

MODEL
NUTRIENT MANAGEMENT PLAN

2020

FOR CROP PRODUCTION

(poultry litter, pastured animals and P-risk)

Don Showfelder Farm Scenario²⁰

Farm Operator

Mr. Dan Showfelder owns and operates a 210.5 acre farm consisting of a broiler operation with cropland and horses on pasture.

Property Information

The farm address is P.O. Box 245, Road 432, Chestertown, Maryland, 21620. The property is in Kent County in the Upper Chester River Watershed (0058). A stream runs through the CREP area. It is greater than 35 feet from any cultivated field or pasture.

Account ID	Cropland & Pasture Acres
152201548632	184.5

Crops & Tillage

There are 9 fields in a corn-bean rotation (see below). Yield goal for corn on these fields is 140 bu/A. Yield goal for beans is 50 bu/A. Pasture yield was estimated by Mr. Showfelder at 4 tons per acre. Conservation tillage (vertical tillage) is utilized on all crop fields.

fields	2018	2019	2020 (planned)
1-4	corn	beans	corn
5-9	beans	corn	beans
10	CREP	CREP	CREP
11	pasture	pasture	pasture

Soil texture of fields 1&3 is sandy loam, all other fields have silt loam soils.

Animals

The broiler operation consists of 2 x 25,000 capacity houses. Most years, 5 flocks per house per year are produced. Average bird weight at harvest is 6.5 pounds. Last total cleanout was in 2015 and the next total cleanout is anticipated in 2023. Crustouts occur after each flock. Most manure is exported when total cleanouts occur.

Mr. Showfelder has 4 horses that are kept on pasture (Field 11) 24-7. The horses weigh approximately 1000 pounds each.

Manure Management

The broiler litter from crustouts is stored in a manure storage shed on the farm and applied in spring as close to planting time as possible. Most litter from the last total cleanout was sold to other operations. Currently any excess manure is sold to Joseph Cromwell of 24946 Chestertown Rd, Chestertown, MD.

Litter is typically applied to some of the corn fields at a rate of 2 tons/ac and incorporated within 24 hours of application. Because Phosphorus Management Tool (PMT) is high in fields 1 & 3, fields 2 and 4 will receive litter this year. No litter is applied to Field 11. Litter was rotated on various fields over the years and the history follows:

2017	2018	2019
Fields 7 & 8	Fields 1 & 3	Fields 5, 6 and 7

No manure is collected from the horses.

Fertilizer Management

Commercial fertilizer will be used as recommended.

NUTRIENT MANAGEMENT PLAN
for
Don Showfelder
PO Box 245, State Rd. 432
Chestertown, MD 21620

BRIEF DESCRIPTION OF OPERATION: This plan is for a broiler operation (2 houses with a capacity of 25,000 birds each) with crop land and horses on pasture (210.5 acres total with nutrient recommendations for 184.5 acres of cropland and pasture) in Kent County.

DATE OF PLAN: 10-1-19

DURATION OF PLAN: March 1, 2020 to February 28, 2021.

SOIL SAMPLING AND TESTING: Soil samples were collected by Mr. Showfelder in December 2018 and analyzed at Spectrum Lab. New samples will be required for the 2022 update.

MANURE SAMPLING AND TESTING: Manure sample was collected by Mr. Showfelder in October 2019 and analyzed at Waters Agricultural Laboratory.

MANURE MANAGEMENT: Mr. Showfelder removes cake after every flock. The last total cleanout was done in 2015. The next cleanout is not anticipated until at least 2023.

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 24 hours of spreading.

Any excess poultry manure will be exported to Joseph Cromwell of 24946 Chestertown Rd, Chestertown, Maryland.

Horses are on pasture 24/365 and no manure is collected.

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 were intended for application and results of the PMT are listed as well as the P Loss Rating.

Farm	Field with FIV\geq150	PMT done?	P Loss Rating	Application Rate Used in Calculation; Explanation/Restriction
Home Farm	1 & 3	yes	HIGH	While a P-removal rate is allowed, it is not achievable by client's spreader so no manure will be applied
Home Farm	2	yes	MED	pre-set rate of 2 tons/A can be applied in 2020 on corn
Home Farm	4	yes	LOW	pre-set rate of 2 tons/A can be applied in 2020 on corn

Transition Management 1 (TM1) of the UM-PMT is the regulatory P risk assessment for the upcoming growing season.

Since the UM-PMT will be the regulatory tool in 2022 results of both TM1 and results of the UM-PMT are included with this plan, as well as a table comparing the outcomes of both TM1 and the UM-PMT. It is possible that management of nutrient sources, both organic sources and fertilizer, will be impacted by the full adoption of UM-PMT.

