



Manure Applicator's Workbook



Extension
UNIVERSITY OF WISCONSIN-MADISON

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Quick fact! The \$ Value of Dairy Manure

Using current fertilizer values of:

Urea	\$340/ton
DAP	\$467/ton
Potash	\$312/ton

1,000 gallons of dairy manure using book values for the [NPM Program's Fast Facts publication](#) would replace \$11 of commercial fertilizer. Multiply \$11 times the application rate that is the fertilizer value of manure (8,000 gallons per acre x \$11 = \$88 of nutrients per acre). Solid manure would replace commercial fertilizer at a rate \$4/ton of manure applied (20 ton x \$4 = \$80 of nutrients per acre).

There are added benefits to the soil when manure is applied to cropland: secondary nutrients, micronutrients and organic material!

Tips for Taking Manure Samples

Manure nutrients can vary significantly throughout a storage system: *Proper agitation can greatly reduce nutrient variability.*

Composite sampling is recommended for each emptying session: *Minimum of 10 sub samples is recommended to make a composite sample.*

A composite sample should be taken for each emptying event — this could be a day or a few days, or when the practices (and therefore the manure characteristics) change significantly. Samples should be kept cool/on ice to reduce nitrogen loss.



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Manure Applicators Workbook 2021

University of Wisconsin-Madison, Extension Nutrient Management Team Manure Application Subcommittee:

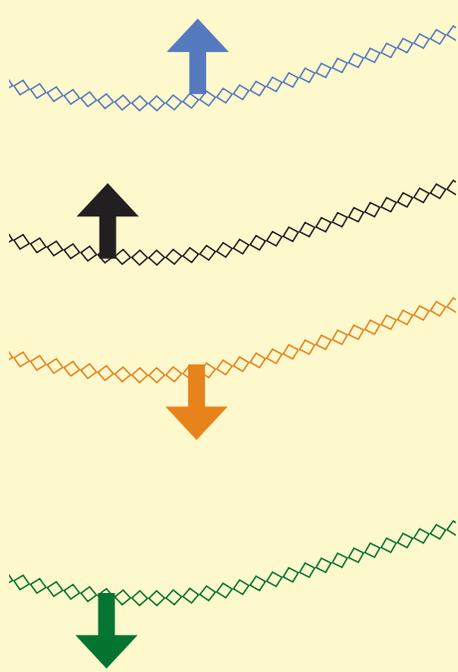
Mimi Broeske, Jerry Clark, Kevin Erb, Richard Halopka, Josh Kamps, George Koepf, Amber O'Brien and Cheryl Skjolaas

This publication is available for download from the Nutrient and Pest Management (NPM) Program. web (ipcm.wisc.edu)

Understanding Manure Gases

The four main gases produced with the decomposition of manure are **hydrogen sulfide**, **ammonia**, **carbon dioxide** and **methane**. The primary hazards of these gases are toxicity, asphyxiation and potential for explosion.

The most serious problems with manure gases occur when manure is agitated or when ventilation systems are inadequate or fail. However, gases are constantly being produced and there is never a 'safe' time to enter manure storage facilities or other confined spaces, such as tanks, within a manure handling system.



MANURE GASES

Methane is odorless, lighter than air, flammable and exposure may result in headaches/dizziness.

Ammonia is lighter than air, has a sharp pungent odor and causes eye/respiratory irritation.

Hydrogen Sulfide is heavier than air, extremely toxic and may cause death in seconds, has a rotten egg odor but cannot be smelled at high concentrations.

Carbon Dioxide is odorless, heavier than air and exposure may result in headaches/dizziness.

Factors that increase gas production: (especially **hydrogen sulfide**)

- ▶ Manure temperature increases
- ▶ Manure pH decreases
- ▶ High sulfur content in manure due to high sulfur diets
- ▶ Silage runoff
- ▶ Spoiled feed
- ▶ Bedding additives (such as gypsum)

1. The most serious problems with manure gases occur when manure is _____ or when _____ systems are inadequate or _____.

2. Which manure gas is extremely toxic? _____

Working in Confined Spaces

Follow your company's and OSHA's plan for confined space procedures. If the plan's procedures indicate **no entry, that means NO ENTRY. Thinking that an action will only take a second, may take a life.**

If your procedures allow for entry, and entry is required, take the following precautions prior to entering a confined space:

1. Ventilate the space
2. Use a retrieval system that includes a safety harness, tripod, and winch. Have adequate personnel available.
3. Utilize the buddy system with safety attendant
4. Measure hazardous gases using a gas monitor

The only accurate measure of gas levels is an appropriate gas monitor. When working with manure systems and working in confined spaces, a multi-gas monitor is recommended.



An example of a portable multi-gas monitor that can simultaneously measure up to four gases.

If at any time an employee of your company or the host farm loses consciousness in a confined space,

DO NOT ENTER AND ATTEMPT RESCUE.

IMMEDIATELY proceed to follow your emergency response procedures with a call to 911.

