

# Water Barriers for Cattle

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Livestock producers learn very early that animals will foul their drinking water. This may explain why checking an animal's water and cleaning water troughs daily are primary goals of 4-H and youth livestock projects. Providing fresh, clean water to cattle requires the prevention of fouling (or contamination) from feed, manure, saliva, soil, and other pollutants. In addition, open-trough watering facilities can accumulate sediment, feed, bedding, and manure, creating a potential breeding ground for flying and aquatic insects. The reduction or exclusion of these contaminants can be accomplished with a water barrier.

A water barrier is a physical barrier or partition used to regulate access to drinking water. Installed along the perimeter of open watering troughs, these barriers help control the cattle movement, prevent competition and aggression during watering, and minimize water contamination. Water barriers are an important component for the efficient management of open watering facilities. The purpose of this publication is to explore the benefits of water barriers and design considerations for cattle operations.

## Purpose of Water Barriers

Well-designed water barriers can offer multiple benefits:

**Space allocation.** By dividing watering areas into individual sections or stalls, water barriers can help allocate space for each animal to access water and keep dominant animals from monopolizing the trough.

**Behavioral management.** Water barriers can help reduce competition and aggression among animals during watering, promoting a more orderly and calm watering environment.

**Hygiene.** Water barriers can reduce the fouling of drinking water and allow for easy draining, cleaning, and maintenance of troughs.

## Types of Water Barriers

Water barriers are typically fixed structures made from metal, wood, and plastics. However, flexible water barriers can also be fabricated using moveable partitions made from rubber mats, plastic, steel chains, or cable. The choice of water barrier depends on factors such as the size and type of cattle, watering system used, and specific farm management practices. Water barriers can be constructed in various shapes, including square, triangular, linear, or circular, as shown in Figures 1 through 4. Locating a trough outside of animal housing could also be considered a barrier (Figure 3). In addition, the placement of a watering facility on the outside of livestock housing provides easy access for workers to visually inspect drinking water and maintain a trough.



**Figure 1.** A square water barrier constructed from welded steel materials.



**Figure 2.** A triangular water barrier constructed using wood planks and posts.



**Figure 3.** Water barriers can be created by using posts with steel cable.

Hay rings are an example of an available farm structure that can be repurposed with modification to become a water barrier for a watering facility (Figure 4). Figure 5 is an example of a water barrier that includes an insulated cover to reduce heat loss and potential freezing.

## Design Considerations

The goal of designing a water barrier is to ensure all the animals can access their drinking water without experiencing confrontation, frustration, or aggression. A well-designed barrier allows animals to drink freely and comfortably, promoting adequate water intake.

Water barriers are suggested for trough-type watering facilities. Trough-type water fountains enable multiple animals to drink simultaneously, an important consideration since herd animals naturally prefer to drink together.

Designs of water barriers should consider the behavior of the animal to create an ergonomic design. Designing a water barrier for the animals that will use it will allow for convenient, injury-free access to drinking water while reducing the risk of fouling. Designs should provide enough water surface area for an animal to drink in a natural position (Figure 6), with a minimum of aggression or frustration with other animals or the barrier. Additionally, the barrier should also protect the water from contamination by manure and minimize waste around the watering facility.



**Figure 4.** An example of an old hay feeding ring, with curved vertical partitions, being used as a water barrier.



**Figure 5.** This water barrier incorporates an insulated cover to reduce the surface area of the water and the potential for freezing.

## Determining the Dimensions

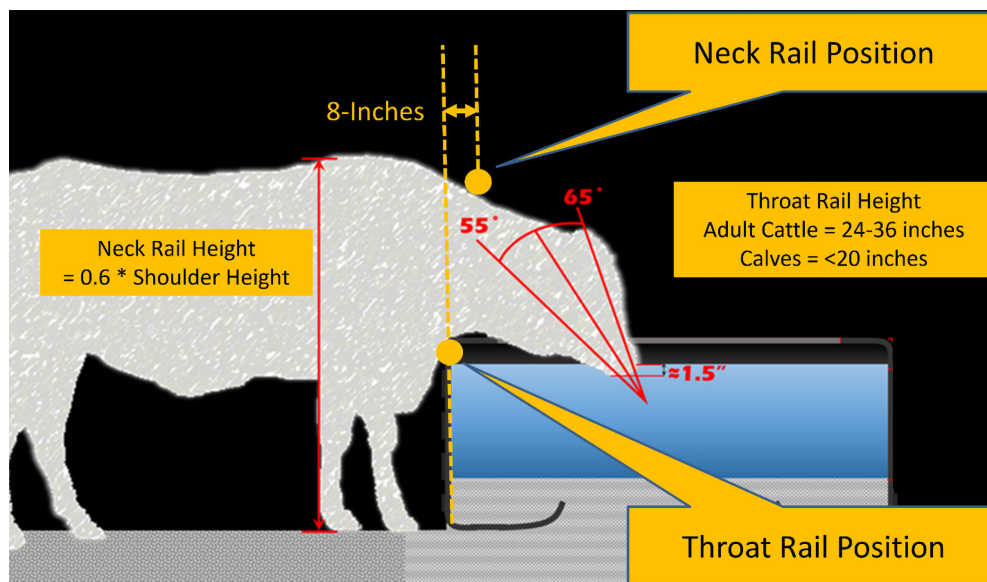
Water barriers have a general design, which may be determined by the weight of the animal, its age, the width of the animal's chest, the height to its throat, and the height to its shoulders. These measurements can then be used to determine the three main parts of a water barrier:

1. Neck rail
2. Throat rail
3. Vertical partition (shape and width)

Designing watering facilities for only cattle of the same general age, height, and weight would be straightforward. The complex part of water barrier design is for cattle operations with a range of animal sizes and weights that use the same watering facility. In this case, dimensions that accommodate larger animals might be inadequate for serving smaller stock.

