

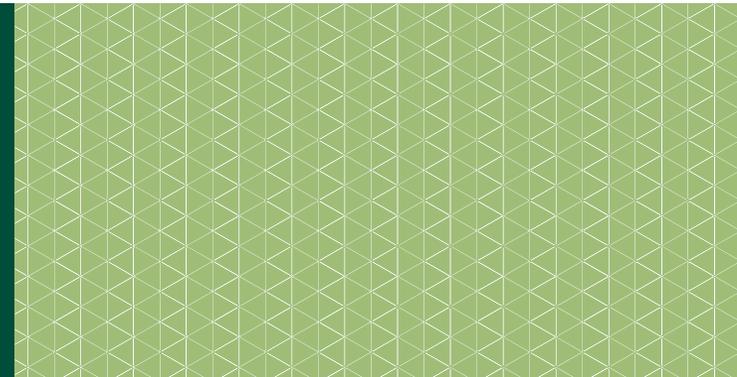
Stable Solutions: Managing Manure in Winter

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Livestock Environmental Management



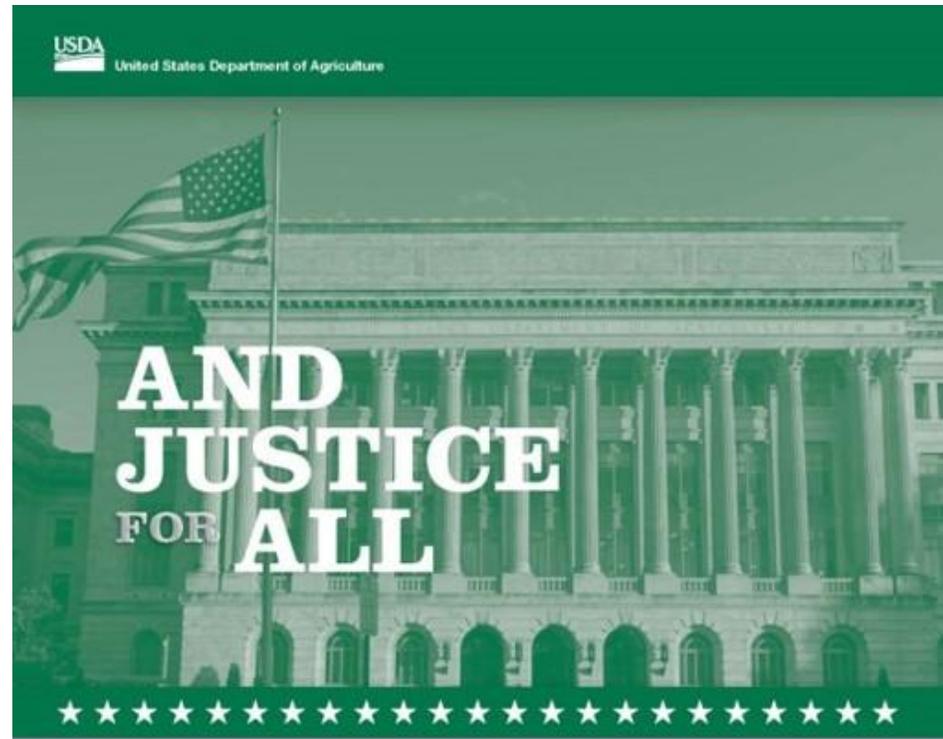
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Office of the Assistant Secretary for Civil Rights
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program.intake@usda.gov.

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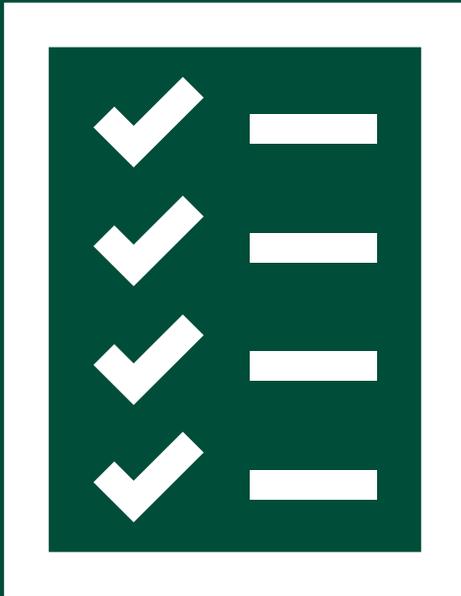
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Overview



1. What is manure, and why do we manage it?
2. What is your manure management plan?
3. Manure management options
4. Spreading manure
5. Other winter management considerations

What is manure?

