Update on Tools to Support Segment-Shed Expectations for the Tidal Jurisdictions

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Existing Measure of Relative Effectiveness

Key factors:

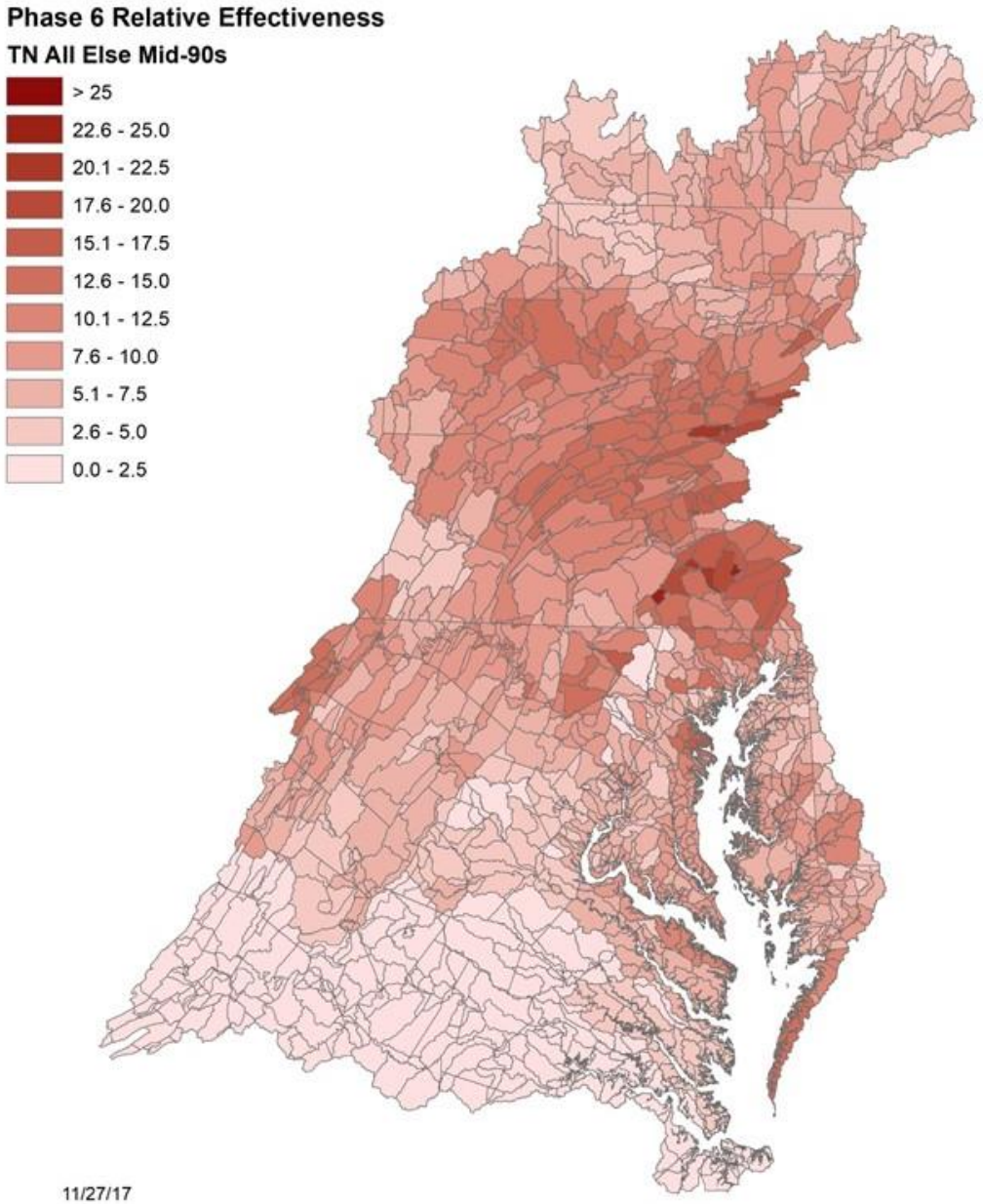
