available, in addition to audio and video field guides that provide an introduction to common backyard birds. (Source: National Parks Traveler, January 17, 2013)

Book Reviews

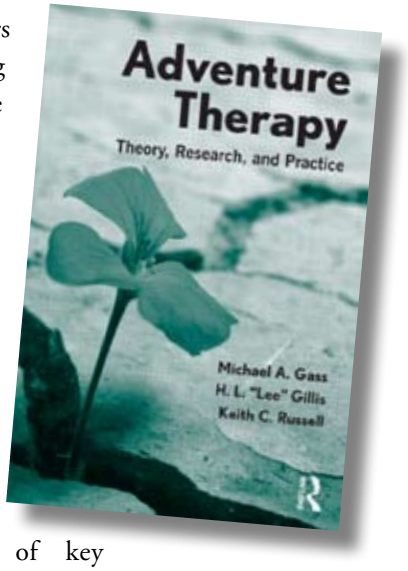
JOHN SHULTIS, BOOK REVIEW EDITOR

Adventure Therapy: Theory, Research, and Practice

By Michael A. Gass, H. Lee Gillis, and Keith C. Russell. 2012. Routledge. 426 pp. $36.95 (pb).

The idea that adventure therapy (AT) can offer an avenue for effectuating positive behavioral change and healing has long been held by practitioners but has not always been formally researched or promulgated as its own, singular profession. *Adventure Therapy: Theory, Research, and Practice* provides readers with a solid foundation of the growing field of adventure therapy and its future role as an "accepted" and viable treatment.

The authors outline the common path from which most inchoate professions must travel in order to become a well-established and accepted entity. As the title denotes, the authors frame the book from the wide-reaching parameters of theory, research, and practice and explore each area in-depth. Overall, there are 14 chapters that competently expound on the integral components of adventure therapy. These include an introductory chapter to the field of AT, defined as "the prescriptive use of adventure experiences provided by mental health professions, often conducted in natural settings that kinesthetically engage clients on cognitive, affective, and behavioral level" (p. 1). They concede that this definition was not a simple endeavor but have initiated it as a starting point from which to explore the three main components of theory, research, and practice. In addition, an excellent chapter outlines the historical development of adventure therapy, providing a reflective glance at how the field has slowly evolved. The chapter concludes with an admonishment that AT's future "may be at risk … without continued investment in research and regular evaluation of practices of multidisciplinary teams. … Contraction will occur if the field does not continue to innovate and grow to meet the current needs of the participants" (p. 46).



Subsequent chapters address corresponding issues related to the essential troika of theory, research, and practice. Regarding theory, their foundation chapter does a creditable service in relating the theoretical application of Walsh and Golins' Outward Bound Process Model to the AT process, explaining the integration of key components of AT within this model's framework. The majority of the remaining chapters address issues related to AT practice: these include the descriptions of several models (e.g., "CHANGES"), assessment, ethics, competencies, and risk management. The chapter regarding research and evaluation hails the need for ongoing outcomes and/or evidence-based practice. In their final chapter, the authors challenge the field of adventure therapy to emerge as its own profession, or simply remain an application of others.

The field of AT encompasses a very wide array of practice applications and touches on many related areas, such as adventure-based counseling and wilderness therapy, but there have been few textbooks that encapsulate the theoretical essence as well as practical implications for service delivery. To their credit, the authors have tackled an amorphous topic and created one of the most comprehensive writings regarding the process and practice of adventure therapy to date.

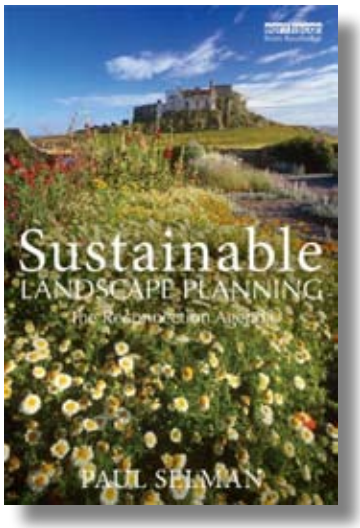
REVIEWED BY ALISON VOIGHT a faculty member and Therapeutic Outdoor Programs coordinator, Department of Recreation, Parks, and Tourism Studies, Indiana University, USA; email: avoight@indiana.edu.

