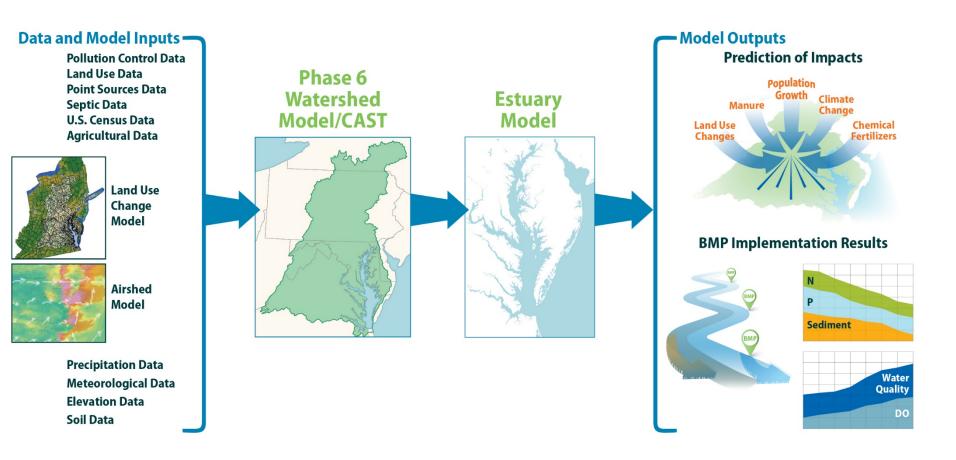
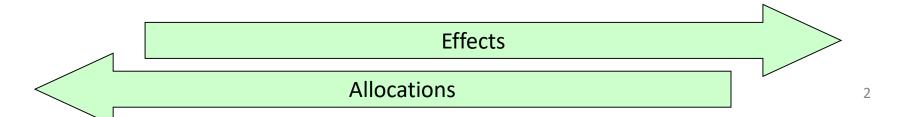
The Phase 6 Chesapeake Bay Program Watershed Model

Gary Shenk – USGS - Chesapeake Bay Program 11/8/18

This information is being provided to meet the need for timely best science. The information is provided on the condition that neither the U.S. Geological Survey nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the information.

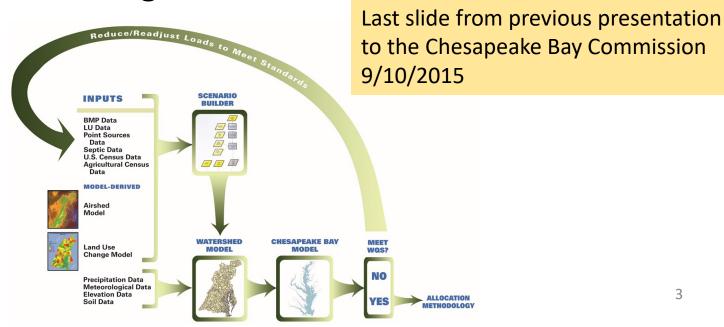


What management practices to we need to implement to achieve appropriate dissolved oxygen?



Goal – Stakeholder understanding

- Understandable model
- Inclusive process
- Better and more local input data
- More monitoring data



Participatory Modeling

Water Quality Goal Implementation Team

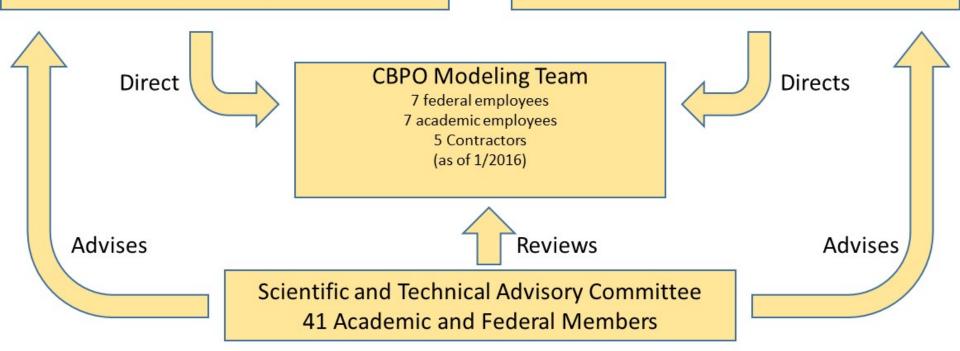
30 State, Federal, Academic, and NGO members

7 WQGIT Workgroups

Over 300 State, Federal, Academic, and NGO members (as of 1/2016)

Modeling Workgroup

17 State, Federal, and Academic members (as of 1/2016)













Phase 6 Model Structure

Average Load + ∆Inputs * Sensitivity **Land Use Acres BMPs** Direct Loads **Land to Water Stream Delivery River Delivery**

Preliminary Information-Subject to Revision.

