

Statement for the Record

on

**Major Environmental Threats to the Great Basin in
the 21st Century**

by

**Mark Salvo, Director
Andy Kerr, Advisor
Sagebrush Sea Campaign**

to the

**Subcommittee on Public Lands and Forests
Energy and Natural Resources Committee
United States Senate
Las Vegas, Nevada**

October 11, 2007

Conclusions and Recommendations

1. The Great Basin is a desert. Drying periods (“droughts”) are common in the Great Basin.
2. A primary cause of excessive wildfires in the Great Basin is the spread of flammable, nonnative cheatgrass (*Bromus tectorum*). A primary cause of cheatgrass invasion is domestic livestock grazing.
3. Climate change, continued livestock grazing and the presence of nonnative weeds will complicate restoration of native ecosystems and watersheds in the Great Basin.
4. Federal agencies and programs fail to consider what is known about the relationship of livestock grazing to cheatgrass invasion, the cheatgrass-fire cycle, and implications for native restoration of cheatgrass-infested ecosystems in the Great Basin.
5. Great Basin rangelands should be restored to provide habitat for sage-grouse, pronghorn, mule deer and other wildlife; clean and plentiful water for Great Basin communities; and quality recreational opportunities for Americans.
6. Rangelands restored with native species and ungrazed by livestock will be more resistant and resilient to climate change than degraded lands.

7. The Federal government should:
 - a. Require Federal land management agencies to develop and implement comprehensive plans to halt the spread of cheatgrass and conserve and restore native ecosystems and watersheds on Federal public lands.
 - b. Prohibit the use of non-native plants/seeds for restoration and require the use of locally adapted native shrubs, wildflowers and grasses/seeds for restoration on Federal public lands.
 - c. Discontinue livestock grazing on Federal public lands to eliminate a primary cause of weed invasion and increase the success of ecological and hydrological restoration programs in sagebrush steppe.

“Drought” is Common in the Great Basin

The Great Basin is historically prone to droughts. At least six multi-year droughts have been recorded in the Great Basin: 1896-1905, 1930-1936, 1953-1965, 1974-1978, 1988-1993, and 1999-2004.¹ Although climate change may be contributing to recent droughts in the region, droughts are “a normal part of natural climate variations.”² Droughts are “merely temporary abnormalities determined by deficient precipitation.”³

Cheatgrass Occurrence and Distribution

Cheatgrass has become the dominant species on 100 million acres – 158,000 square miles – in the Intermountain West.⁴ More than fifty percent of sagebrush steppe may be invaded to some extent by cheatgrass, with losses projected to accelerate in the future.⁵ Cheatgrass is spreading at a rate of 14 percent annually in the United States.⁶ A BLM ecologist and program coordinator has warned that “[c]heatgrass is changing the West.”⁷

¹ Bureau of Reclamation. “Drought in the West: Great Basin” (webpage). U.S. Dept. Interior, Bureau of Reclamation. (www.usbr.gov/uc/feature/great_basin.html; viewed Oct. 7, 2007).

² Bureau of Reclamation. “Drought in the West: Upper Colorado River Basin” (webpage). U.S. Dept. Interior, Bureau of Reclamation. (www.usbr.gov/uc/feature/drought.html; viewed Oct. 7, 2007).

³ Bureau of Reclamation, “Upper Colorado River Basin.”

⁴ Rosentreter, R. 1994. Displacement of rare plants by exotic grasses. Pages 170-175 in S. B. Monsen and S. G. Kitchen (eds.). PROCEEDINGS—ECOLOGY AND MANAGEMENT OF ANNUAL RANGELANDS. Gen. Tech. Rep. INT-313. USDA, Forest Service, Intermountain Research Station. Ogden, UT: 170 (citing R. Mack. 1981. Invasion of *Bromus tectorum* L. into western North America: an ecological chronicle. *Agro-Ecosystems* 7: 145-165).

⁵ Rowland, M. M. 2004. Effects of management practices on birds: Greater Sage-grouse. Northern Prairie Wildlife Research Center. Jamestown, ND. Available at Northern Prairie Wildlife Research Center Online: www.npwr.usgs.gov/resource/literatr/grasbird/grsg/grsg.htm (ver. 12AUG2004) (citing N. E. West. 1999.

