

TRAIL HORSES SHOULD NOT BE SINGLED OUT IN THE BATTLE AGAINST NOXIOUS WEEDS

**A Position Paper of the Boulder County Horse Association
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Abstract

Horses have long been the quintessential icon of the diverse American traditions of farming, ranching, mining, exploration, settlement, hunting, outdoor recreation, and nature appreciation on public lands. Of the approximately 6.9 million horses in the United States, about a third (2.9 million) are used as recreational trail companions and a means of transportation into front country and backcountry settings (American Horse Council, 2001). About 145,000 horses call Colorado home, and approximately 57,000 of those horses are considered to be recreational trail horses, including pack stock (Colorado Horse Development Authority, 1999; AHC, 2001). In Colorado alone, recreational trail horses provide a \$500 million economic benefit and support 5,200 full-time jobs – the state’s largest equine-related category (AHC, 2001).

In recent years regulatory pressures have increased on all forms of recreation, from municipal parks to National Parks. Although statewide the number of acres in the public domain has increased, and trail mileage has increased somewhat, neither has increased as fast as the population; meanwhile, maintenance budgets have been shrinking. These imbalances have created tensions among trail user groups, environmentalists, and public land managers, as each constituency fights for its share of what it sees as a shrinking pie. Equestrians have come under more than their share of scrutiny, specifically over a generalized anxiety about whether horses spread noxious weeds on trails and public lands.

The Colorado Horse Council, Back Country Horsemen of America, Boulder County Horse Association, and others have conducted extensive research into the available literature on this subject, and have discussed the issue directly with researchers in the field and with agency personnel. We also contribute considerable personal experience representing thousands of trail miles ridden and hundreds of trail miles built.

It is our professional belief that horses are not significant vectors in the spread of noxious weeds or non-native vegetation. We support best management practices to control the spread of weeds of all kinds, and we outline some of these principles in this paper.

Introduction

Noxious weeds and other invasive plants are causing widespread damage to ecosystems throughout North America. In 2002 alone, more than 196,241 acres were considered lost to knapweed in Colorado. This silent invasion reduced native habitat for myriad flora and fauna, diminished the quality of grazing land for livestock, and caused more than \$10 million in lost production (Beck, 2008). It will take many years, significant willpower and manpower, and extensive financial resources to restore this land to its pre-infestation state (if indeed that is ever to be possible). Cheatgrass (*Bromus tectorum*) dramatically increases the frequency of fire in sagebrush-dominated shrublands from a historic interval of 60-110 years to less than five years recently, and native plants are often unable to recover from such frequent fires (Whisenant, 1990).

Colorado maintains a list of 72 noxious weeds divided into three categories. List A species are designated by the Commissioner for eradication; List B species have a state noxious weed management plan developed to stop their spread; List C weeds will receive some resources to jurisdictions that choose to manage these species (Colorado Dept. of Agriculture, 2008). Additional considerations, beyond the scope of this position paper, include native vs. non-native species, invasive vs. non-invasive species, and the widespread cultivation and use of livestock forage, which in turn may or may not be classified as invasive, native, etc.

Public lands in Colorado have traditionally been managed for a variety of purposes. Most public land management agencies try to implement a set of best management practices to control the spread of noxious weeds while continuing to support a reasonable balance of other uses, such as recreation and agriculture.

Known vectors for the spread of noxious weed seeds include wind, water, truck tires, boats, birds, wildlife fur and that of other mammals such as dogs and cats, hiking boot soles, mountain bike treads, and the intestines of many animals such as elk, deer, and cattle. Horses are often implicated in the latter category, but Eric Lane, former Colorado State Weed Coordinator, asserts that horses are no more to blame for weeds than any of the aforementioned known vectors (1998, pers. comm). Cindy Lair, Program Manager with the Colorado Department of Agriculture State Conservation Board, agrees, saying that "Horses are not important weed carriers. Public land management agencies need comprehensive plans for weed management, but singling out horses for trail and access restrictions out of concerns about weeds is inappropriate" (2008, pers. comm.).

The research discussed below specifically evaluates horses and their effectiveness, or lack thereof, at spreading weeds. While there is no doubt that some vegetation does germinate from horse manure, the preponderance of evidence from documented, controlled studies in the field and in the laboratory support the assertion that horses have a minimal role in the spread of weeds and exotic species for a variety of reasons.

