



# Clean Water and Livestock Operations: Assessing Risks to Water Quality

## Livestock and Clean Water

This document provides information on livestock related water quality impacts to help landowners and producers make informed management decisions to protect water quality. Because Washington is geographically diverse, proper management practices can vary across the state. Therefore, this document can only provide general guidance.

Livestock production is an important industry in Washington State. It occurs in all areas of the state and contributes significantly to our state's economy and culture. Water resources, and the quality of state waters, are critical to our health and welfare, our environment, and our economy.

Washingtonians rely on clean water for drinking water, recreation, and the harvesting of fish and other food. Livestock production also depends on the state's water resources. Two primary statutes protect the quality of Washington's waters: the federal Clean Water Act and the state Water Pollution Control Act, both implemented by the Department of Ecology.

Many livestock operators use good management practices to protect water quality and pose no threat to Washington State waters. However, some livestock and manure handling practices pollute our surface and ground waters, in violation of state and federal law. The most concerning impacts are from the direct deposition of livestock manure into and near surface waters, the degradation of the riparian area by livestock, and mismanagement of livestock manure. Even a small number of livestock can deposit significant amounts of manure and associated pollutants when they have extended access to surface water. While livestock manure can be a valuable nutrient, it can also cause significant human health and environmental impacts if management practices do not limit it from reaching state waters.

Bacteria and pathogens in manure are not the only water quality problems that can be caused by livestock. Livestock may also denude and compact riparian area soils, and destabilize stream banks. These livestock impacts in turn, decrease infiltration rates, and increase runoff, sedimentation, and bank sloughing and retreat. A degraded riparian area also loses its natural ability to filter pollutants and stabilize the soil. Increasing overland flow encourages transport of pathogens and nutrients. This increased flow can also impact the structure of the stream by increasing stream velocity, sediment loading, and the erosive power of the stream. These impacts increase the distance that pollutants can be transported from pollution sources. The farther the pollutants travel, the more likely they will compound other pollution problems and impair water quality.

# Risk Management and Livestock Operations

Water quality problems are common when animals have extended or concentrated access to streams and riparian areas. Improper livestock grazing can have serious and wide-ranging effects on riparian ecosystems and the streams they depend on.

Assessing site conditions is the best way to evaluate potential livestock related pollution problems. This document discusses aspects of livestock operations that operators can evaluate for themselves to avoid pollution problems.

*The following site conditions should not be evaluated in isolation. Instead, multiple site conditions should be considered together to make a determination of possible impacts to state waters. By considering multiple site conditions and signs, a landowner or producer can get a better idea of whether their property is impacting water quality or if it is likely to impact water quality.*

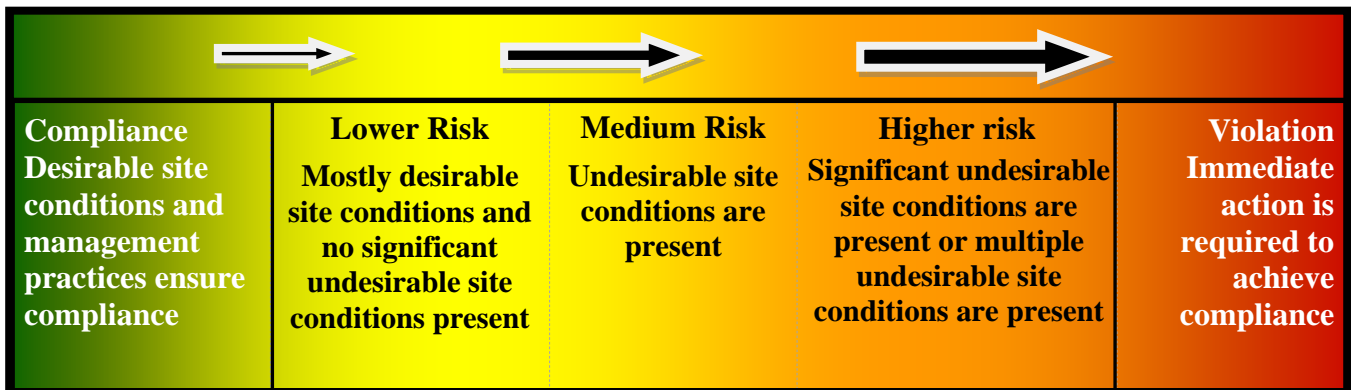
## Key Principles

- Improve compliance with state and federal law and the water quality standards.
- Recognize the importance of the livestock industry to Washington State.
- Clearly articulate examples of good and bad site conditions.
- Help landowners and livestock producers make informed decisions about their operations related to protecting water quality.

