PRESTO!

PRESTO is a screening level GIS-based tool that calculates basin specific average annual phosphorus loads from point and nonpoint sources within Wisconsin

Watershed Delineation

+

Effluent Aggregation

+

Pollutant Runoff

Why was PRESTO developed?

PRESTO was developed to support the determination of one condition of adaptive management eligibility for permitted industrial and municipal dischargers as defined in s. NR 217.18, Wis. Adm. Code. For an outfall location, PRESTO calculates the ratio of point to nonpoint source phosphorus load from the delineated contributing watershed. Facilities where the point source phosphorus load is < 50% satisfy one condition of adaptive management eligibility.

How does PRESTO work?

PRESTO was developed using the Python scripting language within ESRI's ArcGIS 10 & 10.1. The tool exists as a ArcToolbox, requiring ArcMap and the Spatial Analyst Extension. It utilizes several statewide GIS datasets including topography, land cover, hydrography, subbasins, and outfall locations that are provided with the tool. The point source component of PRESTO is derived from measured data stored in the WDNR System for Wastewater Applications and Monitoring Permits (SWAMP) database and are available from 1995 - 2011. Average annual nonpoint phosphorus loads are calculated using one of three estimation methods:

Figure 1: Example of how the phosphorus source ratio is determined using PRESTO

Point : Nonpoint Source Ratio

(A) Point Source Load
\+
(B) Sum of All Upstream Point Source Loads
: (C) Nonpoint Estimation Load Model

- Wisconsin-specific export coefficients
- Multiple regression (#1) model using grassland, forest, and stream density
- Multiple regression (#2) model using cropland, urban, and stream density

A statewide validation analysis showed multiple regression (#1) model performed best statewide. Using the process described above, PRESTO provides a point and nonpoint phosphorus load ratio (*Figure 1*).
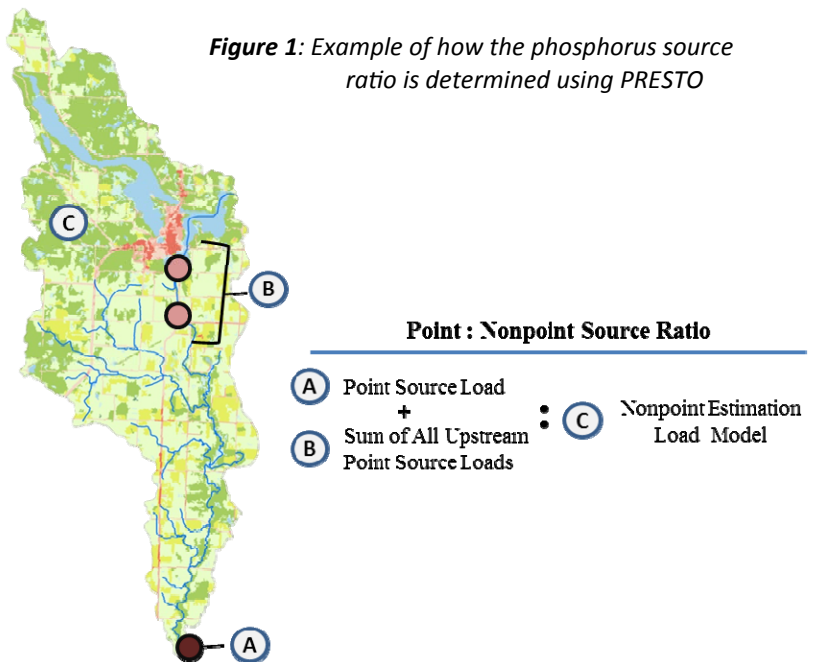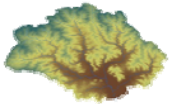
What information does PRESTO provide?

