

BWSR Estimator Spreadsheet Tools

Appropriate Application and Use

October 2021

What are the intended uses of the BWSR Estimators?

The BWSR Estimator Tools were developed in the 1990's to estimate field or project scale estimates of sediment, soil, and phosphorus reductions from typical BMPs installed with BWSR financial assistance. These estimators provide those reductions to the nearest water body of concern, but do not provide modeled pollutant loading estimates. The intended use of the estimators are to:

- Provide pollution reduction estimates for a limited set of common agricultural structural and vegetative practices,
- Estimates may be used for reporting outcomes for BWSR grant applications and individual project pollution reduction estimates may be required for eLINK reporting for BWSR Grants,
- Estimators may be used to help staff and board members determine feasibility, relevance, and appropriateness of practices that technical staff propose to undertake.

What conservation practices can the BWSR Estimators be used to calculate field scale pollution reductions estimates from?

Practice Name	Practice Code	Applicable BWSR Estimator	Practice Life Expectancy (years)
Conservation Cover	327	Sheet and Rill	10
Conservation Crop Rotation	328	Sheet and Rill	3 to 5
Contour Buffer Strips	332	Sheet and Rill	10
Contour Farming	330	Sheet and Rill	10
Cover Crop	340	Sheet and Rill	1 to 3
Erosion Control	148M	Sheet and Rill, Filter Strip, Gully, Stream and Ditch	10
Filter Strip	393	Filter Strip	10
Grade Stabilization Structure	410	Gully	10
Grassed Waterway and Swales	412	Gully	10
Lined Waterway or Outlet	468	Gully	10

Practice Name	Practice Code	Applicable BWSR Estimator	Practice Life Expectancy (years)
Riparian Forest Buffer	391	Stream and Ditch	
Riparian Herbaceous Cover	390	Filter Strip, Stream and Ditch	10
Sediment Basin	350	Gully	10
Stream Channel Stabilization	584	Stream and Ditch	20
Streambank and Shoreland Protection	580	Stream and Ditch	20
Strip-cropping	585	Sheet and Rill	1 to 3
Terrace	600	Gully	10
Water and Sediment Control Basin	638	Sheet and Rill, Gully	10
*Note: Sheet and Rill and the Filer Strip Estimators require RUSLE2/WEPP inputs			

What are some of the practices that are not appropriate for the estimators?

- Urban Stormwater:
 - Rain gardens or stormwater bio infiltration basins,
 - Use the MIDS or another appropriate estimator.
- Structural and engineered practices that primarily treat nitrogen,
 - Drainage water management practices, bioreactors, alternative tile intakes, saturated buffers, etc.
- Nutrient management planning, and
- Crop residue management impacts.

What are the data inputs and project information needed to run this BWSR Estimators?

BWSR Estimator	Inputs and Data Needs	Estimator Output Units
<i>Gully/Stream and Ditch</i>	<ul style="list-style-type: none"> • Soils data for the project area • Estimated volume voided • Field data or photographic records to determine estimated time for gully or streambank failure to occur • Location of gully to nearest waterbody • CAD drawings, GIS analysis, or surveyed profiles of existing impacted area • Lidar or other elevation data 	<ul style="list-style-type: none"> • Sediment reduction (TSS) tons/year • Soil Savings tons/year • Phosphorus reduction lbs/year
<i>Sheet and Rill/Filter Strip</i>	<ul style="list-style-type: none"> • RUSLE2/WEPP field scale soil loss before and after 	

BWSR Estimator	Inputs and Data Needs	Estimator Output Units
	<ul style="list-style-type: none"> Distance to water (measured in field or via GIS software) Soils data for the field Known upland treatment from contributing watershed (acres) Presence or absence of filter strips, buffers, or other existing BMPs 	

Tips for using the Sheet and Rill and the Filter Strip Estimator?

<p>RUSLE2 inputs are needed for sediment loss per acre,</p> <ul style="list-style-type: none"> Using RUSLE2 incorrectly can results in bad data going into the BWSR, If you are unsure how to use RUSLE2 or don't use it often, work with someone who knows how to use RUSLE2 (ex. NRCS staff), Other calculations from other accepted models can be used in place of RUSLE2 (Ex WEPP).
<p>Distance to Water:</p> <ul style="list-style-type: none"> Edge of field to water needs to be measured correctly, Water = an actual stream, lake, wetland (not just a dry run waterway).
<p>Filter Strip Estimator: The estimator should not be used for filter strips wider than 100 feet, as the estimator accuracy is greatly reduced after that width.</p>
<p>Buffer Law Alternative Practices: <u>DO NOT USE</u> the BWSR Estimators for assessing the applicability of alternative practices for the State Buffer Law. The Buffer Decision Support Tool and the Ag Buffer Builder are the <u>only</u> two tools currently adopted. See BWSR Buffer web page for more detail.</p>

Tips for using the Stream/Ditch and Gully Estimators

<p>Volume Voided:</p> <ul style="list-style-type: none"> May need to survey or do GIS work to estimate, Be conservative if you have limited data. Usually larger areas voided and photo/GIS interpretation needed, and Take sand bars into account if applicable.
<p>Gully Condition:</p> <ul style="list-style-type: none"> Channelized (direct into water resource of concern), Non-channelized (most situations in Ag land), and Landlocked (gully into a basin with no outlet).
<p>Distance to Water (Gullies only)</p> <ul style="list-style-type: none"> Determine if the gully directly connects to a water body, is hydrologically connected but set back from the waterbody, or is in a landlocked situation. For gullies connected to ravines, you need to consider the if the ravine has water run perennially (especially with drain tile connections) or intermittent.

- Using GIS tools to determine distance to the water body is appropriate along with in field determinations.

Years: The model has a simple linear relationship between years and the amount of pollution reduction estimated.

- Gully: Use minimum of 5-year estimate or longer,
- Stream: Consider more than 5 years for duration (preferably 10 to 30 years).

Limitations

- Simple model for extremely complicated problem,
- Model doesn't adjust for attenuation and deposition downstream, and
- May get very high reduction value...may not be realistic (consult your local DNR Hydro/engineer)

What estimator do I use for reporting for BWSR grants if I have an extensive watershed modeling completed for a Comprehensive Watershed Management Plan?

- If you are in a watershed that has either HSFP-SAM or PTMApp data, those models should be used for calculating pollution reductions for most land management (ex. cover crops) or structural practices (ex. WACOBS, waterways) instead of using the Sheet and Rill/Filter strip estimator tools. The MPCA and BWSR will be developing guidance on how to better utilize HSPF-SAM and PTMApp data for BWSR reporting over the next year.
- Currently, there are not many simple tools to use to calculate stream bank and near channel erosion processes. BWSR recommends continued use of the Stream and Ditch/Gully estimators for near channel erosion projects unless more detailed analysis has been completed by a licensed professional.

For more Information:

Matt Drewitz
BWSR Measures and Outcomes Coordinator
matt.drewitz@state.mn.us
(507) 766-5020 (cell/text)