

MODEL

NUTRIENT MANAGEMENT PLAN

2024

FOR AGRONOMIC CROP PRODUCTION
AND ANIMAL PRODUCTION

NUTRIENT MANAGEMENT PLAN

for

Don Showfelder – Showfelder Farms
12005 Homewood Rd
Ellicott City, MD 21042

BRIEF DESCRIPTION OF OPERATION: Don Showfelder owns and operates Showfelder Farms, a beef cow/calf (30 cow/calf pairs) and crop operation that grows grain, silage, hay, pasture and vegetable crops. This plan includes 133.8 acres in production in Howard county.

DATE OF PLAN: December 20, 2023

DURATION OF PLAN: March 1, 2024 to February 28, 2025.

SOIL SAMPLING AND TESTING: Soil samples were collected by Mr. Showfelder in December 2023 and analyzed at Spectrum Analytical Lab. New samples will be required for the 2027 growing season and plan update.

MANURE SAMPLING AND TESTING: A sample of stored beef manure was taken by Mr. Showfelder in December 2023 and analyzed at Waters Agricultural Laboratory.

MANURE MANAGEMENT: The cow/calf operation consists of 30 cow/calf pairs. The beef cows calve in March and calves are sold the following November. Cows and calves are maintained on pasture 24/7 during the summer months (Apr-Oct). After the calves are sold, cows are confined in the barn until the following spring (Nov-Mar). Manure and straw bedding is collected and stored in the barn during the winter months and is spread prior to corn planting the following spring. All collected manure is applied on farm fields. Manure application recommendations in this plan cover 27.5 acres.

Regulations that became effective in December 2016 require the incorporation of manure under many cropping situations. Mr. Showfelder is aware of this requirement and utilizes tillage equipment to incorporate manure within 48 hours of spreading.

BASIS OF RECOMMENDATIONS: Nutrient recommendations are both nitrogen & phosphorus based, as required by State of Maryland regulations.

UM-PHOSPHORUS MANAGEMENT TOOL (UM-PMT): The farms/fields in the table below had soil test phosphorus (expressed as FIV-P) of 150 or above. PMT determinations were conducted for fields on which P-bearing materials will be applied and results of the PMT are listed as the P Loss Rating.

Farm	Field with FIV≥150	PMT done?	P Loss Rating	Application Rate Used in Calculation; Explanation/Restriction
Home Farm	7	No	N/A	No phosphorus to be applied to this field.
Home Farm	8	Yes	MED	Operator may apply up to 10 tons/acre of beef manure. This phosphorus application rate is below the expected amount removed by the crop rotation immediately following application (corn grain followed by triticale silage).

SOURCE OF YIELD GOAL INFORMATION: Yield goals for grain, silage, hay, and vegetable crops are based records as indicated by the operator. Pasture yields are based on Web Soil Survey estimates.

NUTRIENT APPLICATION EQUIPMENT CALIBRATION: Application equipment must be calibrated to estimate actual application rates for all nutrient applications. Equipment must be recalibrated when equipment settings, ground speed, consistency or density of a product varies from the original calibration. Documentation of the calibrations must be recorded and made available during an implementation review conducted by MDA. This documentation must include any of the necessary calculations to attain the nutrient rate that was determined.

TIMING: Guidance on the timing of fertilizer applications is included on the recommendations sheet(s). Also note that nutrient application is prohibited when the soil is saturated, when the ground is covered with snow greater than one inch, or when the ground is hard-frozen greater than two inches. Additional information of a general nature is included in the “NUTRIENT APPLICATION REQUIREMENTS” and “GENERAL PRINCIPLES OF NUTRIENT MANAGEMENT” sections of this plan.

BEST MANAGEMENT PRACTICES: Operator has a Soil Conservation Water Quality Plan and is implementing it as time and resources allow.

CUSTOM APPLICATION OF NUTRIENTS: If any nutrient sources are custom-applied, it is imperative that the farmer/operator inform the custom applicator(s) of the recommendations contained in this plan as well as any setbacks that are required. The farmer/operator is solely responsible for ensuring that the nutrient recommendations and setback requirements contained in this plan are followed by all hired contractors and employees.

RECORD KEEPING REQUIREMENTS: The Water Quality Improvement Act requires that producers keep records on fertilizer and manure usage. Consult the model form and directions included in the record keeping section of this plan for the type of information required.

Farm Identification Summary

Farm Name	Tax Account ID Numbers	Watershed Location Code	Total Cropland and Pasture Acres
Showfelder Farms	1403301702	0102	133.8

Manure Summary Table

Animal Type and Number	Total Manure Generation (tons/yr)	Manure Avail. for Utilization (tons/yr)	Manure Storage Capacity/Conditions	Timing of Application
Beef Cows/Calves (30)	483 tons	177 tons	Covered barn	Spring 2024

Plan Update Requirements

As stated in the cover sheet, this plan was developed for use from
March 1, 2024 to February 28, 2025

The following is a list of situations that will impact whether or not the attached Nutrient Management Plan will need updating **before** the end of the time period for which the plan was developed.

- 1) A change to the **planned crop or cropping rotation**, or introduction of a **new crop** not currently addressed in the existing nutrient management plan.
- 2) A change in **nutrient source or soil test results**.
- 3) A change in **acreage** managed of 10 percent or greater, or 30 acres, whichever is less.
- 4) A change in **animal units** of 10 percent or greater if resultant manure production will require significant management adjustments.

NUTRIENT APPLICATION SETBACKS FROM SURFACE WATER:

(5-19-15)

Setbacks for Nutrient Application are required in the development of nutrient management plans. Application and livestock setback regulations are contained under the Nutrient Application Requirements, Maryland Department of Agriculture 2012, COMAR 15.20.07.02, Maryland Nutrient Management Manual, 1-D1.

A minimum of a 10’ vegetative setback must be in place next to surface water. The chart below indicates if surface water is present that requires a setback on any farm/operation and identifies the fields that are required to have a nutrient application setback. **An application of crop nutrients using a broadcast method either with or without incorporation requires a 35’ setback. A directed spray application or the injection of crop nutrients only requires a 10’ setback.** Excepting perennial forage crops grown for hay and pasture, vegetation in the 10’ setback area may not include plants that would be considered part of the crop grown in the field (i.e. row crops). Pastures and hayfields are subject to a 10’ and/or a 35’ nutrient application setback depending on application methods. Nutrients may not be applied within the 10’ setback.

Livestock on pasture are required to meet the minimum 10’ setback by means of fencing unless a Best Management Practice (BMP) is approved by MDA or a Soil Conservation and Water Quality Plan is developed and implemented that prescribes an alternative to fencing animals 10’ from surface water. Alternative BMP’s may include stream crossings, watering facilities, pasture management, or other practices that are equally protective of water quality. Sacrifice lots for livestock require a 35’ setback from surface water.

If nutrients are custom applied, it is the operator’s responsibility to inform the applicator of the setback distance based on the method of application.

Farm Name(s)	Is Surface Water Present on the farm that requires a setback (Yes or No)	Field(s) requiring a Nutrient Application Setback*	Nutrient Application Setback Required (Indicate with “Yes” in appropriate column(s).)		
			Livestock on Pasture ≥ 10 ft.	Directed Application** ≥ 10 ft.	Broadcast Application or Sacrifice Lots*** ≥ 35 ft.
Showfelder Farms	Yes	3	No	Yes	Yes

***If a field contains multiple sources of surface water (i.e. a pond and a stream), list each separately or identify on the map.**

****Directed Application** = Directed Spray Application (Vertical Fan or Drop Nozzle), Air Flow Application, Knifed/Injected application of Nutrients, Planter Applied nutrients

*****Broadcast Application or Sacrifice Lots** = Spinner Spreaders (Manure or Fertilizer), High Volume Horizontal Nozzles, Manure Spreaders (Box type with beaters, Splasher plates for liquid, Side Discharge V-Type)




Maryland Department of Agriculture
Maryland Agricultural Cost-Share Program (MACS)

CURRENT NUTRIENT MANAGEMENT PLAN CERTIFICATION

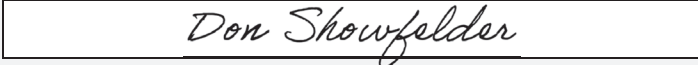
Participants of MACS cost-share programs must certify that the agricultural operation associated with the cost-share practice(s) is following a *current* Nutrient Management Plan (NMP), to the extent required by COMAR 15.20.07. This form must be submitted to the local Soil Conservation District (SCD) office *when applying* to the MACS Program.

The SCD shall include a copy of this form with any MACS cost-share application. Applications received without this form, or with a form that is missing information, will be considered incomplete. Exception: This form may be submitted at the claim stage for Manure Transport and Manure Injection projects.

Section I. To be filled out by the Certified Nutrient Management Plan Preparer

Farm Operator Name(s)	Don Showfelder			
Farm Name (if applicable)	Showfelder Farm			
Address	12005 Homewood Rd			
	Number		Street	
	Ellicott City	MD	21042	Howard
	City	State	ZIP	County
Plan Preparer Name	Don Showfelder			
Certification No.	xxxx	License No. (if applicable)	xxxx	
Date the NMP was prepared or updated	12/20/2023	Total Acres Under Plan	133.8	
Period the plan covers:	Begin Date	3/1/2024	End Date	2/28/2025
I certify that the NMP information for the farm operation listed above is true and correct. I understand that if this information has been falsified, my certification and/or license may be revoked.				
Signature	 Certified NM Consultant or Certified Farm Operator		12/20/2023 Date	

Section II. Farm Operator Certification

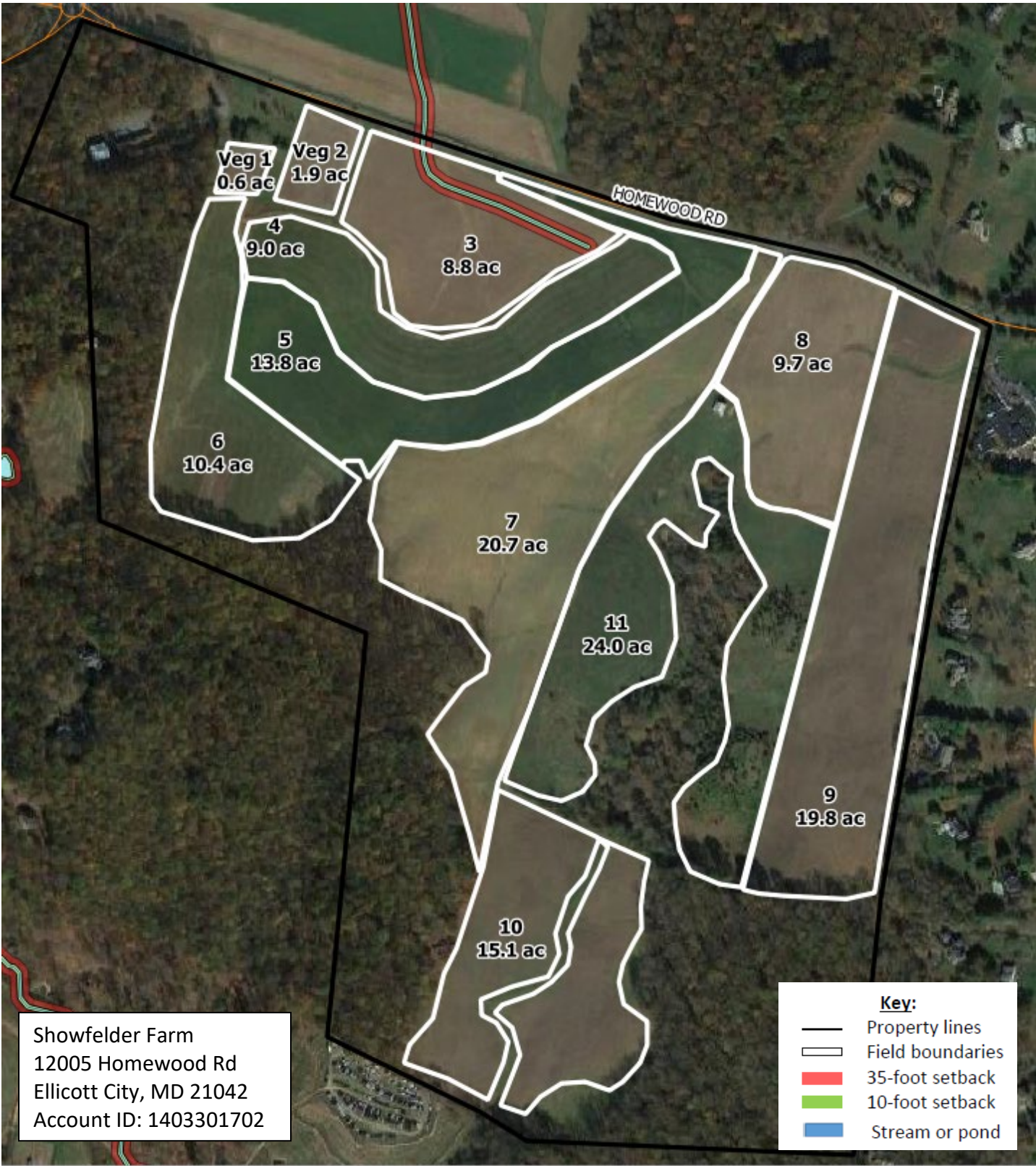
I certify that: (1) my farm is operating under a current nutrient management plan for the time period indicated above and, (2) my nutrient management plan was developed by the plan preparer named above.			
Signature	 Farm Operator		12/20/2023 Date
Print Name	Don Showfelder		

Section III. Landowner Information

(Fill out this section only if the landowner is applying for cost-share and is *not* the agricultural operator of the land)

Landowner Name				
Address				
	Number		Street	
	City	State	ZIP	County

Field Information



Showfelder Farm
12005 Homewood Rd
Ellicott City, MD 21042
Account ID: 1403301702

Key:

- Property lines
- Field boundaries
- 35-foot setback
- 10-foot setback
- Stream or pond

Soil Tests

Soil Analysis Report

Spectrum Analytic Inc.

PO Box 639 – 1087 Jamison Road
Washington C.H., OH 43160

www.spectrumanalytic.com

Report To
Don Showfelder Showfelder Farms 12005 Homewood Rd Ellicott City, MD 21042

Prepared For
Account – 02341 Don Showfelder 12005 Homewood Rd Ellicott City, MD 21042

Sampled	12-7-2023
Received	12-14-2023
Tested	12-15-2023

Sample Number	Lab Number	pH		Organic Matter %	lbs/A - Rating				CEC	Base Saturation			ppm – Rating				Index – Rating	
		Soil pH	Buffer pH		Phosphorus (P)	Potassium (K)	Magnesium (Mg)	Calcium (Ca)		K %	Mg %	Ca %	Sulfur (S)	Boron (B)	Zinc (Zn)	Iron (Fe)	Copper (Cu)	Manganese (Mn)
Veg 1	Y18740	6.1	6.8	1.8	85	192	252	1800	12.6									
Veg 2	Y18741	6.2	6.9	1.9	77	312	205	2100	11.8									
3	Y18742	6.1	7.0	1.7	89	208	226	1752	13.0									
4	Y18743	6.4	7.0	2.0	98	365	286	1845	12.2									
5	Y18744	6.5	7.0	1.9	81	155	210	1240	12.6									
6	Y18745	6.2	6.9	2.1	165	330	252	1795	12.5									
7	Y18746	6.3	7.0	1.9	335	345	245	1828	12.2									
8	Y18747	6.4	7.0	2.0	225	320	220	1840	12.4									
9	Y18748	6.1	6.8	1.6	176	330	224	1860	12.3									
10	Y18749	5.8	6.0	2.2	58	315	221	1300	13.2									
11	Y18750	5.7	6.2	2.8	76	284	160	1250	13.1									

Sample Number	Lab Number	P2 ppm	Na ppm	Na Sat %	Salts Mmhos/cm	NO3 ppm	Texture	Sand %	Silt %	Clay %	

Soil Test Results

Farmer/Operator		Don J Showfelder				Plan Year			2024				
Street Address		12005 Homewood Rd				MDA operator no.			123456789				
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023				
Tract No.	Field No.	Lab	Test Date	Soil Texture	Test Number	pH	O.M	P	K	Mg	Ca	Al	Fe
Showfelder Farm	Veg 1	SP	12/15/23	L	18740	6.10	1.80	85	192	252	1800		
					Conversion to FIV	6.10	1.80	73 (O)	62 (O)	116 (E)	121 (E)		
Showfelder Farm	Veg 2	SP	12/15/23	L	18741	6.20	1.90	77	312	205	2100		
					Conversion to FIV	6.20	1.90	67 (O)	102 (E)	96 (O)	144 (E)		
Showfelder Farm	3	SP	12/15/23	L	18742	6.10	1.70	89	208	226	1752		
					Conversion to FIV	6.10	1.70	76 (O)	68 (O)	105 (E)	118 (E)		
Showfelder Farm	4	SP	12/15/23	L	18743	6.40	2.00	98	365	286	1845		
					Conversion to FIV	6.40	2.00	83 (O)	120 (E)	131 (E)	125 (E)		
Showfelder Farm	5	SP	12/15/23	L	18744	6.50	1.90	81	155	210	1240		
					Conversion to FIV	6.50	1.90	70 (O)	50 (M)	98 (O)	79 (O)		
Showfelder Farm	6	SP	12/15/23	L	18745	6.20	2.10	165	330	252	1795		
					Conversion to FIV	6.20	2.10	134 (E)	108 (E)	116 (E)	121 (E)		
Showfelder Farm	7	SP	12/15/23	L	18746	6.30	1.90	335	345	245	1828		
					Conversion to FIV	6.30	1.90	262 (E)	113 (E)	113 (E)	124 (E)		
Showfelder Farm	8	SP	12/15/23	L	18747	6.40	2.00	225	320	220	1840		
					Conversion to FIV	6.40	2.00	179 (E)	105 (E)	102 (E)	124 (E)		
Showfelder Farm	9	SP	12/15/23	L	18748	6.10	1.60	176	330	224	1860		
					Conversion to FIV	6.10	1.60	142 (E)	108 (E)	104 (E)	126 (E)		



Soil Test Levels (FIVs), Soil Test Category and Yield Response

Soil Test Fertility Index Value (FIV)	Soil Test Category	Likelihood of Yield Response
0-25	low	yield response likely
26-50	medium	yield response possible
51-100	optimum	yield response unlikely
>100	excessive	yield response very unlikely

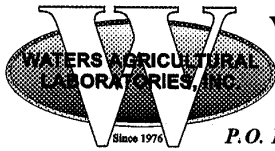
Your soil tests have been converted to the Maryland Fertility Index Value (FIV) scale.

Not all soil testing laboratories use the same extraction methods. There are also a number of ways in which the results can be reported (i.e., pounds per acre or ppm; P or P₂O₅). Converting soil test results from several laboratories to a common scale simplifies the process of making recommendations for agricultural crops grown in Maryland.

For more information about converting soil test results to the FIV scale and the basis for the conversions, please consult Soil Fertility Management 4 (SFM-4), *Converting Among Soil Test Analyses Frequently Used in Maryland*.

07-01-2020

Manure Information



Waters Agricultural Laboratories, Inc.
Manure/Sludge Analysis and Application Report

P.O. Box 382 * 257 Newton Highway * Camilla, Georgia 31731-0382 * phone: (229) 336-7216

Ship To: Don Showfelder 12005 Homewood Rd Ellicott City, MD 21042	Grower: Don Showfelder	
	SampleNumber:92 Lab Number: 5922 Type: Beef	Date Submitted: 12/15/23 Report Date: 12/17/23

	%	Pounds per ton
Nitrogen – Total	0.83	16.6
Nitrogen – Ammonium	0.21	4.2
P ₂ O ₅ – Total	0.35	7.0
K ₂ O – Total	0.87	17.4
Moisture (%)	71.5	

Results Reported On: As received basis

Remarks: Suggest the use of PLANT and SOIL analysis to monitor the need for additional and or build up of some elements.



Waters Agricultural Laboratories, Inc.