Not for Citation or Distribution

Phase 6

Keep It Simple

Average Load + ▲ Inputs * Sensitivity

*

Land Use Acres

*

BMPs

*

Land to Water

*

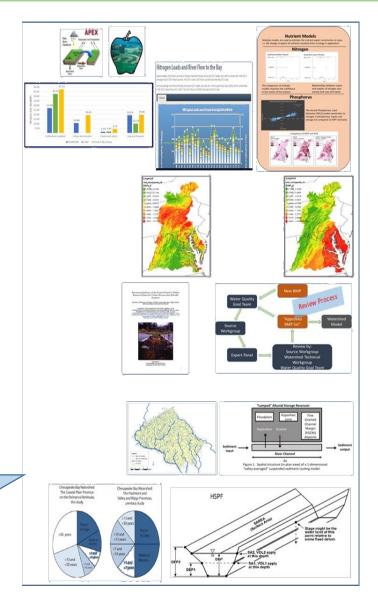
Direct Loads

Stream Delivery

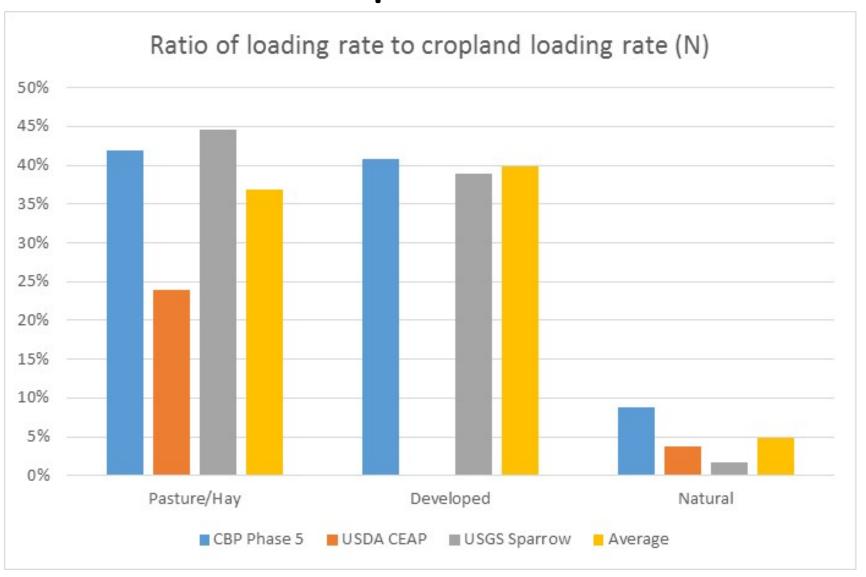
*

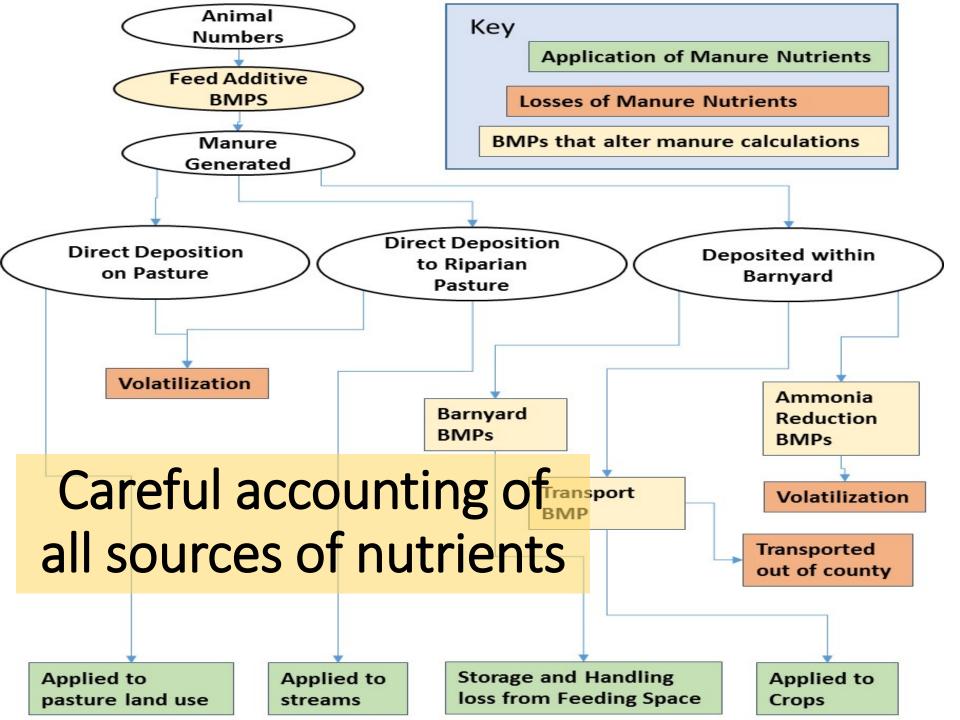
River Delivery

Include Everything



