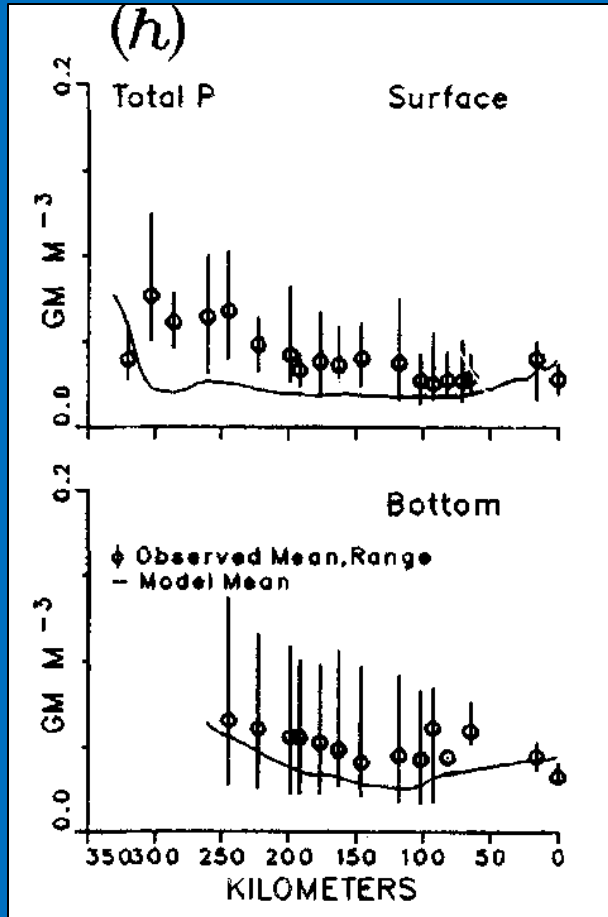


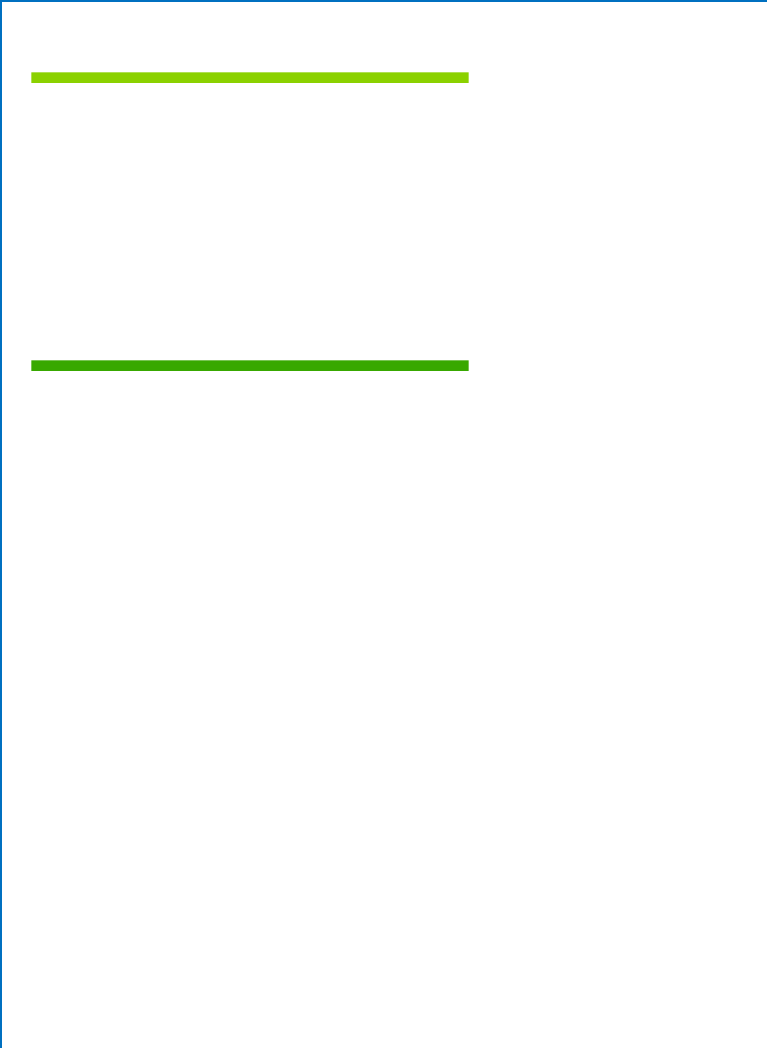
# Nutrients from Shoreline Erosion



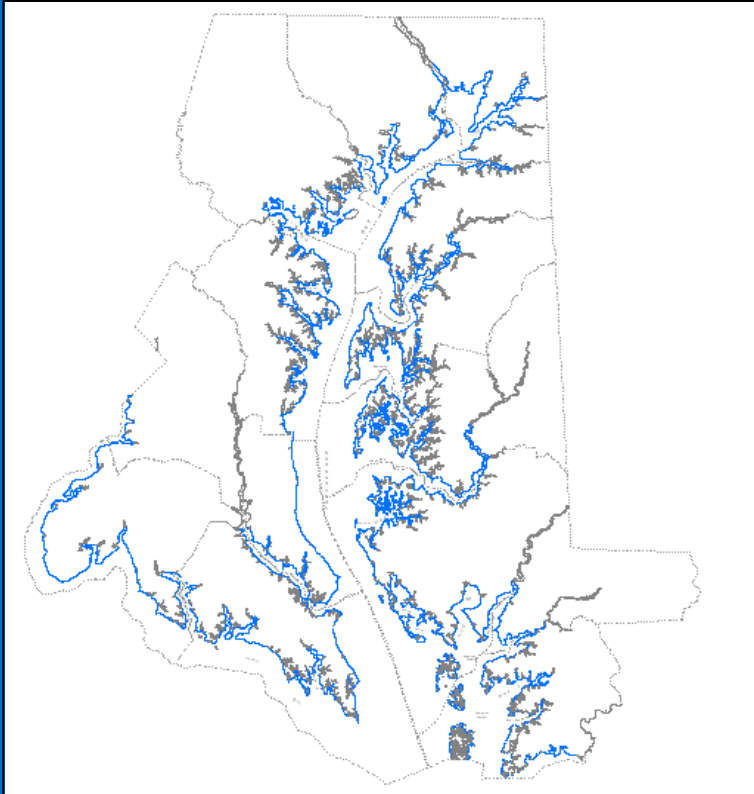
Simulated total phosphorus is less than observed and does not fully replicate the spatial trend. We believe the underestimation of total phosphorus is due to omission of phosphorus loads from bank erosion. The contribution from bank erosion has been estimated as  $6,000 \text{ kg day}^{-1}$  ("1990 Progress" 1991), roughly 18% of the loads considered in the model package. To

- Modelers have recognized the importance of nutrient loads from shoreline erosion for a long time.
