

# Defining the Time Scale for Future Phosphorus Scenarios

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Chesapeake Bay Program

Presentation to WQGIT

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# Draft Phase 6 Release Schedule

- June 1 Calibrated Model and Documentation
- June 15 Scenarios

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- June 15 Scenarios
- CAST is scenario tool so will also release CAST on June 15
- Dependent on today's decision from WQGIT on time frame for scenarios for phosphorus

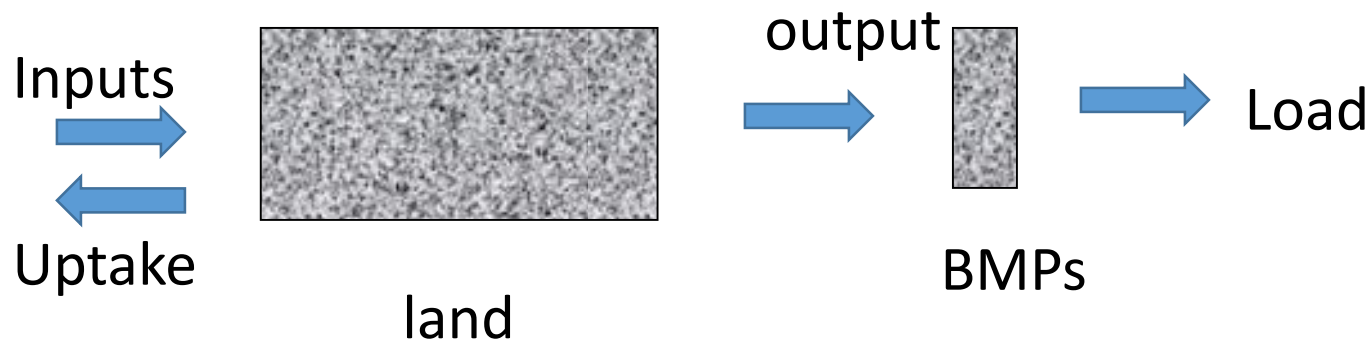
# Ask

- Phosphorus exports respond slowly to changes in inputs
- Changing phosphorus inputs for one year will have a very small effect in that year.
- How many years into the future should we assume that management is held constant
  - 1?
  - 10?
  - 25?
  - Some other number?

# AgWG recommendation

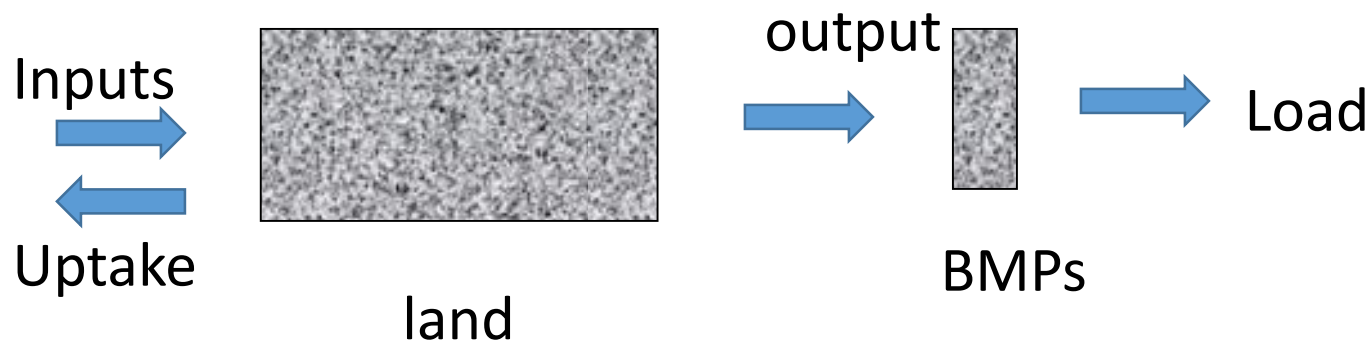
- Decision: The AgWG made a recommendation to the WQGIT to move forward with implementing a 25-year time frame for P simulation in the initial Phase 6 scenarios. During the summer of 2017, other time-frames of 1, 10, 50, and 100 years will be tested, and this decision will be revisited during fall of 2017.

