Horse Owners Guide to

Water Quality Protection

COUNCIL OF BAY AREA

RESOURCE CONSERVATION DISTRICTS

in partnership with the USDA Natural Resources Conservation Service

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Horse owners can reduce the need for further regulation by taking responsibility to manage horse waste, limit erosion, control stormwater runoff, and protect creeks and waterways.

Introduction

Conservation practices that protect water quality at horse facilities add to a horse property's value, promote horse health, build good relations between neighbors, and discourage further regulation.

While horses contribute only a small fraction of the total pollutants entering local waterways, horse owners and facility managers bear the responsibility to minimize water pollution through:

- Facility design and siting
- Horse waste management
- Stormwater runoff management
- Pasture and paddock care
- Protection of waterbodies

Implementation of conservation practices does not need to be costly. Often a slight change in operations will achieve the desired result. How can horse waste and erosion affect water quality? How well are you as a horse owner protecting water quality? What more can you do?

With an expanding urban environment, horse owners must diligently protect water quality and present a good image to their neighbors.

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What can horse owners do to minimize adverse water quality impacts?

Be informed and proactive. Analyze possible water quality impacts of your operations before and during rains. Learn how to perform simple water quality monitoring tests. Implement conservation practices if necessary. Carefully consider potential water quality problems before expanding your facility. Schedule a workday at your stable to install roof gutters, improve drainage channels, set up a new manure storage system, or revegetate a creek. Volunteer to maintain public trails. Encourage your friends and horse clubs to do the same.

Remember, any complaint about horses reflects on all horse owners. Realize that not everyone loves horses. Consider yourself an ambassador for horses by good stewardship of land and water resources. Care of natural resources in your local area will initiate an expanding ripple.

How can horse waste impair water quality?

Although horse wastes (manure, urine and soiled bedding) are organic, biodegradable materials, many of their biological and chemical properties can be detrimental to fish, insects, and other aquatic life if those wastes get into local waterbodies.

All aquatic life depends on the small amount of ***dissolved oxygen*** that naturally exists in water. The atmosphere contains 20% oxygen, but water saturated with oxygen contains only 11 parts per million (ppm) at 50˚F, and even less, 9 ppm, at 70˚F. The addition of any decomposable organic material to water stimulates the growth of aerobic bacteria that break down, or consume the organic matter. The respiratory demand of the resultant bacterial population can become large enough to overwhelm the water's oxygen dynamics, leaving little or no dissolved oxygen for other aquatic life.

Horses in the wild may roam up to twenty-five miles a day for food, water and shelter. Their continual movement disperses manure and urine and allows for regrowth of vegetation. However, domestic horses can be kept in a small area. If not carefully managed, horse waste and sediment from horse facilities could enter waterways or infiltrate ground water to create conditions detrimental to drinking water supplies, recreational activities and the environment.

Many of the ***nutrients*** ingested by animals, not just horses, return to the environment in feces and urine. On land, moisture and atmospheric oxygen support the bacterial conversion of these wastes to nutrients available for plants. However, when carried by stormwater runoff to streams and lakes, excessive amounts of these same nutrients can stimulate unwanted ***algae blooms***. Algae produce oxygen by photosynthesis, but only during sunny times of the day do they produce more oxygen than they consume. Thus, algal respiration, like the bacterial decomposition of organic material, uses up dissolved oxygen in water.

Ammonia is an intermediate byproduct of bacterial conversion of urea, a principal constituent of urine and other nitrogenous materials excreted by animals. A very small amount of ammonia dissolved in water can kill fish. State, Federal, and international criteria recognize that waters which support a balanced population of fish and aquatic life have an almost undetectable un-ionized ammonia concentration of 0.025 parts per million or less.

Salts contained in all animal waste do not breakdown, and can be carried by rain runoff into local surface and ground waters. The presence of salts in soils of animal confinement areas can increase the salt load to local streams, limiting the species of fish, amphibians, and invertebrate life.

Bacteria and viruses in horse manure rarely cause health problems for people. The potential for spread of disease to other horses, or susceptible wildlife species may be of concern.

How does erosion affect water quality?

