

Livestock Water Quality

Developed by: Brandy Brabham, WVU Extension Agent, Roane County, Agriculture & Natural Resources,
brandy.brabham@mail.wvu.edu or 304-927-0975

- Water is a critical nutrient for livestock and poultry.
- Farm water supplies, either surface or ground, should be protected against contamination from microorganisms, chemicals, and other pollutants.
- Substances that originate on livestock farms and often contaminate water supplies include nitrates, bacteria, organic materials, and suspended solids.
- A high level of suspended solids and an objectionable taste, odor or color in water can cause animals to drink less than they should.
- Surface water in which livestock have ready access are always potential candidates for contamination.
- Shallow dug wells without good surface drainage away from the well may be subject to infiltration of contaminants.
- The presence of coliform bacteria in a well is an indication that surface water is finding its way into the well.
- Water can serve as a reservoir for many different disease organisms and toxins.
- **Stagnant water contaminated with manure or other nutrients may develop blue-green algae, which can poison livestock, causing muscle tremors, liver damage, and death.**
- Farm pond water needs to be observed for the presence of algae and other harmful organisms during hot, dry weather.
- Leptospirosis and Fusobacterium are two bacterial contaminants that often use water and mud, respectively, as modes of transportation from animal to animal. Leptospirosis is spread through urine of carrier animals. This disease often manifests itself as **reproductive problems**. Problems may range from **infertility, to low milk production, to widespread late-term abortion**. The organism can **survive for extended periods of time in surface waters**
- Avoid forcing livestock to drink from water sources that may be contaminated with urine.
- Fusobacterium infection is more commonly known as "foot-rot." The bacterium is a soil-borne organism found virtually throughout the US. It is carried on the feet of animals, which then serve to contaminate any body of water they enter. The bacteria then enter through cuts, bruises, or puncture

wounds on damaged feet of other animals. Once inside an animal's body, they multiply rapidly and serve to spread the disease.

- Clinical signs of "foot-rot" are most seen as chronic lameness, often with swelling above the foot. "Foot-rot" can usually be effectively treated with penicillin and sulfa.
- When water is suspected of causing health problems in livestock, veterinary assistance should be sought to determine the actual disease.
- Temporarily changing to a known safe water supply is a useful test to determine whether the health problems can be solved.
- Water is too often blamed for production or disease problems. Thus, the importance of an accurate diagnosis must be emphasized.
- Toxicity from a specific mineral or compound depends on its concentration and on relative levels of other components with which it interacts.
- The EPA recommends that livestock water contain less than 5,000 coliform organisms per 100 milliliters; fecal coliform should be near zero.
- Alkalinity is expressed either as a pH or as titratable alkalinity in the form of bicarbonates. A pH of 7 is neutral; a pH between 7.0 and 8.0 is mildly alkaline; and a pH of 10 is highly alkaline. Excessive alkalinity can cause physiological and digestive upsets in livestock.
- The saltiness of water is commonly measured by *total dissolved solids*, which is approximated by the electrical conductance of the water.
- Nitrates are soluble and move with percolating or runoff water. Therefore, ponds with runoff from heavily fertilized or manured fields and water from poorly cased, shallow wells may contain nitrates. Water from deep wells is usually nitrate free.
- During a drought, corn silage may accumulate high concentrations of nitrate and when added to the nitrate present in water may result in a lethal combination. The ensiling process will reduce the nitrate level to acceptable levels after a period of aging for 60 to 90 days in the silo.
- Unlike other simple-stomached animals such as swine, horses do have a cecum containing microbes capable of converting nitrate to the more toxic nitrite form. Fortunately, the extent and rapidity of this chemical conversion in horses is insufficient to make them as susceptible as ruminants.