# Nitrogen Conceptual Model



1 lb reduction in fertilizer is about a quarter lb reduction in output

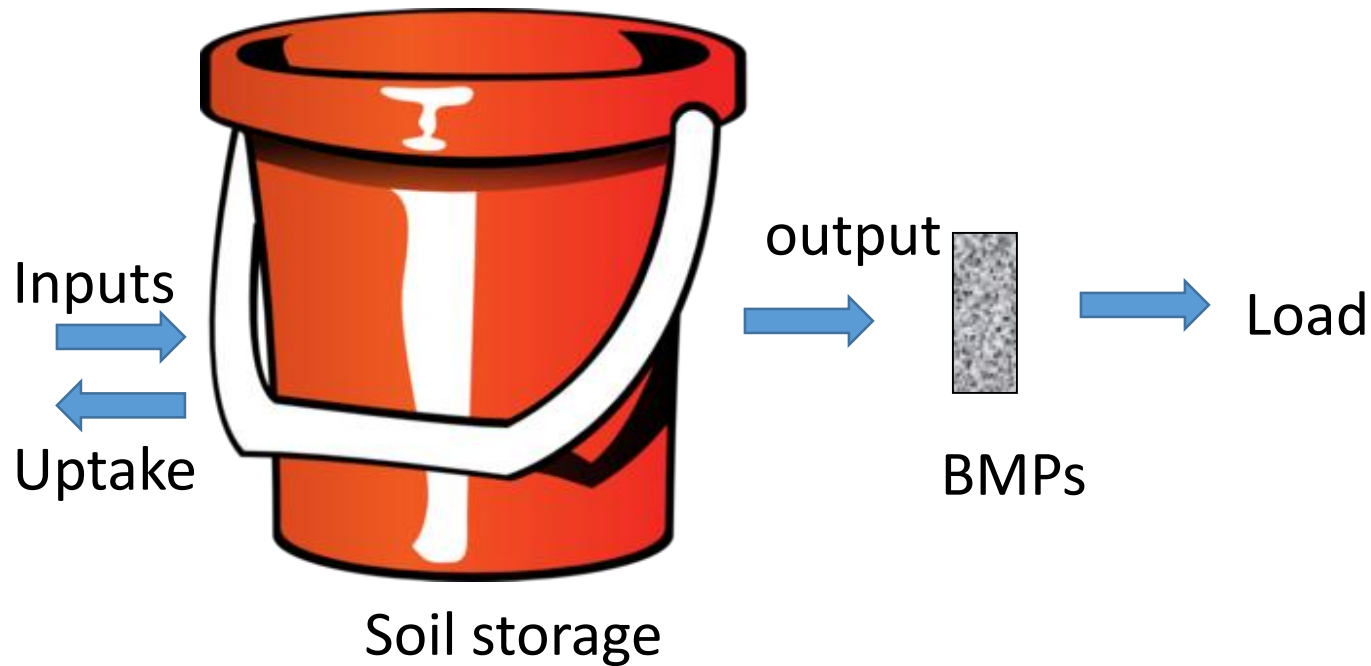
# Nitrogen Conceptual Model



In the model, the benefits are received immediately

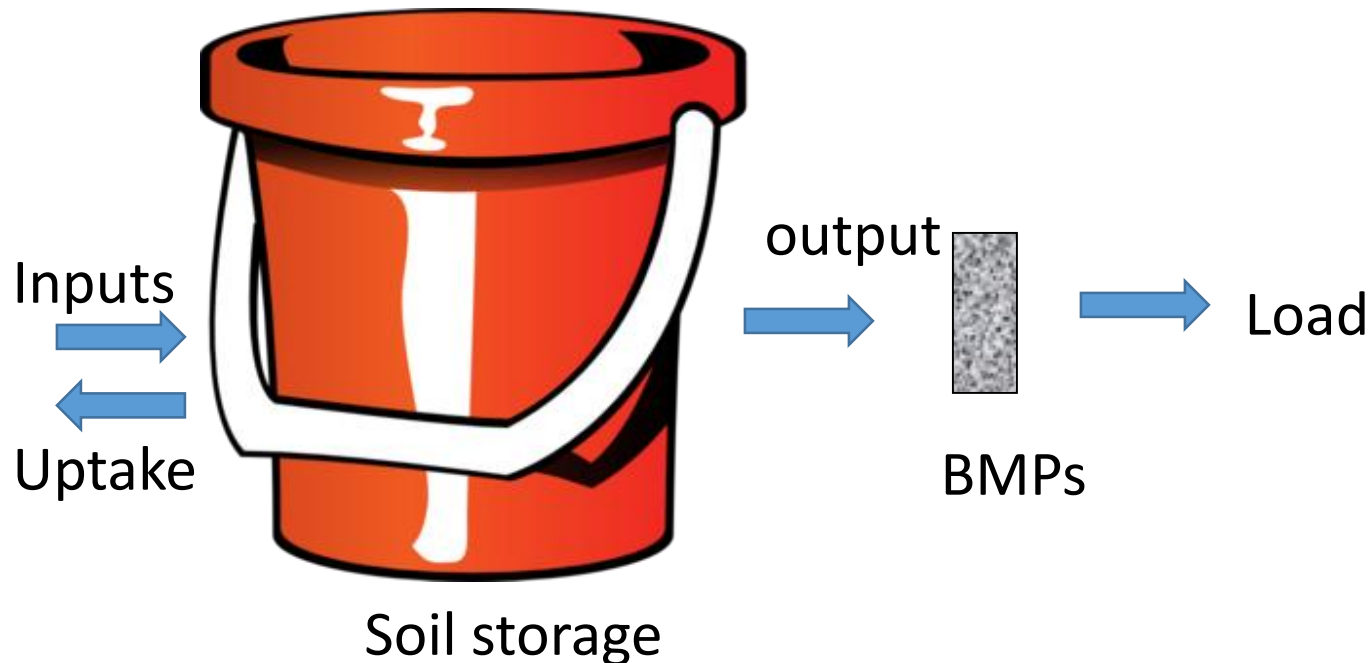
In the real world, about half of the benefit is received right away, the other half is lagged an average of 10 years

# Phosphorus Conceptual Model





# Phosphorus Conceptual Model



In the model, the benefits depend on how long you have changed inputs

In the real world, a small portion of the benefit is received right away, the greater portion is lagged for many years.