- Mixture of feces and urine that can include other things
 - Bedding, spilled feedstuffs, hair and soil
- Nutrients
 - N, P, K + micro-nutrients

What Affects Nutrient Variability?

- Differences in digestive systems
 - Ruminant vs. Hindgut Fermenters vs. Monogastric
 - Weed seed breakdown
 - Small/hard vs. Large/soft
- Differences in diet (within or among species)
- Physiological state

Why Manage Manure?

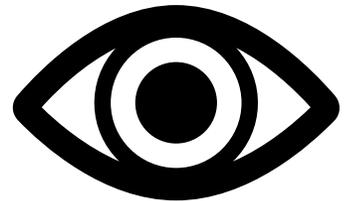
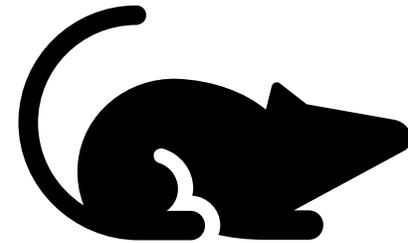
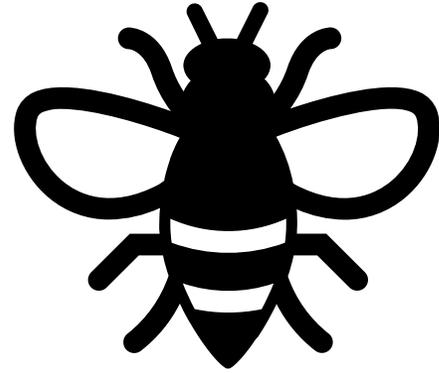
- Manure contains valuable nutrients plants can use. If the nutrients are not used they become a pollutant and are wasted.
- **Improper manure storage and land application**
 - Excess soil nutrients
 - Surface runoff
 - Leachate
 - Water-contaminated with manure



Harmful algal bloom. Photo courtesy: NDDEQ.

Other Manure Management Considerations

- External parasites (flies)
- Bacteria and Pathogens
- Rodents
- Odors
- Internal parasites
- Weed seeds
- Visual appearance



Industry Perspective

*“...Picking up manure regularly from stalls, paddocks, confinement areas, and high-traffic areas minimizes the amount of mud on your farm over the winter months, making chore life easier. This also helps minimize parasite load in these areas, reduces flies and odors, **helps prevent groundwater and surface water pollution**, and improves pasture quality (because you can reapply the composted manure).”* – TheHorse.com

Manure Stacking/Stockpiling Guidelines - ND

- Short-term Manure Stockpiles
 - Manure may **not** be stockpiled for **more than** nine months at short-term stockpile locations.
 - The same location cannot be used from year to year.
- Permanent Manure Stockpiles
 - Manure stockpiles **for more than** nine months must be stored at a permanent stockpile location.
 - Involves soil investigation and regulatory oversight.

Stockpiling Site Selection

- **Sandy soils have rapid permeability** that allows nitrate to move quickly through the soil to ground water (leaching), while **loamy or clayey soils have slower permeability** that helps retain nitrate in the soil profile.
- Depth to ground water and location of surface water

Stockpiling Site Selection

Manure stockpiles may not be located:

- In gravel pits, or any other excavations;
- Along streams or lakes;
- Within a flood plain; or,
- Within 50 feet of a private water supply well or 100 feet of a public water supply well

Site selection important for manure, dry lots,
mortality and compost areas.

Production (lbs.) – Michigan State Univ. Ext.