Activities, such as heavy grazing or trampling, that remove the soil's vegetative cover and thus expose the soil surface to the energy of raindrops, water runoff, and wind, accelerate the natural process of erosion. Once mobilized into a stream, excessive sediment

A gully needs stabilization to control deepening and widening. Horses should be restricted from gullies as trampling can exacerbate erosion problems. Soil erosion is easier to control in its early stages when revegetation or simple drainage improvements may be all that are necessary.

can fill pools, smother fish spawning beds, cover or obscure food supplies, reduce the amount of sunlight reaching aquatic plants, increase water temperature, and clog fish gills. In addition, heavy metals and other toxic contaminants can temporarily bind to sediments and be carried along into water.

What is voluntary compliance?

Both State and Federal laws set standards for handling of animal waste to provide protection of surface and underground water resources. Currently, regulatory and enforcement agencies encourage owners and managers of animal feeding or confinement operations, as well as individual horse owners, to follow a program of "voluntary compliance" to achieve these "clean water" standards without more formal regulatory action.

Voluntary compliance means ***voluntarily undertaking the necessary and appropriate management practices to minimize the release of pollutants into local waters.*** Horse owners and facility managers should evaluate the effectiveness of their existing erosion control, stormwater management, and waste management practices to minimize transport of pollutants. Voluntary compliance allows the horse community the opportunity to demonstrate responsible stewardship of natural resources while avoiding stricter enforcement of regulations. Voluntary compliance does not mean that water quality concerns can be ignored.

Turn out horses for a limited period of grazing each day to increase the duration of the pasture's use and to reduce soil compaction.

Proper manure management is essential. Manure cleanup, storage, and use are critical components of good stewardship.

Conservation Practices for Horse Owners

A conservation practice ***is any activity that improves, protects or restores a natural resource***. To implement conservation practices that protect water quality:

- Identify the source of pollution
- Determine how pollutants reach the water
- Select a conservation practice, or a combination of practices, to cost effectively reduce the adverse impact to water quality
- Monitor and evaluate its effectiveness in achieving the desired result
- Make any necessary changes based on the evaluation

Horse owners should consider the following points to protect water quality:

1 Horse Waste Management

Clean up manure and soiled bedding on a regular basis, especially during wet weather, to limit seepage of salts and nutrients into ground water or runoff of manure into waterbodies.

After clean up, during the arid summer, use a bucket, hose or sprinkler to water areas where horses frequently deposit manure. Watering maintains the moist environment bacteria need to decompose residual waste.

Store horse waste on an impervious surface (a concrete pad or plastic tarp) and under cover (a roof or tarp) during rains to prevent leaching or runoff of pollutants. Locate storage areas away from waterways so that floods or runoff will not wash away waste. Do not dump horse waste on the edge or directly into stream channels.

Disposal fees are expensive. Manure composts into an excellent soil

Composting manure may be an excellent way to handle large quantities of manure and create a useful product.

Control winter access to soggy pastures to help prevent pollutants from leaching into the ground water and to keep horses out of the mud.

Convey runoff from barn roofs through gutters, downspouts and splash pads. Divert this clean water to areas so it will not come in contact with horse waste or cause soil erosion.

amendment. Perhaps neighbors or local gardeners will want your organic material. Keep compost piles moist and well aerated to aid in conversion of urea and ammonia compounds to more useable, and less toxic nitrates. Be innovative and establish a disposal solution rather than create a disposal problem.

2 Facility Siting

Keeping horses close to streams, in flood-prone areas, or on steep hillsides increases the potential for the runoff of manure and sediment. One does not always have an ideal site, given the constraints of topography, soil, rainfall patterns or existing structures; but conscientious management can often offset site shortcomings. New facilities should be sited and designed to address water quality concerns. Work to upgrade existing facilities.

3 Stormwater Runoff Management

• Keep "clean water clean." Use grassed ditches, berms, or subsurface drains to divert "clean" runoff around barns, manure storage areas, and paddocks.

• Install and maintain a system of properly sized roof gutters, downspouts, and drains to prevent "clean" roof water from becoming "polluted" by mixing with barnyard manure and sediment.

