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TITLE: ENDING THE RANGE WARS?

SOURCE: Environment v38 p4-9+ My '96

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Long-time observers of the heated debates over appropriate uses of America's public lands, especially the some 370 million acres of federal land that constitute half the land area of the 11 western states,(FN1) will not be surprised that Interior Secretary Bruce Babbitt's recent attempt to reform federal grazing policy met with fierce opposition from ranchers and the cattle industry. The U.S. public land grazing system evolved through accretion, beginning with informal arrangements in the 1800s among the early Spanish and American ranchers that were later formalized and modified through legislation and regulation as the federal land management agencies, born in the early 1900s, defined their missions. Legal challenges and the wealth of environmental legislation created in the 1960s and 1970s further complicated range policy (see the box on page 6). Today, some 260 million acres of western public lands--an area larger than the states of California, Oregon, and Washington combined--are grazed under permit systems managed by the Interior Department's Bureau of Land Management (BLM) and the Department of Agriculture's U.S. Forest Service (USFS). Other public land users such as hikers and campers are accustomed to, and sometimes angered by, seeing cattle and sheep grazing all but the most protected areas (most national parks and wildlife refuges are not grazed).

Critics argue that the rudiments of federal grazing policy are outdated and actually discourage resource protection. Environmental groups have tried to reform range policy for several decades, but public lands ranchers and their supporters, including powerful members of Congress, have always thwarted significant change. Until recently, the warring parties were stuck in a status quo with which neither seemed satisfied. The appointment of Bruce Babbitt as secretary of the Department of the Interior in 1993 appeared to signal, at last, profound change in grazing policy. Armed with a mandate from President Bill Clinton for wholesale changes in federal land management, Babbitt chose range policy as his first venture, proposing sweeping changes called "Range Reform '94."(FN2) He pushed for stronger protection of range ecosystems and greater public oversight of grazing in particular. Ranchers saw this as an attempt to weaken their already frail rights to use public lands and countered that ranching was essential to the rural economy of the West and that grazing benefited range ecologies.

Babbitt and other critics believe that range policy is out of touch with current values and demands on public land. University of Colorado law professor Charles Wilkinson calls the political powers protecting long-standing grazing, mining, water use, and timber practices in the West the "Lords of Yesterday." These forces support

rules, usually coupled with extravagant subsidies, [that] simply do not square with the economic trends, scientific knowledge, and social values in the modern West.(FN3)

Secretary Babbitt quite self-consciously saw his attempt to resolve the bitter grazing dispute as a historic mission to end anachronistic land-use patterns. He told the *Gunnison Country Times*:

What strikes me about this grazing issue is that it has been going on non-stop for 100 years, [but] I think on the threshold of the 21st century there is a big and transcendental chance for momentous change.(FN4)

Babbitt's efforts have mainly resulted in procedural changes that environmentalists feel leave the problem largely unsolved. Yet, even this modest course correction, coupled with the changing demographics and economics of the West, portends a historic shift in range management.

The effort to change range policy, like arguments over most environmental issues, has polarized the interested parties. Environmentalists claim that much of the federal rangeland is overgrazed and that low grazing fees and lax agency oversight give ranchers de facto control of the land and make them careless of the resource.(FN5) Cattle numbers were originally set unrealistically high to accommodate historic use. Ranchers have bitterly fought attempts to reduce those numbers to match grazing pressure to the land's carrying capacity because the allowable stocking rate affects the capital value of the entire ranch. Ranchers who voluntarily reduce grazing pressure for environmental reasons risk losing their permits. Under current law, grazing allotments are tied to particular ranches, rather than open for bidding among all competing interests, and fees are formulated to protect the livestock industry rather than to cover administrative costs or make money for the national treasury. Half of the grazing fees are plowed back into range improvements aimed mostly at producing more and bigger livestock. Much of the decisionmaking power about public use of BLM lands, including allocation of the fee rebates, was ceded to permittee advisory boards that lacked representation by most other land users.