Factors that **INCREASE RISK** by decreasing gas dispersion from manure storage areas:

- ▶ Wind conditions are still
- ▶ Temperature inversions exist
- ▶ Impermeable covers are used
- ▶ A heavy crust has formed

During normal atmospheric conditions, the air temperature is warmest near the soil surface and cooler at higher altitudes (30-100 feet above the ground). Cooler air is denser than warmer air, so air is constantly moving vertically during normal conditions. During a temperature inversion, the air temperature near the soil surface is cooler than the air above, preventing vertical air movement. Temperature inversions are common during the summer, and typically start in the evening and may last until the next morning. Signs of temperature inversion include low wind speed (< 3 mph), dust or smoke hanging in the air and slowly moving horizontally, and presence of haze in low areas.

3. What is an approved method/device to determine the risk of hazardous gases being present in a confined space or near a manure pit?

4. List three safety precautions that can be taken prior to entering a confined space:

Manure Agitation

Best Safety Practices

- ▶ Boat operators are properly trained on equipment and safety hazards
- ▶ Use gas monitoring devices in proper working condition – calibrated and bumped tested
- ▶ Use wind socks/flags to note wind direction/speed
- ▶ Operate equipment at low speed around storage basin
- ▶ Prevent erosion/damage to storage basin
 - Use designated ramps/locations
- ▶ Develop/share an emergency response plan with all involved



Safe Manure Agitation Boat Operations

- ▶ Check boat maintenance and flotation tanks on boat before placing in storage basin
- ▶ Be aware of nozzle direction
- ▶ Constant movement of the boat is necessary for safe and effective use
- ▶ Agitate entire surface area, focusing on high solid concentration areas
- ▶ While in the pit, keep a safe distance between the boat and pump
- ▶ Use safe transportation in storage basin to fix the boat
 - Multiple people should be present
 - Consider this a confined space as gas levels (especially **hydrogen sulfide**) may be high

BEFORE agitation:

- ▶ Be aware of surroundings around storage basin
 - Animals, people, hazards
- ▶ Routine maintenance check: oil, grease, fuel, etc.
- ▶ Open/close correct valves/caps on pump
- ▶ Place tractor and agitator pump upwind to reduce exposure to released manure gases
- ▶ Use blocks, chains, or cables on pump tractor next to storage basin

BEGINNING agitation:

There is a higher probability of dangerous gasses being released when the manure crust is broken. Agitation rapidly increases dangerous gas release especially when breaking crust and beginning agitation.

- ▶ Double check that there is no damage to equipment and safety devices are in place
- ▶ Check surroundings before turning on PTO
- ▶ Slowly lower pump into storage while beginning agitation
- ▶ Agitate area surrounding pump before pumping manure out of storage basin

DURING agitation:

If weather conditions favor a temperature inversion, trapped manure gasses can be lethal.

- ▶ Be aware of the pump nozzle direction
- ▶ Don't aim pump nozzle into air; it releases gases into air
- ▶ Do not stand on boat while agitating
- ▶ Focus agitation on solid areas in the storage basin, but do not leave boat agitating in one spot for extended periods of time
- ▶ If possible, move agitation pump around the storage basin throughout the day

5. **Circle one:** Place tractor DOWNWIND or UPWIND to prevent gas exposure to pit worker when agitating.
6. Agitation boats can potentially ruin the storage basin if left agitating in the same spot for an extended period of time. True False

Pump and Pressure Safety

Each year, billions of gallons of liquid manure are pumped through miles of hose. To achieve efficient rates of gallons per minute, high horsepower motors are needed to push manure out to applicator tractors in the fields from storage pits or transfer tanks. This creates dangerous air and fluid pressure levels in pumps and hoses, which could potentially lead to serious injuries, or even death, if proper safety protocols are not followed.

General Safety Tips

- ▶ Proper Employee Training – Safety and Equipment Operation
- ▶ Provide proper maintenance to equipment (oil checks, grease, etc.)
- ▶ Efficient communication system (e.g. mobile radio system)

On the Pump

- ▶ Use heavy duty safety chains on caps/covers on pumps
- ▶ Pressure relief valves in chambers with high air pressure
- ▶ Correct size and type of pins/clips/bolts in locations
 - ▶ Insert clips in a direction that they don't have the potential to unclip or fall out
- ▶ Be sure caps/covers move freely before disconnecting
 - ▶ Chamber may be holding a dangerous level of air or fluid pressure
- ▶ Do not connect the air compressor hose until ready to clean out the line
 - ▶ Vibrations from the motor could loosen the connection
- ▶ Slowly turn manual valve levers



Pressure Protocol

- ▶ Know your valve/lever/computer control system; **these controls will be different depending on manufacturer and model; not all pumps have the same design**
- ▶ Monitor pressure levels closely
- ▶ Losing pressure while the pump is running safely - check hose for leaks
- ▶ Gaining pressure while the pump is running - check valves and pumps
- ▶ Start at lower PSI when first sending manure through the hose