AVERAGE SOIL PHOSPHORUS FERTILITY INDEX VALUE: The average soil FIV-P for this operation is based on the soil tests used for the development of the 2016 nutrient management plan.

The average soil FIV-P for this operation 235. Therefore, it is considered a Tier A Operation with an average soil FIV-P of 150 or greater but less than 300.

Consult *Farming with Your Nutrient Management Plan* (page 10) for more information on the transition to the Phosphorus Management Tool. A copy of this publication is included with this plan.

SOURCE OF YIELD GOAL INFORMATION: Yield goal information was provided from the operator's records.

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
Home Farm	152201548632	0058	184.5

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
50,000 broilers/flock x 5 flocks/yr = 250,000 birds/yr	333 ton*	50 tons collected as crustout	40 X 60 ft. shed	Spring 2020
horses - 4	37 tons	0	none	pastured 24/365

*Total cleanout is not anticipated this planning period.

Certified Consultant #1111
License # 9999

Plan Update Requirements

As stated in the cover sheet, this plan was developed for use from

March 1, 2020 to February 28, 2021

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	No	n/a	No	No	No

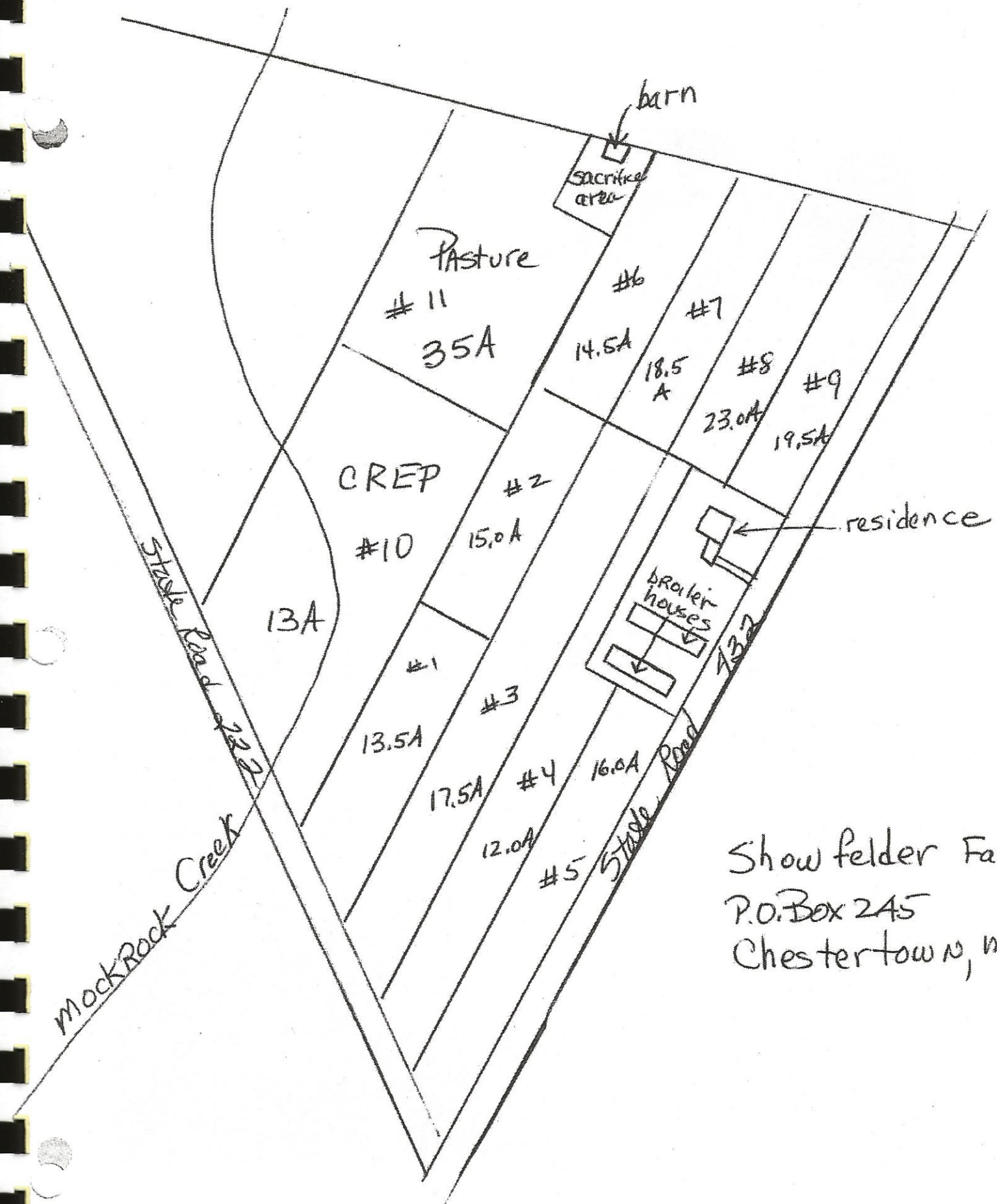
***If a field contains multiple sources of surface water (i.e. a pond and a stream), list each separately or identify on the map.**