Grazing supporters, including most range management professionals and BLM and USFS administrators, argue that grazing is a legitimate and productive use of public lands, that ranchers respect the land as the basis of their own well-being, and that most of the western range is improving through careful management.(FN6)

Babbitt's reform proposals tilted range policy toward environmental values, but grazing supporters in Congress won the first skirmish in this latest battle by holding Interior Department appropriations hostage. The secretary withdrew, vowing to build a stronger constituency for reform in the West. Babbitt sensed that the changing western economy would work in his favor and that both pro- and antigrazing forces were frustrated with deadlocked range policy. The region is becoming more urbane, filling with residents attracted by the open space and other amenities of the public lands. These "New Westerners" do not graze cattle, dig for minerals, drill for oil, or cut timber for a living; instead, they constitute the manufacturing, information, and service sectors that now dominate the western economy.(FN7) (The box on page 8 explores the factors shaping the evolution of the new West in greater detail.) This new economy allows people with urban values to live in rural areas, and the West's rural hinterlands are swelling with new residents who advocate land preservation and are skeptical of the ecological and economic logic of widespread cattle grazing, logging, and mining.(FN8) In response, westerners aligned with the extractive economy have mounted a campaign to defend, and even increase, the resource extraction on which the region's economy was originally founded.(FN9) It would seem that the West is poised on the brink of another great battle over public land use.

Yet, Secretary Babbitt's efforts to create a constituency for change in the West uncovered signs that ranchers

and environmentalists can come to consensus on some key grazing issues and might even be able to equitably resolve the battle over the rangelands. Development of private ranch lands increasingly concerns both environmentalists and ranchers. Pragmatic voices on both sides are seeking a way out of the policy deadlock, which both blocks environmental reforms and keeps ranchers in limbo on future access to the public range. Consensus seekers are formulating different approaches to public range management, including new ways to evaluate range ecosystem health, more market-like treatment of grazing permits, and collaborative land management.

The viability of these new approaches depends on the warring parties overcoming their differences on four main questions: What is a healthy range? What is the appropriate use of the western range? What is the correct fee for grazing the public range? And who should have a say in how public lands are managed?

RANGELAND HEALTH

Reformers argue that the decline in the health of the western range is attributable to decades of improper livestock grazing. They point especially to riparian areas, those thin, rare swaths of lush vegetation that cover only 2 percent of the land in the West but provide important habitat to 8 out of 10 western wildlife species. Cattle loiter in riparian areas, denuding them of natural willow cover, trampling stream banks, and competing with wildlife that also require access to water and streamside vegetation. Fish, amphibians, neo-tropical songbirds, and water quality all suffer as a result.(FN10) On the uplands, livestock consume vegetation that provides food and cover to native species. Finally, ranchers demanded and helped to exterminate predators; they now steadfastly resist efforts, such as wolf reintroduction to Yellowstone National Park and central Idaho, to restore predators to ecosystems.

Most ranchers and professional range managers discount these indictments of range health. According to the technical literature, most areas of the West tolerate carefully managed livestock grazing with no overt harm, and even damaged areas can be restored through changes in grazing patterns or livestock numbers.(FN11) Legislation introduced by Senator Pete Domenici (R-N. Mex.) in 1995 stated boldly that "the Federal rangelands are in the best condition they have been this century, and their condition continues to improve." A closer examination of how range condition is evaluated, however, reveals that neither grazing critics nor advocates can produce unambiguous support for their positions. The federal agencies have kept at least approximate tabs on range conditions since the first forest reserves were leased for grazing in 1897; regional appraisals conducted during the Dust Bowl droughts of the mid-1930s led most observers to agree that the western range was in bad shape.(FN12)

In 1974, a benchmark federal court decision, *Natural Resources Defense Council, Inc. v Morton*, led to the most discerning rangeland health evaluations ever.(FN13) The court ruled that the National Environmental Policy Act (NEPA) required environmental impact statements (EIS) for individual grazing plans, rather than the single, national grazing EISs the agencies had prepared. The resulting detailed studies suggested that roughly half of the public range was in a condition that most ranchers and many environmentalists would consider reasonably good, that another quarter was degraded in one way or another but still relatively stable, and that the final quarter was deteriorating under current grazing practices.(FN14)

Yet, instead of reducing uncertainty and giving grazing advocates and critics a common basis for debate, range condition assessments in the 1970s and 1980s actually heightened tensions because of the ambiguous terminology and differing methods used. The National Research Council's Board on Agriculture tried to fix this by appointing an expert panel to evaluate the evaluations. Their 1994 report, *Rangeland Health*, concluded that past range quality measurements were unreliable because they used too many different methods and included too little data.(FN15) However, the committee also concluded that even the most scientific assessments would not necessarily defuse conflict because the debate is as much about appropriate use and control of land as it is about ecological health.

