GRAIP: Geomorphic Road Analysis Inventory Package

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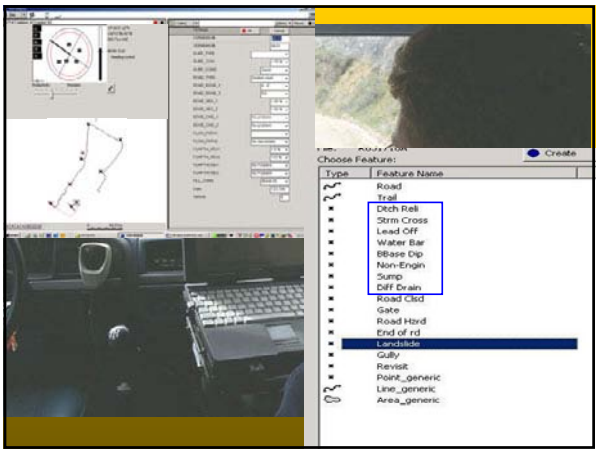
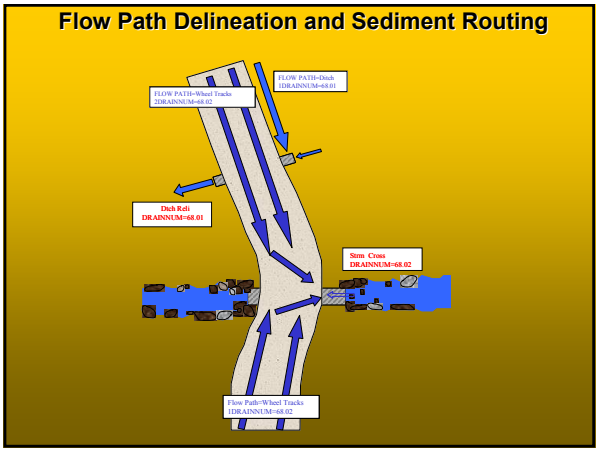
Overview

- Component Description
  - Road inventory
  - Sediment production
  - Sediment delivery and accumulation
  - Mass wasting
  - Habitat fragmentation

