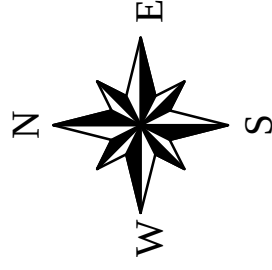


FATT Runoff Analyses

PART II

Data Input and Results Summary

A topographic map of the Bear River area in Utah. The Bear River watershed is highlighted in yellow and orange. The map shows contour lines, roads, and the town of Panguitch. The river flows from the north towards the south, eventually joining the Colorado River. The surrounding area is characterized by green hills and valleys.



Printed March 27, 2002

**Seng Creek LIDAR
3D View
Watershed Delineation**



**Seng Creek LIDAR
Plan View
Watershed Delineation**



Seng Creek Study Area

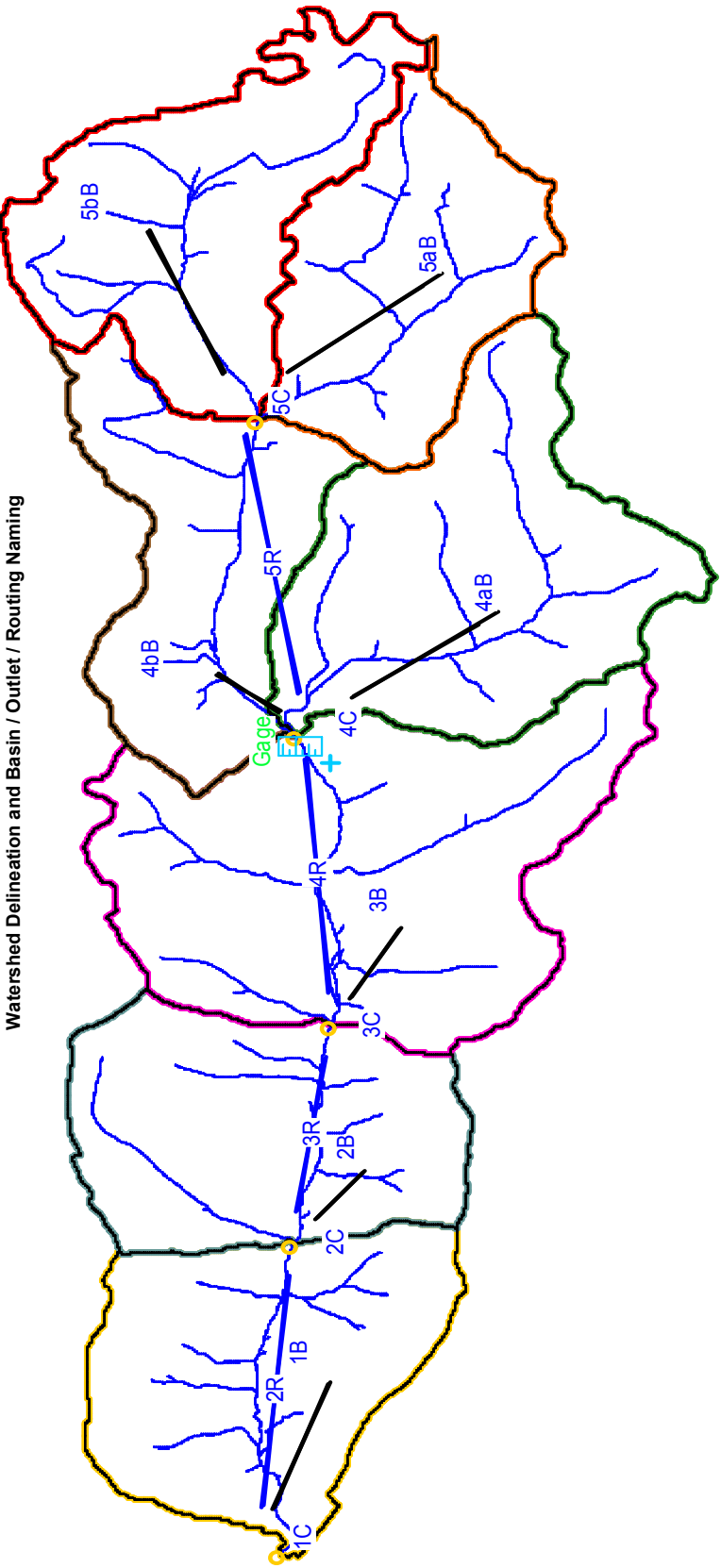


Legend

-  Seng Creek Watershed Boundaries



Seng Creek	Scenario 1				Scenario 2				Scenario 3				Scenario 4				Scenario 5			
	With Logging (CN 70 & 73)				Without Logging (CN 70)				Without Logging (CN 70)				Without Logging (CN 70)				With Logging (CN 70 & 73)			
	Topography w Mining (CN 75 & 87)				Topography w Mining (LIDAR Data)				Reclaimed Mining (CN 70)				Pristine Topography (USGS DEM Data)				Pristine Topography (USGS DEM Data)			
Outlet Node	Event	25 yr	100 yr	14 yr	Event	25 yr	100 yr	14 yr	Event	25 yr	100 yr	14 yr	Event	25 yr	100 yr	14 yr	Event	25 yr	100 yr	14 yr
1C	2595	3467	4622	4622	2451	3224	4350	4350	2379	3118	4230	4230	2457	3265	4431	4431	2609	3545	4751	4751
2C	2297	3209	4255	4255	2171	2986	4008	4008	2097	2861	3867	3867	2190	3005	4065	4065	2322	3243	4339	4339
3C	1995	2816	3722	3722	1883	2622	3507	3507	1810	2490	3359	3359	1828	2534	3418	3418	1942	2733	3641	3641
4C	1440	2155	2872	2872	1364	1991	2689	2689	1293	1864	2545	2545	1374	1941	2654	2654	1452	2112	2847	2847
5C	713	1145	1511	1511	686	1092	1452	1452	618	961	1306	1306	705	1078	1465	1465	732	1131	1524	1524