Even where agreement on poor range condition exists, remedial prescriptions differ, varying from proposals to abolish all domestic grazing to serious arguments that more, not fewer, cattle are necessary to improve the land.(FN16) Grazing critics may deny it but several cases of improvements in rangeland health through careful grazing have been credibly documented.(FN17)

APPROPRIATE RANGELAND USE

Grazing use of public lands rests on two somewhat contradictory principles: Renewable public resources should be put to beneficial private use, but the land must simultaneously be protected for more public values like water quality, biodiversity, recreation, and aesthetics. The grazing debate can thus be seen as an argument over private and public resource values. But it also has roots in differing attitudes about the appropriate role of humans in nature and our concept of "nature" itself. These differences clearly emerged during an extraordinary series of meetings between western environmentalists and ranchers arranged by Secretary Babbitt in 1993 and 1994. After the U.S. Senate stymied his first efforts to reform range policy, Babbitt turned to a Colorado group that had called at least a local truce in the range wars. Facing burgeoning land development and water transfers to cities, Colorado ranchers and environmentalists had overcome some of their differences to build a coalition against further development. Babbitt hoped that this grassroots armistice could be strengthened and used to drive reform around the traditional roadblocks--industry lobbyists, their supporters in the U.S. Senate, and entrenched environmentalists. He enlisted the Colorado group to get Range Reform '94 back on track.

After two months of intensive meetings cochaired by Babbitt and Colorado Governor Roy Romer, the Colorado Rangeland Reform Working Group proposed a less centralized, more collaborative structure for public range management.(FN18) The group's negotiations revealed the different norms of appropriate land use that underlie range debates. For instance, ranchers argued that "humans are part of ecosystems" and therefore that grazing policy must support community well-being as well as ecological health. To them, community health meant a stronger agricultural economy as well as commercial growth and prosperity. Environmentalists saw the ecosystem issue as simply a question of how much resource extraction people were willing to forego to maintain ecosystem elements, like predators or songbirds, not directly or obviously beneficial to humans.

These basic differences in outlook became especially pronounced in discussions about "conservation use" (voluntary destocking for ecological reasons) and water development. The utilitarian view on conservation use, for instance, sees livestock grazing as necessary to maintain healthy rangeland. Because grass has to be grazed to flourish, and most native grazing animals are gone, the range must be stocked with domestic animals. From

this perspective, environmentalist notions that nature is best left as alone as possible seem quaint and illogical. Arguments over rangeland water development revealed an attitude among ranchers that humans have an obligation to improve on nature, a sort of "theory of necessary human intervention." Ranchers were proud of having created water sources for cattle and wildlife where none previously existed. Environmentalists, on the other hand, believe that dry hill slopes and small seeps are best left as they are because artificial impoundment attracts animals and places unnatural pressure on the upland ecology.

Although there are great differences between the attitudes of environmentalists and ranchers toward ecosystem health, the discussions in Colorado carry one clear implication: The warring parties must at least recognize and articulate the abiding differences in their attitudes toward ecosystem health if a common sense of "appropriate" land use is ever to be achieved.

WHAT PRICE A BLADE OF GRASS?

How much should ranchers pay to graze the public range? As in the debates over range health and land use, ideology and politics muddy the issue. Compared with private land costs, public grazing fees have been low since their inception. Even with Secretary Babbitt's proposed tripling of the fee, from \$1.23 to \$3.69 per head per month, public land grazing would still be much cheaper than private pasturage.(FN19) Ranchers renting private range pay up to \$10.00 or more per animal per month, and grazing critics want public land fees increased to reflect such "fair market" rates. Two factors partially explain the big difference between private and public range fees. First, much of the private range is simply more productive than the public lands. Homesteaders naturally claimed the best lands, and the public lands were created from the remaining, often less productive, acreage. Ranchers also argue that private range lease rates include facilities and services, like water and fencing, not offered on public grazing allotments. Indeed, several economic studies concluded that public grazing fees are roughly equivalent to private rates when services and investment differences are accounted for.(FN20) But similar studies also show that federal expenditures on range programs exceed not only fee receipts but the profits ranchers make from grazing their livestock on public lands.(FN21) The government could actually save money by simply paying ranchers not to graze the public lands! But ranchers counter that other public land users, like recreationists, hardly cover administrative costs; why should some users be subsidized and others not?