Checking the Hose

- ▶ Check regularly for leaks; hose couplers and draglines have higher risk for leaks
- ▶ Keep a safe distance from the hose when pressurized (fluid or air pressure)
- ▶ Keep a safe distance from the area where the pig completes hose clean out
- ▶ After blow out is complete, step on the hose to check air pressure before disconnecting
- ▶ Keep non-essential personnel or the general public away from your operation

7. After the pig has cleaned out the hose, what should you do to the hose before disconnecting it from a pump? _____

8. All pumps and application set-ups have the same pressure protocols. True False

Following the 4Rs of Nutrient Management

4Rs

Manure applications should follow the 4Rs of nutrient management in order to apply the correct amount of nutrients in the most environmentally friendly way. In addition, applicators need to follow the guidelines for the farm's 590 NM Plan and/or the NR 243 CAFO permit and plan. Two valuable documents for nutrient applicators are the Farm's Nutrient Management Plan and Spreading Restriction Maps.



Right Source. Manure, urea, ammonium sulfate, ammonium nitrate, anhydrous ammonia, potash, lime or other nutrient sources are used to meet the crop needs.



Right Place. This includes the right fields and then as surface, incorporated or injected applications. Field maps help applicators apply the manure in the Right Place. Manure needs to be placed so plant roots can reach the nutrients and that nutrients do not run off fields or leach into groundwater. Also, identify areas where manure applications are:

Prohibited — manure cannot be applied at any time, areas include

Restricted — manure can be applied under specific conditions



Right Rate. Application rate is indicated as gallons per acre for liquid manure or tons per acre for solid manure. In order to apply at the right rate, equipment must be first properly calibrated.

To adjust the rates, an operator may:

- ▶ Drive slower to increase the rate
- ▶ Drive faster to decrease the rate
- ▶ Increase or decrease pump pressure
- ▶ Vary the opening on valves and ports

- ▶ Concentrated flow channels
- ▶ Surface waters
- ▶ Saturated soils
- ▶ Areas of active snow melt
- ▶ Where vegetation is never removed
- ▶ Direct conduits to groundwater
- ▶ Tile inlets
- ▶ Within 8 feet of irrigation wells
- ▶ Within 1000 feet of municipal wells
- ▶ Within 50 feet of private wells



Right Time. When manure can be applied is based on weather, field conditions and time of year. Do not apply manure prior to an expected major rain or runoff event. Check the Runoff Risk Advisory Forecast (see page 16).

- ▶ No winter applications are allowed in Surface Water Quality Management Areas (SWQMAs)
- ▶ In winter, liquid manure application rate is limited to 7,000 Gal/A; can be applied on slopes less than 6%

