Identifying Critical Areas for BMP Applications

Critical Areas

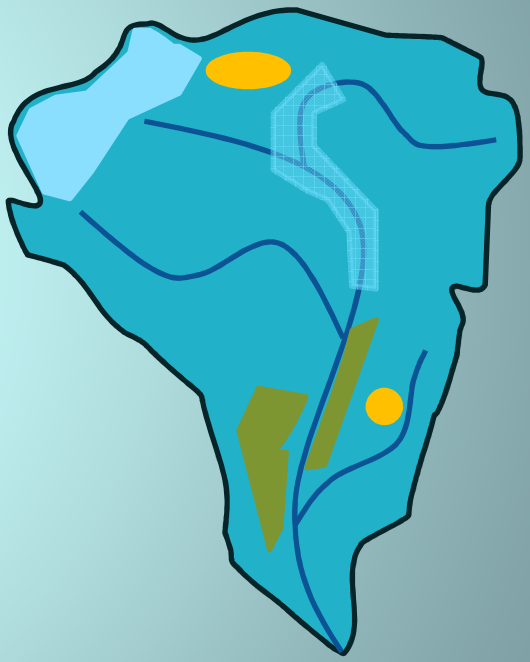
- **Those areas or sources where the greatest water quality improvement can be accomplished per dollar spent (Maas, et al., 1985).**

NOT just the source of the greatest loads!

Critical Area Selection Criteria

N,P, Sediment, Pathogens

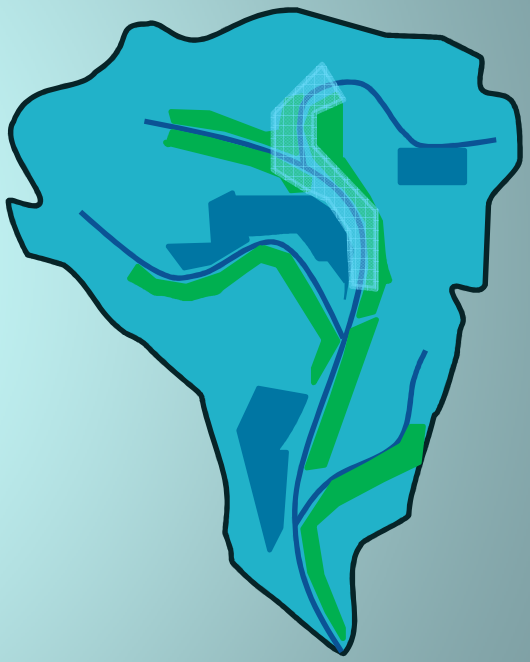
- Type and Severity of Water Resource Impairment
  - Sedimentation or turbidity?
- Erosion Rate
  - Useful to some degree for P
  - Not so useful for N or pathogens
- Fertilizer Rates and Timing
  - Timing of N more important than timing of P
  - Soil test P
  - Animal waste application areas
- Pathogen Source Magnitude
  - Feedlots, cropland with manure, urban sources
  - In-stream sources (AZ NMP)



Critical Area Selection Criteria

N,P, Sediment, Pathogens

- **Distance to Nearest Watercourse**
  - Delivery ratio varies with pollutant and path characteristics
- **Distance to Impaired Water Resource**
  - Delivery ratio varies with pollutant and path characteristics
- **Present Conservation Status**
  - How much improvement is possible?



How Can Monitoring Help?

- **Type and Severity of Water Resource Impairment**
  - Discussed earlier
- **Erosion Rate**
  - USLE and sediment delivery estimates
- **Fertilizer Rates and Timing**
  - Survey of farmers and homeowners
  - Soil sampling on farms and homes
- **Pathogen Source Magnitude**
  - Windshield survey
  - Check WWTP discharge records

In an ideal project where there is plenty of time, the land inventory would be conducted first, and that information would help in selecting water quality monitoring sites, sample parameters, and sample timing (IDEM, 2003).

How Can Monitoring Help?

- Distance to Nearest Watercourse
  - Edge-of-field grab samples at suspected major sources can yield concentration data
  - Baseflow and runoff conditions
  - Estimate flow?
- Distance to Impaired Water Resource
  - Tributary grab samples
  - Baseflow and runoff conditions
  - Estimate flow for instantaneous load comparisons

How Can Monitoring Help?

- Present Conservation Status
  - Farm survey
  - SWCD and NRCS
- On-site evaluation
  - Farm*A*Syst self-audits
  - Inspections

How Can Modeling Help?

- **Simple Models**
  - **Limited to waterbodies where loadings can be aggregated over longer averaging periods**
  - **Limited to gross loadings**
  - **Need to create subwatersheds and model them to allow critical area delineation**

How Can Modeling Help?

- **Mid-Range Models**
  - **Limited to waterbodies where loadings can be aggregated over longer averaging periods**
  - **Daily/monthly load summaries**
  - **Need to create subwatersheds and model them to allow critical area delineation**
  - **Loads for different source categories**

How Can Modeling Help?

- **Comprehensive Watershed Models**
  - **Include both landscape and receiving water simulation, BUT**
  - **Calibration is required…AND**
  - **Time-consuming…AND**
  - **Requires greater experience**

STEPL

- Estimates Pre-BMP and Post-BMP loads for N, P, BOD, and sediment
  - By land use
  - Doesn't identify specific sources
  - Lack of detail re: current BMP status and potential for change due to new/modified BMPs
  - BE CAREFUL

References

- IDEM. 2003. *Indiana Watershed Planning Guide,* Indiana Department of Environmental Management, Indianapolis, IN.
- Maas, R.P., M.D. Smolen, and S.A. Dressing. 1985. *Selecting critical areas for nonpoint-source pollution control,* Journal of Soil & Water Conservation, 40(1):68-71.