Is there common ground on the fee question? The Colorado working group concluded that permit costs are, and always have been, a political rather than an economic or environmental issue, and that administrative costs, land quality, and ranchers' ability to pay should all be considered in the fee formula. Like entrance fees for national parks or rates of farm subsidies, grazing fees are not set by market competition but by political compromise.

Other analysts argue that it is time to cut the subsidies and put the public[cont. on p.27] range system on a market basis. Two reform-minded range scientists, Jerry Holecheck and Karl Hess, believe that the federal grazing system is needlessly costly, adversarial, and inefficient and that it encourages overstocking.(FN22) They want permit holders to be allowed to manage the land for other uses desired by the public, like improved fisheries, and they propose that the government create a market in which ranchers can voluntarily sell their grazing permits. Antigrazing interests could then purchase and retire the permits, while simultaneously compensating ranchers for their investment and loss of grazing access. Such market schemes could break the political deadlock between grazing critics and proponents.

WHO MANAGES THE LAND?

The first Rangeland Reform '94 proposals called for stricter enforcement of existing law and additional requirements for ranchers to meet ecosystem health goals. But a different logic, popular in both private industry and government, recommends decentralized environmental management, with individuals and groups empowered to fashion adaptable solutions that suit local circumstances while meeting broad national goals. Federal lands management may appear inescapably tied to top-down, bureaucratic structures that protect broad public values, yet compelling arguments for decentralized management are emerging.(FN23) While some analysts want simply to privatize public lands (the ultimate act of decentralization), others call for giving collaborative groups, at both regional and local levels, the power to mesh national goals and community needs in ways best suited to their different social and environmental contexts.

Most grazing opponents, however, argue that federal lands range management is already too decentralized. The 1934 Taylor Grazing Act gave local advisory boards, composed of the ranchers themselves, power to make many land-use decisions. Over the years, administrative and legal interpretations of range policy squelched outside participation, creating a political system virtually closed to everyone but agency personnel and ranchers.(FN24)

Thus it would seem that grazing reform requires the unusual combination of decentralized decisionmaking and increased involvement by groups representing national concerns such as environmental and aesthetic protection. The Colorado working group proposed just such a combination, and several other groups in the West advocate similar approaches.(FN25) Armed with a grassroots proposal that received at least cautious support from other areas of the West, Babbitt issued final regulations, effective in August 1995, giving significant new range management oversight to regional resource advisory councils made up of ranching, environmental, wildlife, and other interests. The councils would appoint technical teams to solve location-specific problems and encourage sustainable grazing while assuring that grazing maintains, restores, and enhances range ecosystem health, the proper function of riparian systems, water quality (by meeting or exceeding state standards), and habitat of threatened and endangered species. In a significant break with traditional federal land planning, the new regulations allow the councils to establish detailed grazing standards for their region or state. The councils are thus mandated to make some of the tough decisions that have bedeviled the traditional grazing bureaucracy, decisions that ultimately determine how grazing is practiced, the fees that ranchers pay, and what lands are even suitable for livestock use. Most importantly, the councils' guidelines would reflect regional conditions, thus nullifying ranchers' long-standing complaint that rules made in Washington, D.C. ignore the geographic realities of the West.

Although the councils have only advisory power, Babbitt required BLM grazing managers to consult with them on plans to spend range improvement funds and gave them authority to appeal directly to the secretary of the interior if they feel that local federal land managers have arbitrarily ignored their advice. The Colorado working group argued that this approach would actually bring more effective pressure to bear on grazers to protect range

ecosystems, pressure that appears to be lacking in the centralized, bureaucratic system now in place. They carefully distinguished this proposal from calls for "local control" by special interests, arguing that the new collaborative councils would be legitimate only if they reflect the full spectrum of national interests in rangeland ecosystems.

This strategic fusion of transcendent values and regional and local empowerment builds on successful environmental protection programs in which the states and corporations are given flexibility to meet federal standards; it also reflects research indicating that the most enduring farming and grazing systems around the world are not centrally managed and nationally policed structures but are founded on collaborative rule making and dispute resolution.(FN26)

Only time will tell whether the regional councils can end the range wars. Environmentalists argue that the councils are no more likely than the bureaucracy to address the thorniest range problem--too many livestock grazing too much of the landscape too hard--and ranchers fear that recreational and ecological concerns will override their need to make a living from the land. But the unusual combination of national standards implemented by groups collaborating to meet regional and local needs as well may be just the course correction needed to put western rangelands onto a trajectory toward social and ecological sustainability.