Seng Creek Hydrology Analysis

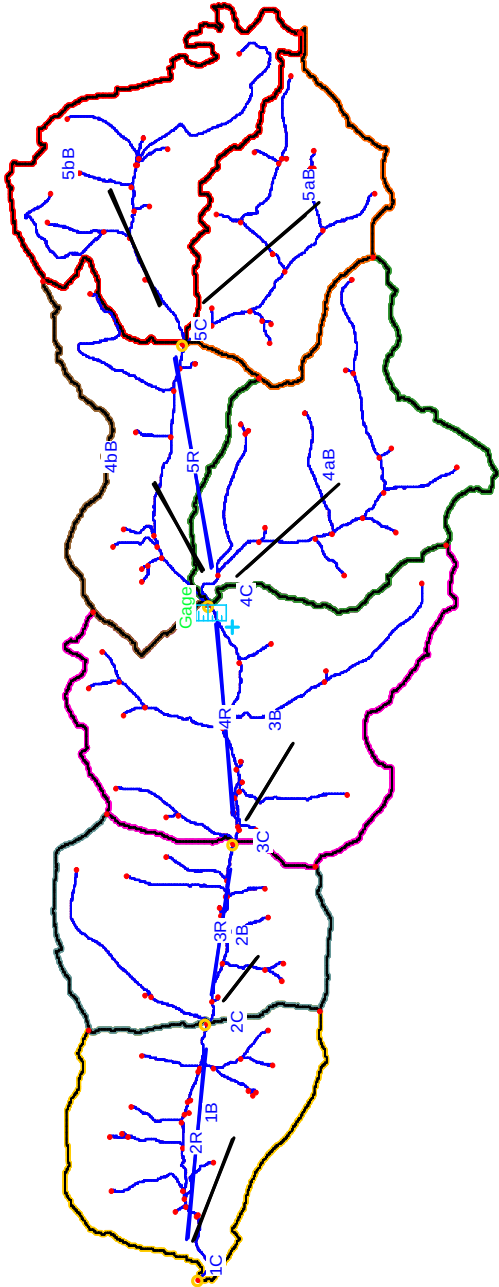
Seng Creek Watershed Hydrology Analysis			Scenario 1			Scenario 2			Scenario 3			Scenario 4			Scenario 5		
Bottom of Seng Creek at Node 1C			With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)			Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)			Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)			Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)			With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)		
Storm Event			25 Yr Storm	100 yr Storm	4622	Storm Event	25 Yr Storm	100 yr Storm	4350	Storm Event	25 Yr Storm	100 yr Storm	4230	Storm Event	25 Yr Storm	100 yr Storm	4751
Max Flow			2595	3467	4622	Storm Event	2451	3224	4350	Storm Event	2379	3118	4230	Storm Event	2609	3545	4751
Difference			216	349	392	Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 4			
% Difference			9.1%	11.2%	9.3%	72	3.0%	3.4%	2.8%	138	6.2%	4.3%	5.6%	152	6.2%	8.6%	7.2%
Logging Influence			243	272		Mining Influence				Topography Influence				Logging Influence Cross Check			
Comparison with Scenario 2			144	243	272	Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 4			
Difference			5.9%	7.5%	6.3%	-6	-0.2%	-1.3%	-1.9%	-78	-4.7%	-201	-3.3%	-147	-4.8%	-201	-4.8%
% Difference																	
At Node 2C			Storm Event			Storm Event			Storm Event			Storm Event			Storm Event		
Max Flow			2297	3209	4255	2171	2986	4008	2097	2861	3867	2190	3005	4065	2322	3248	4339
Difference			Comparison with Scenario 3			Comparison with Scenario 1			Comparison with Scenario 4			Comparison with Scenario 1			Comparison with Scenario 4		
% Difference			200	348	388	74	125	141	107	204	190	132	243	274	132	243	274
Logging Influence			9.5%	12.2%	10.0%	3.5%	4.4%	3.6%	4.9%	6.8%	4.7%	6.0%	8.1%	6.7%	6.0%	8.1%	6.7%
Mining Influence			Comparison with Scenario 3			Comparison with Scenario 1			Comparison with Scenario 4			Comparison with Scenario 1			Comparison with Scenario 4		
Difference			126	223	247	-19	-19	-57	-93	-144	-198	-4.4%	-5.0%	-5.1%	-93	-144	-198
% Difference			5.8%	7.5%	6.2%	-0.9%	-0.6%	-1.4%	-4.4%	-5.0%	-5.1%				-4.4%	-5.0%	-5.1%
At Node 3C			Storm Event			Storm Event			Storm Event			Storm Event			Storm Event		
Max Flow			1995	2816	3722	1883	2622	3507	1810	2490	3359	1828	2534	3418	1942	2733	3641
Difference			Comparison with Scenario 3			Comparison with Scenario 1			Comparison with Scenario 4			Comparison with Scenario 1			Comparison with Scenario 4		
% Difference			185	326	363	73	132	148	167	282	304	114	199	223	114	199	223
Logging Influence			10.2%	13.1%	10.8%	4.0%	5.3%	4.4%	9.1%	11.1%	8.9%	6.2%	7.9%	6.5%	6.2%	7.9%	6.5%
Mining Influence			Comparison with Scenario 3			Comparison with Scenario 1			Comparison with Scenario 4			Comparison with Scenario 1			Comparison with Scenario 4		
Difference			112	194	215	55	88	89	-18	-44	-59	-1.0%	-1.8%	-1.8%	-18	-44	-59
% Difference			5.9%	7.4%	6.1%	3.0%	3.5%	2.6%	-1.0%	-1.8%	-1.8%				-1.0%	-1.8%	-1.8%