Manure/Sludge Analysis and Application Report

*P.O. Box 382 * 257 Newton Highway * Camilla, Georgia 31731-0382 * phone: (229) 336-7216*

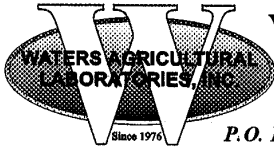
Ship To: Don Showfelder 12005 Homewood Rd Ellicott City, MD 21042	Grower: Don Showfelder <hr/> SampleNumber: 131 Lab Number: 6222 Type: Beef <hr/> Date Submitted: 12/20/2022 Report Date: 12/24/2022
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Applied in
2023 growing
season

	%	Pounds per ton
Nitrogen – Total	0.78	15.6
Nitrogen – Ammonium	0.20	4.0
P ₂ O ₅ – Total	0.41	8.2
K ₂ O – Total	0.72	14.4
Moisture (%)	75.5	

Results Reported On: As received basis

Remarks: Suggest the use of PLANT and SOIL analysis to monitor the need for additional and or build up of some elements.



Waters Agricultural Laboratories, Inc.
Manure/Sludge Analysis and Application Report

P.O. Box 382 * 257 Newton Highway * Camilla, Georgia 31731-0382 * phone: (229) 336-7216

Ship To: Don Showfelder 12005 Homewood Rd Ellicott City, MD 21042	Grower: Don Showfelder	
	SampleNumber: 105 Lab Number: 6022 Type: Beef	Date Submitted: 12/10/21 Report Date: 12/15/21

Applied in
2022 growing
season

	%	Pounds per ton
Nitrogen – Total	0.80	16.0
Nitrogen – Ammonium	0.19	3.8
P ₂ O ₅ – Total	0.38	7.6
K ₂ O – Total	0.77	15.4
Moisture (%)	72.0	

Results Reported On: As received basis

Remarks: Suggest the use of PLANT and SOIL analysis to monitor the need for additional and or build up of some elements.

MANURE QUANTITY ESTIMATION (For Solid Manure)

You can only edit values highlighted in blue

Farm name: Showfelder Farm

Manure Production period:

Starting date: 4/1/2023 Ending date: 3/31/2024

A. Total days in manure production period: 366

Livestock Information

B. Livestock group	1	2	3
	Beef Cows		
C. Average weight (lbs.)	1100		
D. # of animals	30		
E. Animal units (AU) [(C x D)/1000]	33	0	0
F. Full days confined during manure production period	151		
G. Days partially confined during manure production period	0		
H. Hours per day confined	0		
I. Day equivalents partially confined (G * H)/24	0	0	0
J. Total day equivalents confined (F + I)	151	0	0
K. Total day equivalents unconfined on pasture (A - J)	215	366	366
L. Weight of manure/AU/day (lbs.) (see Table 1.)	63		

Bedding Estimation

M. Bedding type (straw, sawdust, etc.)	1	2	3
	straw		
N. Volume of bedding this production period (cu.ft.). (If weight of bedding is known, proceed to P and enter it directly.)			
O. Density of bedding (lbs. per cu.ft.) (see Table 2.)			
P. Weight of bedding (tons) [(N x O)/2000]	20.0	0.0	0.0

Uncollected Manure (Deposited on Pasture)

Q. Weight of manure on pasture (tons) [(E x L x K)/2000]	1	2	3
	223	0	0

Collected Solid Waste (Manure And Bedding)

R. Weight of collected manure (tons) [(E x L x J)/2000]	1	2	3
	157	0	0
S. Weight of collected manure & bedding (tons) (P + R)	177	0	0

Updated: 3-12-10

MANURE QUANTITY ESTIMATION (For Solid Manure)

You can only edit values highlighted in blue

Farm name: Showfelder Farm

Manure Production period:

Starting date: 4/1/2023 Ending date: 10/31/2023

A. Total days in manure production period: 214

Livestock Information

B. Livestock group	1	2	3
	Beef Calves		
C. Average weight (lbs.)	450		
D. # of animals	30		
E. Animal units (AU) [(C x D)/1000]	13.5	0	0
F. Full days confined during manure production period	0		
G. Days partially confined during manure production period	0		
H. Hours per day confined	0		
I. Day equivalents partially confined (G * H)/24	0	0	0
J. Total day equivalents confined (F + I)	0	0	0
K. Total day equivalents unconfined on pasture (A - J)	214	214	214
L. Weight of manure/AU/day (lbs.) (see Table 1.)	58		

Bedding Estimation

M. Bedding type (straw, sawdust, etc.)	1	2	3
N. Volume of bedding this production period (cu.ft.). (If weight of bedding is known, proceed to P and enter it directly.)			
O. Density of bedding (lbs. per cu.ft.) (see Table 2.)			
P. Weight of bedding (tons) [(N x O)/2000]	0.0	0.0	0.0

Uncollected Manure (Deposited on Pasture)

Q. Weight of manure on pasture (tons) [(E x L x K)/2000]	1	2	3
	84	0	0

Collected Solid Waste (Manure And Bedding)

R. Weight of collected manure (tons) [(E x L x J)/2000]	1	2	3
	0	0	0
S. Weight of collected manure & bedding (tons) (P + R)	0	0	0

Updated: 3-12-10

Manure Utilization and Allocation Summary

Type information in yellow cells; blue cells have a pull down list from which you must choose.

Date prepared: 12/20/2023 Operator name: Showfelder Farms

Manure Utilization Information

Period of Application	Fields Available	Acres	Manure Application Rate	Units	Manure Utilization Potential
Spring	3	8.80	10.00 Tons/ac		88.00
	4	9.00	10.00 Tons/ac		90.00
	8	9.70	10.00 Tons/ac		97.00
				Tons/ac	0.00
				Tons/ac	0.00
				Tons/ac	0.00
				Tons/ac	0.00
				Tons/ac	0.00
				Tons/ac	0.00
				Tons/ac	0.00
Total		27.5 ac			275 Tons

Manure Allocation Summary

Period of Application	Spring	Summer	Fall	Winter
Period for Manure Generation	Apr 2023-Mar 2024			
Manure Available for Use per Period	177.00 Tons	Tons	Tons	Tons
Manure Utilization Potential per Period	275.00 Tons	0.00 Tons	0.00 Tons	0.00 Tons
Excess or Deficit (-)	-98 Tons	0 Tons	0 Tons	0 Tons

*If excess, indicate name and address of export location in cover sheet

Soil Fertility Guide



EC-1

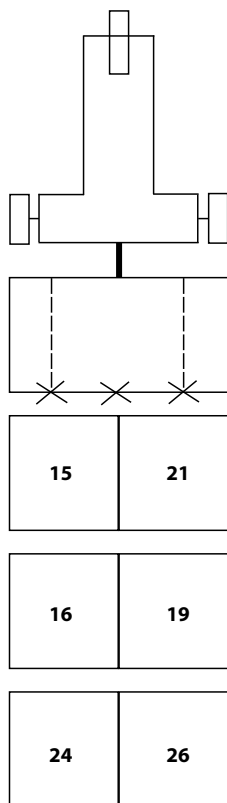
CALIBRATION OF MANURE SPREADERS UNIFORMITY, SPREAD PATTERNS AND EFFECTIVE SWATH WIDTH

Introduction

Application uniformity is essential for ensuring that crops have adequate access to nutrients in all areas of a field. Unfortunately, application of manure by many spreaders (especially older models) is often non-uniform. For most spreaders the rate of application is higher directly behind the spreader than off to the side of the spreader.

Dealing with Non-uniformity

Application is often non-uniform, even directly behind the spreader. Figure 1 shows the variation in application of a composted manure by a single-beater, rear-discharge box spreader.



Three sets of two equally-sized collection surfaces were placed in the path of the spreader. The tractor and spreader were driven directly over each of the two pairs of collection surfaces at the producer's usual speed and equipment settings. Notice how directly behind the spreader, where the application rate is the most uniform, actual application rates vary from a low of 15 tons per acre to a high of 26 tons per acre.

The most effective way to calculate a reliable average of any measurements with high variability is to collect multiple measurements. University of Maryland Extension (UME) recommends a minimum of three measurements for load-area methods and five measurements for the weight-area method.

Figure 1. Non-uniformity of application behind a single-beater, rear-discharge box spreader

Swath and Spread Patterns

Swath is the width of the strip of land upon which manure is spread by one pass of a spreader. Some spreaders, like many box spreaders, have swaths that mirror the width of the spreader itself (see Figure 2a below). Other spreaders, like spinner spreaders, deposit material on both sides of the spreader as well as directly behind the spreader (see Figure 2b below). This type of spreader has a *wide swath*.

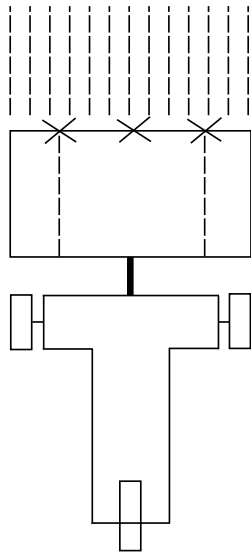


Figure 2a. Bird's eye view of a box spreader swath

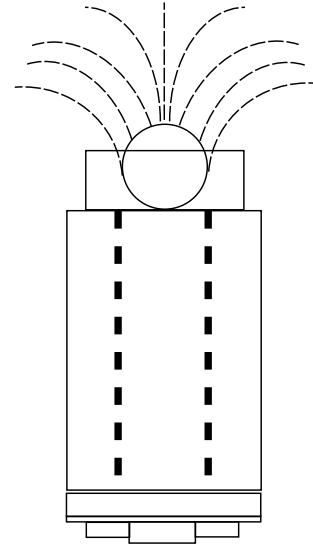


Figure 2b. Bird's eye view of a spinner spreader swath

If one investigates the application rate across a swath, also known as the *spread pattern*, the application rate for all types of spreaders is highest directly behind the spreader and decreases with distance from the spreader. Figure 3 below shows a spread pattern from one pass of a rear-discharge box spreader. The swath is 18 feet and the highest application rate (about 15 tons per acre) is directly behind the spreader. Application rates drop quickly with distance from the spreader.

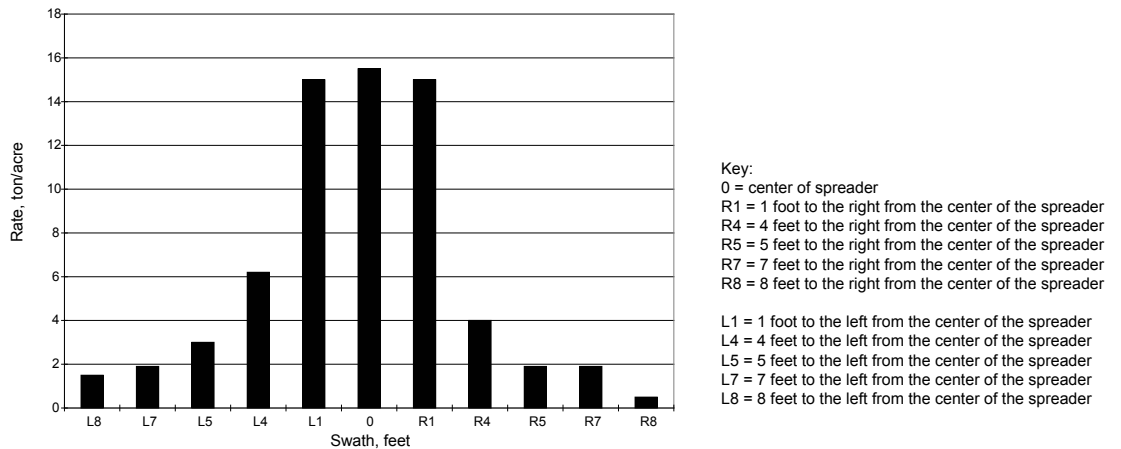


Figure 3. Spread pattern from a rear-discharge box spreader after one pass (© 2000 Iowa State University; *Manure Application with Dry Spreaders*; J. Lorimor)

Figure 4 below shows a spread pattern for three passes of the same rear-discharge, box spreader. The swath width (i.e., the distance from the center of one pass to the center of the next pass) was 12 feet. While swaths were overlapped, the application rate across the field was extremely non-uniform.

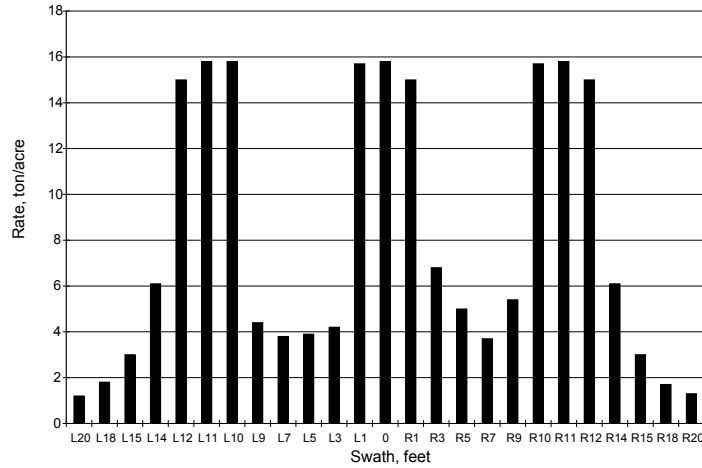


Figure 4. Spread pattern from a rear-discharge, box spreader using a 12-foot swath width (© 2000 Iowa State University; *Manure Application with Dry Spreaders*; J. Lorimor)

If one uses a 6-foot swath width for the same set of circumstances, the application rate across the field would be much more uniform (see Figure 5 below).

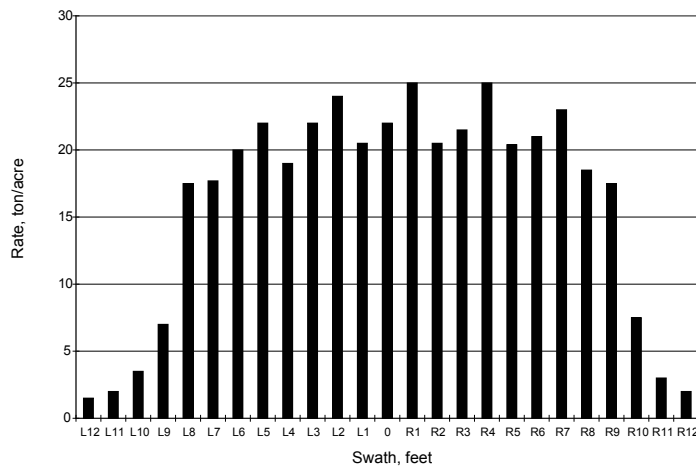


Figure 5. Spread pattern from a rear-discharge, box spreader using a 6-foot swath width (© 2000 Iowa State University; *Manure Application with Dry Spreaders*; J. Lorimor)

One can analyze the initial spread pattern of one swath and calculate the effective swath width required to maximize uniformity across swaths.

Effective Swath Width: What is It?

Effective swath width can be thought of in several ways.

- It is the distance between the center point of one pass of a spreader and the center point of the next pass. This overlap of manure application will lead to a more uniform nutrient application.

- It is the sum of the distance on each side of the center of the spreader where the application rate is 50% of the maximum application rate (typically directly behind the spreader).

Figure 6 below illustrates the concept of effective swath width.

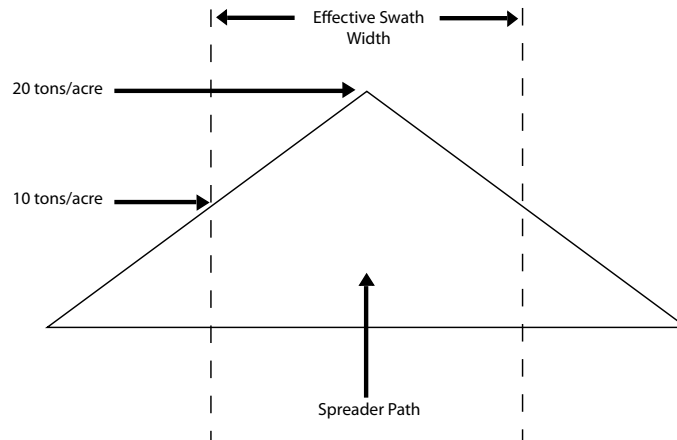


Figure 6. Effective swath width (© 2008 University of Georgia Cooperative Extension; modified from *Calibration of Manure Spreaders*; J. Worley et al.)

Effective Swath Width: How is It Determined?

Effective swath width can be calculated by locating the point on each side of the center of the spreader where the application rate is half as much as the maximum rate.

The type (pan or plastic sheet), size and placement of collection surfaces will depend upon the maximum application rate, the condition of the manure (i.e, solid, liquid) and the distance the manure is spread laterally from the spreader. The number of collection surfaces will vary depending upon the distance the manure is being thrown laterally from the spreader; however, 5-13 collection surfaces are typical.

The following equipment is needed to determine the effective swath width:

- collection surfaces (plastic sheets, tarps, or large pans for liquid manures)
- stakes or pins
- weighing containers (bucket or tub)
- scales (capacity and accuracy depends upon size of collection surface and application rate)

The steps for determining effective swath width are as follows:

Step 1. Set down a line of collection surfaces, at precisely determined intervals, perpendicular to the spreader line of travel. Secure the collection surfaces to the ground using stakes or pins to prevent them from moving during application of the manure.

PTO or Hydraulically-driven Spreaders

Figure 7a below shows an example of where to place collection surfaces when using a box spreader where lateral distribution of manure is minimal. Figure 7b below shows an example of where to place collection surfaces when using a spinner spreader where lateral distribution of manure is extensive.

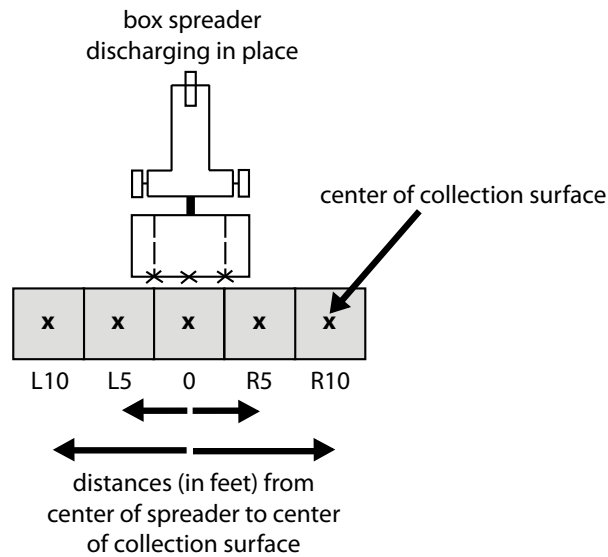


Figure 7a. Placement of collection surfaces when using a PTO or hydraulically-driven box spreader

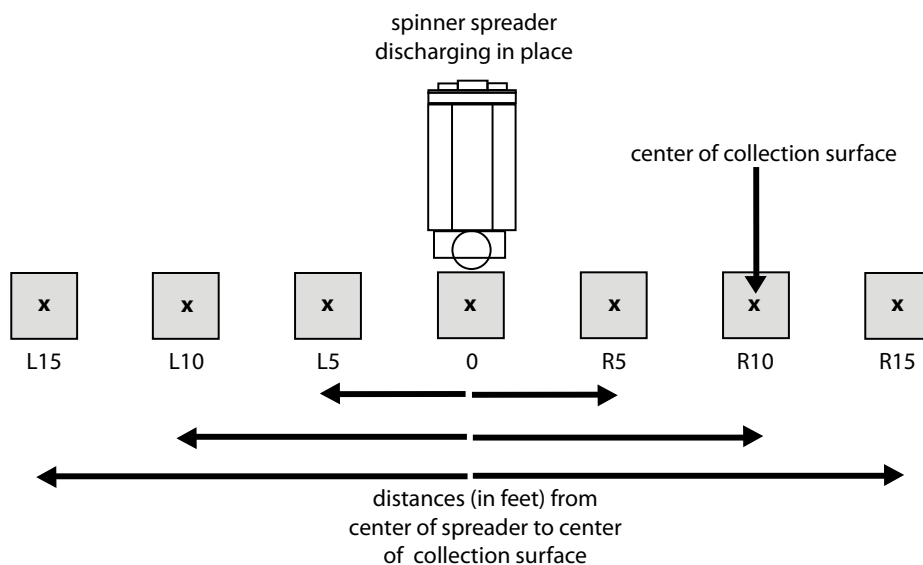


Figure 7b. Placement of collection surfaces when using a spinner spreader

Ground-driven Spreaders

Figure 7c below shows an example of where to place collection surfaces when using a ground-driven box spreader where lateral distribution of manure is minimal. Place the collection surfaces in a location so that the tractor and spreader will be driven at the typical speed when you pass over them.