****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)

Field Information Sheet

[illegible]



Showfelder Farm
P.O. Box 245
Chester town, MD

SOIL TESTS

Soil Analysis Report

Spectrum Analytic Inc.

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

www.spectrumanalytic.com

<i>Report To</i>
Don Showfelder P.O. Box 245 Chestertown, MD 21620

<i>Prepared For</i>
Account – 02341 Don Showfelder P.O. Box 245 Chestertown, MD 21620

Sampled	12-7-2018
Received	12-10-2018
Tested	12-11-2018

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)
1	Y18740	6.1	6.8	1.3	324	320	226	1752	12.6									
2	Y18741	6.2	6.9	1.2	287	312	205	2100	11.8									
3	Y18742	6.4	7.0	1.2	335	345	238	1850	13.0									
4	Y18743	6.4	7.0	1.1	254	365	286	1845	12.2									
5	Y18744	6.5	7.0	1.4	81	155	210	1240	12.6									
6	Y18745	6.2	6.9	1.1	165	330	252	1795	12.5									
7	Y18746	6.3	7.0	1.3	172	345	245	1828	12.2									
8	Y18747	6.4	7.0	1.3	185	320	220	1840	12.4									
9	Y18748	6.1	6.8	1.2	176	330	224	1860	12.3									
11	Y18749	5.8	6.0	2.8	76	284	160	1300	13.2									

L=Low M=Medium G=Good H=High V=Very High

[illegible]

Analyzed by Spectrum Analytic Inc.
www.spectrumanalytic.com

HID:7100-0363-4310-0017

Soil Test Results													
Farmer/Operator		Don J Showfelder				Plan Year			2020				
Street Address		PO Box 245				Tier - Phase			A - TM1				
City, State, Zip, County		Chestertown MD 21620 Kent				Date Plan Prepared			10-1-2019				
Tract No.	Field No.	Lab	Test Date	Soil Texture	Test Number	pH	O.M	P	K	Mg	Ca	Al	Fe
Home Farm	1	SP	12-10-18	SL	18940	6.10	1.30	324	320	226	1752		
					Conversion to FIV	6.10	1.30	254 (E)	105 (E)	105 (E)	118 (E)		
Home Farm	2	SP	12-10-18	SiL	18741	6.20	1.20	287	312	205	2100		
					Conversion to FIV	6.20	1.20	226 (E)	102 (E)	96 (O)	144 (E)		
Home Farm	3	SP	12-10-18	SL	18742	6.40	1.20	335	345	238	1850		
					Conversion to FIV	6.40	1.20	262 (E)	113 (E)	110 (E)	125 (E)		
Home Farm	4	SP	12-10-18	SiL	18743	6.40	1.10	254	365	286	1845		
					Conversion to FIV	6.40	1.10	201 (E)	120 (E)	131 (E)	125 (E)		
Home Farm	5	SP	12-10-18	SiL	18744	6.50	1.40	81	155	210	1240		
					Conversion to FIV	6.50	1.40	70 (O)	50 (M)	98 (O)	79 (O)		
Home Farm	6	SP	12-10-18	SiL	18745	6.20	1.10	165	330	252	1795		
					Conversion to FIV	6.20	1.10	134 (E)	108 (E)	116 (E)	121 (E)		
Home Farm	7	SP	12-10-18	SiL	18746	6.30	1.30	172	345	245	1828		
					Conversion to FIV	6.30	1.30	139 (E)	113 (E)	113 (E)	124 (E)		
Home Farm	8	SP	12-10-18	SiL	18747	6.40	1.30	185	320	220	1840		
					Conversion to FIV	6.40	1.30	149 (E)	105 (E)	102 (E)	124 (E)		
Home Farm	9	SP	12-10-18	SiL	18748	6.10	1.20	176	330	224	1860		
					Conversion to FIV	6.10	1.20	142 (E)	108 (E)	104 (E)	126 (E)		

Soil Test Results	
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Department of Environmental Science
and Technology

Agricultural Nutrient Management Program

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*.

