Chapter 13—Reducing Environmental and Health Concerns

Trail Talk

Trail Talk—Impact Study

David Newsome and others (2004) reviewed research in the United States and Australia in their report, *Environmental Impacts Associated with Recreational Horse-Riding.*

They remind riders that: "Because of the impact potential, it needs to be emphasized to horse-riders that, for continued access, management is critical. Only with 'best practice' management should horse-riding be allowed in national parks and similar areas. With sustained horse traffic, management may have to include some or all aspects of the following: trail location and design; trail construction (drainage and control); trail hardening, such as the use of gravel, geotextiles or geoblock; trail maintenance; visitor regulation (confinement, amount of use, timing of use); education (user behavior, codes of conduct); policing and enforcement."

All users create impacts on the environment. Project planners reduce adverse impacts through sensitive planning of trails and recreation sites. Designers should carefully consider the needs of riders and mounts, the limits of the site, and project limitations. Consult applicable Federal, State, and local environmental regulations when dealing with environmental concerns.

It is beyond the scope of this guidebook to offer scientific data about the environmental effects and health concerns of horse use, or to provide detailed information regarding mitigation. This chapter contains general background information and suggested approaches.

Water Quality

Equestrian trails, trailheads, and campgrounds that are poorly located or improperly designed can cause erosion that deposits sediment in streams, harming fish habitat and waterflow. Sedimentation occurs every time an animal steps in a stream (figure 13–1). Prolonged sedimentation can reduce roughness along the stream bottom and decrease water depth.

Figure 13–1—Riding off the trail in streambeds can disturb aquatic life and soils.

Planning and Design Considerations

- ✯ Consult soil scientists, hydrologists, or engineers to locate water crossings.
- ✯ Use bridges or stabilized water crossings.
- ✯ Construct approaches to stream crossings so overland water does not flow on the trail or road surface, and rising streams don't run down the approaching tread. Where suitable, reinforce approaches with gravel, rock armoring, or other materials that resist water damage.
- ✯ Locate trails and roads so topography and grades restrict destructive runoff. Use appropriate construction and drainage techniques.
- ✯ Choose suitable surface treatments—such as soil hardeners or geotextiles—for trail treads across boggy areas.
- ✯ Plan trails so users will go slower in sensitive areas. For example, incorporate trail curves in such areas instead of long straight segments.
- ✯ Use a trail design that constricts trail users to a designated tread to minimize the tendency of stock to create *braided*—or multiple—trail treads.

Horse Manure

The beneficial uses of manure as fertilizer are well-known—ask any gardener or farmer. However, in recreation areas and on trails manure may be unwelcome. Users may wonder whether horse or mule manure poses significant health risks to humans. There are no definitive answers, but studies are proposed or underway to examine manure's role in water pollution, insect breeding, pathogen transfer, and distribution of weed seeds.

A lot of the manure produced by stock is concentrated at predictable places, including trailers, confinement areas, and trailheads. Because horses and mules often defecate in the first one-half mile (0.8 kilometer) of a trail ride, consider providing two short trail segments from the campground to the main trail—one for riders and one for other users.

Some equestrian groups foster a stewardship attitude by cleaning up after their stock where signs (figure 13–2) are posted and convenient containers are provided. In other places, such as wildland areas where use is low, cleaning up is not customary. Posting signs asking riders to clean up after their stock may not be effective, especially on trails. Programs that involve planners, managers, and all trail users—not just riders—may be useful for finding effective solutions and changing local attitudes. Enforcement efforts may be considered until riders become familiar with the policies. Some jurisdictions classify manure as a solid waste and have regulations regarding disposal.

Planning and Design Considerations

- ✯ Involve riders when planning manure management in recreation sites.
- ✯ Plan separate trails or treads for riders in areas where manure might cause problems for other users.
- ✯ Provide separate equestrian-only parking so others won't have to park near animal waste.
- ✯ Locate corrals and tethering areas away from water sources.
- ✯ Provide convenient structures for sanitary manure disposal. Onsite *composting*—or controlled decomposition—may be subject to local health regulations. Locate receptacles on level ground and provide positive drainage to prevent puddles from forming and waterways from being contaminated. Manure containers with lids minimize odors and flies. Receptacles must be easy to use.
- ✯ Design containers so waste can be removed easily.
- ✯ Consider providing wheelbarrows, rakes, bags for manure cleanup, and a place to store them.