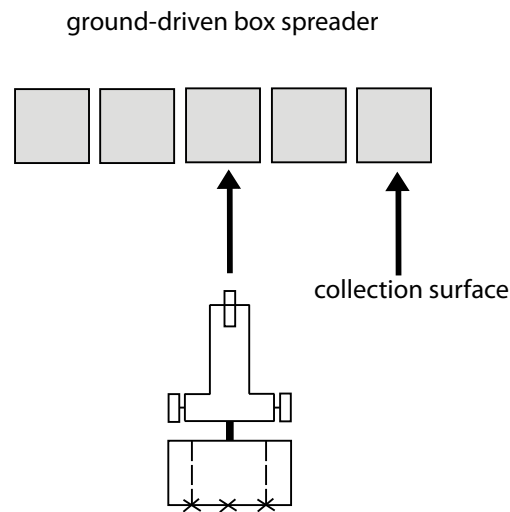


Figure 7c. Placement of collection surfaces when using a ground-driven box spreader

Carefully note the location of each collection surface in reference to the center of the spreader (center = 0 feet). Record each location in feet on **line 1** of **Worksheet 1**.

Step 2. Weigh each empty collection surface. Record the weight in pounds on **line 2** of **Worksheet 1**.

Note: Individual collection surfaces may not be heavy enough to register on a scale. You may need to weigh all of the empty collection surfaces together and then divide by the number of collection surfaces to determine the average weight.

Step 3. For PTO and hydraulically-driven spreaders, engage the spreader (in place) for 20-30 seconds or until a distribution pattern of manure is observed.

For ground-driven spreaders, be sure that the tractor and spreader are being driven at the typical speed when you pass over the collection surfaces.

Step 4. Weigh each collection surface. Record the total weight of each collection surface with manure in pounds on **line 3** of **Worksheet 1**.

Step 5. Calculate the weight of the manure. Subtract the weight of each collection surface (**line 2**) from the weight of the collection surface and manure (**line 3**). Record the weight of manure in pounds on **line 4** of **Worksheet 1**.

Step 6. Determine the location where the application rate was maximum. Use **Worksheet 2** to graph the application rate in pounds per collection surface on the vertical axis (y-axis) and the distance in feet from the center of the spreader to the center of each collection surface on the horizontal axis (x-axis).

Step 7. Determine the distance in feet to the left of center where 50% of the maximum rate was spread. Determine the distance in feet to the right of center where 50% of the maximum rate was spread. Add the two distances to get the effective swath width.

**Effective Swath
Width: An
Example**

Scenario: A spinner spreader discharged poultry litter for 20 seconds onto 3 feet by 3 feet collection surfaces while in a stationary location. The following typical settings were used by the producer:

- PTO was set at 540 RPMs
- discharge gate was set at 8 inches
- drag chain speed was set at low range

The arrangement of collection surfaces is shown in Figure 8 below. Table 1 on page 8 shows the location and pounds of litter on each collection surface.

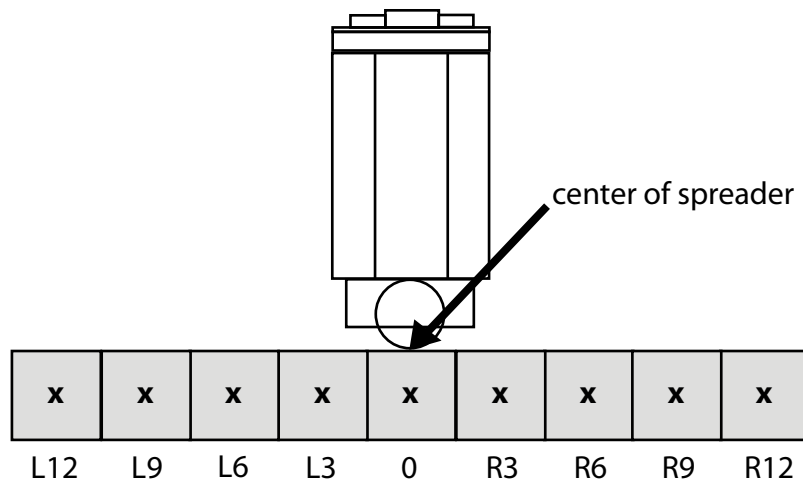


Figure 8. Location of collection surfaces relative to the center of the spreader in feet

Table 1. Weight of poultry litter on each collection surface

Location of collection surfaces in feet relative to center of spreader	Weight of litter in pounds per collection surface
L12	6
L9	15
L6	30
L3	36.8
0	40.8
R3	37
R6	28
R9	14.5
R12	5.6

Interpretation: The highest rate of litter application was observed directly behind the center of the spreader at zero (0) feet. Therefore the maximum application rate of litter on the collection surface directly behind the spreader is:

40.8 pounds

Half of the maximum application rate is 20.4 pounds:

$$40.8 \text{ pounds} / 2 = 20.4 \text{ pounds}$$

To interpret the graph of the data (Figure 9 on page 9), find where 20.4 (approximately) lies on the left-hand side and draw a line over to where it intersects the curve on the graph. Follow that point down to the horizontal axis (x-axis) (feet from center of spreader) and determine the distance to the left of center. In this case, the distance is approximately 7.5 feet. Repeat to find the distance to the right of center. In this example, the distance to the right of center is approximately 7.5 feet. To calculate the effective swath width, add the two distances together:

$$7.5 \text{ feet} + 7.5 \text{ feet} = 15 \text{ feet}$$

Therefore, the effective swath width for this scenario is 15 feet.

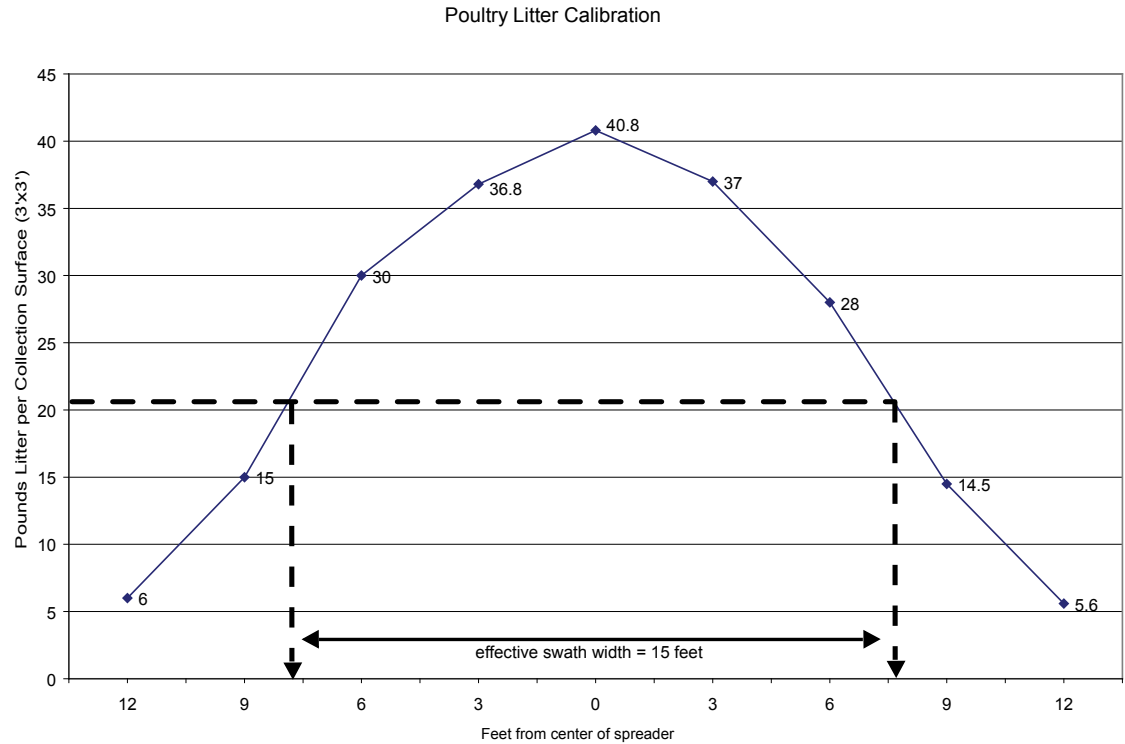


Figure 9. Graph of data for effective swath width scenario

How Frequently Should Effective Swath Width Be Determined?

Variation in spread patterns between manure spreaders is great. However, spread patterns are relatively constant for a particular spreader if the following manure and equipment conditions are similar:

- consistency of manure (moisture content and flow characteristics)
- rate of delivery of material (chain speed, valve or gate setting, PTO speed)
- point of delivery of material (spinner speed, balance between spinners, gate setting)
- cleanliness and upkeep of equipment

If any of these conditions change, the effective swath width should be recalculated.

References

Lorimor, J. 2000. *Manure Application with Dry Spreaders*. Odor and Nutrient Management Newsletter. Iowa State University, Ames, IA, 50111.

Worley, J., P. E. Sumner and T. M. Bass. 2008. *Calibration of Manure Spreaders*. Circular 285. University of Georgia Cooperative Extension, Athens, GA, 30602.

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EC-1 in the *Soil Fertility Guide* series.



The *Soil Fertility Guide* series is written and produced by the University of Maryland College of Agriculture and Natural Resources and funded by the Maryland Department of Agriculture.

Worksheet 1

EC-1, "Calibration of Manure Spreaders: Uniformity, Spread Patterns and Effective Swath Width"

line 4													
line 3													
line 2													
line 1						0 (center)							

line 1 - location of each collection surface relative to the center of the spreader (ft)

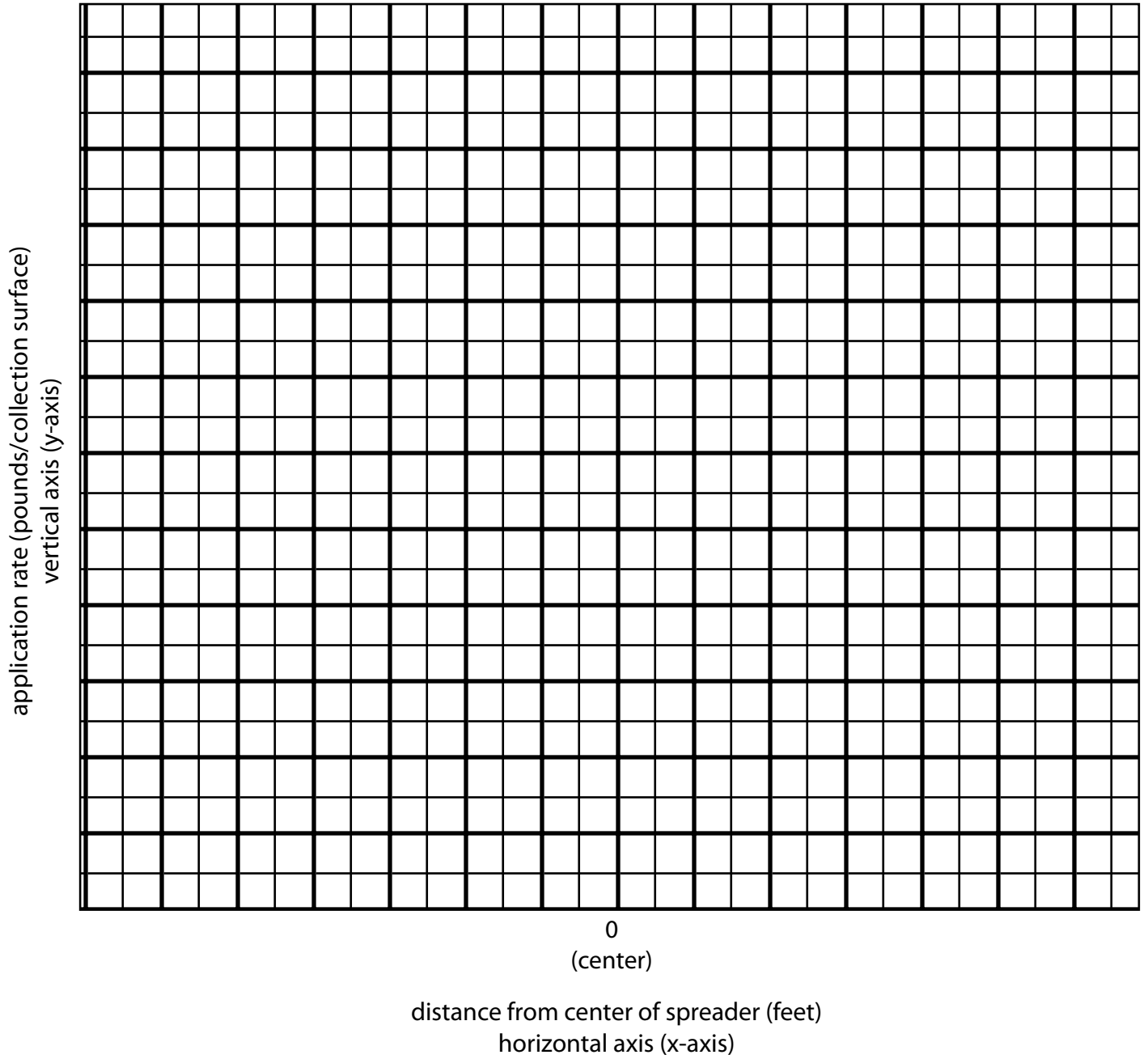
line 2 - weight of each collection surface (lbs)

line 3 - weight of each collection surface and manure (lbs)

line 4 - weight of manure on each collection surface (lbs)

Worksheet 2

EC-1, "Calibration of Manure Spreaders: Uniformity, Spread Patterns and Effective Swath Width"



Soil Fertility Guide



EC-2

CALIBRATION OF A MANURE SPREADER USING THE WEIGHT-AREA METHOD

Introduction

Calibration is a way of checking and/or adjusting a manure spreader to ensure that a nutrient source is being applied uniformly and at the desired rate. It is important to properly calibrate a manure spreader to minimize the potential for over- or under-applying nutrients to your crops.

The weight-area method is one method of calibrating manure spreaders when using solid and semi-solid manure. This method involves spreading manure on a collection surface of known dimensions, weighing the manure on the collection surface, and calculating the application rate. The application rate is then converted to a per-acre basis.

Use of the weight-area method is not advisable for calibrating spinner spreaders applying poultry litter because a portion of the litter often slides beyond the collection surface. The load-area methods are more accurate for poultry litter. Consult EC-4, “Calibration of a Manure Spreader Using the Load-area Method (with Drive-on Scales)” or EC-5, “Calibration of a Manure Spreader Using the Load-area Method (with Estimation of Density and Load Weight)” for information on these calibration methods.

Manure application rates across a field for some types of spreaders can be quite variable even at the same ground speed and with identical equipment settings. Multiple measurements of actual application rates are required to ensure that the calculated average rate is truly representative of the average rate across the field.

NOTE: A minimum of five measurements is recommended for the weight-area method of calibration.

Before continuing, determine the spread pattern of the spreader. For some box spreaders, the swath width is the width of the spreader. For spinner spreaders, spreaders with vertical beaters and many liquid spreaders, material is spread for some distance on each side of the spreader and the *effective swath width* must be determined to maximize application uniformity. Consult EC-1, “Calibration of Manure Spreaders: Uniformity, Spread Patterns and Effective Swath Width,” in the *Soil Fertility Guide* series for information.

**Weather
Conditions**

It is important to take note of the weather conditions before conducting a calibration. If the weather is windy or rainy, it would be a good idea to reschedule the spreader calibration for a different day as both of these conditions can affect the accuracy of your measurements.

**Using the
Weight-area
Method**

The following equipment is needed to perform the weight-area method of calibration:

- bucket
- scale (with a capacity of 50 pounds and accuracy to a tenth of a pound)
- collection surfaces such as plastic sheets or tarps
- stakes or flags

We’ll refer to the collection surfaces as *plastic sheets* for the rest of this publication as they are most commonly used. The steps for using the weight-area method of calibration are as follows:

Step 1. Make note of equipment settings using the information at the top of the worksheet on page 6 as a guide for the kind of information you want to track. Record these settings on the top of the worksheet.

In addition to recording equipment settings, use the worksheet to record calibration data. Calculations used in the weight-area method are provided on the worksheet.

Step 2. Cut five plastic sheets of manageable size. A length and width of 4 feet by 5 feet works well. Weigh the sheets and record the total weight in pounds on line **A1** of the worksheet.

Step 3. Measure the length and width of one plastic sheet in feet. Record these measurements on lines **B1** and **B2**, respectively, of the worksheet.

Step 4. Calculate the collection surface area in square feet. Enter the value on line **B3** of the worksheet.

Step 5. Position the plastic sheets on the field so that they are on the second of three passes (see Figure 1 on page 3). Use the effective swath width that you have previously determined is necessary to maximize application uniformity (refer to EC-1, “Calibration of Manure Spreaders: Uniformity, Spread Patterns and Effective Swath Width”).

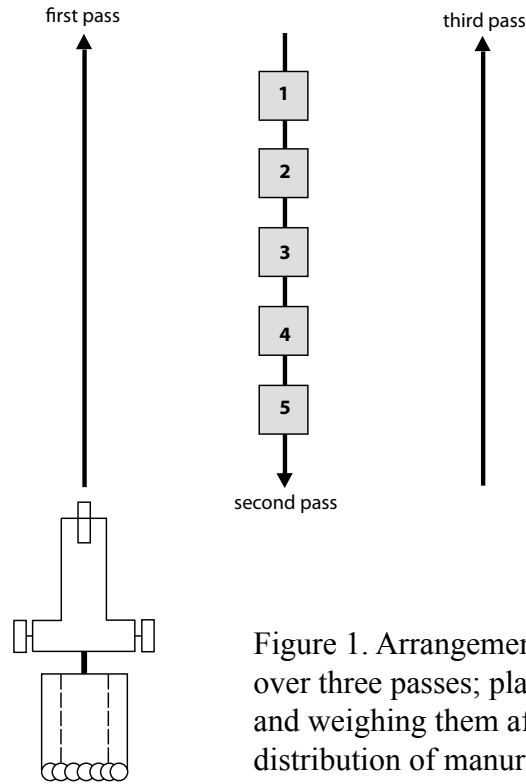


Figure 1. Arrangement of plastic sheets and travel pattern over three passes; placing plastic sheets on the second pass and weighing them after the third pass accounts for lateral distribution of manure from the pass on each side.

Secure the plastic sheets to the ground using stakes or flags to prevent the sheets from moving during application. Flatten plants and stubble so that the sheets lie as flat as possible.

Step 6. Load the manure spreader. Start spreading manure on the first pass, approximately 50 feet before entering the calibration area, at the speed and settings you typically use when spreading manure.

Step 7. Continue spreading on the second pass, making sure to drive the spreader over the center of the plastic sheets, using the same speed and settings as the first pass. Use the effective swath width that you have determined is necessary to maximize application uniformity.

Step 8. Finish spreading on the third pass using the same speed and settings as the first two passes.

Step 9. Collect each plastic sheet and the manure it contains and weigh each separately. Record the weights in pounds on line **A2** of the worksheet. If one of the plastic sheet weights is radically different from the others, consider excluding it from the average as an “outlier.”

For example, if the weights of manure (in pounds) on 5 plastic sheets were 15.1, 13.7, 7.1, 14.2 and 13.0, the measurement of 7.1 pounds would be the outlier.

Step 10. Calculate the total weight of the manure and plastic sheets in pounds. Enter the value on line **A3** of the worksheet.

Step 11. Calculate the total weight of the manure in pounds. Enter the value on line **A4** of the worksheet.

Step 12. Calculate the average weight of manure in pounds applied to the collection surface. Each plastic sheet is considered a collection surface. Enter the value on line **A5** of the worksheet.

Step 13. Calculate the application rate in tons per acre. Enter the value on line **C1** of the worksheet.

If the current application rate is different from the recommended application rate, adjust the settings on the manure spreader or change your driving speed to increase or decrease the application rate, as needed. Repeat the calibration procedure until you identify the tractor speed and manure spreader settings that will enable you to approximate the recommended application rate. Maryland Department of Agriculture (MDA) policy requires that the average application rate should be within 10% of the recommended rate.

