

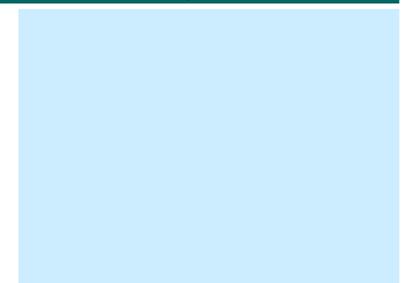
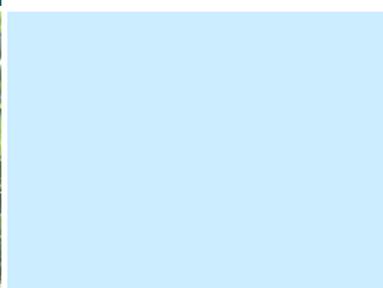
Senate Education, Health, Environmental Affairs Committee

# PMT & Manure Transport Update

Secretary Joe Bartenfelder

Assistant Secretary Hans Schmidt

January 18, 2017





# Phosphorus Management Tool (PMT)





# Phosphorus Management Tool (PMT)

## Four Significant Enhancements

- 1. Enact an immediate ban of additional phosphorus on soils highest in phosphorus based on a soil test.**
- 2. Provide comprehensive information on soil phosphorus conditions statewide.**
- 3. Ensure adequate time for farmers to fully understand and plan for new requirements.**
- 4. Assure agricultural producers that critical elements are available for implementation.**



# Phosphorus Management Tool (PMT)

## MD State Total Soil Phosphorus Data 1/11/2017

|                                   |                  |
|-----------------------------------|------------------|
| <b>Total Regulated Acres</b>      | <b>1,277,931</b> |
| <b>Total Acres Submitted</b>      | <b>1,083,552</b> |
| <b>Percentage Reported</b>        | <b>84.8%</b>     |
| <b>Number of Fields Submitted</b> | <b>73,647</b>    |
| <b>P FIV &lt; 150</b>             | <b>79.3%</b>     |
| <b>P FIV 150-499</b>              | <b>19.1%</b>     |
| <b>P FIV &gt; 500</b>             | <b>1.6%</b>      |