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Manure and Human Health

Adda Quinn investigated current literature to write *Does Horse Manure Pose a Significant Risk to Human Health?* (2001). She states: "Horse guts do not contain significant levels of the two waterborne pathogens of greatest concern to human health risk, *Cryptosporidium* or *Giardia*, neither do they contain significant amounts of E. coli 0157:H7 or *Salmonella*. Fungus, viruses, bacteria and worms found in horses have never been shown to infect humans, and are unlikely to be zoonotic [*transmittable from animals to humans*]." Quinn cites numerous scientific studies and resources to support her conclusions.

Figure 13–2—Signing encourages trail users to be responsible for their animals.

Trail Talk

Manure on Trails

Horses and mules leave significant amounts of manure on trails each year, some of which washes into streams. Few studies have looked at whether horse or mule manure can transmit pathogens to humans. A study conducted at the University of California, Davis, Medical Center by Robert Wayne Derlet, M.D., and James Carson, Ph.D., (2004) looked at the prevalence of human pathogens in horse and mule manure along the John Muir Trail. According to the researchers, "Pack animal manure commonly encountered by backpackers on Sierra Nevada trails contains large numbers of…bacteria normally found in animals. Human pathogens with potential medical importance are present but have a low prevalence."

Noxious and Invasive Weeds

Seeds of noxious plants and invasive species may remain viable after passing through a horse or mule's digestive tract. Weed management efforts focus on:

- Stopping weed introduction
- Redirecting traffic around existing vegetation
- Removing noxious and invasive plants

As a precautionary measure, some land managers restrict trail use unless trail stock are fed certified weed-free feed for several days before and during trail use. Figure 13–3 shows a sign that informs trail users about feed regulations. Also see *Appendix G—Sample Requirements for Weed-Free Feed (BLM)* and *Appendix H—Sample Requirements for Weed-Free Feed (Forest Service).*

Planning and Design Considerations

- Avoid areas with known noxious or invasive species when locating recreation facilities.
- Search literature for current best planning and management practices.
- Install signs informing recreationists about noxious weeds, invasive species, and agency requirements.

Figure 13–3—Many public agencies have regulations regarding stock feed.

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Spreading Nonnative Seeds

Horses and mules are often thought to be an important source of weed and nonnative seed introduction along trails, but the evidence is largely anecdotal. The American Endurance Riding Conference funded a study to examine the issue. Stilth T. Gower, Ph.D., of the Department of Forest Ecology and Management at the University of Wisconsin-Madison determined that "while there are seeds from weeds and nonnative species in horse manure and hay, the plants that result don't survive or spread on trails. Therefore, horses do not appear to be a major source for the introduction of nonnative species…native and nonnative plant species rarely become established on horse trails because of the adverse effects of harsh environmental conditions and frequent disturbance on seedling establishment." The article, *Do Horses Spread Non-Native Plants on Trails?*, is available at *http://www.thehorse.com/ViewArticle.aspx?ID=8846*. The site requires free registration.

Resource Roundup

Weeds and Seeds

Many electronic sources offer helpful information regarding weed management.

- ✯ *Backcountry Road Maintenance and Weed Management* (Ferguson and others 2003) at *http://www.fs.fed.us/t-d/pubs/htmlpubs/htm03712811*. This Web site requires a user-name and password. (Username: t-d, Password: t-d)
- ✯ *Federal Interagency Committee for the Management of Noxious and Exotic Weeds* (FICMNEW) Web site at *http://www.fws.gov/ficmnew*.
- ✯ *Invasive Species Management* (National Park Service) at *http://www.nature.nps.gov/biology/invasivespecies*.
- ✯ *Weed Free Feed: Horsemen Protecting Public Lands from Invasive Weeds* at *http://www.extendinc.com/weedfreefeed*.
- ✯ *Weeds Website* (Bureau of Land Management) at *http://www.blm.gov/weeds*.

Soil Erosion and Root Damage

Trail stock generate many pounds of pressure on the ground under each hoof. Stock tied to highlines, trees, and shrubs for prolonged periods will compact the soil, possibly damaging root systems (figure 13–4). Horses and mules may circle repetitively when they are bored or anxious, creating a doughnut-shaped area of disturbed soil. Other nervous stock paw trenches. Post signs with educational information about stock tethering. When riders are well informed, they can minimize impacts. A regular maintenance program may be able to address problems before they become serious.