- Nutrient loads have been included in various versions of the model since 2002.
- Nutrient loads from shoreline erosion were not incorporated into the 2010 TMDL because no guidance existed as to how to incorporate them in the TMDL.
- Since nutrient reduction credits for erosion management are under consideration, nutrient loads from erosion are back.

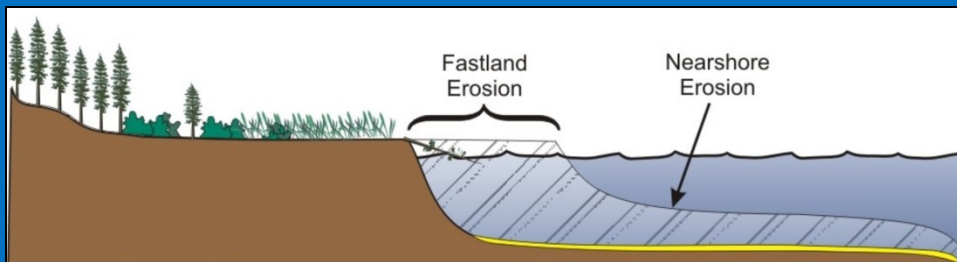
# Solids from Shoreline Erosion

- 
- Nutrient loads from erosion are obtained by assigning a nutrient content to solids loads.
  - Solids loads from shoreline erosion were included in the 2010 TMDL.
  - For the TMDL an expert panel was convened to derive state-of-the-art estimates of these loads.