Watershed Transport

- Watershed Characteristics
- Travel time
- Existence of impoundments

Position along mainstem bay

- Estuarine circulation

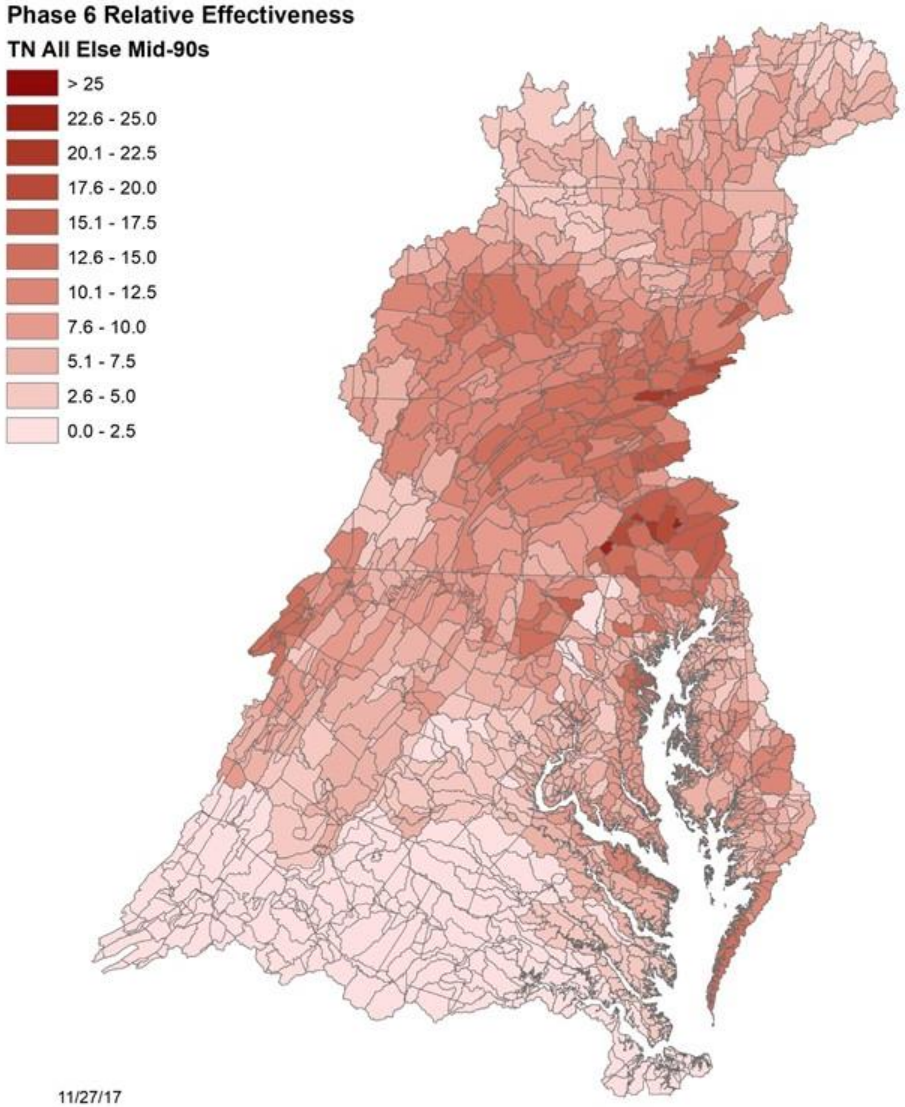
Existence of riverine estuary