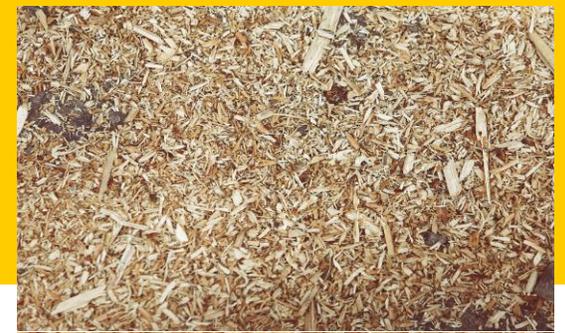
Manure produced for 1 horse per month:

- 1000 lbs. horse = 50 lbs. manure & urine/day
- 50 lbs. manure x 30 d = 1500 lbs. manure/month/horse
 - (1 lb. manure:0.3 lbs. wood shavings if horse is stalled)
- 1500 lbs. manure + 450 lbs. shavings = **1950 lbs. total/horse/month**
 - 2000 lbs. = 1 ton x 12 months = 24,000 lbs. or 12 tons manure/year

https://www.canr.msu.edu/news/managing_horse_manure

Bedding

- Insulates against frozen ground (12" deep)
- Keeps animal clean
- Common materials in ND
 - Straw (wheat, oat, barley, flax)
 - Wood (chips, shavings, saw dust, pellets)
 - Other (peat moss, newspaper shreds, corn stalk shreds, dried compost, sand)
- Location of use
 - Inside vs. Outside



Managing Manure in the Winter for the Spring

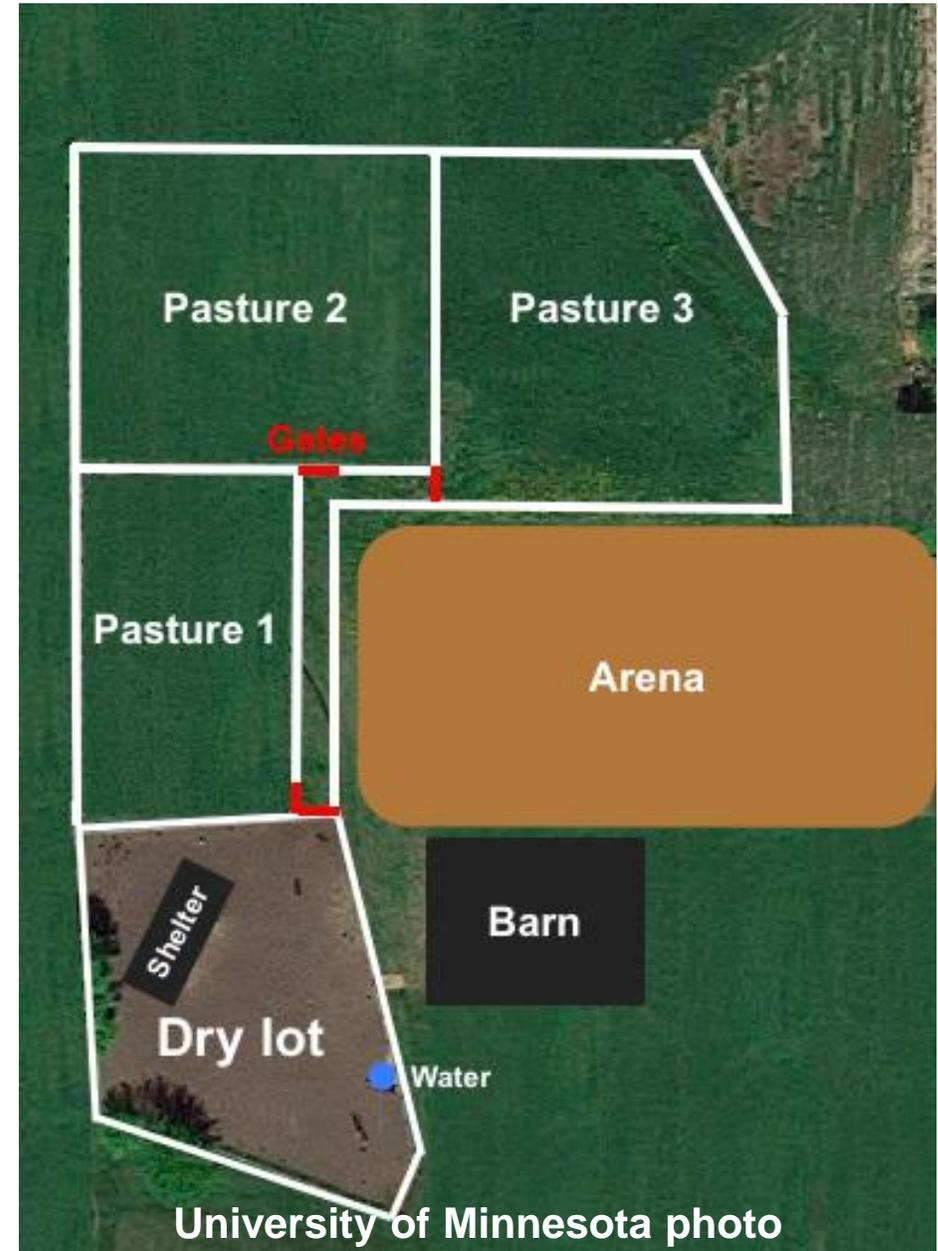
- **Assess** where manure is currently being stored and if it needs to be moved now before the spring thaw and overland flooding.
- **Turn** the snow/bedding pile to keep it heating.
- **Clear** what you can now in your dry lot
- **Plan for next year!**