Spatial Outputs

- Snapped outfall points
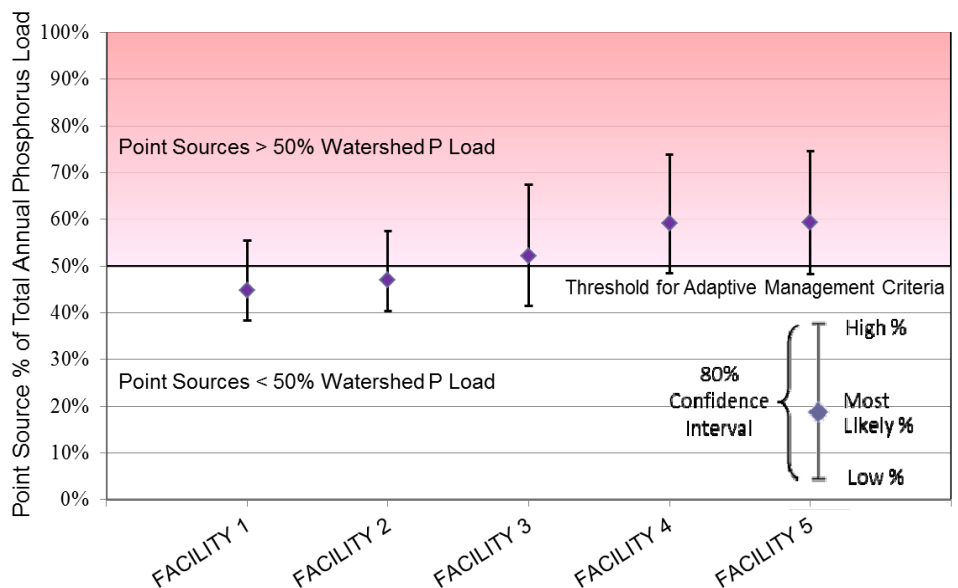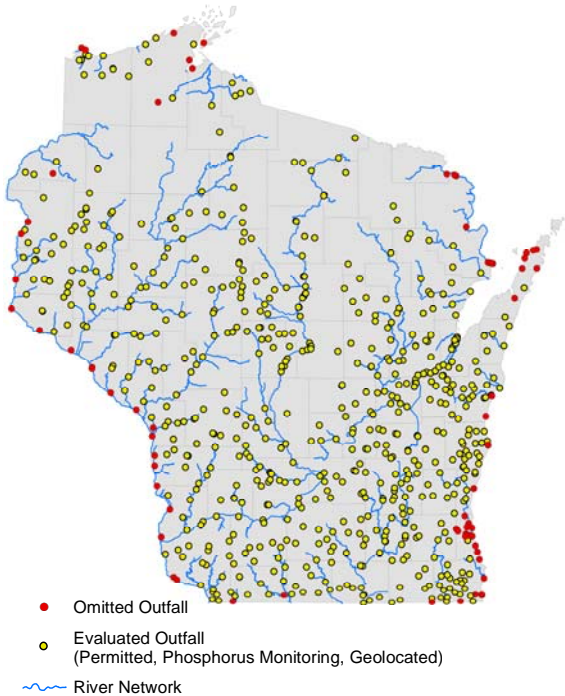- Individual watersheds coverage
- Combined watersheds coverage

Tabular Outputs

- Basin characteristics (area, stream density, headwater basin)
- Annual phosphorus point and nonpoint load estimates
- Point to nonpoint phosphorus ratio (%)
- Upper and lower bounds for nonpoint estimates to constrain uncertainty

PRESTO statewide analysis:

Municipal and industrial outfalls in Wisconsin that were geolocated and contained a phosphorus monitoring record (652 outfalls) were examined with PRESTO. The point to nonpoint ratio provided by PRESTO was used to determine what facilitates met the eligibility criteria for NR217's adaptive management (Facility and any upstream facilities are less than 50% of the watershed phosphorus load) (*Figure 2*). A table of the point to nonpoint ratio for each facility is provided in the PRESTO Documentation, Validation, and Analysis Report.

Omitted Outfall

Evaluated Outfall
(Permitted, Phosphorus Monitoring, Geolocated)

River Network

Figure 2: Comparison of facilities to Adaptive Management Eligibility Threshold

Is PRESTO available to download?

The PRESTO model (Version 1.1), User Manual, and Documentation, Validation, and Analysis Report can be downloaded at http://dnr.wi.gov/topic/SurfaceWater/PRESTO.html For additional questions please contact the Water Quality Modeling Technical Team: dnrwqm@wisconsin.gov or 608.264.6021