The Claims Against Horses

Fear: Some researchers claim that horses are responsible for spreading weeds via their digestive systems. St. John Sweeting and Morris (1990) found that when horses were fed a mixture of weedy seeds in Australia, many species were able to pass through horses with little or no loss in viability. Campbell and Gibson (2001) found in Illinois that the overall density of exotic species was greater on trails that allowed horses than on those that did not; also, 44% of the species found in horse manure were aliens, and only one of those species was present in the surrounding vegetation. Janzen (2001) found that non-native seeds can be passed through a horse's digestive system, but no attempt was made to determine if the seeds were viable. Wells (2006) collected manure from which she claimed three "state-listed" species germinated: cheatgrass, shepherds purse, and yellow foxtail. A recent study by Wells and Lauenroth (2007) collected manure found along a single trail on Colorado's Western Slope, from a few animals that had been trailered in from other locations, and found that 10 native and 10 alien species germinated from 12 samples, with aliens comprising 85% of the seedlings that emerged. These studies are being used to justify banning horses because of a concern that equine-borne weeds might become established along trails.

Fear: Other researchers claim that horses are responsible for spreading weeds because they create physical disturbances to soil that make conditions favorable for germination. Landsberg et al (2001) suggested the likelihood of weed invasion from horse traffic through disturbance of the soil. Cole and Spildie (1998) found that horses destroyed more vegetation than hikers or llamas on experimental tracks through existing vegetation. These studies are being used to justify banning horses from trails because the disturbed ground might provide a hospitable seed bed for weeds to become established.

But Here is The Rest of the Story

Fact: Most horses will not eat weedy hay or live weeds if they are given the opportunity to graze on good quality pastures or hay (Boulder County Horse Assoc., 2008). Many noxious weeds are toxic to horses, and many other undesirable weeds are unpalatable, and most will be avoided unless the horse is starving. Most horses in a starved condition are not taken out on trails for recreational purposes.

Fact: Most of the studies that recovered viable seeds from horse manure or that germinated seedlings from horse manure found that noxious or invasive species were not present. Of the 654 seedlings painstakingly nourished by Wells and Laurenroth (2007), not a single plant belonged to any of the Class A or B species listed as "noxious" by the State of Colorado, and only one, cheatgrass, is found on the Class C list (12 were grasses, sedges, and rushes, six were forbs, and one was a tree). No attempt was made to determine what the horses had eaten before starting the ride. The only other research in Colorado that found any state-

listed species was that of Wells (2006), which is inconsistent because a search of all the listed weeds in Colorado in 2008 revealed that only cheatgrass is included).

Fact: Most of the plant species characterized in these studies as non-native, exotic, or alien, are actually ubiquitous and are often valued as forage species.

In the Wells and Lauenroth study (2007), Kentucky bluegrass (*Poa pratensis*) was found in 9 of the 12 samples and contributed 59% of the seedlings. But Kentucky bluegrass is a perennial, non-invasive, cool-season, sod-forming grass which is used throughout the United States for golf courses, lawns, pastures, and erosion control. In the Campbell and Gibson study (2001), white clover (*Trifolium repens*) and lespedeza (*Kummerowia striata*) were also listed as exotic species. But white clover is an herbaceous perennial legume valued as a forage crop for American livestock, and lespedeza is widely used as a stabilization cover crop in many parts of the United States (Quinn et al, 2008). These common plants are not found on any state's noxious or controlled weed lists.

Fact: Most seeds found in horse manure are not viable. Janzen (1981) and Cash, Barney and Gagnon (2006) found that the mastication and digestion of viable weed seed by the equine digestive system reduced seed viability by 98%. In the latter study, the researchers actually dosed horses with known quantities of weed seeds, including leafy spurge and spotted knapweed, and report that "total passage of viable weed seeds through 72 hours ranged from 0 to 2%." Equine physiology may play a role in decreasing the ability of seeds to remain viable. Seeds must be sufficiently small and tough to get past the large strong molars of the horse, and those that do must still survive the acids and enzymes of the horse's gut. Evidently some do, but most do not.

Fact: Most viable non-native seeds that are found in horse manure fail to mature. Wells and Lauenroth (2007) spread their manure samples over a layer of sterile potting soil in a greenhouse, watered them daily and fertilized them with Miracle Gro every 2 to 3 weeks – hardly the typical fate of similar manure samples deposited out in the field. Campbell and Gibson (2001) found that 23 non-native species germinated in their greenhouse but only 3 non-native species germinated from fecal samples in the field. And Gower (2006) conducted a recent study in the eastern United States which investigated the ability of seeds recovered from horse manure to germinate along the trail where deposition actually occurred; only 1% of the 288 hay, manure, and hoof-debris plots established on horse trails at five sites in five states contained any live plants at the end of the first growing season.

Fact: Most horse trails do not exhibit any more non-native vegetation than do trails that are closed to horses. Cole and Hall (1992) found that the change in exotic species cover at campsites used by backpackers and horsemen over a nine-year period in the Bob Marshall Wilderness of Montana was "virtually identical." Another study in a Montana wilderness displayed no difference in the quantity of spotted knapweed (*Centaurea maculosa*) between backpacker and equestrian campgrounds (Marcus et al, 1998). Similarly, Soehn (2001) found no difference between horse-use and hiker-only sites in Great Smoky Mountains National Park.