Managing for biodiversity of rangelands. Pages 101-126 in W. W. Collins and C. O. Qualset (eds.). BIODIVERSITY IN AGROECOSYSTEMS. CRC Press. Boca Raton, FL [supporting statement that cheatgrass has invaded more than half of the sagebrush habitats] and M. A. Hemstrom, M. J. Wisdom, M. M. Rowland, et al. 2002. Sagebrush-steppe vegetation dynamics and potential for restoration in the interior Columbia Basin, USA. *Conservation Biology* 16: 1243-1255 [supporting contention that cheatgrass will continue to spread into sagebrush steppe]).

⁶ Duncan, C. A. et al. 2004. Assessing the economic, environmental, and societal losses from invasive plants on rangeland and wildlands. *Weed Technology (Invasive Weed Symposium)* 18(5): 1412, Table 1.

⁷ Miller, J. “Alien invader clings to socks, stokes West’s wildfires.” *Daily Herald* (Provo, UT) (Aug. 8, 2007).

The Great Basin and Nevada are particularly susceptible to cheatgrass incursion. Nearly 80 percent of the Great Basin and 80 percent of the land area in Nevada are estimated to be susceptible to displacement by cheatgrass at low or greater risk.⁸ Sagebrush covers approximately 28 percent of the Great Basin, of which nearly 38 percent is estimated at moderate risk and nearly 20 percent at high risk of invasion by cheatgrass.⁹ Eighty-four percent of Nevada is managed by the federal government (primarily by the Bureau of Land Management), and federal lands contain nearly 90 percent of the area estimated to be at moderate risk of cheatgrass invasion.¹⁰

Factors in the Spread of Cheatgrass

Cheatgrass thrives in disturbed, and especially burned, areas. Cultivation and subsequent land abandonment, livestock grazing, removal of native vegetation, and repeated fires can interact, or act singly, to proliferate cheatgrass. Cheatgrass can increase fire frequency, favoring itself and potentially inhibiting native plants from establishing in burned areas. The presence of cheatgrass in sagebrush steppe can lead to an eventual conversion of the shrubsteppe community into an exotic grassland. In some cases, cheatgrass encourages invasion by other exotic species such as knapweed and thistle.¹¹ Cheatgrass is well adapted to dry (xeric) sites and climate change may favor cheatgrass invasion.

Livestock Grazing is a Primary Cause of Cheatgrass Invasion

The Bureau of Land Management (BLM) administers approximately 18,000 grazing permits and leases to graze almost 13 million AUMs (animal unit months)¹² on 165 million acres of public lands,¹³ primarily in sagebrush steppe. More than 99 percent of remaining sagebrush steppe has been affected by livestock and approximately 30 percent has been heavily grazed.¹⁴ The BLM

⁸ Suring, L. H., M. J. Wisdom, R. J. Tausch, R. F. Miller, M. M. Rowland, L. Schueck, C. W. Meinke. 2005. Modeling threats to sagebrush and other shrubland communities. Chap. 4 in part II: Regional assessment of habitats for species of conservation concern in the Great Basin. Pages 114-149 in M. J. Wisdom, M. M. Rowland, L. H. Suring (eds.). *HABITAT THREATS IN THE SAGEBRUSH ECOSYSTEM: METHODS OF REGIONAL ASSESSMENT AND APPLICATIONS IN THE GREAT BASIN*. Alliance Communications Group. Lawrence, KS: 138.

⁹ Suring et al. (2005): 138.

¹⁰ Suring et al. (2005): 140.

¹¹ Gucker, C. L. 2007. *Bromus tectorum* in Fire Effects Information System (database). U.S. Dept. Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. (www.fs.fed.us/database/feis; viewed Oct. 7, 2007) (and references cited).

¹² An animal unit month is a measure of the amount of forage necessary to sustain a cow and calf, one horse, or five sheep or goats, for one month.

¹³ BLM. Undated. Bureau of Land Management 2007 Budget Justifications. Bureau of Land Management. Washington, DC: I-3; *see also* Government Accountability Office. 2005. Livestock grazing: federal expenditures and receipts vary depending on the agency and the purpose of the fee charged. GAO-05-869. Government Accountability Office. Washington, DC: 15, 76; BLM. 2007. Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report. Bureau of Land Management, Nevada State Office. Reno, NV: 4-94. (June 2007) (grazing permitted on 165 million acres of BLM lands).

