Forestry Estimator for Runoff and Nutrients (FERN)

The Forestry Estimator for Runoff and Nutrients (FERN) was created by Houston

Engineering, Inc (HEI) with funding support from the Upper Mississippi-Grand Rapids Watershed partnership planning effort. The purpose of FERN is estimating water quality benefits from select forestry best management practices (BMPs). FERN is intended to be a statewide forest implementation decision support tool. Prior to the development of FERN simple models, tools, or estimators for estimating reasonable sediment, phosphorus, and nitrogen load reductions at receiving waterbodies from BMPs implemented within forested lands did not exists. FERN is a tool that can help fill that space.

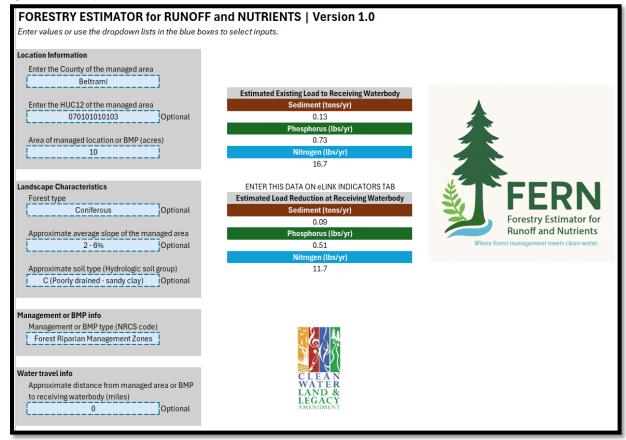


FERN was created within Microsoft Excel and estimates existing sediment, phosphorus, and nitrogen loads along with BMP-driven load reductions using static datasets of landscape sediment and nutrient yields.

Existing loads of sediment, total phosphorus, and total nitrogen calculated within FERN are based on data from the United States Geological Survey (USGS) Spatially Referenced Regressions on Watershed attributes (SPARROW) model for the Midwest United States (Robertson and Saad, 2019). Once the final existing sediment and nutrient load values are calculated, the expected load reduction from an implemented BMP is calculated based on the assumed load reduction efficiency of a selected BMP and the area across which that BMP is being applied.

The FERN tool, along with the tech memo, has been posted on the BWSR Water Quality Tools and Models webpage with the other pollution reduction tools and is available for estimating and reporting measurable environmental outcomes for water quality projects funded through BWSR and agency partners.

Fig. 1: BMP example on FERN.



FORESTRY ESTIMATOR TOOL

FORESTRY TECHNICAL MEMORANDUM

CONTACT

Udai Singh

Modeling and Outcomes Coordinator (507) 766-5020

udai.singh@state.mn.us

Matthew Picklo

Forester (218) 326-5573

Matthew.picklo@itascaswcd.org

Darren Mayers

Board Conservationist | MN Board of Water and Soil Resources 1601 Minnesota Drive. Brainerd, MN 56401 (218) 290-8384 | <u>darren.mayers@state.mn.us</u> | <u>www.bwsr.state.mn.us</u>