EXTENSION

- Another fortunate thing is that preformed nitrite is rarely encountered in sufficient concentrations in water and feed to be a toxic threat.
- To achieve high-quality surface water, **fence livestock out of the pond or stream and pipe the water to a tank or other waterer**. To obtain the best water from a pond, provide a **grassed watershed where no chemicals or manure are applied and float a screened pipe intake about 2 feet below the surface**.
- Water can be pumped from a stream or, in some cases, can be piped to a tank by gravity.
- An alternative is to allow limited access for livestock to drink from a pond or stream.
- Spring water may need to be pumped to the desired waterer location, or the spring may need to be developed to provide the head necessary for gravity flow.
- Well sites should be graded to drain surface water away from the well casing.
- Wells should be located as far as practical from septic tanks ~50 feet min., septic fields ~100 ft min., chemical mixing areas ~300 ft min., feedlots ~100 ft min., earthen manure storage basins and lagoons ~300 ft min., and land application areas for manure ~ 300 ft min.
- At a minimum, the nutrient management plan should prevent the application of nutrients at rates that will exceed the capacity of the soil and planned crop needs. Soils, crop material and manure should be tested to determine nutrient needs.
- Manure application equipment should be calibrated to ensure that the quantity of material being applied conforms to a plan.
- Records of crops removed annually, and the total amount of effluent applied will allow producers to maintain the desired nutrient balance.
- Annual water tests are recommended for private wells, especially for shallow wells, and whenever a problem is suspected. Owners of private wells can have their water tested by collecting a sample themselves or by hiring a qualified person to do so.
- The sample should be taken to a certified laboratory for analysis. Sample bottles should be obtained from the testing laboratory or local health department, because containers may be especially prepared for a specific contaminant.
- Sampling and handling procedures depend on the water quality concern and should be followed carefully.

- Water analyses typically include the following tests:
 - Total coliform bacteria; pH (acid or alkaline level); Total dissolved solids; Total soluble salt; Salinity; Hardness; Nitrates; Sulfate; Other factors such as toxicity problems with specific minerals or pesticides, or occasionally, heavy algae growth
- There are no regulations governing the number of microorganisms or bacteria in water used for livestock production unless the farm is a Grade A dairy.
 - In that case, the water must be from a supply that provides water of safe and sanitary quality with no detectable fecal coliform bacteria.
- Normally, hard water does not interfere with livestock performance; however, hard waters can cause difficulty in washing of milking equipment and causes water heaters to "lime up." Contaminates such as iron and sand will clog pipelines.
- Well water with high iron content may have problems with iron bacteria forming a red, slimy mass that can clog well screens and require periodic treatment with chlorine.
- Some wells produce considerable amounts of sand. A sand separator should be installed at the beginning of a pipeline in such a case. Sand separators are available through suppliers of trickle irrigation equipment.
- Sulfur waters are corrosive and have a bad odor.
- City water is a reliable source but may be too costly for large livestock operations. However, consider connection to the city source as a backup supply. Backflow prevention valves shall be used to prevent contamination of the city water supply. In some cases, PSD's require an air gap because backflow valves are not safe enough.

References:

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Goodson, T., Keaton, M., Young, G. (2022). West Virginia Department of Health and Human Resources Water Quality Laboratories Certified in West Virginia. Exert. Retrieved September 3, 2024. [Water Quality Laboratories Certified in WV \(wvdhhr.org\)](http://wvdhhr.org).

Water Testing Labs in WV

WV ALS Environmental - South Charleston, 304-356-3168, 147 11th Avenue South Charleston <https://www.alsglobal.com/en/locations/americas/north-america/usa/west-virginia/south-charleston-environmental>

WV ANALABS, Inc., 304-255-4821, 196 Dayton Street, Crab Orchard <http://www.analabsinc.com/>

WV Industrial Lab Analysis, 304-233-5595, 65 36th Street, Wheeling

WV PACE Analytical Services Inc., 304-757-8954, Weatheridge Drive, Hurricane <https://www.pacelabs.com/about-us/locations/hurricane-wv.html>

WV PACE Analytical Services, Inc., 304-241-5861, 16 Commerce Drive, Westover <https://www.pacelabs.com/about-us/locations/morgantown-service-center.html>

WV PACE Analytical Services, Inc., 800-999-0105, 225 Industrial Park, Rader <https://www.pacelabs.com/about-us/locations/beaver-wv.html>

WV Reliance Laboratories, 304-596-2084, 25 Crimson Circle, Martinsburg <http://reliancelabs.net/>

WV Reliance Laboratories, 304-842-5285, Bridgeport <http://reliancelabs.net/>

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WV Reliance Laboratories, Inc., 304-842-5285, 2044 Meadowbrook Dr., Bridgeport <http://reliancelabs.net/>

WV Sturm Environmental Service, 304-62365, 49 Brushy Fork Rd, Bridgeport <http://sturmenvironmental.com/>

WV Tra-Det, Inc., 304-233-9060, 8 Industrial Park, Wheeling <http://www.tra-det.com/>

WV WVDA Nutrient Mgmt. & Water Quality Lab, 304-538-2397, Industrial Park Road, Moorefield