¹⁴ West, N. E. 1996. Strategies for maintenance and repair of biotic community diversity on rangelands. Chap. 22. Pages 326-346 in R. C. Szaro and D. W. Johnston (eds.). *BIODIVERSITY IN MANAGED LANDSCAPES. THEORY AND PRACTICE*. Oxford University Press. New York, NY: 336, 337.

grazing program is administered by 107 field offices that spend at least \$58 million annually to manage public lands grazing,¹⁵ at a loss of at least \$54.6 million per year to federal taxpayers.¹⁶

Livestock spread cheatgrass by:

- disturbing the soil (and damaging biological soil crust—a living protective layer that prevents erosion, provides nutrients to plants, and helps prevent establishment of invasive weeds);
- removing competing native vegetation; and
- spreading cheatgrass seeds on their coats and hooves.¹⁷

Furthermore, recent research indicates that nonnative ungulates—such as domestic livestock—select native plants over nonnative plants, giving a competitive advantage to nonnative weeds.¹⁸

Once cheatgrass is established, it is usually only a matter of time before the area burns. Livestock grazing following fire is especially damaging to recovery of sagebrush steppe. Livestock graze and trample sagebrush seedlings, emerging grasses and wildflowers, and disturb soil on burned sites when they are most at risk of invasion by cheatgrass and other exotic species. Current research suggests that native vegetation in the sagebrush steppe may require ten years or more to recover from various management treatments or disturbance (such as fire).¹⁹ However, the BLM usually only prescribes two years of rest following fire.

Managing for the Lords of Yesterday

Wildfires have burned more than 2.4 million acres of sagebrush steppe in Idaho, Nevada, and Utah in 2007. The BLM has blamed drought, climate change, high temperatures and “Mother Nature” for the fires.²⁰ Cheatgrass is also identified as a major cause of wildfires, but never the livestock that help introduce and spread the species. Indeed, one BLM state director has even suggested that his agency may need to “re-examine the convention of resting burned allotments

¹⁵ Government Accountability Office. 2005. Livestock grazing: federal expenditures and receipts vary depending on the agency and the purpose of the fee charged. GAO-05-869. Government Accountability Office. Washington, DC: 21.

¹⁶ GAO (2005): 31.

¹⁷ Gucker (2007); E. J. Rawlings, K. K. Hanson, R. L. Sanford, J. Belnap. 1997. The striking effects of land use practices and *Bromus tectorum* invasion on phosphorous cycling in a desert ecosystem of the Colorado Plateau. *Bull. Ecological Soc'y of America* 78: 300; A. J. Belsky and J. L. Gelbard. 2000. Livestock grazing and weed invasions in the arid West. Distributed report. Oregon Natural Desert Association. Bend, OR; J. Gelbard. 1999. Multiple scale causes of exotic plant invasions in the Colorado Plateau and Great Basin, USA. M.S. thesis. Duke University, Nicholas School of the Environment. Durham, NC.

¹⁸ John D. Parker, J. D., D. E. Burkepile, M. E. Hay. Opposing effects of native and exotic herbivores on plant invasions. *Science* 311: 1459-1461.

¹⁹ Monsen, S. B., R. Stevens, N. L. Shaw (compilers). 2004. RESTORING WESTERN RANGES AND WILDLANDS (vol. I). Gen. Tech. Rep. RMRS-GTR-136-Vol. 1. USDA-Forest Service, Rocky Mountain Research Station. Fort Collins, CO: 194-198.

²⁰ Christensen, M. “Dangerously dry.” *Times-News* (Twin Falls, ID) (Aug. 6, 2007).

for two or three years before allowing grazing again,” claiming that “[l]ivestock may need to get back on the ground sooner to keep the fire load down.”²¹

The public lands grazing industry has so captured²² the process of Federal public lands management that livestock grazing is now commonly viewed as a solution to weed invasion, rather than a cause. Some agency staff have advocated seeding burned areas with nonnative forage plants rather than native shrubs, grasses and wild flowers because native plants “don’t have a prayer” against cheatgrass.²³ In fact, native plants don’t have a prayer against livestock. Others believe that livestock can be used to control cheatgrass, although research suggests that prescriptive grazing would have little effect on cheatgrass.²⁴

A few simple facts prove that managing public lands for grazing, mining and other extractive industries—the “Lords of Yesterday”²⁵—supports only a small minority of Americans, and at the expense of native flora and fauna, recreational opportunities and amenity-based businesses. In Nevada (the state with more federal land than any other outside of Alaska), federal public lands grazing only provides 1,228 jobs.²⁶ By comparison, one casino in Las Vegas employs 37,000 people.²⁷ Changing economies, lifestyle choices and retirement are contributing to a steady decline in public lands ranching across the West.