Sustainable Landscape Planning: The Reconnection Agenda

By Paul Selman. 2012. Earthscan from Routledge. 162 pages. $54.95. (pb).

In our modern technological era, many suggest that human society is rapidly becoming disconnected from the natural world. This may be especially evident in the younger generations, where many individuals would prefer to spend their time indoors instead of interacting with the natural environment. This potential disconnection from nature is recognized as a major problem in modern landscape planning. Interacting with the natural world can provide a plethora of personal and societal benefits, and a lack of such interaction can lead to major problems within our societies.

In *Sustainable Landscape Planning: The Reconnection Agenda*, Selman argues that a landscape is "more than merely scenery – it is a complex system comprising natural and social subsystems. Its properties derive from the dynamic relations between these subsystems, producing a whole that is more than the sum of its parts" (pp. 3–4). Selman identifies and reviews various aspects of "disconnects" between landscapes, including the aforementioned loss of connections between people and nature, between the past and present, among ecological habitats, and between city and country. The author also provides many examples of the personal and societal benefits that can be achieved through interaction with nature, and he suggests that reconnecting society with the natural world on a broad scale could have major positive impacts on both individuals and society. For example, healthy and resilient natural systems can provide benefits such as mitigation of climate change, flood management, economic enhancement, and food production (p. 27). Selman suggests these benefits are by-products of a healthy ecosystem and should not be pursued as goals in themselves. The English background of the author is reflected in the focus on cultural rather than wild landscapes in this work.



Specific chapters of the book focus on the ecological and social values within landscapes, the role of change and resilience in landscapes, and physical and social connections within landscapes. The final chapter of the book addresses present and future challenges in ensuring landscape connectivity, noting that managing for connectivity is crucial through thinking about it and developing specific policy and practices for it. By using such methods, resource managers can achieve "future multifunctionality, sustainability and resilience" (p. 118) from landscapes around the world.

This book would be appropriate for undergraduate students and those interested in sustainable natural resource management. While wilderness researchers may be dismayed at the "Old World" focus on cultural landscapes, and perhaps the merging of natural and cultural landscapes, the discussion reflects recent perspectives on the social aspects of all landscapes, the dynamic nature of them, resilience theory, and the importance of connectivity in creating sustainable landscapes. Certainly, better connections between city and countryside and society and nature are important issues in both the New and Old World.

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management alternatives. Hence, managers cannot expect to encounter consistent public responses as new problems emerge. Further research is needed to understand which specific aspects of disturbance and response shape public support for action. It also seems clear that visitors support the idea of naturalness but have rather simple notions of what this means, often assuming that allowing nature to be wild will preserve naturalness, and vice versa. This suggests an urgent need for wilderness managers to document and explain the types of changes that are occurring in wilderness ecosystems. Finally, visitors' opinions are shaped by differing values and ethical positions, but awareness of specific wilderness policy is conspicuously absent. This, too, reinforces the need for communicating the policy constraints facing wilderness managers.

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Continued from EDITORIAL PERSPECTIVE, page 3

movement that unites around the question, "What does nature need?" By asking this simple question, and acting on it, we are never wrong.

In this issue, Julie Anton Randall and I discuss the Social Half concept as a strategic and sustainable planning complement to the concept that Nature Needs Half of the planet for the sake of environmental integrity and sustainability and for human populations. Jean-Claude Génot and Annik Schnitzler present "Rewilding France Via Feral Nature." Till Meyer, Stefanie Jäger, and Christine Miller ask and answer the question, "How can wolf, bear, and lynx persist in the cultural landscapes of central Europe?"

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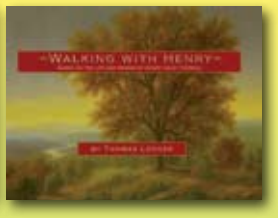

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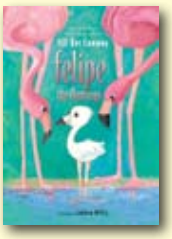

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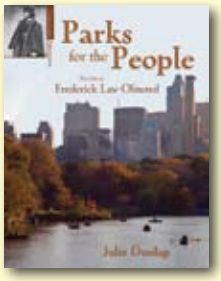

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