# Phosphorus Management Tool (PMT)

1/17/2017

| County                     | Total AIR Acres Reported 2014 | Total Acres submitted | % of County Reported | Soil Test P FIV <150 |               | Soil Test P FIV 150 - 499 |               | Soil Test P FIV > 500 |               |  |
|----------------------------|-------------------------------|-----------------------|----------------------|----------------------|---------------|---------------------------|---------------|-----------------------|---------------|--|
|                            |                               |                       |                      | Acres                | % of Acres    | Acres                     | % of Acres    | Acres                 | % of Acres    |  |
| <b>Western Maryland</b>    |                               |                       |                      |                      |               |                           |               |                       |               |  |
| Allegany                   | 12,321.60                     | 10,091.90             | 81.90%               | 9,532.40             | 94.46%        | 533.50                    | 5.29%         | 26.00                 | 0.26%         |  |
| Carroll                    | 94,462.98                     | 75,820.42             | 80.26%               | 71,170.03            | 93.87%        | 4,518.49                  | 5.96%         | 131.90                | 0.17%         |  |
| Frederick                  | 127,363.87                    | 98,676.43             | 77.48%               | 87,356.65            | 88.53%        | 11,255.82                 | 11.41%        | 63.96                 | 0.06%         |  |
| Garrett                    | 39,478.24                     | 28,256.97             | 71.58%               | 27,366.74            | 96.85%        | 865.23                    | 3.06%         | 25.00                 | 0.09%         |  |
| Washington                 | 80,805.27                     | 60,444.35             | 74.80%               | 56,195.65            | 92.97%        | 4,231.05                  | 7.00%         | 17.65                 | 0.03%         |  |
| <b>Regional Total</b>      | <b>354,431.96</b>             | <b>273,290.07</b>     | <b>77.11%</b>        | <b>251,621.47</b>    | <b>92.07%</b> | <b>21,404.09</b>          | <b>7.83%</b>  | <b>264.51</b>         | <b>0.10%</b>  |  |
| <b>Central Maryland</b>    |                               |                       |                      |                      |               |                           |               |                       |               |  |
| Baltimore                  | 38,004.15                     | 36,260.06             | 95.41%               | 34,301.08            | 94.60%        | 1,898.36                  | 5.24%         | 60.62                 | 0.17%         |  |
| Harford                    | 49,862.63                     | 40,266.01             | 80.75%               | 36,673.58            | 91.08%        | 3,460.06                  | 8.59%         | 132.37                | 0.33%         |  |
| Howard                     | 14,635.39                     | 14,945.05             | 102.12%              | 13,677.85            | 91.52%        | 1,251.90                  | 8.38%         | 15.30                 | 0.10%         |  |
| Montgomery                 | 49,377.83                     | 28,200.84             | 57.11%               | 27,245.45            | 96.61%        | 846.09                    | 3.00%         | 109.30                | 0.39%         |  |
| <b>Regional Total</b>      | <b>151,880.00</b>             | <b>119,671.96</b>     | <b>78.79%</b>        | <b>111,897.96</b>    | <b>93.50%</b> | <b>7,456.41</b>           | <b>6.23%</b>  | <b>317.59</b>         | <b>0.27%</b>  |  |
| <b>Southern Maryland</b>   |                               |                       |                      |                      |               |                           |               |                       |               |  |
| Anne Arundel               | 15,557.15                     | 12,350.46             | 79.39%               | 8,985.77             | 72.76%        | 3,298.19                  | 26.70%        | 66.50                 | 0.54%         |  |
| Prince Georges             | 12,069.75                     | 10,366.24             | 85.89%               | 8,324.05             | 80.30%        | 2,008.19                  | 19.37%        | 34.00                 | 0.33%         |  |
| Calvert                    | 11,685.82                     | 8,538.90              | 73.07%               | 5,689.50             | 66.63%        | 2,838.10                  | 33.24%        | 11.30                 | 0.13%         |  |
| Charles                    | 22,075.21                     | 20,060.81             | 90.87%               | 15,912.21            | 79.32%        | 4,115.80                  | 20.52%        | 32.80                 | 0.16%         |  |
| Saint Mary's               | 35,326.72                     | 28,072.46             | 79.47%               | 21,093.96            | 75.14%        | 6,872.72                  | 24.48%        | 105.78                | 0.38%         |  |
| <b>Regional Total</b>      | <b>96,714.65</b>              | <b>79,388.87</b>      | <b>82.09%</b>        | <b>60,005.49</b>     | <b>75.58%</b> | <b>19,133.00</b>          | <b>24.10%</b> | <b>250.38</b>         | <b>0.32%</b>  |  |
| <b>Upper Eastern Shore</b> |                               |                       |                      |                      |               |                           |               |                       |               |  |
| Cecil                      | 51,726.39                     | 57,939.99             | 112.01%              | 54,216.06            | 93.57%        | 3,590.17                  | 6.20%         | 133.76                | 0.23%         |  |
| Kent                       | 95,083.11                     | 92,746.15             | 97.54%               | 85,129.51            | 91.79%        | 7,274.52                  | 7.84%         | 342.12                | 0.37%         |  |
| Queen Annes                | 125,814.99                    | 112,972.15            | 89.79%               | 98,495.01            | 87.19%        | 14,357.72                 | 12.71%        | 119.42                | 0.11%         |  |
| <b>Regional Total</b>      | <b>272,624.49</b>             | <b>263,658.29</b>     | <b>96.71%</b>        | <b>237,840.58</b>    | <b>90.21%</b> | <b>25,222.41</b>          | <b>9.57%</b>  | <b>595.30</b>         | <b>0.23%</b>  |  |
| <b>Mid Eastern Shore</b>   |                               |                       |                      |                      |               |                           |               |                       |               |  |
| Talbot                     | 69,783.22                     | 65,560.26             | 93.95%               | 58,569.18            | 89.34%        | 6,932.68                  | 10.57%        | 58.40                 | 0.09%         |  |
| Caroline                   | 92,039.41                     | 89,914.24             | 97.69%               | 58,434.75            | 64.99%        | 31,218.39                 | 34.72%        | 261.10                | 0.29%         |  |
| Dorchester                 | 84,686.73                     | 51,364.50             | 60.65%               | 38,036.64            | 74.05%        | 13,079.54                 | 25.46%        | 248.32                | 0.48%         |  |
| <b>Regional Total</b>      | <b>246,509.36</b>             | <b>206,839.00</b>     | <b>83.91%</b>        | <b>155,040.57</b>    | <b>74.96%</b> | <b>51,230.61</b>          | <b>24.77%</b> | <b>567.82</b>         | <b>0.27%</b>  |  |
| <b>Lower Eastern Shore</b> |                               |                       |                      |                      |               |                           |               |                       |               |  |
| Somerset                   | 32,598.90                     | 27,011.51             | 82.86%               | 5,875.77             | 21.75%        | 17,417.44                 | 64.48%        | 3,718.30              | 13.77%        |  |
| Wicomico                   | 53,223.80                     | 46,209.11             | 86.82%               | 15,473.65            | 33.49%        | 24,794.72                 | 53.66%        | 5,940.00              | 12.85%        |  |
| Worcester                  | 69,947.75                     | 67,482.73             | 96.48%               | 20,867.79            | 30.92%        | 40,595.72                 | 60.16%        | 6,019.22              | 8.92%         |  |
| <b>Regional Total</b>      | <b>155,770.45</b>             | <b>140,703.35</b>     | <b>90.33%</b>        | <b>42,217.21</b>     | <b>30.00%</b> | <b>82,807.88</b>          | <b>58.85%</b> | <b>15,677.52</b>      | <b>11.14%</b> |  |
| <b>MD State Total</b>      | <b>1,277,930.91</b>           | <b>1,083,551.54</b>   | <b>84.79%</b>        | <b>858,623</b>       | <b>79.24%</b> | <b>207,254</b>            | <b>19.13%</b> | <b>17,673.12</b>      | <b>1.63%</b>  |  |



