Manure BMP Questions

How is Manure Treatment Technology credited differently than Manure Transport? What is the difference between all 19 different types of Manure Treatment Technology?

Manure transport simply moves the manure from one location to another and then the replacement nutrients are applied in the source location. Manure Treatment Technology works the same way but also includes a reduction based on the treatment and an added load due to ammonia volatilization. A reference guide is available that discusses the types of Manure Treatment Technology. It may be downloaded from the CAST home page under BMPs, Models and Geography. The direct link is: https://www.chesapeakebay.net/documents/BMP-Guide_Full.pdf. The information for this BMP is on pages 68 to 75.

What level of N and P load reductions are achieved for removing a ton of manure from the watershed?

This amount is highly variable and depends on the number and type of animals in a county, crop need, and acres of manure-receiving land uses. For nitrogen, the load is likely to increase with additional implementation of Manure Transport and Manure Treatment Technologies. An estimate of the load reduction by BMP is available for all counties for nitrogen as well as phosphorus by downloading the spreadsheet named BMP Pounds Reduced and Costs under the heading Cost Effectiveness of BMPs at: http://cast.chesapeakebay.net/Documentation/DevelopPlans. An average for PA is 0.43 pounds of phosphorus per dry ton of manure.

The difference in nutrient concentrations by animal types may be found in the manure source data file that can be downloaded from: http://cast.chesapeakebay.net/Home/SourceData. It varies by year, county and animal type.

What is the different effect of transporting manure between counties compared to moving manure out of the watershed?

Crop need is the amount of nutrients a crop is designated to need to produce a typical crop yield.

Manure transport between counties reduces the manure in the source county and increases it in the destination county. The biggest load reduction comes from reducing crop need with the Nutrient Management Core BMP. If your area of interest is only the source county, then moving to another county or out of the watershed accomplishes the same goal. If you are looking at managing a larger area, like a state, then phosphorus reductions can be seen from manure transport. The impact depends on multiple factors like crop need, amount of manure, acres of cropland, and other BMPs in the scenario.

How can I determine which counties have manure in excess of crop need?

Login to CAST and navigate to Results>Reports. Select the report type of Nutrients Applied. You can request the report for multiple counties for a scenario. This report includes the amount of manure and fertilizer applied to meet the crop need. There are columns with the amount of crop need, manure and fertilizer. Note that eliminating manure does not bring the loads down. You also must reduce the crop need using the Nutrient Management Core BMP. You can see the amount of crop need met in this same

report in the column named Total N App to Crop Need. Implementing 100% of Nutrient Management Core will produce the lowest crop need.

Is there a reduction in N and P for eliminating manure from a county that does not have excess manure nutrients?

There is likely to be a phosphorus reduction since manure is applied to meet the nitrogen crop need. It is less likely that there is a nitrogen reduction since the replacement nutrients are applied at the same application rate as before the manure was eliminated.

Why did my nitrogen loads increase with Manure Treatment Technology or Manure Transport?

While phosphorus will be reduced after applying the Manure Treatment Technology or Manure Transport BMP, nitrogen loads may increase. Removing manure without also controlling the amount of replacement inorganic fertilizer results in the same rate of inorganic fertilizer being applied as when manure was applied. When using these manure BMPs, increase the amount of the Nutrient Management Core BMP (accessed in the Agriculture BMPs tab) to control the amount of replacement inorganic fertilizer. Additionally, the runoff of inorganic fertilizer is higher than manure, which also contributes to the potential increase in nitrogen loads.

The Nutrient Management Core BMP will lower the application to the crops. It is recommended that this be implemented on most, if not all, of the acres. The other Nutrient Management BMPs for Rate, Placement, and Timing reduce the amount of runoff loads but do not affect the crop need or application rate.

Here is more detail on how the application rate is determined. The amount of nitrogen and phosphorus crop need met is defined by the amount met in 2014. The nitrogen and phosphorus nutrients are applied to agricultural load sources using the fraction of crop need met in that year's progress. If the amount of crop need met in 2014 was 110%, then 110% of crop need will be met in 2015 and later years. When selecting base conditions for years between 1984 and 2014, the amount of crop need calculated from the ratio of all nutrient inputs applied to meet crop need are defined by the official annual progress scenario for that year.

Why are there changes in N and P loads on non-manured load sources when I implement Manure Treatment Technology or Manure Transport? Shouldn't this only change the agricultural load sources that receive manure?

One of the parameters used to calculate the phosphorus loads is the amount of phosphorus in the soil. That is calculated across all crop load sources together, following the decision of the Chesapeake Bay Program Partnership. When manure is changed, such as with the manure transport BMP, the impact will be on all crop load sources, not just those that have manure applications. The non-manured load sources that show this change are soybeans, grains without manure, and silage without manure.

When comparing the phosphorus loads among years, I am seeing the loads change in an unexpected direction. Why?

This can happen for several reasons related to BMP implementation levels. Phosphorus loads can be amplified when Manure Treatment Technology or Manure Transport are decreased in later years than in the prior year. The amount of manure available in 2014 was part of the calculation of crop need that is met. Decreasing Manure Treatment Technology and/or Manure Transport BMPs will increase the amount of manure. The manure that previously was transported will be applied in addition to the

manure and fertilizer application that meets crop need. Put another way, for phosphorus, the difference between the amount of Manure Transport in 2014 and later years is subtracted from the amount of manure nutrients applied after other nutrients are applied to meet the proportion of crop need met in 2014. The implication is that if more manure is transported into a location than was transported out in the 2014 Progress, the phosphorus applied is effectively lowered. Conversely, if less manure is transported out of a location than was transported in for the 2014 Progress, the phosphorus applied increases.