9. What two pieces of information do applicators need to apply manure correctly on a field?

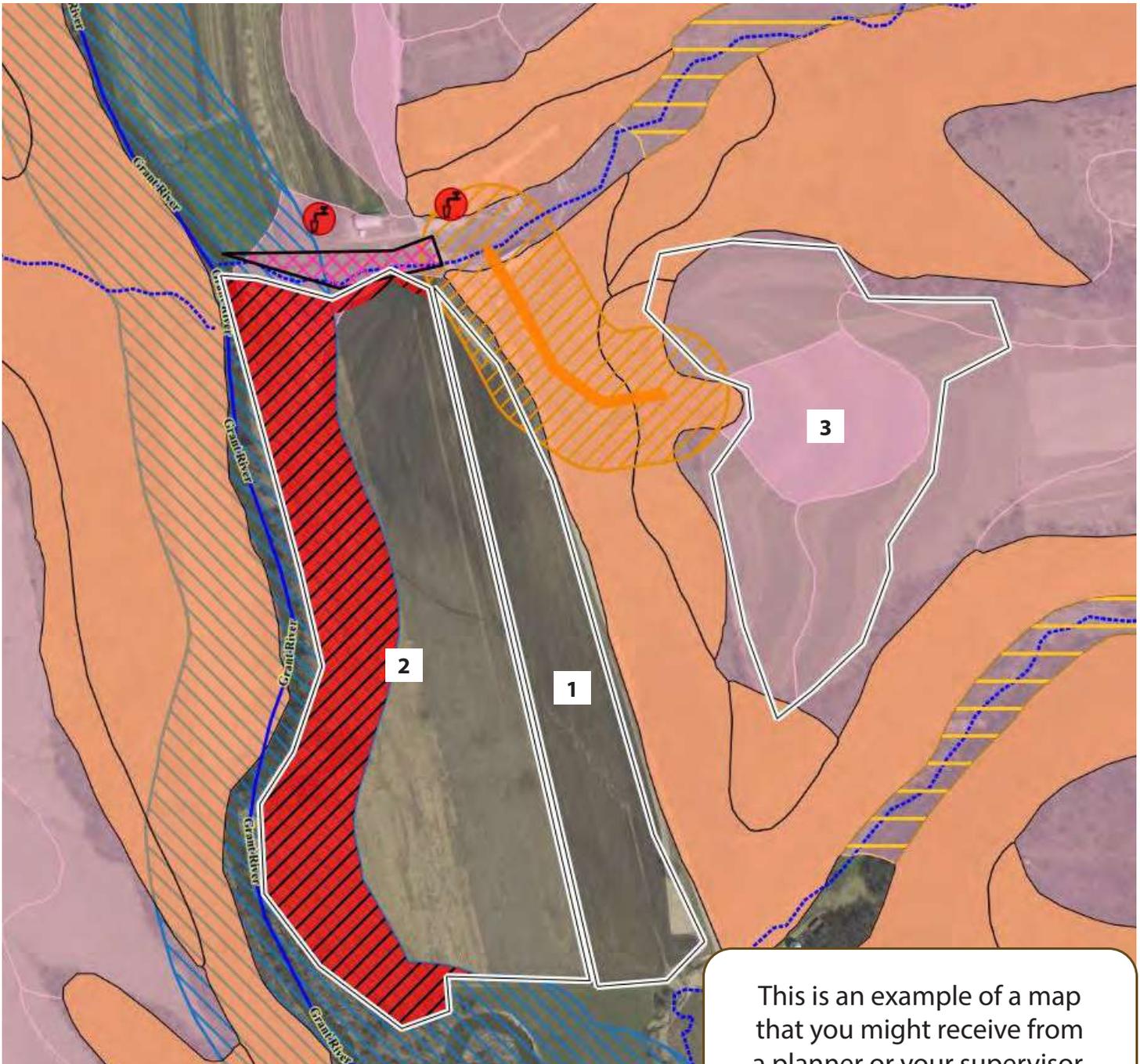
_____ and _____

10. Name three areas where manure can never be applied:

11. List two ways that you can decrease application rate on a calibrated manure applicator:

map 6

Farm: Lancaster, V18 Generated:11/25/2019, Crop year: 2020, Township Range Section:4N 4W s15



This map shows 3 fields: highlighted areas/icons for wells, shallow bedrock, SWQMAs, P soils, winter manure prohibited area, winter restrictions (slope >6%) areas, intermittent streams and perennial streams

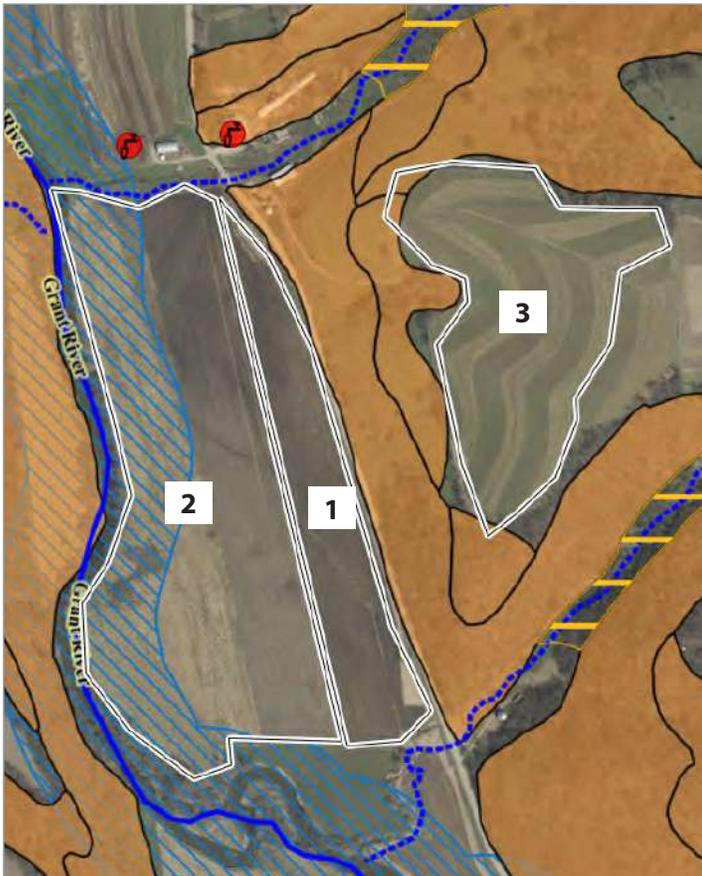
This is an example of a map that you might receive from a planner or your supervisor. The map should have the field boundaries drawn and clearly labeled. A legend of the layers should also be included. Remember if you have any questions about the maps, ***always ask and have the information clarified before you begin application!***

- | | |
|---|---|
| <ul style="list-style-type: none"> Winter restrictions Slope > 6% 590 SWQMA 300FT Bedrock depth <5ft Channelized Flow 200ft Buffer Perennial Streams Intermittent Streams P - High Permeability Winter manure prohibited areas Nutrient prohibited areas (buffers vary by feature) Nutrient prohibited areas (drawn manure prohibited areas) | <ul style="list-style-type: none"> Ditch Gully Not farmed Grass filter area Vegetated buffer Non-metallic mine Water Sinkhole/other karst feature Other Soil samples County Defined Karst Features Fields Drinking Well |
|---|---|

Understanding Manure Spreading Maps from SnapPlus

SnapPlus is the software used in Wisconsin to write nutrient management plans that comply to the Department of Agriculture, Trade and Consumer Protection's (DATCP) rules, NRCS's 590 Nutrient Management Standard, DNR's NR 243 and NR 151 rules. The mapping portion (SnapMaps) generates maps that have layers of information that help planners and applicators visually understand the landscape and where nutrient application can occur. The maps on this and the following page show key layers derived from the complete map on page 8 (note that the map is for a non-permitted farm; CAFOs may have different layers).

