Maryland Department of Agriculture

Nutrient Management Regulations Update

Environmental Law Conference

November 18, 2016

Nutrient Management Update

Current Regulations Phased-In

Nutrient Management Regulation Changes

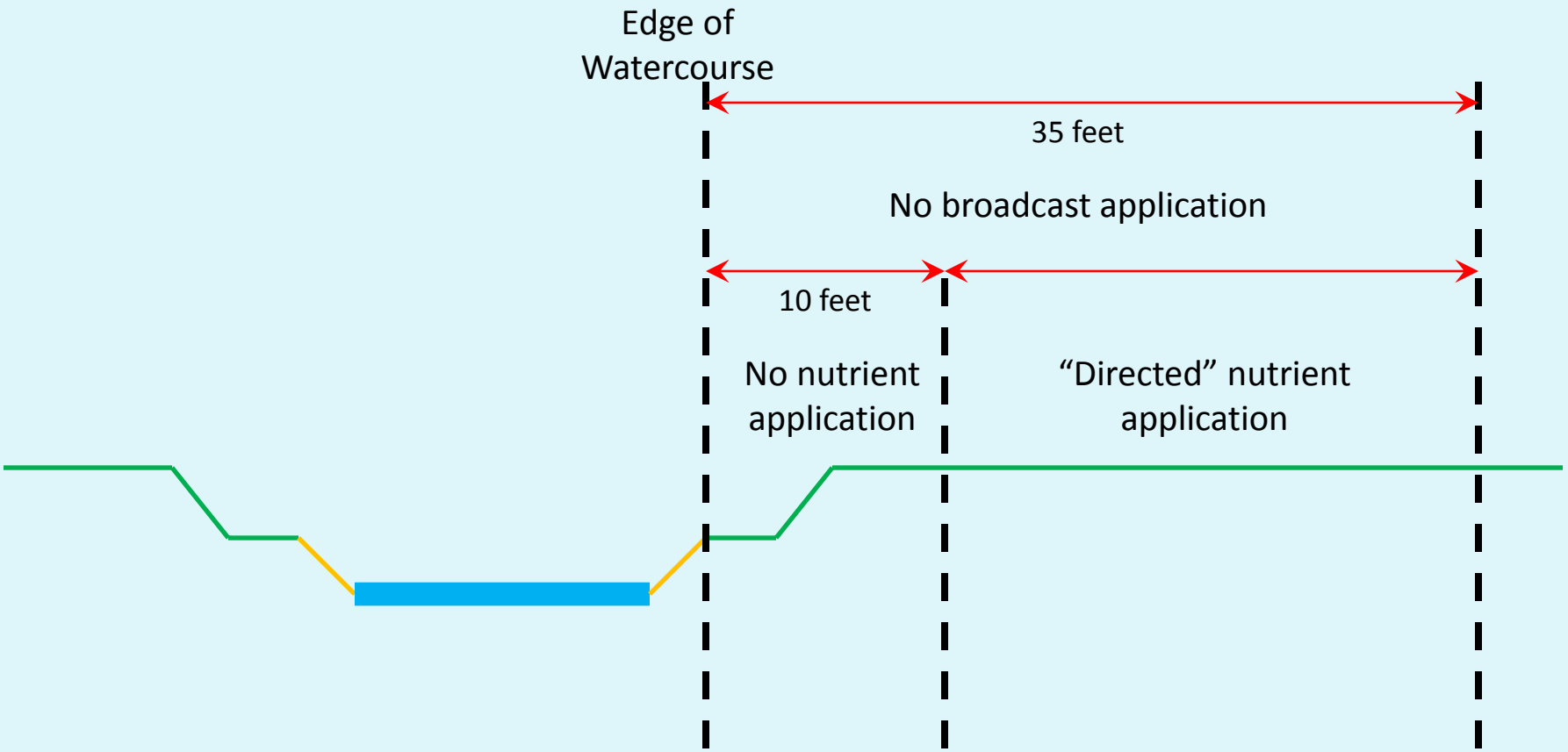
Update on FIV Soils Data

PMT Economic Study

Nutrient Application Setbacks

If the watercourse is:	It is defined as a:	For crop and pasture land adjacent to the watercourse, the setbacks requirements:
Natural and either perennial or intermittent	Stream	Apply
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	Apply
Channelized and intermittent	Ditch	Do Not Apply
Ephemeral (natural or channelized)	Ditch	Do Not Apply

Nutrient Application Setbacks



Why re-visit the regulations? Regulations were adopted in 2012 Why now?