Manure Snow Piles and Safety



Manure and Snow Management Areas

Where are the manure and snow stacking areas in this plan?



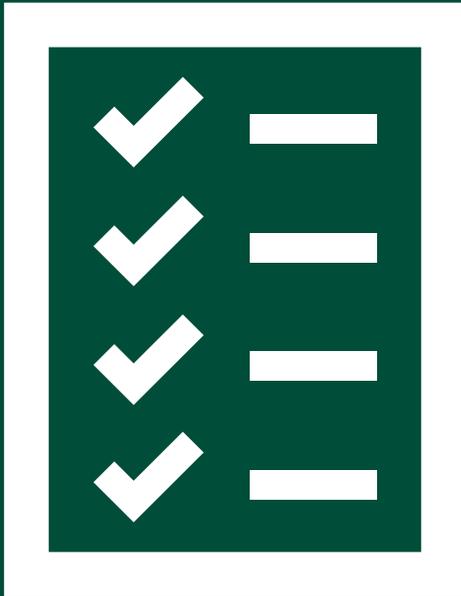
Dry lots, Sacrifice Areas or Exercise Paddocks

The goal of these areas is to **sacrifice a small part** of your grazing/hay land resources to **ensure the majority** of your land has the rest it needs to stay healthy and productive.



- Shelter
- Water
- Feed
- Space

Dry Lot Benefits



- Provides a place during extreme wet or drought
- Give pastures much-needed rest
- Key to a good rotational grazing system
- Provides an outdoor space for horses with metabolic conditions

Managing Mud on Horse Farms

“Create a plan for piling snow to ensure that you can accommodate snowmelt in the spring. Make sure that rainfall, snowfall and melting snow doesn’t drain into manure piles as this can create nutrient runoff.”



University of Minnesota photo

<https://extension.umn.edu/horse-pastures-and-facilities/managing-mud-horse-farms>



It may look like this for a while, but it will get better!

Dry Lot Factors to Consider

- **Location (site selection)**
 - Where will you store manure in relation to surface and groundwater?
- **Soil characteristics and structure**
 - Will the soil type be able to withstand continuous hoof action? Does the site drain water well? Where does water flow after a large rain event?
- **Ease of use**
 - Where is the sacrifice area relative to the water source, food storage and manure storage areas?
- **Space**
 - Does your sacrifice area provide an adequate exercise area?

Barn Manure and Pen Manure



Manure Storage Management Considerations

- Will you compost the manure or will you spread it fresh?
- If you plan to spread the manure, will you do it or will you hire a custom applicator?
- If hiring a custom applicator, do you have the land to spread the manure on and is your manure storage area large enough for the applicator's equipment?
- Where is the manure storage area relative to the dry lot?
- If you think long term, how will you manage the manure storage area?