9/7/11

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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 P.O.Box 245 Chestertown, MD	Grower: Don Showfelder	
	SampleNumber: 357 Lab Number: 1066 Type: Poultry	Date Submitted: 10-1-19 Report Date: 10-2-19

	%	Pounds per ton
Nitrogen – Total	3.17	63.2
Nitrogen – Ammonium	0.69	13.8
P2O5 – Total	2.05	41
K2O – Total	2.48	49.5
Moisture (%)	21.7	

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 P.O.Box 245 Chestertown, MD	Grower: Don Showfelder	
	SampleNumber: 29 Lab Number: 1029 Type: Poultry	Date Submitted: 1-6-19 Report Date: 1-11-19

	%	Pounds per ton
Nitrogen – Total	3.45	63.2
Nitrogen – Ammonium	1.21	19.4
P2O5 – Total	2.31	41
K2O – Total	2.59	49.5
Moisture (%)	23.7	

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 P.O.Box 245 Chestertown, MD	Grower: Don Showfelder	
	SampleNumber: 957	Date Submitted: 1-23-18
	Lab Number: 4366	Report Date: 1-28-18
	Type: Poultry	

	%	Pounds per ton
Nitrogen – Total	3.25	64.8
Nitrogen – Ammonium	1.05	18.0
P2O5 – Total	2.45	49.0
K2O – Total	2.68	53.6
Moisture (%)	27.7	

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.

POULTRY LITTER QUANTITY ESTIMATE

Name: **Showfelder**

Tract / Farm:

Date: 10/1/2019

Houses included: 2

Bird type:

Broiler

Average Bird Market Weight (lbs):

6.5

A.	Years between total cleanouts: Yr. next total cleanout: - Yr. last total cleanout: = Years in cleanout cycle:	2023 2015 8
B.	Total # of birds per flock (for all houses on this cleanout cycle):	50,000
C.	Flocks per year	5
D.	Number of flocks per cleanout cycle (A x C):	40
E.	Estimated tons of cake/crust per 1000 birds per flock: *	0.2
F.	Estimated tons of litter + cake/crust per 1000 birds per flock: *	1.33275
G.	Tons cake/crust produced per flock (B x E/1000):	10
H.	Tons cake/crust produced per cycle (G x D)	400
I.	Tons litter + cake/crust produced per cycle (B x D x F/1000):	2,666
J.	Tons of litter produced per cycle (less cakeout/crustout) (I - H):	2,266
K.	Tons of litter produced per year (less cakeout/crustout) (J/A):	283
L.	Tons of litter + cake/crust produced per year (I/A)	333

* 2007 Delmarva Poultry Litter Production Estimates, George W. Malone, University of Delaware, Georgetown Delaware.

Quantity of Poultry Litter, Cake/Crust Available per Year

[illegible]

*** Cake/Crust not removed due to windrowing, is added with the litter remaining in the house the following year. Windrowing may likely result in actual quantities of litter being less than the estimates shown here. The actual amount of Cake/Crust removed may also be less than the estimated amounts produced due to improved drinker systems, ventilation, etc.



MANURE QUANTITY ESTIMATION

(For Solid Manure)

You can only edit values highlighted in blue

Farm name: **Don Showfelder**

Manure Production period:

Starting date: **3/1/2020**

Ending date: **2/28/2021**

A. Total days in manure production period: **365**

Livestock Information

B. Livestock group	1	2	3
	horses		
C. Average weight (lbs.)	1000		
D. # of animals	4		
E. Animal units (AU) [(C x D)/1000]	4	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)	365	365	365
L. Weight of manure/AU/day (lbs.) (see Table 1.)	50		

Bedding Estimation

M. Bedding type (straw, sawdust, etc.)	1	2	3
	none		
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
	37	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

AGRICULTURAL NUTRIENT MANAGEMENT PROGRAM

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Poultry Litter Removal Data Collection Sheet



OPERATOR NAME: _____

DATE: _____

FARM NAME: _____

A	B	C	D	E	F	G	H
Date (mm/dd/yr)	Removal From (house or shed)	Load Description*	Load Weight (Tons)**	Number of Loads	Total Removed (D) x (E) = (F) (Tons)	Destination (on-farm shed, on- farm field or if exported; name/address of receiving party)	Quantity Received (if other than total removed)

* identify type of equipment used to remove waste (i.e. truck, spreader, etc)

** if load weight is unknown, calculate it based on the following estimates: 1 cu.ft. litter = 28 lbs; 1 bushel litter = 35 lbs