# Phosphorus Management Tool (PMT)

## 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.



# Phosphorus Management Tool (PMT)

## How It Works: Management

| PMT Risk Category | Transition Management Phase I               | Transition Management Phase II | PMT                      |
|-------------------|---|--------------------------------|--------------------------|
| LOW               | N-Based (not to exceed 3 Year Crop Removal) | 3 Year Crop Removal            | 3 Year Crop Removal      |
| MEDIUM            | 3 Year Crop Removal                         | 2 Year Crop Removal            | 1 Year Crop Removal      |
| HIGH              | 1 Year Crop Removal                         | 50% of 1 Year Crop Removal     | No Additional Phosphorus |



# Phosphorus Management Tool (PMT)

## PMT Statewide Tier Group Data

- **1,661 Operations** have been reported
  - Represents one or more fields being 150 or greater
  - Represents 11,769 fields
    - Only these fields transition to PMT
  - Represents 187,870 acres
- **PMT Tier Groups**
  - **Tier A = 150 – 300 Avg FIV (Transitions 2020)**

|                    |              |               |
|--------------------|--------------|---------------|
| • 1,313 operations | 8,220 fields | 122,705 acres |
|--------------------|--------------|---------------|
  - **Tier B = 300 – 450 Avg FIV (Transitions 2019)**

|                  |              |              |
|------------------|--------------|--------------|
| • 252 operations | 2,815 fields | 54,271 acres |
|------------------|--------------|--------------|
  - **Tier C = >450 Avg FIV (Transitions 2018)**

|                 |            |              |
|-----------------|------------|--------------|
| • 96 operations | 734 fields | 10,894 acres |
|-----------------|------------|--------------|



# Phosphorus Management Tool (PMT)



## Economic Analysis Sample

- 8 farms in study
  - 4 Poultry Operations
  - 4 Dairy Operations
- Participating farms range from 59 to 104 acres
- Each participant compensated with incentives to reimburse commercial fertilizer costs



# Phosphorus Management Tool (PMT)

## P Loss Risk Ratings PSI → PMT

Of the field samples included in our study:

Under **PSI**:

| Low | Medium | High (+) |
|-----|--------|----------|
| 75% | 25%    | 0%       |

Under **PMT**:

| Low   | Medium | High  |
|-------|--------|-------|
| 30.8% | 30.8%  | 38.5% |



# Phosphorus Management Tool (PMT)

## 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 PSI | Rating Under PMT |
|---------|------------------|------------------|
| Field A | Medium           | High             |
| Field B | Low              | High             |



# Phosphorus Management Tool (PMT)

## 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**



# Phosphorus Management Tool (PMT)

## Case Study: Farm 2015-P-02

PMT Nutrient Recommendation:

**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**



# Phosphorus Management Tool (PMT)

## 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



# Manure Transport Program





# Manure Transport Program

## FY2016 Accomplishments

- 213,000 tons transported (all manure)
- \$1.4 million in payments
- Poultry litter tons: 57,700
- Other manure tons: 155,400
- Land applied poultry litter – 6,000 tons (17 contracts)



# Manure Transport Program



## Effect on WIP Goals

- Maryland continues to exceed WIP goals for Manure Transport
- Cost-Share program allows MDA to track manure transport



