Chesapeake Bay Program

Science. Restoration. Partnership.

Poultry Farm Mortality Freezers

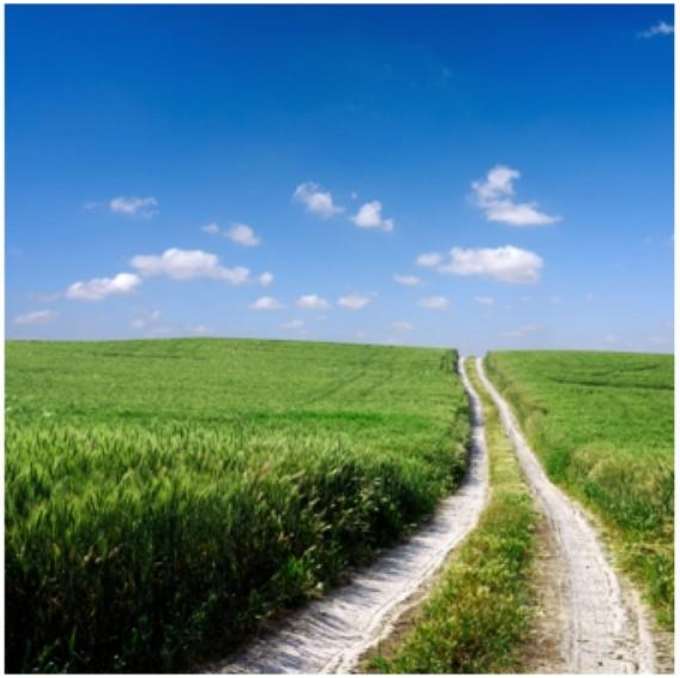
An Old BMP Now A New Solution For Delmarva

Major Concern: Excess Nutrients

- The prime pollutant of concern is excess nutrients, such as phosphorous and nitrogen.
- The majority of those nutrients come from three human activities:
  - agriculture
  - urban/suburban runoff
  - vehicle emissions
- Nearly one-quarter of the land in the watershed is devoted to agricultural production

Agriculture's Impact

- Agriculture is the single largest source of nutrient pollution entering the Bay.
- A disproportionate amount of the excess nitrogen and phosphorus is coming from Delmarva, according to a recent USGS report cited on the Bay Program website.



"[A]gricultural production – including fertilizer and ***manure applied to cropland*** *– accounts for more than 90 percent of the nutrients reaching the lands of the Eastern Shore."* -- CPB website

It's More Than Manure

- The "manure" being applied to cropland is actually a combination of:
  - Manure
  - Bedding material
  - Dead birds that have been composted

- Mortality (and how it is managed) is often overlooked – but shouldn't be.
- Nearly 22,500 tons of poultry mortality was generated on Delmarva in 2013.

No Choice But To Compost

- Originally, this material was disposed of in large pits in the ground behind the chicken houses.
- The industry moved away from pit burial about two decades ago because of the impact on nearby surface and groundwater resources.

- But mortality was still treated like a waste product and the only viable option was to compost it and then land apply it.
- When done properly, the process transforms chicken carcasses into a nutrient-rich compost for farm fields.

Not A Long-Term Solution

- The problem is that we already have too much nutrient rich material to spread on farm fields.
- Unlike chicken manure, there are no alternative uses for compost – no one wants it.

- And composted mortality is higher in phosphorous than manure.
- It's time for the industry to change again

A Better Alternative

On-farm freezer units allow for storage until mortality can be taken off-site for rendering.

- Rendering converts the material into useful commodities
  - For example, poultry fat can be used in bio-fuels
- There is no residual material requiring some form of second stage waste disposal like other BMPs

How It Works

The grower places the routine mortality inside a specially designed collection unit and then simply closes the lid.

A custom collection vehicle arrives after the flock has been caught to empty the units.

A Proven Practice

This BMP is an off-the-shelf ready and proven practice:

- It's not on the drawing board or in some early R&D stage.
- It's been done elsewhere for two decades.
- Most "alternative use" pilot projects are years away from commercial viability

- And few, if any, are being designed with mortality in mind.
- So what is the potential impact of this "new" but "proven" BMP on the watershed?

