Virtual workshop series: Water quality impacts of livestock operations and grazing management

Natural Resources PFT
Kansas Center for Agricultural Resources and the Environment (KCARE)
Water quality impacts of livestock operations and grazing management

• Offered as a Professional Development Event in PEARS for county extension agents

• Date/Time: May 5 to May 13, 8:30 am to 9:30 am

• Zoom Meeting ID: 952 6066 1935
Today’s format

• If you haven’t already, **please mute** your microphones.
• Speakers will present for 30-40 minutes
• Panelists will join the discussion at the end
• Please ask questions through the **chat** function (located at the lower part of your screen).
• Although our “end time” is posted for 9:30 a.m., participants are welcome to remain longer if they want to discuss the topic further.
Water quality impacts of livestock operations and grazing management

Electric fence systems

Wednesday, May 13
Rod Schaub
Frontier Extension
District Agent

Panelists

Will Boyer, KCARE watershed specialist; Herschel George, KCARE watershed specialist, retired
Fencing Systems

Rod Schaub
Frontier Extension District
Livestock Agent
What Is the Right Fence?

• Any fence that keeps livestock where you want them.
What Fences Are Appropriate For Grazing Systems?

Physical Barrier

- Barbed Wire
- Woven Wire
- Plank or Pipe
What Types Are Appropriate For Grazing Systems?

Psychological Barrier: Electric or Power Fence

Temporary

Permanent
Electric Fencing

**Cons**
- Bad experiences
- Most misunderstood
- Least familiar

**Pros**
- Least expensive
- Durable
- Easy to install
- Most Flexible
Components

- Charger
- Fence
- Ground
Charger or Energizer

- Low impedance
  - minimum 5000 volt output **with a load**
  - pulse <300 mAmp 0.0003 seconds long
  - 35 - 65 pulses per minute
- Size - miles, acres, joules
- 110 volt, Battery or Solar
- Surge protection
- Lightening choke or induction coil
- Snap in service modules
- 1 joule per mile of fence under an average load
  - Joule = one watt for one second.
  - It is the measure of the “horsepower” of a pulse
Electric Energizer

protected from weather and with a surge protector installed
Solar Energizer
Large solar panel
Solar Energizer
Small panels on chargers are inadequate
Battery type charger attached to barbed wire
Ground

90 % of electric fence problems are from poor grounding system.
Fence Charger Grounding System

- 3 feet of 1/2-5/8 ” rod per joule
  - Minimum 3 six foot rods
- Spaced 10’ apart, in moist area
- Use galvanized ground rod, clamp, wire
- **Avoid mixing metals**, such as copper and galvanized. Causes corrosion and poor conduction.
- 65 ft from utility ground, well casing or other grounds
- Keep ground rod ends, connecting wire and clamps above ground
Install charger ground rods under fence lines or drip edge of a building.
Install Ground Rod Connectors Above Ground Level
Not Deep Enough!
**Energizer Installation**

**Simple Lightning Arrestors**
(can use either)
- Gap wires sufficiently to prevent arcing
- Plastic or other non-conductive material

- **Insulated wire at least 12.5 gauge**
- **Use at least 3 energizer grounding rods, placed at least 10' apart and in dripline of roof or fenceline.**
- **Ground rods should be at least 10' apart. At least one more rod than Energizer grounding rods.**
- **65' minimum**
- **10'**
- **5'6" from surface down**
- **Electric fence**
- **Crimp**
- **Lightning Arrestor**
- **Lightning Coil**
- **Surge Suppressor**
- **Energizer**

**Drawing 1**
Lightning Protection

- Minimum 65 ft. from charger ground rods
- One more rod than charger ground
- Want to attract the lightening to this point
- Lightning Arrestor
  - Purchased or home-made arrestor
- Lightning choke
  - Purchased or home-made arrestor
**Home-Built Lightning Arrestors**

*Adjusting Gap with a Volt Meter*

1. Set energizer to highest setting.
2. Secure lead from fence.
3. Leave lead to ground loose enough to slide.
4. Leaving lead to ground unattached at grounding end, clip volt meter to ground system then to end of lead.
5. Slide lead at arrester apart until voltage is no longer read on volt meter.
6. Tighten lead on arrester and then secure to grounding system (after removing volt meter).