Livestock producers and landowners are encouraged to consult with Ecology, their local conservation district or other technical assistance providers to identify options and conservation programs available to promote water quality compliance. If Ecology identifies a property as having pollution problems, management choices need to ensure compliance with state law and the water quality standards, and should be made in consultation with Ecology.

## Risk of Causing Pollution

As depicted below some conditions are clear violations of the law, while other conditions are associated with a healthy stream. Most situations, however, fall somewhere in-between. In those situations multiple site conditions must be evaluated to determine the risk of polluting state waters.



Discharges are usually the result of degraded site conditions, poor management decisions and inadequate or absent management practices. In general, when evaluating a site for nonpoint pollution problems Ecology considers the following questions:

- Are there sources of nonpoint pollution?
- Is surface water present at the site or in proximity to the site?
- Are there groundwater concerns?
- Are there pathways for pollution to get to state waters?
- Is there evidence that pollutants have entered state waters?
- Are management practices in place for nonpoint pollution sources to prevent delivery of pollution to state waters?

## Watershed and Other Environmental Considerations

Factors related to the physical characteristics and physical setting of the site, climatic conditions, and additional information should be considered in conjunction with the factors described in this document. These include:

- Soil conditions and characteristics (runoff class, permeability, leaching potential, saturation, etc.)
- Slope of the land surface
- Precipitation and climate
- Anticipated flooding/flooding frequency
- Depth to groundwater-shallow groundwater is more vulnerable to pollution

## Site Conditions

While all potential sources of pollution should be evaluated to assess a property, these guidelines organize site conditions under the following general locations: Riparian Area, Confinement Areas, Manure Storage Areas and Upland Pasture Areas. Example conditions are presented in a sequence from healthy conditions to clear violations for each location.

## Riparian Areas

Protecting stream and riparian areas is key to keeping waters from being polluted. While a clear identification of stream and riparian area boundaries is difficult because these areas are not fixed in time and space, as used here *riparian area* is intended to refer to the stream channel, and the transition zones between upland areas and surface water. The riparian area is functionally part of the stream, and impacts in this area can directly affect stream health and water quality.

### Healthy Riparian Area

Healthy, undisturbed riparian areas generally contain a combination of indigenous trees, shrubs, woody debris, riparian vegetation, litter layers, and soils to filter and attenuate incoming sediments and pollutants. This helps to protect water quality. Vegetation in riparian areas shades streams maintaining cool temperatures needed by most fish. Plant roots stabilize stream banks and control erosion and sedimentation. Riparian vegetation moderates stream volumes by reducing peak flows during flooding periods and by storing and slowly releasing water into streams during low flows. Signs that the riparian area is healthy include:

- Streamside vegetation sufficient to filter out pollutants before they reach the stream.

- No signs of significant livestock impacts: no bare ground, manure deposited in or near surface water, livestock paths and trails, soil compaction, and only minimal signs of livestock grazing activities.
- No slumping or eroding stream banks associated with livestock.
- No signs of sheet or rill erosion associated with livestock.
- Indigenous woody vegetation present (diverse age class and species composition).
- Presence of both overstory and understory woody species in a mix of species and densities that would be indigenous to the location.
- Floodplain is connected and consistently accessed by the stream to reduce scour and bank erosion.
- Streambanks are well-vegetated at all times of the year. Plant communities consist of healthy indigenous species and are able to hold banks in place.

### Signs of Concern

Signs that livestock may be causing or leading to a water quality violation. The presence of any one or combination of the following signs, if associated with or caused by livestock activity, can be a concern:

- Absence of woody vegetation that would be natural in the region
- Destabilized, slumping and/or eroding stream banks
- Soil compaction
- Stream sedimentation
- Widening and shallowing of the stream
- Vegetation overutilized or absent
- Visible signs of overutilization of grasses
- Manure deposited near surface water
- Livestock paths and trails in riparian areas

### Clear Violation

- Bare ground associated with livestock activity
- Manure accumulation near and/or in surface water
- Livestock paths and trails in riparian areas exhibiting erosion leading to surface waters
- Contaminated run-off (evidence of past run-off, active, or foreseeable runoff with precipitation)
- Sheet or rill erosion associated with livestock activity
- Active bank erosion associated with livestock activity

## Confinement and Winter Feeding Areas

If properly sited and maintained, confinement and winter feeding areas can help prevent pollutants from reaching surface water, and groundwater. Conversely, confinement and winter feeding areas that are not properly sited and maintained can cause considerable pollution because animals, their manure and their impacts are concentrated into relatively small areas.

### Well Managed Confinement Areas

- Confinement areas are located away from surface water.
- Clean water is diverted around confinement areas.
- Heavy use area protection is utilized.
- No signs of mud or manure leaving the confinement area.

- No signs of erosion.
- No accumulations of manure outside the confinement area.
- Located on level areas and outside of riparian areas.