Not All Manure Is "Bad"

"The fundamental tenet of economically and environmentally sound nutrient management is the strategic approach of nutrient mass balancing. … Nutrient inputs to a farm, watershed, county or state should be balanced by nutrient outputs … preventing a nutrient surplus where manure-nutrients are treated as a waste and not a nutrient. … ***Nitrogen and phosphorus fertilizers are significant costs in grain production and should be equally valued when in the form of litter/manure.***"

-- Bill Rohrer discussing the nutrient mass balancing research of Dr. Tom Sims as part of the excess litter analysis in the Delaware Nutrient Management Commission's 2010 Annual Report

Putting It In Perspective

The "problem" is not the whole amount of manure/litter/mortality generated -- much of the material is not only useful, but valuable.

ANNUAL REPORT 2010

To Governor Jack A. Markell and the 146th Delaware General Assembly

Delaware Nutrient Management Commission

April 1, 2011

Delaware Department of Agriculture — Serving Agriculture and Protecting Consumers

Introduction

2010 was an important year for nutrient management.

During 2010 the Nutrient Management Program in cooperation with DNREC implemented new Concentrated Animal Feeding Operation (CAFO) Regulations. Also new outdoor manure staging and storage regulations were developed and a new set of nutrient management State Technical Standards were written.

As in previous years, farmers and other nutrient handlers are required to develop and implement phosphorus-limited nutrient management plans, maintain nutrient handling records, maintain nutrient certification and submit an annual report.

The implementation progress illustrated in this annual report demonstrates that nutrient handlers are making significant improvements in reducing nutrient runoff. Animal feeding operations, row crop farmers, horse operations, golf courses and lawn care companies are implementing nutrient management practices and demonstrating accountability.

Nutrient Management Law Implemented

The Nutrient Management Law was passed in 1999 and mandates that all farmers, golf courses and other nutrient handlers develop and implement phosphorus-limited nutrient management plans, maintain nutrient handling records, maintain nutrient certification and submit an annual report. Voluntary programs are comprised of many practices offered by the County Conservation Districts, Natural Resources Conservation Districts (NRCS) and stakeholder initiatives by the property owners, farmers and nutrient handlers across the state. In the past several years, the U.S. Environmental Protection Agency (EPA) has become much more interested in agriculture's influence on water quality and how Delaware officials, such as the Commission, were regulating nutrient runoff. EPA recognizes the success of the Nutrient Management Law but is very focused on two elements of the Clean Water Act called Concentrated Animal Feeding Operation (CAFO) permits and Total Maximum Daily Load (TMDL) limits. Both elements consist of EPA regulations that the states must address.

The Commission is working jointly with the Delaware Department of Agriculture (DDA) and the Department of Natural Resources and Environmental Control (DNREC) to evaluate these federal requirements. The University of Delaware and the NRCS are valuable resources for understanding and addressing these requirements.

Organizational Purpose

The organizational structure of the Nutrient Management Program is important. It is also critical as budget shortfalls within state government persist and difficult decisions are needed. The mission of the Commission is "To manage those activities involving the generation and application of nutrients in order to help improve and protect the quality of Delaware's ground and surface waters, sustain and promote a profitable agricultural community, and to help meet or exceed federally mandated water quality standards, in the interest of the overall public welfare." In order to accomplish this mission, the following strategic goals are in place:

