



Bio-solids in the Phase 6 Watershed Model

Jeff Sweeney
Environmental Protection Agency
Chesapeake Bay Program Office
jsweeney@chesapeakebay.net
410-267-9844

Wastewater Treatment Workgroup Meeting
November 3, 2015



Bio-solids in the Phase 6 Watershed Model

- U.S. EPA Chesapeake Bay Program Office Grant and Cooperative Agreement Guidance
 - Attachment 6 – Chesapeake Bay Program Wastewater Facility and BMP Implementation Data Submission Specifications and Requirements
 - Wastewater Facility, Bio-Solids, and Spray Irrigation Data Submission
 - Beginning in 2015, CBPO expects jurisdictions to provide available bio-solids and spray irrigation data where these nutrients are applied to the land.
 - The data is to include the location of application, mass of bio-solids or volume of irrigation, concentrations of nutrients in the bio-solids, and the timing of applications.
 - States not having spray irrigation data in a database may rely on the initial one time determination of nutrient loads for future progress runs.



Bio-solids in the Phase 6 Watershed Model

- U.S. EPA Chesapeake Bay Program Office Grant and Cooperative Agreement Guidance
 - Attachment 6 – Chesapeake Bay Program Wastewater Facility and BMP Implementation Data Submission Specifications and Requirements
 - Wastewater Facility, Bio-Solids, and Spray Irrigation Data Submission
 - Jurisdictions should provide an initial submission of historical bio-solids and spray irrigation data by June 30, 2015 to allow time for processing and review by CBPO and jurisdictions.
 - Jurisdictions are expected to submit final bio-solids and spray irrigation data by September 30, 2015.
 - It is expected that jurisdictions will annually submit initial updates to their bio-solids and spray irrigation data by June 30 and final updates by September 30.



Bio-solids in the Phase 6 Watershed Model

- Needs and assistance with historic bio-solids data
 - Language in 2015 (and 2016) Grant Guidance
 - Notice of data needs for the mid-point assessment from the Water Quality GIT at its October 7, 2015 face-to-face meeting
 - Provided jurisdictions a template for how to report their data
 - Offered technical assistance through existing Tetra Tech contract to jurisdictions to compile data



Bio-solids in the Phase 6 Watershed Model

- Quality of the data submitted for initial Phase 6 calibration was highly variable among jurisdictions

Jurisdiction	Years of data
DC	0
DE	2001-2013
MD	1994, 2001, 2009, 2012-2013
NY	2013
PA	0
VA	2007-2013
WV	1985-2014



Bio-solids in the Phase 6 Watershed Model

- Possible sources for a more-complete record of bio-solids data for the Phase 6 calibration and forward:
 - 1st = data from jurisdictions
 - 2nd = methods for defaults from jurisdictions ⇒ Wastewater Treatment Workgroup decisions
 - 2nd to last = CBPO methods
 - Last = No bio-solids data



Bio-solids in the Phase 6 Watershed Model

- Fertilizer, manure and bio-solids inputs to the model require:
 - Location of application to the land
 - Down to county level
 - Landuse type the nutrients are applied to
 - Crops
 - Application rate = mass of each species of nutrients divided by landuse acre
 - Species are TN = NH_3 , Organic N, NO_3
 - Species are TP = PO_4 , Organic P
 - Timing of application
 - By month
 - Over the 1985 – 2013 calibration period



Bio-solids in the Phase 6 Watershed Model

- Where location of applications were missing
 - Proportioned mass of nutrients according to manure eligible crop need in the counties by year
- Where concentrations of nutrient species were missing
 - Used average species concentrations by state
 - If no state concentration data (PA), used Phase 5 WSM average species concentrations
- For years when nutrient mass data were missing
 - Held constant at mass in the nearest year
- Application timing
 - Followed manure timing \Rightarrow state information