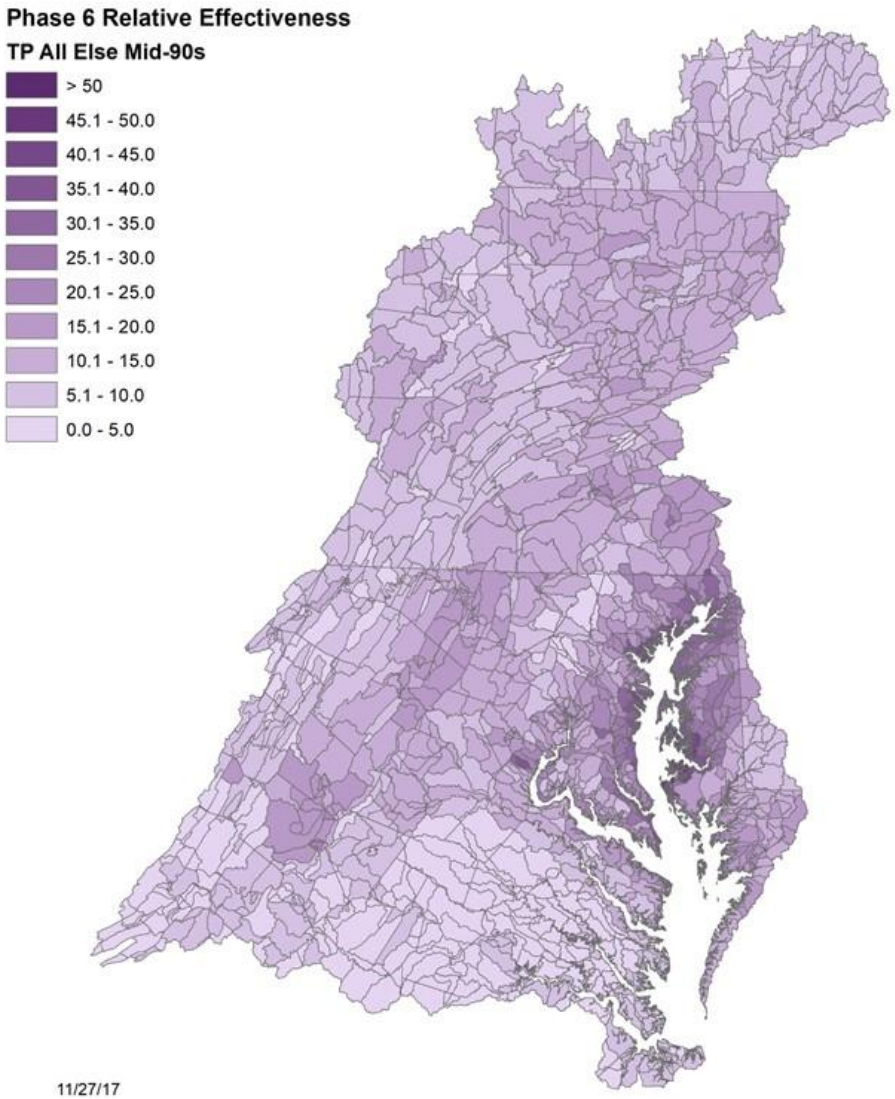
Watershed delivery:
Pound delivered per pound produced
Estuarine delivery
Oxygen reduced per pound delivered
Overall Effectiveness
Oxygen reduced per pound produced