ND Custom Manure Hauler Equipment Examples



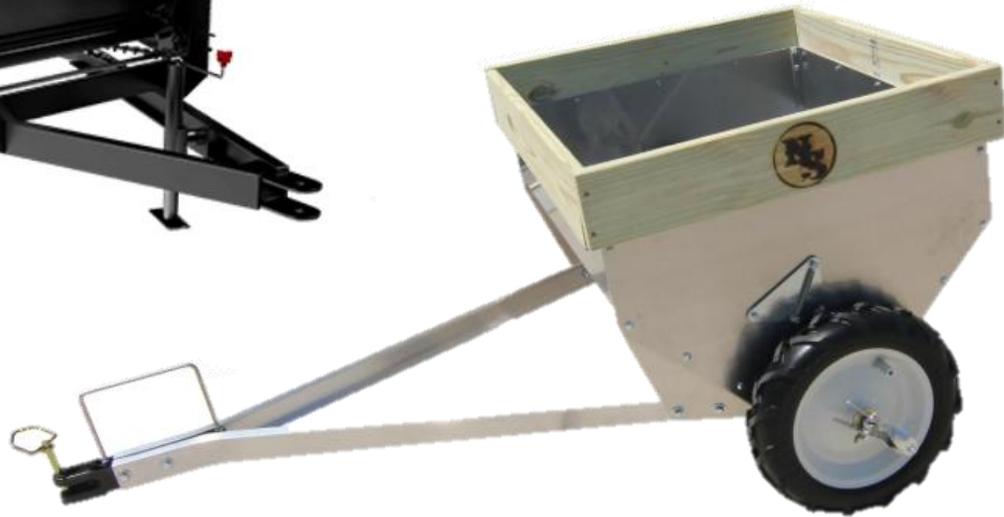


At-home Spreading Options

- Small, pull type, ground driven spreader
- Pulled by ATV, lawn mower, horse
- Examples:
 - ABI Classic Spreader
 - Loyal Manure Spreader
 - Newer Spreader 225

head
ground capacity
vehicle
spreading
variable
shredding

At-home Spreader Examples



Landfills

- Most will take livestock manure
- List of active landfills in North Dakota
 - <https://deq.nd.gov/foia/SolidWaste/ActiveSWLandfills.aspx>
 - Call first!!!

Benefits of Composting Manure



↓ Nutrient Loss
↑ Nutrient Stability

Composting

NDSU Extension YouTube
Playlist for *2020 Online Manure
Composting Workshop*

<https://www.youtube.com/playlist?list=PLnn8HanJ32l6uhwdS9m-G1z8Bq1U0aJzF>

13 videos + producer interaction

1		Welcome to the UMN-NDSU Online Manure Composting Workshop U of M Manure Management
2		Basics of Composting U of M Manure Management
3		Manure Compost Site Selection U of M Manure Management
4		Turning Compost Rows and Piles U of M Manure Management
5		Calibrating a Solid Manure Spreader U of M Manure Management
6		Sampling Compost for Analysis U of M Manure Management
7		Understanding your compost nutrient analysis U of M Manure Management

Using Manure

- No restrictions in ND as far as when to spread.
 - Manure can be land applied during frozen conditions provided it is applied on land where runoff is contained and does not drain off during spring runoff.
 - Consider land with slopes of less than 6 percent, where there is stubble or vegetative cover and less than 8 inches of snow on the ground surface.
- Use common sense:
 - Don't spread before, during, or after a large rain event
 - Don't spread where water quality will be compromised

Manure Management – Your Turn!

- Manure management
- Manure removal during extreme conditions
- Removing snow from pens
- Let's chat!
 - Type in ideas