## Signs of Concern

Signs that livestock may be causing or leading to a water quality violation. The presence of any one or combination of the following signs can be a concern:

- Confinement areas close to surface water or a vulnerable groundwater source.
- Inadequate wellhead protection near confinement and winter feeding areas.
- Stock watering tanks close to surface water.
- Overflow from stock watering tanks flowing through mud or manure toward surface waters.
- Lack of gutters on structures to divert precipitation away from confinement areas.
- Presence of drainage structures or features (French drains, swales, drain tiles, stormwater conveyances) that cause or may cause polluted runoff to leave the area or enter groundwater.
- Polluted runoff or signs of polluted run-off leaving the confinement area.
- Poor stormwater management up gradient or adjacent to the confinement areas that causes or may cause polluted runoff to leave the area.
- Presence of mud and manure close to surface water.
- Sheet or rill erosion in or down gradient of the confinement area.
- Stockpiles of manure or other indications of excess manure accumulations that could cause leaching to groundwater.

## Clear Violation

- Confinement or feeding areas straddling, abutting or otherwise directly connected to surface water.
- Presence of drainage structures or features that connect to surface water (French drains, swales, drain tiles, stormwater conveyances) that cause or may cause polluted runoff to enter surface or ground water.
- Polluted runoff or signs of polluted run-off from confinement area and/or stock watering tanks reaching surface water.

## Manure Storage

Proper collection, disposal, storage, and use of manure are important to ensure water quality is protected.

### Properly Managed Manure Storage

- Manure storage located away from surface water and stormwater conveyances.
- No signs of polluted runoff leaving the collection or storage area.
- Manure storage facilities are covered (non-lagoon).
- Manure stored on an impermeable surface.
- Manure storage is appropriately sized to collect and store all manure and all contaminated water.

## Signs of Concern

Signs that livestock may be causing or leading to a water quality violation. The presence of any one or combination of the following signs can be a concern:

- Manure storage close to surface water or with likely conveyance to surface or ground water.

- Presence of stormwater conveyances in or near the collection or storage areas that may cause polluted runoff to enter surface or ground water.
- Polluted runoff or signs of polluted runoff leaving the collection or storage area.
- Uncovered manure storage.
- Manure stored on bare ground or permeable surface.
- Insufficiently sized manure storage—considering the number of animals and amount of storage needed.
- Improperly designed, maintained or constructed impoundments that are used to store manure.

## Clear Violation [REDACTED]

- Manure storage with a conveyance that causes polluted runoff to enter surface or ground waters.
- Polluted runoff or signs of polluted runoff leaving the collection or storage area and reaching surface water.

## Upland Pasture Areas

Good management in upland areas can support well functioning riparian areas, and help prevent pollution from entering riparian areas, surface waters, or conduits to surface waters. Conversely, upland areas can cause impacts to surface water if not managed properly. Significant manure accumulations or signs of erosion in upland areas combined with conveyances or drainages leading to surface water, can impact water quality. Polluted runoff or signs of polluted runoff from upland pasture areas reaching surface water is a clear violation and can occur if upland areas are over utilized, even if there is a healthy riparian area. Additionally, if areas are frequently flooded, inundated, or saturated during periods of the year, the risk of water quality impacts increases. However, landowners and producers can help prevent water quality violations by protecting the riparian area and utilizing good practices in the upland areas.

## Conclusion

State Water Quality Law prohibits the discharge of pollutants to state waters without a permit. The law addresses multiple water quality parameters, including nutrients, bacteria, dissolved oxygen, pH, temperature, and sediment. Ecology is responsible for implementing both state and federal water quality law.

When making water quality determinations Ecology evaluates conditions in and near the stream. Those site conditions are the best way to determine if pollution is occurring or if there is a risk of pollution occurring. The presence of livestock in the riparian area will not result in an enforcement action if the livestock are managed to avoid pollution. Ecology will not take action without evidence of pollutants in the water or signs of livestock impacts.

Ecology has determined that the best way to ensure water quality compliance is to combine good upland management practices with the exclusion of livestock from the stream and riparian area. Techniques that rely on management in the riparian area may also be used but are less reliable than exclusion. These techniques may reduce the likelihood, frequency, or amount of pollutant discharge and subsequent risk of noncompliance, but require significant active management efforts.

Landowners should consider how their management decisions may cause pollution and consider the risks of violating state law when choosing approaches for livestock management. Producers and landowners are encouraged to consult with Ecology, their local conservation district or other technical assistance providers to identify options and conservation programs available to promote water quality compliance. Formal compliance determinations can only be made in consultation with Ecology staff.

## **For more information**

For more information on this publication contact Ben Rau – Ecology at 360-407-6551 or [ben.rau@ecy.wa.gov](mailto:ben.rau@ecy.wa.gov).

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