Planning and Design Considerations

- ✯ Choose locations for concentrated stock use carefully, evaluating soils and vegetation for vulnerability to damage or disruption.
- ✯ Locate hitch rails, horse areas, pulloffs, and viewing areas away from fragile soils and vegetation.

Figure 13–4—Stock can cause soil or root damage when they are tied to trees. Signs at visitor information stations can discourage this practice.

Vegetation and Facility Damage

Horses and mules graze whenever they have the opportunity—unless their riders stop them. Stock consume more than just grass. They will nibble on most of the trees, shrubs, and plants within their reach. Sometimes, grazing is prohibited to achieve management objectives. When tethered or contained stock are bored, hungry, uncomfortable, fearful, or just need attention, they sometimes chew on things they would normally leave alone. Sometimes they engage in *cribbing*—biting and swallowing air at the same time. Chewing, cribbing, gnawing, and similar behaviors damage fences, hitch rails, and recreation site furnishings.

Planning and Design Considerations

- ✯ Locate areas of concentrated horse use away from sensitive vegetation. Trim vegetation back at least 7 feet (2.1 meters) from trailheads, horse areas, hitch rails, and water troughs. When planting young trees and shrubs, consider how large they will be when they are mature. Trim tree canopies at least 12 feet (3.6 meters) above horse areas, parking pads, or parking spaces.
- ✯ Locate trail and campground furnishings at least 7 feet (2.1 meters) from places where stock are confined so the stock can't chew on them.

Toxic Vegetation

Many plants are toxic to stock and may damage their digestive systems or kill them. The animal's weight, age, and general health affect how intense the reaction will be. Most horses and mules avoid toxic plants that taste bad. The horses in figure 13–5 are feeding on grass and deliberately avoiding the potentially toxic shoots in between. However, some toxic plants—such as water hemlock—have tender, young sprouts or roots that appeal to horses and mules.

Planning and Design Considerations

- ✯ Avoid locating trails or facilities in areas known to have plants toxic to stock. Remove the toxic plants where possible.
- ✯ Post signs noting the presence and location of plants that are toxic to stock.

Figure 13–5—Most adult horses and mules avoid toxic species because they are unpalatable, but some toxic plants have young tender shoots that taste good to stock.

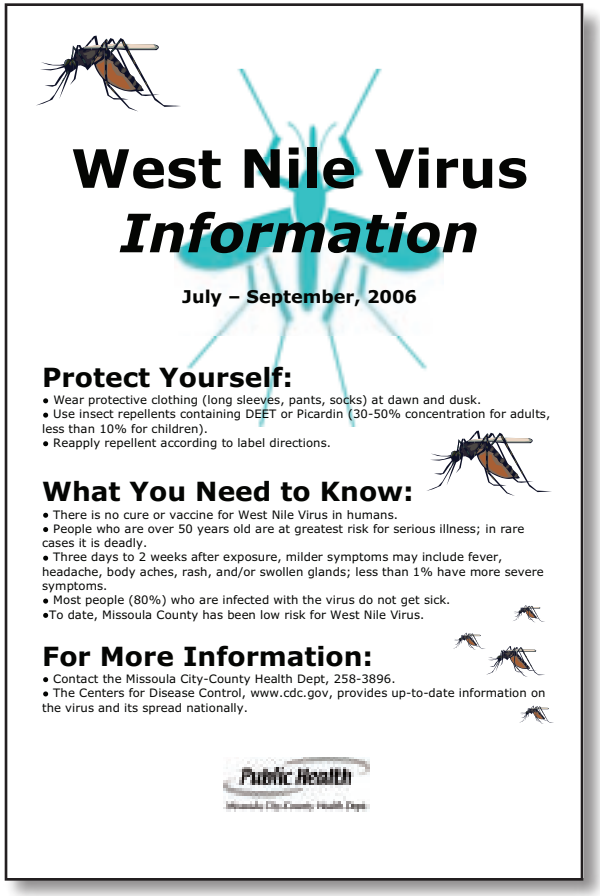
Dangerous Creatures

Attacks by aggressive bees, disease-carrying mosquitoes, biting horseflies, toxic spiders or scorpions, poisonous reptiles, and large predators (figure 13–6) can seriously injure or kill horses and mules. Post warnings for users explaining local dangers (figure 13–7). Educate visitors by offering campground talks, informative brochures, and so forth. Land managers can address some problems through maintenance programs. For example, a bee control program can include inspecting facilities where bees might nest and following up on reports of ground-dwelling colonies.

