Landcare Notes

Water supply for stock containment areas

September 2002
LC0077
ISSN 1329-833X

Peter Thomas, Bendigo

The "Prevention of Cruelty to Animals Act 1986" requires that a person in charge of stock provide adequate food, water and shelter.

A sufficient and reliable water supply is essential for successful operation of stock containment areas. The stock housed in such areas are totally dependant on the person responsible for managing this area of confinement. It is therefore vital that a good water supply be provided. Because of the diet that will be fed to stock in containment areas, it is critical from an animal health point of view that there is a permanently available supply of water. This water should be of appropriate quantity and quality and should be reticulated to troughs in the stock containment area.

Water Quality

As a guide, maximum desirable[1] salt levels[2] for stock water should be as follows:-

Sheep and cattle		
Adult	10,000 ppm	(16,700 EC[3])
Lactating	5,000 ppm	(8,300 EC)
Young	5,000 ppm	(8,300 EC)

Note **1** Stock need to be introduced slowly to water at these upper levels of salt.

Note **2**: Bore water should be tested for other toxic minerals such as magnesium

Note **3**: EC units as µS/cm at 21°C

Water Requirements

Weather has a big influence on how much water will be drunk by stock. Maximum daily consumption figures under extreme weather conditions during summer are estimated for north and west Victoria in the table below. Consumption will reduce significantly in cool weather which makes the long term average about half of the maximum figure.

However:

- the maximum daily demand must be used to determine the rate of water supply to the troughs;
- the long term average consumption should be used to determine the total volume of the main water storage (ie dam) required.

	Maximum *daily demand (Trough flow calculation)* **L/head/day**	Long term *average (Dam capacity calculation)* **L/head/day**
Sheep		
Lactating	14	7
Dry	10	5
Weaners	5	2.5
Cattle		
Lactating	160	80
Dry	100	50
Weaners	50	25

Note: These quantities are for water of a low salt content, stock of average size and in an area with shade and shelter.

Reticulation Scheme Layout

The ideal scheme is to pump from a dam, creek or bore into a well placed tank and then supply the troughs by gravity. Continuous pumping is then not required in this scheme. Pumping may only be required every few days if the tank is of reasonable size.

An alternative system is to use a pressure unit pumping direct to the troughs, with a gravity standby supply tank holding at least one day's supply. This standby tank should be connected in such a manner that it is kept full by the pressure unit and automatically takes over as the supply to the troughs if the pump fails.

If a gravity tank is not incorporated in the scheme and (for instance) a pressure unit is used to pump direct to the troughs, a backup pump is vital to maintain water supply if the first pump fails.

Another advantage of the gravity type scheme is the possible utilisation of cheaper night rate power if electric pumping is intended.

Night Rate Pumping

If an electric pump is proposed, consideration should be given to utilising night rate power. A storage tank holding say 3-4 days supply should be used. A pressure unit could then be sited at the water source and connected to night rate power. The pump would then be automatically switched on by time switch at 11 pm to fill the storage tank. A pressure switch would switch off the pump when the tank is full and the float valve on the tank shuts. The night rate pumping period generally operates from 11 pm until 7 am and hence the design flow rate should be such that it delivers the daily requirement within this 8 hour period.

In any system like this it is advisable to have a manual over-ride whereby the pump can be switched to day rate and operated at any time if necessary.

Water Supply

The source of water may be a dam, creek, channel, bore, etc. See also Landcare Notes,

- LC0089: Water quality for farm water supplies,
- LC0071: Farm water in dry times - a checklist,
- LC0080: Drought reserve dams,
- LC0066: How much water do I need, and
- LC0073: How Long will my dam water last?

It is most important that the quantity and quality of the water is properly checked prior to the siting of any stock containment area. See Landcare Notes:

- LC0089: Water quality for farm water supplies
- LC0074: Organic pollution in farm dams: prevention and treatment
- LC0079: Minimising alagal growth in farm dams.

When estimating water needed in storage, add 30 % (for simplicity) to the calculated value to allow for evaporation during the summer period.

In the case of bores, the yield should be checked to ensure it is capable of providing the daily demand over the summer period, including evaporation losses.

Assuming a fairly normal autumn break, the water supply for stock containment areas should be designed to last until at least June of next year.

An Example

A stock containment area with 500 dry sheep would require a reliable storage of 0.6 megalitres (600 cubic metres) to last 6 months. ie:

500 sheep x 5 litres x 182 days = 455 000 litres

30% addition for evaporation = 136 500 litres

Total = 591 500 litres

Design Flow Rates

A reliable water supply to stock containment areas is vital. To ensure this, a tank with a gravity supply to the troughs is recommended. The tank should be large enough to supply the estimated maximum daily demand.

The tank-to-trough system should be able to deliver the total maximum daily requirement within 4 hours.

If the tank holds only one day's supply, the pump-to-tank system should also be able to deliver the total maximum daily requirement within 4 hours.

If the tank holds 3-4 days supply the pump-to-tank system can be reduced in capacity to deliver the total maximum daily requirement in 8-12 hours. Never-the-less the tank-to-trough section of the scheme will still need to supply the total daily requirement in 4 hours.

Example:

1. A gravity supply tank to hold one days supply for 500 dry sheep would need to be 5,000 litres.
   ie. 500 sheep x 10 litres = 5,000 litres.
2. A reticulation scheme to supply 500 dry sheep, with a tank holding one day's supply would need to be capable of a flow rate of 21 litres per minute.
   ie. (500 sheep x 10 litres) (4 hours x 60 minutes)
   = 20.8 litres per minute.
3. If a tank of 4 days supply were used (ie approx 22,700 litre), the flow rate in the pump-to-tank section could be reduced to 7 litres per minute.
   ie. (500 sheep x 10 litres) ÷ (12 hours x 60 minutes)
   = 6.9 litres per minute.

Troughs

Troughs should be of sufficient volume both to keep water reasonably cool and to act as a buffer storage at times of high demand.

Troughs will require regular cleaning. Select trough design with this in mind.

Troughs should be fitted with non restrictive float valves which need to be protected from physical damage by stock.

Site troughs as far away from feed supply as possible to prevent cross contamination.

Troughs should be of adequate size to allow 10% of stock to drink at the same time.

Example

Sheep

500 sheep need 15 metres of trough edge.

Cattle

100 cattle need 5 metres of trough edge.

Maintenance

Daily inspection of the water supply scheme is necessary.

Rectify any problems immediately.