# Manure Transport Program

## Program History

| Year         | Tons Transported annually | Tons Poultry Litter Transported | Tons Non-Poultry Litter Transported |
|--------------|---------------------------|---------------------------------|-------------------------------------|
| FY 99        | 1,925                     | 1,925                           | 0                                   |
| FY 00        | 13,366                    | 13,366                          | 0                                   |
| FY 01        | 20,477                    | 20,477                          | 0                                   |
| FY 02        | 47,483                    | 43,144                          | 4,339                               |
| FY 03        | 28,463                    | 27,707                          | 756                                 |
| FY 04        | 40,755                    | 37,674                          | 3,081                               |
| FY 05        | 38,333                    | 24,080                          | 14,253                              |
| FY 06        | 69,009                    | 35,469                          | 33,540                              |
| FY 07        | 99,298                    | 47,844                          | 51,454                              |
| FY 08        | 99,817                    | 44,843                          | 53,979                              |
| FY 09        | 119,892                   | 62,505                          | 57,387                              |
| FY 10        | 80,899                    | 51,383                          | 29,516                              |
| FY 11        | 61,150                    | 37,807                          | 23,343                              |
| FY 12        | 35,380                    | 32,544                          | 2,837                               |
| FY13         | 52,481                    | 38,238                          | 14,243                              |
| FY14         | 118,995                   | 46,906                          | 72,089                              |
| FY15         | 167,237                   | 54,380                          | 112,857                             |
| FY16         | 213,151                   | 57,727                          | 155,424                             |
| <b>Total</b> | <b>1,308,111</b>          | <b>678,019</b>                  | <b>629,098</b>                      |



# Manure Transport Program

## Land Application vs. Alternative Use

Manure Transport Project - Tons

| FY Year | Poultry Litter   |                 |            | Non-Poultry      |                 |            | TOTAL   |
|---------|------------------|-----------------|------------|------------------|-----------------|------------|---------|
|         | Land Application | Alternative Use | TOTAL (PL) | Land Application | Alternative Use | TOTAL (NP) |         |
| 2016    | 6,003            | 51,724          | 57,727     | 155,425          | 0               | 155,425    | 213,151 |
| 2015    | 1,892            | 52,488          | 54,380     | 112,857          | 0               | 112,857    | 167,237 |
| 2014    | 5,441            | 41,465          | 46,906     | 72,089           | 0               | 72,089     | 118,995 |
| 2013    | 1,179            | 37,059          | 38,238     | 14,243           | 0               | 14,243     | 52,481  |
| 2012    | 0                | 32,641          | 32,641     | 2,923            | 0               | 2,923      | 35,564  |
| Average | 2,903            | 43,075          | 45,978     | 71,507           | 0               | 71,507     | 117,486 |



# Manure Transport Program

## Poultry Litter Land Application

- 383,949 Tons Poultry Litter Collected 2015
- 383,949 Tons / 2 Tons Application Rate = 191,975 acres needed for application of litter
  - Upper Shore = 245,362 ac. (90% of reported acres is below 150 FIV)
  - Mid Shore = 184,882 ac. (75% of reported acres is below 150 FIV)
  - Lower Shore = 38,943 ac. (25% of reported acres is below 150 FIV)
  - Total Acres Available for Spreading = 469,187



# Animal Waste Technology Projects

| PROJECTS   | ANIMAL TYPE/LOCATION                         | STATE FUNDING | TECHNOLOGY  | STATUS  |
|--|--|---------------|---|---|
| Biomass Heating Solutions Inc. (BHSL)<br>Annapolis, MD           | Poultry<br>Murphy Farms/Dorchester County    | \$970,000     | Fluidized bed (Thermo-chemical)                     | Commissioned Dec 2016, operational January 2017                       |
| Green Mountain Technologies, Inc. (GMT)<br>Bainbridge Island, WA | Horse<br>Days End Farm / Howard County       | \$150,790     | In vessel composter/turnkey                         | Operational October, 2015- present successful                         |
| Green Mountain Technologies, Inc. (GMT)<br>Bainbridge Island, WA | Dairy Cattle<br>Iager Farm /Frederick County | \$237,520     | In vessel composter/turnkey                         | Operational December 2015 to present, 3 mos. add't monitoring planned |
| Planet Found Energy Development (PFED)<br>Berlin, MD             | Poultry<br>Millenium Farms/Worcester County  | \$676,144     | Anaerobic digestion with nutrient separating system | Commissioning Dec 2016-January 2017; operational Feb 2017             |



# Animal Waste Technology Projects

Projects Approved October 2016

| 2016 projects            | ANIMAL TYPE/LOCATION           | STATE FUNDING | TECHNOLOGY                          |
|--------------------------|--------------------------------|---------------|-------------------------------------|
| Veteran Compost          | Livestock/Anne Arundel County  | \$350,302     | Aerated Static Pile Composting      |
| ChesapeakeBay Renewables | Poultry Litter/Somerset County | \$1,400,000   | Thermophilic AD w/Nutrient Recovery |



# Summary



**Thank You**