Many dairy farmers are struggling financially

Availability of cost-share funding

Ability of adequate technical assistance

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Concerns of food processing facilities

Biosolids Industry

Dairy Meetings

July 11- Elkton, Cecil County

July 12- Sharpsburg, Washington County

July 14- McHenry, Garrett County

Current Nutrient Application Time Frames

- Fall Application dates
  - Sept 10 – November 1 (East of the Chesapeake Bay and the Susquehanna River)
  - Sept 10 – November 15 (West of the Chesapeake Bay and the Susquehanna River)
- Winter Application
  - November 16 – February 28

2016 Nutrient Application Extension

- This type of extension has occurred in the past under MDA authority based on weather & planting and harvesting conditions
- All Nutrient Sources allowed to be applied up to November 15th.
- Only on farm generated liquid manure are allowed to be applied up to December 3rd.
  - Does not apply to Bio-Solids
  - Does not apply to Food Processing Wastes

Winter Spreading Prohibition Effective July 1, 2016

Nov.1st- Winter Spreading for the Eastern Shore

Nov. 15th- Winter Spreading west of the Bay

No Emergency Spreading Provisions included

Affects farmers, biosolids, food processing

A special meeting of the NM Advisory Committee was held at MDA on July 5, 2016 to address this issue. Public comments were accepted.

PROHIBITION AGAINST WINTER APPLICATION

I. 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 plan with a design flow capacity of less than 0.5 million gallons per day.

b. This exception to the general prohibition 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.

The Department is considering the following recommendations

- Remove the incorporation requirement for Spring and Fall manure spreading.

- Extend the Fall spreading dates to reflect Sept. 10th- Dec. 15th and eliminate the east and west of the Bay distinction. Winter date will be Dec. 16th- March 1.

- Add an Emergency Spreading provision under Winter application.

Remove Incorporation Spring/Fall

Since 2012 there has been much discussion that requiring incorporation is in conflict with statewide efforts to promote no-till farming.

Also since 2012 NRCS has concentrated on soil health and has presented many studies showing soil health is improved with little or no soil disturbance other than planting.

Proposed Regulations
Incorporation Spring/Fall

- 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

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

Proposed Regulation Change
Extend the Fall Spreading Date

The Department believes the Fall spreading date should be the same on both sides of the Bay.

- Fall Application Period would be 9/10 – 12/15
- Winter dates would become December 16th – February 28th.

Added- no spreading on frozen or snow covered ground to the Spring and Fall requirements.

Added- *Winter* must be 100’ from surface water in Winter

Emergency Spreading Provision

The current spreading ban included an emergency provision which was effective. To prevent an overflow from a storage structure, farmers called MDA and followed procedures.

Since 2012 dairy farmers constructed 58 waste storage structures and 14 are underway, but an emergency provision is still needed.

Applies to farms/facilities with some storage.

Proposed Regulation
Emergency Spreading Provision

Applications required in emergency situations due to an imminent overflow of a storage facility for operation >50 animal units

- On farm generated organic fertilizer
- Shall be managed in consultation with the MDA
- Operators shall contact there 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.

TEMPORARY FIELD STOCKPILING FOR ORGANIC NUTRIENT SOURCES

General Provisions (Abbreviated Version)

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

3. Any material staged in field stockpile shall be land applied in the first spring season following the placement of the stockpile.