1) Measure the equipment volume in cu. ft. or bushels

2) Load weight (lbs) = equipment volume in cu. ft. or bushels X lbs per cu. ft. or bushel

3) Load weight (tons) = load weight (lbs) divided by 2,000

UMCP-ANMP

07/09

MANURE UTILIZATION INFORMATION

A	B	C	D	E
Period of Application	Fields Available	Acres	Manure Application Rate	Manure Utilization Potential
spring 2020	2	15	2 T/A	30
	4	12	2 T/A	24
Total				approx 54 tons

MANURE ALLOCATION SUMMARY

Period of Application	spring 2019			
Period for Manure Generation	4/1/19 – 3/31/20			
Manure Production per Period	50 tons			
Manure Utilization Potential per Period	54 tons			
Excess or deficit	-4			

P Risks Tool

UM Phosphorus Management Tool (PMT) Report					
Farmer Name	Don J Showfelder			Year - - - Phase	2020 - A - TM1
	1	2	3		
Account ID	152201548632	152201548632	152201548632	152201548632	
County	Kent	Kent	Kent	Kent	
Tract or Farm ID	Home Farm	Home Farm	Home Farm	Home Farm	
Field ID	1	2	3	4	
MUSYM	FaA	MtA	FaA	MtB	
Area Crop	13.50 Acres 1	15.00 Acres 1	17.50 Acres 1	12.00 Acres 1	
Organics		Pltr +L		Pltr +L	
R Factor					
Adj. K Factor LS Factor					
C P Factors					
RUSLE A	1.50	1.90	3.50	2.50	
Transport Risk Factors					
SED Value	4	4	8	6	
Soil Permeability Class	Very Slow	Slow	Very Slow	Slow	
Field slope Concave? SR Factor	2.00 No 7.0	1.00 No 6.3	4.00 No 7.0	3.00 No 6.3	
Soil Drainage Class	poorly	moderately well	poorly	moderately well	
HSG Artificial Drainage? SD Factor	C/D No 0.0	C No 0.0	C/D No 0.0	C No 0.0	
Management Factors					
Distance to Water (DF)	< 100 ft 1.0	200-349 ft 0.6	100-199 ft 0.8	> 500 ft 0.2	
Buffer Width & Type (BF)	> 35' veg. 0.9	> 35' veg. 0.9	> 35' veg. 0.9	> 35' veg. 0.9	
Soil Test P Fertility Index Value	254	226	262	201	
Degree of P Saturation (DPS M3)	60.2 (est.)	55.4 (est.)	61.6 (est.)	51.2 (est.)	
Fert. P appl. rates, lb/A FP * PSC	- - - 0	- - - 0	- - - 0	- - - 0	
Org. P appl. rates, lb/A OP * PSC	- - - 0	82 - - 41	- - - 0	82 - - 41	
Runoff Fert. P appl. methods AMr(f)	- - - 0.00	- - - 0.00	- - - 0.00	- - - 0.00	
Runoff Org. P appl. methods AMr(o)	- - - 0.00	M2 - - 0.40	- - - 0.00	M2 - - 0.40	
Subsurface Fert. P appl. methods AMsub(f)	- - - 0.00	- - - 0.00	- - - 0.00	- - - 0.00	
Subsurface Org. P appl. methods AMsub(o)	- - - 0.00	M1 - - 0.32	- - - 0.00	M1 - - 0.32	
P particulate P runoff P subsurface	91 76 0	49 43 0	151 62 0	22 13 0	
P Loss Rating Score	167 (H)	92 (M)	213 (H)	35 (L)	

P-FIV Summary (PFIV > 150) : Average value 235

[illegible]

Comparison of Manure and/or Fertilizer Recommendations Based on Tier/Transition Management Phase and
University of Maryland - Phosphorus Management Tool (UM-PMT)

Farm & field ID	Tier/Transition Management Phase	Manure Application Recommended (tons or gallons per acre)	Commercial Fertilizer Recommended (pounds phosphate or P ₂ O ₅ per acre)	UM-PMT category	Manure Application Recommended (tons or gallons per acre)	Commercial Fertilizer Recommended (pounds phosphate or P ₂ O ₅ per acre)
Home 1	TM1	0	0	High	0	0
Home 2	TM1	2 tons/ac	0	Med	1.4 tons/ac (1 year crop P-removal rate)	0
Home 3	TM1	0	0	High	0	0
Home 4	TM1	2 tons/ac	0	Low	2 tons/ac (3 year crop P-removal in 3 year period)	0

The application of nutrient sources containing phosphorus could be more restrictive when the UM-PMT is fully implemented.