Existing Measure of Relative Effectiveness

Nitrogen



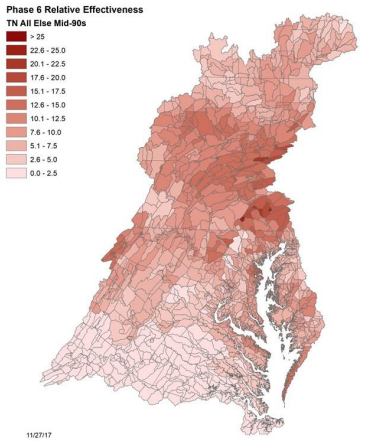
Phosphorus



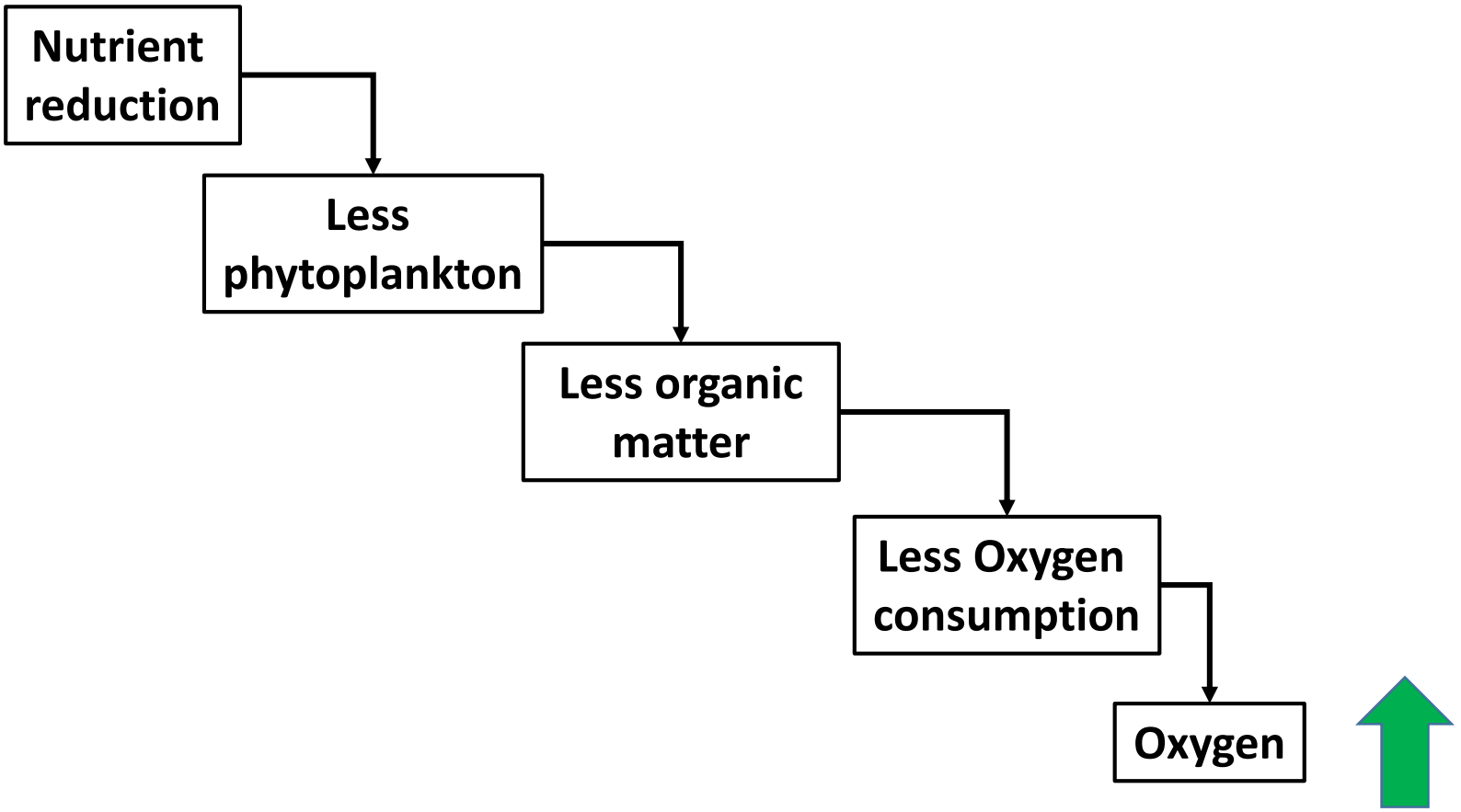
Expand to other designated uses

- Existing relative effectiveness for planning targets:
  - Deep Water and Deep Channel
  - CB3MH, CB4MH, CB5MH, POTMH