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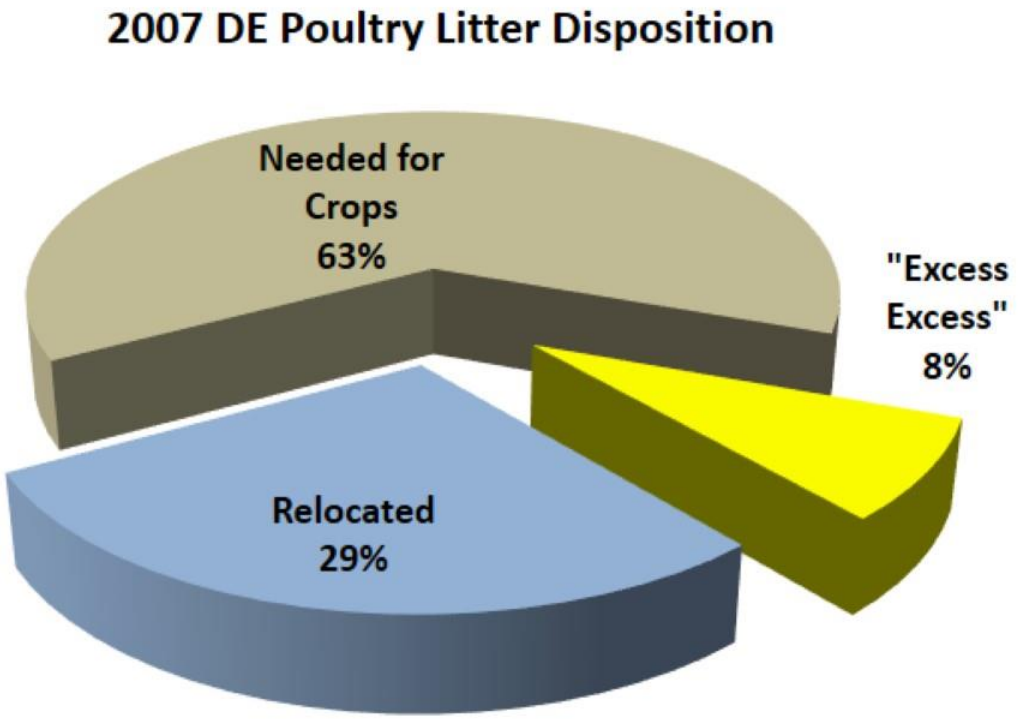
- The problem is the "nutrient surplus" – the portion of the whole not needed and without economic value.
- To illustrate the point, we used the analysis published in that same 2010 DNMC annual report for most of our data and calculations.
- The data are from 2007 and limited to Delaware, but the concept is universal.

The "Excess Excess" Is The "Problem"

More than 323,000 tons of litter/manure/mortality was generated in 2007.

However, 63% of that material was suitable for crops per benchmarks in Delaware's 1999 Nutrient Management Act.



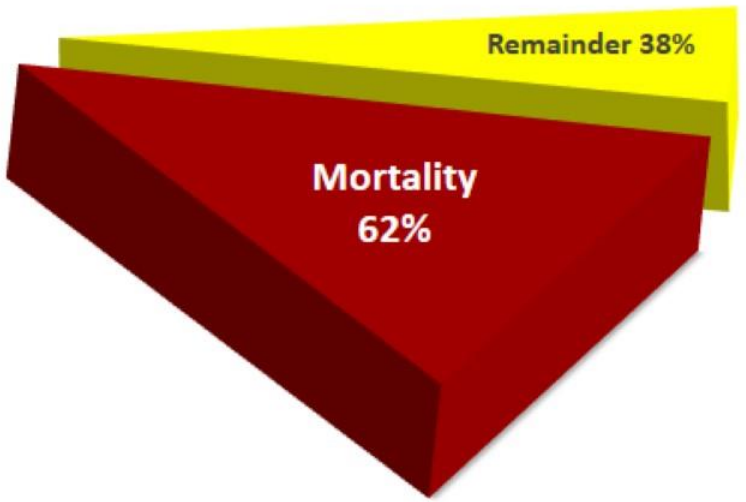
- Another 29% was relocated for land application and/or alternative uses -- only 8% was true surplus or "excess excess."
- **So where does mortality fit in?**

Potential Impact Of New BMP

Delaware growers generated more than 16,000 tons of mortality that year – an amount equal to 62% of "the problem."

Imagine if we could find a home for all of that material.