Seng Creek Hydrology Analysis

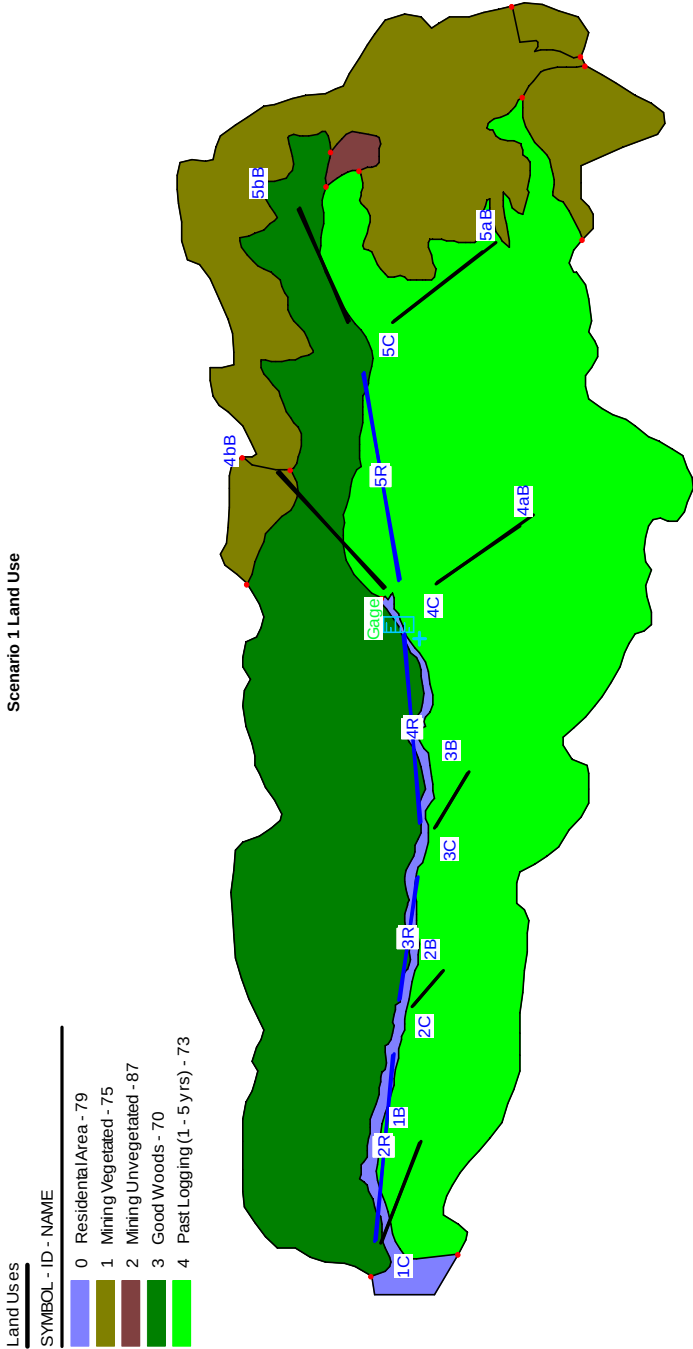
Seng Creek Watershed Hydrology Analysis		Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)			Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)			Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)			Scenario 4 Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)			Scenario 5 With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)		
at Node 4C	Storm Event	1440	2155	2872	1364	1991	2689	1293	1864	2545	1374	1941	2654	1452	2112	2847
	Max Flow															
		Comparison with Scenario 3			Comparison with Scenario 3			Comparison with Scenario 1			Comparison with Scenario 4			Comparison with Scenario 4		
	Difference	147	291	327	71	127	144	66	214	218	66	214	218	78	171	193
	% Difference	11.4%	15.6%	12.8%	5.5%	6.4%	5.7%	4.8%	11.0%	8.2%	4.8%	11.0%	8.2%	5.7%	8.8%	7.3%
		Logging Influence			Mining Influence			Topography Influence			Total Influence			Logging Influence Cross Check		
	Difference	76	164	183	-10	50	35	-81	-77	-109	-6.3%	-4.1%	-4.3%			
	% Difference	5.6%	8.2%	6.8%	-0.7%	2.6%	1.3%	-6.3%	-4.1%	-4.3%						
Downstream of Valley Fill at Node 5C		Comparison with Scenario 2			Comparison with Scenario 4			Comparison with Scenario 3			Comparison with Scenario 1			Comparison with Scenario 4		
	Storm Event	713	1145	1511	686	1092	1452	618	961	1306	705	1078	1465	732	1131	1524
	Max Flow															
		Comparison with Scenario 3			Comparison with Scenario 3			Comparison with Scenario 1			Comparison with Scenario 4			Comparison with Scenario 4		
	Difference	95	184	205	68	131	146	8	67	46	8	67	46	27	53	59
	% Difference	15.4%	19.1%	15.7%	11.0%	13.6%	11.2%	1.1%	6.2%	3.1%	1.1%	6.2%	3.1%	3.8%	4.9%	4.0%
		Logging Influence			Mining Influence			Topography Influence			Total Influence			Logging Influence Cross Check		
	Difference	27	53	59	-19	14	-13	-87	-117	-159	-14.1%	-12.2%	-12.2%			
	% Difference	3.9%	4.9%	4.1%	-2.8%	1.3%	-0.9%	-14.1%	-12.2%	-12.2%						

