



GUZZLING THE WEST'S WATER

Squandering a Public Resource at Public Expense

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Livestock production, which includes the irrigation of livestock feed crops, accounts for the greatest consumption of water in the West. Such a water-intensive industry is poorly suited to the arid West. Dewatering of rivers and groundwater pumping for irrigation is a major cause of species decline throughout the region, and water development for agriculture is costly to taxpayers.

When people think of California and water, they often imagine sprawling cities dotted liberally with swimming pools and watered lawns; legions of vain auto owners washing their SUVs, sports cars, and minivans; and endless acres of verdant golf courses—all sucking down rivers both near and far. This image is partly correct—rivers are going dry. But the major reason is not direct consumption by humans—urbanites running sprinklers on their front yards and the like. In California, the major user of water is agriculture, and within agriculture, the thirstiest commodity is the cow.

Overall, agriculture accounts for 83 percent of all water used in California. It's true that California grows the majority of America's fruits and vegetables, so liberal use of water by its agricultural sector would not be unexpected. However, few people would suspect that growing feed for cattle is the predominant agricultural use of water in California. In 1997, 1.7 million acres of the state were planted to alfalfa alone. Irrigated pasture and hayfields consume more water than any other single crop in California—more than a third of all irrigation water.¹ Together, alfalfa and hay and pasturage account for approximately half of all water used in the state.

The story is similar in other western states. In Colorado, some 25 percent of all water consumed goes to alfalfa crops.² In Montana, agriculture takes 97 percent of all water used in the state, and just about the only irrigated crop there is hay and pasture forage; more than 5 million acres in the state are irrigated hay meadows.³ In Nevada—the most arid state in the country—domestic water use amounted to 9.8 million gallons a day in 1993. By contrast, agriculture used 2.8 *billion* gallons of water per day.⁴ Altogether, agriculture uses 83 percent of Nevada's water⁵—and the major crop is hay for cattle fodder. In Nevada, while cow pastures are flood irrigated, wetlands at wildlife refuges and the state's rivers often go bone-dry.⁶

Cows are poorly adapted to arid environments. They are profligate consumers of water. Beef production demands an estimated 3,430 gallons of water just to produce one steak!⁷ Most western rangelands simply don't provide enough forage alone—because the climate is too dry—to run livestock economically. Supplemental feed and irrigated pasture are also needed. Many of the ecological and health impacts of livestock production in the West are associated with the use and abuse of water: the livestock industry alters water quantity and quality and water flow regimes.

The removal of water from streams and aquifers for irrigation threatens many species with local extinction. Rivers and springs are often completely dewatered. According to the Montana Department of Fish, Wildlife and Parks, some 3,778 miles of river are dewatered in Montana annually.⁸ Dewatering of streams is a major factor in the decline of many fish species across the West, including most native trout and many salmon stocks.

Dewatering leaves fish stranded in shallow pools, where they are more vulnerable to predators. Fish eggs can be left high and dry when water levels drop during the irrigation season. Many young fish are diverted, along with portions of their streams, into irrigation canals; they subsequently die when water ceases to flow down the canal. In one study in the Bitterroot Valley, Montana, up to 90 percent of the annual production of young westslope cutthroat trout—a species petitioned for listing under the Endangered Species Act—was lost out of some streams because of irrigation canals. Dewatering also leads to higher water temperatures in streams and concentrates pollutants—all to the detriment of native aquatic life.

Another problem is that irrigation exacerbates an already naturally high loss of water from the land into the atmosphere. Huge amounts of water evaporate from storage reservoirs or are transpired into the air by water-hogging crops, such as alfalfa.

Irrigation leads not only to the concentration of pollutants already in streams: new pollutants enter the water, thanks to the diversion of water onto fields and the subsequent return of some of that water to groundwater or surface water bodies. Contaminants picked up from fields include excess nitrogen and

Irrigation sprinkler delivers water to a crop of alfalfa near Mud Lake, Idaho.

minerals leached out of the irrigated soils. In Nevada, for instance, used irrigation water diverted back into the Stillwater National Wildlife Refuge is so full of mercury, selenium, and boron leached from agricultural fields that waterfowl and other wildlife at the refuge are being adversely affected.⁹ A similar problem with polluted irrigation return water has been documented at Kesterson National Wildlife Refuge in California.¹⁰

Groundwater pumping has diminished or destroyed water sources for numerous species around the West. In southern Idaho, water is pumped out of the aquifer to grow hay; as a consequence of this activity, Bruneau Hot Springs—sole habitat for the Bruneau Hot Springsnail—has been drying up. The snail was listed as endangered by the U.S. Fish and Wildlife Service in 1993. Similar groundwater depletion once threatened a host of unique fish and snail species at Ash Meadows in Nevada. Fortunately for these species, the offending agricultural operations were purchased and retired to create Ash Meadows National Wildlife Refuge, but other aquatic species haven't been so lucky. Groundwater pumping for irrigation has already caused some desert fish to go extinct.¹¹

Dewatering of streams and aquifers has led to a shrinkage in riparian vegetation and naturally subirrigated lands (such as valley bottom meadows) around the West. This reduction in riparian habitat has serious consequences for wildlife, since an estimated 70 to 80 percent of all western species—plants and animals—are dependent on these thin zones of moisture for survival.¹²

What is particularly ironic about livestock-caused stream dewatering is that it usually makes little economic sense. In much of the West, the value of leaving water in the river to sustain native fisheries or to provide for water-based recreation is often vastly greater than that of the beef produced with the same amount of water.¹³ Leaving water in the river to support fishing may ultimately be far more beneficial to local economies than using it for irrigation.¹⁴ Yet we regularly sacrifice the fish to produce beef—a commodity that is already produced more economically and with less environmental impact in other, naturally wetter, parts of the country.