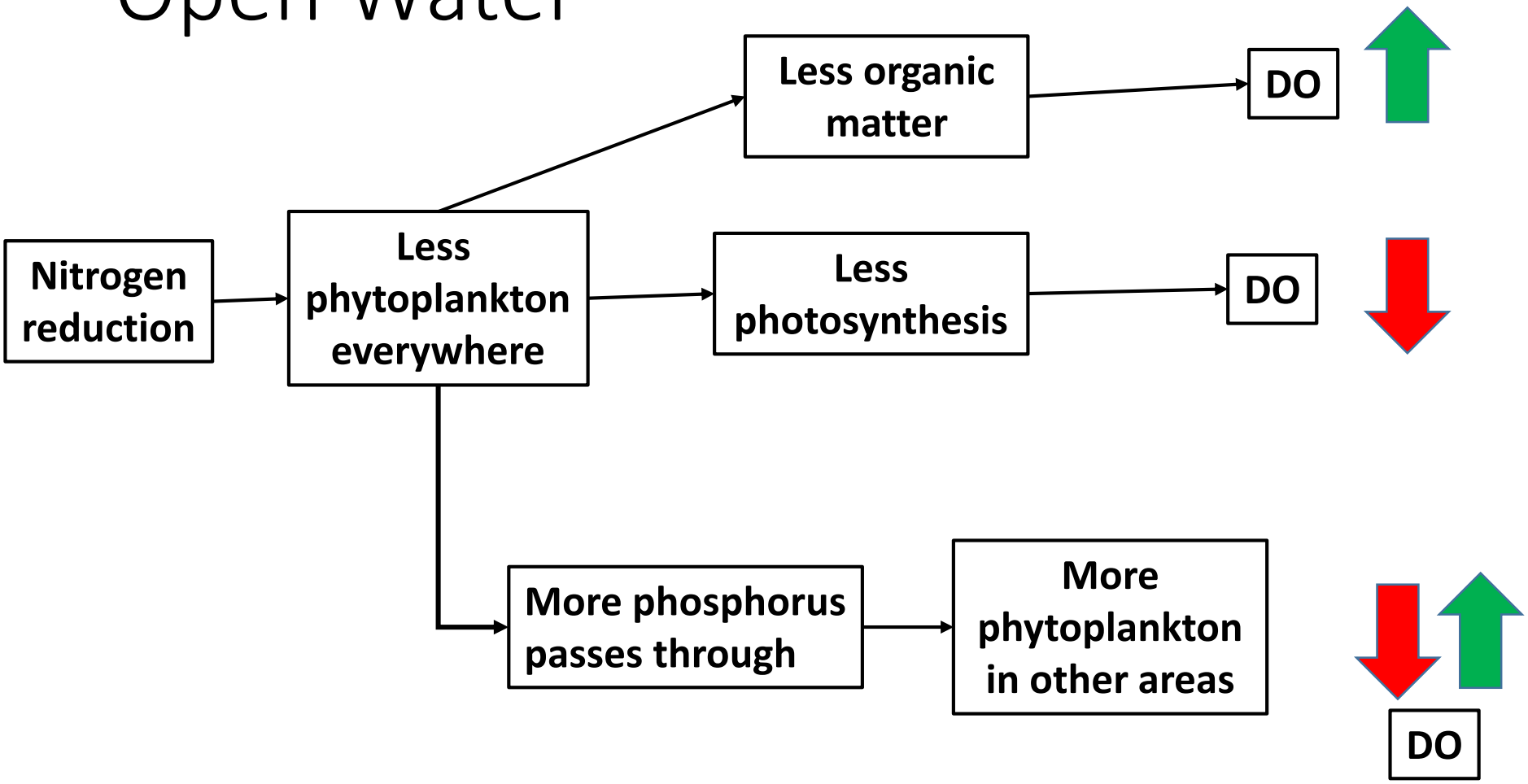
- Goal is to provide a tool for the partnership to visualize the source of load for each Tidal Segment



Deep Water / Deep Channel



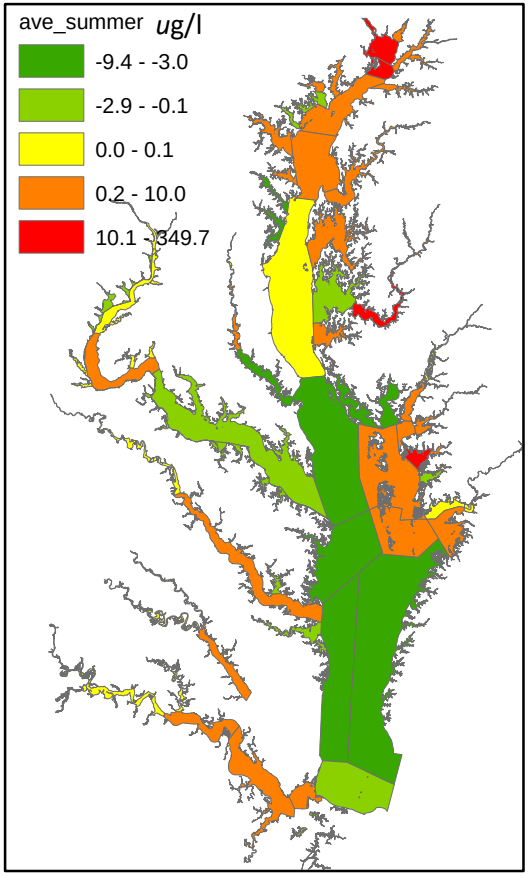
Open Water


Nitrogen reduction
Less phytoplankton everywhere
Less organic matter
DO
Less photosynthesis
DO
More phosphorus passes through
More phytoplankton in other areas
DO

