

CHECKLISTS & CONSIDERATIONS FOR IMPROVED GRAZING SYSTEMS

Introduction

Now that you have identified the land area that would benefit from *improved grazing systems*, review this document as it contains items you may need to think about and/or address prior to installation. It includes checklists and tips for **fencing, energizers, grounding, and water systems**. This is by no means an exhaustive list so please refer to the resource information and contact list at the end of the document.



Energizers and Grounding

Energizer & Grounding Checklist	Yes	No
I have determined the length of fence I need to power.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined the energizer size I need based on my fence length and the animals I am containing, and protecting them from.	<input type="checkbox"/>	<input type="checkbox"/>
I have thoroughly researched energizers by comparing them apples-to-apples (output joules-to-output joules) and have selected one that is the appropriate size for my fence.	<input type="checkbox"/>	<input type="checkbox"/>
I have materials for a grounding system that should allow for adequate charge.	<input type="checkbox"/>	<input type="checkbox"/>
I have selected the appropriate power supply option for my pasture situation (plug-in, battery with backup, or battery with solar charger).	<input type="checkbox"/>	<input type="checkbox"/>
My pastures are close enough to a building with electricity to plug in directly.	<input type="checkbox"/>	<input type="checkbox"/>
I have backup batteries for when my main batteries are charging.	<input type="checkbox"/>	<input type="checkbox"/>
I have selected an appropriate solar charger and voltage regulator for my batteries.	<input type="checkbox"/>	<input type="checkbox"/>
I have a backup power source for necessary fencing in the event of an extended power outage.	<input type="checkbox"/>	<input type="checkbox"/>

*If you answered **No** to any of the above questions, consider the following tips and/or additional resources at the end of the document before you install your fencing system.*



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Energizer—Tips & Considerations

The energizer is responsible for delivering the pulse of electricity to the fence wires. To be successful at protecting and containing your animals, it must have adequate capacity for the length and number of wires being electrified.

What are **Joules**? The power that pushes the electric pulse (or shock) down the fence wire.

- **Stored Joules** refers to the amount of energy stored inside the energizer's capacitors while **Output Joules** refers to the actual amount of energy delivered to the fence.
 - Manufacturers often overpromise how many miles of fence their energizer will power.
 - A conservative recommendation is that 1 output joule can power 3 miles of fence.
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Grounding—Tips & Considerations

Grounding is necessary in order for the electrical circuit to be completed between your fence and animal and thus the electric shock transmitted effectively.

- Galvanized steel rods should be used.
 - The amount of rods needed varies according to the energizer size and conditions (dry soil), but it is safe to assume that you will need at least three (3) six-foot ground rods spaced ten feet apart.
 - ◆ Alternating ground/energized fence stands can be an effective method to increase grounding in dry conditions.
 - ◆ Larger capacity energizers will require more ground rods.
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Powering Your System—Tips & Considerations

- The simplest and most cost-effective way to provide electricity to your fencing system is to plug directly into your electrical grid via a power outlet.
 - ◆ This is only an option for pastures in close proximity to a barn, house, or other building with electricity.
- If you do not have a power outlet available nearby, DC/battery power units are a great the alternative although typically more costly.
 - ◆ Deep cell marine batteries recommended, however, car batteries are also common.
 - ◆ These batteries will need to be replaced every 3-4 years.
 - ◆ You may also need back-up batteries that can be used while your main batteries are being recharged.
 - ◆ Alternatively, using a solar-powered charger may also be an option.
- If certain areas of your fencing system are crucial to maintaining the integrity of your grazing system, be prepared with a backup power source in the event of an extended power outage.

Fencing Design & Water Systems

Fencing Design Checklist	Yes	No
I have determined the appropriate type and number of wires for my fence.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined the appropriate wire height and spacing for my fence.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined how I will move my livestock between pastures and the farmstead (i.e. laneways, road crossings, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
I have addressed layout challenges in my system such as avoiding wet spots, steep inclines, and gate positioning.	<input type="checkbox"/>	<input type="checkbox"/>
I have considered environmentally sensitive areas in my system design (i.e. surface water access)	<input type="checkbox"/>	<input type="checkbox"/>
I have considered how I will train my animals to respect the fence.	<input type="checkbox"/>	<input type="checkbox"/>
I have addressed the use of temporary fencing in my system.	<input type="checkbox"/>	<input type="checkbox"/>
I have a plan for controlling undergrowth/weeds around my fence.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined who has the necessary knowledge and tools to install my fencing system.	<input type="checkbox"/>	<input type="checkbox"/>

*If you answered **No** to any of the above questions, consider the following tips and/or additional resources at the end of the document before you install your fencing system.*

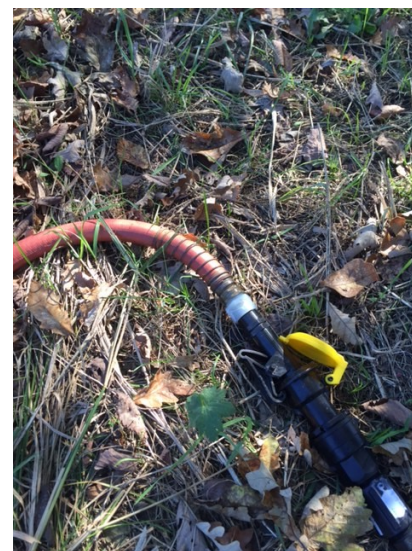
Fencing Design—Tips & Considerations

- Consider the distance (perimeter) rather than the area of your grazing system.
 - ◆ Some wires, such as Polywire, require more power over long distances compared to other wire options, such as High Tinsel.
- Undergrowth/weeds in contact with the bottom live fence wires can drain your charger and reduce the effectiveness of your fence. Regular weed maintenance may be required.
- Low impedance wire options allow for the use of plastic Polywire and a more effective shock, but they have less weed burning ability than other wire options.
- In the case of an extended power outage, be prepared with a backup power source for necessary fencing and water systems.



