

USING LIVESTOCK ENERGY TO PUMP LIVESTOCK WATER

This Factsheet outlines options to use livestock to pump their own water with “Nose Pumps”.

Introduction

Livestock water pumping options are selected with pump-driving energy as the limiting factor, especially remote systems. While other onsite-available energy options may be selected, the use of livestock to pump their own water is a viable choice for some types of livestock (bison, horses, beef or dairy cows) and for ground and surface water sources. Note that the following discussion concerns pumps used in non-freezing conditions; refer to page 4 for a winter-use livestock-operated pump.

Nose Pumps

These pumps are produced by various manufacturers with similar features. Figure 1, below, illustrates two typical nose pumps. Livestock is attracted to the unit as it has a bowl which retains some water (the bowl slopes to the rear). To access this water, they have to push a broad-ended lever that is in the way, and in doing so, a diaphragm is operated, creating suction that draws up water to the bowl.

As the nose is used to operate the pump they are called “nose pumps”. The term ‘pump’ is a bit misleading as they do not move water above the pump location but only ‘suck’ water up to the drinker. Suction depends on atmospheric pressure to move water; a maximum 10m or less than 34 feet of lift possible at sea level – less at higher elevations. Practical limits of the pump (through a 25mm / 1 inch polyethylene pipe) are typically lifts to 6m (20 ft) from water supply surface to the nose pump, 60m (200 ft) horizontally, or a combination (with each 10m horizontal approximately equal to 1m of lift).



Figure 1

Typical Nose Pumps from Two Manufacturers

Livestock Use of Nose Pumps

Livestock best suited to operate a nose pump tend to be larger-sized animals such as bison, horses, beef or dairy cows, as shown in Figure 2, below. This animal size is most able to operate the diaphragm lever. The units are a sturdy construction of steel and cast metal able to withstand the loads, but they must be securely mounted to a rigid base.



Figure 2 Nose Pump Use by Cattle

Young calves are not suited to operate the pump. However, adding a “catch basin” for overflow water may make water available to calves, as shown in Figure 3, right. One producer has drilled a small hole in the water bowl to ensure some water bleeds into the tray. They should be able to use the pump once a few months old.

One manufacturer offers an adaptation for sheep or goats consisting of a confining frame that replaces the operating lever, as shown in Figure 4, below. As the animal steps into the frame, their weight operates the diaphragm, drawing water into the bowl.



Figure 3 Catch Basin



Source: Blue Skies West
(Aquamat Nose Pump)

Figure 4 Nose Pump Adapted for Sheep Use

Typical Nose Pump Installations

A nose pump installation allows livestock to be fenced out of the water source avoiding impacts that could reduce water quality, as shown in Figure 5, below. This shows a fenced farm dugout where the water is accessed by cattle via a nose pump. The pump is mounted on wooded timbers.



Figure 5 Nose Pump Sourcing Water from a Fenced Dugout

To avoid one animal from “controlling” the waterer, two can be provided, as shown in Figure 6, below. Also note that this raised mount will also help prevent livestock from stepping in, or defecating on the water bowl.



Source: Blue Skies West
(Aquamat Nose Pump)

Figure 6 Dual Nose Pump Installation on a Raised Mount

Where high livestock pressure can be expected on the fencing at the waterer, consider installing wooden rail fencing. Shown in Figure 7, below, rails are used at the nose pump and around the dugout.



Figure 7 Rail Fencing at Nose Pump Location

Nose Pump Pro's & Con's

Nose Pumps have the following advantages:

- low cost, typically \$300 - \$500
- easily moved, set up, and maintained
- no energy source needed
- can be used to access ground water (via a shallow well) or surface water
- can be set back from the water source, reducing contamination concerns

Nose Pumps have the following disadvantages:

- livestock will need some training to operate the waterer
- generally for larger sized livestock, but adaptations possible for others
- limited to approximately 6m (20 ft) lift; 60m (200 ft) distance, or combination
- a single waterer serves a small number of livestock (see below)
- slow water delivery of approximately ½ litre per lever stroke
- can not be used in freezing conditions (see below)

Successful installations

Consider the following points for a successful nose pump installation:

- allow for 1 waterer per 20-30 beef cows or horses, or 10 milking dairy cows
- securely mount to a ground-level or raised base
- use a foot valve at the supply end of the pipe to maintain water in the line
- train livestock to use the nose pump prior to putting them out on pasture

Winter-Use Nose Pump

The nose pumps described above are only for use in non-freezing conditions. A producer in Alberta has developed a nose pump that can be used in winter that is structurally different from the above “sucking” devices. The *Frostfree Nosepump* is set up over a shallow well. As with other nose pumps, the livestock operate a lever to deliver water to the drinker. The difference with this design is that the lever operates a simple reciprocating displacement piston pump set down the well (a pump type similar to a windmill pump – refer to Factsheet # 590.305-2). This pump truly “pumps” water up from the well into the drinker. Refer to Figure 8, next page.

The amount of energy required to move water is the volume times the lift so there is a practical limit to the pump depth down the well. The supplier suggests depths of about 10 feet and has units up to 47 feet deep. Well casing must be sized to accommodate the pump diameter. Standard units are 4 inch in diameter with a smaller 2.75 inch diameter unit available.

Environmental Conditions. In locating most waterers, sites are chosen that have a low risk on contaminating surface or ground water (such as setback where contaminated runoff will not impact a stream). As this nose pump must be installed on the well head to accommodate the pump drive, there is some degree of risk of ground water contamination from manure that will collect around the waterer. The supplier recommends good sealing to the casing and a 20 feet by 20 feet sloped concrete pad around the well casing thus ensuring drainage away from the casing.

It should be noted that such winter waterers are often installed to reduce impacts that may occur to surface water from direct livestock access. The ground water risk of a winter nose pump may be much less than the direct access option.

For details go the suppliers' web site at <http://www.frostfreenosepumps.com/>



Source: Frostfree Nosepumps Ltd.



Figure 8 Frostfree Nosepump Installation