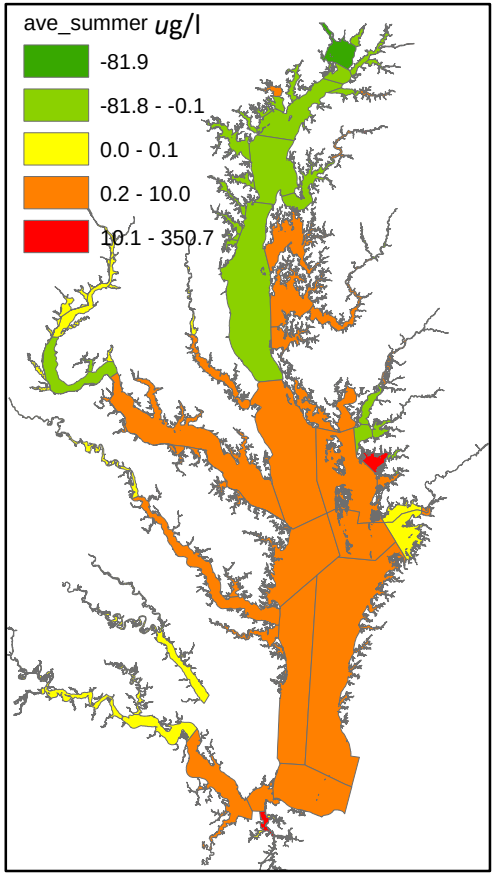
Increase in Susquehanna Loads Effect on Oxygen

- 5 million lbs N increase / 0.5 million lbs P increase

N



P

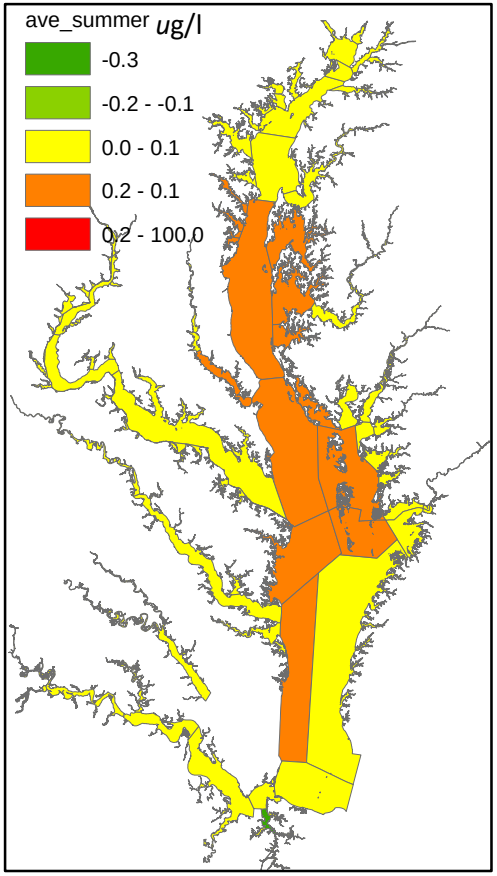


- N-limited areas hurt by N increase
- P-limited areas hurt by P increase
- Dual nutrient control necessary
- Complicated picture – hard to map or calculate

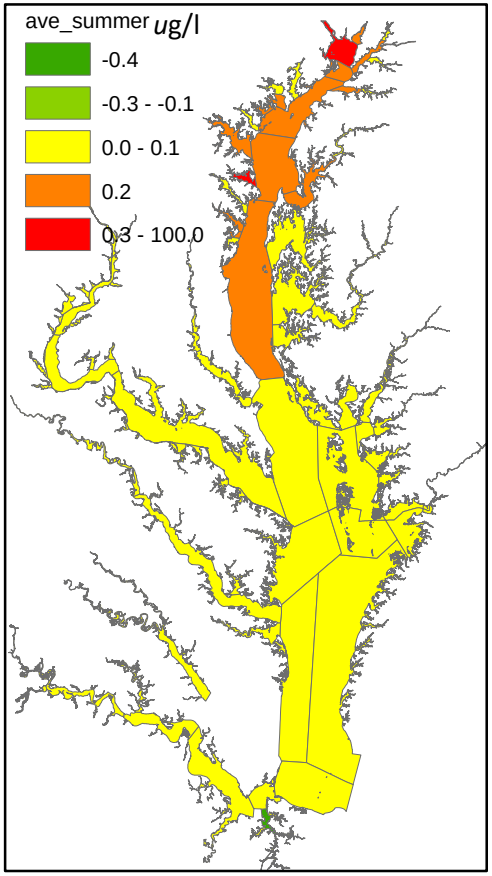
Increase in Susquehanna Loads Effect on Chlorophyll

