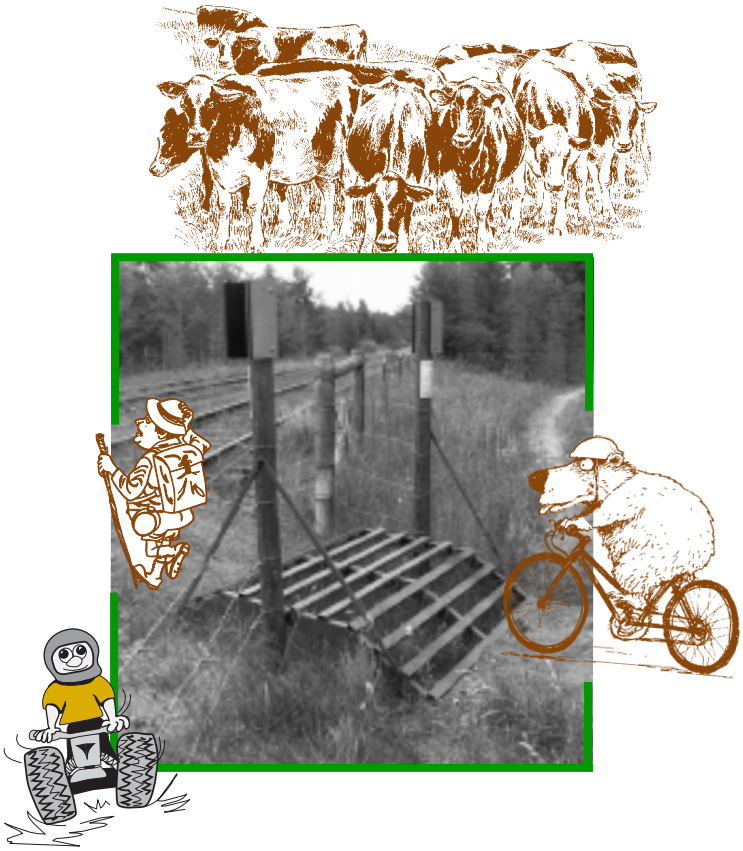
Cattle Guards for Off-Highway Vehicle Trails



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Introduction

One of the greatest sources of contention between recreationists and livestock permittees as trail use increases is gates. Gates are left open, allowing livestock to roam in places where they shouldn't. While the cows don't mind, ranchers, recreationists, and agency managers certainly do.

With dirt bike, all-terrain vehicle (ATV), and mountain bike traffic on the rise, trail managers have identified the need to evaluate small cattle guards that offer an alternative to gates.

Kent Traveller, from the Dixie National Forest, asked the Missoula Technology and Development Center (MTDC) to evaluate and document designs for trail cattle guards that work. The cattle guards would be suitable for trails used by ATV's, motorcycles, mountain bikes, and hikers. They would need to be lightweight and easy to install, particularly when compared with the massive cattle guards used on roads.

MTDC found four trail cattle guard designs that were doing the job on several National Forests. Three are steel, or a combination of steel and wood. Another is made entirely of wood. We decided to show you all four. Differences in design, fabrication, and installation could make any one of the four the top choice for your installation.

These designs were developed on the Deschutes, Caribou, Deerlodge, and Challis National Forests. We heard about others, but were unable to obtain documentation in time to include them. We modified the designs slightly in some instances to make them stronger or easier to fabricate and so they would be wide enough to accommodate the larger ATV's now being sold.

Selection and Installation Considerations

Think about links between safety and trail-user psychology when choosing a design. Traveling fast is part of the thrill for many off-highway vehicle (OHV) users. But in the back of their minds most users also want to travel safely. Most users will slow down if they perceive danger or a hazard.

This is where your selection of cattle guards and their placement can affect the behavior of trail users. The Forest Service does not want to encourage reckless behavior.

Keeping the cattle guard narrow is probably the best way to convince users not to speed. If they think it will be a challenge to get across the cattle guard without mashing their fingers or scraping their machines, they will usually slow down. For ATV users especially, a cattle guard only slightly wider than their machine means they will voluntarily slow down to avoid hitting the sides. A narrow cattle guard blocks vehicles wider than those allowed on the trail.