Seng Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)

Watershed Delineation and Basin / Outlet / Routing Naming

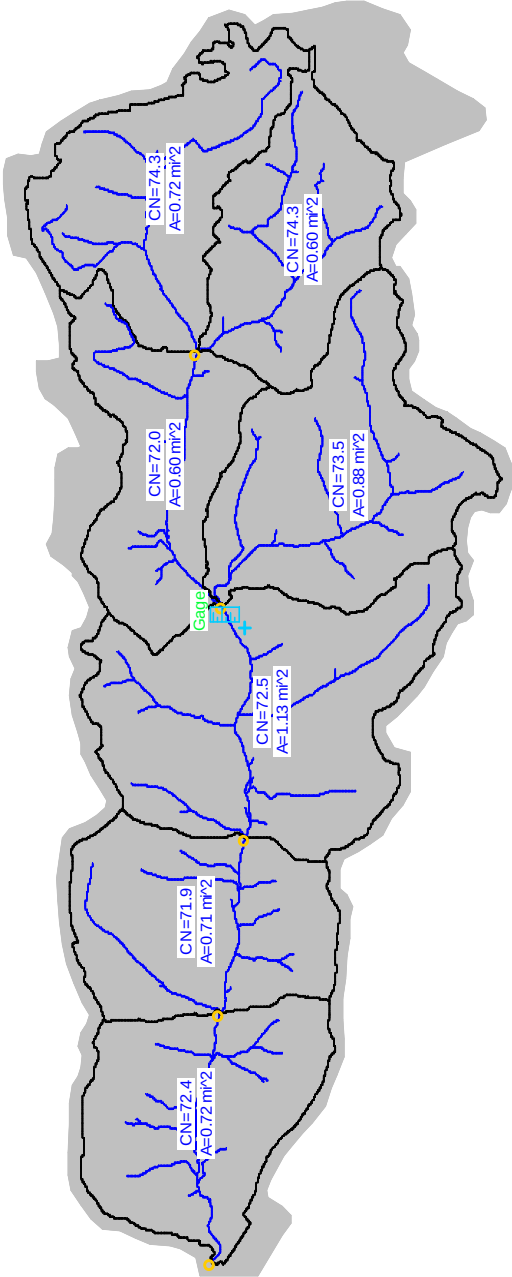


Seng Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Scenario 4 Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	Scenario 5 With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)
---	---	---	--	--	--