- 5 million lbs N increase / 0.5 million lbs P increase

N

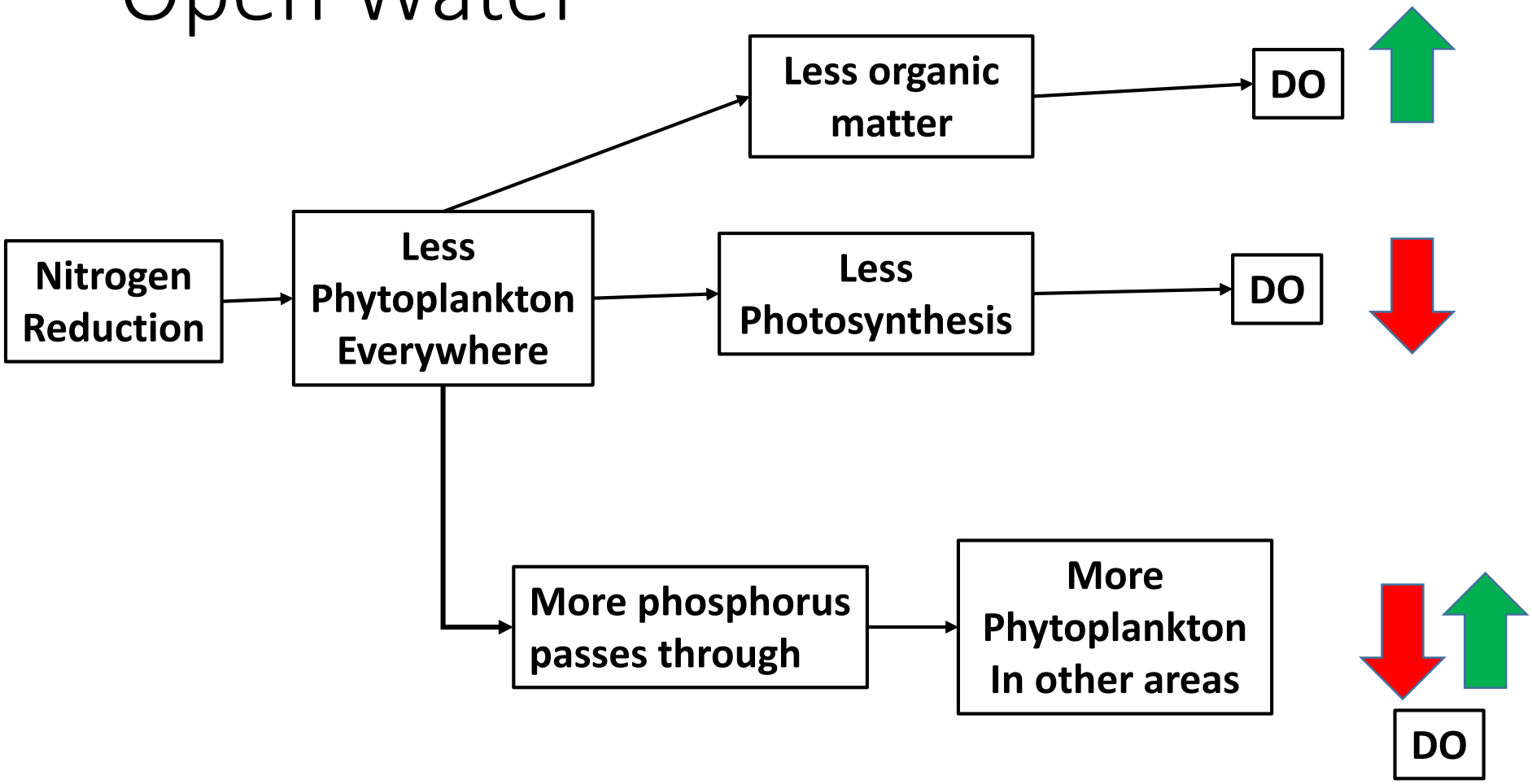


P

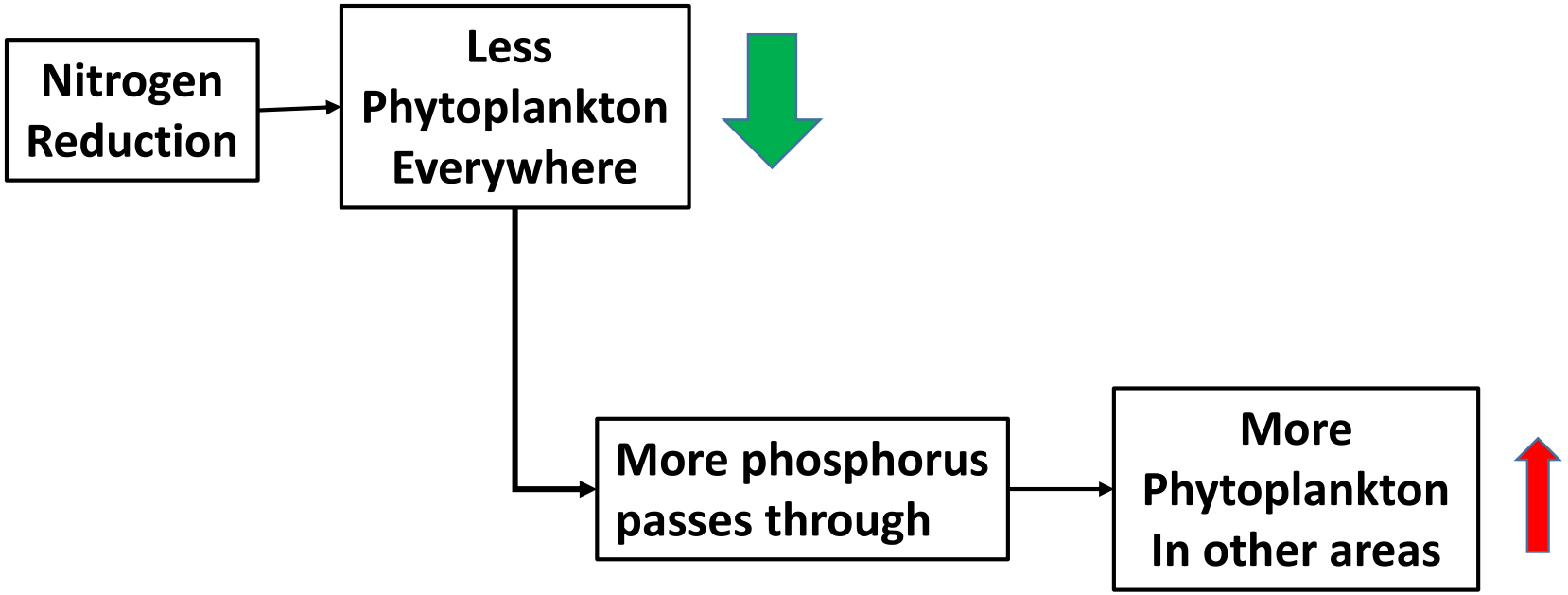


- N-limited areas hurt more by N increase
- P-limited areas hurt more by P increase
- Dual nutrient control necessary
- Easier to explain

Open Water

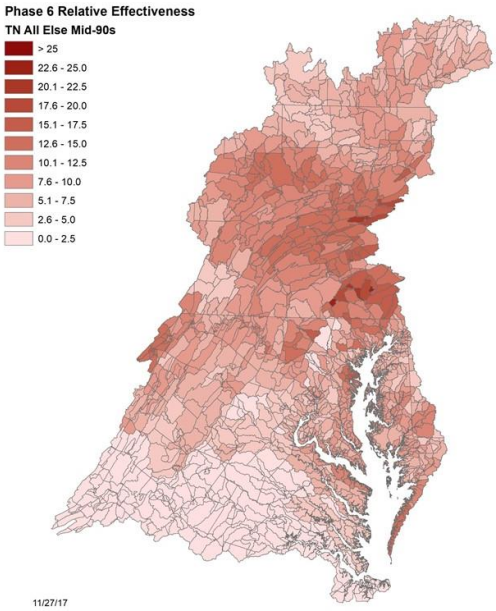


Open Water



Implications

- Open Water dissolved oxygen has a complicated response to single nutrient reduction from a specific area
- Chlorophyll has a much more straightforward response
- Calculations of exchange ratios for a given designated use should not be made
  - Exchange ratios based on DW/DC are still valid
- The Final product will be interactive map of areas contributing to chlorophyll for a given designated use



Schedule

- Nearly 400 WQSTM runs
  - 90 segments (2 have no WQSTM cells)
  - 2 constituents (N and P)
  - 2 sources (PS and NPS)
- Analysis of results
- Development of interface
- Delivery in January 2019