Two copies of the worksheet are included so all data for each calibration attempt can be recorded.

Recalibrating the Spreader

For manure spreaders handling solid or semi-solid manures, recalibrate whenever the consistency of a manure is different from the manure used for the last calibration. Consistency of manure can vary due to changes in any of the following:

- bedding
- feed components
- manure management practices
- any factor that affects the moisture content of manure

Application rates change over time as equipment gets older and components wear. Periodic recalibration of spreaders is encouraged even if all factors appear to be similar.

Record Keeping

Keep calibration worksheets and nutrient application records with your nutrient management plan. This information will be needed in the event that MDA conducts a plan implementation review.

Reference

Brodie, H. L. and G. L. Smith. 1993. *Calibrating Manure Spreaders*. Fact Sheet 419. University of Maryland Extension, Maryland Institute for Agriculture and Natural Resources, College Park, MD 20742.

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June 2010

EC-2 in the *Soil Fertility Guide* series.

The *Soil Fertility Guide* series is written and produced by the University of Maryland College of Agriculture and Natural Resources and funded by the Maryland Department of Agriculture.



WORKSHEET
EC-2, "Calibration of a Manure Spreader Using the Weight-area Method"

Tractor _____ Spreader model _____ Ground speed _____

Gear _____ Gate setting _____ PTO _____

Apron chain setting _____ Other _____

Date of spreader calibration _____

(A) calculation of average weight of manure (lbs)

A1) total weight of plastic sheets (lbs)					
	Sheet 1	Sheet 2	Sheet 3	Sheet 4	Sheet 5
A2) weight of manure and plastic sheets (lbs)	(a)	(b)	(c)	(d)	(e)
A3) total weight of manure and plastic sheets (lbs) (see line A2) [(a) + (b) + (c) + (d) + (e) = A3]					
A4) total weight of manure (lbs) (A3 - A1 = A4)					
A5) average weight of manure (lbs) (A4 / 5 = A5)					
where 5 = number of plastic sheets					

(B) calculation of collection surface area (sq ft)

B1) length of plastic sheet (ft)	
B2) width of plastic sheet (ft)	
B3) collection surface area (sq ft) (B1 x B2 = B3)	

(C) calculation of application rate (t/ac)

C1) application rate (t/ac) [(A5 x 43,560) / (B3 x 2,000) = C1]	
where 1 acre = 43,560 square feet and 1 ton = 2,000 pounds	

WORKSHEET
EC-2, "Calibration of a Manure Spreader Using the Weight-area Method"

Tractor _____ Spreader model _____ Ground speed _____

Gear _____ Gate setting _____ PTO _____

Apron chain setting _____ Other _____

Date of spreader calibration _____

(A) calculation of average weight of manure (lbs)

A1) total weight of plastic sheets (lbs)					
	Sheet 1	Sheet 2	Sheet 3	Sheet 4	Sheet 5
A2) weight of manure and plastic sheets (lbs)	(a)	(b)	(c)	(d)	(e)
A3) total weight of manure and plastic sheets (lbs) (see line A2) [(a) + (b) + (c) + (d) + (e) = A3]					
A4) total weight of manure (lbs) (A3 - A1 = A4)					
A5) average weight of manure (lbs) (A4 / 5 = A5)					
where 5 = number of plastic sheets					

(B) calculation of collection surface area (sq ft)

B1) length of plastic sheet (ft)	
B2) width of plastic sheet (ft)	
B3) collection surface area (sq ft) (B1 x B2 = B3)	

(C) calculation of application rate (t/ac)

C1) application rate (t/ac) [(A5 x 43,560) / (B3 x 2,000) = C1]	
where 1 acre = 43,560 square feet and 1 ton = 2,000 pounds	

Phosphorus Management Tool

UM Phosphorus Management Tool (PMT) Report

Farmer Name	Don J Showfelder			Plan Year	2024
	8				
Account ID	1403301702				
County	Howard				
Tract or Farm ID	Showfelder Farm				
Field ID	8				
MUSYM	GbB				
Area Crop	9.70 Acres 2				
Organics	Beef S				
R Factor					
Adj. K Factor LS Factor					
C P Factors					
RUSLE A	5.00				
Transport Risk Factors					
SED Value	10				
Soil Permeability Class	Moderate				
Field slope Concave? SR Factor	6.00 No 6.4				
Soil Drainage Class	well				
HSG Artificial Drainage? SD Factor	A No 0.0				
Management Factors					
Distance to Water (DF)	350-500 ft 0.4				
Buffer Width & Type (BF)	> 35' veg. 0.9				
Soil Test P Fertility Index Value	179				
Degree of P Saturation (DPS M3)	47.4 (est.)				
Fert. P appl. rates, lb/A FP * PSC	- - - 0				
Org. P appl. rates, lb/A OP * PSC	70 - - 35				
Runoff Fert. P appl. methods AMr(f)	- - - 0.00				
Runoff Org. P appl. methods AMr(o)	M2 - - 0.40				
Subsurface Fert. P appl. methods AMsub(f)	- - - 0.00				
Subsurface Org. P appl. methods AMsub(o)	M1 - - 0.32				
P particulate P runoff P subsurface	64 25 0				
P Loss Rating Score	89 (M)				

Crop Rotation Phosphorus Removal for Transition Management Phases/PMT

Name		Don J Showfelder						2024						
Address		1205 Homewood Rd						Wednesday, December 20, 2023						
City, Zip, Phone		Ellicott City MD 21042 410-555-5555						Phone410-555-5555						
Tract / Farm	Field	Acre	Year	Risk	P loss rating score	Crop code	Crop name	Yield	Yld. units	P2O5 lb/yld. unit	P2O5 uptake lb/A	Fert. P2O5 appl. lb/a	Org. P2O5 appl. lb/A	Tot. P2O5 appl. lb/A
Showfelder Farm	8	9.7	2024	Med	89	2	Corn grain, conservation till	160.0	Bu/A	0.40	64.00		70.0	70.0
						260	Small grain for silage	8.0	T/A	10.00	80.00			
											144.0		70.0	70.0



Farming with Your Nutrient Management Plan

A COMPREHENSIVE GUIDE

to Maryland's Nutrient Management Regulations and Requirements

What's Inside:

- 1** Implementing Your Nutrient Management Plan
- 2** Nutrient Application Requirements
- 3** Setbacks for Nutrient Applications
- 4** Requirements for Temporary Manure Stockpiling
- 5** Phosphorus Management Tool Requirements



INTRODUCTION

Maryland law requires all farmers grossing \$2,500 a year or more or livestock producers with 8,000 pounds or more of live animal weight to follow nutrient management plans when fertilizing crops and managing animal manure. These science-based plans specify how much fertilizer, manure or other nutrient sources may be safely applied to crops to achieve yields and prevent excess nutrients from impacting waterways. Nutrient management plans are required for all agricultural land used to produce plants, food, feed, fiber, animals, or other agricultural products. The Nutrient Management Program ensures that plans are developed, updated, and implemented according to state regulations.

To protect the health of local farm streams, farmers must have stream setbacks and livestock exclusion measures in place. Farmers who till their soil are required to incorporate manure and other organic nutrient sources into fields within 48 hours of application and follow specific timing requirements for fall nutrient applications. To further protect waterways, all farm operations—regardless of size—are banned from spreading manure on fields in winter. In addition, fields with high soil phosphorus levels must be managed using Maryland's Phosphorus Management Tool (PMT).

This guide is designed to help farmers follow their nutrient management plans and comply with all nutrient application and reporting requirements. For additional guidance and clarification, contact your nutrient management consultant or regional nutrient management office listed on the back of this guide.

1

Implementing Your Nutrient Management Plan

Nutrient management plans detail the optimum use of nutrients to minimize losses to the environment while maintaining crop yields. Soil and manure tests are used to develop application rates that meet projected crop yields based on soil productivity or historic yields of a site. Plans are prepared by University of Maryland Extension advisors, private consultants who are certified by the Maryland Department of Agriculture, or farmers who are certified to develop plans solely for their own operations.

Implementing your nutrient management plan requires you to follow guidelines for the amount, timing, and placement of nutrients for each crop. Plans must be revised and updated before they expire. Most plans are written for one or three years. The expiration date can be found on the plan. Major changes to your operation may require your plan to be modified or updated sooner. In addition, you must have a soil test completed at least once every three years. If you use manure, it must be analyzed for nutrient content at least every other year.

The success of your nutrient management plan in protecting water quality often hinges on whether you have read the plan and communicated its content to other family members, hired employees, or your fertilizer company. Contact your nutrient management consultant

if you have questions about your plan. The most important thing that you can do is to read and follow your plan—don't allow it to simply collect dust on a shelf. For some farm employees, training may be needed in equipment calibration and record keeping.

ADDITIONAL REQUIREMENTS:

Nutrient Applicator Voucher Training

If you apply nutrients to 10 or more acres of cropland, you are required to attend a two-hour nutrient applicator training course once every three years. Free voucher training and recertification courses are offered in fall and winter by the department and Extension at locations across the state. If you are certified to write your own nutrient management plan, you are not required to attend voucher training. However, certified farmers must earn six continuing education credits every three years.

Annual Implementation Reporting

Regulated farmers are required to submit Annual Implementation Reports to the Maryland Department of Agriculture by March 1 summarizing nutrient applications for the previous year. The department mails reporting forms to farmers in January and posts them on its website at **mda.maryland.gov**. In addition, online reporting is available through the Maryland OneStop portal.



2

Nutrient Application Requirements

Nutrient application requirements vary depending on the crop, season, nutrient source, and weather conditions. Here in Maryland, farmers are required to follow University of Maryland nutrient recommendations and use best management practices that minimize nutrient losses to nearby waterways as outlined in Maryland's Nutrient Management Manual. **The following requirements apply:**

- Chemical fertilizer may be applied from March 1 through December 15 for an existing crop or a fall planted crop following University of Maryland recommendations.
 - Organic nutrients may be applied from March 1 through December 15 for an existing crop, a fall planted crop, or a crop that is planted the next spring following University of Maryland recommendations.
 - Poultry litter may be applied in spring and fall for an existing crop or crops planted for the upcoming season, as long as it is applied following University of Maryland recommendations.
 - Applying nitrogen in the fall is prohibited on small grains if a fall nitrate test indicates levels greater than 10 parts per million for wheat or 15 parts per million for barley.
- Cover crops must be planted when organic nutrient sources are applied to fallow ground in the fall.
 - Winter application (December 16 through February 28) of chemical fertilizer is prohibited. **Exceptions exist** for green up of perennial forage crops and small grains as well as greenhouse, cool season grass sod production, and vegetable and fruit production, as long as applications are performed following University of Maryland recommendations.
 - Use of potash and liming materials is **not restricted** in winter.
 - Manure deposited directly by livestock is **not restricted** at any time of year.
 - Manure, biosolids and other organic nutrient sources must be injected or incorporated into the soil within 48 hours of application. **The following conditions may exempt you from this requirement:**
 1. You are using no-till farming practices.
 2. Livestock manure is deposited directly by animals.
 3. The land is in permanent pasture.
 4. The land is being used for hay production.





5. Fields are defined as highly erodible land by USDA-Natural Resources Conservation Service (NRCS) Field Office Technical Guide standards and determination protocols. This exemption requires supporting documentation (a Farm Service Agency map or Soil Conservation and Water Quality Plan signed by a soil conservation district representative).
 6. Spray irrigation is being used to apply nutrients to a growing crop.
 7. Small grains have been planted for harvest on the land, either as grain or silage. This is considered a standing crop, and therefore exempt from incorporation of organic nutrient sources during spring green up.
- Nutrient applications are prohibited from December 16 through February 28. This requirement applies to all poultry and livestock operations, regardless of size.
 - An emergency provision allows the department to work with farmers on a case-by-case basis to prevent an overflow from liquid manure storage structures during winter, when spreading manure is otherwise prohibited. The exemption is only for on-farm generated manure that cannot be stored due to extraordinary circumstances. It does not apply to biosolids or food waste.
 - If you decide to seek an emergency waiver, you must submit proof that you have attempted to obtain manure storage.
 - If approved, you must implement environmental protections to safeguard water quality, including the application of manure on vegetative cover and the use of a 100-foot buffer zone next to waterways.
 - If you are granted an emergency exemption, you are prohibited from applying liquid manure if the ground is saturated, snow covered, or hard frozen two inches or more.




3

Setbacks for Nutrient Application

A nutrient application setback is a vegetated area ranging from 10 to 35 feet from an eligible waterway where nutrients may not be applied in order to protect water quality. Maryland's nutrient management regulations require setback information identifying these areas to be included on farm nutrient management plans.

If you apply nutrients to crop fields, you are required to adhere to the setback distance as determined by the method of application. If nutrients are custom-applied, it is your responsibility to inform the applicator of the setback requirements. The setback indicator chart shown below may be used to satisfy the Nutrient Management Program's reporting requirements. A map is recommended, but not required.



Maryland Nutrient Management Program Nutrient Application Setback Indicator

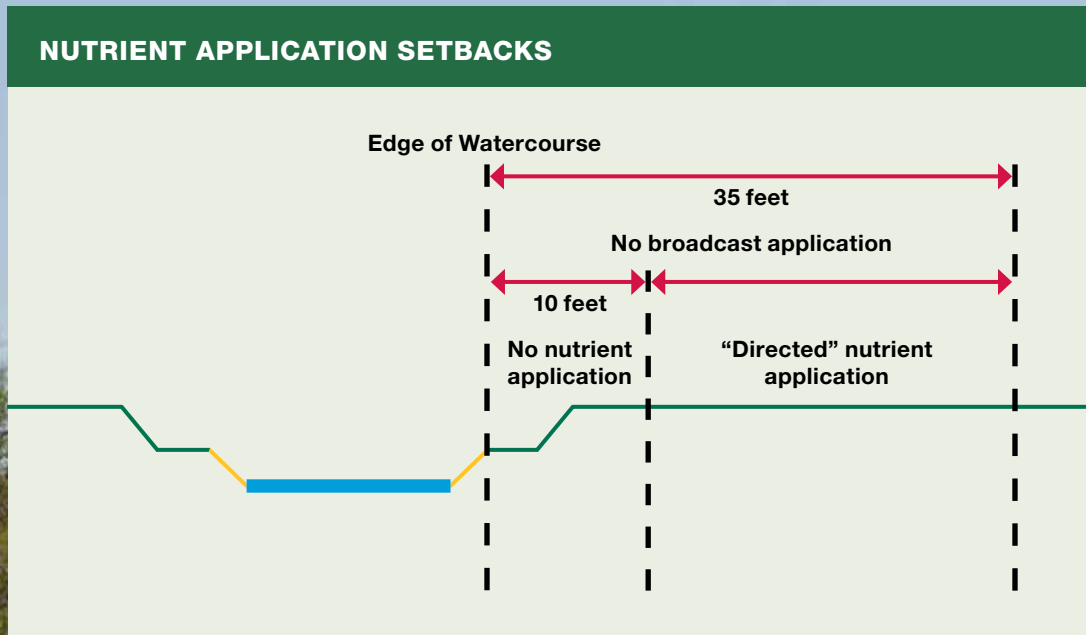
Farm Name(s)	Is Surface Water Present on the Farm that Requires a Setback? (Yes or No)	Field(s) Requiring a Nutrient Application Setback*	Nutrient Application Setback Required (Indicate with "Yes" in appropriate column or columns)		
			Livestock on Pasture ≥ 10 ft.	Directed Application** ≥ 10 ft.	Broadcast Application or Sacrifice Lots*** ≥ 35 ft.

*If a field contains multiple sources of surface water (i.e. a pond and a stream), list each separately or identify on the map.
**Directed application is a directed spray application (vertical fan or drop nozzle), air flow application, knifed/injected application of nutrients, and planter applied nutrients.
***Broadcast application or sacrifice lots: spinner spreaders (manure or fertilizer), high volume horizontal nozzles, and manure spreaders (box type with beaters, splasher plates for liquid, side discharge V-type).

THE FOLLOWING NUTRIENT APPLICATION SETBACK REQUIREMENTS APPLY:

- A minimum 10-foot setback is required for all nutrient applications adjacent to surface waters and streams.
- A 35-foot setback is required when using broadcast fertilizer application methods. No crops may be grown on the 10-foot setback except pasture and hay. The remaining 25-foot setback may have crops, but may not be fertilized unless a direct application method is used.
- Pastures and hayfields are subject to a 10-foot setback.
- Nutrients may not be applied mechanically within the 10-foot setback area.
- Livestock are not allowed in the setback; however, flash grazing is allowed.
- Fencing to control livestock may not be required in all cases. If you do not have stream protection measures in place, contact your soil conservation district to schedule a farm visit. District staff can evaluate the site to determine whether fencing is needed or alternative practices such as watering facilities, livestock crossings, or vegetative exclusion will help protect water quality. The district will provide you with the necessary documentation to meet this requirement. If alternative practices do not inhibit access, the department may require fencing.
- Livestock sacrifice lots require a 35-foot setback from surface water.

Use the following charts to determine the length of the setback required:



WHEN DO NUTRIENT APPLICATION SETBACKS APPLY?

If the watercourse is:	It is defined as a:	For crop and pastureland adjacent to the watercourse, a setback is:
Natural and either perennial or intermittent	Stream	Required
Channelized and perennial and : A. Lies within a floodplain soil map unit, or B. Lies within a hydric soil map unit mapped as a narrow, elongated feature in a fluvial (stream-like) floodplain position, or C. Lies within a “B” slope or greater soil	Stream	Required
Channelized and intermittent	Ditch	Not Required
Ephemeral (natural or channelized)	Ditch	Not Required

4

Requirements and Best Management Practices for Temporary Manure Stockpiling (Staging)

Temporary field stockpiling (staging) of poultry litter and other dry organic nutrient sources with 60 percent or less moisture content is allowed under Maryland's nutrient management regulations when other immediate use options and alternatives are unavailable. Dry process waste is primarily associated with poultry operations but can also come from swine, beef, or dairy cattle operations. To minimize the duration of temporary field stockpiling, work with your integrator to schedule manure applications as close to spring planting as possible so that crops have a readily available nutrient source when they need it most.

- Manure storage structures should be completely utilized before starting a stockpile.
- Record the date that the stockpile was started.
- Manure in temporary stockpiles must be land applied no later than the first spring following the placement of the stockpile.
- The stockpile area must be:
 - At least 100 feet from any surface water and irrigation or treatment ditches, or 35 feet away if a vegetative buffer is in place.
 - At least 150 feet from wells, springs, and wetlands.
- At least 300 feet from a well that is down gradient from the stockpile.
- At least 200 feet from any residence outside the operator's property.
- Outside flood prone areas and areas prone to ponding.
- No farther than 150 feet from the top of a 3 percent slope with no diversion installed.
- Stack the stockpile at least 6 feet high; make sure it is peaked to allow it to shed rainfall.
- Stockpile materials should be stockpiled in a manner that prevents nutrient runoff.
- If the manure stockpile will be exported off the farm, record the date that the manure was shipped along with the name and address of the recipient and an estimate of the tonnage exported.
- Following removal of the stockpile, thoroughly scrape or clean the ground and restore the area to its original condition. If necessary, reseed the area with grass or an agronomic crop to facilitate nutrient uptake.
- Place subsequent stockpiles in the same location to minimize environmental impact.



