

Building a Better Bay Model: A Workshop for Agricultural Partners

Please select one breakout session per day:

	Wednesday, May 22	Thursday, May 23
Agricultural Modeling	1. Defining the Landscape	1. Measuring the Impacts of Dairy and Beef
	2. Planting and Harvesting Crops	2. Accounting for Swine
	3. Nutrient Placement and Usage	3. Poultry Production and Nutrients in the Model
Agricultural Forecasting	4. Livestock Session, Informing the Present with the Future	4. Crop Session, Informing the Present with the Future

*Agronomic Sessions

*Livestock Sessions

Detailed Description of Crop and Animal Production Breakouts

May 22, 2013

Agronomic Sessions

Session 1: Defining the Landscape – Bob Ensor (facilitator); Matt Johnston (CBPO modeler)

Purpose: To engage the agricultural community in understanding current agricultural land uses simulated in the model, and to explore potential new opportunities to represent land uses across the agricultural landscape.

As the Model sees it - The Chesapeake Bay Program’s Non-Point Source Data Analyst, Matt Johnston, will provide the group with an overview of how Agricultural Census data for crops, animals and farms are used to define the Watershed’s agricultural landscape. Johnston will explain how this and other data are used to:

- Place animals, crops, and farms on the digital (modeled) landscape;

- Show the benefits of best management practices such as forest buffers or land retirement;
- Assign basic export rates for nutrients and sediment to each land use;
- And create the conditions for application of nutrients and reductions of nutrients through BMPs.

As the next Model might see it - The Chesapeake Bay Program's Agricultural Technical Coordinator, Mark Dubin, will provide the group with a set of proposed agricultural land uses for the next version of the Chesapeake Bay Program's Watershed Model, describe how the Agricultural Census and other data might be used to derive these land uses, and describe the process the Bay Program will undertake to assign loading rates to these new land uses.

Discussion questions:

1. What data are available that could help redefine agricultural land uses in the next version of the Model?
2. What land use data are being used by other tools throughout the Watershed that could inform the next suite of land uses?
3. How do states, producers and others define their agricultural landscapes through the use of land uses?
4. What data are available that could help the CBP assign nutrient and sediment export rates to each land use?
5. What land use and loading rate data was used in the most recent CEAP study, and how can we incorporate information from CEAP?
6. What regulatory drivers might alter the future agricultural landscape?
7. Are there innovative survey approaches that could help define lands under conservation tillage practices, or other common practices that significantly impact sediment and nutrient runoff from the landscape?
8. What soil nutrient content data are available across the Watershed? How can the Partnership collect and use county averaged soil nutrient content data?

Session 2: Planting and Harvesting Crops – Matt Royer (facilitator); Gary Shenk (CBPO modeler)

Purpose: To engage the agricultural community in understanding current agricultural production systems simulated in the Model, and to explore potential new opportunities to represent the planting and harvesting of agronomic crops across the agricultural landscape.

As the Model sees it – The Chesapeake Bay Program's Integrated Analysis Coordinator, Gary Shenk, will provide the group with an overview of how data from states, the Agricultural Census, RUSLE, and other sources are used to define how crops interact with nutrients in and runoff across the landscape. Shenk will discuss:

- Placement of crops across the digital (modeled) landscape;

- Detached sediment and crop cover factors;
- Crop inorganic and organic nutrient needs and application rates;
- And crop yields, uptake and nitrogen fixation.

Discussion questions:

1. What data are available that could modify the Model's assumptions for nutrient needs, crop yields and uptake?
2. What data are available from the fertilizer industry, state chemistry labs, or other sources that could inform the Model about fertilizer use across the watershed?
3. Are there data available to reflect organic and inorganic nutrient use across crop types? e.g., Can we definitively say that a percent of cropland for X crop in Y county does NOT receive manure?
4. What data are available that could inform how both organic and inorganic nutrients are transported throughout the watershed from sales or production sites to be used on individual farms?