RECOMMENDATIONS

Fertilizer Recommendations														
Farmer/Operator		Don J Showfelder				Plan Year			2020					
Street Address		PO Box 245				Tier - Phase			A - N/A					
City, State, Zip, County		Chestertown MD 21620 Kent				Date Plan Prepared			10-1-2019					
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	
Home Farm	1 2019 [*]	1 Corn grain, conven. till. 7 1 2 3 27 60 92 93	13.50 Acres	140 Bu/A	140-0-0 #/A	15 #/A	5 #/A	0 #/A	Total	120 #/A	0 #/A	0 #/A		0.8 t/A
									broadcast	0 #/A	0 #/A	0 #/A		
									banded w/planter	30 #/A	0 #/A	0 #/A		
									sidedress	90 #/A	0 #/A	0 #/A		
Home Farm	2 2019 [M]	1 Corn grain, conven. till. 7 28 1 2 3 27 60 92 93	15.00 Acres	140 Bu/A	140-0-0 #/A	15 #/A	0 #/A	0 #/A	Total	125 #/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	95 #/A	0 #/A	0 #/A		
Home Farm	3 2019 [*]	1 Corn grain, conven. till. 1 2 3 27 60 92 93	17.50 Acres	140 Bu/A	140-0-0 #/A	15 #/A	5 #/A	0 #/A	Total	120 #/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	90 #/A	0 #/A	0 #/A		
[*] - indicates primary recommendation used for the PMT calculation.														

Lime recommendations are valid for the duration of the soil analysis. This is not an annual recommendation. Subtract any applications made since the soil analysis from this recommendation.

Fertilizer Recommendations														
Farmer/Operator		Don J Showfelder				Plan Year			2020					
Street Address		PO Box 245				Tier - Phase			A - N/A					
City, State, Zip, County		Chestertown MD 21620 Kent				Date Plan Prepared			10-1-2019					
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	
Home Farm	4 2019 [M]	1 Corn grain, conven. till. 28 1 2 3 27 60 92 93 Follow recommendations on this page if you use commercial fertilizer only as your nutrient source.	12.00 Acres	140 Bu/A	140-0-0 #/A	15 #/A	0 #/A	0 #/A	Total	125 #/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	95 #/A	0 #/A	0 #/A		
Home Farm	5 2019 [*]	10 Soybeans 3 4	16.00 Acres	50 Bu/A	0-43-70 #/A	0 #/A	15 #/A	0 #/A	Total	0 #/A	43 #/A	70 #/A		0.0 t/A
									brdcst/band @plntg	0 #/A	43 #/A	70 #/A		
Home Farm	6 2019 [*]	10 Soybeans 7 3 4	14.50 Acres	50 Bu/A	0-0-0 #/A	0 #/A	15 #/A	0 #/A	Total	0 #/A	0 #/A	0 #/A		0.6 t/A
									brdcst/band @plntg	0 #/A	0 #/A	0 #/A		
[*] - indicates primary recommendation used for the PMT calculation.														

Lime recommendations are valid for the duration of the soil analysis. This is not an annual recommendation. Subtract any applications made since the soil analysis from this recommendation.

Fertilizer Recommendations														
Farmer/Operator		Don J Showfelder				Plan Year			2020					
Street Address		PO Box 245				Tier - Phase			A - N/A					
City, State, Zip, County		Chestertown MD 21620 Kent				Date Plan Prepared			10-1-2019					
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	
Home Farm	7 2019 [*]	10 Soybeans 3 4	18.50 Acres	50 Bu/A	0-0-0 #/A	0 #/A	15 #/A	0 #/A	Total	0 #/A	0 #/A	0 #/A		0.0 t/A
									brdcst/band @plntg	0 #/A	0 #/A	0 #/A		
Home Farm	8 2019 [*]	10 Soybeans 3 4	23.00 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		
Home Farm	9 2019 [*]	10 Soybeans 7 3 4	19.50 Acres	50 Bu/A	0-0-0 #/A	0 #/A	0 #/A	0 #/A	Total	0 #/A	0 #/A	0 #/A		0.8 t/A
									brdcst/band @plntg	0 #/A	0 #/A	0 #/A		
[*] - indicates primary recommendation used for the PMT calculation.														

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

Lime recommendations are valid for the duration of the soil analysis. This is not an annual recommendation. Subtract any applications made since the soil analysis from this recommendation.