WHITHER PUBLIC LANDS MANAGEMENT?

The battle over grazing is just one facet of the larger debate over western public lands--and part of the region's painful transition from a century of resource extraction and development to an era in which Americans place greater value on open space, healthy ecosystems, species protection, and recreation. Many of the laws governing public land management, intended to solve past problems, now protect an outdated status quo. The West is changing, its urban and suburban population burgeoning, and its dependence on environmental quality, recreation, and tourism increasing dramatically. Traditional land-use planning is not working, and the public lands are caught in a time warp of outmoded laws and entrenched user groups afraid to try new approaches.

Prescriptions for breaking the public lands gridlock and achieving more sustainable land use in the West tend to fall into three categories. First, the "Wise Use" movement, arguing that lack of secure tenure actually breeds unsustainable land use, seeks to free extractive users from environmental regulation or simply to privatize the public lands.(FN27)

Other voices demand stronger national efforts to protect the West's ecology, perhaps integrating piecemeal land laws into omnibus legislation that protects whole ecosystems.(FN28) The third type of prescription reflects the grazing debates: Keep the public lands public, but give more management authority to local and regional groups as long as they represent a wide array of interests. Westerners' desire for greater input into federal lands management grows out of a frustration, common to both environmentalists and producer groups, with centralized planning. The current system of land management was designed to stop abuses by particular groups, often local resource users who disliked federal oversight and resented restrictions stemming from national goals such as environmental protection. Proponents of local collaboration separate themselves from Wise Use rhetoric, however, by asking for the flexibility to meet national goals for species protection, clean water, and other values while simultaneously strengthening western communities and avoiding the sometimes illogical dictates of one-size-fits-all planning.

The great challenge in western public land and resource management, then, is to settle the tension between national interests and local needs and concerns. The latest skirmishes in the range wars forced environmentalists, ranchers, and the federal landlords to recognize that their competition for control might be blocking the region's transition to a more sustainable economy. Western historian Patricia Limerick likened the battles to rounds in a boxing match where contestants hope for a knockout but merely bludgeon each other until reaching a wobbly standoff.(FN29) Outside the ring, however, the economy, demography, and ecology of the West is changing, and the new forms of dual governance and collaborative management emerging in federal range policy are a step toward a system of shared land governance that might break the gridlock and help the region make the transition to sustainable development.

Added material

Cattle's tendency to trample banks around water sources--manmade or otherwise--is just one of the many factors behind the decline in rangeland health.

Housing developments like this one in Colorado Springs speak to the economic and demographic changes that are reshaping the region.

To the left, ungrazed land. To the right, grazed land.

Collaborative coalitions like the Colorado working group, some of whose members are shown above, have proposed innovative approaches to rangeland management.

FOOTNOTES

1. The federal or "public" lands include national forests, national parks, Bureau of Land Management (BLM) lands, national wildlife refuges, and smaller holdings by various agencies. Roughly three-quarters of this land is used for livestock grazing. Outside of Alaska (which alone encompasses over 300 million acres of public lands), 11 western states contain most of the public lands; federal holdings in these states amount to quite large percentages of their land area, e.g., Arizona (44 percent), California (45 percent), Colorado (38 percent), Idaho (64 percent), Montana (30 percent), Nevada (86 percent), New Mexico (33 percent), Oregon (52 percent), Utah (64 percent), Washington (29 percent), and Wyoming (49 percent).

2. The Clinton administration's campaign to reform grazing on federal lands was officially born in the Federal Register on 13 August 1993 (58 CFR 43208). A modified proposal appeared in the Federal Register on 25 March 1994 (43 CFR Part 4, 1780 and 4100). The draft environmental impact statement (DEIS) was issued in April 1994. The final reformed regulations were published as "Final Rule, 43 CFR Parts 1780 and 4100" in the Federal Register on 22 February 1995. The Department of the Interior refers to the entire process as "Range Reform '94," a convention also used in this article.

3. C. F. Wilkinson, Crossing the Next Meridian: Land, Water and the Future of the West (Washington, D.C.: Island Press, 1992).

4. Gunnison Country Times, 21 January 1994, 1. Babbitt visited Gunnison, Colorado, to show his support for local ranchers and environmentalists who had reconciled their differences and cooperated to fight water diversions and agricultural land development.

