Increasing Effectiveness and Reducing the Cost of Non-Point Source Best Management Practice (BMP) Implementation: Is Targeting the Answer?

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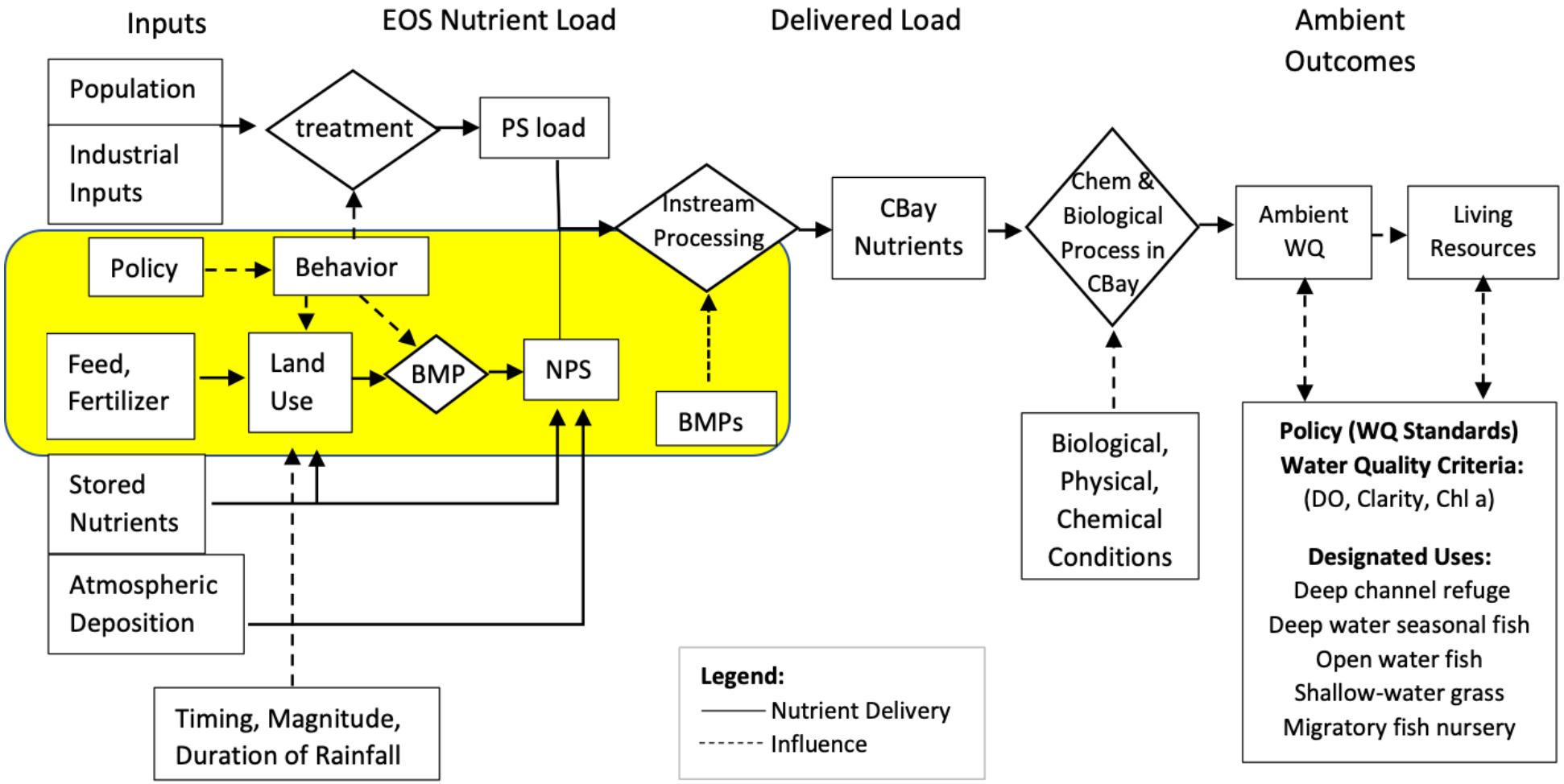
Motivation

