

GWLF: Generalized Watershed Loading Function

Model Uses The Generalized Watershed Loading Function (GWLF) is a watershed loading model developed to assess non-point source flow and sediment and nutrient loading from urban and rural watersheds.

Major Categories Hydrology and Water Use
Water Quality
Geomorphology

Subject Knowledge Level
intermediate

Minor Categories Run Off
Non-Point Source
Point Source
Nutrient Flow
Erosion

Technical Difficulty Level
intermediate

Model Type Physical model

Geographic in Nature?
semi

Abstract

The Generalized Watershed Loading Function (GWLF) is a mid-range watershed loading model developed to assess non-point source flow and sediment and nutrient loading from urban and rural watersheds. The GWLF model provides the ability to simulate runoff, sediment, and nutrient loadings (N and P) from a watershed given variable-size source areas (e.g., agricultural, forested, and developed land). It also has algorithms for calculating septic system loads, and allows for the inclusion of point source discharge data. It is a continuous simulation model, which uses daily time steps for weather data and water balance calculations. GWLF is considered to be a combined distributed/lumped parameter watershed model.

A GIS-based version of GWLF, titled AVGWLF is currently available from Pennsylvania State University. The current distributed software application is designed for use in **Pennsylvania**. This application can (and has been) modified for use in other areas. However, this is difficult to do without assistance from **AVGWLF** developers due to the need for code/algorithm changes dependent on regional landscape conditions. To date, **AVGWLF** has been adapted for use in such locations as Mexico, Bulgaria, and North Carolina.

Future Developments

A GIS based version of GWLF, titled AVGWLF is currently available from Pennsylvania State University.

Model Limitations

Unknown

Model Features

- derive input data for GWLF for use in an “impaired” watershed
- simulate nutrient and sediment loads within the impaired watershed
- compare simulated loads within the impaired watershed against loads simulated for a nearby “reference” watershed that exhibits similar landscape, development and agricultural patterns, but which also has been deemed to be unimpaired
- identify and evaluate pollution mitigation strategies that could be applied in the impaired watershed to achieve pollutant loads similar to those calculated for the reference watershed. The primary bases of comparison between impaired and reference watersheds are the average annual nutrient and sediment loads estimated for each.

Required Data Types

- Historical weather data
- Transport Data
 1. Basin Size
 2. Land use/cover distribution

Model Outputs

- simulate runoff, sediment, and nutrient (N and P) loadings from a watershed given variable-size source areas
- calculated septic system loads

3. Curve numbers by source area
4. USLE (KLSCP) factors by source area
5. ET cover coefficients
6. Erosivity coefficients
7. Daylight hrs. by month
8. Growing season months
9. Initial snow amount (cm water)
10. Sediment delivery ratio Soil water (available water capacity)

- Nutrient Data

1. N and P point source loads
2. Background N/P concentrations in GW
3. Background P concentrations in soil
4. Background N concentrations in soil
5. Months of manure spreading
6. Population on septic systems

Source

Pennsylvania State University

Source (URL)

<http://www.avgwlf.psu.edu>

Hardware Requirements

Unknown

		Supported Platforms	
DOS	<input checked="" type="checkbox"/>	UNIX	<input type="checkbox"/>
Windows	<input checked="" type="checkbox"/>	Macintosh	<input type="checkbox"/>

Software Requirements

Unknown

Cost, Licensing and Availability

unknown