# What determines P loads in a given year?

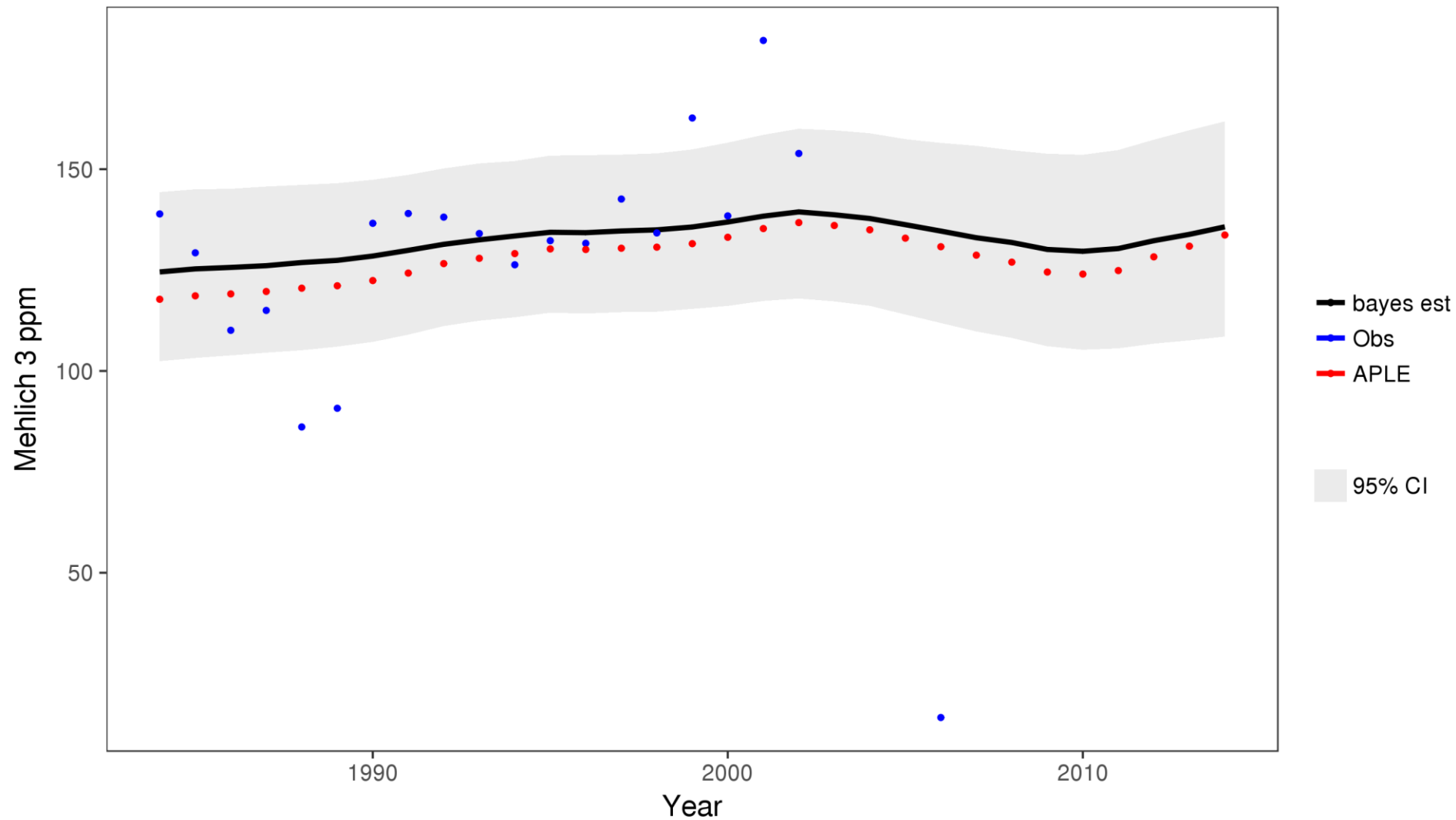
- Soil Storage
- Sediment Washoff
- Stormwater Runoff
  - Water Extractable P Applications
    - Manure
    - Fertilizer
    - Uptake

# So how is P Runoff Determined?

- A change in any one of four variables is multiplied by a “sensitivity.”
- That sensitivity work was completed by Modeling Workgroup for Beta 2.
- [Webinar](#) provided to Ag Workgroup in March, 2016.
- Beta 2 [documentation](#) published online in April, 2016.
- Sensitivity work showed P runoff was sensitive to soil P.
- **Future Soil P level depends on how far in the future**