5. For critical assessments, see L. Jacobs, *Waste of the West* (Tucson, Ariz.: Lynn Jacobs, P.O. Box 5784, Tucson, AZ 85703, 1991), a compilation of the negative effects of western grazing self-published by the region's most ardent antigrazing activist; and J. M. Feller, "What is Wrong with the BLM's Management of Livestock Grazing on the Public Lands?" *Idaho Law Review* 30, no. 3 (1993-94): 555-602.
6. See T. M. Quigley and E. T. Bartlett, "Livestock on Public Lands: Yes!" in E. B. Godfrey and C. A. Pope, eds., *Current Issues in Rangeland Resource Economics* (Eugene, Oreg.: Oregon State University Extension Service, 1990).
7. T. M. Power, "Thinking About Natural Resource-Dependent Economies: Moving Beyond the Folk Economics of the Rear-View Mirror," in R. L. Knight and S. F. Bates, eds., *A New Century for Natural Resources Management* (Washington, D.C.: Island Press, 1995), 235; and R. Rasker, "A New Look at Old Vistas: The Economic Role of Environmental Quality in Western Public Lands," *University of Colorado Law Review* 65, no. 2 (1994): 369-99.
8. Of course, their arrival also causes some impacts on the landscape, and rapid development of private ranch lands in the West has made some environmentalists support ranchers' demands for more secure use of the range.
9. Traditionalists even argue that the federal government and environmentalists are waging a "war on the West" that threatens their cherished freedom to exploit the region's resources. See W. Pendley, *War on the West: Government Tyranny on America's Great Frontier* (Washington, D.C.: Regnery Publishing, Inc., 1995).
10. See E. Chaney, W. Elmore, and W. S. Platt, *Managing Change: Livestock Grazing on Western Riparian Areas* (Eagle, Idaho: Northwest Resource Information Center, Inc., 1993). Riparian areas can be rehabilitated, usually through reduced livestock grazing, reseeding, and structural management interventions. For more information, see W. Elmore and B. Kauffman, "Riparian and Watershed Systems: Degradation and Restoration," in M. Vavra, W. A. Laycock, and R. D. Pieper, eds., *Ecological Implications of Livestock Herbivory in the West* (Denver, Colo.: Society for Range Management, 1994), 212.
11. A scientifically credible and well-researched assessment of grazing effects in the West is offered in Vavra, Laycock, and Pieper, note 10 above. This collection concludes that past grazing practices caused serious degradation while current grazing has halted, and even reversed, western range deterioration.
12. W. Rowley, *U.S. Forest Service Grazing and Rangelands: A History* (College Station, Tex.: Texas A & M University Press, 1985). Although it was universally agreed that the western range was in poor shape after major droughts in 1934 and 1936, even then various interests perceived the problem differently. While prograzing technical analysts blamed a combination of drought and decades of overgrazing, the livestock industry argued that drought was the sole cause and the range would be fine once the rains returned. See F. E. Mollin, *If and When It Rains: The Stockman's View of the Range Question* (Denver, Colo.: American National Livestock Association, 1938).
13. *Natural Resources Defense Council, Inc. et al. v. Rodgers C. B. Morton et al.*, 388 F.Supp. 840 (1974).
14. Divergent interpretations of range condition statistics are so standard to the grazing debate that the impartial observer might be tempted simply to assume that neither side can make its case unequivocally. Two reports nicely exemplify the alternative views: Bureau of Land Management, *State of the Public Rangelands 1990: The Range of Our Vision* (Washington, D.C.: U.S. Department of the Interior, 1990); and J. Wald and D. Alberswerth, *Our Ailing Public Rangelands, Still Ailing: Condition Report, 1989* (Washington, D.C.: National Wildlife Federation, 1989).
15. Committee on Rangeland Classification, *Rangeland Health: New Methods to Classify, Inventory, and Monitor Rangelands* (Washington, D.C.: National Academy Press, 1994).
16. Proposals for total destocking of the western range appear in, for example, G. Wuerthner, "Some Ecological Costs of Grazing," *Wild Earth* 2, no. 2 (Spring 1992): 10-14; G. Wuerthner, "Subdivisions versus Agriculture," *Conservation Biology* 8, no. 3 (1994): 905-08; and Jacobs, note 5 above. The most radical argument for properly managed grazing as a way to heal past land abuses is A. Savory, *Holistic Resource Management* (Washington, D.C.: Island Press, 1988). This argument is explicit or implicit to most theory and practice in the field of range science. In a break with his profession's traditional support for widespread grazing, one senior range scientist, Jerry Holechek at New Mexico State University, argued that a tenth of the western range ought not to be grazed at all by domestic animals. See J. L. Holechek, "Policy Changes on Federal Rangelands: A Perspective," *Journal of Soil and Water Conservation* 48, no. 3 (1993): 166-74.
17. Vavra, Laycock, and Pieper, note 10 above.
18. The group's recommendations are summarized in Colorado Rangeland Reform Working Group, *The Colorado Working Group Rangeland Reform Proposal* (Denver, Colo.: Governor's Office, 1994). Most of the suggestions were incorporated into the Department of the Interior's final regulations. See "Final Rule, 43 CFR Parts 1780 and 4100" in the *Federal Register*, 22 February 1995. The discussions on appropriate rangeland use reported here are drawn from the author's notes of weekly working group meetings, 8 November 1993 and 20 January 1994. (The author was a member of the working group.)
19. U.S. General Accounting Office, *Rangeland Management: Current Formula Keeps Grazing Fees Low* (Washington, D.C., June 1991).
20. A compilation of such studies appears in N. R. Rimby and D. E. Isaak, eds., *Current Issues in Rangeland Economics--1994* (Moscow, Idaho: Idaho Agricultural Experiment Station, University of Idaho, 1994).
21. J. L. Holechek and K. Hess, "Free Market Policy for Public Land Grazing," *Rangelands* 16, no. 2 (1994): 63-67.
22. *Ibid.*
23. R. H. Nelson, *Public Lands and Private Rights: The Failure of Scientific Management* (Lanham, Md.: Rowman and Littlefield, 1995). Karl Hess makes a compelling argument for decentralized and market-like management of public rangelands in K. Hess, *Visions Upon the Land: Man and Nature on the Western Range* (Washington, D.C.: Island Press, 1992). Another thoughtful observer of the West, Don Snow, executive director of the Northern Lights Research and Educational Institute, Inc., argued for the creation of regional nonprofit citizen councils to take the place of land management agencies in testimony he gave before the U.S. House of Representatives Committee on Natural Resources in a hearing on the changing needs of the West held in Salt Lake City, Utah, on 7 April 1994.
24. J. M. Feller, "Grazing Management on the Public Lands: Opening the Process to Public Participation," *Land and Water Law Review* 26, no. 7 (1992): 571-95; and Feller, note 5 above.
25. The Colorado Rangeland Reform Working Group is one of several "common ground" groups formed