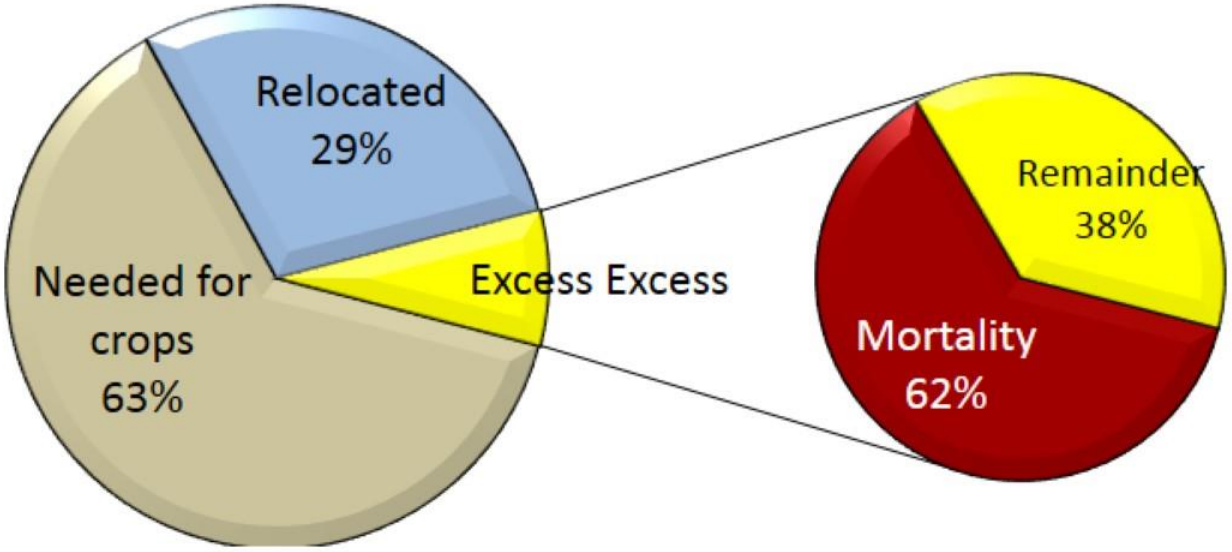
Mortality Portion of "Excess Excess"



- There are no alternative uses for composted mortality -- so it's not going to move into the "relocated" column.

Mortality: No Place To Go

- And farmers actually don't like to spread compost on their fields because leftover bird parts clog up the spreading equipment.
- Composted mortality has less of the nutrient the farmers want -- nitrogen -- than manure, so why would they want to use it?
- And it's higher in P than manure so why would we even want them to spread it?