Fertilizer Recommendations														
Farmer/Operator		Don J Showfelder				Plan Year			2020					
Street Address		PO Box 245				Tier - Phase			A - N/A					
City, State, Zip, County		Chestertown MD 21620 Kent				Date Plan Prepared			10-1-2019					
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	
pasture	11 2019 [*]	74 Orchardgrss; Maint. 7 4 6 53 60 70 71 88 89 92 93 184 185 186	35.00 Acres	4.0 T/A	200-20-24 #/A	0 #/A	0 #/A	0 #/A	Total	200 #/A	20 #/A	24 #/A		1.4 t/A
									tpdrs@ green-up	50 #/A	20 #/A	24 #/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.

Lime recommendations are valid for the duration of the soil analysis. This is not an annual recommendation. Subtract any applications made since the soil analysis from this recommendation.

Recommendations using Organic Nutrient Sources

[illegible]

Notes			
Farmer/Operator	Don J Showfelder	Plan Year	2020
Street Address	PO Box 245	Tier - Phase	A - N/A
City, State, Zip, County	Chestertown MD 21620 Kent	Date Plan Prepared	10-1-2019
<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), $\frac{1}{2}$ 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>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>			

Notes			
Farmer/Operator	Don J Showfelder	Plan Year	2020
Street Address	PO Box 245	Tier - Phase	A - N/A
City, State, Zip, County	Chestertown MD 21620 Kent	Date Plan Prepared	10-1-2019
<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> <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>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>			

Notes			
Farmer/Operator	Don J Showfelder	Plan Year	2020
Street Address	PO Box 245	Tier - Phase	A - N/A
City, State, Zip, County	Chestertown MD 21620 Kent	Date Plan Prepared	10-1-2019
<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>			

MDA'S

NUTRIENT APPLICATION

REQUIREMENTS

NUTRIENT APPLICATION REQUIREMENTS

Source: Maryland Department of Agriculture 2016

Regulatory Citation: 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 Animal Feeding Operations regulations in COMAR 26.08.01 and 26.08.03.09, or the Maryland Department of the Environment Sewage Sludge Management regulations in COMAR 26.04.06 regarding the requirements for sewage sludge storage, buffer zones, and the incorporation of sewage sludge 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, sewage sludge, food processing wastes/residuals, spray irrigation from wastewater treatment plants, other waste streams containing nutrients, and soil conditioners/amendments.

D. 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. 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 ground water 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 II.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.

III. 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 and Summer (March 1 through September 9)
1. A person may make a nutrient application during the spring-summer time period for an existing crop or a crop to be planted either during this time period or in the fall provided that, for each such crop, the rates and applications are made 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, when the ground is covered with snow greater than one inch, or when the ground is hard-frozen greater than two inches.
 3. Organic nutrient sources shall be injected or incorporated as soon as possible, but no later than 48 hours after application, except those farm operations that choose to manage their farms to obtain the benefits of no-till farming will not be required to incorporate.
 - a. MDA reserves the right to require incorporation of organic nutrient sources on a case by case basis.

C. 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 provided that, for each such crop, the rates and applications are made in accordance with recommendations found in Section I-B of the Maryland Nutrient Management Manual.

2. Organic Fertilizers

a. General Rules for Fall Application of Organic Sources

(i) Excepting poultry litter, a person may make a fall application of an organic nutrient source for an existing crop or a crop to be planted either during this time period or the following spring (before 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*.

(ii) A person may make a fall application of poultry litter for an existing crop or a crop to be planted during this time period 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. General Conditions Relating to the Fall Application of Organic Nutrient Sources

(i) A person may make a fall-application on pasture land, hay-land or other acreage under vegetative cover.

(ii) Organic nutrient sources shall be injected or incorporated as soon as possible, but no later than 48 hours after application, except those farm operations that choose to manage their farms to obtain the benefits of no-till farming will not be required to incorporate.

(a) MDA reserves the right to require incorporation of organic nutrient sources on a case by case basis

(iii) 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. The cover crop planting shall occur no later than November 15; and

(iv) 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.

(v) If the application is phosphorus-based, the phosphorus application rate:

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

(bb) 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;

(cc) Shall follow the provisions of the Phosphorus Site Index, as they may otherwise apply; and

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

(vi) 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 (before June 1), the application of nitrogen may not exceed 50 lbs. of plant available nitrogen per acre.

(vii) 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.

3. Emergency Situations

Applications required in emergency situations due to an imminent overflow of a storage facility shall be managed in consultation with the Maryland Department of Agriculture. Operators in such situations shall contact the MDA regional nutrient management representative for guidance.

