

Suitability of Water for Livestock Fact Sheet

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Livestock Water Requirements

Livestock and poultry require large quantities of water to survive and perform to their maximum potential. Mammals require larger quantities of water than other animals due to their high protein diets, and ruminants require even more water for proper function of the rumen for digestion. Feedstuffs with high water-absorbing characteristics (wheat bran and alfalfa hay for example) increase water needs even further. For optimal livestock and poultry performance, it is important that the water source is not toxic and that the water is sufficiently palatable to encourage animals to drink the optimal amount. See the table below for comments about poultry and livestock performance with saline water.

A Guide to the Use of Saline Waters for Livestock and Poultry

Total Dissolved Solids (mg/L)	Comment
Less than 1,000	These waters have a relatively low level of salinity and should present no serious burden to any class of livestock or poultry
1,000 to 2,999	These waters should be satisfactory for all classes of livestock and poultry. They may cause temporary and mild diarrhea in livestock not accustomed to them or watery droppings in poultry (especially at the higher levels) but should not affect their health or performance.
3,000 to 4,999	These waters should be satisfactory for livestock, although they might very possibly cause temporary diarrhea or be refused at first by animals not accustomed to them. They are poor waters for poultry, often causing watery feces and (at the higher levels of salinity) increased mortality and decreased growth, especially in turkeys.
5,000 to 6,999	These waters can be used with reasonable safety for dairy and beef cattle, sheep, swine, and horses. It is advisable to avoid using water approaching the higher levels for pregnant or lactating animals. They are not acceptable waters for poultry, almost always causing some type of problem, especially near the upper limit, where reduced growth and production, or increased mortality, will probably occur.
7,000 to 10,000	These waters are unfit for poultry and probably for swine. Considerable risk may exist in using them for pregnant or lactating cows, horses, sheep, the young of these species, or for any animals subjected to heavy heat stress or water loss. In general, their use should be avoided, although older ruminants, horses, and even poultry and swine may subsist on them for long periods of time under conditions of low stress.
More than 10,000	The risks with these highly saline waters are so great that they cannot be recommended for use under any conditions.

Adapted from National Research Council (1974)

Alkalinity (mg/L)

>1,000 Values over 1,000 mg/L are considered unsatisfactory for Livestock.

Nitrate - NO₃ (mg/L as N)

0 - 44 No harmful effects.
45 - 132 Safe if diet is low in nitrates and nutritionally balanced.
133 - 220 Could be harmful if consumed over long periods of time.
221 - 660 Cattle at risk; possible death losses.
661 - 800 Unsafe; high probability of death losses.
>800 Unsafe; do not use.

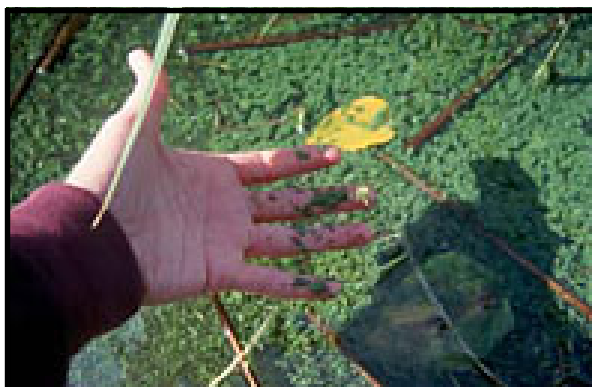
Sulfate (mg/L)

<1,500 Safe except possible mild diarrhea near upper limit.
1,500 - 2,500 No harmful effects except some temporary diarrhea.
2,500 - 3,500 Poor water for poultry; Very laxative in livestock, but symptoms usually disappear after a few weeks.
3,500 - 4,500 Very laxative; not recommended for pregnant or lactating cows, cattle in confinement, horses, or sheep; Unacceptable for poultry.
>4,500 Not recommended for use under any conditions.

Additional Parameters of Interest in Livestock Water

Cyanobacteria

Cyanobacteria were traditionally called blue-green algae but are actually bacteria. When large blooms of these bacteria grow in a water source, they can cause severely toxic effects. These bacteria have chlorophyll and use the sun as an energy source but depend on nutrients in the water for food. Excluding animals from entering the source water and minimizing nutrients in the water will reduce risk of cyanobacteria blooms.



Planktonic Cyanobacteria bloom
Picture from Agri-Food Canada website referenced below

Additional parameters which can affect livestock health and performance

Parameter	Safe Upper Limit of Concentration (mg/L)	Parameter	Safe Upper Limit of Concentration (mg/L)
Arsenic	0.2	Lead	0.1
Barium	Not Established	Manganese	Not Established
Cadmium	0.05	Mercury	0.010
Chromium	1.0	Molybdenum	Not Established
Cobalt	1.0	Nickel	1.0
Copper	0.5	Nitrate-N	100.0
Cyanide	Not Established	Nitrite-N	10.0
Fluoride	2.0	Vanadium	0.1
Iron	Not Established	Zinc	25.0

Adapted from National Research Council (1974)

Additional Resources:

South Dakota State University, Extension Extra, March 2004, Nancy Thiex, Dave German

<http://agbiopubs.sdstate.edu/articles/ExEx2042.pdf>

Algae, Cyanobacteria and Water Quality; Agri-Food Canada

http://www.agr.gc.ca/pfra/water/algcyano_e.htm

Livestock and Water Quality; Agri-Food Canada

http://www.agr.gc.ca/pfra/water/livestck_e.htm

References:

Applied Animal Nutrition, Feeds and Feeding Third Edition; Peter R. Cheeke;

Montana State University, Beef Briefs, 10/23/2004, John Paterson

National Research Council. 1974. Nutrients and Toxic Substances in Water for Livestock and Poultry, National Academy Press
South Dakota State University Extension; Interpretation of Water Analysis for Livestock Suitability; March 2004; Nancy Thiex