Gathering Knowledge from Multiple Sources







Collaborative Stakeholder Processes

Expert Panel to determine effectiveness of BMPs

Academics
Managers
Practitioners



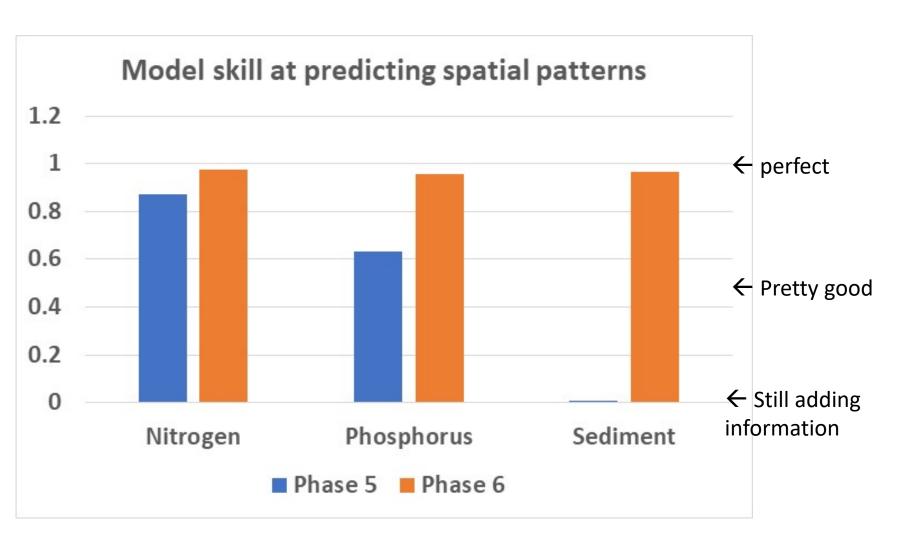
CBP Water Quality
Goal Implementation Team



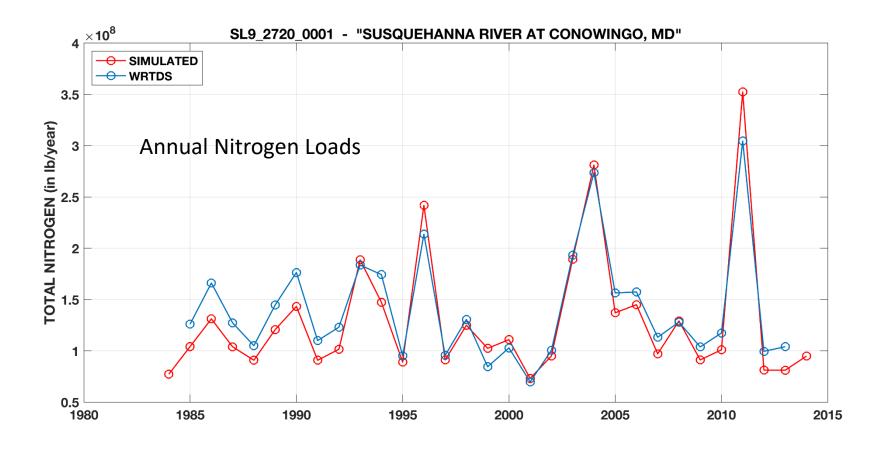


Agriculture,
Wastewater,
Urban, or
Forestry
Workgroup

How did it work?