Color vision deficiency can also interfere with understanding the information. If you have any questions about the maps, **always ask and have the information clarified**. Maps can also be printed with a single layer of information per map, making the information easier to see. Inform your supervisor or planner ahead of time if you need additional maps.



This map shows 3 fields: highlighted areas/icons for wells, shallow bedrock, SWQMAs, P soils, intermittent and perennial streams

Using the above map, answer the following questions:

12. Which field is in SWQMA? _____
13. What field has **bedrock depth less than 5 ft**? _____
14. Do any of the mapped fields have **P soils**? _____
15. How many wells (**nutrient prohibited areas**) are on the map? _____

► Field boundaries are outlined in white

► Water layers:



Solid blue line: Perennial streams normally has water in its channel at all times; it may or may not be named on the map.



Dotted blue line: Intermittent streams flow only when they receive water from rainfall runoff or from some surface source (such as melting snow).

► Restriction layers:



Blue-lined area: SWQMA (pronounced swik-muh): SWQMA stands for Surface Water Quality Management Area. They require special care in management to avoid surface water contamination because they are adjacent to surface water. Specific conservation practices must be in place for fall, spring and summer manure applications. **No manure applications are allowed in the winter.** The SWQMA for streams and rivers is 300 ft on each side, while that for lakes and ponds extends for 1,000 ft. For CAFOs, there are additional application restrictions for SWQMAs.



Orange solid area: Bedrock depth less than 5 ft

Area where bedrock is within 5 feet of the surface is deemed to have an increased risk of groundwater contamination and has some restrictions on nitrogen applications (restrictions will vary based on compliance rules) in the fall and late summer when no crop is being grown.



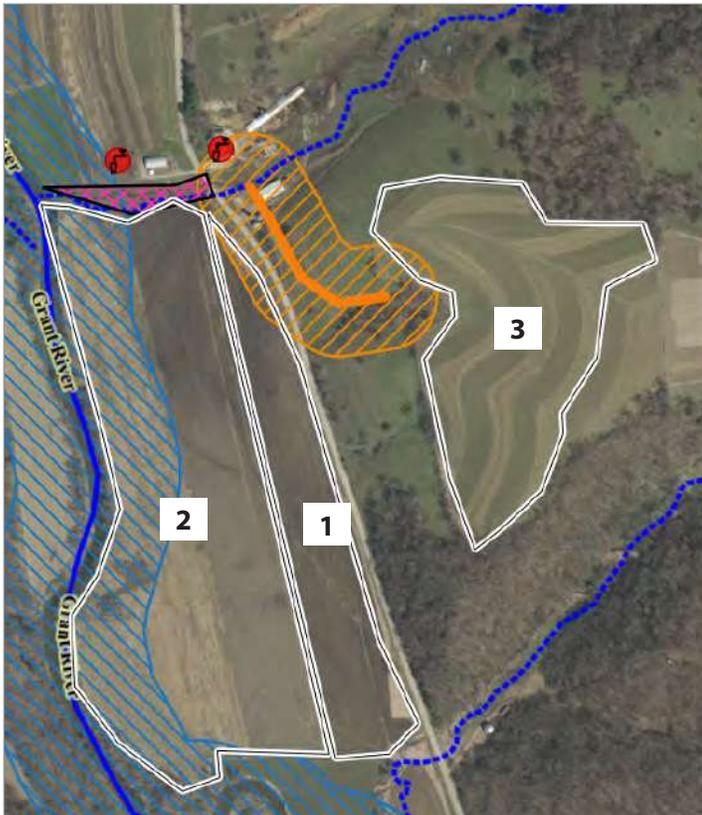
Yellow horizontal line: P soils (high permeability)

have a high risk for allowing contaminants to leach through to groundwater. These soils have restrictions on the rates of fertilizer and manure N applied in the late summer or fall. In addition, P soils require practices to prevent N fertilizer leaching year-round.



Solid red area: Nutrient prohibited area indicates where there is a prohibition on manure applications. These are often buffer areas around direct conduits to groundwater.

The symbols (this one indicates a well) and exact prohibitions for these areas vary by the feature they buffer. In some cases fertilizer is also prohibited. Note if you see an **unmapped prohibited area** (see list page 7), contact your supervisor before applying.



This map shows 3 fields: highlighted areas/icons for wells, SWQMAs, a concentrated flow channel, a channelized flow buffer, an exclusion area, intermittent streams and perennial streams

Using the map on the left, answer the following questions:

 **Colored solid line: Concentrated flow channel**
Flow channels can be drawn with varying widths from 5-100 feet. Areas with concentrated flow channels need special management for winter manure applications to avoid manure runoff.