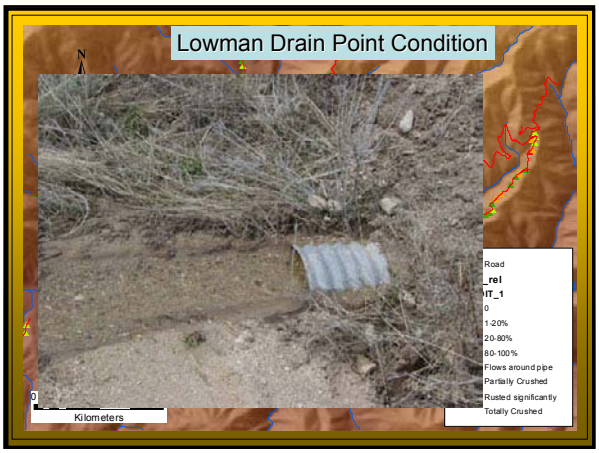
Stream Crossing Failure

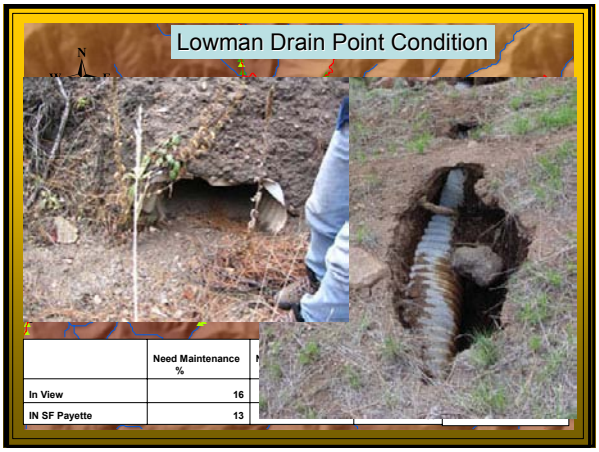


Flow Path Delineation and Sediment Routing

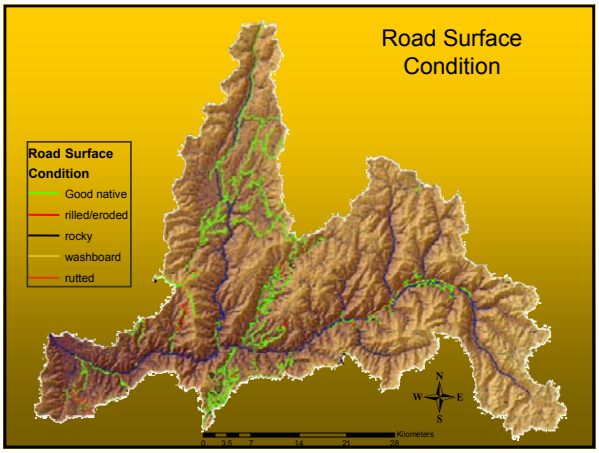


Drain Point Condition

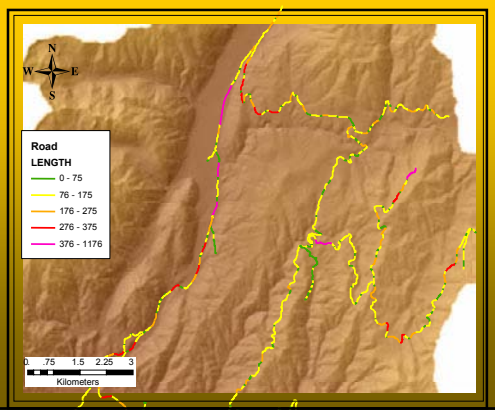




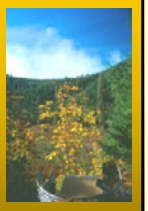
	Need Maintenance %
In View	16
IN SF Payette	13



Contributing Length Deer Creek



Sediment Production Estimate



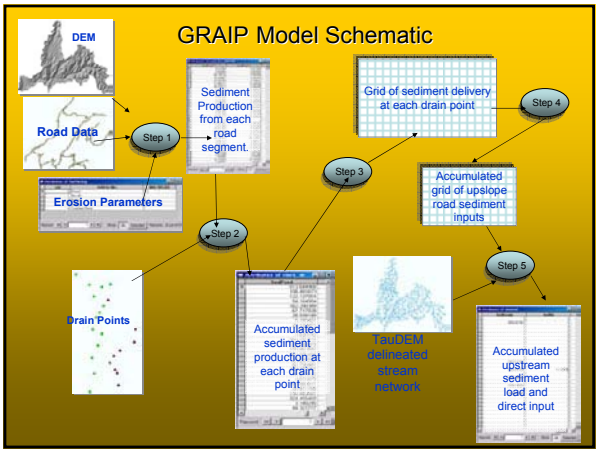
Sediment production by road segment

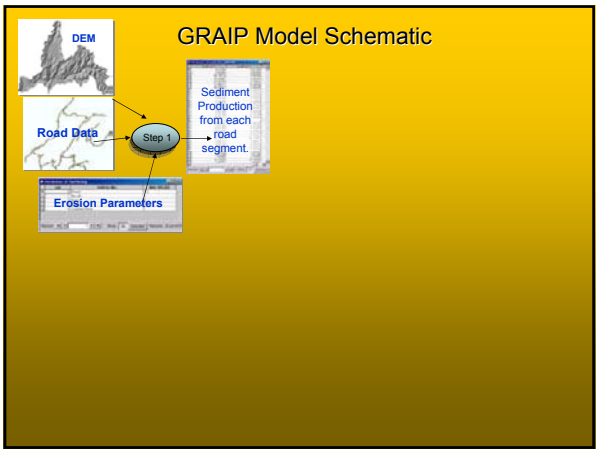
Sed Prod=A x L x S x V x R

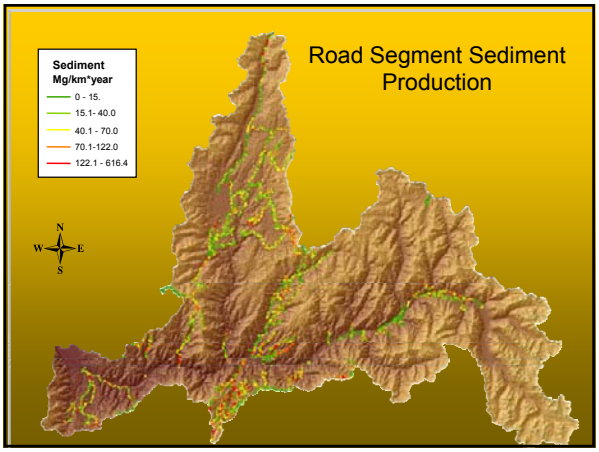
Sed Prod Sediment production (Kg/yr)
A Erosion base rate
L Flow path length
S Flow path slope
V Vegetation factor
R Road surface factor