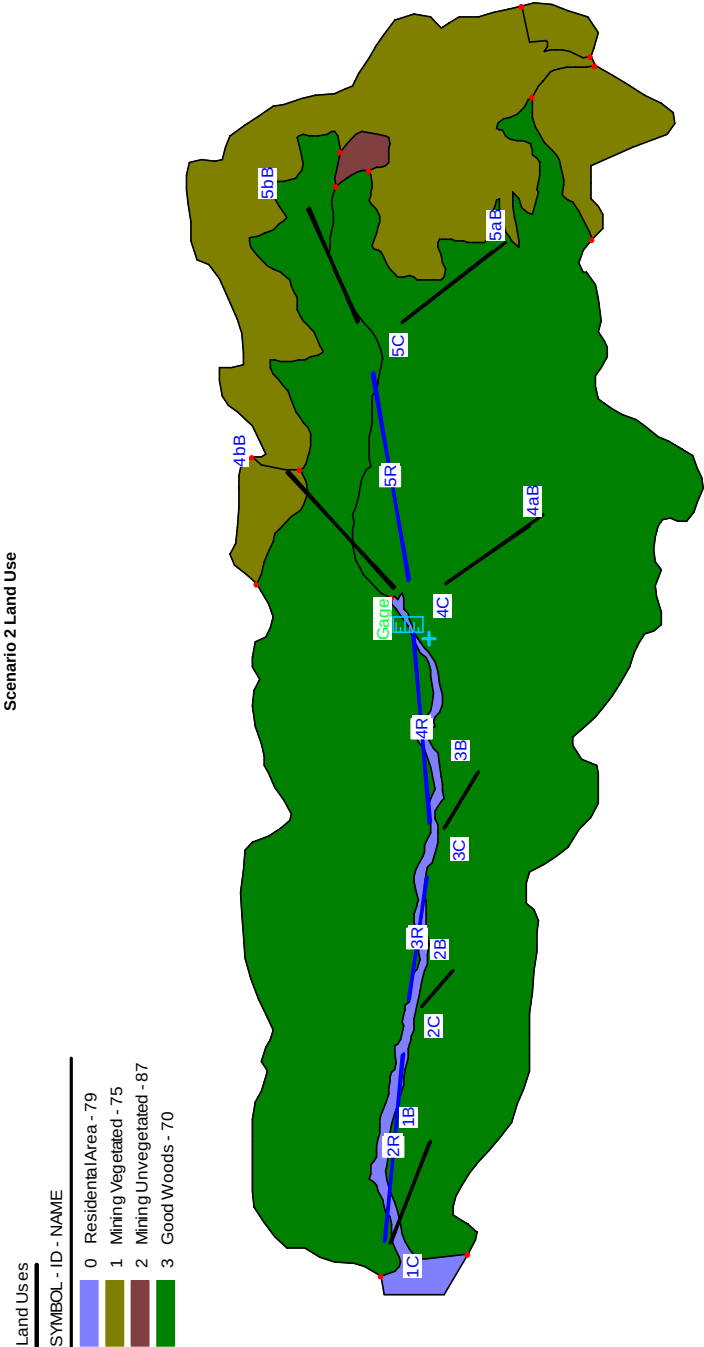


Seng Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)

Scenario 1 Watershed Boundaries
and Composite CN and Computed Areas

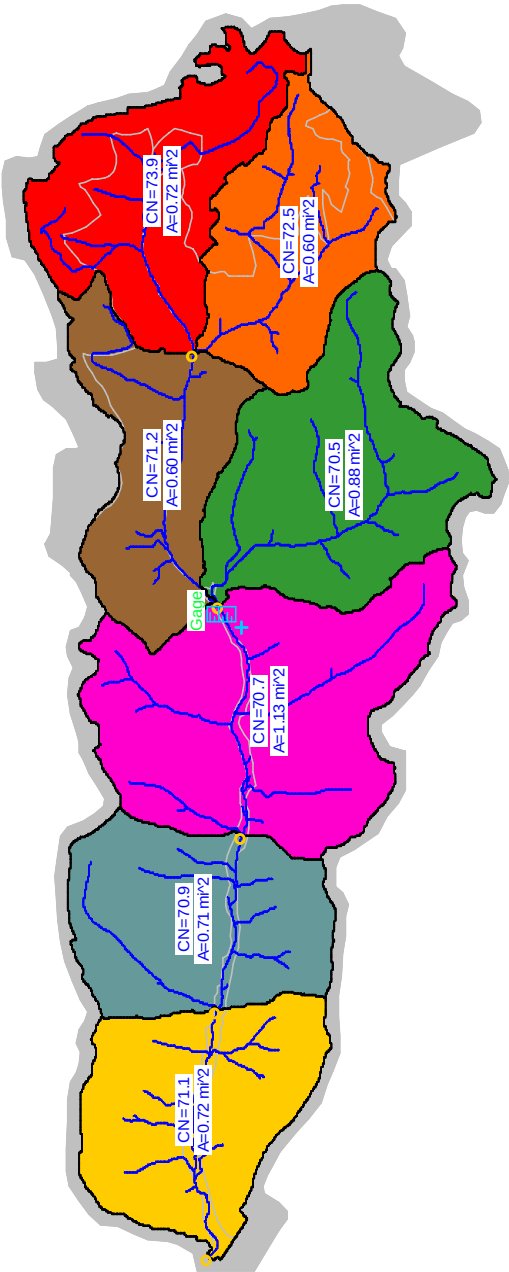


Seng Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Scenario 4 Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	Scenario 5 With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)
---	---	---	--	--	--



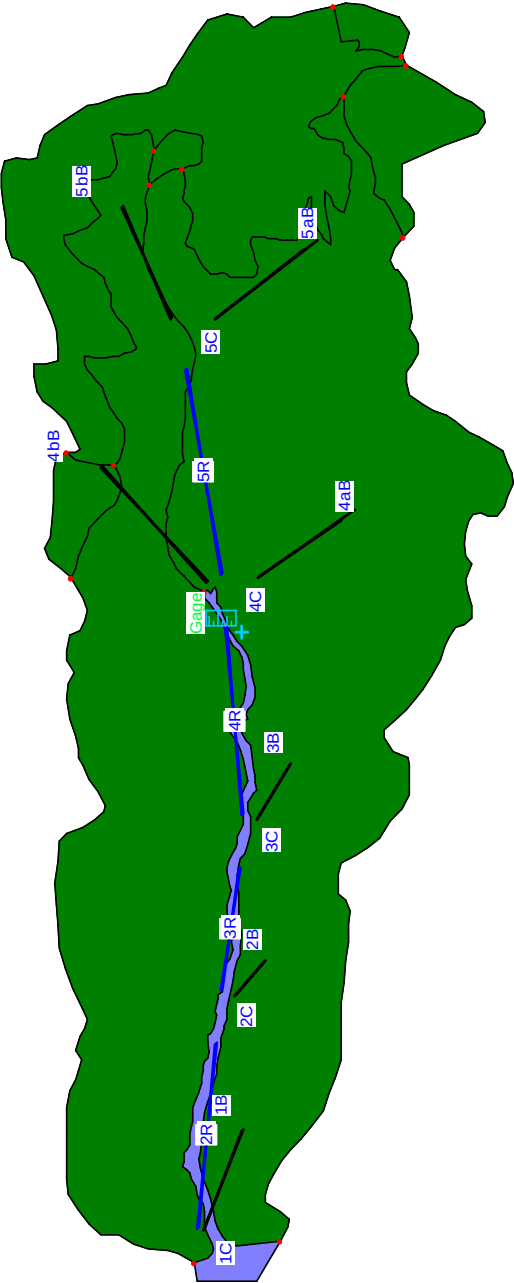
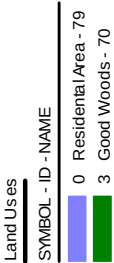
Seng Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)