SUMMARY: Maryland Nutrient Management Application Requirements



●	You may apply chemical fertilizer from March 1 through December 15 to an existing crop or a fall planted crop following University of Maryland recommendations.
●	Organic nutrient sources may be applied from March 1 through December 15 to an existing crop. Additional restrictions and conditions for organic nutrients applied in the fall (September 9 through December 15) are described in the <i>Maryland Nutrient Management Manual</i> .
●	You must inject or incorporate manure, biosolids, and other organic nutrient sources into the soil within 48 hours of application. There are exceptions for no-till farming systems, spray irrigation on a growing crop, permanent pastures, hay production fields, and highly erodible fields.
●	Fall application of nitrogen is prohibited on small grains if a fall nitrate test indicates levels greater than 10 parts per million for wheat or 15 parts per million for barley.
●	Cover crops must be planted when organic nutrient sources are applied in fall.
●	A minimum 10-foot setback is required for all nutrient applications adjacent to surface waters and streams.
●	A 35-foot setback is required when using broadcast fertilizer application methods. Only pasture and hay may be grown on the 10-foot setback area. The remaining 25-foot setback may have crops, but may not be fertilized unless a direct application method is used.
●	Pastures and hayfields are subject to a 10-foot setback. Livestock are not allowed in the setback area.
●	Livestock stream protection practices are required.
●	Livestock sacrifice lots require a 35-foot setback from surface water.
●	Winter application (December 16 through February 28) of chemical fertilizer is prohibited. There are exceptions for green up of perennial forage crops and small grains as well as greenhouse, cool season grass sod production, and vegetable and fruit production, as long as applications are performed following University of Maryland recommendations.
●	Nutrient applications are prohibited from December 16 through February 28.
●	If nutrients are custom-applied, <i>it is your responsibility—as the farmer—to inform the applicator of the setback distance based on the method of application.</i>

Phosphorus Management Tool (PMT)

Maryland's Phosphorus Management Tool (PMT) regulations require farmers with high soil phosphorus levels to use the PMT to identify the potential risk of phosphorus loss from farm fields and prevent the additional buildup of phosphorus in soils that are already saturated. Soils with high phosphorus levels are typically found on farms that have used manure or poultry litter as a crop nutrient over an extended period of time.

Fertility Index Value (FIV) is a measurement of phosphorus in the soil as determined by a laboratory test of a soil

sample. A level between 51-100 is considered "optimum" for crop production. FIV levels above 100 indicate that the soil contains more phosphorus than the crop needs. ***Farm fields with high soil phosphorus levels identified by a Fertility Index Value of 150 or greater are required to be managed using the PMT. If a farm field scores less than 150 FIV, phosphorus may be applied to the land following University of Maryland recommendations outlined in the Maryland Nutrient Management Manual.***

● PHOSPHORUS TESTING REQUIREMENT

Maryland's PMT regulations require certified nutrient management consultants and farmers who prepare their own nutrient management plans to submit soil test phosphorus data to the department every six years. Soil test phosphorus data was collected in 2015 and 2021.

● SPECIAL PROVISIONS AND CONSIDERATIONS

The following special provisions allow farmers to apply phosphorus to crops when it would otherwise be restricted by the PMT. For additional guidance, contact your nutrient management consultant or regional nutrient management specialist.

- **Tissue Analysis**—Crop tissue, such as the leaves of a corn plant, may be analyzed as an indicator of crop health and nutrient deficiency. If a phosphorus deficiency is indicated, you may add phosphorus to the crop following University of Maryland recommendations.
- **High Phosphorus Crops**—Vegetable and tobacco crops with proven higher phosphorus needs may receive phosphorus applications at planting.
- **Organic Crops**—Certified organic farmers who rely on animal manures as a source of both nitrogen and phosphorus for crop production may apply limited amounts of phosphorus under certain conditions.
- **Alternative Use**—Farmers adopting Maryland Department of Agriculture-approved alternative use technologies to lower the phosphorus content in animal manure may apply limited amounts of phosphorus.



MARYLAND DEPARTMENT OF AGRICULTURE Nutrient Management Offices

WESTERN MARYLAND

Allegheny, Garrett and Washington counties

P.O. Box 459
Hancock, MD 21750
410-279-3506

Carroll and Frederick counties

92 Thomas Johnson Drive, Suite 110
Frederick, MD 21702
410-353-4320

CENTRAL AND SOUTHERN MARYLAND

Anne Arundel, Howard and Montgomery counties

92 Thomas Johnson Drive, Suite 110
Frederick, MD 21702
410-507-4811

Baltimore, Cecil and Harford counties

P.O. Box 850
Bel Air, MD 21014
410-841-5959

Calvert, Charles, Prince George's and St. Mary's counties

P.O. Box 652
Leonardtown, MD 20650
410-980-9479

EASTERN SHORE

Caroline and Dorchester counties

P.O. Box 340
Marydel, MD 21649
410-353-5660

Kent, Queen Anne's and Talbot counties

P.O. Box 549
Cordova, MD 21625
410-279-4003

Somerset, Wicomico and Worcester counties

27722 Nanticoke Road, Unit 2
Salisbury, MD 21801
410-507-4949



Maryland Department of Agriculture

Office of Resource Conservation

Nutrient Management Program
50 Harry S. Truman Parkway
Annapolis, MD 21401
410-841-5959
nminfo.mda@maryland.gov
mda.maryland.gov

PLEASE READ: The information provided in this booklet is for general reference purposes only. For specific information on Maryland's nutrient management regulations, please contact the regional nutrient management specialist serving your county.



Nutrient Recommendations

Fertilizer Recommendations

Farmer/Operator		Don J Showfelder				Plan Year			2024					
Street Address		12005 Homewood Rd				MDA operator no.			123456789					
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023					
Tract No. / Farm Name	Field No.	Crops & Note Numbers	Area	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Fertilizer To Be Applied					Lime
						Leg	Man.	Shu.	Method	N	P2O5	K2O	Mg	
Showfelder Farm	Veg 1 2024 [*]	169 Pumpkin 7 11 101 103 121 122 146 161 202	0.60 Acres	5.0 T/A	100-39-83 #/A	0 #/A	0 #/A	0 #/A	Total	100 #/A	39 #/A	83 #/A		0.8 t/A
									brdct & disk in	25 #/A	39 #/A	83 #/A		
									sdrs @ 1st runners	75 #/A	0 #/A	0 #/A		
Showfelder Farm	Veg 1 2024	51 Cover crop for water quality	0.60 Acres	0.0 T/A	0-0-0 #/A	0 #/A	0 #/A	0 #/A	Total	0 #/A	0 #/A	0 #/A		0.8 t/A
Showfelder Farm	Veg 2 2024 [*]	127 Broccoli 7 11 101 103 121 122 144 161 166	1.90 Acres	0.0 Cwt/A	200-42-0 #/A	0 #/A	0 #/A	0 #/A	Total	200 #/A	42 #/A	0 #/A		0.6 t/A
									brdct & disk in	100 #/A	42 #/A	0 #/A		
									sdrs2-3wksPostplant	50 #/A	0 #/A	0 #/A		
									sdrs4-6wksPostplant	50 #/A	0 #/A	0 #/A		

Recommendations for more than one crop (multiple recommendations) are given for some/all fields. Use the recommendation for the crop you choose to grow.

* indicates primary recommendation used for the PMT calculation.

Fertilizer Recommendations

Farmer/Operator		Don J Showfelder				Plan Year			2024					
Street Address		12005 Homewood Rd				MDA operator no.			123456789					
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023					
Tract No. / Farm Name	Field No.	Crops & Note Numbers	Area	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Fertilizer To Be Applied					Lime
						Leg.	Man.	Stu.	Method	N	P2O5	K2O	Mg	
Showfelder Farm	Veg 2 2024	129 Cabbage 7 11 101 103 121 122 144 161 167	1.90 Acres	0.0 T/A	150-42-0 #/A	0 #/A	0 #/A	0 #/A	Total	150 #/A	42 #/A	0 #/A		0.6 t/A
									brdcst & disk in	50 #/A	42 #/A	0 #/A		
									sdrs2-3wksPostplant	50 #/A	0 #/A	0 #/A		
									sdrs if needed	50 #/A	0 #/A	0 #/A		
Showfelder Farm	Veg 2 2024	132 Cauliflower 7 11 101 103 121 122 144 161 167	1.90 Acres	0.0 Cwt/A	150-42-0 #/A	0 #/A	0 #/A	0 #/A	Total	150 #/A	42 #/A	0 #/A		0.6 t/A
									brdcst & disk in	50 #/A	42 #/A	0 #/A		
									sdrs2-3wksPostplant	50 #/A	0 #/A	0 #/A		
									sdrs if needed	50 #/A	0 #/A	0 #/A		
Showfelder Farm	Veg 2 2024	136 Cucumbers 7 11 101 103 121 122 146 161 172	1.90 Acres	0.0 T/A	150-40-0 #/A	0 #/A	0 #/A	0 #/A	Total	150 #/A	40 #/A	0 #/A		0.6 t/A
									brdcst & disk in	50 #/A	0 #/A	0 #/A		
									band w/planter	25 #/A	40 #/A	0 #/A		
									sdrs:irrig@1stRnrs	75 #/A	0 #/A	0 #/A		

Recommendations for more than one crop (multiple recommendations) are given for some/all fields. Use the recommendation for the crop you choose to grow.

* indicates primary recommendation used for the PMT calculation.

Fertilizer Recommendations

Farmer/Operator		Don J Showfelder				Plan Year			2024					
Street Address		12005 Homewood Rd				MDA operator no.			123456789					
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023					
Tract No. / Farm Name	Field No.	Crops & Note Numbers	Area	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Fertilizer To Be Applied					Lime
						Leg.	Man.	Slu.	Method	N	P2O5	K2O	Mg	
Showfelder Farm	Veg 2 2024	149 Kale 7 11 101 103 121 122 144 161 175	1.90 Acres	0.0 T/A	200-42-0 #/A	0 #/A	0 #/A	0 #/A	Total	200 #/A	42 #/A	0 #/A		0.6 t/A
									brdct & disk in	100 #/A	42 #/A	0 #/A		
									sdrs post 1st cut.	50 #/A	0 #/A	0 #/A		
									sdrs if needed	50 #/A	0 #/A	0 #/A		
Showfelder Farm	Veg 2 2024	152 Lettuce: Leaf 7 101 103 121 122 161 177	1.90 Acres	0.0 Cwt/A	125-75-0 #/A	0 #/A	0 #/A	0 #/A	Total	125 #/A	75 #/A	0 #/A	0.6 t/A	
									brdct & disk in	75 #/A	75 #/A	0 #/A		
									sdrs3-5wksPostplant	50 #/A	0 #/A	0 #/A		
Showfelder Farm	Veg 2 2024	164 Peppers 7 20 101 103 121 122 146 161 198	1.90 Acres	0.0 Cwt/A	180-75-0 #/A	0 #/A	0 #/A	0 #/A	Total	180 #/A	75 #/A	0 #/A	0.6 t/A	
									brdct & disk in	100 #/A	75 #/A	0 #/A		
									sdrs post fruitset	50 #/A	0 #/A	0 #/A		
									sdrs later if need	30 #/A	0 #/A	0 #/A		

Recommendations for more than one crop (multiple recommendations) are given for some/all fields. Use the recommendation for the crop you choose to grow.

[*] - indicates primary recommendation used for the PMT calculation.

Fertilizer Recommendations

Farmer/Operator		Don J Showfelder				Plan Year			2024					
Street Address		12005 Homewood Rd				MDA operator no.			123456789					
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023					
Tract No. / Farm Name	Field No.	Crops & Note Numbers	Area	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Fertilizer To Be Applied					Lime
						Leg.	Man.	Slu.	Method	N	P2O5	K2O	Mg	
Showfelder Farm	Veg 2 2024	175 Radishes 7 101 103 121 122 161	1.90 Acres	0.0 Cwt/A	50-42-0 #/A	0 #/A	0 #/A	0 #/A	Total	50 #/A	42 #/A	0 #/A		0.6 t/A
									brdct & disk in	50 #/A	42 #/A	0 #/A		
Showfelder Farm	Veg 2 2024	181 Squash; summer 7 11 101 103 121 122 146 161 208	1.90 Acres	0.0 Cwt/A	100-42-0 #/A	0 #/A	0 #/A	0 #/A	Total	100 #/A	42 #/A	0 #/A		0.6 t/A
									brdct & disk in	25 #/A	42 #/A	0 #/A		
									sdrs @ 1st runners	50 #/A	0 #/A	0 #/A		
									apply w/irrig.sys.	25 #/A	0 #/A	0 #/A		
Showfelder Farm	Veg 2 2024	190 Tomatoes; fresh market 7 20 101 103 121 122 146 161 217	1.90 Acres	0.0 T/A	90-75-0 #/A	0 #/A	0 #/A	0 #/A	Total	90 #/A	75 #/A	0 #/A		0.6 t/A
									brdct & disk in	45 #/A	75 #/A	0 #/A		
									sdrs @ fruit set	45 #/A	0 #/A	0 #/A		

Recommendations for more than one crop (multiple recommendations) are given for some/all fields. Use the recommendation for the crop you choose to grow.

indicates primary recommendation used for the PMT calculation.

Fertilizer Recommendations

Fertilizer Recommendations														
Farmer/Operator		Don J Showfelder				Plan Year			2024					
Street Address		12005 Homewood Rd				MDA operator no.			123456789					
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023					
Tract No. / Farm Name	Field No.	Crops & Note Numbers	Area	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Fertilizer To Be Applied					Lime
						Leg	Man.	Slu.	Method	N	P2O5	K2O	Mg	
Showfelder Farm	3 2024 [M]	2 Corn grain, conservation till 7 28 1 2 3 27 60 92 93	8.80 Acres	160 Bu/A	160-31-55 #/A	15 #/A	10 #/A	0 #/A	Total	135 #/A	31 #/A	55 #/A		0.8 t/A
									broadcast	30 #/A	0 #/A	28 #/A		
									banded w/planter	30 #/A	31 #/A	27 #/A		
									sidedress	75 #/A	0 #/A	0 #/A		
Showfelder Farm	3 2024	260 Small grain for silage 7 28 3 4 6 228	8.80 Acres	8.0 T/A	100-25-25 #/A	0 #/A	0 #/A	0 #/A	Total	100 #/A	25 #/A	25 #/A		0.8 t/A
									brdcst bef seeding	20 #/A	25 #/A	25 #/A		
									tpdrs@ green-up	80 #/A	0 #/A	0 #/A		
Showfelder Farm	4 2024	2 Corn grain, conservation till 28 1 2 3 27 60 92 93	9.00 Acres	160 Bu/A	160-29-0 #/A	15 #/A	20 #/A	0 #/A	Total	125 #/A	29 #/A	0 #/A		0.0 t/A
									broadcast	0 #/A	0 #/A	0 #/A		
									banded w/planter	30 #/A	29 #/A	0 #/A		
									sidedress	95 #/A	0 #/A	0 #/A		

Follow recommendations on this page if you decide to use commercial fertilizer rather than manure on any fields.

Follow recommendations on this page if you decide to use commercial fertilizer rather than manure on any fields.

[*] - indicates primary recommendation used for the PMT calculation.

Fertilizer Recommendations

Farmer/Operator		Don J Showfelder				Plan Year			2024					
Street Address		12005 Homewood Rd				MDA operator no.			123456789					
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023					
Tract No. / Farm Name	Field No.	Crops & Note Numbers	Area	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Fertilizer To Be Applied					Lime
						Leg.	Man.	Stu.	Method	N	P2O5	K2O	Mg	
Showfelder Farm	4 2024 [M]	260 Small grain for silage 28 3 4 6 228	9.00 Acres	8.0 T/A	100-25-0 #/A	0 #/A	0 #/A	0 #/A	Total	100 #/A	25 #/A	0 #/A		0.0 t/A
									brdcst bef. seeding	20 #/A	25 #/A	0 #/A		
									tpdrs@ green-up	80 #/A	0 #/A	0 #/A		
Showfelder Farm	5 2024 [*]	260 Small grain for silage 3 4 6 228	13.80 Acres	8.0 T/A	100-25-25 #/A	0 #/A	0 #/A	0 #/A	Total	100 #/A	25 #/A	25 #/A		0.0 t/A
									brdcst bef. seeding	20 #/A	25 #/A	25 #/A		
									tpdrs@ green-up	80 #/A	0 #/A	0 #/A		
Showfelder Farm	5 2024	5 Corn silage, conservation till 1 2 3 4 27 60 92 93	13.80 Acres	22 T/A	134-34-94 #/A	0 #/A	10 #/A	0 #/A	Total	124 #/A	34 #/A	94 #/A		0.0 t/A
									broadcast	30 #/A	0 #/A	54 #/A		
									banded w/planter	30 #/A	34 #/A	40 #/A		
									sidedress	64 #/A	0 #/A	0 #/A		

[*] - indicates primary recommendation used for the PMT calculation.

Fertilizer Recommendations

Farmer/Operator		Don J Showfelder				Plan Year			2024					
Street Address		12005 Homewood Rd				MDA operator no.			123456789					
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023					
Tract No. / Farm Name	Field No.	Crops & Note Numbers	Area	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Fertilizer To Be Applied					Lime
						Leg.	Man.	Slu.	Method	N	P2O5	K2O	Mg	
Showfelder Farm	5 2024	51 Cover crop for water quality	13.80 Acres	0.0 T/A	0-0-0 #/A	0 #/A	10 #/A	0 #/A	Total	0 #/A	0 #/A	0 #/A		0.0 t/A
Showfelder Farm	6 2024 [*]	260 Small grain for silage 7 3 4 6 228	10.40 Acres	8.0 T/A	100-0-0 #/A	0 #/A	0 #/A	0 #/A	Total	100 #/A	0 #/A	0 #/A		0.6 t/A
									brdcst bef seeding	20 #/A	0 #/A	0 #/A		
									tpdrs@ green-up	80 #/A	0 #/A	0 #/A		
Showfelder Farm	6 2024	5 Corn silage, conservation till 7 1 2 3 4 27 60 92 93	10.40 Acres	22 T/A	13-4-0-0 #/A	0 #/A	20 #/A	0 #/A	Total	114 #/A	0 #/A	0 #/A		0.6 t/A
									broadcast	0 #/A	0 #/A	0 #/A		
									banded w/planter	30 #/A	0 #/A	0 #/A		
									sidedress	84 #/A	0 #/A	0 #/A		

[*] - indicates primary recommendation used for the PMT calculation.

Fertilizer Recommendations

Farmer/Operator		Don J Showfelder				Plan Year			2024					
Street Address		12005 Homewood Rd				MDA operator no.			123456789					
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023					
Tract No. / Farm Name	Field No.	Crops & Note Numbers	Area	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Fertilizer To Be Applied					Lime
						Leg.	Man.	Slu.	Method	N	P2O5	K2O	Mg	
Showfelder Farm	6 2024	51 Cover crop for water quality	10.40 Acres	0.0 t/A	0-0-0 #/A	0 #/A	20 #/A	0 #/A	Total	0 #/A	0 #/A	0 #/A		0.6 t/A
Showfelder Farm	7 2022 [*]	10 Soybeans 3 4	20.70 Acres	50 Bu/A	0-0-0 #/A	0 #/A	0 #/A	0 #/A	Total	0 #/A	0 #/A	0 #/A		0.0 t/A
									brdcst/band @plntg	0 #/A	0 #/A	0 #/A		
Showfelder Farm	8 2024 [M]	2 Corn grain, conservation till 28 1 2 3 27 60 92 93	9.70 Acres	160 Bu/A	160-0-0 #/A	15 #/A	0 #/A	0 #/A	Total	145 #/A	0 #/A	0 #/A		0.0 t/A
									broadcast	0 #/A	0 #/A	0 #/A		
									banded w/planter	30 #/A	0 #/A	0 #/A		
									sidedress	115 #/A	0 #/A	0 #/A		

Follow recommendations on this page if you decide to use commercial fertilizer rather than manure on any fields.

[*] - indicates primary recommendation used for the PMT calculation.

Fertilizer Recommendations

Farmer/Operator		Don J Showfelder				Plan Year			2024					
Street Address		12005 Homewood Rd				MDA operator no.			123456789					
City, State, Zip, County		Ellicott City MD 21042 Howard				Date Plan Prepared			12-20-2023					
Tract No. / Farm Name	Field No.	Crops & Note Numbers	Area	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Fertilizer To Be Applied					Lime
						Leg.	Man.	Slu.	Method	N	P2O5	K2O	Mg	
Showfelder Farm	8 2024	260 Small grain for silage 3 4 6 228	9.70 Acres	8.0 T/A	100-0-0 #/A	0 #/A	0 #/A	0 #/A	Total	100 #/A	0 #/A	0 #/A		0.0 t/A
									brdcst bef seeding	20 #/A	0 #/A	0 #/A		
									tpdrs@ green-up	80 #/A	0 #/A	0 #/A		
Showfelder Farm	9 2024 [*]	74 Orchardgrss; Maint. 7 4 6 53 60 70 71 88 89 92 93 184 185 186	19.80 Acres	4.0 T/A	200-0-0 #/A	0 #/A	0 #/A	0 #/A	Total	200 #/A	0 #/A	0 #/A		0.8 t/A
									tpdrs@ green-up	50 #/A	0 #/A	0 #/A		
									tpdrs post hvst#1	50 #/A	0 #/A	0 #/A		
									tpdrs late summer	50 #/A	0 #/A	0 #/A		
									tpdrs late fall	50 #/A	0 #/A	0 #/A		
Showfelder Farm	10 2024 [*]	74 Orchardgrss; Maint. 7 4 6 53 60 70 71 88 89 92 93 184 185 186	15.10 Acres	4.0 T/A	200-20-0 #/A	0 #/A	0 #/A	0 #/A	Total	200 #/A	20 #/A	0 #/A		1.3 t/A
									tpdrs@ green-up	50 #/A	20 #/A	0 #/A		
									tpdrs post hvst#1	50 #/A	0 #/A	0 #/A		
									tpdrs late summer	50 #/A	0 #/A	0 #/A		
									tpdrs late fall	50 #/A	0 #/A	0 #/A		

[*] - indicates primary recommendation used for the PMT calculation.