- We need to reduce pollutant loads from NPS by an additional
  - 47 million pounds of N
  - 1.9 million pounds of P
  - 1,535 million pounds of sediment
- We need to improve effectiveness of NPS control efforts
  - Limited W Q response to NPS BMP efforts
- Between 5-20% of the land area generates 50-90% of runoff and NPS loads
  - Motivate treatment of these areas to meet WQ goals

Conceptual Model of the System



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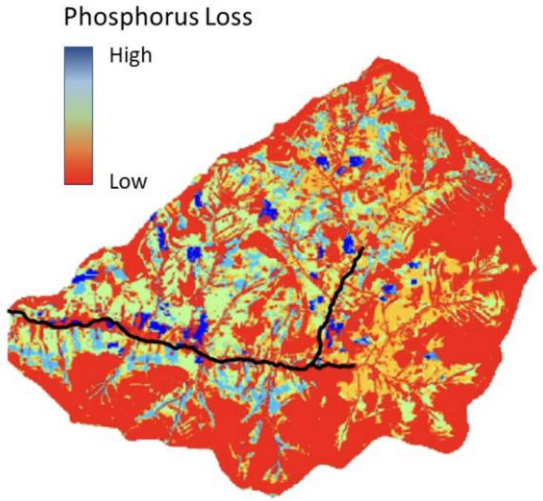

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STAC Publication 20-002

Improve the spatial prediction capability of the CBP TMDL accounting system:

1. Develop finer scale modeling capacity to guide and inform targeting
2. Continue to improve spatial resolution of datasets that drive the CBP models
3. Allow for differential crediting of BMPs

Develop and test alternative incentives systems for targeting programs:

1. Develop and support testbed watersheds to pilot and test targeting incentives
2. Enhanced monitoring to support/evaluate targeting programs
3. Support development nonfinancial approaches to encourage participation

Broad consensus:

1. Some areas produce disproportionate NPS loads and BMP effectiveness varies across the landscape
2. There are opportunities to increase the amount of NPS reductions we can achieve for every dollar spent
3. More effective methods for identifying spatial variation in pollutant source areas and BMP effectiveness will increase the effectiveness of programs
4. Increasing flexibility in how we incentivize land managers (*ex cost share for practice vs pay for outcomes*) can improve NPS program effectiveness (more load reduction per program dollar spent, less uncertainty)

Targeting

1. Targeting landscape NPS areas that produce disproportionate loads
2. Incentivizing people to treat those loads with NPS control measures
3. Selecting the most cost-effective NPS control measures to treat those areas

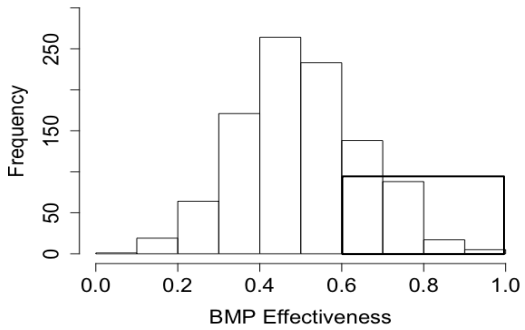
The 3 R's of Targeting

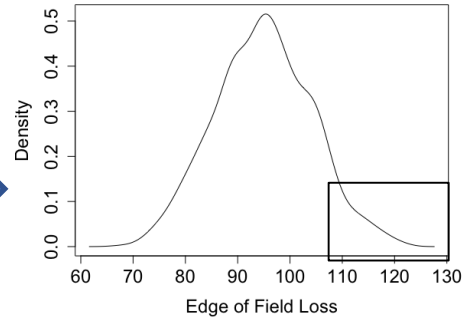
1. **R**ight location
2. **R**ight people
3. **R**ight treatment option

Variation in NPS Loads and Control Effectiveness

Area Load (Loss)

x





Instream Load

Loss rate
- Varies across fields
- Varies within a field
- Varies over time

% removal
- Varies across fields
- Varies within a field
- Varies over time

Variation in physical landscape significantly influences loss rates

Variation in NPS Loads and Control Effectiveness

N, P applications
Land use practices

Adoption Decisions
Assessment of Costs, Risks
Conservation Attitudes

Land managers differ in attitudes, situations, abilities, etc.