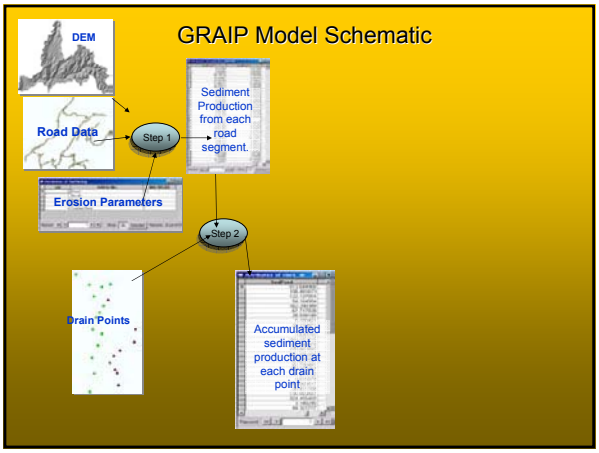
***"A"* can be determined experimentally or using a physically based model (e.g. WEPP)**

GRAIP Model Schematic

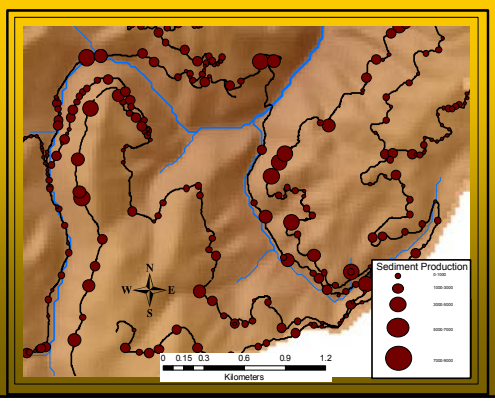



GRAIP Model Schematic
DEM
Road Data
Step 1
Sediment Production from each road segment.
Erosion Parameters


Road Segment Sediment Production
Sediment Mg/km*year
0 - 15.
15.1- 40.0
40.1 - 70.0
70.1-122.0
122.1 - 616.4
N
W
E
S

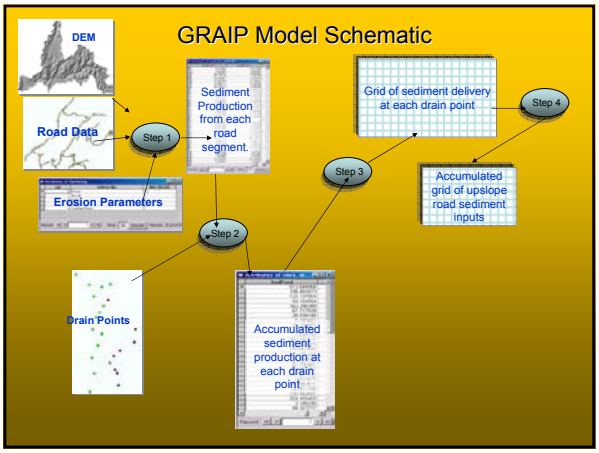

GRAIP Model Schematic
DEM
Road Data
Step 1
Sediment Production from each road segment.
Erosion Parameters
Step 2
Drain Points
Accumulated sediment production at each drain point