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

11/10/2016

				Soil Test P-FIV <150		Soil Test P-FIV 150 - 499		Soil Test P-FIV > 500	
County	**Total AIR Acres Reported 2014**	**Total Acres submitted**	**% of County Reported**	**Acres**	**% of Acres**	**Acres**	**% of Acres**	**Acres**	**% of Acres**
Western Maryland									
Allegany	12,321.60	10,091.90	81.90%	9,532.40	94.46%	533.50	5.29%	26.00	0.26%
Carroll	94,490.68	66,762.60	70.66%	62,612.26	93.78%	4,039.94	6.05%	110.40	0.17%
Frederick	127,168.57	94,292.28	74.15%	83,256.30	88.30%	10,972.02	11.64%	63.96	0.07%
Garrett	39,478.24	16,677.72	42.25%	16,122.42	96.67%	530.30	3.18%	25.00	0.15%
Washington	80,948.17	59,982.05	74.10%	55,758.65	92.96%	4,205.75	7.01%	17.65	0.03%
Regional Total	354,407.26	247,806.55	69.92%	227,282.03	91.72%	20,281.51	8.18%	243.01	0.10%
Central Maryland									
Baltimore	38,193.15	34,632.90	90.68%	32,801.65	94.71%	1,770.63	5.11%	60.62	0.18%
Harford	49,862.63	34,666.56	69.52%	31,360.43	90.46%	3,200.56	9.23%	105.57	0.30%
Howard	14,635.39	14,891.45	101.75%	13,624.25	91.49%	1,251.90	8.41%	15.30	0.10%
Montgomery	49,412.83	27,042.33	54.73%	26,063.14	96.38%	869.89	3.22%	109.30	0.40%
Regional Total	152,104.00	111,233.24	73.13%	103,849.47	93.36%	7,092.98	6.38%	290.79	0.26%
Southern Maryland									
Anne Arundel	15,557.15	10,992.36	70.66%	8,142.17	74.07%	2,783.69	25.32%	66.50	0.60%
Prince Georges	12,069.75	10,084.06	83.55%	8,133.29	80.65%	1,916.77	19.01%	34.00	0.34%
Calvert	11,685.82	8,451.50	72.32%	5,602.10	66.29%	2,838.10	33.58%	11.30	0.13%
Charles	22,075.21	20,553.31	93.11%	16,052.01	78.10%	4,468.50	21.74%	32.80	0.16%
Saint Mary's	32,628.90	27,909.26	85.54%	20,965.96	75.12%	6,837.52	24.50%	105.78	0.38%
Regional Total	94,016.83	77,990.49	82.95%	58,895.53	75.52%	18,844.58	24.16%	250.38	0.32%
Upper Eastern Shore									
Cecil	51,726.39	55,838.89	107.95%	52,155.46	93.40%	3,549.67	6.36%	133.76	0.24%
Kent	95,083.11	80,506.45	84.67%	73,591.61	91.41%	6,572.72	8.16%	342.12	0.42%
Queen Annes	125,814.99	111,760.19	88.83%	97,288.05	87.05%	14,352.72	12.84%	119.42	0.11%
Regional Total	272,624.49	248,105.53	91.01%	223,035.12	89.90%	24,475.11	9.86%	595.30	0.24%
Mid Eastern Shore									
Talbot	69,783.22	65,137.06	93.34%	58,145.98	89.27%	6,932.68	10.64%	58.40	0.09%
Caroline	91,353.81	79,507.20	87.03%	53,424.63	67.19%	25,953.67	32.64%	128.90	0.16%
Dorchester	85,183.33	48,387.98	56.80%	36,072.42	74.55%	12,068.54	24.94%	247.02	0.51%
Regional Total	246,320.36	193,032.24	78.37%	147,643.03	76.49%	44,954.89	23.29%	434.32	0.22%
Lower Eastern Shore									
Somerset	35,326.72	15,372.31	43.51%	4,053.77	26.37%	9,606.34	62.49%	1,712.20	11.14%
Wicomico	61,109.61	42,294.84	69.21%	14,522.13	34.34%	22,556.67	53.33%	5,216.04	12.33%
Worcester	62,222.85	31,909.53	51.28%	10,265.39	32.17%	18,445.42	57.81%	3,198.72	10.02%
Regional Total	158,659.18	89,576.68	56.46%	28,841.29	32.20%	50,608.43	56.50%	10,126.96	11.31%
MD State Total	1,278,132.12	967,744.73	75.72%	789,546	81.59%	166,258	17.18%	11,940.76	1.23%