Session 3: Nutrient Placement and Usage – Erin Ling (facilitator); Jeff Sweeney (CBPO modeler)

Purpose: To engage the agricultural community in understanding current nutrient use and application systems simulated in the model, and to explore potential new opportunities to represent the use of these inorganic and organic nutrient sources across the agricultural landscape.

As the Model see it – The Chesapeake Bay Program's Non-Point Source Data Manager, Jeff Sweeney, will provide an overview of how manure nutrients generated by animals or inorganic nutrients are applied to the landscape to meet crop need. Sweeney will discuss:

- How manure nutrients are generated and placed to meet crop need;
- The differences between N and P-based application plans in the current tools;
- How nutrients applied in excess of crop need contribute to future crop needs and how excess nutrients are spread across the landscape in excess of crop need.

The current and future uses of nutrient management in the tools – Chris Brosch, Virginia Tech University and Chair of the Chesapeake Bay Program's Nutrient Management Panel, will describe how nutrient management is currently simulated in the tools, and options the Panel is considering for improving this simulation.

Discussion questions:

1. What data are available to describe the number and types of nutrient application management plans, both N-based and P-based, that exist across the Watershed?
2. How can the Partnership track and verify P-based nutrient application management plans?

3. What data are available that could inform the Model about manure transport into and out of the Watershed beyond state permit data?
4. How and when is excess manure applied to a farm with animal production?
5. How and when is manure applied to a farm without animal production?
6. What methods are suggested and what data can be used to better determine: 1) nutrient application rates to the many crop types and application timing – both chemical fertilizer and manure; 2) the uptake and timing of nutrients applied to crops and in the soils; and 3) the difference between these fluxes or the mass of excess nutrients (keeping in mind temporal changes over, perhaps, a 25-30 year period and spatial variability across a 64,000 square-mile watershed)?
7. Is it preferable to use sales data of chemical fertilizers directly or the current method of estimating chemical fertilizer application rates from available manure nutrients, crop types and uptake, etc.?
8. What, specifically, is pasture land nutrient management? Does the definition vary from state to state? What methods are suggested for simulating the benefits of pasture nutrient management?
9. Should the model account for application of bio-solids across all jurisdictions, and if so, what data are available to estimate application rates and timing of these nutrients?

Livestock Session

Session 4: Agricultural Forecasting; Livestock Production – Jim Baird (facilitator); Peter Claggett (CBPO modeler)

Purpose: To engage the agricultural community in exploring economic, policy, and technological factors influencing the forecasting of future livestock production.

As the Model sees it – The Chesapeake Bay Program’s Land Data Manager, Peter Claggett, will provide the group with an overview of how land uses are currently forecast using the Chesapeake Bay Land Change Model v2 and how livestock production is extrapolated using statistical techniques. Claggett will discuss:

- Role of short-term and long-term forecasts in the Bay TMDL;
- Data used to represent agricultural land uses;
- Data and methods used to determine rates and quantities of urban development;
- Data and methods used to estimate the amount of farmland converted or retired;
- And assumptions about future manure loads and land use changes.

Q&A - Participants will discuss what steps could be taken to improve the long-term forecasting capacity of the CBP?

2a. As the next Model might see it - The American Farmland Trust’s Mid-Atlantic States Director, Jim Baird, will facilitate a discussion among participants of historic livestock trends, factors influencing those trends, and alternative methods for improving short-term extrapolations of those trends.

2b. Demographic, economic, and environmental factors influencing farm resilience – Peter Claggett will provide an overview of potential “vulnerability” indicators and Jim Baird will facilitate a discussion of factors influencing the persistence of livestock operations.

3. Crop Production in the Chesapeake Bay Watershed under a Changing Climate –USDA ERS economist Dr. Scott Malcolm will present and lead a discussion.

4. Future agricultural scenarios – Jim Baird will facilitate a discussion of current regional and industry forecasts to develop a summary of factors/drivers impacting short and long-term livestock trends.

Discussion Questions :

1. What data are available to characterize livestock trends?
2. What methods are available to estimate future livestock production?
3. What factors will likely influence historic and future livestock trends?
4. What data are available to characterize factors affecting trends?