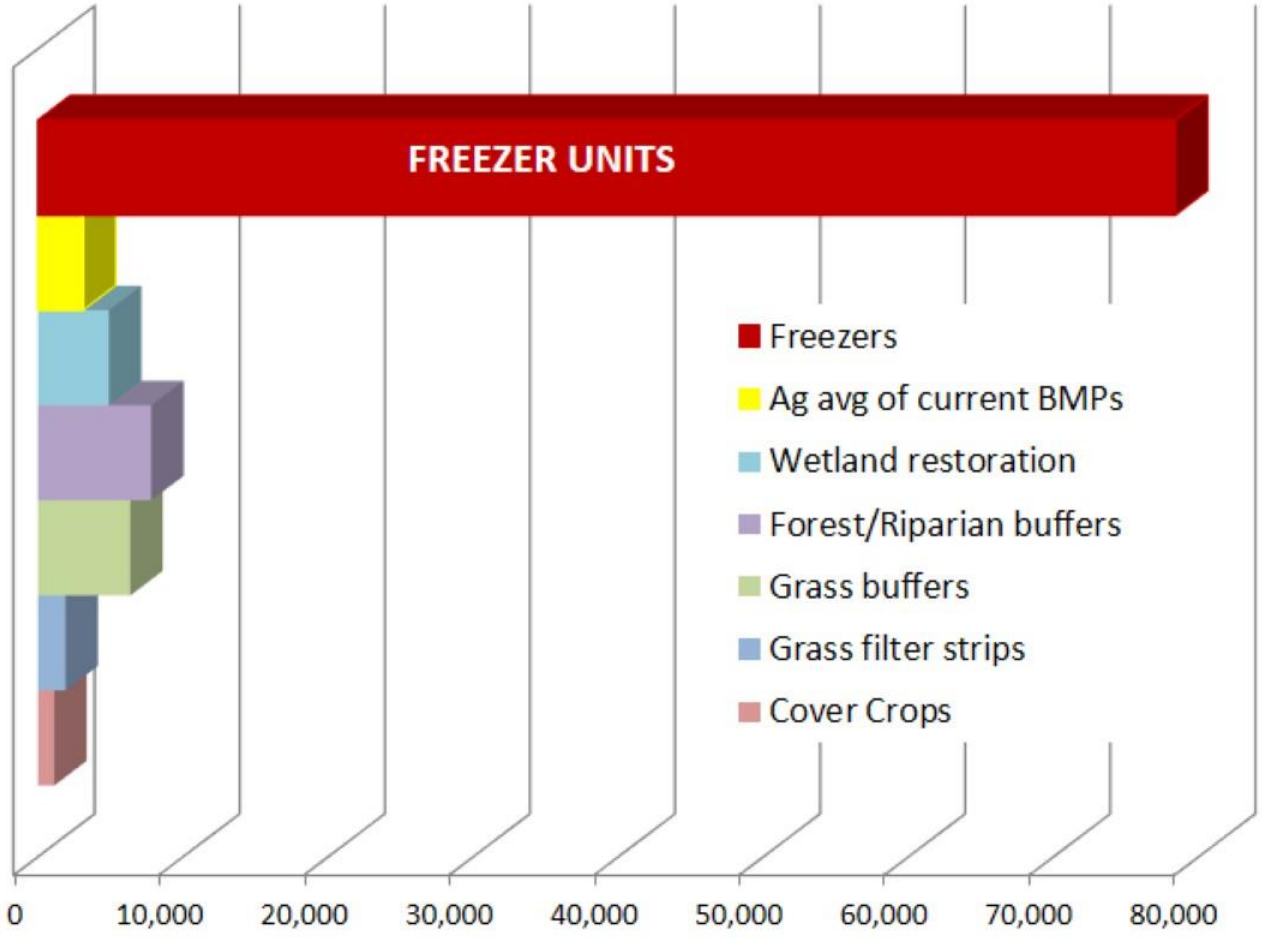


Game Changer For BMP Budget

- This BMP is 95% more cost effective than the average of all other Ag BMPs in reducing phosphorous – and 53% more cost effective in reducing nitrogen.
- For every dollar spent on the other BMPs, we could get the same impact on phosphorous with this practice for only 5 cents.
- Now imagine we had a $1 million budget to spend on nutrient management.
- How many pounds of phosphorous could we remove with the BMPs currently in our toolbox?