MD State Total
11/10/2016

Total AIR Acres	1,278,132
Total Acres Submitted	967,744
Percentage Reported	75.72%
Number of Fields Submitted	65,600
P FIV < 150	81.59%
P FIV 150-499	17.18%
P FIV > 500	1.23%

Data on Phosphorus Levels

- 81.6% of the acreage statewide will not be impacted by PSI/PMT.
- 81.6% represents 789,546 acres that are <150 FIV
- 18.4% represents 178,198 acres that are >150 FIV
- MDA continues to take incremental measures to obtain the remaining information.
  - Consultants
  - Farm Operators

Poultry Litter Land Application

- 312,393 Tons Poultry Litter Collected
- 312,393 acres / 2 Tons Application Rate = 156,196 acres needed for application of litter
  - Upper Shore = 245,362 ac. (90% of reported acres is below 150 FIV)
  - Mid Shore = 184,740 ac. (75% of reported acres is below 150 FIV)
  - Lower Shore = 39,664 ac. (25% of reported acres is below 150 FIV)
  - Total Acres Available for Spreading = 469,767

Soils Data Update

March data was used extensively

Percentages have not changed significantly

Problems

Getting complete data

Lack of current information

Next Challenge

Establishing the Tier Groups

PMT Economic Analysis Sample

- 8 farms in study
  - 4 Poultry Operations
  - 4 Dairy Operations
- Participating acreage ranging from 58.9 to 103.6
- Each participant compensated with incentive package to reimburse costs of commercial fertilizer

PMT Economic Study Update

Second year of the study- same fields

Early Observations

All 4 poultry litter farms indicate commercial fertilizer nearly doubled the cost over litter use on a per bushel basis.

One of the dairy farms had 7 different strips, all FIV 150-250. None of the fields needed P or K. The fertilizer recommendation was 162-0-0 for all strips. In this case, the cost of pumping and spreading the liquid manure exceeded value.

P Loss Ratings PSI➡PMT

Of the field samples included in our study:

Under **PSI**:

Low	Medium	High (+)
75.0%	25.0%	0%

Under **PMT**:

Low	Medium	High
30.8%	30.8%	38.5%

P Loss Ratings PSI➡PMT

Of Fields with *Low* Rating Under PSI:

27.8% became Medium under PMT

33.3% became High under PMT

Of Fields with *Medium* Rating Under PSI:

66.7% became High under PMT

Interpretation of PMT Final Score

- Low – Total P applications should be limited to no more than a three-year crop P removal applied over a three year period
- Medium – P applications limited to amount expected to be removed from field by crop harvest immediately after application or soil test-based P application recommendations
- High – No P should be applied to this site

Case Study: Farm 2015-P-02

Costs of Fertilizer under PSI regulation:

Input	Price ($)
Manure 68-104-136	15.00/ton @ 2 tons/acre
Spreading Manure	10.00/acre
N-SUL-32	41.40/acre
Knife in N	10.00/acre

Total Cost Per Acre: $91.40

Case Study: Farm 2015-P-02

Poultry Operation

Acreage in Study: 103

- Composed of two fields, A (32 acres) and B (71 acres)

Crop: Corn

P Loss Rating Changes

	Rating Under PMI	Rating Under PMT
Field A	Medium	High
Field B	Low	High

Case Study: Farm 2015-P-02

PMT Nutrient Recommendation:

Field A: 150-0-63 Field B: 145-0-59

Costs of Fertilizer under PMT regulation:

Input	Price ($)
10-0-30	43.70/acre
Spreading	7.00/acre
N-SUL-32	62.00/acre
Knife in N	10.00/acre

Total Cost Per Acre: **$122.70**

Case Study: Farm 2015-P-02

What was the change?

Price Per Acre: $91.40 ➡ $122.70

Change of **31.30** $/acre

What were the extra costs?

In comparison with PSI, under PMT the farmer had to purchase:

- An additional ~56 lbs/acre N
- 60 lbs/acre Potash

Case Study: Farm 2015-P-02

Discussion of Cost Change

- What is the sale value of litter?
  - Could partially offset increased costs
- Variation in cost change based on crop
  - Would expect to see less increase in costs growing soybeans (no need for extra N)

Yield Differences?