May 23, 2013

Livestock Sessions

Session 1: Measuring the impacts of Dairy and Beef - Matt Royer (facilitator); Gary Shenk (CBPO modeler)

Purpose: To engage the agricultural community in understanding current dairy and beef populations and production systems simulated in the model, and to explore potential new opportunities to represent the management of bovines across the agricultural landscape.

As the Model sees it - The Chesapeake Bay Program's Integrated Analysis Coordinator, Gary Shenk, will provide the group with an overview of how the manure nutrients are generated from dairy and beef, and the fate of these nutrients within the tools. Shenk will describe:

- How Agricultural Census data are used to estimate dairy and beef numbers;
- The use of animal production areas in the tools;
- Dairy and beef manure generation, storage, and application on pasture and within confined areas;
- And what BMPs can reduce the available nutrients for application to crops.

Discussion questions:

1. What data are available from industry or other sources that could inform animal population estimates and these trends over time?
2. How much manure is typically generated per animal type, and what is the typical nutrient content of this manure? What data can be used in the model for manure mass and nutrient concentration trends in time over, perhaps, a 25-30 year period and spatial variability across a 64,000 square-mile watershed?
3. How is dairy and beef manure typically distributed across the landscape? How far does it travel, and what crops or land areas are most likely to receive it?
4. What land uses most appropriately describe the dairy production landscape?
5. What BMPs not described in the previous presentation are typically used on dairy operations?
6. The model assumes a certain percentage of manure is "lost" to the environment from cattle production facilities, and a nutrient load from this "loss" is transported through the environment. What is this percentage and how was this value developed?
7. How is livestock mortality currently represented, and what data are available from industry or other sources that could improve this representation?
8. What data sources are available to describe feed management and manure management changes and improvements over time?

Session 2: Accounting for Swine – Erin Ling (facilitator); Jeff Sweeney (CBPO modeler)

Purpose: To engage the agricultural community in understanding current swine populations and production systems simulated in the model, and to explore potential new opportunities to represent the management of swine across the agricultural landscape.

As the Model sees it - The Chesapeake Bay Program's Non-Point Source Data Manager, Jeff Sweeney, will provide an overview of how the manure nutrients are generated from swine and the fate of these nutrients within the tools. Sweeney will describe:

- How Agricultural Census data for are used to estimate swine numbers;
- The use of animal production areas in the tools;
- Swine manure generation, storage, and application;
- And what BMPs can reduce the available nutrients for application to crops.

Overview of National Pork Board's Environmental Sustainability Program - Allan Stokes, Director of Environmental Programs, will provide a brief overview the National Pork Board's efforts in defining baseline carbon, water, air and land footprints for live swine production, quantifying progress made and future improvements possible, and developing research and tools to aid pork producers in achieving continuous improvements in protecting the environment and natural resources, including the "Pig Production Environmental Footprint Calculator" tool.

Discussion questions:

1. What data are available from industry or other sources that could inform animal population estimates and these trends over time?
2. How much manure is typically generated per animal type, and what is the typical nutrient content of this manure? What data can be used in the model for manure mass and nutrient concentration trends in time over, perhaps, a 25-30 year period and spatial variability across a 64,000 square-mile watershed?
3. How is swine manure typically distributed across the landscape? How far does it travel, and what crops are most likely to receive it?
4. What BMPs not described in the presentation are typically used on swine operations?
5. How often do swine operators clean out their facilities between groups of animals and how has this frequency changed over the past few decades? Do the number of cleanouts differ across states within the Watershed?
6. The model assumes a certain percentage of manure is "lost" to the environment from swine production facilities through storage and handling, and a nutrient load from this "loss" is transported through the environment. What is this percentage and how was this value developed?
7. How is livestock mortality currently represented, and what data are available from industry or other sources that could improve this representation?
8. What data sources are available to describe feed management and manure management changes and improvements over time?

