# Interpretations and Applications

# PSAT Development

- Based on the Watershed Treatment Model from the Center for Watershed Protection (www.cwp.org)
- Modifications:
  - Focus on phosphorus
  - Factors appropriate for central Minnesota
  - Expanded rural land use categories
  - Improved user interface

# Improving agricultural loading estimates

1. Subdivide ag land into management categories
2. Identify local data
3. Use the MN P Index to refine loading factors
4. Choose a range of loading factors

# Converting MN P Index results to PSAT loading factors

| | MN PI results | PSAT loading factor |
|---|---|---|
| **Very low** | <1 | 0.1 – 0.2 |
| **Low** | 1 – 1.9 | 0.2 – 0.5 |
| **Medium** | 2 – 3.9 | 0.5 – 0.9 |
| **High** | 4 – 5.9 | 1.0 – 1.4 |
| **Very high** | >6 | >1.4 |

# What next?

- Run several scenarios to illustrate the range of uncertainty
- Identify other models or data needed
  - E.g., survey of septic systems or use of MN P Index
- Attach a written interpretation of assumptions and uncertainties.

# Cautions

- Scale
  - Use on watersheds less than 200 sq mi
  - Predominantly urban watersheds should be much smaller (20 sq mi).
  - For use on larger watersheds, adjust loading factors.
- Default values
  - Use local data as much as possible

# Cautions, cont.

- Relative, not actual loads
  - Not a calibrated model
  - Cannot reproduce actual in-stream loads
  - Use to express load reduction as a percent reduction
- Annual averages
  - No indication of variation within or between years.
  - When planning treatment, consider critical conditions and plan for major events such as snowmelt or large runoff events

# Cautions, cont.

- Uncertainty
  - Conservative assumptions in the model provide some margin of safety
  - Incorporate explicit margin of safety where specific targets are to be met, such as in a TMDL study.
  - Model a range of assumptions.
- High soil test P
  - Does not explicitly account for high STP levels in soils near water bodies. The MN PI should be used in these situations.

# Cautions, cont.

- Forest P loads
  - may be minimal, generally, but quite high from isolated locations with high compaction or high snowmelt runoff.
- Does not consider internal loading
- No differentiation between dissolved vs. particulate P.

# Cautions, cont.

- No consideration of particle size
  - So there is no way to model multiple BMPs in a series, since most BMPs preferentially remove heavier particulates
- Does not consider watershed P balance and watershed P loading.
  - Buildup of P may be more important in smaller watersheds and over longer time frames.