Point of Interest: Are there yield effects of using inorganic fertilizer in place of manure?

Two types of potential comparisons in data:

1. Against historic yield data from previous harvest of same field
2. Against yield data for other fields on same property in same year

Yield Differences?

What we saw:

- Highly mixed results
  - some experienced decreased yields with commercial fertilizer use, some experienced increased yields.

Examples (comparison to previous corn yield):

Farm ID	Yield Under PSI (manure)	Yield Under PMT (inorganic fertilizer)	Change in Yield
2015-P-03	154.89 bushels/acre	162.87 bushels/acre	+7.98 bushels/acre
2015-P-02	152.0 bushels/acre	127.88 bushels/acre	-24.12 bushels/acre

Yield Differences?

How valid are these comparisons?

- Not appropriate given the design of the experiment.

Why?

- Too many factors affect yield that we did not account for or collect data on.

There is no valid comparison from this data to draw a conclusion on how a switch to inorganic fertilizer impacts yield.

Poultry vs. Dairy Operation

- All poultry litter operations in our study were already supplementing their crops with purchased commercial N, even when using manure. Under PMT, the required poundage to meet yield goals increased but commercial N was already a cost consideration
- Of the dairy operations in this study, two of the four only required manure and spreading costs under PSI. Commercial fertilization was only involved under the PMT, which changes the cost differential of switching to PMT for dairy producers

Going Forward

- Working with producers to complete data profile
- Creating a comprehensive summary of how an individual farmer can be affected by the changes implemented under the PMT
- Considering factors that may potentially offset or mitigate the cost changes
- Finalizing comparable result structure across farms to get a sense for the variation in change

Phosphorus Management Tool (PMT) Preliminary Tier Group Reporting Data

- 1,156 Operations have been reported
  - Represents 7,220 fields
  - Represents 92,378 acres

- MDA has extended the deadline for Licensed companies and certified operators to report this information by November 30, 2016

Phosphorus Management Tool Tier Group Reporting

Name of Company or Certified Operator		Nutrient Management License Number or Certificate (CFO):	

First Name	Last Name	Farm Name	Address	City	State	Zip	County	Number of Fields ≥ 150 FIV	Acreage of Fields ≥ 150 FIV	Average FIV	Tier Group
											NA
											NA
											NA
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PMT Tier Group A

- Average soil P FIV 150-300
  - Begins Transition Management Phase 1 in 2020
  - Three year schedule (2020 - 2022)
    - 896 operations reported
    - 4,753 fields reported
    - 58,466 acres reported
    - 77.5 % of reported operations

PMT Tier Group B

- Average soil P FIV 300-450
  - Begins Transition Management Phase 1 in 2019
  - Four year schedule (2019 - 2022)
    - 181 operations reported
    - 1,839 fields reported
    - 24,925 acres reported
    - 15.7 % of reported operations

PMT Tier Group C

- Average soil P FIV >450
  - Begins Transition Management Phase 1 in 2018
  - Five year schedule (2018 - 2022)
    - 79 operations reported
    - 628 fields reported
    - 8,987 acres reported
    - 6.8 % of reported operations

Phosphorus Management Tool
Overview of How it Works
RISK

7 YEAR TRANSITION SUMMARY							
	CROP YEAR						
	2016	2017	2018	2019	2020	2021	2022
Tier C - Avg. FIV P 450 and above	PSI/PMT	PSI/PMT	TM1	TM1	TM2	TM2	PMT
Tier B - Avg. FIV P 300-450	PSI/PMT	PSI/PMT	PSI	TM1	TM2	TM2	PMT
Tier A - Avg. FIV P 150 - 300	PSI/PMT	PSI/PMT	PSI	PSI	TM1	TM2	PMT
PSI = Phosphorus Site Index							
TM1 = Transition Management Phase 1							
TM2 = Transition Management Phase 2							
PMT = Phosphorus Management Tool							

