Feedback from Farm Freezers and Greener Solutions on Expert Panel Report Titled Estimates of Nutrient Loads from Animal Mortalities and Reductions Associated with Mortality Disposal Methods and Best Management Practices (BMPs) in the Chesapeake Bay Watershed

Who We Are

I write on behalf of Farm Freezers and Greener Solutions, local companies that provide equipment and hauling services in connection with routine mortality management on farms in the watershed. My partner also operates a poultry farm in Millsboro, DE, so our comments set forth below are not only informed by our knowledge of freezer equipment and the rendering industry, but by his knowledge of on-the-ground daily operations of farming – including routine mortality management. In fact, it was his realization, shortly after buying the farm – that there was a better use for routine mortality than composting and land application – that started us down this path a decade ago.

Others saw the beneficial aspects of this management method too, and, therefore, in 2016, Delaware and Maryland jointly petitioned the Bay Program to grant poultry mortality freezers interim status pending an expert panel. This is important to note because (i) data about poultry growth rates, poultry mortality rates and nutrient content was readily available –and, in fact, had been adopted by prior panels, (ii) poultry mortality was already reflected in the model as part of an existing load (manure/litter), thanks to one of those prior panels, and (iii) the use of freezers (with transport to rendering) was identical to manure transport out of the watershed vis-à-vis how this new BMP would be reflected in the model.

The scope of the original petition was later expanded to include many more animal types and four other management methods. A comprehensive review of mortality management made sense, however, data for those other animal types and data reflecting how those other management methods would be reflected in the model was severely limited – making the task extremely difficult, but also making the panel's achievement all the greater.

Why This Panel's Work Is So Important

The panel's work has brought this previously unseen aspect of both agriculture and nutrient generation out into the light.

Though the panel modestly downplayed the importance of its work – "The nutrients contained in mortalities are a minor component of the water pollution potential of animal production." -- the reality is that conservation solutions rarely come in the form of a silver bullet. Reducing a load by 5% or 10% is actually a big deal.

But more importantly, as the panel would no doubt agree, a great majority of the litter that is generated in the watershed is actually needed for land application as a soil amendment.

So, our task as supporters of both agriculture and the watershed, is not to figure out how to zero out 80% or 90% of the manure/litter load; our task is finding a way to zero out the nutrients from that portion of the manure/litter load that mass balance studies say we have in excess.

It is for that reason, that while mortality may be an insignificant part of the manure/litter load, zeroing out the nutrients from mortality could be a significant part of the solution.

We appreciate the panel's work and respectfully ask that the comments we are submitting (below and attached) be fairly considered and hopefully adopted where appropriate. We have done our best to be clear and thorough, but welcome questions when we have fallen short of that goal.

More Context for Each Method Will Increase the Value of the Report

Though the panel's charge discussed reviewing various mortality management methods that have historically been employed in the watershed, not all methods discussed deserve equal billing.

First, some methods have fallen out of favor or have been outright banned since their introduction. For example, pit burial was commonly used for routine poultry mortality on Delmarva, until it was deemed to be a hazard to ground water and surface water resources about three decades ago. In fact, composting owes its creation in part to pit burial's demise on the Peninsula.

Second, some methods discussed in the report are viable options for catastrophic losses, but are never used for routine mortality. For example, windrowing inside a chicken house is used only in mass mortality disease situations because it takes the chicken house out of production for a long time.

Thorough discussion of each method is understandable from an academic perspective; however, giving each method equal billing – with occasional caveats about limitations embedded here and there -- does not reflect the reality on the ground. For example, a new poultry operation in Delaware is in essence limited to either freezing/rendering or composting, and even within the category of composting, only bins, channels and rotary drums are used for routine mortality. But those limitations are not apparent from the report.

Pit burial, landfilling and incineration may be options in other states for routine poultry mortality, but setting forth which states and under what circumstances, would increase the value of the report.

The confusion is compounded when some aspects of mortality management are discussed watershed-wide (e.g., Table I.2.1. sets forth broiler production in the Chesapeake Bay Region). It's hard for the reader to remember that the management methods cannot be deployed watershed-wide when those methods are set out as equals. For example, that same table says the largest producer of chicken is Delaware, however, producers in Delaware are essentially limited to two options for mortality management, rendering discussion about the other three poultry mortality management options moot for the most relevant group.

Our suggestion is the inclusion of a chart or table that sets out each method and identifies each state in which its use is allowed and for which animal types. This would allow the reader to cross reference the panel's findings to put into perspective the potential impact on nutrient reduction each method is capable of achieving for each state. This would make the panel's work even more valuable. For example, while landfilling routine poultry mortality may, in theory, zero out the associated nutrients, if landfilling routine poultry mortality is banned in most poultry producing states – then its impact is not accurately reflected in the report.

As for practices that are limited to catastrophic losses, those should be removed as outside the scope of the charge for the same reason – the impact of those practices on the routine mortality load is not accurately reflected in the report. If discussion of those practices is preserved, maybe drop those comments into footnotes so it's obvious to the reader that the topic is not about routine mortality.

Final Disposition Is Critical to the Value of the Panel's Work

The primary goal of the Bay Program is nutrient reduction in the watershed. So, while it's important to understand intermediate steps in the nutrient's life cycle, the actual impact on the watershed – the end result – is why BMPs are created, vetted and incorporated into the model.

The panel has focused on the final disposition of the nutrients attributable to routine mortality. For example, the panel determined – rightly so – that the freezer shed was an interim step on the way to final disposition at a rendering plant, and renamed the BMP accordingly.