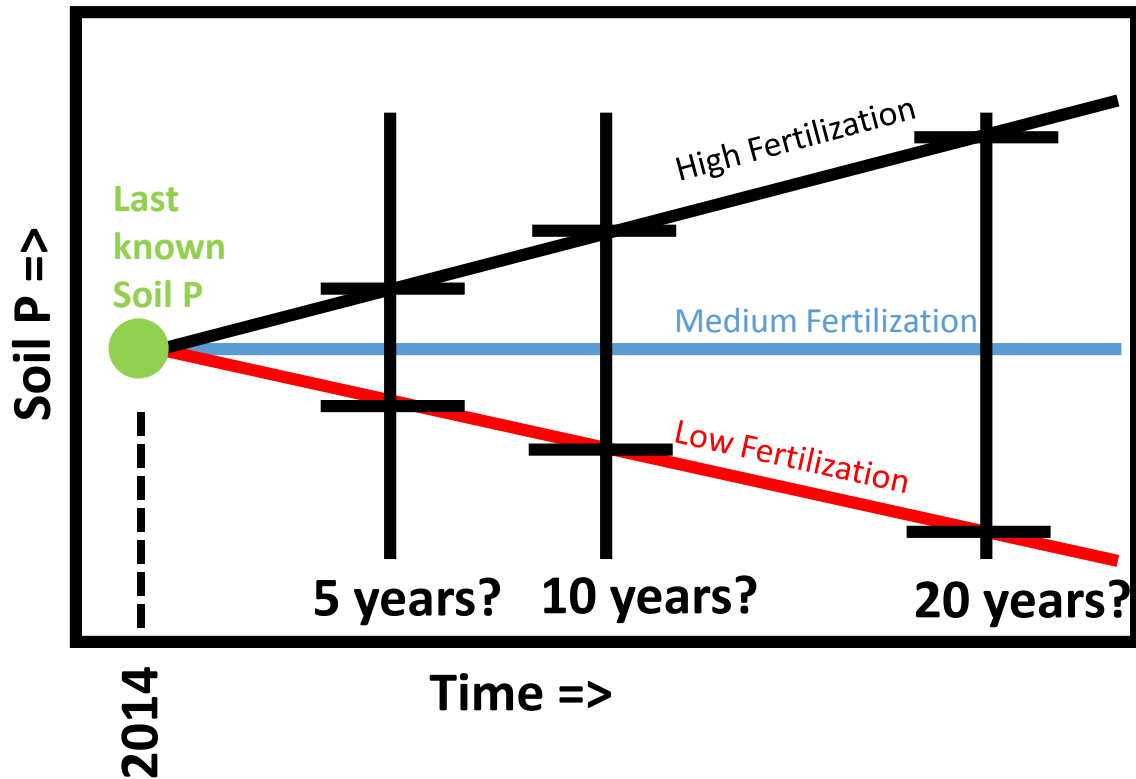
Input	Input Unit	Change in EOSS P loss (lbs)
<b>Soil P</b>	<b>ppm</b>	<b>0.015</b>
Sediment Washoff	ton/ac	0.168
Runoff	Inches	0.057
Water Extractable P (WEP)	lbs/acre	0.018

