

K-STATE

Research and Extension



Construction of a Limited Access Ramp for Pond Watering of Cattle

Herschel George Watershed Specialist
Pat Murphy Biological and Agricultural
Engineering Department

The limited access ramp is designed as part of a pond fencing system that allows cattle to drink only at a specific location. Limiting cattle access to a pond improves pond water quality and reduces bank erosion. A limited access ramp for a pond is a hard surfaced area similar to a boat ramp, that is designed to support cattle as they approach and drink from the pond.

Limited access ramps are NOT planned near the emergency spillway area or where surface water will enter the pond. Ideally, limited access ramps are planned and installed at the time of pond construction or reconstruction (clean out of the sediments).

Excessive slope of the access ramp can limit cattle use. Slopes of 1 ft vertical to 4 ft horizontal have been used successfully. Slopes of 1 ft vertical to 6-10 ft horizontal are ideal.

The limited access ramp is designed for the maximum head of cattle to drink from the area. The width of the water frontage area should be at least 10 ft wide plus 1 additional foot for each 10 head of cattle in the herd; thus an access area for 80 head would need a minimum of an 18-foot wide ramp.

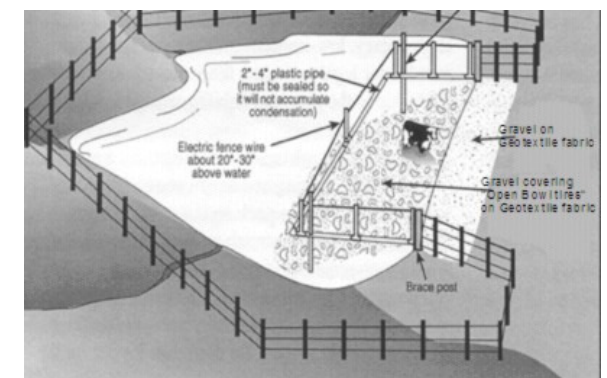
Functionally, cattle need 3 feet of watering distance in front of them to drink. As the pond level changes, such a small area may not be practical. Having 10 ft of watering distance into the pond (depths of 1-2 ft) allows cattle to water with greater changes in pond level. Producers build fence and gate systems at the end of the watering area that can be adjusted to allow cattle access to water during seasonal changes of pond water level.

The length of the access ramp into the water is dependent on the ramp slope. Pond levels fluctuate each summer, thus the ramp access should be designed to allow at least a 4 ft drop in pond level. Ponds that are known to lose greater depths of water should design for the expected pond level change. If a pond is expected to have as much as a 4 ft water level change during the year, an additional 2 ft should be added to compensate for the depth within the drinking space, for a total water depth on the ramp of 6 ft. With a ramp slope of 6:1 (6 horizontal for each 1 vertical) the total length of the access ramp from the edge of the pond would be $6 \text{ (slope ratio)} \times 6 \text{ ft} = 36 \text{ ft}$.

Two different construction methods are used for surface hardening of the lower limited access ramp that is covered with water and the upper gathering and approach portion of the ramp.

The Open Bowl Tire system for lower ramp Construction

The Open Bowl Tire system utilizes discarded tires from semi-trucks and trailers. One sidewall is removed so the remaining tire looks like a bowl. The tires are about 3½ ft in diameter and about 10 inches deep. A local tire recycler can usually remove the sidewall and provide the tires at low cost. The steel in the sidewall near the tread makes on-farm cutting of the tires more difficult.



Width of the limited access ramp is calculated in consideration of the stocking rate (10 ft plus 1 ft/10 head) and the tire diameter. For example, if the goal is an 18 ft wide limited access, the hardened area should be wide enough so that cattle do not step off the edges of the hardened surface. Adding one tire width may be necessary to make the ramp area wide enough to protect the edges. Producers may find it beneficial to install posts inside the outer tires on the ramp in order to maintain a fence. Thus, 5 tires wide would be 17.5 to 18 ft width on the inside, plus one more tire so posts can be installed in the center of the outer row of tires. Total excavation width would need to be 21 to 22 ft wide to allow for 6 tires wide, leaving about 18 ft on the inside of the posts.

Remove Soil from Ramp Area

When the limited access area has been selected and marked with flags, soil is removed from the ramp area to a depth of 10 to 12 inches (the depth of the tire). The top end of the excavation should continue up the slope to or above the contour of the “full” pond level (at the primary spillway pipe level or the emergency spillway level).

Geotextile fabric is placed into the excavated area and the tires are positioned close together on top of the fabric. If posts are to be installed through the fabric, the fabric must be cut in an “X” format to allow the post-hole auger to dig in the middle of the corner tires and other line posts. The posts should be tamped into place just as you would any fence post.

Placing the tires onto the geotextile area can proceed by arranging the tires as close as possible in rows and columns. No fasteners are used to hold the tires into place. The tires are designed to prevent the gravel from working down the ramp slope as the livestock use the limited access ramp.

Covering the Tires

A dump truck can back down the ramp and, as gently as possible, dump gravel onto the tires. The gravel should fill the tires, plus an additional 2 inches above the tires. If care is taken, the gravel can be moved down the hill and leveled with a skid steer or tractor loader. Care must be used not to drag against a tire in a way that would lift them from the geotextile base. After the cattle have used the site, a producer may see the upper edge of the tire tread showing through the gravel. It is not necessary to maintain the 2 inches of additional gravel above the tire tread. The Open Bowl Tire System is designed to prevent the gravel from eroding to the lower portion of the ramp.

The Gathering and Approach Area

The width of the gathering area above the pond access ramp should be wider than the limited access ramp area. The gathering and approach area should be stabilized with Geotextile and covered with six inches of gravel (without the open tires) for intensive cattle traffic.

The Exclusion Fence around the pond can be constructed with barbed wire or electric fence systems. Producers that choose to use an electric exclusion fence often will use a

floating electric fence across the pond limited access. Barbed wire can be installed into the ramp watering area; however, the wire will be subject to corrosion due to the pond water. Care must be taken if the fence becomes submerged, so that the cattle do not become entangled in the wire. The fence outline should always be visible above the water level.

For additional information contact:

Will Boyer 785-587-7828
Wboyer@ksu.edu
Jeff Davidson 620-583-4437
Jdavidso@ksu.edu
Herschel George 913-294-6021
Hgeorge@ksu.edu
Ron Graber 620-727-5665
Rgraber@ksu.edu

K-STATE
Research and Extension



*Kansas State University Agricultural Experiment Station and Cooperative Extension Service
K-State Research and Extension is an equal opportunity provider and employer. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, John D. Floros, Director*

February 2015