 **Colored lines: Channelized flow buffer 200 ft** flow only when they receive water from rainfall runoff or from some surface source (such as melting snow).

 **Crosshatched area, multiple colors: Exclusion area**
Field area that is not included in the field acres for nutrient management planning including areas that are not farmed, grass filter areas, vegetated buffers, non-metallic mines, sinkholes, other karst features or waterbodies. These areas do not receive any applications.

16. What field **includes a channelized flow buffer of 200 ft**? _____
17. Areas with concentrated flow channels do not need special management for winter manure applications to avoid manure runoff.
 True False



This map shows 3 fields: highlighted areas/icons for wells, winter manure prohibited area, winter restrictions (slope >6%) areas, SWQMAs, intermittent streams and perennial streams

Using the map on the left, answer the following questions:

 **Pink areas: Winter restrictions slope > 6%** Winter manure applications on fields with slopes greater than 6% require special management to protect against manure runoff. Winter conditions are defined as having frozen or snow-covered soils that prevent effective incorporation at the time of application.

 **Red area/black lines: Winter manure prohibited areas** indicate that manure cannot be spread during winter.

18. Winter is defined by the calendar months of December thru February.
 True False
19. What field has a:
winter manure prohibited area? _____
winter spreading restriction? _____
20. Can manure be applied in winter to the portion of the field that does not have the winter manure prohibited area?
 Yes No

Manure Regulations for CAFOs

A confined animal feeding operation (or CAFO) has 1,000 animal units (AUs) or more (700 mature dairy cows = 1,000 AU). CAFOs are regulated by the Wisconsin Department of Natural Resources (DNR). Under special circumstances, the Wisconsin DNR can designate a smaller farm as a CAFO if they have had a pollutant discharge to surface water or if they contaminate groundwater such as a drinking water well. CAFOs must follow the DATCP rules, DNR NR 243 and NRCS 590 Nutrient Management Standard, including but not limited to:



- ▶ Every load of manure applied must be documented
- ▶ No surface spreading of **liquid** manure February 1st- March 31st
- ▶ No surface spreading of **solid** manure February 1st March 31st **IF** the ground is frozen or there is greater than 1 inch of snow cover
- ▶ No spreading of manure within 100 feet of a private well and 1,000 feet from a community well
- ▶ No manure spreading on soils with a depth to bedrock less than 24 inches or soils with groundwater within 24 inches of the surface
- ▶ CAFO permits are audited annually

IMPORTANT NOTE: CAFOs have additional restrictions when making applications in a SWQMA (including intermittent streams). Each farm selects from multiple strategies for applying manure in a SWQMA, so you must follow the specific instructions and maps for the farm that you are making applications on. As stated on page 9, *CAFOs will have additional map layers and colors for these restrictions.*

There are many other spreading restrictions not listed here, so you must follow the maps and instructions for the specific farm that you are making applications on.

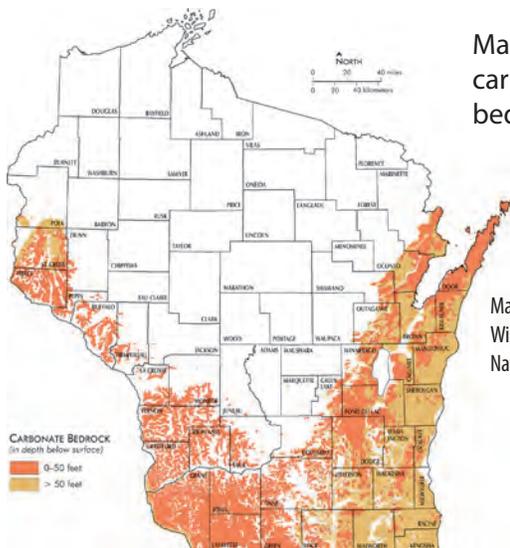
-
21. What Wisconsin agency regulates CAFO farms? _____
 22. May a farm with less than 1,000 AU be permitted like a CAFO? Yes No
 23. Every load of manure spread for a CAFO farm must be documented. True False
 24. When spreading manure for a CAFO farm, how far must you stay away from a private well (Karst areas have increased setbacks, see page 12)? _____ feet
 25. All CAFOs use the same strategy for applying manure in a SWQMA. True False

Shallow Soils, Karst Areas and Groundwater Concerns

In some areas, either the soils or the rock/sand/gravel under the soil quickly allows manure, nutrients and pathogens to contaminate the groundwater wells used by local residents. **Knowing what these are, and the steps to take to avoid the risk, are essential.**

Highly permeable (sandy) soils allow rain, snowmelt and contaminants to move quickly downward. The nutrient management plan may limit rates and the time of year when manure or fertilizer can be applied.

Karst areas are defined as the combination of shallow soils and porous bedrock. Some types (such as the fractured limestone on the eastern side of Wisconsin) are considered very high risk, but the potential for sinkholes and karst-like features exists around the eastern, southern and western parts of Wisconsin. Since thick soils are better at filtering than shallow soils, the risk is highest when there are shallow soils above karst rock.