Area Load (Loss) X BMP (% removal) → Edge of Field Load → Instream Load

Loss rate
Varies across watersheds
Varies across fields
Varies within a field
Varies over time

% removal
Varies across watersheds
Varies across fields
Varies within a field
Varies over time

How can we target incentives and assistance in this setting?

N, P applications
Land use practices

<u>Adoption Decisions</u>
Assessment of Costs, Risks
Conservation Attitudes

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<u>Loss rate</u>
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<u>% removal</u>
Varies across watersheds
Varies across fields
Varies within a field
Varies over time

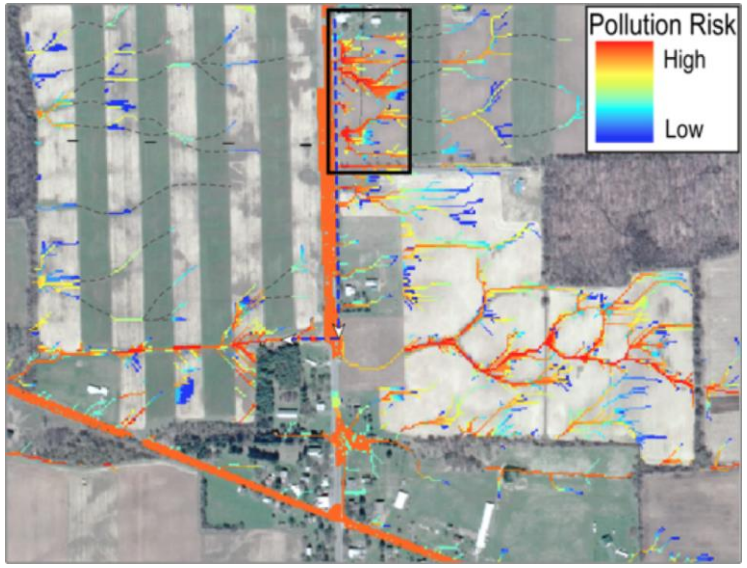
More effective methods for identifying spatial variation in pollutant source areas and BMP effectiveness

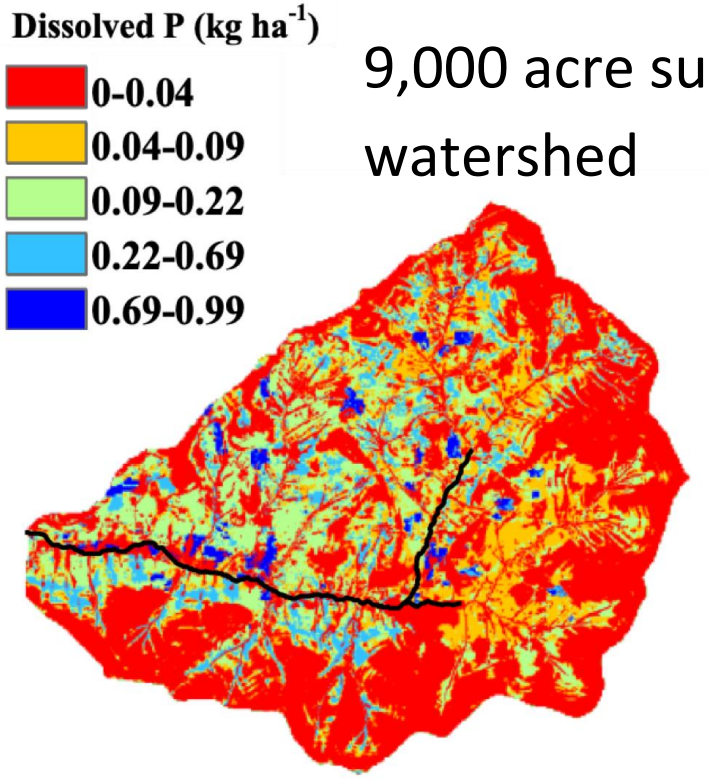
Workshop discussions centered on:

1. What scale
2. What models/indicators-how to quantify

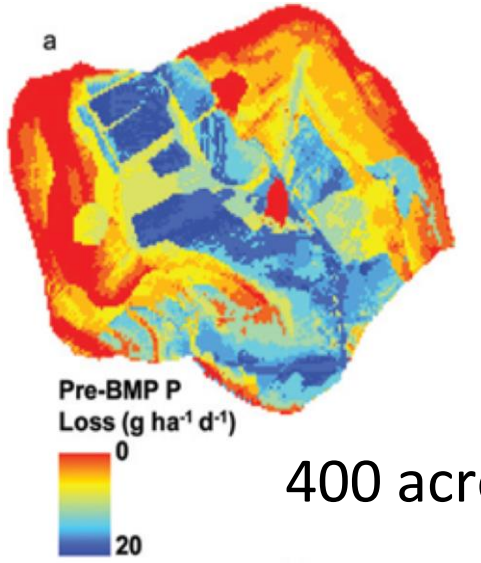
Scale

25 acre parcel

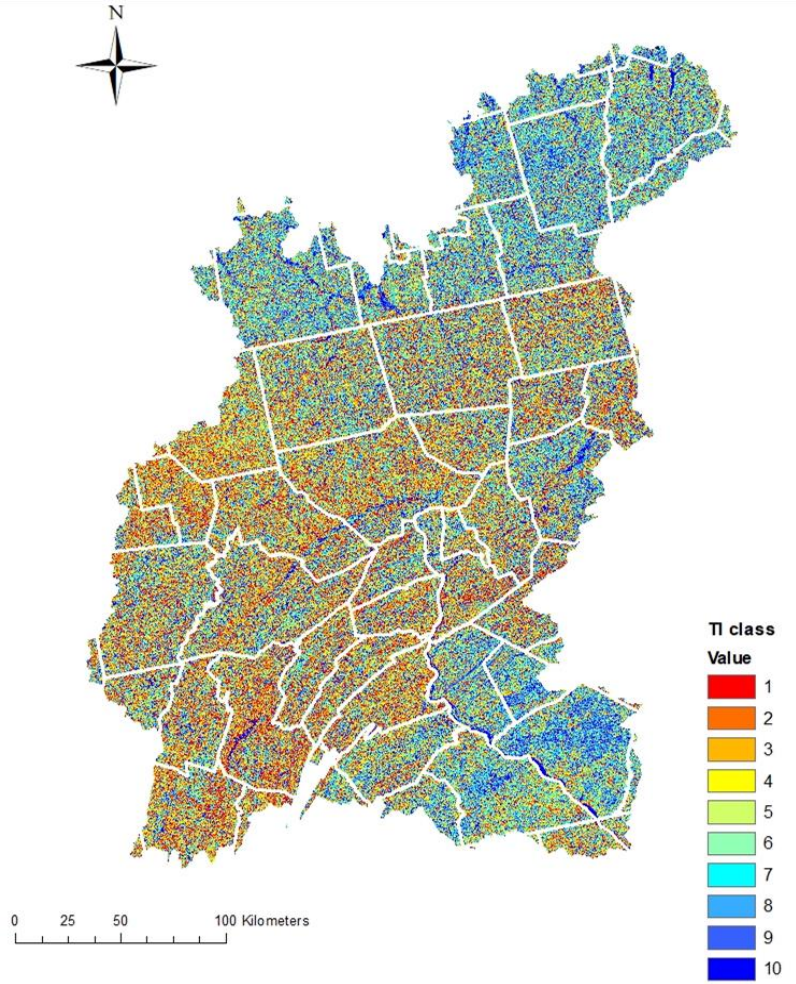




9,000 acre sub-watershed



400 acre farm

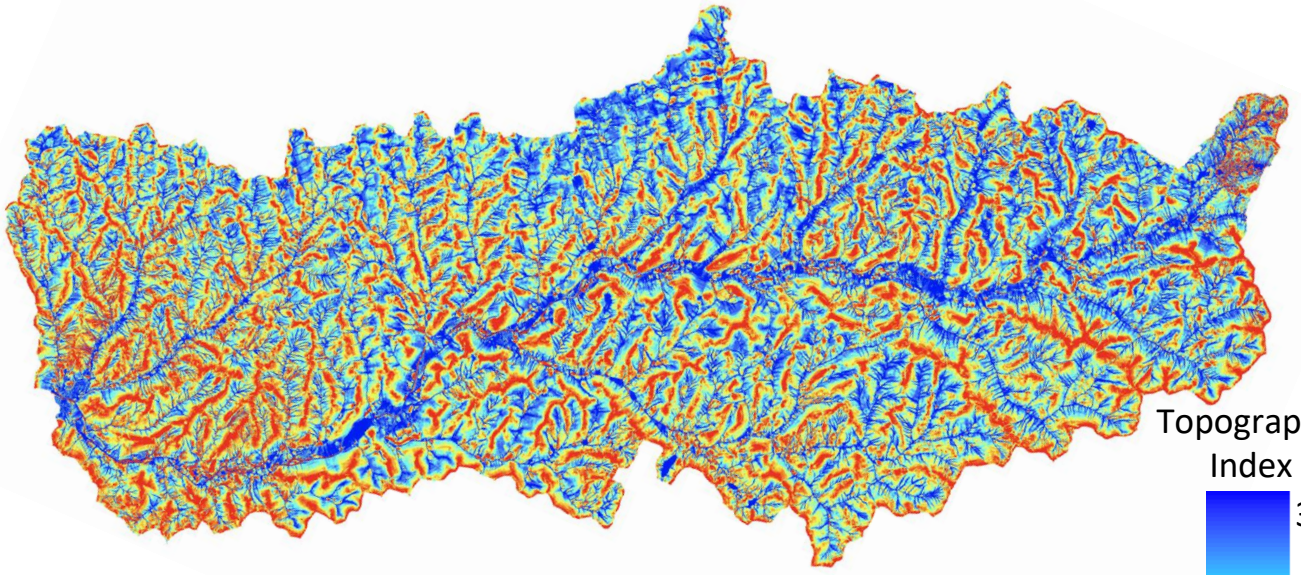


County

Quantification

- The larger and more complex the watershed, the more difficult it is to identify clear signals of BMP effectiveness
- Measured vs modeled
  - Measurement (at a fine enough scale) is expensive and time consuming but more certain
    - Opportunities to leverage indirect ‘indicators’ of BMP effectiveness
      - Soil P level, nutrient mass balance
  - Modeling can provide insight into BMP effectiveness, but estimates often have high uncertainty
    - Some good “discussion” about what kinds of models would be most appropriate
    - Alternatives to traditional NPS modeling

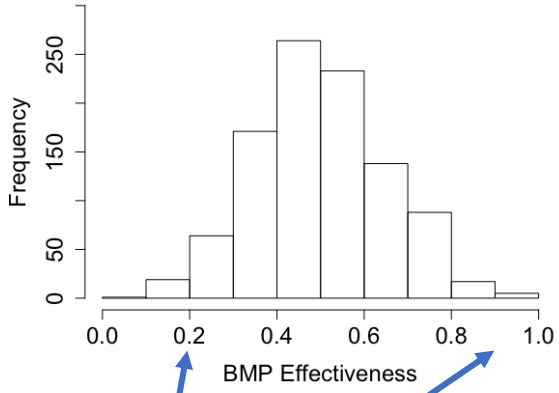
An example of Targeting and Differential Crediting



Topographic Index

33.10

3.52



Risk Index

10

1

More risk

Less risk

Increasing flexibility in how we incentivize land managers can improve NPS program effectiveness

Current voluntary “practice-based” programs:

- Provide limited information on nutrient removal performance
- In some cases requires significant cost burdens on land manager
- Limited incentives/ability for landowner and conservation staff to search & treat high loss areas
- There is potential to improve voluntary incentive programs by rewarding achievement of pollutant reductions (“pay for success”)
- Many implementation challenges to these programs

Recommendations

1. Improve the spatial prediction capability of the CBP TMDL accounting system:
   i. Develop finer scale modeling capacity to guide and inform targeting
   ii. Continue to improve spatial resolution of datasets that drive the CBP models
   iii. Allow for differential crediting of BMPs

2. Develop and test alternative incentives systems for targeting programs:
   i. Develop and support testbed watersheds to pilot and test targeting incentives
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