• Divert "polluted" runoff from manured areas away from waterways and to low-gradient vegetated buffer areas.

• Separate barnyards, paddocks, and manure storage areas from any waterway with buffer strips of vegetation to filter sediments and absorb nutrients in runoff.

• Construct or repair trails, arenas, roads, parking areas, their associated ditches, and culverts to drain water in a non-erosive manner.

• With a little training, horse owners can use simple water quality test kits to monitor their operations.

Vegetation protects water quality by slowing the rate of stormwater runoff, which increases absorption into soil, increases bacterial conversion of toxic or consumptive constituents, and lessens the risk that soil and manure solids will be carried into streams.

• Additional benefits of runoff management include a drier barnyard, a healthier horse environment, and better working conditions.

4 Pasture and Paddock Care

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Grazing Management

Maintain pasture productivity by controlling the number of horses and the amount of time they spend on a pasture. In most cases, pastures provide an exercise area and not the primary food source. For this reason, pasture management should focus on protecting the pasture's soil and vegetative cover. Prevent bare areas from forming. Allow grass time for regrowth. Cross fence to divide pastures into smaller areas, which can be grazed in rotation. Inexpensive and moveable, electric fencing works well to define grazing areas. During the growing season, graze grass to a height of 3-4 inches and allow regrowth to 6-8 inches before returning horses to the pasture. Manage grazing so that a cover of dry residual vegetation protects soil from the first rains.

Soil Compaction

A porous soil improves plant vigor by allowing the infiltration of water, air, and nutrients. Hoof impact and machinery operation on water saturated land compact soil particles and cause loss of porosity.

Paddocks as a Sacrifice Area

Use turnout paddocks as "sacrifice areas" to preserve pastures. This strategy reduces churning and compaction of wet soils, and overgrazing when pastures require rest. If possible, locate paddocks back from waterways; and avoid swales where overland flows can wash away bare soil or manure. Maintain a vegetated border around paddocks to help filter pollutants. Be sure paddocks provide horses with adequate exercise room.

Restrict horses from creeks to help keep manure and urine from being deposited in creeks and minimize erosion on streambanks. Use fencing to help manage horse access to riparian areas.

5 Protection of Waterbodies

Riparian Buffer Strips

Protect or restore a vegetated riparian (streamside) corridor with grass, trees, shrubs and/or groundcover to filter sediments and horse waste, stabilize streambanks, reduce solar heating of the water, and enhance aquatic habitat.

Limit Horses Access to Waterways

Provide other sources of water and shade. The direct deposit of manure into water can harm aquatic life. Trampling physically breaks down streambanks and destroys vegetative cover, which can increase sedimentation. The loss of streamside vegetation may also result in excessive solar heating of the water, which can harm cold water fish, such as steelhead and salmon. Design stream crossings to minimize erosion. Exclusionary fencing and seasonal grazing of riparian corridors are possible management choices.

Protect Small Tributaries

Ditches and drainage swales carry a large amount of rain runoff. These tributaries also require vegetation to filter sediment and reduce the erosive energy of water. Fencing may be necessary to exclude horses from these smaller waterways.

Wetlands naturally filter pollutants from water and provide excellent wildlife habitat. Protect wetlands from grazing and trampling during the rainy season.

Chemicals in horse grooming and health products, detergents, disinfectants, herbicides, and pesticides can harm aquatic life. Follow instructions for correct application. Minimize use whenever possible. Be careful to avoid direct application or airborne transport of sprays to waterbodies. Do not let horse wash water drain directly into waterways.

Horses benefit from good land management and stewardship by having a healthy and clean environment.

For more information contact:

Local Resource Conservation Districts (RCD):

Alameda County RCD (925) 371-0154

Contra Costa RCD (925) 672-6522

Guadalupe-Coyote RCD (408) 288-5888

Loma Prieta RCD (408) 847-4171

Marin County RCD (415) 663-1170

Napa County RCD (707) 252-4189

San Mateo County RCD (650) 726-4660

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Resource Conservation Districts (RCD) are non-regulatory, special districts governed by a volunteer board of directors. In addition to educational programs, RCDs provide landowners and the public with technical assistance in natural resource management.

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