## N24039 Est Soil History

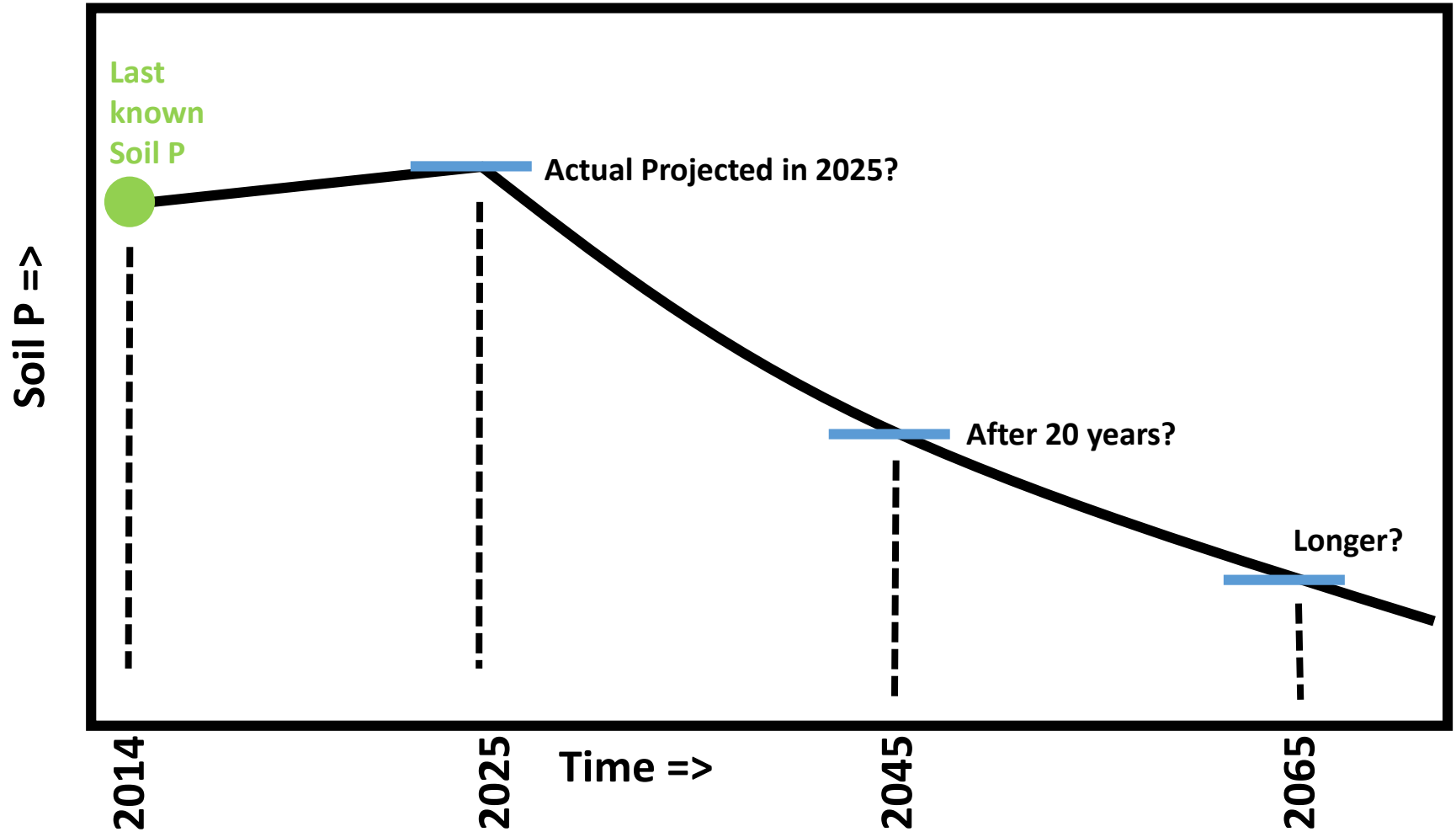


Double Crops in Somerset County, Maryland

# How Do we project future soil P



# What Does a 2025 scenario mean?

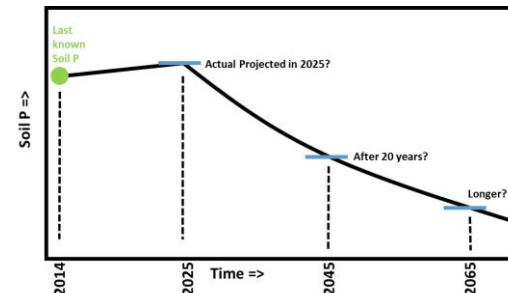


# Meaning of Scenarios

- If management was constant through time what would be the long term loading rate?

