



Cattle Producer's Handbook

Miscellaneous Section

1224

Ranch Roads: Maintaining Low-Maintenance Roads

Sheila Barry, University of California, Davis

Unpaved roads are vital to beef cattle operations in the western states. Roads are important for access, controlling livestock distribution, and managing rangelands. Many of these roads are well designed and located in a manner that serves their intended need and require minimal maintenance. However, far too many existing ranch roads create costly maintenance headaches and cause needless environmental degradation. In fact, in many western watersheds, the majority of erosion that exceeds natural rates is generated by road systems.

Roads range in size and condition from paved highways to unpaved roads and trails. They all intercept, collect, and concentrate runoff during storm events. This concentrated runoff can lead to sediment being washed directly from road cuts, fills, and running surfaces to streams, reservoirs, and other water bodies. Road cuts, ditch lines, and surface drainage systems can also intercept and concentrate runoff patterns that can lead to enlarged gullies or landslides.

In addition to the increase in topsoil loss and sediment yields to streams, poorly designed roads can have high maintenance and repair costs and can also disrupt operations. In the long term, properly designed, low-maintenance roads make good environmental and economic sense.

This fact sheet describes some general guidelines on road inspection and assessment as well as road design principles that will provide for low-maintenance roads. It concludes with a list of maintenance strategies that will help reduce long-term maintenance costs.

Road Inspections and Assessment

Some problems can be dealt with by inspecting before and during storm events. Thorough inspection before storm events is much less inexpensive than after a minor drainage problem has been neglected and allowed to expand throughout the winter. For example, clearing debris from a culvert inlet might prevent a stream cross-

ing or road from washing out and necessitating costly road reconstruction. Additionally, sediment lost due to road or stream crossing failure can seldom be reclaimed and is usually destined to impact the watershed.

Learn to read the land to determine why there is erosion. Consider topography (hillslopes, valleys, ridgelines, creeks, wet meadows, obstacles, and barriers) and soils (depth, texture, alluvial, or colluvial). Understand the surrounding landscape; not just the road and immediate area surrounding the roadway. Clearly identify and map existing erosion problems; gullies, rills, cut banks, etc.

A set of rain clothes, a shovel, and a waterproof logbook are perhaps the most important investments a land manager can possess in managing a road system. On wet dirt roads, these inspections should be conducted on foot, horseback, or an all terrain vehicle (ATV) to avoid damage to soft surfaces and cross drains.

Road Design Principles

Low-maintenance road design principles are based on reducing the impact of water on roads. Water is a powerful agent capable of destroying a road and making it unusable. The ability of water to erode increases exponentially. If water volume is doubled, the ability of water to erode is increased approximately four times. Removing water from a road before it can accumulate to destructive levels will minimize road maintenance.

The following principles can help landowners understand how to design, re-design, and manage to maintain low-maintenance unpaved roads:

- **Hillslope Location**—Roads are best located on hillslopes of 10 to 40 percent. This slope facilitates opportunities to control drainage and minimizes potential bank failure. Roads located on hillslopes of 0 to 10 percent may be difficult to drain, and roads on hillslopes of greater than 40 percent may have potential bank failure.