Nutrient recommendations for forages were developed for hay production systems. Pasture-based producers can modify the timing and rate of nutrient applications to optimize their production system as long as the total annual application rate does not exceed the total annual recommendation for each nutrient.

Recommendations using Organic Nutrient Sources

Farmer/Operator		Don J Showfelder				Plan Year		2024							
Street Address		12005 Homewood Rd				MDA operator no.		123456789							
City, State, Zip,		Ellicott City MD 21042 Howard				Date Plan Prepared		12-20-2023							
Tract No. / Farm Name	Field No.	Area	Crops & Note Numbers	Yield Goal	Plant Nutrients Needed N-P2O5-K2O	Nitrogen Credits			Nutrient Sources to be Applied						
						Leg.	Man.	Slu.	Organic Nutrient Sources				Commercial Fertilizer N-P2O5-K2O	Lime	
									Type / Source	Min. Rate	Applic. Rate [Time Inc.]	Organic Waste Applic- Basis			Available N-P2O5-K2O
Showfelder Farm	3 2024 [*]	8.80 Acres	2 Corn grain, conservation till 7 28 1 2 3 27 60 92 93	160 Bu/A	160- 31- 55 #/A	15 #/A	10 #/A	0 #/A	(3) Beef S	0.35	10.0 tons/A [< 1 hr]	Preset Rate	71- 70- 174 #/A	64- 0- 0 #/A	0.8 t/A
Showfelder Farm	4 2024	9.00 Acres	2 Corn grain, conservation till 28 1 2 3 27 60 92 93	160 Bu/A	160- 29- 0 #/A	15 #/A	20 #/A	0 #/A	(3) Beef S	0.35	10.0 tons/A [< 1 hr]	Preset Rate	71- 70- 174 #/A	54- 0- 0 #/A	0.0 t/A
Showfelder Farm	8 2024 [*]	9.70 Acres	2 Corn grain, conservation till 28 1 2 3 27 60 92 93	160 Bu/A	160- 0- 0 #/A	15 #/A	0 #/A	0 #/A	(3) Beef S	0.35	10.0 tons/A [< 1 hr]	Preset Rate	71- 70- 174 #/A	74- 0- 0 #/A	0.0 t/A

Follow recommendations on this page if you decide to use manure as a nutrient source on any of these fields.

Notes			
Farmer/Operator	Don J Showfelder	Plan Year	2024
Street Address	12005 Homewood Rd	MDA operator no.	123456789
City, State, Zip, County	Ellicott City MD 21042 Howard	Date Plan Prepared	12-20-2023
<p>1. To satisfy TOTAL recommendation for many crops, it may be necessary to adjust SUGGESTED TIMING AND METHODS of application, (i.e. broadcast, topdress, sidedress, row, etc.) to be compatible with available equipment and materials.</p> <p>2. These recommendations assume that the highest level of nitrogen (N) management will be utilized and that N losses due to leaching, volatilization and denitrification are minimized by utilizing to best management practices.</p> <p>3. For conventional tillage, ag-lime recommendations are based upon the amount of oxides required for the surface 8" of soil. Lime should be thoroughly mixed with the soil by plowing and disking. If recommended amount of oxides exceeds 1.5 tons of lime per acre (assuming 50% total oxides), ½ should be plowed down and the remainder applied after plowing and disked in thoroughly.</p> <p>4. If topdressing ag-lime without tillage, reduce the total amount of oxides recommended by 50 percent. When topdressing ag-lime, and soil mixing is not possible, do not apply more than 1500 lbs per acre of oxides in any one application. The balance can be applied the next year. It would be best to do a soil test before making the second application.</p> <p>6. Split-application of nitrogen is required for optimal production and nitrogen use efficiency of established pasture and hay land and for the protection of ground water resources.</p> <p>7. Magnesium will be recommended when the soil test indicates a low or very low level. Use dolomitic lime as a liming material when magnesium is recommended AND when lime is needed to correct soil acidity. The magnesium (Mg) recommendation is expressed as elemental Mg when lime is not required.</p> <p>11. A number of vegetable crops have a starter phosphorus recommendation (expressed as phosphate or P2O5) of 25 pounds per acre. This includes sweet potatoes, many members of the Brassica genus - broccoli, collards, cabbage, Chinese cabbage, kale, kohlrabi, Brussels sprouts, cauliflower), onions, cucurbits (cucumbers, melons, squash, pumpkins and watermelons). If soil test FIV-P is 150 or greater, phosphorus risk assessments (Phosphorus Site Index [PSI] and/or Phosphorus Management Tool [PMT]) must first be conducted to determine if starter phosphorus is allowed.</p> <p>20. A number of vegetable crops have a starter phosphorus recommendation (expressed as phosphate or P2O5) of 50 pounds per acre. This includes asparagus, peppers, white potatoes, spinach and tomatoes. If soil test FIV-P is 150 or greater, phosphorus risk assessments (Phosphorus Site Index [PSI] and/or Phosphorus Management Tool [PMT]) must first be conducted to determine if starter phosphorus is allowed.</p>			

Notes

Farmer/Operator	Don J Showfelder	Plan Year	2024
Street Address	12005 Homewood Rd	MDA operator no.	123456789
City, State, Zip,	Ellicott City MD 21042 Howard	Date Plan Prepared	12-20-2023
<p>27. If soil test FIV-P is 150 or greater, a phosphorus risk assessment (Phosphorus Site Index [PSI] or Phosphorus Management Tool [PMT]) must first be conducted to determine if a starter containing phosphorus is allowed. A starter may be beneficial in stimulating early plant growth, especially on cold, wet soils. A good starter fertilizer should supply 20-30 lbs/A of N, P2O5, and K2O.</p> <p>28. Proper timing of nutrient applications is important. Apply nutrient sources as close to planting or nutrient demand as possible so that nutrients are absorbed by plants quickly and not allowed to runoff into surface water or leach into ground water.</p> <p>53. (See related 70, 71, 88 & 89) For the maintenance of fescue (not accumulated for late fall/winter grazing), orchardgrass or reed canarygrass (4 tons per acre yield goal), the TOTAL nitrogen recommendation ranges from 150-200 lbs per acre. Topdress 35-50 lbs per acre at greenup. In addition, topdress 40-50 lbs per acre after the first harvest, 35-50 lbs in late summer, and 40-50 lbs per acre in late fall.</p> <p>60. If the nitrogen requirement is met by surface broadcasting UAN either prior to or at planting, use of proven urease and nitrification inhibitors is recommended to minimize nitrogen loss via volatilization and/or denitrification pathways.</p> <p>70. For the maintenance of fescue (not accumulated for late fall/winter grazing), orchardgrass or reed canary grass (5 tons per acre yield goal), the TOTAL nitrogen recommendation ranges from 200-250 lbs per acre. Topdress 60-80 lbs per acre at greenup. In addition, topdress 50-60 lbs per acre after the first harvest, 50-60 lbs per acre in late summer, and 40-50 lbs per acre in late fall.</p> <p>71. For the maintenance of fescue (not accumulated for late fall/winter grazing), orchardgrass or canary grass (6 tons per acre yield goal, and up), the TOTAL nitrogen recommendation ranges from 250-300 lbs per acre. Topdress 80-100 lbs per acre at greenup. In addition, topdress 65-75 lbs per acre after the first harvest, 65-75 lbs per acre in late summer, and 40-50 lbs per acre in late fall.</p> <p>88. For the maintenance of fescue (not accumulated for late fall/winter grazing), orchardgrass or reed canarygrass (up to 2 tons per acre yield goal), the TOTAL nitrogen recommendation ranges from 75-100 lbs per acre. Topdress 35-50 lbs per acre after the first harvest. In addition, topdress 40-50 lbs per acre in late fall.</p> <p>89. For the maintenance of fescue (not accumulated for late fall/winter grazing), orchardgrass or reed canarygrass (3 tons per acre yield goal), the TOTAL nitrogen recommendation ranges from 100-150 lbs per acre. Topdress 30-50 lbs per acre after the first harvest. In addition, topdress 30-50 lbs per acre in late summer and 30-40 lbs in late fall.</p>			

Notes			
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Street Address	12005 Homewood Rd	MDA operator no.	123456789
City, State, Zip.	Ellicott City MD 21042 Howard	Date Plan Prepared	12-20-2023
<p>92. If UAN is dribbled or streamed on the soil surface, use a proven urease inhibitor to help minimize nitrogen loss via volatilization.</p>			
<p>93. If nitrogen source is granular urea, use a proven urease inhibitor to help minimize loss via volatilization.</p>			
<p>101. Direct application of raw manure is not recommended for vegetable or herb crops other than sweet corn. If raw manure application is intended for a field that will be planted with vegetable or herb crops other than sweet corn, it should be applied and incorporated just prior to establishing a cover crop the previous fall, at rates that will not exceed the cover crop utilization of nutrients that fall.</p>			
<p>103. Well-composted manure may be applied directly to all vegetable crops, if it is incorporated prior to planting the crop.</p>			
<p>121. Calcium (Ca) may be deficient in some soils that have not been properly limed, where excessive potash fertilizer has been used, and/or where crops are subjected to drought stress.</p>			
<p>122. Magnesium (Mg) may become deficient in some soils used for vegetable production. Dolomitic or high-magnesium limestones should be used when liming soils that are low in magnesium. Magnesium should be applied as a fertilizer source (e.g. epsom salts, sulfate of potash-magnesia, kieserite, brucite, etc.) on low-magnesium soils where lime is not needed. Magnesium may be applied as a foliar spray to supply magnesium to the crop in emergency situations.</p>			
<p>144. A number of vegetable crops recommend crop replacement values of 25 lb K₂O/A on soils testing excessive. These include many members of the Brassica genus - broccoli, collards, cabbage, Chinese cabbage, kale, kohlrabi, Brussels sprouts, cauliflower), onions, and chives.</p>			
<p>146. A number of vegetable crops recommend crop replacement values of 50 lb K₂O/A on soils testing excessive. These include cucumbers, melons, squash, pumpkins, gourds, peppers, white potatoes, spinach, tomatoes, and others.</p>			
<p>161. Using good tillage practices, winter cover crops, and periodically resting the land with the use of summer cover crops between vegetable plantings, are essential to prevent the deterioration of soil structure that is vital for maintaining high levels of production.</p>			
<p>166. For broccoli, the total nitrogen recommendation is 150-200 lbs/acre. Broadcast and disk in 50-100 lbs/acre before planting, sidedress 50 lbs/acre 2-3 weeks after planting, and sidedress 50 lbs/acre 4-6 weeks after planting.</p>			

Notes

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<p>167. For brussels sprouts, cabbage, cauliflower, Chinese cabbage and bok choy, the total nitrogen recommendation is 100-150 lbs/acre. Broadcast and disk in 50-75 lbs/acre before planting, sidedress 25-50 lbs/acre 2-3 weeks after planting, and sidedress 25-50 lbs/acre more if needed, according to the weather.</p>			
<p>172. For cucumbers and bitter melon, the total nitrogen recommendation is 80-150 lbs/acre. Broadcast and disk in 25-50 lbs/acre before planting, band place 25 lbs/acre with the planter, and sidedress 25-75 lbs/acre when the vines begin to run, or apply in irrigation water.</p>			
<p>175. For kale and collards, the total nitrogen recommendation is 100-200 lbs/acre. Broadcast and disk in 50-100 lbs/acre before planting, sidedress 25-50 following the first cutting, and sidedress an additional 25-50 lbs/acre if needed.</p>			
<p>177. For leaf lettuces including endive, ecarole, arugula, radicchio, and others, as well as basil, cilantro, and oregano, the total nitrogen recommendation is 100-125 lbs/acre. Broadcast and disk in 50-75 lbs/acre before planting and sidedress 25-50 lbs/acre 3-5 weeks after planting.</p>			
<p>184. For each yield goal, the combined nitrogen (N) from the split applications must not exceed the maximum total N recommendation.</p>			
<p>185. The late summer topdress application for fescue, orchardgrass, reed canarygrass, bromegrass, timothy, and perennial ryegrass, should be applied between mid-August and early September, depending on sufficient rainfall to move the nitrogen into the soil.</p>			
<p>186. Late fall nitrogen application (mid- to late October in the mountains of western Maryland and late October to mid-November elsewhere in Maryland, (approximately the killing frost date) stimulates root growth and leads to a more vigorous stand. This application must be a commercial nitrogen source where all N is readily available. Manure or other organic sources of nitrogen are not recommended for the late fall application. If late fall application is not made, add 40-50 lb.N/acre to the greenup application.</p>			
<p>198. For peppers, the total nitrogen recommendation is 100-180 lbs/acre. Broadcast and disk in 50 lbs/acre before planting, sidedress 50 lbs/acre after first fruit set, and sidedress 25-80 lbs/acre later in the season if needed.</p>			
<p>202. For winter squash, pumpkins, gourds, and pumpkin squash, the total nitrogen recommendation is 50-100 lbs/acre. Broadcast and disk in 25-50 lbs/acre before planting, and sidedress 25-50 lbs/acre when vines start to run.</p>			

Notes

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- 208. For summer squash, the total nitrogen recommendation is 75-100 lbs/acre. Broadcast and disk in 25-50 lbs/acre before planting, sidedress 50 lbs/acre when the vines start to run, and apply 25-30 lbs/acre through the irrigation system.

- 217. For tomatoes, fresh market, the total nitrogen recommendation is 80-90 lbs/acre. Broadcast and disk-in 40-45 lbs/acre, sidedress 40-45 lbs/acre when first fruits are set.

- 228. For small grain for silage, the TOTAL nitrogen recommendation ranges from 75-100 lbs per acre. Broadcast 15-20 lbs per acre before seeding, and topdress 60-80 lbs per acre at greenup.

MDA's Nutrient Application Requirements

NUTRIENT APPLICATION REQUIREMENTS

Maryland Department of Agriculture June 2022

Authority: Agriculture Article, §§ 8-801—8-806; COMAR 15.20.07.02

I. GENERAL GUIDELINES

A. This document addresses (1) Setbacks for Nutrient Application, (2) Application Timing for all nutrients, organic and chemical, and (3) Temporary Field Stockpiling (staging) of Organic Materials. Application of nutrients may vary depending on the crop, season, nutrient source, and weather conditions. A person applying nutrients shall use best management practices, including following these “Nutrient Application Requirements,” to maximize plant utilization efficiency as described in Section I-B of the *Maryland Nutrient Management Manual*, and minimize the potential for nutrient movement to sensitive areas and losses to surrounding water bodies, including surface and groundwater.

B. This document does not supersede Maryland Department of the Environment (MDE) Animal Feeding Operations regulations in COMAR 26.08.01 and 26.08.03.09, or the MDE Sewage Sludge Management regulations in COMAR 26.04.06 regarding the requirements for sewage sludge (biosolids) storage, buffer zones, and the incorporation of biosolids into the soil by the end of each working day.

C. All materials that provide primary crop nutrients shall be included in, and managed by, a Nutrient Management Plan. These materials include chemical fertilizer, organic materials such as animal manure, biosolids, food processing wastes and residuals, spent mushroom substrate, spray irrigation from wastewater treatment plants, composts, other waste streams containing nutrients, and soil conditioners/amendments.

D. Imported organic fertilizer materials that provide primary nutrients such as food processing wastes and residuals, spent mushroom substrate, spray irrigation from wastewater treatment plants, composted wastes, other waste streams containing nutrients shall have a current registration with the Maryland Department of Agriculture (MDA) State Chemist as required by COMAR 15.18.03.02 and COMAR15.18.03.04

E. These Nutrient Application Requirements shall be followed by certified consultants in the development of nutrient management plans, and by operators and applicators during plan implementation in order to comply with COMAR 15.20.08.05H and .05I

II. DEFINITIONS

A. “Cover Crop” means a cereal grain or cereal grain mix planted in accordance with the “Maryland Winter Cover Crop Program Requirements” for seeding rates, planting dates, and planting methods, as published on the MDA website.

B. “Food Processing Residual” means an organic material generated by processing agricultural commodities for human or animal consumption. The term includes food residuals, food coproducts, food processing wastes, food processing sludges, or any other incidental material whose characteristics are derived from processing agricultural products for human consumption or animal consumption.

C. “Food Processing Residual” does not include:

1. Digester Digestate;
2. Animal and Poultry Manures;
3. Class A & B Biosolids, as defined by MDE;
4. Compost;
5. Spent Mushroom Soil; or
6. Water Plant Residuals.

III. SETBACKS FOR NUTRIENT APPLICATION

A. “Nutrient Application Setback” means a vegetated area of a prescribed width where nutrient-containing material may not be applied, as measured from the edge of surface water, including perennial and intermittent streams. An intermittent stream means a stream or the reach of a stream that is below the local water table for at least some part of the year, and obtains its flow from both surface runoff and groundwater discharge. Surface water does not include:

1. Ephemeral streams (defined as streams which flow only in direct response to precipitation in the immediate watershed and which have a channel bottom that is always above the local water table);
2. Irrigation and treatment ditches, as defined under “waters” in COMAR 15.20.08.03(B)(39), and
3. Field ditches, which, for purposes of this exception, are defined as channelized waterways that, as provided in the USDA-NRCS National Cooperative Soil Survey, are not within:
 - a. A floodplain soil mapping unit;
 - b. A hydric soil unit and mapped as a narrow, elongated feature in a fluvial/floodplain position; or
 - c. A soil mapping unit that has a “B” slope class or steeper.

B. Effective January 1, 2014, a person who uses nutrients shall implement the following nutrient application setback requirements:

1. An application of crop nutrients using a broadcast method (e.g., spinners, splashers) either with or without incorporation requires a 35-foot setback.
2. A directed spray application or the injection of crop nutrients requires a 10-foot setback.
3. Excepting perennial forage crops grown for hay or pasture, vegetation in the 10-foot setback area may not include plants that would be considered part of the crop grown in the field.
4. Pastures and hayfields are subject to a 10-foot nutrient application setback.
5. Nutrients may not be applied mechanically within the setback. Except as provided in subsection III.B.6, livestock shall be excluded from the setback to prevent direct deposition of nutrients within the setback.
6. As an alternative to fencing livestock from the setback area, a person shall work with the soil conservation district to develop and implement a Soil Conservation and Water Quality Plan. The plan shall include Best Management Practices (BMPs) such as stream crossings, alternative watering facilities, pasture management or other MDA-approved BMPs that are considered to be equally protective of water quality and stream health.
7. As an alternative to a nutrient application setback, MDA may approve other BMPs that it finds equally protective of water quality and stream health.
8. Sacrifice lots (less than 75% grass or grass legume mix) shall maintain a 35-foot setback.

C. Operators are responsible for sediment and erosion control of stream crossing areas. Operators shall move livestock from one side of the stream to the other side only through stream crossings designed to prevent erosion and sediment loss. Operators shall gate crossing areas wider than 12 feet. Operators may allow livestock controlled access to streams for watering in accordance with USDA-NRCS Field Office Technical Guide standards and specifications.

IV. APPLICATION TIMING

A. The consultant, applicator, operator, and the certified farm operator shall comply with the following management requirements when recommending or applying nutrients throughout the year. These requirements separately address the use of (1) chemical fertilizers and (2) organic fertilizers. An organic fertilizer is derived from either a plant or animal product, and contains carbon, and one or more elements other than hydrogen and oxygen that are essential for plant growth. The consultant, applicator, operator, and certified farm operator shall follow the nutrient application recommendations for crops as specified in the Maryland Nutrient Management Manual Section I-B. Nutrients shall be applied as close to plant nutrient uptake period as possible.