Sediment Production at Drain Points

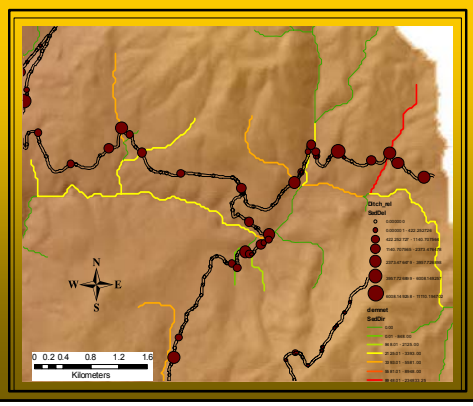


Sediment Delivery

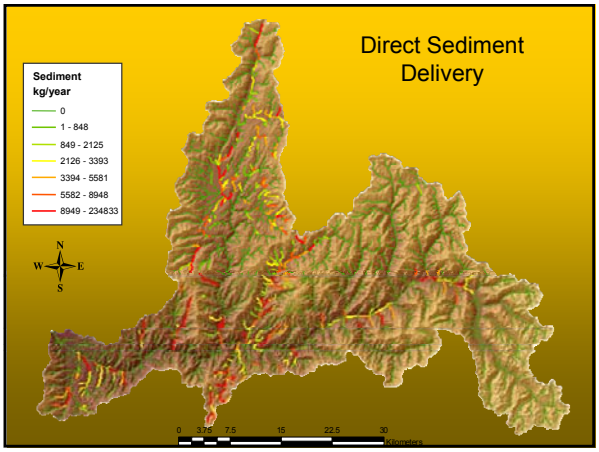
GRAIP Model Schematic



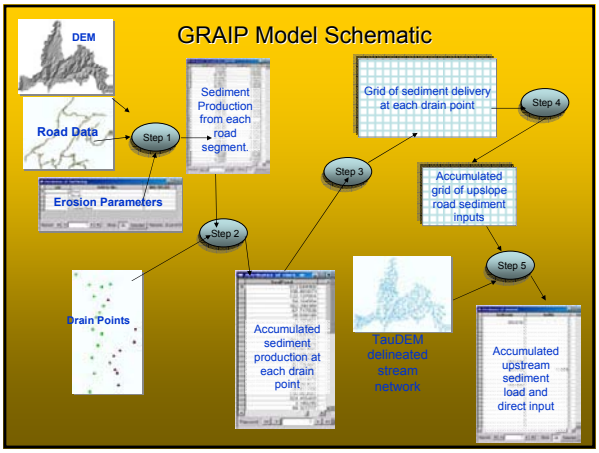
Direct Inputs from Drains to Stream Segment