** Could add time if services are not adequate.


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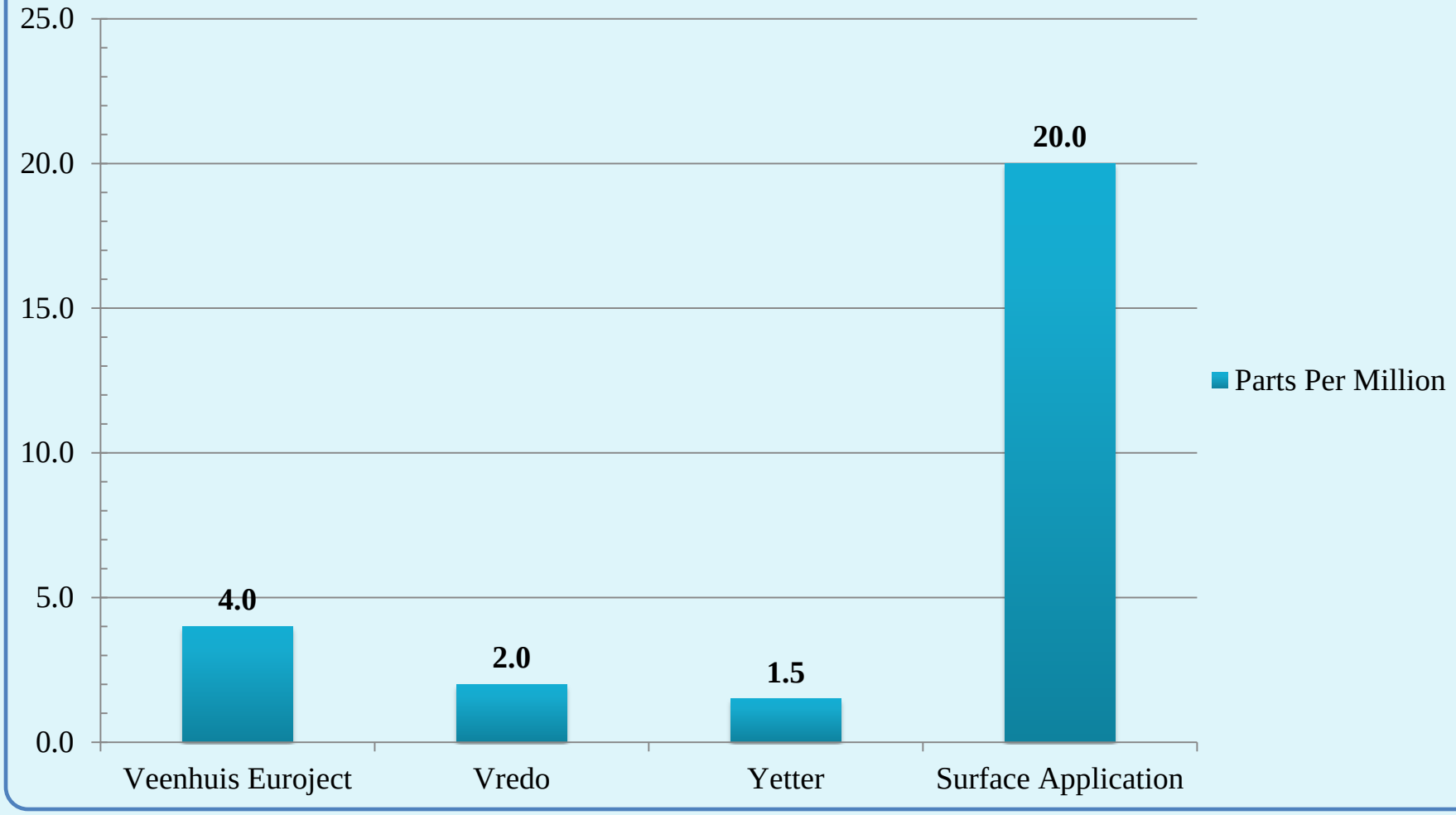
Ammonia Loss By Injection Method
October 13, 2016
DeBaugh Farms



Urban Program

1,697 Certified Professional Fertilizer Applicators

1,855 Trained Employees

922 Licensed Businesses

June 30, 2016

Maryland Department of Agriculture

Dwight Dotterer

NM Program Administrator

410-841-5877