D. Winter Application (December 16 through February 28 of the following year)

1. Chemical Fertilizer

As a general rule, a person may not make a winter application of a chemical fertilizer 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 Fertilizer

a. A person may make a winter application of an organic nutrient source to cropland only if:

(i) The operation has inadequate storage (i.e., the storage capacity will be exceeded before the March 1

winter application restriction);

(ii) The nutrient source is non-stackable; and

(iii) There is no other reasonable option to manage it.

b. Any such application shall be made in accordance with Section I-B of the Maryland Nutrient Management Manual.

c. Operators and generators of organic nutrient sources shall make plans for adequate storage to eliminate the need for a winter application before deadlines described in III. E.

d. 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 60 percent moisture content, such as poultry litter) or adequate storage is available.

(ii) 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.

(iii) Nutrient application is prohibited to land with a slope greater than 7 percent.

(iv) 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.

(v) 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.

(vi) 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.

(vii) Applications required in emergency situations due to an imminent overflow of a storage facility from on farm generated organic fertilizer shall be managed in consultation with the Maryland Department of Agriculture. Operators in such situations shall contact the MDA regional nutrient management representative for guidance. Operators will be required to enter into an agreement of intent with the Soil Conservation District or private entity that is a certified Technical Service Provider approved by NRCS.

E. Prohibition against Winter Application

1. Except as provided in subsections E.2 and, E.3 and E.4, after July 1, 2016, a person may not make a winter application of a nutrient source to agricultural land.

2. a. The prohibition against making a winter application after July 1, 2016 does not apply to a nutrient source that originates from:

(i) A dairy or livestock operation with less than 50 animal units; or

(ii) A municipal wastewater treatment plant with a design flow capacity of less than 0.5 million gallons per day.

b. This exception to the general prohibition referenced in subsection E.1 expires after the winter application that ends on February 28, 2020.

3. The prohibition against making a winter application does not apply to potash, liming materials, or manure deposited directly by livestock. A person may make a winter application of certain nutrients for greenhouse production and for certain vegetable crops, small fruit crops, small grain crops, and cool season grass sod production listed in the Maryland Nutrient Management Manual Section I-B.

4. Applications required in emergency situations due to an imminent overflow of a storage facility from on farm generated organic fertilizer shall be managed AS PROVIDED IN III D.2 [and] in consultation with the Maryland Department of Agriculture. Operators in such situations shall contact the MDA regional nutrient management representative for guidance. Operators will be required to enter into an agreement of intent with the Soil Conservation District or private entity that is a certified Technical Service Provider approved by NRCS.

IV. TEMPORARY FIELD STOCKPILING (STAGING) FOR STACKABLE ORGANIC NUTRIENT SOURCES (EQUAL TO OR LESS THAN 60% MOISTURE CONTENT)

A. General Provisions

1. When other immediate use options and alternatives are not available, temporary field stockpiling (staging) of organic nutrient sources 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 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 percent grade slope and no diversion installed, no farther than 150 feet from the top of the slope.

C. Poultry litter and other 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 nutrients shall be removed from the temporary field (staged) stockpile and the ground area thoroughly scraped or cleaned when the application of the nutrients 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.

RECORDKEEPING

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.

For 3 years, the following records/plan information must be kept:

- 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

For 5 years, the following records must be kept:

- Crop yields and support of crop yield data each year for 5 years

For nurseries or out -of-ground producers, the following records must be kept:

- 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 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.

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

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

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

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

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*

FORAGE YIELD CALCULATION SHEET

(April 2001)

Farm: _____

Year: _____

Field/Mgmt Unit: _____

Crop: _____

Date(s)	Bale Description	Number of Bales	Average Bale Weight (lbs)	Acres Harvested

Total Number of Bales	Total Average Bale Weight (lbs)	Total Acres Harvested

FORAGE YIELD CALCULATION

Total Number of Bales X Total Average Bale Weight = Total lbs Harvested

$$\frac{\text{Total lbs Harvested}}{\text{Total Acres Harvested}} = \text{lbs/acre}$$

$$\frac{\text{lbs/acre}}{2000 \text{ (lbs/ton)}} = \text{Forage Yield (tons/acre)}$$

Total lbs Harvested

lbs/acre

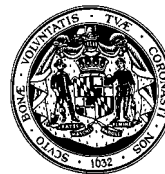
Forage Yield (tons/acre)

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*

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

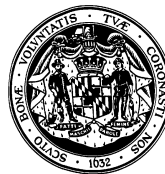
If the operator has recommended rates of potassium that are lower than what can be achieved because of equipment limitations or product availability, they may apply **up to** the recommended rates of that crop and the crop to follow (will require a 2 year crop plan). However, the operator **must** account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



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Plan Implementation Review Process for Operators

(September 2007, updated September 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

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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