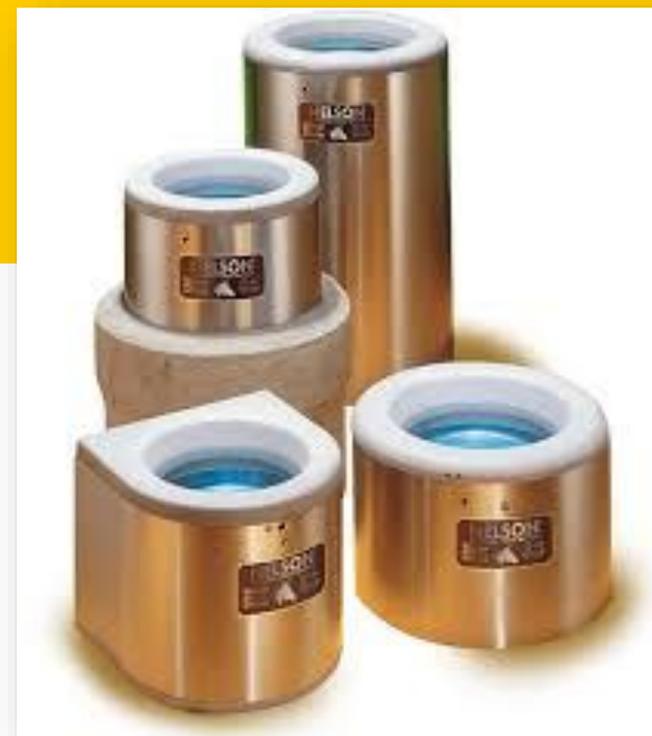
Other Winter Considerations

Winter Fence Maintenance



Waterers

- Check daily
- Heat tape
- Tank Heater
- Protected from prevailing winds



<https://www.nelsonmfg.com/>



Windbreak Variations



Preparing for Winter Storms

- Make sure there is enough forage available
- Safe path to the barn if you need to feed
- Have a generator available with 3 days of fuel to run:
 - Heating systems
 - Water pumps or waterers
 - Lighting
 - Snacks

Approved Mortality Disposal Methods for ND

- Rendering
- Incineration
- Burial
- Composting
- Landfilling
- Burning in special situations
 - Anthrax-infected carcasses
 - Hog cholera
 - Swine erysipelas

The law states that animals that die for any reason must be disposed of in an approved method within 36 hours of death.



University of Minnesota photo

Planning for Equine Mortalities

- Do you have a disposal plan?
- Call 811 before you dig.

Review

- Manure contains valuable nutrients plants can use. If the nutrients are not used, they become pollutants and are wasted.
- What is your manure management plan?
- Composting reduces weed seeds, pathogens, parasites and volume.
- The goal of managing snow and manure in the winter months is to help with water management and nutrient management in the spring.
- Use common sense when spreading to avoid odor and pollution issues.

Contact Us!

- **NDSU Livestock Environmental Mgmt. Spec.**
 - Mary Keena, Carrington Research Extension Center
 - 701-652-2951, mary.keena@ndsu.edu
- **Livestock and Poultry Environmental Learning Community**
 - <https://lpehc.org/>
- **NDSU County Extension Offices**
 - <https://www.ndsu.edu/agriculture/ag-home/directory>



Resources

- **NDSU Extension Horse Management Webinars**
 - https://www.youtube.com/playlist?list=PLnn8HanJ32l50bB2GgeW-QH_7rCMQLo38
- **Horse Facilities Handbook**
 - <https://www.mwps.iastate.edu/catalog/livestock-categories/equine-horse-operations/horse-facilities-handbook>
- **Fencing**
 - [Basics of Effective Horse Fencing | Extension Horses](#)
 - [Horse fencing considerations](#)
- **NDSU Extension Manure Spreader Calibration**
 - <https://www.ag.ndsu.edu/publications/livestock/manure-spreader-calibration-for-nutrient-management-planning>

Resources cont.

- **Horse dry lots and shelters – UMN**
 - <https://extension.umn.edu/horse-pastures-and-facilities/horse-dry-lots-and-shelters>
- **Extension.org, dry lots**
 - <https://horses.extension.org/drylots-for-horses/>
- **Managing Manure on Horse Farms: Exercise or Sacrifice Lots for Horses**
 - <https://njaes.rutgers.edu/fs1190/>
- **Horse Mortality Composting – University of Minnesota**
 - <https://extension.umn.edu/preparing-livestock-emergencies/horse-carcass-compost-pile>
- **NDSU Extension Composting Animal Manures**
 - <https://www.ag.ndsu.edu/publications/livestock/composting-animal-manures-a-guide-to-the-process-and-management-of-animal-manure-compost>

Thank You!