Water Systems Checklist	Yes	No
I have considered how livestock will have access to drinking water.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined how many drinking water access points are needed.	<input type="checkbox"/>	<input type="checkbox"/>
I have considered the distance animals will need to walk to access drinking water in my grazing system.	<input type="checkbox"/>	<input type="checkbox"/>
I have identified a source of surface water for livestock to access drinking water.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined and addressed its seasonal availability in my design.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined a system to prevent environmental degradation during surface water access.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined that water tubs will be used for water access.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined how I will move the tubs between paddocks if needed.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined how I will fill water tubs (i.e. pipeline, transporting water, etc.).	<input type="checkbox"/>	<input type="checkbox"/>
I have determined how water will flow through the piping (i.e. pump, gravity, etc.).	<input type="checkbox"/>	<input type="checkbox"/>
I have determined where my piping will go (i.e. above- or below-ground).	<input type="checkbox"/>	<input type="checkbox"/>
I have determined how my piping will be marked to avoid damage from animals/equipment.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined the size of piping that fits my systems needs.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined whether water testing is necessary for my water source.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined whether water filtration is necessary for my water source.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined how the water system will be freeze/frost proof if needed.	<input type="checkbox"/>	<input type="checkbox"/>
I have determined who has the necessary knowledge and tools to install my water system.	<input type="checkbox"/>	<input type="checkbox"/>

*If you answered **No** to any of the above questions, consider the following tips and/or additional resources at the end of the document before you install your water system.*



Water Systems—Tips & Considerations

- A dairy cow may require between 20-30 gallons of water per day.
- When electing your water source(s), be sure to consider the proximity to both far and near fields, proximity to an electricity source, water holding capacity, recharge rate, overflow, evaporation, etc.
 - ◆ When the water source is more than 900 feet from the grazing area, the grazing animals will drink as a group instead of as individuals.
 - ◆ In general, when animals drink individually, you need a tank that allows 2-4% of the animals to drink at one time and a flow rate that provides total daily needs in four hours or less using full flow values to refill the tank.
 - ◆ When livestock drink as a group, the tank should hold at least 25% of the daily requirement and allow 5-10% of the animals to drink at one time. If the tank cannot be refilled in one hour or less, use a larger tank size (*B. Bartlett, Michigan State Univ., The ABCs of Livestock Watering Systems*).
- Drinking from streams, puddles, ponds, and other surface water is not ideal.
 - ◆ Bacteria and pathogens can contaminate surface water and also be a source of parasite infection.
 - ◆ If surface water must be used (for emergency backup for example) access should be limited.
- If using water tubs, consider placement within the pasture. Putting a water tub in a low elevation area of a pasture may cause a mud puddle, as opposed to having the water tub in a high elevation section.
- Consider using portable tubs as they result in less 'heavy use' areas than stationary tubs.
- Portable tubs result in less 'heavy use' areas than stationary tubs. With moveable tubs, animals will travel less distance to watering points, equaling more time grazing and less time walking. Animals will congregate less by the water source, and as a result nutrients will be distributed more evenly in the pasture.
 - ◆ Plastic/fiberglass is also lighter in weight than a steel tub alternative, making them easier to move. When the tub is moved, the water is dumped and the tub is cleaned.
 - ◆ Portable tubs are typically 100 to 150 gallons. Stationary tubs are typically 300 gallons or more.
- Components of a piped water system:
 - ◆ Black plastic pipeline (160 psi or higher)
 - ◆ Quick connect fittings and couplings
 - ◆ Water tubs (size varies with animal numbers and class)
 - ◆ Full flow float valves
- When designing a water system, you will need an idea of footage of pipe required. Pipe often comes in 300 and 500 foot rolls. One inch diameter pipe is often used, but you may need larger or smaller depending on distance, layout, terrain and water availability. You will also need an idea of the number of watering points and number of fittings needed to deliver water to the paddocks.
 - ◆ Check the system regularly for leaks or breaks. Observation is important during hot, dry weather.
- If using a roll up pipe for your water system, HDPE (high-density polyethylene) is preferred. It is durable, impermeable, and flexible.
- When the black plastic pipe is laid along the fence line, grasses and other pasture plants will grow over the pipe, shading it to keep the pipe cooler. Also since water is recharged regularly with smaller tubs it is flowing more often with less time to sit and heat up.

Interested in receiving additional grazing information?

If you have any questions, please contact:

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More information can be found at: <https://www.uvm.edu/nwcrops>

Helpful Resources & References

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