Map showing carbonate bedrock

Map provided by the Wisconsin Geological and Natural History Survey

What does Karst mean for me?

Because the risk is higher, you need to take special precautions to reduce the risk of contaminating wells.

- ▶ Review the Nutrient Management Plan map to determine if karst areas are mapped
- ▶ Always be on the lookout for karst features when spreading manure
 - ▶ Sinkholes are spots where soil has washed into a crack. Often farmers filled these with rock. In some cases, streams disappear into sinkholes.
 - ▶ Fractures are cracks that allow water to enter the groundwater. In dry seasons, plants tap into the soil in the cracks, and may be able to see the pattern in alfalfa growth.



Bedrock outcrop

photo: Kevin Erb



Sinkhole in road ditch

photo courtesy of Calumet Land Water Conservation



Shallow bedrock

photo: Kevin Erb

Common NR 151 Karst regulations

- ▶ Well setbacks increase to 250 feet for a private well and 1,000 feet of a community/municipal well
- ▶ **Less than 5 feet of soil:** Depth to rock must be verified prior to application on fields
- ▶ **Less than 2 feet of soil:** No manure applications
- ▶ **2-3 feet of soil:** Pre-till and incorporate/injection no deeper than 4 inches (liquid), solid manure rates limited to 15 tons, or manure treatment required
- ▶ **3-5 feet of soil:** Same as 2-3 feet, except injection depth limited to 6 inches

Handling a Manure Spill

When a manure spill happens, **human safety should always be your first concern!**

Call 911 if needed. Then take action and follow these six steps.



26. A spill is (check all that apply):

- a. Any release of manure that has the potential to threaten ground or surface water
- b. Any release of manure greater than 1,000 gallons
- c. Any release of manure that reaches a stream or pond
- d. All of the above

27. You are an employee and are applying manure in a field and a spill occurs; match the correct task to the spill response number.

- | | |
|---------|---|
| 1 _____ | a. Begin the cleanup |
| 2 _____ | b. Call the DNR or appropriate agency |
| 3 _____ | c. Control the spill by turning off the pumps |
| 4 _____ | d. Determine the best way to contain the spill (plow, chisel, berm) |
| 5 _____ | e. Fill out documentation and paperwork |
| 6 _____ | f. Notify your supervisor |

All agricultural or livestock operations, regardless of size, must report manure spills or runoff that may affect Wisconsin's waters to the Department of Natural Resources.

Report manure spills immediately! Call the 24-hour spill emergency hotline: 1-800-943-0003

Spill Response and Public Relations

Consider spill response steps and public relations course of action in the following situations:

28. You are stopped by the state patrol after a complaint that your truck is “very dirty and ruining a Labor Day party” for a family along your route.
How should you respond to this issue?
-



29. Your layline ruptured in the ditch just prior to the field entrance and is continuing to pump manure. The flow of manure in the ditch is heading west towards a well.
How should you respond to this issue?
-



Underground Hazards

Many public utilities are buried underground and can pose a hazard when applying manure, especially when using injection. Communicate with the barn manager where underground utilities are located. Do not rely on farmers and landowners to know where these utilities are located on their land. *Underground hazards are rarely marked on the spreading plan map, so pay attention to any markers or signage near fields.*

Need to locate underground hazards?

In Wisconsin, contact Digger’s Hotline
<http://www.diggershotline.com/>

If out of state, call 811 from that location or go to
<http://www.clickbeforeyoudig.com/>



Consider these hazards:

- ▶ Fiber optic lines
- ▶ Phone lines
- ▶ Natural gas/petroleum pipes
- ▶ Electric service lines
- ▶ Tile inlets/outlets

Watch for overhead electric lines!

Tile drainage lines have been installed in many field across Wisconsin. Pay particular attention to where drainage tile inlets and outlets are located to avoid damaging these systems and monitor them both during and after application for any manure discharge.



Air vents indicate tile drainage in nearby fields

Operating on the Road

Whether you're operating a tractor or driving a truck, there are rules of the road that apply to each type of vehicle. It is important to know the rules related to the vehicle that you are operating as you're responsible if a crash occurs or for a driving violation. Yes, distracted driving rules apply in a tractor! The owner of the vehicle is responsible for the vehicle safety such as inspections, lighting and marking, and brakes. For further information on related laws, see the WI DMV website <https://wisconsin.gov/Pages/dmv/agri-eq-veh/default.aspx>

Every time you pull out onto a road, you're operating on a shared public space. Your first priority is to safely get the work done and that includes avoiding a crash. Having working lights and clean, visible marking should be part of a daily check. When on the road, having lights on at all times is required for wide implements of husbandry (IoH) and a best practice for other vehicles. All motorists are required to provide warning of their intent to turn, meaning use your turn signals. A few key rules of the road for agricultural vehicles are:



General Rules of the Road for All Operators

- ▶ Must yield the right-of-way to an oncoming vehicle and yield half the roadway
- ▶ May not drive on the left side of the roadway on a grade or curve or area designated as no passing zone if it creates a hazard to oncoming traffic
- ▶ May not drive so slowly as to impede the normal movement of traffic
- ▶ Must (if practical) yield the roadway to an overtaking vehicle

In addition, for Wide IoH with required lighting and marking requirements may:

- ▶ Extend over the center of road into the lane intended for travel in opposite direction
- ▶ Extend into passing lane on a 3-lane highway
- ▶ Extend into another lane intended for travel in the same direction, if it does not impede other vehicles from the rear

For more detailed descriptions of vehicle lighting and marking requirements, as well as more information about road safety.