Game Changer For TMDL Goals

Phosphorous Removed With $1,000,000 Per BMP

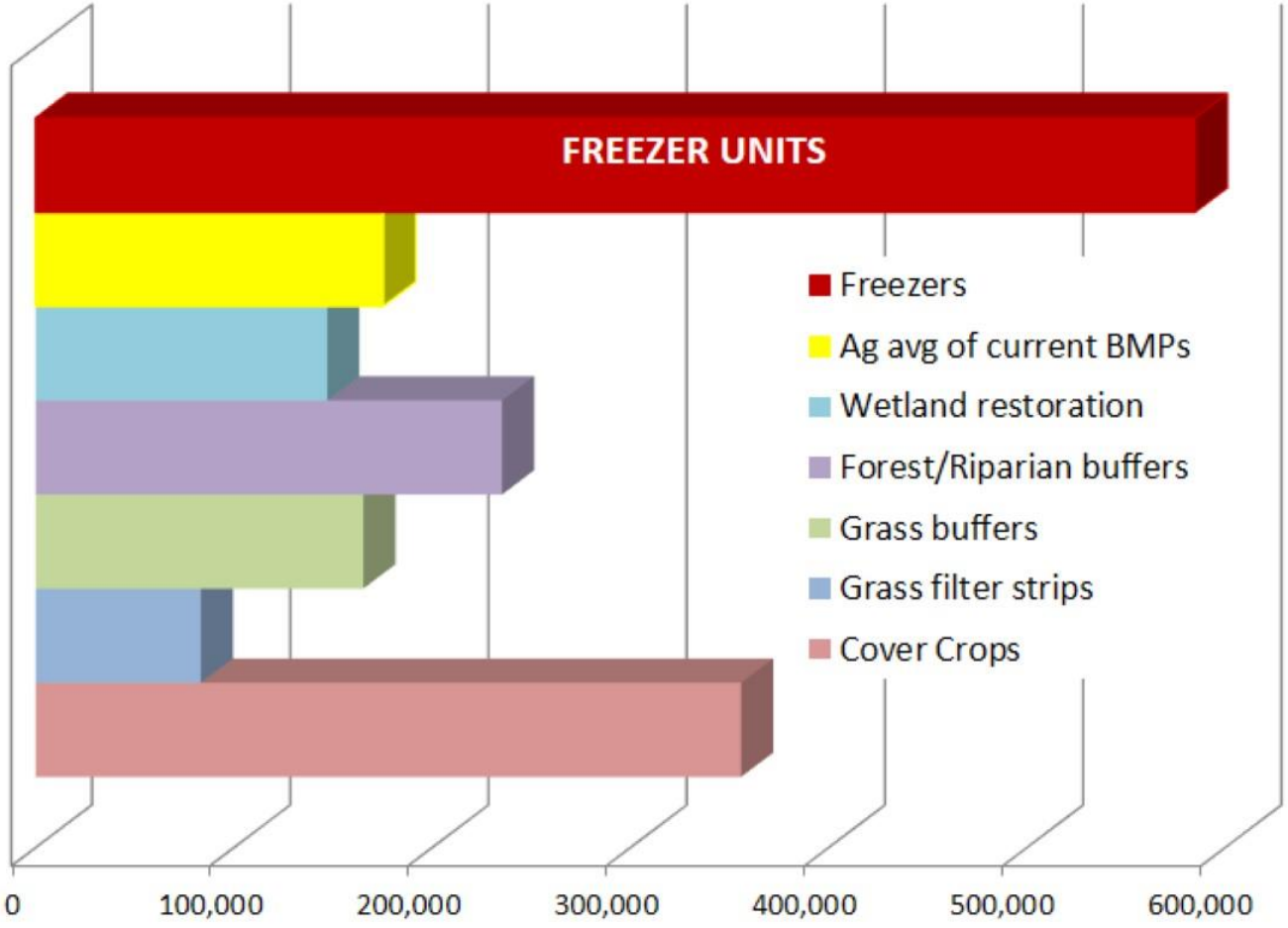


It's hard to believe -- until you consider that freezer units actually remove the material from the farm entirely.

Phosphorous Measured In Pounds

Game Changer For TMDL Goals

Nitrogen Removed With $1,000,000 Per BMP



And there is no byproduct of the process like other BMPs (e.g., incinerators) that must separately be addressed as a waste.

Nitrogen Measured In Pounds

Truly Quantifiable Results

- The effectiveness of our other BMPs is difficult to quantify. For example, the efficacy of cover crops or vegetative buffers is subject to the variability of site conditions.
- That's not the case with this BMP -- you can calculate the exact amount of phosphorous and nitrogen removed.
- And you can publish the data in real time on a customized dashboard for all to see.

BMP Bonus Benefit

- Recent regulatory changes have rendered nearly all existing manure storage sheds to be per se inadequate.
- The issue is even more pressing in Maryland because the new PMT regs are going into effect this month.

- The State has said it will have to build more storage sheds either on farms or in centralized locations.
- But there's the cost and time required to build new structures.
- **What if we could avoid the cost and time required?**

Instant "New" Storage Capacity

Recover more than 30% of current manure shed capacity

- More than 30% of the current manure shed capacity is lost because of composting.
  - About 75% of growers don't compost properly so litter brokers must use the manure shed to continue the process.
  - Even when done properly, however, BMP guidelines require compost be segregated in the manure shed.

Add another 15-25% of capacity with existing infrastructure

- Farms adopting this BMP would no longer need a composter – which could be immediately re-purposed for manure storage.

Benefits For Farmers And The Bay

Cost effectiveness – time and labor is drastically less

- Imagine a foolproof BMP that was less costly – farmer compliance and the benefits of the BMP would be realized.

Simplicity – easier to manage, greatly reducing regulatory risk

- Again, farmer compliance would mean less resources spent on enforcement and more spent on implementation.

Improved quality of life – no smells, no flies and no scavengers

- The Bay Program is not only about clean water, but also quality of life for the watershed's inhabitants and visitors.

Better biosecurity – lock pathogens in and lock scavengers out

- Better biosecurity means less mortality and less composted material that must be spread on fields.

Thank You

Please contact us with your suggestions and questions:

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