Another method is to slide leads apart until arcing no longer occurs, then check with volt meter.
Lightning Choke
Permanent Fencing

- Use 12 ½ gauge high tensile wire
- Make sure wire is class 3 galvanized
- Wire strength 170,000 psi to 210,000 psi
  - Wire under 200,000 psi is easiest to hand tie
- Place posts 40-50 feet apart on level ground
- Insulators- purchase with 10 year warranty-UV protection
- Pin lock versus claw type – pin lock much easier to attach high tensile wire
Offset bracket on existing fence
Portable Fencing

• Polywire – Braided versus Twisted
  • Polywire comes with 6 strands of SS, 9 strands of SS, or mixed metals.
    – Mixed metals are more conductive, but the stainless steel strands won’t break as easily
• Reels – Geared vs. Standard
  – Geared reels will make work much easier/faster.
Portable Fencing

• Many kinds of posts can be used in portable systems
  – Pigtail, fiberglass, stirrup, and step-in posts
• Choose a post according to ease of use
• A post with a large step and a small diameter rod is easiest to get into the ground
Electric Gate (not hot when unhooked)

- Line Tap
- Insulator
- Galvanized Cable 1/16" - 1/8"
- Gate Handle
- Insulated Wire 12.5 gauge (leave slack)
- Insultube, Insulator, or Insulated Wire

12" minimum recommended

Non-Metal Pipe
3/4" gray electrical conduit with sweep elbows. Conduit should be watertight.
**Drawing 8a**

**Floating Angle Brace**

- **End Insulator**
- Distance from points A and B should be a minimum of twice the height between the top wire and ground surface.
- **Lag bolt, galvanized pin welded, etc.**
- **4” nominal wood, 2” pipe (capped), 2” fiberglass, or steel “T” post**
- **Use insultube or insulator**
- **Point B**
- **In-line Strainer**
- **Point C**
- **Use galvanized staples at Points A and C to allow the brace wire to slip around post.**
- **Flat rock, concrete block half, or treated 2”**

When using steel post to make corner assembly, place cable thimble over end of brace post to allow wire to slip.

*Electric Fencing for Serious Graziers*
Floating Angle Brace
Effective for 1 to 8 wire fences
Steel T-post floating angle brace
Effective on 1 to 2 wire

Steel Pipe, minimum 3” diameter, driven as deep as amount of post above ground
Effective on 1 to 3 wires
Summary

• Look around: learn from others’ experience
• Find a reputable dealer who knows their products and will stand behind them
• Practice
  – Get your feet wet (but don’t touch the fence with wet feet!)
• Don’t cut corners
Energizer Installation

Simple Lightning Arrestors
(can use either)

- Gap wires sufficiently to prevent arcing
- Plastic or other non-conductive material

Insulated wire at least 12.5 gauge

Use at least 3 energizer grounding rods, placed at least 10' apart and in dripline of roof or fenceline.

Ground rods should be at least 10' apart. At least one more rod than Energizer grounding rods.

5'6" from surface down
Don’t hook insulators directly to trees.
Drawing 9

Water Gaps (Flood Gates)

- Insulator
- Insulated wire
- Shut off (optional)
- Current limiter
- Line tap
- Insultubes for spacers between droppers
- Metal streamers (galvanized chain, cable, or 12.5 gauge wire)
- Fence wire
- Above expected high water
- End insulator
- 6" - 12" apart
- Approx. 12"

Water level
Electric Water Gap
Electric Energizer
Protected from weather elements and has a surge protector installed