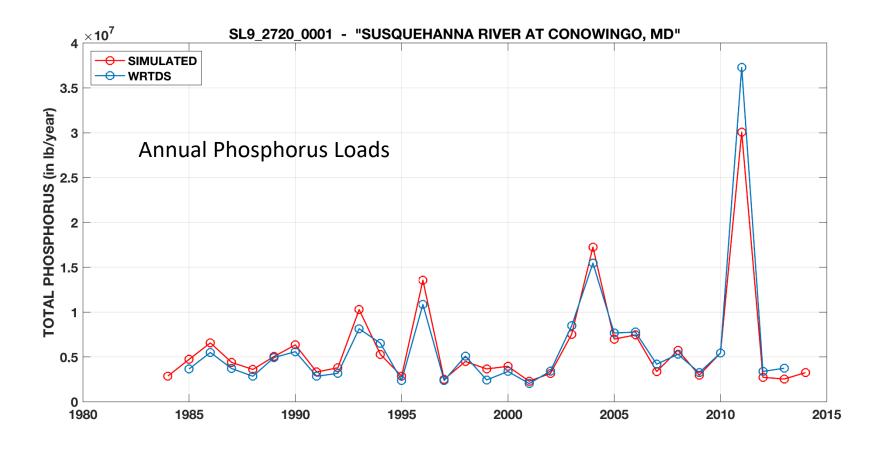


How did it work?



Skill of annual nitrogen load = 0.861 Skill of annual phosphorus loads = 0.935

How did it work?



Skill of annual nitrogen load = 0.861 Skill of annual phosphorus loads = 0.935

On Line Version -- CAST



About CAST

Scenarios

Costs

Scenario Worksheets

Scenario Results

Log Out | Edit Profile

Dauphin County Summary Results

Description: Irseg base loads

Initial Conditions: 2017, revised: 4/2016 Date Created: 5/4/2016 10:25:23 AM **@** Help

Download Results | Compare Scenarios

Total Loads

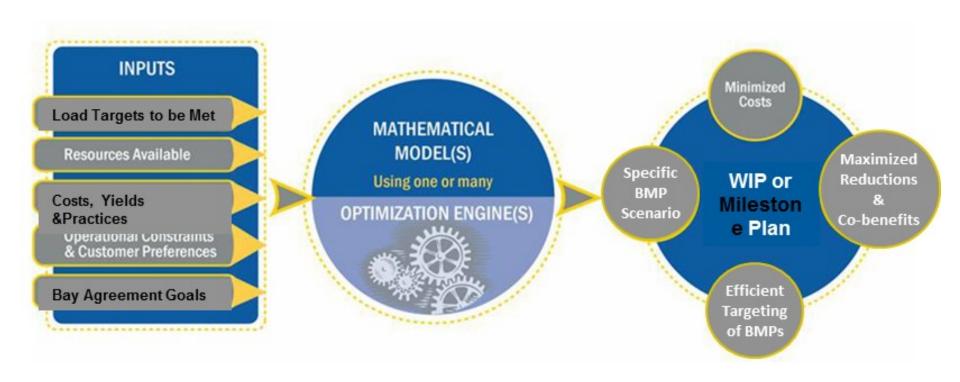
Load Type	Lbs Nitrogen Edge of Stream	Lbs Nitrogen Delivered	Lbs Phosphorus Edge of Stream	Lbs Phosphorus Delivered	Lbs Sediment Edge of Stream	Lbs Sediment Delivered
Landuse	6,513,592.7	5,271,385.8	197,995.9	76,354.8	137,419,842.9	53,823,104.8
Septic	141,079.6	114,690.5	0.0	0.0	0.0	0.0
Waste Water and Combined Sewer Output	1,487,025.4	1,236,710.8	216,146.1	83,354.6	12,325,864.3	4,827,660.2
Total:	8,141,697.7	6,622,787.1	414,142.0	159,709.4	149,745,707.2	58,650,765.0

Total Annualized Costs

North Arthre State Annual State	
Sector	Total Annualized Cost
Urban Land	
Septic	

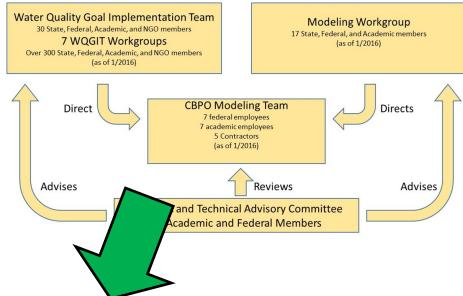
OPTIMIZATION Calculation Engine

Users input objectives, tool outputs BMPs in the plan that maximize effectiveness at minimum cost.



^{*} Still in vaporware stage

Extensive partnership involvement...



...Which Leads to a robust model of the watershed

...Leads to collaborative thinking...