So how wide is wide enough? This is a tricky question, because ATV's seem to be getting wider each year. In some cases the width of a large ATV differs little from a small four-wheel-drive vehicle (Figure 1). The width of the cattle guards described in this report range from 4 feet (1.2 m) to 5 feet (1.5 m). Cattle guard widths of 52 to 60 inches (1.3 to 1.5 m) will allow most new ATV's to cross—just barely. Build them wider and you risk indiscriminate use by four-wheel-drive vehicles, which may not be allowed in your management plans. They are also too heavy to be supported by the cattle guards. Four-wheel drives will damage cattle guards, and their owners may claim damages if their vehicles are harmed (Figure 2).

Angling the wings of the cattle guard from top to bottom allows the top to be wider. This is often desirable to give riders, especially on motorbikes, a little extra margin for error to avoid catching their handlebars on the fenceposts.

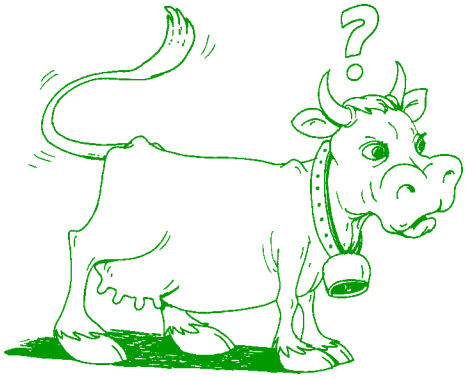
Figure 1—ATV's are becoming larger and more powerful. This Polaris Sportsman 500 is able to pull this trail/road grader on the Francis Marion National Forest, South Carolina.

Where your cattle guard will have little psychological effect on speed (in wide-open country, for instance), consider using the flat Deschutes Cattle Guard instead of elevated designs to avoid sudden loss of control caused by a change in elevation.

Psy**cow**logy comes next. Will you be able to fool the cows into thinking your

Figure 2—For safety, you will absolutely want a straight approach on either side of the cattle guard. Modify the fence or the trail, if necessary, to ensure the approach is straight. Curves in the trail leading to the approach can help reduce speed. Note the gate to the right of the cattle guard for horse riders and livestock.

trail cattle guard is an impenetrable barrier to the greener grass and freedom on the other side? Probably.



The four cattle guards featured here actually work. Even when bunched up, cattle avoided these cattle guards. A trail cattle guard that meets these specifications should work:

- Length from 5.6 feet (1.7 m) for the Deerlodge Trail Cattle Guard to 13 feet (4 m) for the Caribou Trail Cattle Guard
- Suitable wings or side barriers (Figure 3)
- Spacing of about 4 inches (100 mm) between the tread rails.

Figure 3—The side supports (or wings), extending from the Deerlodge Trail Cattle Guard to the fencepost, are essential in persuading cattle not to jump the cattle guard. Butting the posts up to the cattle guard helps keep vehicle speed down, but at the risk of catching handlebars.

If the cattle guard is too short, lacks side guards or wings, or has incorrect spacing between the tread rails, cattle may be tempted to try to jump it or walk through it. We heard of one instance of a cow that had to be destroyed after it got its leg caught in another type of trail cattle guard.

In many cases, a wire fence gate is needed near the trail cattle guard for horse riders and to allow cattle to be moved between pastures.

A few practical considerations in the design are:

Steel or wood—Steel offers long life and strength. Wood is easy to work with and might be preferred for esthetic reasons. Our examples include the all-wood Challis design, the all-steel Caribou design, and two steel designs (Deerlodge and Deschutes) that have steel, but have wood sills or bases.

Transportation—The Deschutes and Challis designs can be assembled onsite or in the shop. The Caribou and Deerlodge Cattle Guards are fabricated in the shop. All designs can be hauled to the trail site in pickup trucks or on trailers pulled by ATV's, but there are substantial size and weight differences.

Installation—Cattle Guards that lie flat on the ground (Deschutes) require excavation and periodic cleaning. Elevated designs like the Deerlodge and Caribou can be placed without excavation (except for support sills for the Deerlodge design). The all-wood Challis Trail Cattle Guard also needs periodic cleaning. Volunteers or force-account crews can install any of these cattle guards without heavy equipment.

Cost—Cost is an important factor. We have not verified costs down to the dollar, because they vary considerably due to labor for installation, materials (new or used), and the fabrication rates charged by local shops. None of the four designs is especially complicated to construct or install. Materials for the Deschutes Trail Cattle guard cost about $550. The Deerlodge Cattle Guard cost $235 the last time a shop fabricated some (sill timbers would also be needed). Materials for the Caribou design run about $150 with new materials—less if it is made with used steel fenceposts. We do not have