How Livestock Impacts Ecosystems

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Cattle grazing Grand Staircase Escalante NM, Utah. Photo by George Wuerthner

Livestock production is one of the most ubiquitous human activities around the globe. It is particularly detrimental to arid lands, and much of the western public lands are arid. Typically most livestock advocates, which also includes far too many conservation organizations, focus on one or two areas where livestock impacts can be mitigated (not eliminated) such as fencing riparian areas to protect water quality or range riders to fend off predators.

But all of these are just halfway measures that ignore a full accounting of the multiple ways that livestock production harms our ecosystems, wildlife, and our planet. They do not address the real issue-does it make sense to use water-loving, slow-moving, domesticated animals to produce protein? There are alternative sources of protein, and certainly better places to do this than the arid lands of the Western U.S.

There have been some excellent reviews of livestock impacts.

Welfare Ranching: The Subsidized Destruction of the American West (Wuerthner and Matteson 2002) has numerous chapters addressing many aspects of livestock production ecological impacts in the arid West.

Waste of the West: Public Lands Ranching by Lynn Jacobs. A classic book that is heavily illustrated. An excellent primer for anyone who is interested in getting acquainted with the issue.

A classic paper is Thomas Fleischner's Ecological Costs of Livestock Grazing in North America (Fleischner 1994).

Another is Freilich et al. Ecological Effects of Ranching: A Six-Point Critique.

A critical review of Allan Savory Claims by John Carter et al. (2014) is useful.

More recently, a review of global impacts is Livestock's Long Shadow, which asserts that livestock production is the leading cause of biodiversity loss (FAO 2006).

In 2019 the U.N. updated the earlier report with the IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. The review finds that Agriculture, particularly livestock grazing, is the single greatest impact on global biodiversity and contributes significant amounts of CO2 to GHG emissions.

Quoting from the report, "Over one-third of the world's land surface and nearly three-quarters of available freshwater resources are devoted to crop or livestock production {2.1.11}. Crop production occurs on some 12 percent of total ice-free land. Grazing occurs on about 25 percent of total ice-free lands and approximately 70 percent of drylands {2.1.11}. Approximately 25 percent of the globe's greenhouse gas emissions come from land clearing, crop production, and fertilization, with animal-based food contributing 75 percent of that."

The key findings of the report include:

Livestock production (grazing and feedstock) is the single largest driver of global habitat loss.

Grazing areas for cattle account for about 25% of the world's ice-free land.

Animal agriculture contributes at least 18% to global greenhouse gas emissions.

Livestock production uses a large portion of freshwater resources.

One-third of the world's crops are used as feed for livestock production.

Animal-based foods, especially beef, require more water and energy than plant-based foods. This production of crops for animal feed means more greenhouse-gas emissions.

The meat and dairy industries use 83% of farmland but contribute only 18% of food calories.

Farmed animals now account for over 90% of all large land animals.

Producing protein via farmed animals is a very wasteful use of resources. It can take from 10kg to 100kg of plant foods to produce just 1kg of animal products.

The demand for grain-fed meat is one of the main drivers of global biodiversity loss.

Within the United States, livestock production is a significant land use (see excel chart) NPLGC has been identified as contributing to these ecological losses and habitat degradation.

Cattle grazing Sonoran Desert National Monument, Arizona. Photo by George Wuerthner

KEY IMPACTS OF LIVESTOCK PRODUCTION (NOT JUST GRAZING) UPON THE LAND.

1. Forage competition—the majority of the forage is consumed by livestock, leaving little residual cover or food for native wildlife (Schieltz and Rubenstein. 2016).
2. Livestock compact and trample soils reducing infiltration, creating higher run-off, more flooding and erosion (Kauffman B. and W. C. Krueger. 1984 , Belsky, J.A et al. 1999).
3. Livestock is the major source of non-point water pollution in the West (FAO 2006).
4. Livestock destroys soil biocrusts that bind soils and captures free nitrogen making it available to plant growth, soil crusts and inhibit weed establishment (Zaady E., Eldridge D.J., Bowker M.A. (2016).
5. Livestock is among the chief sources of weed dispersal. Also, the trampling of plants, as well as cropping of desirable plants give weedy species a competitive advantage (Hogan J. P., Phillips C. J. C. (2011).
6. Most of the West's water is diverted for livestock forage production (i.e. hay). In Montana, 97% of all water removed from streams is used by agriculture (M.R. Cannon and Dave R. Johnson 2000).
7. Livestock can socially displace native species. Elk and other species have been shown to avoid areas actively being grazed by domestic animals (Clegg, Kenneth. 1994).
8. Livestock transmits disease to native, i.e. as in bighorn sheep (Pils and Wilder 2018).
9. Predator and pest control such as the killing of wolves and prairie dogs greatly reduces the ecological integrity of the landscape (Ripple and Beschta 2012).
10. Trampling of riparian areas negatively affects 75-80% of the West's wildlife species (Kauffman B. and W. C. Krueger 1984).
11. Plant community conversion—grazing can lead to the eventual transformation of a plant community (F. Amiri, Ali Ariapour and S. Fadai .
12. Livestock grazing contributes to increased fire severity by removing grasses allowing tree seedlings to become established, leading to greater tree densities. Livestock has led to the spread of cheat grass—a highly flammable annual grass that increased fire frequency, negatively impacting native grasses and shrubs (Belsky, A.J., and J. L. Gelbard, 2000).
13. Livestock interrupts nutrients cycles (Fleischner 1994)
14. Livestock degrades the aesthetics of the landscape.

15. Forage production and livestock grazing off and on public lands affect native plant communities. There are 1.9 billion acres in the United States outside of Alaska. Agriculture, particularly, livestock production affects more than half of that acreage. There are 408 million acres of agricultural land were in cropland—much of it forage crops to feed to livestock–614 million acres were in pasture and range, 127 million acres were in grazed forestland (Cynthia Nickerson and Allison Borchers 2012).
16. Livestock affects many smaller native species that are seldom on the radar screen of most citizens from snails to frogs (Wuerthner and Matteson 2002).
17. Livestock production is responsible for more endangered species than other land use in the West (Flather et al. 1994).
18. Fences, water development, and other developments used to maintain livestock operations have negative impacts on native species. Fences can block wildlife migration or fence posts may provide perches for birds of prey to attack sage grouse (Jakesa et al. 2018).
19. Getting at the true costs of livestock production is nearly impossible. The real ecological costs are uncountable, and even the public taxpayer costs are obscured (Wuerthner and Matteson 2002).

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