## Meaning of the WIPs

- Necessary implementation to ***eventually*** meet water quality standards

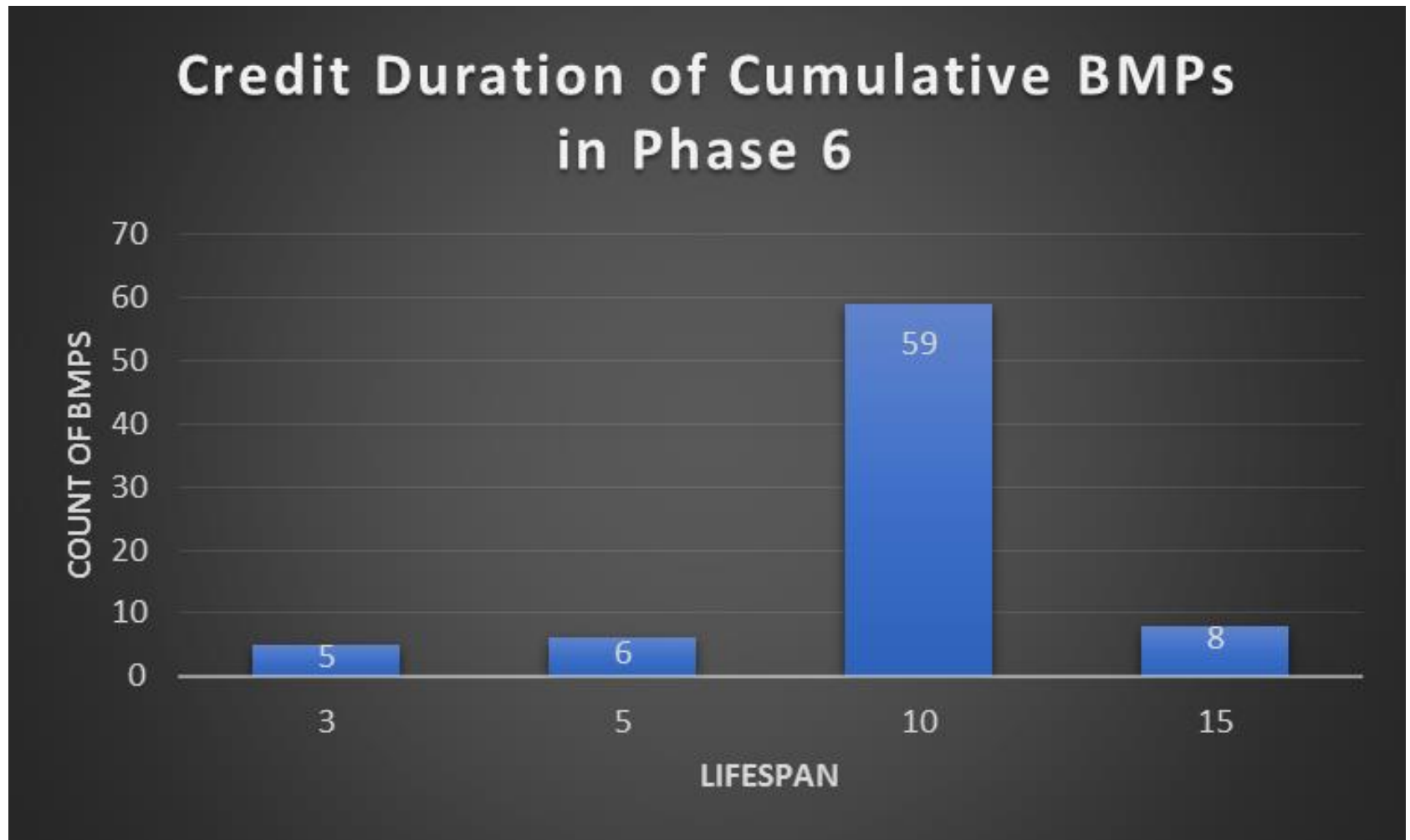


# Options for Eventually

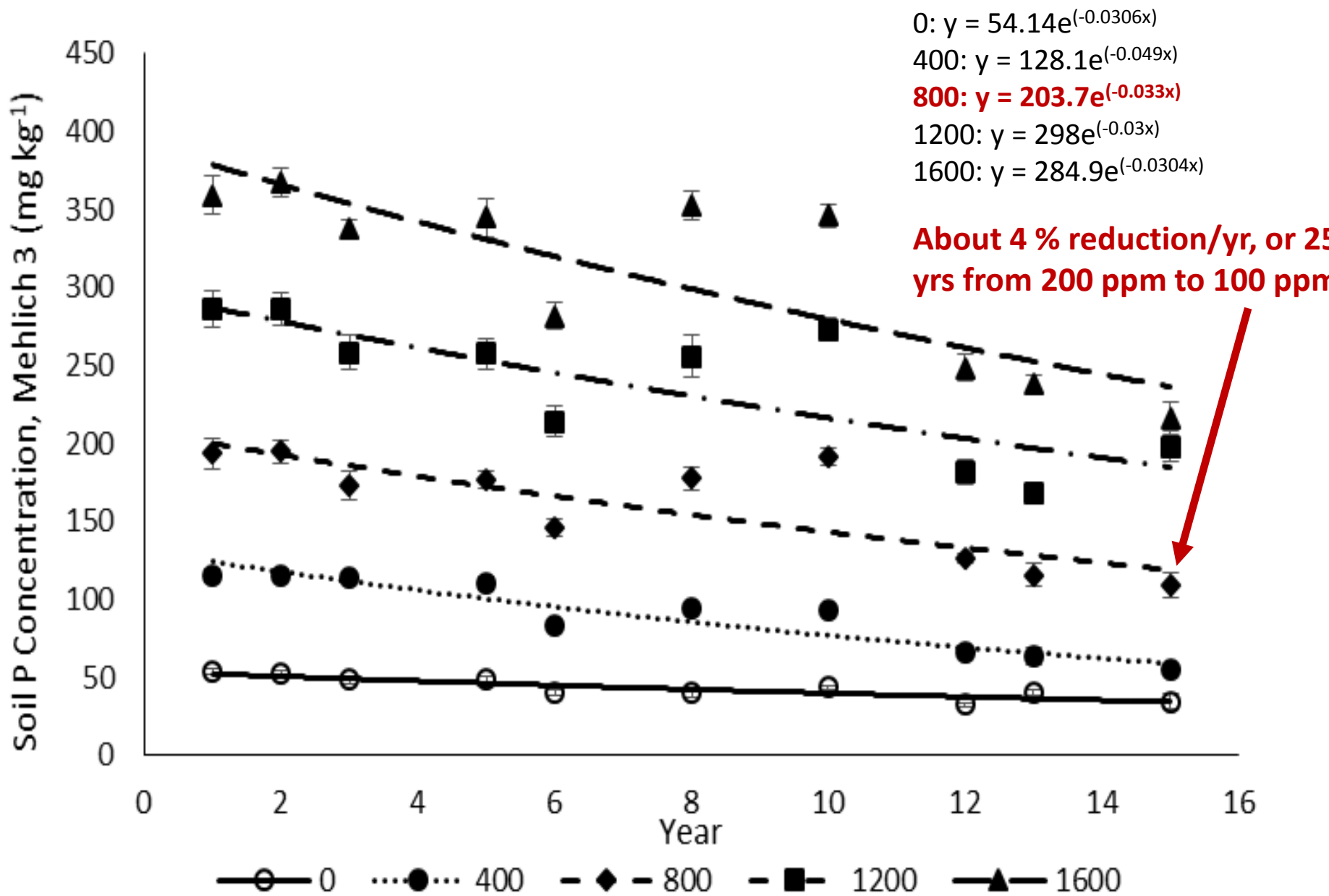
- 1 Year
  - Applications could change significantly with very, very minimal change in P soil, and thus P runoff.
  - Wastewater progress is measured in “current year” format.
  - Low uncertainty, low effect
- 10 Years
  - Most common credit duration for BMPs
  - Similar time period to nitrogen load.
- 25 Years
  - P drawdown study on Mid-Atlantic Coastal Plain estimated P could be drawn down from 200 ppm to 100 ppm Mehlich 3 in 25 years with zero additional inputs.
  - High effect, high uncertainty
- Something Else?



# Basis for 10 Years?



# Basis for 25 Years?



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