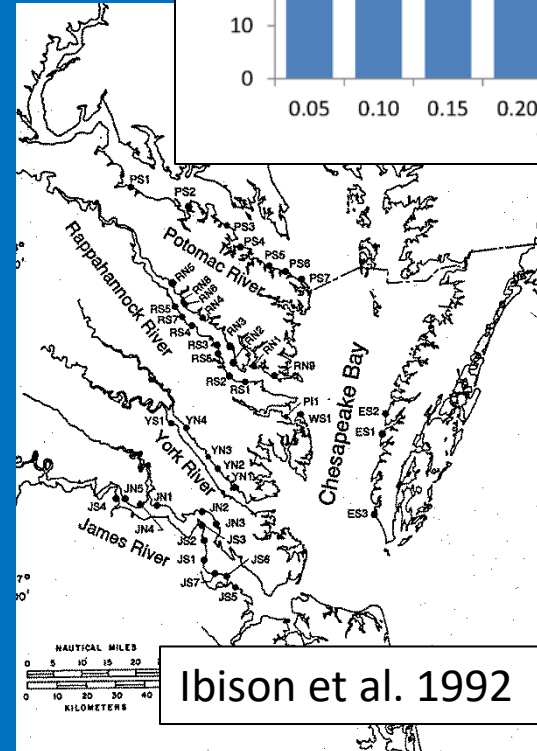
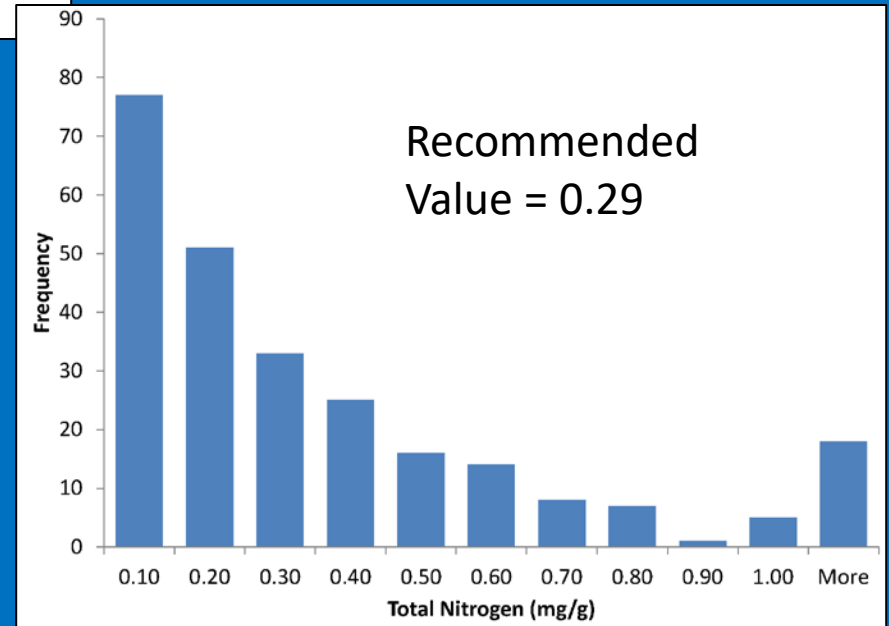
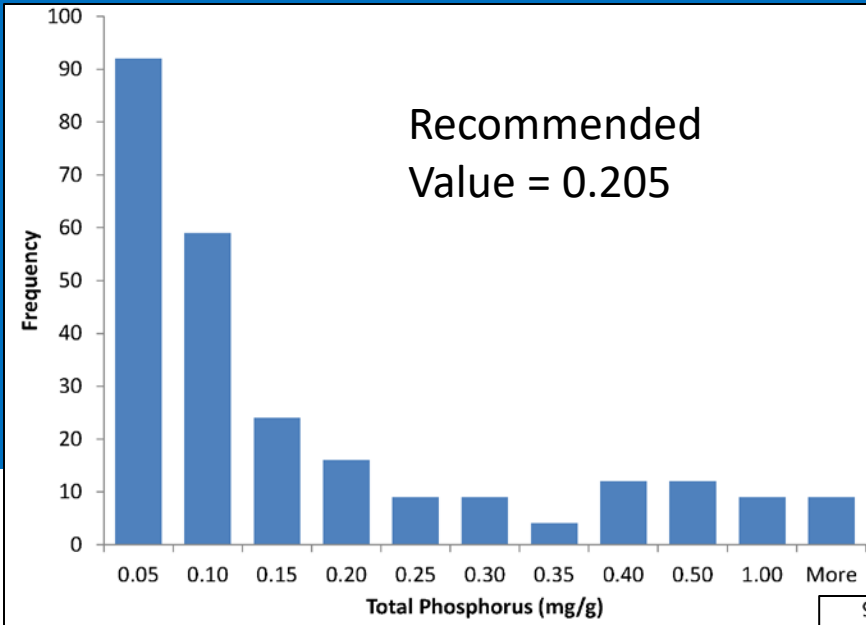
# Solids from Shoreline Erosion



- The shoreline erosion study resulted in decadal-average mass erosion rates per unit shoreline length .
- The study accounted for the presence of protective structures and incorporated erosion of fastland and nearshore solids.
- The CBP GIS team merged three key pieces of information: mass erosion rates, shoreline length, and WQSTM computational grid. Shoreline length was assigned to each cell adjoining the shore (2,928 cells) and the mass loading to each cell was computed.



# Nutrient Content



# Load Comparison

<b>Nonpoint Source Load Summary 1991-2000<sup>1</sup></b>			
<b>Metric ton d<sup>-1</sup></b>	<b>Total Nitrogen</b>	<b>Total Phosphorus</b>	<b>Total Suspended Solids</b>
<b>Susquehanna</b>	191.2	7.32	3761
<b>Potomac</b>	49.2	3.47	2141
<b>James</b>	12.2	1.47	1570
<b>Other Tributaries</b>	12.6	1.31	961
<b>Below-Fall-Line</b>	106.2	5.14	1832
<b>Shoreline Erosion</b>	3.3	2.33	11375

Shoreline erosion loads of nitrogen are negligible. Shoreline erosion loads of phosphorus are comparable in magnitude to other nonpoint sources.