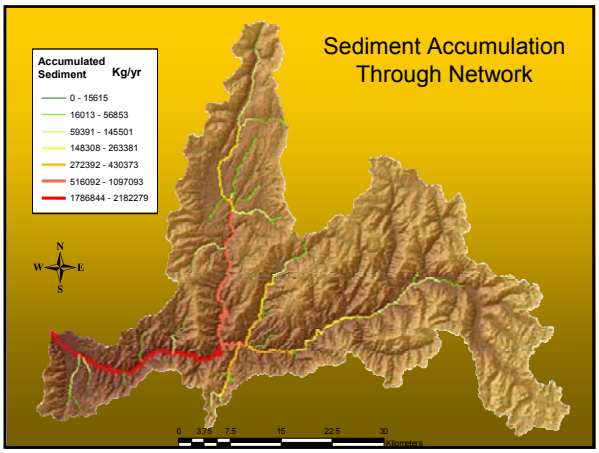


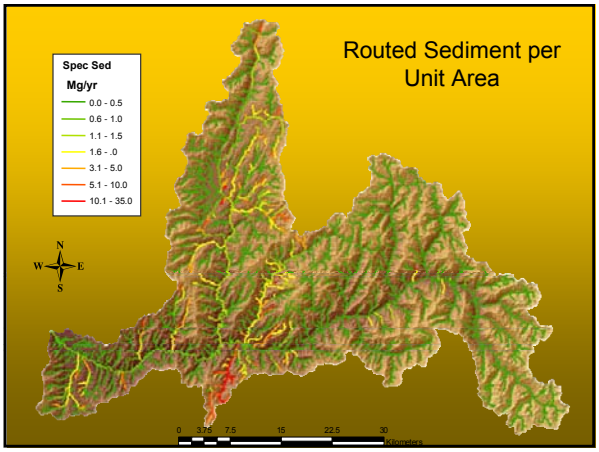
Direct Sediment Delivery

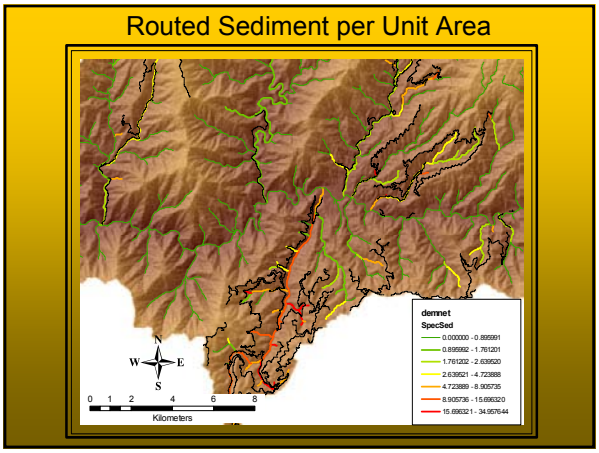


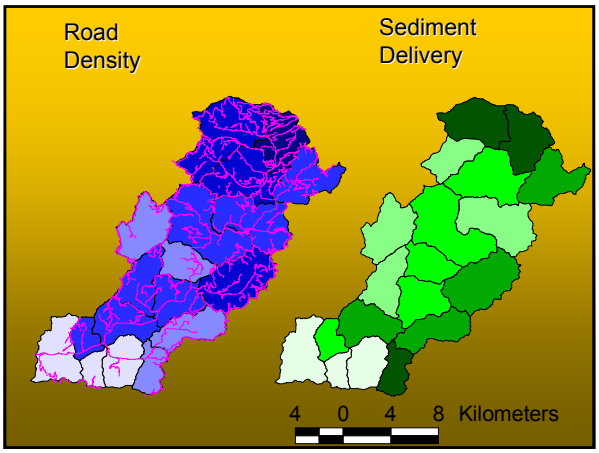
GRAIP Model Schematic

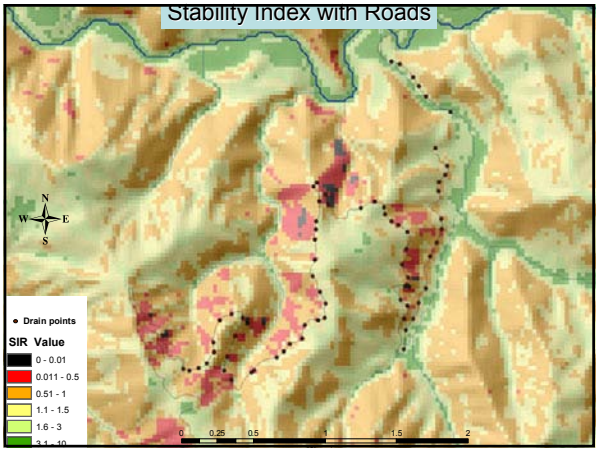



Sediment Accumulation Through Network
Accumulated Sediment Kg/yr
0 - 15615
16013 - 56853
59391 - 145501
148308 - 263381
272392 - 430373
516092 - 1097093
1786844 - 2182279
N
W
E
S
0 3.75 7.5 15 22.5 30
Kilometers

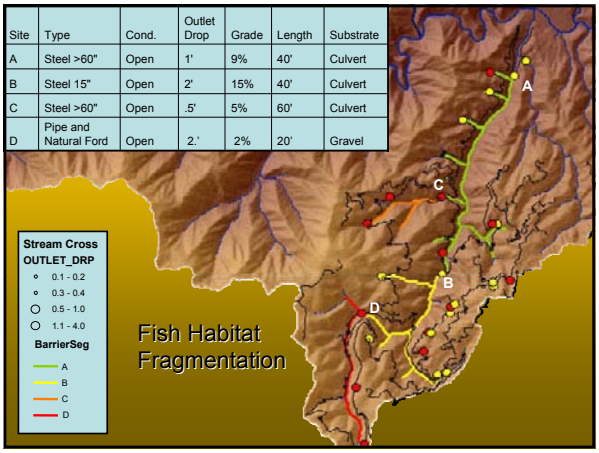
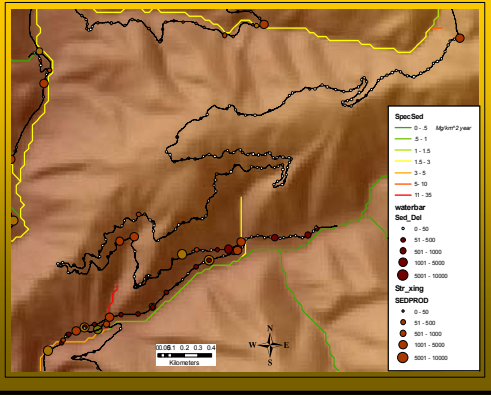

Routed Sediment per Unit Area
Spec Sed
Mg/yr
0.0 - 0.5
0.6 - 1.0
1.1 - 1.5
1.6 - .0
3.1 - 5.0
5.1 - 10.0
10.1 - 35.0
N
W
E
S
0 3.75 7.5 15 22.5 30
Kilometers


Routed Sediment per Unit Area
demnet
SpecSed
0.000000 - 0.895991
0.895992 - 1.761201
1.761202 - 2.639520
2.639521 - 4.723888
4.723889 - 8.905735
8.905736 - 15.696320
15.696321 - 34.957544
N
W
E
S
0 1 2 4 6 8
Kilometers





Site	Type	Cond.	Outlet Drop	Grade	Length	Substrate
A	Steel >60"	Open	1'	9%	40'	Culvert
B	Steel 15"	Open	2'	15%	40'	Culvert
C	Steel >60"	Open	.5'	5%	60'	Culvert
D	Pipe and Natural Ford	Open	2.'	2%	20'	Gravel



BMPs Reduce Sediment Delivery Near Long Creek