Scenario 2 Watershed Boundaries
and Composite CN and Computed Areas



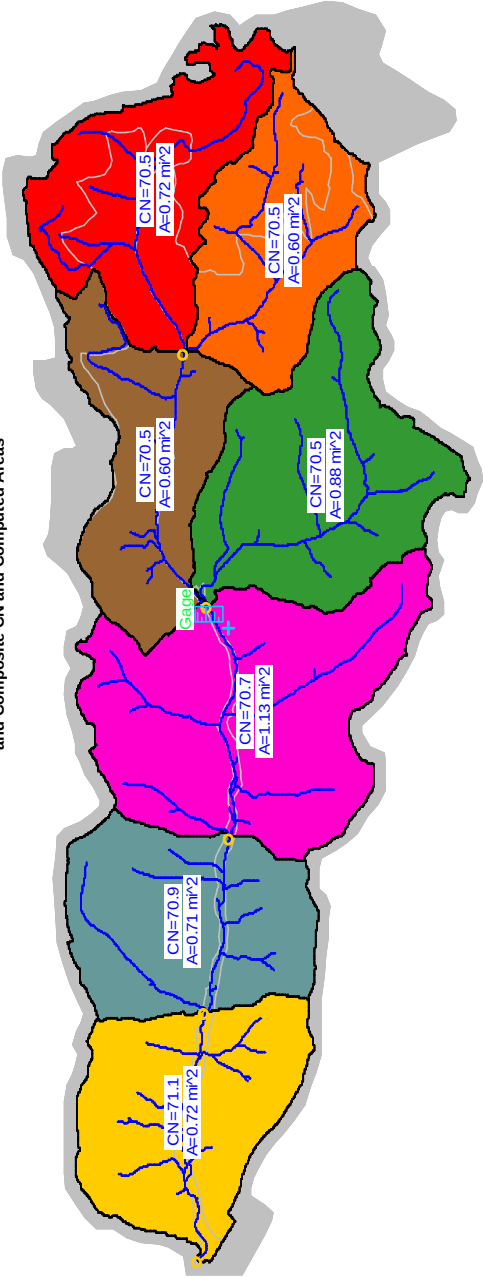
Seng Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Scenario 4 Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	Scenario 5 With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)
---	---	---	--	--	--

Scenario 3 Land Use



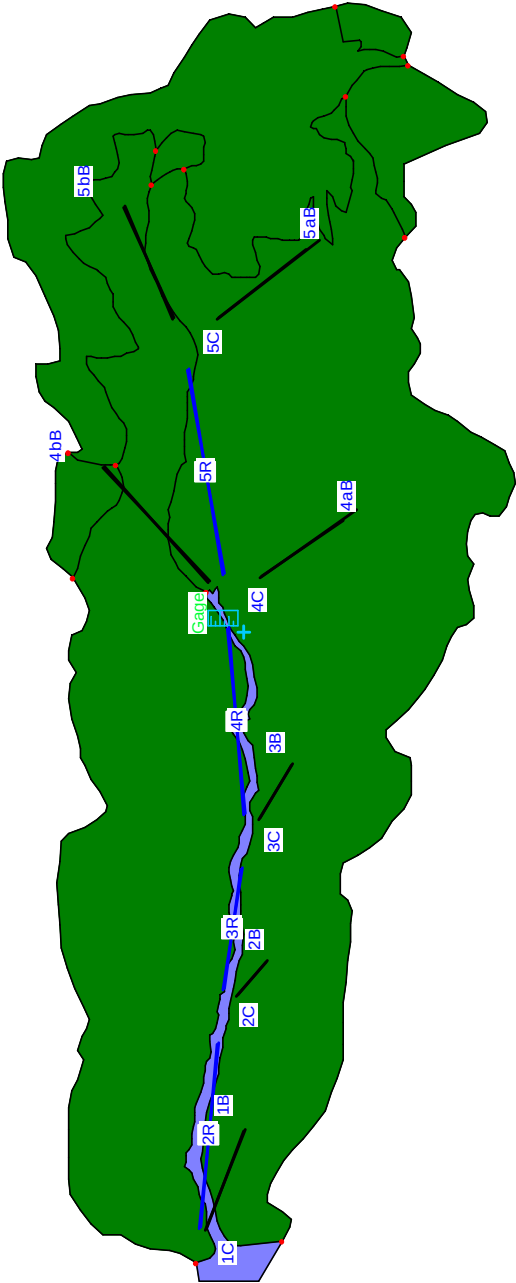
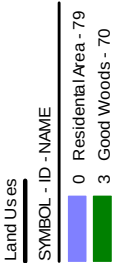
Seng Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)