Session 3: Poultry production and nutrients in the Model - Bob Ensor (facilitator); Matt Johnston (CBPO modeler)

Purpose: To engage the agricultural community in understanding current poultry populations and production systems simulated in the model, and to explore potential new opportunities to represent the management of poultry across the agricultural landscape.

As the Model sees it - The Chesapeake Bay Program's Non-Point Source Data Analyst, Matt Johnston, will provide the group with an overview of how the manure nutrients are generated from poultry and the fate of these nutrients within the tools. Johnston will describe:

- How Agricultural Census data are used to estimate poultry numbers;
- The use of animal production areas in the tools;
- Poultry litter generation, storage and application;
- And what BMPs can reduce the available nutrients for application to crops.

Phytase and other changes – The Chesapeake Bay Program's Agricultural Technical Coordinator, Mark Dubin, will provide the group with an update of work completed by the Chesapeake Bay Program's Poultry Litter Subcommittee. The Subcommittee has gathered thousands of data points from manure sampling labs across the watershed to try to describe how the nutrient content of poultry litter has changed through time.

Discussion questions:

1. What data are available from industry or other sources that could inform animal population estimates and these trends over time?
2. How much manure is typically generated per animal type, and what is the typical nutrient content of this manure? What data can be used in the model for manure mass and nutrient concentration trends in time over, perhaps, a 25-30 year period and spatial variability across a 64,000 square-mile watershed?
3. How is poultry litter typically distributed across the landscape? How far does it travel, and what crops are most likely to receive it?
4. What land uses most appropriately describe the poultry production landscape?
5. What BMPs not listed are typically used on poultry operations?
6. The model assumes a certain percentage of manure is "lost" to the environment from poultry production facilities, and a nutrient load from this "loss" is transported through the environment. What is this percentage and how was this value developed?
7. How is livestock mortality currently represented, and what data are available from industry or other sources that could improve this representation?
8. How should the model represent the trend to extend whole house cleanouts (sometimes as long as three years), thereby reducing the amount of manure generated in any given year?
9. What data sources are available to describe feed management and manure management changes and improvements over time?

Agronomic Session

Session 4: Agricultural Forecasting; Crop Production – Jim Baird (facilitator); Peter Claggett (CBPO modeler)

Purpose: To engage the agricultural community in exploring economic, policy, and technological factors influencing future non-point source loads.

1. As the Model sees it – The Chesapeake Bay Program’s Land Data Manager, Peter Claggett, will provide the group with an overview of how land uses are currently forecast using the Chesapeake Bay Land Change Model v2 and how crop production is extrapolated using statistical techniques. Claggett will discuss:

- Role of short-term and long-term forecasts in the Bay TMDL
- Data used to represent agricultural land uses.
- Data and methods used to determine rates and quantities of urban development.
- Data and methods used to estimate the amount of farmland converted or retired.
- Assumptions about future manure loads and land use changes.

Q&A - Participants will discuss what’s missing from the forecast and what steps could be taken to improve the long-term forecasting capacity of the CBP?

2a. As the next Model might see it - The American Farmland Trust’s Mid-Atlantic States Director, Jim Baird, will facilitate a discussion among participants of historic crop production trends, factors influencing those trends, and methods for developing short-term extrapolations of those trends.

2b. Demographic, economic, and environmental factors influencing farm resilience – Peter Claggett will provide an overview of potential “vulnerability” indicators and Jim Baird will facilitate a discussion of factors influencing the persistence of cropping operations.

3. Crop Production in the Chesapeake Bay Watershed under a Changing Climate –USDA ERS economist Dr. Scott Malcolm will present and lead a discussion.

4. Future agricultural scenarios – Jim Baird will facilitate a discussion of current regional and industry forecasts to develop a summary of factors/drivers impacting short and long-term crop production and cropland area trends.

Discussion Questions:

1. What data are available to better characterize crop trends?
2. What methods are available to better estimate future crop production?
3. What factors will likely influence historic and future crop trends?
4. What data are available to characterize factors affecting trends?