Planning and Design Considerations

- ✯ Design sites and facilities in a manner that does not hinder animal emergency care or rescue.
- ✯ Avoid building structures, fences, hitch rails, and corrals with openings that might harbor insects, snakes, or other animals that might harm stock.

Figure 13–6—Horses and mules are vulnerable to reptiles, predators, and poisonous or disease-carrying insects,



West Nile Virus
Information

July – September, 2006

Protect Yourself:
• Wear protective clothing (long sleeves, pants, socks) at dawn and dusk.
• Use insect repellents containing DEET or Picardin (30-50% concentration for adults, less than 10% for children).
• Reapply repellent according to label directions.

What You Need to Know:
• There is no cure or vaccine for West Nile Virus in humans.
• People who are over 50 years old are at greatest risk for serious illness; in rare cases it is deadly.
• Three days to 2 weeks after exposure, milder symptoms may include fever, headache, body aches, rash, and/or swollen glands; less than 1% have more severe symptoms.
• Most people (80%) who are infected with the virus do not get sick.
•To date, Missoula County has been low risk for West Nile Virus.

For More Information:
• Contact the Missoula City-County Health Dept, 258-3896.
• The Centers for Disease Control, www.cdc.gov, provides up-to-date information on the virus and its spread nationally.

Public Health

Figure 13–7—Visitors appreciate current information about dangers in an area. —*Courtesy of City-County Health Department, Missoula, MT.*

Animal Diseases

Horses and mules contract communicable diseases from bedding, fence materials, water troughs, or other items they share with infected stock. Direct contact between healthy and infected stock can spread many diseases. Strangles, ringworm, rabies, encephalitis, and respiratory illnesses are common examples. Communicable diseases often occur cyclically. Posting current information during outbreaks is a good practice.

Planning and Design Considerations

- Provide easy-to-clean water troughs that drain between uses.
- Provide a convenient disposal method for used bedding material.

Manager and User Awareness

Riders can anticipate many situations and minimize unwanted effects of horse use through responsible behavior. Some uninformed riders create unintentional environmental impacts. Occasionally, users ignore regulations that don't make sense to them or that seem unreasonable.

Land managers should learn and incorporate current best management practices that address environmental and health issues, encourage input from all users, and adapt to changing needs. An example is a bee control program. Managers also can foster awareness and understanding by providing signs and handouts (see *Chapter 12—Providing Signs and Public Information*). Other activities include developing user guides or sponsoring educational programs about outdoor ethics. Monitoring maintenance, posting current conditions, and providing necessary tools—for example, manure rakes, shovels, bags, and wheelbarrows—are other ways managers can help riders. Agencies can hold events that unite different user groups for a common cause, such as trail cleanup days, and have the added bonus of fostering better relationships between user groups. Many areas have recreation land stewardship groups that assist managers in their efforts. See *Appendix B—Trail Libraries, Trail Organizations, and Funding Resources*.

Resource Roundup

Low Impact Recreation Use

The Leave No Trace Center for Outdoor Ethics is a national nonprofit organization that promotes responsible outdoor recreation through education, research, and partnerships. The center's *Leave No Trace* message consists of seven major points:

- Plan ahead and prepare.
- Travel and camp on durable surfaces.
- Dispose of waste properly.
- Leave what you find.
- Minimize campfire impacts.
- Respect wildlife.
- Be considerate of other visitors.

More information about *Leave No Trace* principles is available at *http://www.lnt.org*.

Low Impact Stock Use

The *Leave No Trace Stock Master* course covers Leave No Trace principles as they apply to stock users and packers. Students learn hands-on methods and techniques for teaching outdoor ethics to diverse audiences in a train-the-trainer format. The course is offered by the Forest Service's Ninemile Wildlands Training Center near Missoula, MT. More information is available at *http://www.fs.fed.us/r1/lolo/resources-cultural/nwtc/descriptions.pdf*.