Scenario 3 Watershed Boundaries
and Composite CN and Computed Areas



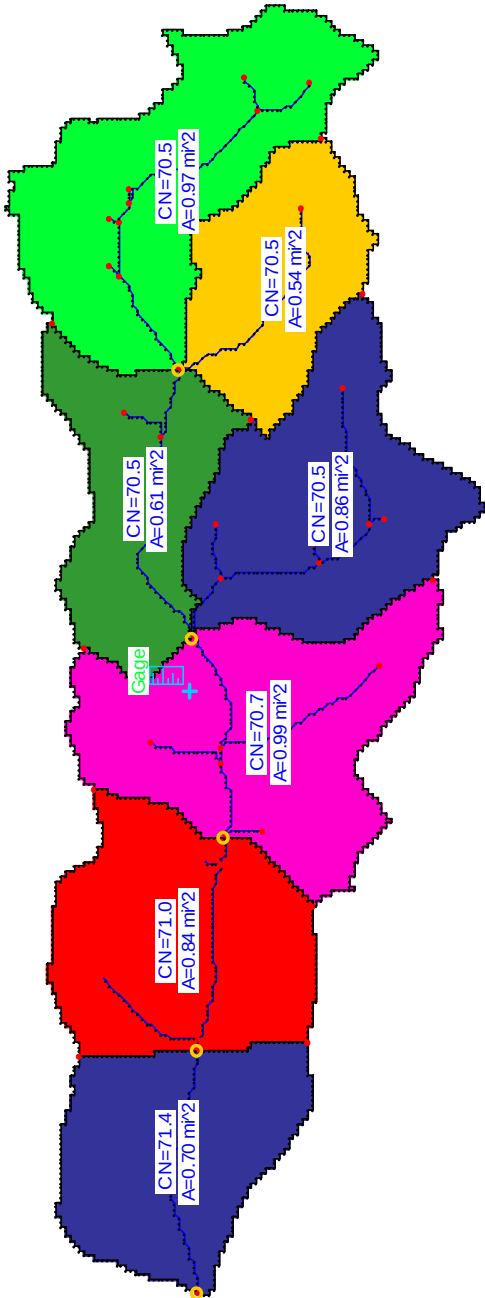
Seng Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Scenario 4 Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	Scenario 5 With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)
---	---	---	--	--	--

Scenario 4 Land Use

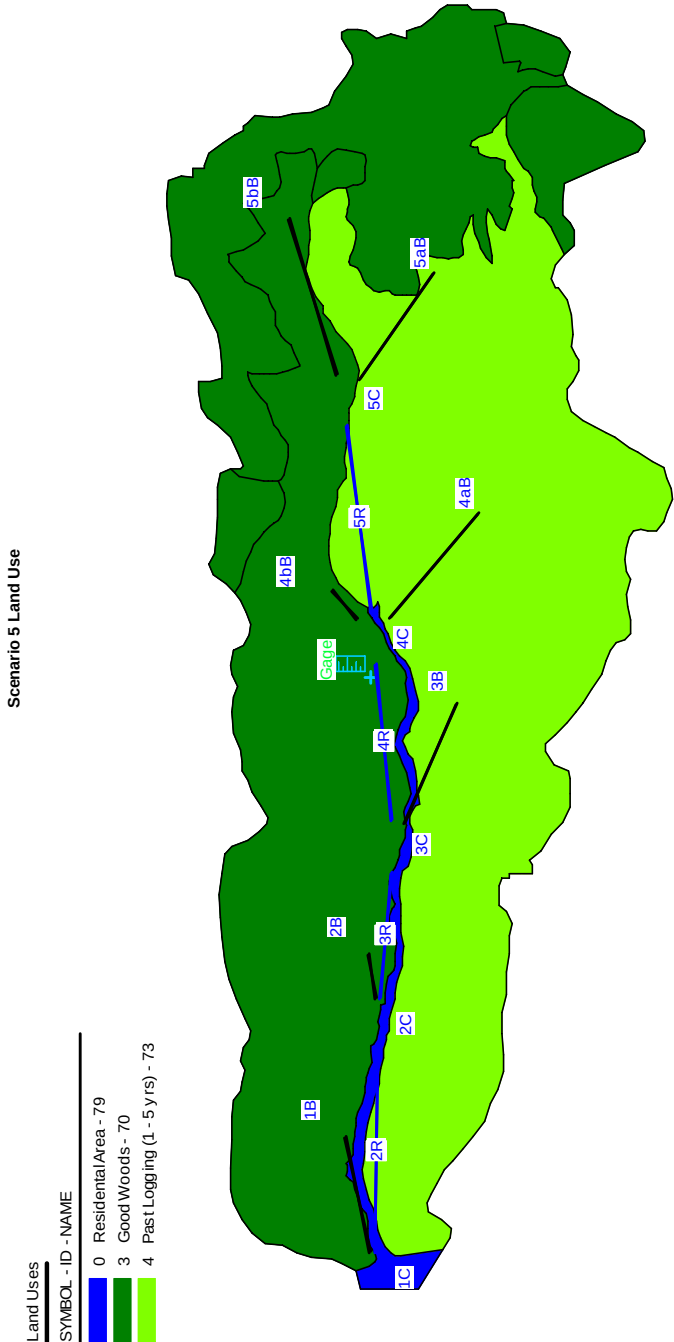


Seng Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Scenario 4 Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	Scenario 5 With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)
---	---	---	--	--	--