B. Spring (March 1 through June 30)

1. A person may make a nutrient application during the spring time period (March 1 through June 30) for an existing crop or a crop to be planted during this time period in accordance with recommendations found in Section I-B of the Maryland Nutrient Management Manual.
2. Nutrient application is prohibited when the soil is saturated.
 - a. A person may not apply nutrients in areas of fields that have standing water because the water holding capacity of the soil has been exceeded.
 - b. A person may apply nutrients after the standing water has been absorbed by the soil.
3. Frozen or Snow-Covered Ground. A person may not make a nutrient application if the ground is covered with snow greater than one inch, or when the ground is hard-frozen greater than two inches.
4. Organic Nutrient Sources other than Food Processing Wastes and Residuals. Unless the farm operation is a no-till operation, a person shall directly inject the organic nutrient source into the soil or incorporate the material into the soil as soon as possible, but no later than 48 hours after application. If the farm is a no-till operation, MDA may direct the operation to incorporate the material into the soil dependent on such factors as weather, wind, and the severity of the odor caused by the material.
5. Food Processing Residuals. For all crops, except pastures and hayfields, a person applying food processing residuals shall: (a) directly inject the material into the soil; or (b) incorporate the material into the soil as soon as possible, but no later than the end of the day that the application is made. If incorporated, the incorporation must result in 95% soil coverage of the material and shall consist of heavy discing, chisel plowing, or use of other primary tillage equipment. Vertical tillage equipment may not be used to incorporate this material.
6. Pastures and Hay Fields. If a pasture or hay field has a minimum of 75% vegetation predominantly in grass or grass legume mix and legumes, a person may make a nutrient management application in accordance with recommendations found in Section I-B of the Maryland Nutrient Management Manual.
7. Emergency Situations. If a person faces an emergency situation due to an imminent overflow of a storage facility, the person shall manage the emergency in consultation with MDA. In these situations, the person shall contact the MDA regional nutrient management representative for guidance before nutrient application.

C. Summer (July 1 through September 9)

1. A person may make a nutrient application during the summertime (July 1 through September 9) period for an existing crop or a crop to be planted during this time period in accordance with recommendations found in Section I-B of the Maryland Nutrient Management Manual.
2. Nutrient application is prohibited when the soil is saturated.
 - a. A person may not apply nutrients in areas of fields that have standing water because the water holding capacity of the soil has been exceeded.
 - b. A person may apply nutrients after the standing water has been absorbed by the soil.
3. Organic Nutrient Sources other than Food Processing Wastes and Residuals. Unless the farm operation is a no-till operation, a person shall directly inject the organic nutrient source into the soil or incorporate the material into the soil as soon as possible, but no later than 48 hours after application. If the farm is a no-till operation, MDA may direct the operation to incorporate the material into the soil dependent on such factors as weather, wind, and the severity of the odor caused by the material.
4. Food Processing Residuals. For all crops, except pastures and hay fields, a person applying food processing residuals shall: (a) directly inject the material into the soil; or (b) incorporate the material into the soil as soon as possible, but no later than the end of the day that the application is made. If incorporated, the incorporation must result in 95% soil coverage of the material and shall consist of heavy discing, chisel plowing, or use of other primary tillage equipment. Vertical tillage equipment may not be used to incorporate this material. A person shall plant a harvestable crop or cover crop no later than fourteen (14) days after the application of the material to the field is complete.
5. Pastures and Hay Fields. If a pasture or hay field has a minimum of 75% vegetation predominantly in grass or grass legume mix and legumes, a person may make a nutrient management application in accordance with recommendations found in Section I-B of the Maryland Nutrient Management Manual.

6. Emergency Situations. If a person faces an emergency situation due to an imminent overflow of a storage facility, the person shall manage the emergency in consultation with MDA. Operators in such situations shall contact the MDA regional nutrient management representative for guidance before nutrient application.

D. Fall Application (September 10 through December 15)

1. Chemical Fertilizers. A person may make a fall application of a chemical fertilizer for an existing crop or a crop to be planted during this time period (September 10 through December 15) in accordance with recommendations found in Section I-B of the Maryland Nutrient Management Manual.

2. General Rules for Application of Organic Nutrient Sources.

a. Application of Organic Nutrient Sources other than Poultry Litter. A person may make a fall application of an organic nutrient source other than poultry litter for an existing crop or a crop to be planted either during this time period (September 10 through December 15) or the following spring (no later than June 1) provided that, for each such crop, the rates and applications are made in accordance with paragraph 2(b) of this subsection and the recommendations found in Section I-B of the *Maryland Nutrient Management Manual*.

b. Application of Poultry Litter. A person may make a fall application of poultry litter for an existing crop or a crop to be planted during this time period (September 10 through December 15) provided that, for each such crop, the rates and applications are made in accordance with paragraph 2(b) of this subsection and the recommendations found in Section I-B of the Maryland Nutrient Management Manual.

3. General Conditions for Application of Organic Nutrient Sources.

a. Nutrient application is prohibited when the soil is saturated.

(i) A person may not apply nutrients in areas of fields that have standing water because the water holding capacity of the soil has been exceeded.

(ii) A person may apply nutrients after the standing water has been absorbed by the soil.

b. Frozen or Snow-Covered Ground. A person may not make a nutrient application if the ground is covered with snow greater than one inch, or when the ground is hard-frozen greater than two inches.

c. Organic Nutrient Sources other than Food Processing Wastes and Residuals. Unless the farm operation is a no-till operation, a person shall directly inject the organic nutrient source into the soil or incorporate the material into the soil as soon as possible, but no later than 48 hours after application. If the farm is a no-till operation, MDA may direct the operation to incorporate the material into the soil dependent on such factors as weather, wind, and the severity of the odor caused by the material.

d. Food Processing Residuals.

(i) September 10 through October 31 Time Period. For all crops, except pastures and hayfields, a person applying food processing residuals shall: (a) directly inject the material into the soil; or (b) incorporate the material into the soil as soon as possible, but no later than the end of the day that the application is made. If incorporated, the incorporation must result in 95% soil coverage of the material and shall consist of heavy discing, chisel plowing, or use of other primary tillage equipment. Vertical tillage equipment may not be used to incorporate this material. A person shall plant a harvestable crop or cover crop no later than fourteen (14) days after the application of the material to the field is complete.

(ii) November 1 through the end of February Time Period.

(aa) Non-Injectable Food Processing Residuals. From November 1 through the last calendar day of February of the following year, a person may not apply non-injectable food processing residuals to land but instead, must be properly stored.

(bb) Injectable Food Processing Residuals. From November 1 through December 15, a person may only inject food processing residuals that are injectable into soil growing an existing crop or cover crop. From December 16 through the last calendar day of February of the following year, a person must properly store this material.

e. Fallow Cropland. A person making a fall-application of an organic nutrient source to fallow cropland shall plant a cover crop as soon as possible after application, following the recommendations found in Section I-B of the Maryland Nutrient Management Manual. The cover crop planting shall occur no later than November 15 and be maintained until March 1

f. The rate of nutrient application shall be determined based on recommendations outlined in Section I-B of the Maryland Nutrient Management Manual using either nitrogen or phosphorus-based criteria.

g. If the application is phosphorus-based, the phosphorus application rate:

(i) For a fall-seeded crop, shall be based on the phosphorus recommendations for that crop;

(ii) For crops to be planted the following spring (no later than June 1), may not exceed the one-year crop removal rate of phosphorus for the spring-planted crop;

(iii) Shall follow the provisions of the Phosphorus Management Tool, as they may otherwise apply; and

(iv) Shall result in an application rate of plant available nitrogen not exceeding 50 lbs. per acre.

(h) If the application is nitrogen-based, the rate of application for a fall-seeded crop shall be based on recommendations for plant available nitrogen as outlined in Section I-B of the Maryland Nutrient Management Manual. If the application is

related to a crop that is to be planted the following spring (no later than June 1), the application of nitrogen may not exceed 50 lbs. of plant available nitrogen per acre.

4. Emergency Situations. If a person faces an emergency situation due to an imminent overflow of a storage facility, the person shall manage the emergency in consultation with MDA. Operators in such situations shall contact the MDA regional nutrient management representative for guidance before nutrient application.

E. Winter Application (December 16 through the last calendar day of February of the following year)

1. Chemical Fertilizers. A person may not make a winter application of a chemical fertilizer for an existing crop or to cropland. However, for small grains and perennial forage crops, a person may apply nitrogen at green-up when tillering begins as recommended in the Maryland Nutrient Management Manual Section I-B. In addition, a person may apply certain nutrients for greenhouse production and for other vegetable and small fruit crops listed in the Maryland Nutrient Management Manual Section I-B. The restriction on the application of chemical fertilizers during winter also does not apply to potash or liming materials.

2. Organic Nutrient Sources. Except as provided in §E.4 below, a person may not make a winter application of an organic nutrient source for an existing crop or to cropland. Instead, operators and generators of organic nutrient sources shall make plans for adequate storage to eliminate the need for a winter application.

3. Imported Organic Nutrient Sources.

A person may not make a winter application of an imported organic nutrient source to an existing crop or to cropland. This prohibition includes an organic nutrient source combined from on-farm generated organic fertilizers and imported organic fertilizers. In emergency situations, MDA may allow relocation of manure/organics to the best available options.

4. Emergency Situations pertaining to imminent overflow of on-farm generated nutrient sources.

- a. A person may make a winter application of an organic nutrient source to an existing crop or cropland only if:
 - (i) The operation has inadequate storage for on-farm generated organic nutrient source (i.e., the liquid storage capacity will be exceeded before the March 1 winter application restriction);
 - (ii) The nutrient source is non-stackable (greater than 75% moisture content); and
 - (iii) There is no other reasonable option to manage it.
- b. Applications required in emergency situations due to an imminent overflow of a storage facility from on-farm generated organic nutrient source(s) shall be managed in consultation with MDA before nutrient application.
- c. Operators in such situations shall contact the MDA regional office for guidance and verification of the necessary application.
- d. Any such application shall be made in accordance with Section I-B of the Maryland Nutrient Management Manual.
- e. The following restrictions apply to any such winter application:
 - (i) Nutrient application is prohibited during the winter if the organic nutrient source is stackable (equal to or less than 75% moisture content, such as poultry litter) or adequate storage is available.
 - (ii) Nutrient application is prohibited when the soil is saturated.
 - (aa) A person may not apply nutrients in areas of fields that have standing water because the water holding capacity of the soil has been exceeded.
 - (bb) A person may apply nutrients after the standing water has been absorbed by the soil.
 - (iii) Frozen or snow-covered ground. A person may not make a nutrient application if the ground is covered with snow greater than one inch or when the ground is hard-frozen greater than two inches.
 - (iv) Nutrient application is prohibited to land with a slope greater than 7 percent.
 - (v) Rates of application shall be minimized and available acreage used to the greatest extent practical. In no case shall the application rate per acre exceed the one-year phosphorus removal rate or 50# of plant available nitrogen per acre for the next harvested crop. Any winter applied nutrients will be deducted from the recommendations of the next harvested crop.
 - (vi) Winter applications shall be made on existing vegetative cover, small grain crops, or established hay fields and pastures and maintained as such until March 1st.
 - (vii) A setback of at least 100 feet from all surface waters shall be maintained, unless best management practices providing water quality protection equivalent to such a setback are in place. (Surface water is defined as any permanent or intermittent, continuous, physical conduit for transporting water. Shovel ditches and water leads are not included as surface waters for purposes of this policy).

V. TEMPORARY FIELD STOCKPILING (STAGING) FOR STACKABLE ORGANIC NUTRIENT SOURCE MATERIALS (EQUAL TO OR LESS THAN 75% MOISTURE CONTENT)

A. General Provisions

1. When other immediate use options and alternatives are not available, temporary field stockpiling (staging) of organic nutrient source-materials (equal to or less than 75% moisture content) is allowed. Temporary field stockpiling (staging) provides greater environmental protection than a fall or winter application of nutrients or applying nutrients too far ahead of normal planting time and crop uptake.

2. To minimize the duration of temporary field stockpiling (staging), operators shall coordinate with integrators to schedule cleanouts as close to spring planting as possible, thereby providing a source of nutrients that is in phase with crop nutrient needs.

3. Existing storage shall be fully used prior to stockpiling material in the field.

4. Any material staged in a temporary field stockpile shall be land applied in the first spring season (no later than June 30) following the placement of the stockpile.

B. The temporary field stockpiling (staging) shall be located:

1. If a vegetated buffer is not in place, at least 100 feet from any surface water as defined in COMAR 15.20.08.03(B)(39) and any irrigation or treatment ditches; and if a vegetated buffer is in place, at least 35 feet from any such water;

2. At least 100 feet from wells, springs, and wetlands; however, if the well is located down gradient from the temporary field stockpiling (staging) area, at least 300 feet from the well;

3. At least 200 feet from any residence outside the operator's property;

4. Outside flood prone areas and areas subject to ponding;

5. If located on more than a 3% grade slope and no diversion installed, no farther than 150 feet from the top of the slope.

C. All organic nutrient source materials shall be stacked at least 6 feet high and peaked to prevent precipitation from soaking into the pile.

D. Materials shall be field stockpiled (staged) temporarily in a manner that prevents nutrient runoff.

Temporary field stockpiling (staging) locations for subsequent piles should stay at the same location, rather than be moved from place to place.

F. All organic nutrient source materials shall be removed from the temporary field (staged) stockpile and the ground area thoroughly scraped or cleaned when the application of the materials takes place.

G. Temporary field stockpile (staged) areas shall be restored to its original condition and, if necessary, reseeded with grass or an agronomic crop to facilitate nutrient uptake.

MDA

**Record Keeping,
Application
Variances
& Inspection**



MARYLAND NUTRIENT MANAGEMENT PROGRAM

Agricultural Operation Record Keeping Requirements

(January 2003)

The Maryland Nutrient Management Program (MNMP) has developed a new record keeping system, which enables operators to evaluate crop management and nutrient management decisions, and helps consultants make more accurate nutrient recommendations. Included in the new system is a *Field-By-Field Nutrient Application Record* form, a *Grain Yield Calculation* sheet and a *Forage Yield Calculation* sheet.

According to the Water Quality Improvement Act (WQIA) of 1998, the application of nutrients on a farm operation must be documented, and certain records must be maintained by the operator for either 3 or 5 years (See Table 1). It may, at times, be necessary to make these records available to a Maryland Department of Agriculture (MDA) Nutrient Management Specialist when he/she evaluates the implementation of a nutrient management plan.

Table 1.

<p>For 3 years, the following records/plan information must be kept:</p> <ul style="list-style-type: none">➤ Nutrient management plan prepared by certified consultant➤ Receipts for nutrients purchased➤ Manure analysis laboratory report and management information (if applicable)➤ Soil analysis laboratory report➤ Documentation of field-by-field nutrient quantity, rates, timing, type and analysis➤ Documentation justifying past revisions or adjustments to the nutrient management plan <p>For 5 years, the following records must be kept:</p> <ul style="list-style-type: none">➤ Crop yields and support of crop yield data each year for 5 years <p>For nurseries or out -of-ground producers, the following records must be kept:</p> <ul style="list-style-type: none">➤ Description of production cycles and nutrients applied, description of substrate, analysis of organic materials used as a source of nutrients in the substrate, and any monitoring information on run-off testing➤ Documented nutrient use for crops without yield goals

In addition to documenting nutrient applications, it is important to document any adjustments to the nutrient management plan. These adjustments include:

- Change in land base
- Change in crops
- Change in nutrient source
- Change in the number of animals
- Change due to manure analysis

Some adjustments are beyond the operator's control, however they still must be documented. These kinds of adjustments include:

- Natural disasters
- Animal mortality or disease
- Economic factors (market changes)
- Weather

Field-by-Field Nutrient Application Record Form

On the new *Field-by-Field Nutrient Application Record* form, operators can easily document the application of nutrients on their farm operations, and account for each farm that they manage on an annual basis. Operators can also keep track of one or more fields that are planted with the same crop and managed similarly.

This form contains two separate areas for recording nutrient applications based on either the same field with different crops in a cropping year or different fields with different crops or management considerations. Each nutrient application can be documented by date, or if the applications are similar, multiple applications can be recorded with several dates on one row.

Other information recorded on this form include the application type (such as chemical fertilizer, animal manure or bio-solids), analysis, rate, total amount applied, method of application and acres applied. Lime application can also be recorded on this form although it is not required by the regulations. Operators can also record any notes specific to the application activity as needed.

Copies of the *Field-by-Field Nutrient Application Record* form can be made by the operator or obtained by contacting the MNMP. Questions regarding this form, record keeping in general or the MNMP can be directed to the county's Extension Agent in Agricultural Science or MDA's Nutrient Management Program at 410-841-5959.

Grain and Forage Yield Calculation Sheets

Two other forms that have been developed by the MNMP are the *Grain Yield Calculation Sheet* and *Forage Yield Calculation Sheet*. These two forms are designed to help operators estimate their crop yields.

Yield information is based on each farm by crop per year. Multiple fields having similar soil characteristics and management for growing a particular crop can be combined to obtain a representative yield. The harvest of a crop can be documented on one or more dates and be based on a similar unit of weight for hay and percent moisture for grain. Once all of the crop harvest information is final, calculations are provided to determine yield estimates.

Grain factors are provided based on information from the University of Maryland Extension and the Penn State Agronomy Guide. On the bottom of each sheet there is a reminder to operators to include determined yields into their nutrient management plan record keeping requirements.

FIELD BY FIELD NUTRIENT APPLICATION RECORD

January-03

FARM NAME: _____

OPERATOR: _____

YEAR: _____

FIELD ID/CROPPING INFORMATION:

Field or Field Strips:		Crop:	Acres:	Actual Yield:		
Application Types:		Fertilizer, Animal Manure, Biosolids, Lime				
<i>Application Date</i>	<i>Nutrient Type</i>	<i>Analysis N-P-K</i>	<i>Application Rate Per Acre</i>	<i>Total Amount Applied</i>	<i>Application Method</i>	<i>Acres Applied</i>
Notes:						

Field or Field Strips:		Crop:	Acres:	Actual Yield:		
Application Types:		Fertilizer, Animal Manure, Biosolids, Lime				
<i>Application Date</i>	<i>Nutrient Type</i>	<i>Analysis N-P-K</i>	<i>Application Rate Per Acre</i>	<i>Total Amount Applied</i>	<i>Application Method</i>	<i>Acres Applied</i>
Notes:						

All records on this sheet, except for lime information, is required for Nutrient Management Regulations

Field-By-Field Nutrient Application Record Form

Definitions

Farm Name: Name of the farm receiving nutrients, lime or pesticides.

Operator: Name of the person who manages the agricultural operation.

Year: The year in which nutrients have been applied.

Field or Field Strips: An area sharing common characteristics, including soil type, nutrient content and plant type or crop produced, such that the nutrients can be recommended and managed in a uniform and consistent manner.

Crop: Primary and/or cover crop grown.

Acres: Total acres representative of the crop grown.

Actual Yield: Crop yield achieved at the time of crop harvest.

Application Date: The date that the nutrient application was made. Any information recorded on the form will be relative to this date.

Nutrient Type: The type of nutrient application such as commercial fertilizer (ammonium nitrate, etc.), animal manure (dairy, beef, etc.), biosolids (lime stabilized, anaerobically digested, etc.), or lime made on the application date. Use additional rows for multiple types of applications on the same date.

Analysis N-P-K: The chemical composition of the applied material as reported by a credited laboratory, or the product label measuring the percentage of nitrogen, phosphorus and potassium.

Application Rate (per acre): Rate of nutrient application measured in wet tons or gallons.

Total Amount Applied: The total quantity of nutrients applied; measured in wet tons or gallons per acre.

Application Method: The method in which the nutrient application is made, such as surface application, surface with incorporation and injection.

Acres Applied: The total number of acres that received the nutrient application.

Notes: Any specific information or occurrences useful for future management of a particular field including notation of variation from NMP recommendations.

