

User Inputs

Highway Runoff Dilution and Loading model (HI-RUN) Version 1.20090424
 This model is for stormwater analysts associated with biological assessments, and is not a design tool.

Data Inputs - End-of-Pipe Loading Subroutine

Description: This mode provides risk-based predictions of stormwater quality at the outlet and Threshold Discharge Area (TDA) scale. The Highway Runoff Manual provides a thorough discussion of TDA delineation specific to transportation drainage systems. The analysis of water quality concentrations is conducted at a subbasin scale, with subbasins being divisions of TDAs that have discrete discharge points in the receiving water. If a TDA has only one discharge point, data need only be entered under Subbasin 1. The analysis of pollutant loadings is done at the TDA scale only. Water quality parameters analyzed by this tool are Total Suspended Solids (TSS), Total Copper (TCu), Dissolved Copper (DCu), Total Zinc (TZn), and Dissolved Zinc (DZn).

Project/TDA ID:

Precipitation Timeseries:

Water Quality Parameters: All
 TSS
 Copper - Total
 Copper - Dissolved
 Zinc - Total
 Zinc - Dissolved

Month:
 January
 February
 March
 April
 May
 June
 July

Step 1: Identify the project location by State Route (SR).
 Step 2: Select the timeseries (from MSQ-Flood) that fit location. To determine which timeseries corresponds to View Region Map button.
 Step 3: Select water quality parameters to model, hold.
 Step 4: Select months to model, hold down Ctrl key to

Treatment Type	Level of Incidental Infiltration (%)	Subbasin 1 Area (acres)	Subbasin 2 Area (acres)	Subbasin 3 Area (acres)	Subbasin 4 Area (acres)	Subbasin 5 Area (acres)	TDA Imperious Area (acres)
Basic	0						0
	20						0
	40						0
	60						0
Enhanced	0						0
	20						0
	40						0
	60						0
Infiltration BMP	100						0
None	0	10	0	0	0	0	10
Total		10	0	0	0	0	10

Treatment Type	Level of Incidental Infiltration (%)	Subbasin 1 Area (acres)	Subbasin 2 Area (acres)	Subbasin 3 Area (acres)	Subbasin 4 Area (acres)	Subbasin 5 Area (acres)	TDA Imperious Area (acres)
Basic	0						0
	20						0
	40						0
	60	3					0
Enhanced	0						0
	20						0
	40						0
	60	5					0
Infiltration BMP	100						0
None	0	5	0	0	0	0	5
Total		8	0	0	0	0	5

Project/TDA ID and Precip.

WQ Parameters

Months

Baseline Conditions

Proposed Conditions

End-of-pipe Loading Analysis - Output

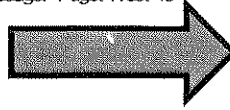
Highway Runoff Dilution and Loading model (HI-RUN) Version 1.0 (

End of Pipe Loading Subroutine Report

This model is for stormwater analysis associated with biological assessments, and is not a design tool.

Date/Time of Run: 10/3/08 10:19
 Outfall ID: SR13/TDA3
 Rain Gauge: Puget West 48

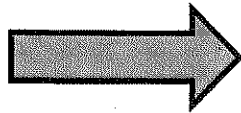
Input summary



Baseline Conditions	
No Treatment	0% Infiltration - 18.5 acres
Basic Treatment	0% Infiltration - 2 acres

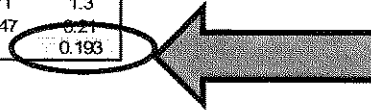
Proposed Conditions	
Basic Treatment	0% Infiltration - 10.5 acres
Enhanced Treatment	60% Infiltration - 15 acres

Load Analysis



Loading Output

	Dissolved Zinc Load (lb/yr)	
	Baseline	Proposed
Max	198	20
75th Percentile	9.16	2.9
Median	4.87	1.9
25th Percentile	2.71	1.3
Min	0.247	0.21
P (exceed)		0.193



P(exceed)

Concentration Analysis

Subbasin 1	Dissolved Zinc Conc (mg/L)	
	Baseline	Proposed
Max	0.723	0.12
75th Percentile	0.049	0.024
Median	0.026	0.017
25th Percentile	0.015	0.012
Min	0.001	0.003
P (exceed)		0.332

User Inputs

Background Concentration



Inputs for Receiving Water Dilution Calculation

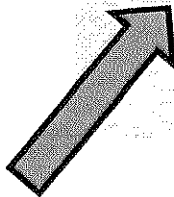
Subbasin 1

Background Concentration	Value (mg/l)
Copper - Dissolved	0.002
Zinc - Dissolved	0.004

Enter short description of simulation

Receiving Water Characteristics Downstream From Waste Input

- Stream Depth (ft)
- Stream Velocity (fps)
- Channel Width (ft)
- Slope
- Discharge Distance From Nearest Shoreline (ft)
- Distance Downstream to Point of Interest (ft)
(iterate value to determine downstream mixing distance)



						August	September		
						1.5	1.5		
						0.5	0.5		
						10	10		
						0.004	0.004		
						0	0		
						15	15		

Receiving Water Characteristics

Receiving Water Dilution Analysis - Output

Input Summary

Concentration Analysis Report - Subbasin 1

This model is for stormwater analysis associated with biological assessments, and is not a design tool.

Date/Time of Run: 8/25/08 13:23
 Output ID: Case Study 2
 Rain Gauge: Montesano
 Description:

Baseline Condition
 No Treatment
 0% Infiltration - 4 acres
 0% Infiltration - 20 acres

Proposed Condition
 No Treatment
 0% Infiltration - 21 acres
 Basic Treatment
 0% Infiltration - 7 acres
 Enhanced Treatment
 60% Infiltration - 3 acres

Dissolved Copper - August - Probability of Occurrence

Conc. (l)	Baseline Conditions									Proposed Conditions												
	> 0.004	0.002 - 0.004	0 - 0.002	0.005	0.001	0.003	0.002	0.001	0	0	0	> 0.004	0.002 - 0.004	0 - 0.002	0.005	0.001	0.003	0.002	0.001	0	0	0
	0.038	0	0	0.038	0.159	0.305	0.209	0.15	0.038	0.004	0.001	0.037	0.103	0.313	0.269	0.140	0.016	0.005	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.038	0.15	0.305	0.301	0.151	0.038	0.004	0.001				0.038	0.104	0.318	0.269	0.15	0.016	0.005	0	0	0	0
	0-3	3-6	6-12	12-24	24-48	48-96	96-192	>192				0-3	3-6	6-12	12-24	24-48	48-96	96-192	>192			

Baseline Results

Proposed Results

Above biological effects threshold.

Baseline to biological effects threshold.

Zero to baseline.

Probability that biological effects threshold will be exceeded in receiving waterbody 10 feet downstream of outfall. Is this > or < than the 5% risk limit?

Conc. (l)	Baseline Conditions							Dissolve	
	> 0.013	0.007 - 0.013	0 - 0.007	0 - 3	3 - 6	6 - 12	12 - 24		24 - 48
	0.023	0.001	0.005	0.008	0.006	0.002	0		
	0.976	0.049	0.202	0.335	0.267	0.103	0.019		
	0.001	0	0	0	0	0	0		
		0.05	0.207	0.343	0.273	0.105	0.02		

Probability that a storm event will be a given duration.