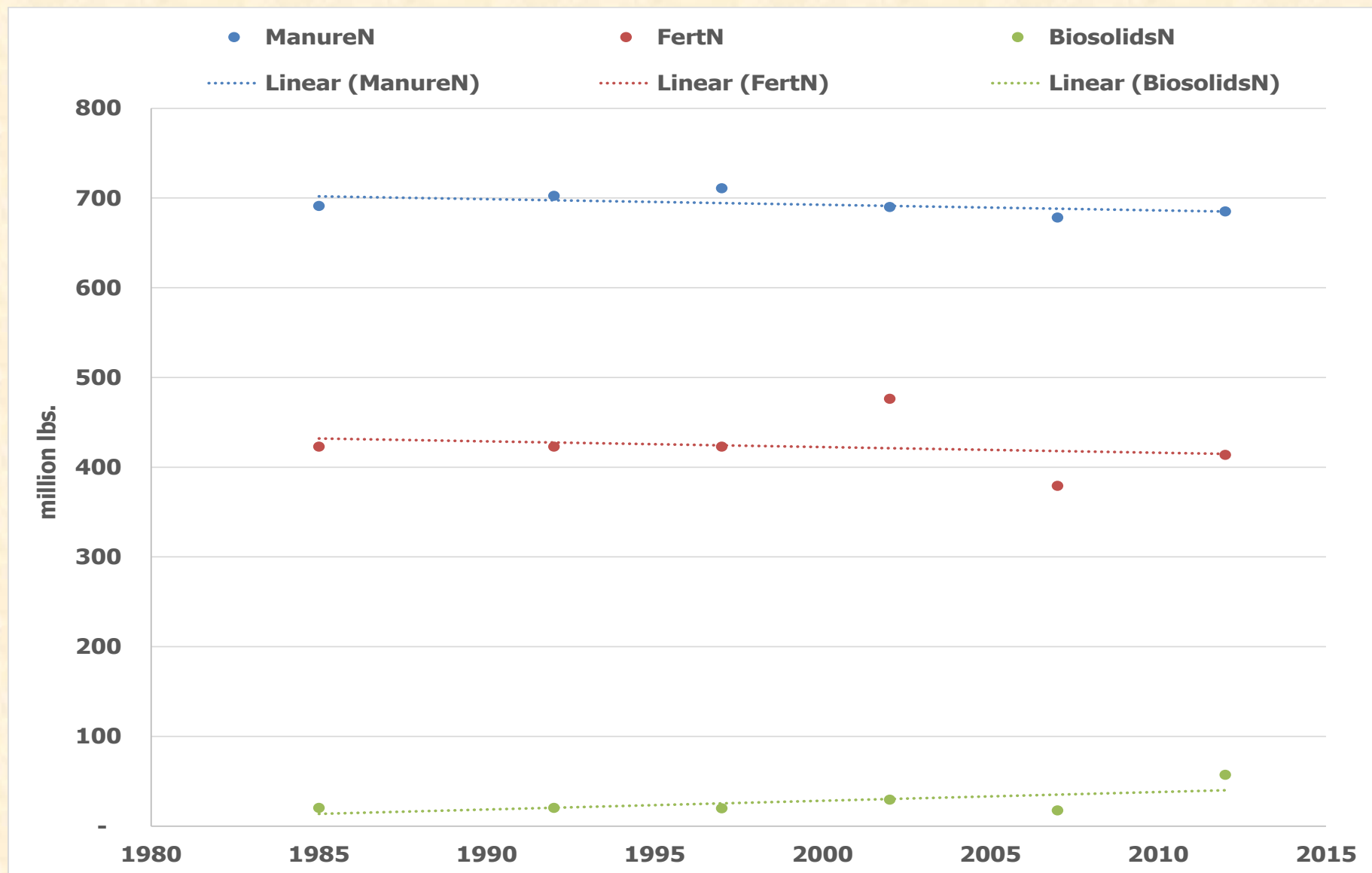


Bio-solids in the Phase 6 Watershed Model

- For Blue Plains
 - MD and VA had some data
- For PA
 - Used dry tons of bio-solids reported to ICIS then converted to nutrients using average concentrations from Phase 5 WSM