FORAGE YIELD CALCULATION SHEET

(May 2022)

Farm: _____

Year: _____

Field/Mgmt Unit: _____ Acres: _____

Crop: _____

Harvest #	Date of Harvest	Bale Description	Number of Bales A	Average Bale Weight (lbs) B	Yield per Cutting (tons/acre) [(AxB)/Acres]/2000 C
1					
2					
3					
4					
5					
6					

FORAGE YIELD CALCULATION

1) Enter total numbers of bales (total of column A above)

Total Number of Bales

2) Enter the average bale weight (average of column B above)

Average Bale Weight

3) Calculate total lbs harvested

$$total\ lbs\ harvested = total\ number\ of\ bales \times average\ bale\ weight$$

Total lbs Harvested

4) Calculate **forage** yield in tons per acre

$$forage\ yield = \left(\frac{total\ lbs\ harvested}{field\ acreage} \right) / 2000$$

Forage Yield (tons/acre)

IMPORTANT:

- Yield information on this calculation sheet must be retained for 5 years
- Remember to record all cuttings made on any given field or management unit
- Harvesting moisture is assumed to be 12-18% (University of Maryland Cooperative Extension estimate)
- Information on calculating yields based on the volume of a storage facility (silo, bunker, agr. Bag) can be obtained from your county Cooperative Extension office
- Multiple fields should be recorded together as one management unit if similar crop management practices/harvesting were done

GRAIN YIELD CALCULATION SHEET

(April 2001)

Farm: _____

Year: _____

Field/Mgmt Unit: _____

Crop: _____

Date(s)	Ticket #(s)	% Actual Moisture	Grain Harvested (lbs)	Acres Harvested

% Average Moisture	Total Grain Harvested (lbs)	Total Acres Harvested

GRAIN FACTORS

Crop	Grain Factor (lbs/bu)	% Standard Storage Moisture
Shelled Corn	56	15.5
Ear Corn	*70	15.5
Soybeans	60	13
Wheat	60	12.5
Barley	48	12.5
Rye	56	12.5
Oats	32	12.5

*Factor is derived from the 1999-2000 Penn State Agronomy Guide
All other factors are derived from the University of Maryland Cooperative Extension (1997)

GRAIN YIELD CALCULATION

$$\frac{\text{(Total Grain Harvested / Grain Factor)} \times (100 - \% \text{ Average Moisture})}{(100 - \% \text{ Standard Storage Moisture})} = \text{Total bu/field}$$

$$\frac{\text{Total bu/field}}{\text{Total Acres Harvested}} = \text{Grain Yield (bu/acre)}$$

Total bu/field

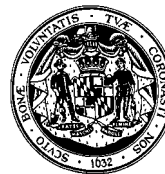
Grain Yield (bu/acre)

IMPORTANT:

- *Attach all weight tickets and/or receipts to this sheet*
- *Yield information on this report page needs to be retained for 5 years*
- *Multiple fields should be recorded together as one management unit if similar crop management practices/harvesting were done*
- *Information on calculating yields for corn silage can be obtained from your county Cooperative Extension office*

Maryland Nutrient Management Program
**Variance for Commercial Fertilizer
Nutrient Application**

(August 2004)



Occasionally operators may need to group a number of fields within a close level (short range) of soil fertility and prepare a fertilizer blend for each group rather than field specific nutrient recommendation rates developed by the software programs. This guidance document will be used by MDA Nutrient Management Program Specialists during an implementation evaluation to evaluate the degree of variance between planned recommendation rates and actual applied rates for operators using commercial fertilizer sources.

Variance in Nutrient Application Rates for Commercial Fertilizer

Nitrogen:

Total application of commercial nitrogen should not exceed the recommended rate by more than #10/acre. Any rate over the recommended rate or the 10#/acre must be justified and is subject to be in non-compliance.

Phosphorus and Potassium

Recommended rates of commercial phosphorus and potassium can be applied at one rate when the plan recommends various rates for different fields. When using a blended fertilizer material containing phosphorus and potassium, the combined rates **cannot exceed** the phosphorus requirements. The following guidance should be used when evaluating the grouping of recommended nutrient rates.

Phosphorus

Maryland soil test FIV's will be used as a guide for what recommended rates can be grouped at one rate. Any soil test FIV's for phosphorus with the same rating (example: low, medium, optimum) can be managed at one rate. The rate should not exceed the highest recommended rate given in your nutrient management plan for that crop in that soil test range. The rate **cannot** exceed the upper limit of the nutrient recommended for that crop and yield goal within that soil test range, given in the Maryland Nutrient Management Manual, Section I-B1 and I-B2. (See two examples below)

Example 1: An operator has 3 corn fields with a yield goal of 140 bushel/acre. The three fields all have different rates of phosphorus recommendations from NuMan. Field 1 recommends #30/acre, field 2 recommends #50/acre, and field 3 recommends #0/acre. Any of these three fields with the same soil test FIV rating can be grouped together and applied at one rate, not to exceed the upper limit recommended within the plan for these crops in the given soil test FIV range. Fields 1 & 2 have a recommendation of #30 and #50/acre and have a soil test FIV rating of medium. Therefore fields 1 and 2 can be applied at the same rate, of up to #50 (the highest recommended rate). Field 3's recommendation is #0/acre, with an excessive soil test FIV rating, and cannot be grouped with fields 1 & 2. Field 3 would be allowed a starter fertilizer of up to #30/acre (provided the P-FIV is less than 150 or a P-Site evaluation has been done) however, the operator **cannot** exceed this rate.

The consultant or person grouping the fields should stay within the lower range when grouping recommendations for one rate when a high range is provided in the manual.

Example 2: An operator again has 3 corn fields with a yield goal of 140 bushel/acre. The three fields all have different rates of phosphorus recommendations from NuMan. Field 1 recommends #120/acre, field 2 recommends #130/acre, and field 3 recommends #70/acre. According to the Maryland Nutrient Management Manual, Section I-B1, these three fields all have the same soil test FIV rating of Low and could be grouped together. However, MDA suggests that the fields be grouped together within the particular range as close to the recommendation as possible. In this case, field 3 should be treated separate from fields 1 and 2 since the FIV range of field 3 is almost half the recommendation of fields 1 and 2. Fields 1 and 2 can be grouped together not to exceed #130/acre.

Potassium Requirement #1

The same guidance of grouping fields together is used for potassium. Any fields with the same soil test FIV ratings for potassium can be managed at one rate. The rate should not exceed the highest recommended rate given in your nutrient management plan for that crop in that soil test range.

Potassium Requirement #2

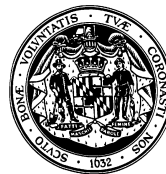
If the operator has recommended rates of potassium that are lower than what can be achieved because of equipment limitations or product availability, they may apply **up to** the recommended rates of that crop and the crop to follow (will require a 2 year crop plan). However, the operator **must** account for the over application with the following crop.

Example: The operator has a recommendation for #30/acre of potassium for their soybean crop, however, they are unable to achieve this rate based on equipment limitations. They plan to follow this crop with wheat/beans which has a recommendation for #60/acre potassium. Therefore the operator may apply **up to** #90/acre potassium at anytime during that 2 year/2 crop rotation. This is only if the operator has equipment limitation issues. If there are no equipment limitations, the operator will need to follow Requirement No. 1.

All applications of nutrients and any reasoning for exceeding the recommended plan rates must be documented. Any applications that exceed the above guidance are subject to be in non-compliance unless prior approval has been granted by the Department.

Maryland Nutrient Management Program Variance for Animal Manure Nutrient Application

(August 2004)



Many operators throughout the state apply some form of animal manures to their fields to help meet crop nutrient requirements. Realizing the tremendous variability within organic nutrient sources such as the type of material, nutrient content, composition, along with various other factors such as equipment limitations, application methods and operator judgment, the following guidance was developed. This guidance document will be used by MDA Nutrient Management Program Specialists to evaluate past animal manure nutrient applications during a plan implementation review of a farm.

Variance in Nutrient Application Rates for Animal Manures

Nitrogen-based Plan: 10#/acre maximum allowance for nitrogen application *(per field)*

Operators who have over applied their animal manure based on the organic N recommended rate for any field, and **have not** met their total crop N requirement through the application of animal manure, will need to make the necessary adjustments in their commercial N recommended rate prior to applying commercial N. The total N application (organic and commercial) should not exceed the total recommended N rate for any field in the plan by more than 10#/acre. Any nutrient application over the recommended rate or the 10#/acre allowance must be justified and is subject to be in non-compliance.

Example:

A dairy producer's plan recommends 140 lbs/acre of Nitrogen for a particular field which will be planted in corn. The plan recommends 5,000 gal/acre of liquid dairy manure along with 40 lbs/acre of commercial N to meet the 140 lbs/acre N recommendation for that field. Due to an error in application, the operator actually applied 6,000 gal/acre. Because of this error, the operator will now need to adjust their commercial N application accordingly. Assuming the liquid dairy manure provided 20 lbs of PAN per 1000 gallons, the operator would need to reduce their commercial N application rate to 20 lbs/acre instead of the original 40 lbs/acre.

Nitrogen and Phosphorus-based plan: 10% maximum variance for N and P application *(per field)*

Operators who intend to meet the total crop N requirement in a field through the application of animal manures, or those operations that are applying to fields restricted to a P- based planning rate (FIV 150 or over and P-Site Index completed), should not exceed the total recommended rate by more than 10 percent. Any rate over the recommended rate, or the 10 percent variance, must be justified and is subject to be in non-compliance.

Example:

A poultry producer's plan recommends 140 lbs/acre of Nitrogen for a particular field which will be planted in corn. The plan recommends 3 tons of poultry litter/acre to meet the 140 lbs/acre N recommendation for a field, or is under a P-based plan restriction of 3 tons of litter/acre. The operator will need to keep their total organic nutrient application rate within 10% of the recommended rate. In this scenario, they would be allowed up to 3.3 tons/acre. This variance is given for equipment variability and possible operator error.

All applications of nutrients must follow the guidelines and standards documented in the *Maryland Nutrient Management Manual* Section I - Nutrient Recommendations, D - Timing of Nutrient Application. Any reasoning for exceeding the recommended plan application rates must be documented. Any applications of nutrients that exceed the above guidance are subject to be in non-compliance unless prior approval has been granted by the Department.

Note: This guidance document does not serve as a tool for those operations using biosolids as a nutrient source. The application of biosolids as a crop nutrient source is regulated under the Maryland Department of the Environment sewage sludge regulations. However, MDA does have planning guidance for the application of biosolids in the *Maryland Nutrient Management Manual* Fact Sheet Series # 6 entitled Nutrient Management Planning Guidance for Biosolid Use.



Plan Implementation Review Process for Operators

(September 2007, updated October 2015)

This document explains the process of a nutrient management plan implementation review and provides the operator with information about preparing for a review.

Selection Method

Nutrient management specialists either randomly select an operation for a review, arrange a review in response to a complaint, schedule a follow-up to a previous review, and/or to discuss questions /concerns with submitted AIRs or other non-compliance issues.

Notification

Nutrient management specialists notify the selected operator by letter or telephone to schedule a plan implementation review. The letter may propose a given date and time to visit at the operation site. MDA may provide the operator the option to confirm or reschedule the meeting date and/or location for the operator's convenience.

Operator Requirements

A specialist from the MDA nutrient management program will conduct the review. The operator must make available for review the current **and** two prior years' nutrient management plans and any records associated with these plans. The specialist will randomly select one or more year's worth of plans and associated records, and compare them against nutrient application records and fertilizer receipts. The specialist will examine several fields or management units representative of the operation. P-Site Index calculations and implementation of any resulting best management practices will be verified. Following the review, the specialist will give the operator a copy of the plan implementation evaluation report which will include any necessary follow-up action.

Use these checklists to prepare for your Nutrient Management Plan Implementation Review.

Necessary Records (retain for 3 years):

From All Nutrient Management Plans for the Operation

- Updated operation information used for required reporting to MDA
- Operation map or aerial photo
- Soil analysis results (original lab test results)
- Manure analysis and management information (if applicable, original lab test results)
- Summary nutrient recommendations (by field and specific to the crop)
- Phosphorus Site Index calculations (if applicable)
- Required Best Management Practices (for P-Site Index only)

From Actual Implementation Records

- Nutrient Type(s)** Type of nutrients applied such as fertilizer, animal manure, biosolid, etc.
- Analysis/Nutrient content** N-P-K analysis of nutrients applied
- Rates & Quantity** Pounds, gallons, or tons applied per acre and total amount applied per total crop acres per timing period
- Application Timing & Method** Date(s) applied and method such as banded, sidedress, topdress, etc.
- Manure Management Information:** Manure type, date of removal from production and/or storage facility, location stored, where applied, name and location of receiver if moved off-site, and quantity estimate
- Actual Yield:** Specific field or management unit yield information **for the last 5 years**
- Applicator voucher or certificate number:** Individual(s) applying or supervising application of nutrients on the operation
- Receipts for nutrients purchased:** Receipts for all nutrients purchased and applied (all organic and inorganic sources)

Management Changes and Plan Modifications during Implementation

Management changes or unforeseen circumstance in an agricultural operation may require the operator to modify or update a plan before its expiration. Any revisions to the plan by a certified consultant or certified operator must be justified, documented and included in the records.

Questions?

Contact your local MDA regional office.

REGIONAL OFFICES

Region 1: ALLEGANY, GARRETT, and WASHINGTON COUNTIES Ashby Ruddle,
Nutrient Management Specialist ashby.ruddle@maryland.gov
Tel: 410-279-3506
P.O. Box 459, Hancock, MD 21750

Region 2a: CARROLL, and FREDERICK COUNTIES
Moana Himes, Nutrient Management Specialist moana.himes@maryland.gov
Tel: 10-353-4320
92 Thomas Johnson Drive, Suite 110, Frederick, MD 21702

Region 2b: ANNE ARUNDEL, HOWARD, and MONTGOMERY COUNTIES
Kenny Favorite, Nutrient Management Specialist kenny.favorite@maryland.gov
Tel: 410-507-4811
92 Thomas Johnson Drive, Suite 110, Frederick, MD 21702

Region 3: CALVERT, CHARLES, PRINCE GEORGE'S, and ST. MARY'S COUNTIES
Weylin Anderson, Nutrient Management Specialist weylin.anderson@maryland.gov
Tel: 410-980-9479
P.O. Box 652, Leonardtown, MD 20650

Region 4a: BALTIMORE and HARFORD COUNTIES
Emilee Smith, Nutrient Management Specialist emilee.smith@maryland.gov
Tel: 443-223-0403
P.O. Box 850, Bel Air, MD 21014

Region 4b: CECIL and KENT COUNTIES
Nick Miller, Nutrient Management Specialist nicholas.miller@maryland.gov
Tel: 410-991-3114
50 Harry S Truman Parkway, Annapolis MD 214

Region 5a: CAROLINE, QUEEN ANNES, and TALBOT COUNTIES
Howard Callahan, Nutrient Management Specialist howard.callahan@maryland.gov
Tel: 410-279-4003
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General Principles of Nutrient Management



General Principles of Nutrient Management

Both farm profitability and water quality can be improved through efficient nutrient use. Manure and biosolids should be considered valuable fertilizer materials and managed in the same manner as commercial fertilizers. Soil testing is very important for the development of nutrient application rates.

Please refer to the appropriate issue of the *Nutrient Manager* (the newsletter of the *University of Maryland Extension Agricultural Nutrient Management Program*) for more information on soil testing, nitrogen, phosphorus, potassium, sulfur, and pH and liming.

I. Nutrient Recommendations

A) Nitrogen:

- 1) Nitrogen recommendations for many crops are based on yield goals for those crops. It is important to establish realistic yield goals for each field based upon historical yield data (the average yield for the best 3 out of the last 5 years, 6 of 10, etc.).
- 2) Recommended application rates for nitrogen should not be exceeded.
- 3) The use of the Pre-Sidedress Nitrogen Test (PSNT) is recommended in the early summer after forage legumes or manure and biosolids applications to corn in order to determine if additional nitrogen is needed.
- 4) Residual values for nitrogen available from legumes in rotation or previous applications of manure or sludge are deducted from gross nitrogen recommendations.
- 5) Growing a winter cover crop is a very effective practice for reducing nitrate losses from cropland during a time of the year when leaching potential is high.

B) Phosphorus and other nutrients:

- 1) Recommendations for phosphorus, potassium and micronutrients are based on soil test values, yield goals and crop rotation. When soil test levels are high, additional nutrients, other than an in-row starter fertilizer, are not recommended for most crops.
- 2) Soil pH influences nutrient availability, particularly phosphorus. Soil pH should be adjusted to the level recommended for the crop to be grown.

II. Recommendations for application of all nutrient sources

A) Proper timing of nutrient applications is important. Apply nutrient sources as close to planting or nutrient demand as possible so that nutrients are taken up by plants quickly and not allowed to runoff into surface water or leach into ground water.

B) Avoid application of nutrient sources to frozen ground and during periods of high potential for leaching and runoff. Application in late fall or winter of any nitrogen source for a spring-planted crop should be avoided whenever possible.

C) Avoid application of nutrient sources to sensitive areas, wetlands, sinkholes, and steep slopes.

D) Calibrate nutrient application equipment accurately to insure that recommended rates are applied. Accurate and uniform applications of nutrients are necessary to maximize the nutrient potential of the fertilizer materials.

III. Recommendations for Manure Applications

A) *Testing:*

1) Manures vary tremendously in nutrient content depending upon animal species, rations, and storage conditions. The nutrient content of manure can be determined through laboratory testing.

2) Whenever possible manure should be sampled at least 6 weeks before planned application to allow time for analysis and plan development.

3) A consistent baseline for nutrient content may be established and based on analyses taken at least twice a year until a uniform value is confirmed, and then every second year thereafter to verify its consistency. If significant changes occur, including feed, management, animals, or storage, new samples should be collected for nutrient analysis.

B) *Application of manure:*

1) Nutrient applications should be made at times of the year that will minimize N and P losses to water and N volatilization loss to the atmosphere. Crop utilization of nutrients in manure and biosolids is maximized if these materials are applied in synchrony with periods of crop uptake. Storage of manure may be necessary to facilitate appropriate timing of nutrient applications.

2) **Nitrogen-based applications of manure will cause phosphorus soil test levels to increase over time.**

3) Winter application of manure is complicated. See the section on *MDA's Nutrient Application Guidelines*, which has information from Part I-D of the **Maryland Nutrient Management Manual** for details.

4) Application recommendations for daily haul operations include consideration of slope, crop and vegetative cover.

C) *Storage capacity:*

1) Optimal utilization of nutrients in manure and other nutrient sources is difficult without the ability to store manure for part of the year. Improving storage capacity available will minimize the potential for nutrient loss or runoff and will improve the possibility of proper timing of manure applications.

2) Contact your ***Soil Conservation District*** for advice on design and cost share programs for storage structures if you do not have manure storage capacity or if you need additional storage capacity.

IV. Erosion and Runoff Control

A) *Best Management Practices* should be used to minimize soil erosion and runoff, which can carry nutrients to surface waters. Advice on soil erosion control can be obtained from your ***Soil Conservation District***.

B) *Best Management Practices* around the barnyard area may need to be updated based on current regulations to reduce likelihood of nutrient loss from the area. Consult with your ***Soil Conservation District*** for details.

C) *Phosphorus Site Index*

The addition of any P-bearing material (fertilizer or manure) to fields whose P soil test levels are greater than or equal to FIV 150 will require evaluation of the risk of P movement.

The *Phosphorus Site Index* is a tool that is used to evaluate potential risk for phosphorus movement from agricultural land to surface waters. The *Phosphorus Site Index* includes determination of the limiting nutrient (nitrogen or phosphorus) and may also require additional restrictions of P fertilizer usage.

For a *Phosphorus Site Index* evaluation of your fields or for more information on the *Phosphorus Site Index* contact your Nutrient Management Advisor.

V. Record Keeping

The **Water Quality Improvement Act of 1998** legislation requires producers to keep the following records for at least 3 years (except for #2, crop yields).

- 1) Nutrient management plans
- 2) Record of crops planted and actual yield (5 years of records needed in order to determine average)
- 3) Record of the timing, location and crop acreage of all nutrient applications
- 4) Analysis of the nutrient content of any fertilizer applied
- 5) Receipts related to the purchase of nutrients
- 6) Animal waste generation measurements and estimations
- 7) Documentation to justify any changes from the nutrient management plan as written