In biology, it can be useful to categorize causative factors as either proximate or ultimate. In the arid West, livestock production is often the ultimate cause of species endangerment, though other factors, often more readily recognized, may be proximate causes. Thus, many dams in the West are proving to be ecological disasters, yet the dams themselves are only proximate causes of deteriorating aquatic ecosystems. Many dams would not have been built but for the demand for water storage for irrigation. Other uses, such as recreation or hydropower production, were often secondary rationalizations for dam construction. Without livestock production, it's likely that many fewer dams would exist in the West.

Dams fragment aquatic systems, preventing free movement of species such as salmon. Dams obviously flood habitat, too, making it unusable for many species. For instance, several species of Snake River snails are now listed under the Endangered Species Act because of dam construction and flooding of the river channel. The change in flow regime and water temperature occasioned by the construction of dams in the Colorado River system has led to the decline of the bonytail chub, the Colorado pikeminnow, the razorback sucker, and the humpback chub.¹⁵ Since most of these dams were constructed for water

storage—with the bulk used for irrigation, mainly of livestock feed—partial blame for the decline in these native species lies with the livestock industry.

Taxpayers carry much of the burden for western water projects that benefit ranchers and the livestock industry. A review of Bureau of Reclamation water projects found that most western irrigation projects are subsidized in three ways.¹⁶ First, irrigators often receive no-interest or extremely low-interest loans for project construction, with repayments scheduled over very long time periods—forty or fifty years or longer. Second, many project costs are forgiven and charged instead to taxpayers, since the projects are seen as having “public benefits,” such as recreation. Third, Congress frequently legislates repayment relief.

In a 1996 review of 133 federally funded irrigation projects, the General Accounting Office found that for only 14 projects had irrigators paid, or were scheduled to pay, their entire allotted share of construction costs. In nearly 90 percent of the water projects, irrigation assistance and/or charge-offs accounted for payment or relief of some portion of the irrigators' repayment obligation.¹⁷

And in a 1988 study conducted for Congressman George Miller, irrigators on the Vernal Unit of the Central Utah Project paid only \$3.68 per acre-foot for water that cost the government \$204.60 per acre-foot to deliver.¹⁸ Such discrepancies between the cost of water storage and delivery and what irrigators ultimately pay are widespread throughout the West.

Livestock also produce actual, not merely economic, waste. Agriculture is the greatest source for nonpoint water pollution (that deriving from an extensive area, such as a farm field or a grazed hillside, rather than a single site, such as the waste pipe of a factory) in the United States.¹⁹ Pollutants from livestock agriculture include sediments as well as animal waste. Nationwide, the output of livestock manure is more than 130 times that of human waste—yet most of the livestock waste enters waterways and groundwater untreated. The Environmental Protection Agency has found that of all rivers it has identified as “impaired” in some way, agricultural runoff, including animal waste, is the culprit in 60 percent of the cases.²⁰ And cattle are the biggest producers of livestock manure: more than 1.2 billion tons per year.²¹

The heavy input of phosphorus and nitrogen from manure can elevate microbial activity in streams and lakes, consequently driving oxygen levels down and harming other aquatic organisms.²² Animal wastes also carry diseases that can be transmitted to humans via water sources. Among the infectious diseases that can be acquired from livestock-contaminated water are salmonellosis, John's disease, leptospirosis, anthrax, listeriosis, tetanus, tularemia, erysipelas, and colibacillosis.²³ Again, neither the cost of treating domestic water supplies to make water safe for human consumption nor the cost of disease outbreaks caused by waterborne pathogens originating with the livestock industry are carried by livestock producers.

Livestock affect water quality and quantity through their impact on vegetation and soils. Trampling compacts soils, reducing water infiltration, which in turn leads to greater overland flow and flooding.²⁴ Trampling also can reduce late-season stream flows by as much as half. The removal and destruction of streamside vegetation by livestock increases bank erosion and allows

the current to increase speed and downcutting capability.²⁵ Livestock damage to watersheds is the most serious cause of excess sedimentation (that is, above the levels of natural erosion) in much of the West. Sedimentation hurts trout and salmon, as well as many lesser known aquatic species, such as freshwater snails.²⁶

According to a 1998 study, dams and other water developments are responsible for the endangerment of 30 percent of *all* species listed as threatened or endangered in the United States.²⁷ Therefore, it should not be surprising that half of the fish species found west of the Continental Divide are listed, or are candidates for listing, under the Endangered Species Act.²⁸ Of course, live-

stock production isn't the only reason for these declines, but it plays a major role in many cases. In addition to the livestock impacts to water and streams enumerated above, livestock can threaten fish species indirectly, by degrading habitat to the point that nonnative fish gain competitive advantage.

In the moisture-limited West, raising water-loving livestock makes about as much sense as raising oranges in Alaska. If you can get most of your costs subsidized, and if you and society are willing to ignore the environmental consequences, it can be done. However, as more of the true costs of western livestock production are realized, including the cost in precious water resources, society may want to reconsider this folly.

Most agricultural water [in the West] grows low-value crops. In California, for example, nearly 1 million acres of irrigated pasture requires about 4.2 million acre-feet of water per year—as much as an urban population of 23 million. Pasture, though it is the single largest water user in California, is an extremely low-value crop.

— Marc Reisner and Sarah Bates, *Overtapped Oasis*, 1990