recently in the West to bring ranchers and environmentalists together to talk about goals for the land. Descriptions of several such groups appear in D. Dagget, *Beyond Rangeland Conflict: Toward a West That Works* (Flagstaff, Ariz.: The Grand Canyon Trust, and Layton, Utah: Gibbs Smith, Publisher, 1995).

26. Arguments for more local, collaborative management of grazing can be found in E. Ostrom, *Governing the Commons: The Evaluation of Institutions for Collective Action* (New York: Cambridge University Press, 1990); R. McC. Netting, *Balancing on an Alp* (New York: Cambridge University Press, 1981); and D. Worster, "Grassland Follies: Agricultural Capitalism on the Plains," in *Under Western Skies: Nature and History in the American West* (New York: Oxford University Press, 1992).

27. See P. Brick, "Determined Opposition: The Wise Use Movement Challenges Environmentalism," *Environment*, October 1995, 16.

28. This approach is taken in proposals to protect biodiversity in the West through vast wilderness designations mandated in ecosystem protection legislation. See D. Foreman, J. Davis, D. Jones, R. Noss, and M. Soule, "The Wildlands Project Mission Statement," *Wild Earth* (The Wildlands Project Special Issue 1993): 3-4.

29. P. N. Limerick, "A History of the Public Lands Debate" (paper presented at Challenging Federal Ownership and Management: Public Lands and Public Benefits conference, Natural Resources Law Center, University of Colorado, Boulder, Colo., October 1995).

CORRECTION

In Christoph Hohenemser's reflections on the Chernobyl accident (April), the average annual rates of thyroid cancer should have been listed on page 4 as increasing since 1990 in Belarus, the Russian federation, and Ukraine from fewer than 1 per million population to 36, 22, and 3.1 respectively. Ukraine has a lower number because the average extends over a large population with varying doses.

In addition, physician I. A. Likhtarev mentioned on the same page is affiliated with The Scientific Center for Radiation Medicine in Kiev, Ukraine.

WBN: 9612203372003