The mining industry, despite its omnipresence in the state, also employs relatively few Nevadans—approximately 14,000.²⁸ By comparison, the gaming industry employs more than 215,000 people in Nevada and generated \$12.6 billion in revenue in 2006.²⁹

Extractive industries are giving way to professional, service and amenity-based economies in the West.³⁰ Management of Federal public lands should support this transition.

Climate Change

Climate change is occurring in the Great Basin and may adversely affect native vegetation and restoration efforts. Atmospheric CO₂ has increased approximately 20 percent during the past

²¹ Wilkins, D. “Summer fires rekindle grazing debate.” *Capital Press* (July 27, 2007).

²² Donahue, D. L. 2005. Western grazing: the capture of grass, ground, and government. *Environmental Law* 35: 721-806.

²³ Miller, “Alien invader clings to socks, stokes West’s wildfires.”

²⁴ Mayer, K. H. 2004. The effects of defoliation on *Bromus tectorum* seed production and growth. M.S. thesis. Oregon State University. Corvallis, OR.

²⁵ The term “Lords of Yesterday” refers to historic industries and was popularized in C. F. Wilkinson. 1992.

CROSSING THE NEXT MERIDIAN: LAND, WATER AND THE FUTURE OF THE WEST. Island Press. Washington, DC.

²⁶ Power, T. 1996. LOST LANDSCAPES AND FAILED ECONOMIES: THE SEARCH FOR A VALUE OF PLACE. Island Press. Washington, DC: 184 (table 8-2).

²⁷ Greenhouse, S. “Behind Las Vegas's glitter, heavy losses and layoffs.” *New York Times* (Oct. 19, 2001).

²⁸ Dilanian, K. “Royalty-free mining days may be near end.” *USA Today* (Oct. 1, 2007): 12A.

²⁹ American Gaming Association. “Industry Information/State Information: Statistics - Nevada” (webpage) (www.americangaming.org/Industry/state/statistics.cfm?stateid=9; visited October 1, 2007).

³⁰ Sonoran Institute. 2006. You’ve Come a Long Way, Cowboy: Ten Truths and Trends in the New American West. Sonoran Institute. Tucson, AZ. (www.sonoran.org/cowboy).

century.³¹ Average temperature has increased 0.6 - 1.1° F in the last 100 years in the Great Basin.³² Climate change is projected to cause temperatures to continue to increase in the Great Basin by 3 - 4° F in spring and autumn, and by 5 - 6° F in winter and summer, by 2100.³³ One study estimated that as much as 80 percent of remaining sagebrush steppe in the West could be lost to the direct or indirect effects of global warming.³⁴

Measures should be implemented immediately to conserve and restore sagebrush steppe in preparation for future climate change and reduce greenhouse gas emissions to limit the estimated increase in temperature.

Recommendations for the Federal Government

Biological invasions, especially invasion by exotic weeds, are consistently cited as among the most important challenges to maintenance of healthy sagebrush communities.³⁵ The Federal government must acknowledge scientific evidence of the contributions of livestock grazing to cheatgrass invasion and resulting unnatural fires and develop strategies to reduce inappropriate grazing on Federal public lands. Current Federal management initiatives, such as the BLM 17-state Final Vegetation Treatments Using Herbicides Programmatic Environmental Impact Statement/Programmatic Environmental Report (the Record of Decision was just released on Friday, October 5³⁶), that do not address the effects of livestock grazing on native vegetation and weed invasion, have no hope of solving the cheatgrass problem. Similarly, federally funded research projects such as the \$13 million “SageSTEP” that purports to study ways to end the cheatgrass-fire cycle—without addressing the contributions of livestock grazing to cheatgrass invasion—are a waste of taxpayer funds.³⁷

Successful ecological and hydrological restoration in the Great Basin will require that livestock grazing either be eliminated or significantly reduced on Federal public lands. The cheatgrass-fire

³¹ West, N. E. 2000. Synecology and disturbance regimes of sagebrush steppe ecosystems. Pages 15-26 in P. G. Entwistle, A. M. Debolt, J. H. Kaltenecker, K. Steenhof (compilers). Proc. Sagebrush Steppe Ecosystems Symposium; June 21-23, 1999; Boise State University, Boise, ID. Publ. no. BLM/ID/PT-0001001+1150. Bureau of Land Management. Boise, ID: 16.

³² Pellant, M., Great Basin Restoration Initiative Coordinator, Bureau of Land Management. Statement before the House Appropriations Subcommittee on Interior, Environment and Related Agencies, regarding Climate Change. (Apr. 26, 2007) (copy on file with the Sagebrush Sea Campaign).