<https://fyi.extension.wisc.edu/ioh/>

Agricultural Vehicles on the Road
UW Center for Agricultural Safety and Health

30. When on the road, lights must be clean and turned on **only** after dark. True False

Making Healthy Choices at Work

Healthy Practices to Prevent Fatigue and Obesity

(National Institute for Occupational Safety and Health)

- ▶ Seven hours of sleep at night
- ▶ Drink water
- ▶ Increase physical activity
- ▶ Increase intake of omega-3 fatty acids
- ▶ Eat a well-balanced diet
- ▶ Eat smaller meals more often during the day to help steady blood sugar levels

Before bed, avoid:

- ▶ Heavy or spicy meals
- ▶ Liquids, especially alcohol or caffeine
- ▶ Nicotine and other stimulants
- ▶ Light exposure from television and electronics

Key Guidelines for Truck and Tractor Drivers

(Department of Health and Human Services)

- ▶ Move more and sit less throughout the day
- ▶ Some physical activity is better than none!
 - Step out of the truck between loads to inspect semi and tanker (check tires, lights, etc.)
 - Walk around when you are not driving (shutdowns, field switching, breakdowns)
- ▶ Physical activity has immediate health benefits like reducing anxiety and blood pressure, or improving the quality of sleep and insulin sensitivity
- ▶ More physical activity = more health benefits
- ▶ Exercise before or after work

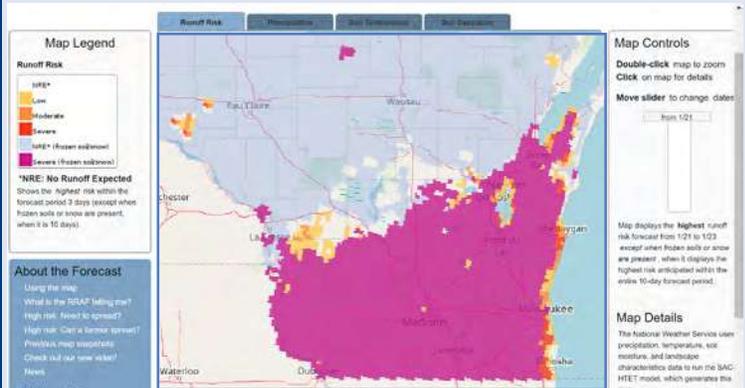
Hacking Your Snacks

(USDA Choose My Plate)

- ▶ **Build your own:** Make your own trail mix
- ▶ **Prep ahead:** Portion snack foods into baggies or containers
- ▶ **Make it a combo:** Combine food groups
- ▶ **Eat vibrant veggies:** Spice up raw vegetables with dips
- ▶ **Snack on the go:** Bring ready-to-eat snacks when you're out

Picking Your Favorite Snack		DOES IT COST MORE TO DRINK HEALTHY?	
			
\$2.29	\$2.49	\$1.39	\$4.59
CHOOSE THIS ↑	OVER THIS ↑		
<ul style="list-style-type: none"> ✓ Increases Energy ✓ Nutritional Value ✓ Satisfies Appetite 	<ul style="list-style-type: none"> ✓ Increases Fatigue ✓ Minimal Nutritional Value ✓ Non-filling 		
		16 fl. oz. Chocolate Milk	vs. 16 fl. oz. Red Bull

The Runoff Risk Advisory Forecast



www.manureadvisorysystem.wi.gov

The Wisconsin Manure Management Advisory System is a set of maps to help farmers and others who apply nutrients to identify suitable cropland areas for spreading. There are several maps available, but the Runoff Risk Advisory Forecast map or RRAF is a key “on the ground” tool that you should learn to consult when conditions are questionable.

The runoff forecast provides maps showing short-term runoff risk for daily application planning, taking into account factors including soil moisture, weather forecast, crop cover, snow cover and slope. It is updated three times daily by the National Weather Service. The data is based on a system using four-kilometer grids (1.25 square mile), allowing users to look at conditions at a very local level.

The RRAF is not a regulatory tool but rather a tool to assist in assessing the risk of nutrient application runoff.

The map displays the runoff risk not just for the current day, but 72 hours into the future based on precipitation model forecasts. In the winter, the model looks out up to 10 days using the temperature forecast to predict snowmelt. This ‘look ahead’ allows better planning of manure and other nutrient applications. A few things to keep in mind:

- ▶ Assess the risk for the actual field before an application
- ▶ Even low risk fields may not be dry enough to spread
- ▶ Risk increases with soil moisture
- ▶ Some fields are always higher risk areas