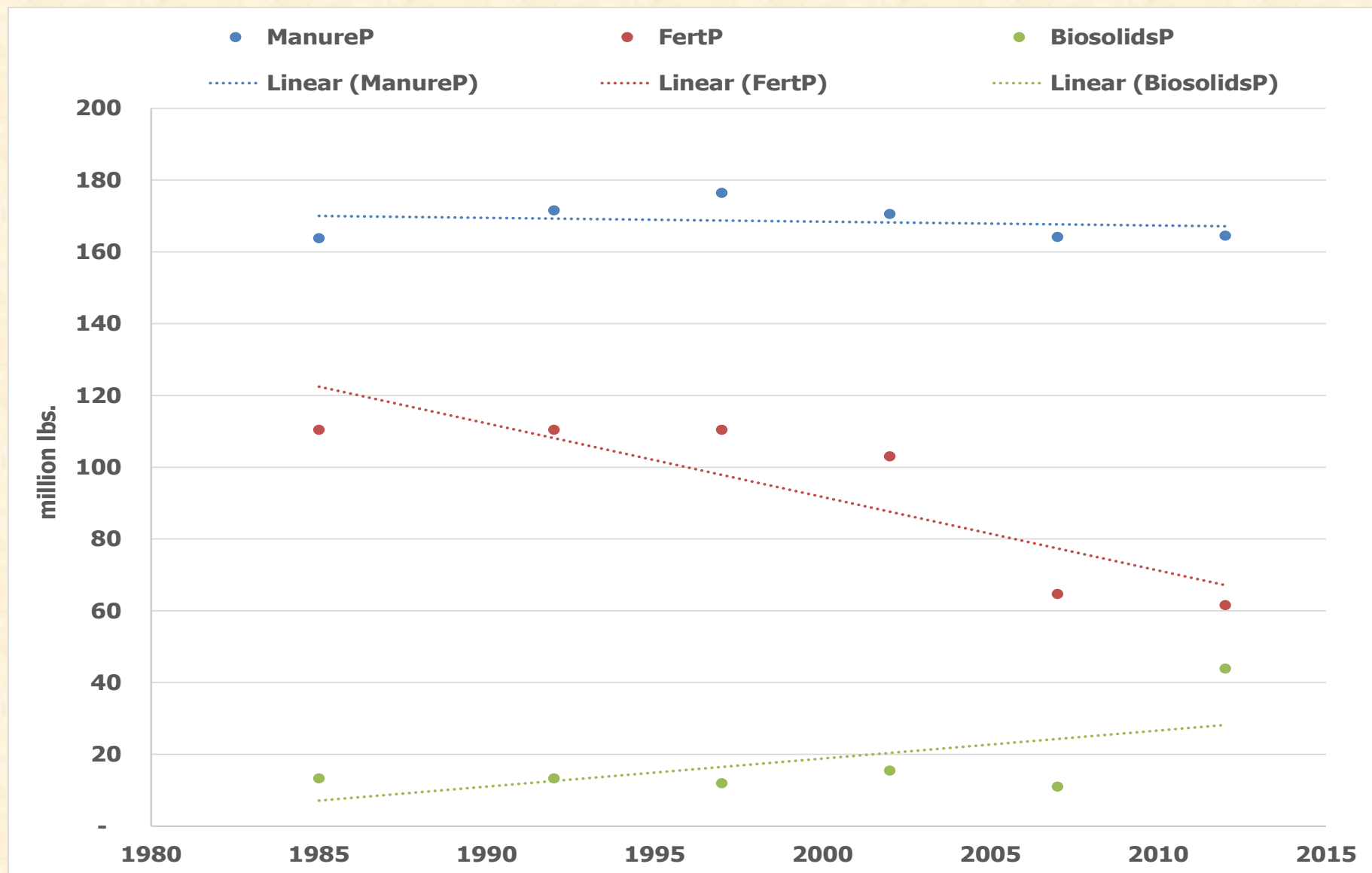


Mass of Nitrogen from Manure, Agriculture Chemical Fertilizer and Bio-solids (CB Watershed, 1985-2012)





Mass of Phosphorus from Manure, Agriculture Chemical Fertilizer and Bio-solids (CB Watershed, 1985-2012)





Bio-solids in the Phase 6 Watershed Model

- Phase 6 model review period begins no later than 1st week of January, 2016
 - Input and output data to the model are available on jurisdiction-specific sites
- Next opportunity for Phase 6 data is (likely, but not guaranteed) April re-calibration \Rightarrow end of March, 2016 submission
 - Bio-solids
 - Ag and Non-Ag Spray Irrigation
 - Rapid Infiltration Basins
 - Large Monitored Onsite Systems
- Final data to be submitted Sept. 30, 2016 which includes finalization of methods



New Nutrient Sources in the Phase 6 Watershed Model

- Suggest each jurisdiction review their data and improve
- Methods for filling gaps should come from Wastewater Treatment Workgroup
 - No different than methods for missing information from wastewater discharges, non-significant + significant, municipal + industrial
 - Location of application
 - Landuse types the nutrients are applied to
 - Speciation of nutrients
 - Application rates
 - Timing of applications