³³ Pellant, M., Great Basin Restoration Initiative Coordinator, Bureau of Land Management. Statement before the House Appropriations Subcommittee on Interior, Environment and Related Agencies, regarding Climate Change. (Apr. 26, 2007) (citing data from the Intergovernmental Panel on Climate Change and the Hadley Centre, United Kingdom) (copy on file with the Sagebrush Sea Campaign).

³⁴ Neilson, R. P., J. M. Lenihan, D. Bachelet, R. J. Drapek. 2005. Climate change implications for sagebrush ecosystems. *Trans. N. Amer. Wildl. & Nat. Res. Conf.* 70: 145-159 (as cited in M. J. Wisdom, M. M. Rowland, R. J. Tausch. 2005. Effective management strategies for sage-grouse and sagebrush: a question of triage? *Trans. N. Amer. Wildl. & Nat. Res. Conf.* 70: 206). See also R. S. Thompson, S. E. Hostetler, P. J. Bartlein, K. H. Anderson. 1998. A Strategy for Assessing Potential Future Changes in Climate, Hydrology, and Vegetation in the Western United States. USGS Circular 1153. Government Printing Office. Washington, DC: 14 (available at pubs.usgs.gov/circ/1998/c1153/c1153.pdf; viewed Apr. 17, 2007) (the range of big sagebrush [*Artemisia tridentata*] is estimated to decline by 59 percent if atmospheric CO₂ is doubled from current levels).

³⁵ Suring et al. (2005): 114 and citations.

³⁶ 72 Fed. Reg. 57065 (Oct. 5, 2007).

³⁷ SageSTEP: Sagebrush Steppe Treatment Evaluation Project, (www.sagestep.org).

cycle will not be broken unless the driver of livestock grazing is removed. Ending or reducing livestock grazing on Federal public lands, while beneficial for the land, water and wildlife, will have consequences for Federal grazing permittees. There is an economically rational, fiscally prudent, socially just and politically pragmatic solution to resolve grazing conflicts and also provide for ranchers: voluntary federal grazing permit buyout. A recent survey indicates that approximately half of public lands ranchers in Nevada may be interested in retiring their grazing permits at the price of \$255 per animal unit month (AUM; the amount of forage necessary to sustain one cow and calf for one month).³⁸ If the price were \$300/AUM, even more ranchers would be interested in voluntary permit buyout.³⁹ Given the amount of subsidies the Federal government annually pays to sustain public lands ranching, compensating grazing permittees to voluntarily end their grazing on public lands would be a good deal for taxpayers, ranchers and the environment.

Conclusion

The presence of cheatgrass in sagebrush habitats has contributed to larger, more intense and more frequent wildfires than what naturally occurred. Domestic livestock aid and abet cheatgrass invasion by disturbing the soil, removing competing native vegetation, and spreading cheatgrass seed on their coats and hooves. Federal agencies will fail to halt the cheatgrass invasion and resultant, excessive wildfires in sagebrush steppe unless and until the effects of livestock grazing are acknowledged and addressed in restoration planning.

About the Sagebrush Sea Campaign

The Sagebrush Sea Campaign (www.sagebrushsea.org) focuses public attention and conservation resources on protecting and restoring the vast sagebrush-steppe landscape in the American West. The campaign participates in public lands management planning, advocates for natural resource protection, and uses education, research, legislation and litigation to conserve and restore the Sagebrush Sea for present and future generations. The Sagebrush Sea Campaign is a project of Forest Guardians.

Contact Information

Mark Salvo, Director
mark@sagebrushsea.org
503/757-4221

Andy Kerr, Advisor
andykerr@andykerr.net
541/201-0053

³⁸ van Kooten, G. C., R. W. Thomsen, T. Hobby. 2006. Resolving range conflict in Nevada? Buyouts and other compensation alternatives. *Rev. Agric. Econ.* 28(4): 515-530.

³⁹ The Cascade-Siskiyou National Monument Voluntary and Equitable Grazing Conflict Resolution Act (S. 3858, 109th Congress), is cosponsored by Senators Ron Wyden (D-OR) and Gordon Smith (R-OR). The bill is expected to be reintroduced into the 110th Congress. The legislation would pay eligible grazing lessees \$300/AUM to retire their grazing permits in and near the Cascade-Siskiyou National Monument. Nearly all eligible lessees are expected to accept the offer.