## Neck Rail

A neck rail (Figure 7) requires an animal to position its head and neck under it to access the water. It should be positioned low enough that the animal cannot walk under it, but high enough that it cannot reach over it. The neck rail may be the simplest means of restraining an animal. The neck of an animal is a more sensitive body part, compared to the shoulders or chest. The purpose of the neck rail is to prevent animals from moving too far forward, while not hindering the consumption of as much drinking water as they want. Therefore, the neck rail should not provide uncomfortable pressure on the neck; it should barely touch an animal while drinking (Figures 6 and 7). By comparison, the neck rail in Figure 3 is shown touching the neck. A better design would move the neck rail forward (away from the animal) by approximately eight inches. As implemented in Figure 3, the cable is too close to the animal by approximately 16 inches.



**Figure 6.** This graphic shows the location and relationship of the rails and their setbacks relative to the animal and watering facility.



**Figure 7.** Hay feeding rings can be used as a water barrier for a watering facility. The proper position of a neck rail should be at a height where it barely touches the neck while an animal is drinking. Notice how the width of the verticals prevents the animal from stepping forward.

## Throat Rail

A throat rail is a horizontal bar installed to help animal positioning and behavior. As a component of a water barrier, its primary purposes are to prevent animals from stepping into the trough and to reduce excessive movement and damage to the trough area, which would limit the lifespan of the equipment.

The throat rail can be an actual rail, a curb, or the reinforced sides of a water trough. The rail should be placed at the throat height of the animal so that an animal cannot comfortably step into the trough. The placement should encourage an animal to stretch its neck over the rail to drink. It should allow an animal to obtain its optimal drinking posture.

The throat rail in Figure 7 becomes the height of the tire or the existing throat rail on the ring, whichever is higher. The verticals and the neck rail still serve their intended functions, and their dimensions remain the same.

## Vertical Partitions

Vertical bars provide head space or a hole for consumption to take place, along with a drinking location. The benefit of this device is that it may inhibit aggressive animals from displacing more submissive animals.

Vertical bars should allow an animal to stick its head and neck through the bars but should not allow the shoulders to pass (Figures 7 and 8). The partitions should create a comfortable experience for an animal that allows it to consume as much water as it wants without being disturbed (Figure 7).



**Figure 8.** A bull managed to get his head through this barrier but had trouble getting it out. As a rule, vertical barriers should not touch the head or ears of an animal. Animals with large necks should also be able to gain access to drinking water.

## Vertical Partition Shape

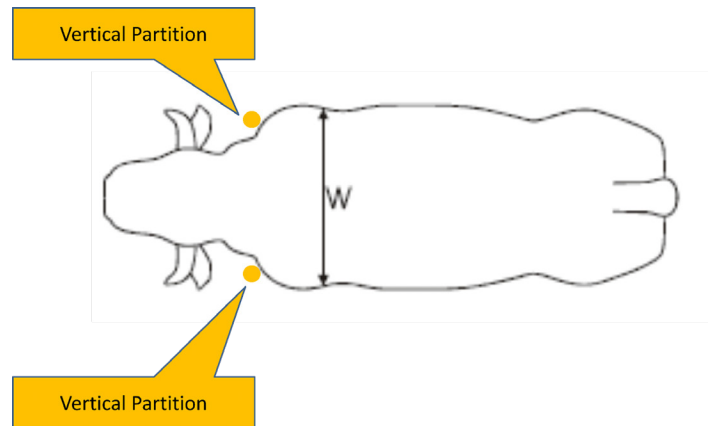
The design of slanted or diagonal bars requires an animal to move its head to the side while it lifts or lowers its head (Figure 8). These types of units have verticals placed to create 12 to 14 inches of horizontal space for the head and neck.

Curved vertical partitions are also used as water barrier devices. Their spacing (18 to 24 inches) is typically wider than diagonal bar types. The openings are typically wide enough to allow an animal to enter without hitting its head or ears and may not require an animal to move its head to the side (laterally) when raising and lowering. (Figure 6).

## Width of Verticals

The width of the verticals should be less than the width of an animal's chest to prevent stepping into a trough (Figure 9). However, pregnant cows need more space (width) at a straight-sided trough to accommodate their bellies and to protect the fetus. Alternatively, curved (concave) watering facilities provide more lateral room than linear troughs. This is attributed to the triangular shape of an animal from its muzzle to its shoulders and the perimeter of large, round troughs, which also provides more room for the belly.

Verticals that are spaced too close together may restrict larger animals (bulls) from gaining access (Figure 8). This could lead to the damage of equipment and infrastructure, in addition to harm or discomfort for the animals.



**Figure 9.** The width of the barrier opening should be less than the width of the animal's chest (W) to prevent stepping into the trough. Pregnant cows, however, may require more space.

## Summary

Water barriers serve as an effective tool for regulating animal access to drinking water, helping to control movement, reducing competition, and minimizing aggression during watering. Additionally, water barriers play a critical role in preventing livestock from entering the water trough, thereby reducing contamination and improving overall water quality. By implementing water barriers, livestock producers can enhance both water consumption and herd health, making them a valuable asset in sustainable cattle management.

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