

Livestock Water Guidelines

by Deke Alkire / doalkire@noble.org

NF-LS-08-01

Water is one of the most important nutrients for livestock. It is vital for many metabolic processes essential for life, growth and reproduction. The quantity of water that animals consume is affected by many factors including growth, pregnancy, lactation, activity, diet composition, feed intake and environmental temperature. The quality of water offered can also affect consumption and performance. Livestock should be provided with free choice access to clean, quality water at all times.

The following guidelines address the most common factors that may affect water quality for livestock. The primary items of interest in your water analysis are Total Dissolved Solids (TDS), Nitrate concentration ($\text{NO}_3\text{-N}$) and Sulfate ($\text{SO}_4\text{-S}$) concentration. However, other anti-quality factors (for example: herbicides, pesticides, coliform bacteria, etc.) that are not included in your water analysis may be present. These may result in decreased performance, decreased consumption and possibly death.

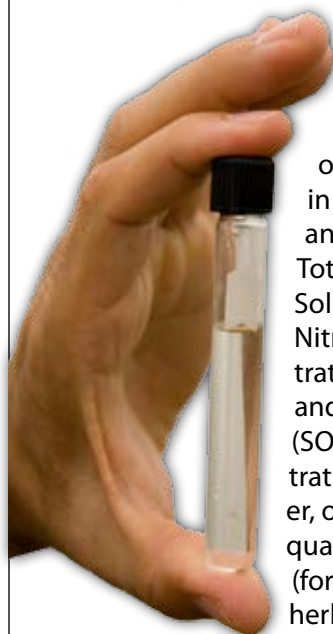


Table 1. Total Dissolved Solids (TDS)

TDS (ppm)	Comments
Less than 1000	Acceptable for use in all classes of livestock.
1000-2999	Acceptable for use in all classes of livestock. May cause mild temporary diarrhea in animals not accustomed to the water.
3000-4999	Acceptable for use in most classes of livestock. May cause mild temporary diarrhea in animals not accustomed to the water. May result in decreased water consumption and poor animal performance. Poor water quality for poultry, especially turkeys, and could result in death.
5000-7000	Avoid using this water for pregnant and lactating animals. Can be used with reasonable safety for some cattle. Decreased consumption and poor performance is likely. May cause mild temporary diarrhea in animals not accustomed to the water. Not recommended for use in working horses. Do NOT use for poultry.
Over 7000	Usually unacceptable for livestock use. Do NOT use for pregnant or lactating animals. Do NOT use for poultry or swine.

Table 2. Nitrate Nitrogen ($\text{NO}_3\text{-N}$)

$\text{NO}_3\text{-N}$ (ppm)	Comments
0-10	Generally safe for livestock.
10-20	Safe if used with a diet low in nitrates.
20-40	Could be harmful if continuously consumed.
40-100	Potentially toxic to cattle. May affect production and fertility.
Over 100	NOT recommended for use. Unsafe for cattle consumption.

Table 3. Sulfate Sulfur ($\text{SO}_4\text{-S}$)

$\text{SO}_4\text{-S}$ (ppm)	Comments
Less than 100	Generally safe for livestock. Use caution when feeding diets high in sulfur.
100-350	No harmful affects if used with a diet low in sulfur. May cause mild temporary diarrhea in animals not accustomed to the water.
350-500	NOT recommended for use. May cause polioencephalomalacia in cattle.

Note: Sulfur and nitrate may be present in cattle feeds. If they are, moderate levels in feed and moderate levels in water may be toxic in combination. Test suspect feedstuffs for nitrate and sulfur and consider these values when evaluating water quality.

Other Considerations

Iron (Fe)

It has been reported that the iron in water from natural sources is absorbed with an efficiency of less than 10 percent; thus it should not pose a threat to livestock. However, other research has placed upper limits for iron content in water between 0.3 and 0.4 ppm.

Blue-green algae

Several species of blue-green algae can be toxic to cattle. Blue-green algae problems tend to be worse during hot, dry periods. It is recommended to keep water sources clean and minimize nutrients entering the water. It is best if piped water sources are shaded from sunlight and sanitized. Disinfect water tanks and troughs by adding one ounce of chlorine bleach per 30 gallons of water and allowing it to stand for 12 hours. Then drain and refill with fresh water. For management of large bodies of water, contact your pond consultant.

This fact sheet is intended to provide guidelines for you to evaluate your water sample results. If your sample results fall outside of any of these guidelines, or if you have any questions or concerns about your water quality contact your livestock consultant.

THE SAMUEL ROBERTS
NOBLE
FOUNDATION

Agricultural Division
2510 Sam Noble Pkwy.
Ardmore, OK 73401

Table 4. Other Potentially Toxic Substances

Substance	Maximum upper limit (ppm)	Substance	Maximum upper limit (ppm)
Arsenic (As)	0.20	Fluoride (Fl)	2.00
Boron (B)	5.00	Lead (Pb)	0.10
Cadmium (Cd)	0.05	Magnesium (Mg)	100.00
Calcium (Ca)	150.00	Mercury (Hg)	0.01
Chlorine (Cl)	300.00	Nickel (Ni)	1.00
Chromium (Cr)	1.00	Sodium (Na)	300.00
Cobalt (Co)	1.00	Vanadium (V)	0.10
Copper (Cu)	0.50	Zinc (Zn)	25.00

References:

- Beede, D.K. 1993. Water nutrition and quality for dairy cattle. In: Proc. Western Large Herd Dairy Mgmt. Conf. pp194-205.
- Boyles, S. Livestock and water. <http://beef.osu.edu/library/water.html> Accessed Mar. 12, 2008.
- Faries, F.C. Jr, J.M. Sweeten, and J.C. Reagor. Water quality: Its relationship to livestock. Texas Agri. Exten. Bull. L-2374.
- Hairston, J.E. 1995. Drinking water for livestock and poultry. Alabama Coop. Exten. Bull. ANR-790-2.6.
- Hutcheson, D. 2001. Water quality and guidelines. MSU Beef Update. <http://www.animalrangeextension.montana.edu/Articles/Beef/Wklynwsltr/10-23-01.htm> Accessed Mar. 12, 2008.
- Interpretation of water analysis for livestock suitability. Spectrum Analytic Inc. http://www.spectrumanalytic.com/support/library/ff/Interpretation_of_Water_Analysis_for_Livestock_Suitability.htm Accessed Mar. 12, 2008.