But the composting shed is an interim step too. Composted mortality does not stay in the shed, it is ultimately land applied. (We're not asking that the composting BMP be renamed "land application," though to be fair, that would be analogous to renaming freezers as the rendering BMP.)
What we are suggesting is that the composting process reflect the reality on the ground – that we follow the nutrients in composted mortality (along with its co-composting material) to their final disposition, for the following reasons:

First, the process simply cannot happen without co-composting material, as explained in the report at page 107: "For proper composting to occur, dry carbon-rich material must be added to mortalities to control moisture released from the carcasses and supply a carbon source for the microbes."

Second, the full process is necessary to have a true apples-to-apples comparison as between the five methods – three of which already are discussed in terms of final disposition of nutrients. Like freezing/rendering, the process doesn't end in the composting shed. Ignoring the final disposition of composting mortality is not a fair comparison on the factor most important to bay restoration efforts and by extension to this three-year endeavor – nutrient impact.

Third, the finished product of composting affects nutrient reduction in three ways:

1. The composted carcasses will be land applied,
2. But so too will the litter mixed in with it
3. Moreover, pure litter on a farm – without mortality mixed in – will not necessarily be land applied; it may be diverted from land application to an alternative use.

To illustrate, consider two identical poultry farms – each produces 100 lbs. of mortality and 1,000 lbs. of litter per flock – but one uses freezing/rendering and the other composting.

At the first farm, it's possible to contribute nothing to the nutrient load. 100 lbs. of mortality is zeroed out at the rendering plant and 1,000 lbs. of manure is zeroed out at the mushroom farm.

At the second farm, to compost 100 lbs. of mortality, ~300 lbs. of manure must be used. At the end of the process, some N escapes to the watershed via leaching, runoff and volatilization per Table II.3.1, but all the P in the 100 lbs. of mortality – and all of the P in the 300 lbs. of manure – is kept, and in fact concentrated, and then land applied. Only the remaining 700 lbs. of pure litter can be zeroed out at the mushroom farm.

This is a very unsophisticated illustration but it demonstrates that the composting process creates an additional and new source of nutrients – and that the process also taints a co-composting material that could otherwise be zeroed out if transported to an alternative use.

Fourth, as stated repeatedly in the panel's report, the co-composting material is MORE important than the carcasses when it comes to

1. Nutrient content – See, e.g., report at 116 "total acreage needed for spreading depends on nutrients added with co-composting materials."
2. Volatilization – See e.g., report at 111 ("There is a large variability in the nitrogen loss from carcass compost piles. This variation is caused primarily by co- composting materials added to piles to aid in composting rather than the carcasses themselves.")
3. Leaching and runoff – see, e.g., report at 114 ("Glanville et al. (2006), Gilroyed et al. (2016), and Hutchinson and Seekins (2021) all found that co-composting material, not the carcasses, significantly influenced leachate and air emission quality and quantity.")

To repeatedly declare the importance of the co-composting material in every facet of the analysis of the composting methodology and then overlook its impact in the final result of the process seems inconsistent and reduces the value of the panel's conclusions.

Fifth, without considering the fate or final disposition of the compost, the analysis misses a significant issue: once the process is done where will the compost be land applied?

As the report states at page 118, "[a]t the end of the compost process, the producer has a valuable soil amendment." Finding a destination for that soil amendment, however, can be challenging. First, many modern poultry growers focus solely on poultry and grow no crops. Therefore, these "no-land" operations have no need (and often no land) for spreading this soil amendment. Second, even some farms that grow crops are prohibited from using manure/litter/compost on their fields because of high legacy nutrients in the soil. Third, according mass balance studies, supply of nutrient rich material is outstripping crop demand, so finding a home for this excess material is becoming more and more challenging.

Sixth, poultry mortality is already reflected in the model as part of the manure/litter load, so the results of the panel's analysis could be plugged directly into load calculations and/or modeling scenarios. (That may not be true for other animal types, but that's not a reason to leave out valuable information the poultry industry could use.) This makes sense as litter, manure and mortality are already combined – and as the report states at page 113 "the carcass disintegrates and becomes more or less congruent with the carbon-rich material" so all three sources are considered a homogenous mix – from both the perspective of the panel and the model.

Seventh, the "fate," i.e., final disposition, of N and P across selected practices includes "Field application" of compost, according the panel's charge on page 8.

Finally, the data should reflect the reality on the ground so the analysis could be used by nutrient management professionals and policy makers for planning purposes. Table II.3.4. and Table II.3.5 on page 117, which calculates how many acres are needed to properly land apply the nutrients found in a carcass – after the carcass has gone through the composting process, but without the nutrients created by the co-composting material – really illustrates why the real value in the analysis is in the final disposition of the process. No one can use the data in those tables. It's not possible to spread just carcasses post-composting.

The difficulty the panel encountered, presumably, is that there are several potential sources for co-composting material and identifying and analyzing all of them would be a huge separate assignment; however, it cannot be that the solution is to forgo the analysis with co-composting material, especially when it has been established that the co-composting material is the bigger factor vis-a-vis nutrient content, leaching and volatilization.

Instead, a common co-composting material could be used to run the acreage calculations, and explain in a footnote that other co-composting materials will skew the results up or down (and that that analysis is a separate research project in the future). For example, nearly all poultry farms on Delmarva (and probably elsewhere) primarily use litter/cake for composting. This makes sense because, as the report explains on page 112:

> *There is very little capital investment required to implement a compost program for carcass management. Most farm operations already have the infrastructure, land, co-composting materials, and material handling equipment necessary for composting.*

In other words, most producers use what they have on hand, i.e., poultry growers use litter/cake rather than pay to have outside materials brought in. So, the panel could use the litter/cake research on nutrient content, leaching and volatilization already found elsewhere in the report to run the numbers and create an example – an example that also happens to be accurate for a large majority of poultry growers. Those numbers would reflect the reality on the ground and could be used by nutrient management professionals, bay modelers and policy makers for planning purposes.