Gower (2006) found that non-native species composition and percent of total plant species did not differ between horse and hiker trails in the eastern US.

Fact: Many studies, including one in Rocky Mountain National Park, have demonstrated that while non-native species may occur near trails, they exist also away from the trail and do not pose a threat to the ecosystem as a whole (Weaver and Adams, 1996; Benninger-Truax et al, 1992; Gower, 2006). Not all of these studies focused on equestrian trails, but the pattern was consistent regardless of trail-use types (Quinn et al, 2008).

Fact: Most established trails are probably not further disturbed as a unique result of horse travel (Weaver and Adams, 1996; Landsberg et al, 2001). Other than equestrian trail users, disturbances to wildlands which render the soil more hospitable to weeds include fires, diversion of natural water sources, road and trail building, vehicles, logging, hikers, intensive grazing, and vegetation trampling (see summary in Quinn et al, 2008).

Fact: Most large herbivores do not carry seeds in their hair coats (Janzen, 1984). Trail horses' coats are rarely shaggy and their lower legs are usually short-haired and smooth, making it unlikely that weed seeds would adhere to them. Grooming the horse before and after riding takes care of any stray plant matter.

Conclusions

Some of the studies referenced above conclude with startling exhortations to trail managers, for example, to "be very aware of the potential for riding and pack stock to transport alien plant seeds for long distances along recreational trails" (Wells and Lauenroth, 2007). Advice like that has prompted some land managers to suggest that horses be banned from extensive trail systems, that they be quarantined for several days before going on public lands, or that they be required to wear "diapers" -- merely because of this possibility. We submit that those are draconian steps, attempts to solve a problem that simply does not exist.

We fully accept the importance of contemporary ecosystem management to ensure the health of native plants and animals, and weed management is a vital part of that process. We acknowledge that in some locations under certain conditions, equine-borne vegetation can become established along trails on public lands. However, the overwhelming body of scientific research, coupled with expert opinions and anecdotal evidence, indicates that horses are an insignificant vector, and only one of many, in the spread of weeds and other non-native plants. Barry Reiswig, retired Director of the National Elk Refuge in Jackson, WY and a 31-year veteran manager with the US Fish & Wildlife Service at other National Wildlife Refuges, states unconditionally that "Most weeds are spread by vehicles. Horses in my experience are not a major source of weeds in the back country. Many wild animals such as deer, elk, bison etc also spread weed seeds. If anyone thinks they can control weeds by simply banning stock, they are sadly mistaken" (pers. comm., 2008).

Dr. Gene Wood, Professor of Forest Wildlife Ecology and Extension Trails Specialist at Clemson University, concludes that “the scientific evidence fails to demonstrate that recreational trail stock significantly contribute to the invasives problem at the landscape level. Furthermore...it is very difficult to even imagine recreational trail stock as a significant contributor to the problem when considered in the context of all other well known pathways and vectors” (Wood, 2006).

Finally, recreational trail horses comprise a tiny fraction of total trail users. For example, in April of 2006, 73,816 recreational users visited Rocky Mountain National Park, 224 of which were “either” snowmobiles or horses. Similarly, 25,911 recreationists visited Redwood National and State Parks in California, of which only 496 were day-use horseback riders (NPS Public Use Statistics Office Website, 2006). Boulder County Parks & Open Space regularly reports that about 2% of its annual visitors are equestrians (BCPOS website, 2008). The number of horses out on the trails nationwide is statistically small compared to other visitors, and carries a similarly small potential for impacts.

In spite of our relatively small demographics, trail use and equestrian access to public lands is extremely important to the horse people who choose that form of recreation.

We recommend that equestrians and public land managers alike adhere to the following set of best management practices to reduce the spread of weeds on public lands:

- 1) Always feed horses the best quality forage available.
- 2) Use certified weed-free hay or processed feed when planning to ride on public lands.
- 3) Carry only certified weed-free hay to trailheads or horse camp sites.
- 4) Clean up and remove manure and spilled hay at trailheads and campgrounds.
- 5) Educate constituents to identify noxious weeds.
- 6) Control weeds in and around horse corrals, pastures, and fences.
- 7) Adopt a trail and conduct frequent weed-pulls along it.
- 8) Groom horses and pick out their feet before bringing them to the trailhead in order to remove any hitchhiking seeds from their coats and hooves.

“The bottom line is that horse trails can be maintained on most natural areas without unacceptably impacting ecological values” (Williams and Conway-Durver, 1998).

If these guidelines are followed, land managers will be able to avoid draconian measures with regard to restricting equestrian use, and horse people will be able to continue enjoying the many diverse forms of public land that have been open to them for centuries, for many more years to come.

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