Scenario 4 Watershed Boundaries
and Composite CN and Computed Areas

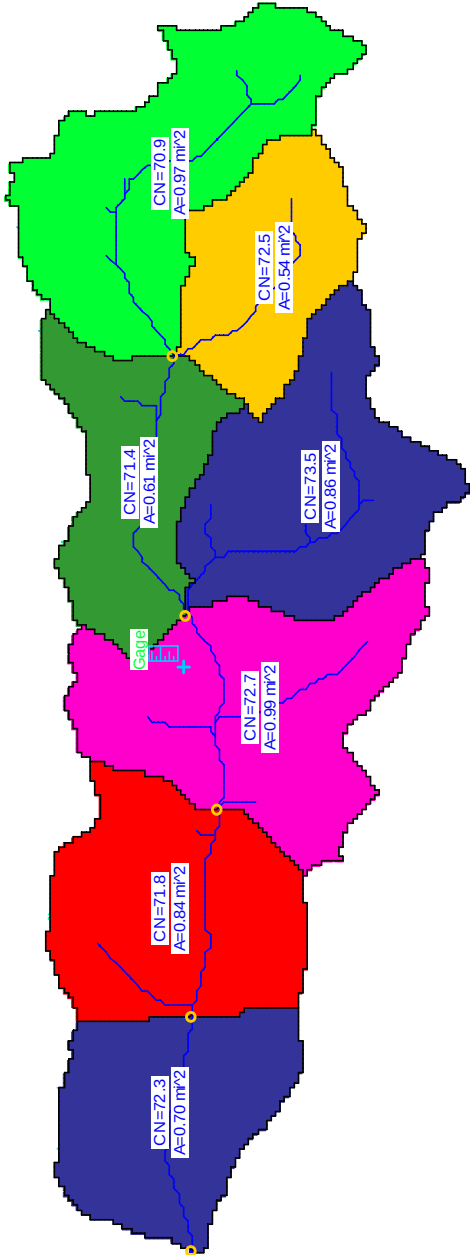


Seng Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Scenario 4 Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	Scenario 5 With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)
---	---	---	--	--	--

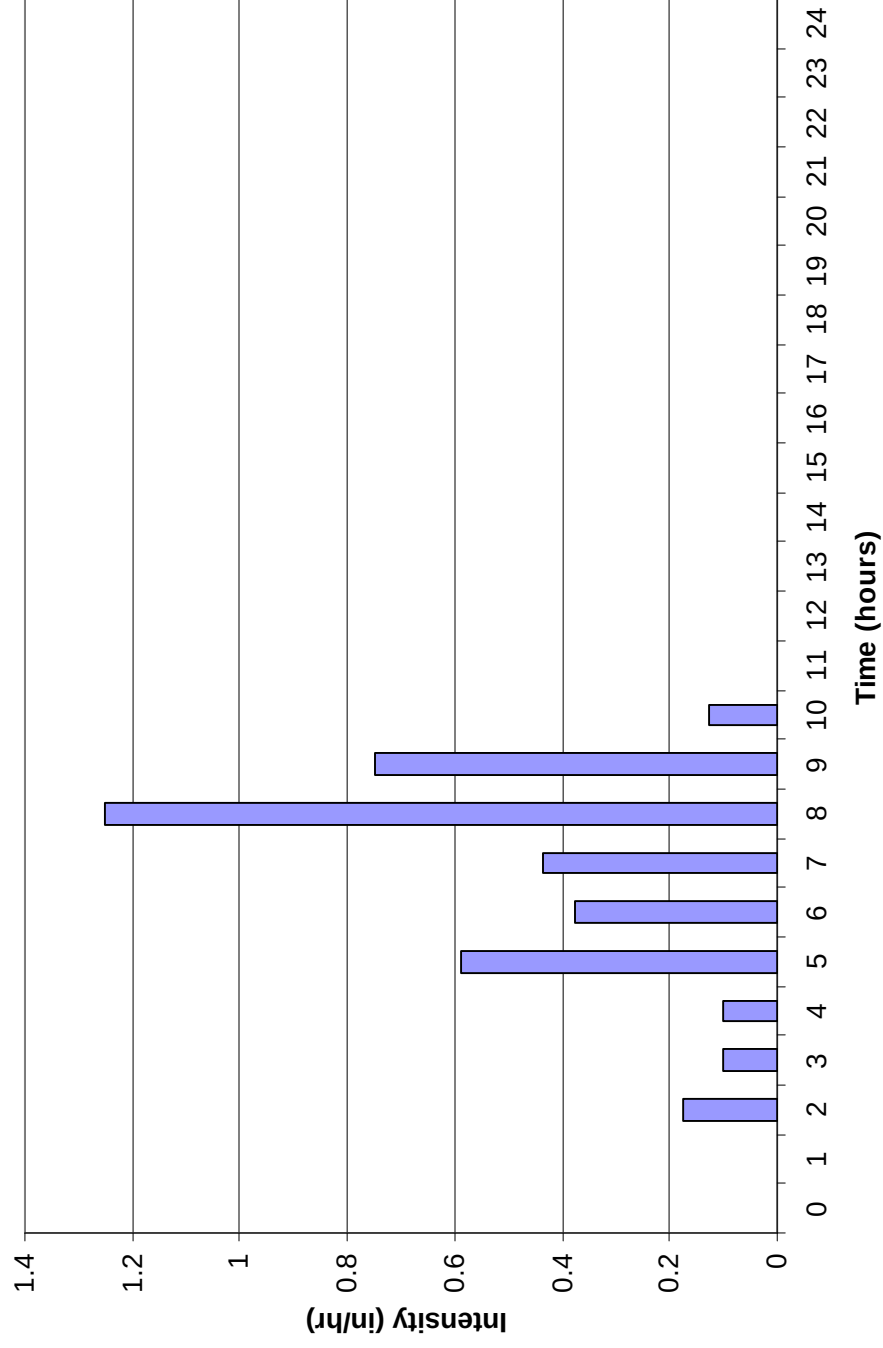


Seng Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (USGS DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (USGS DEM Data)

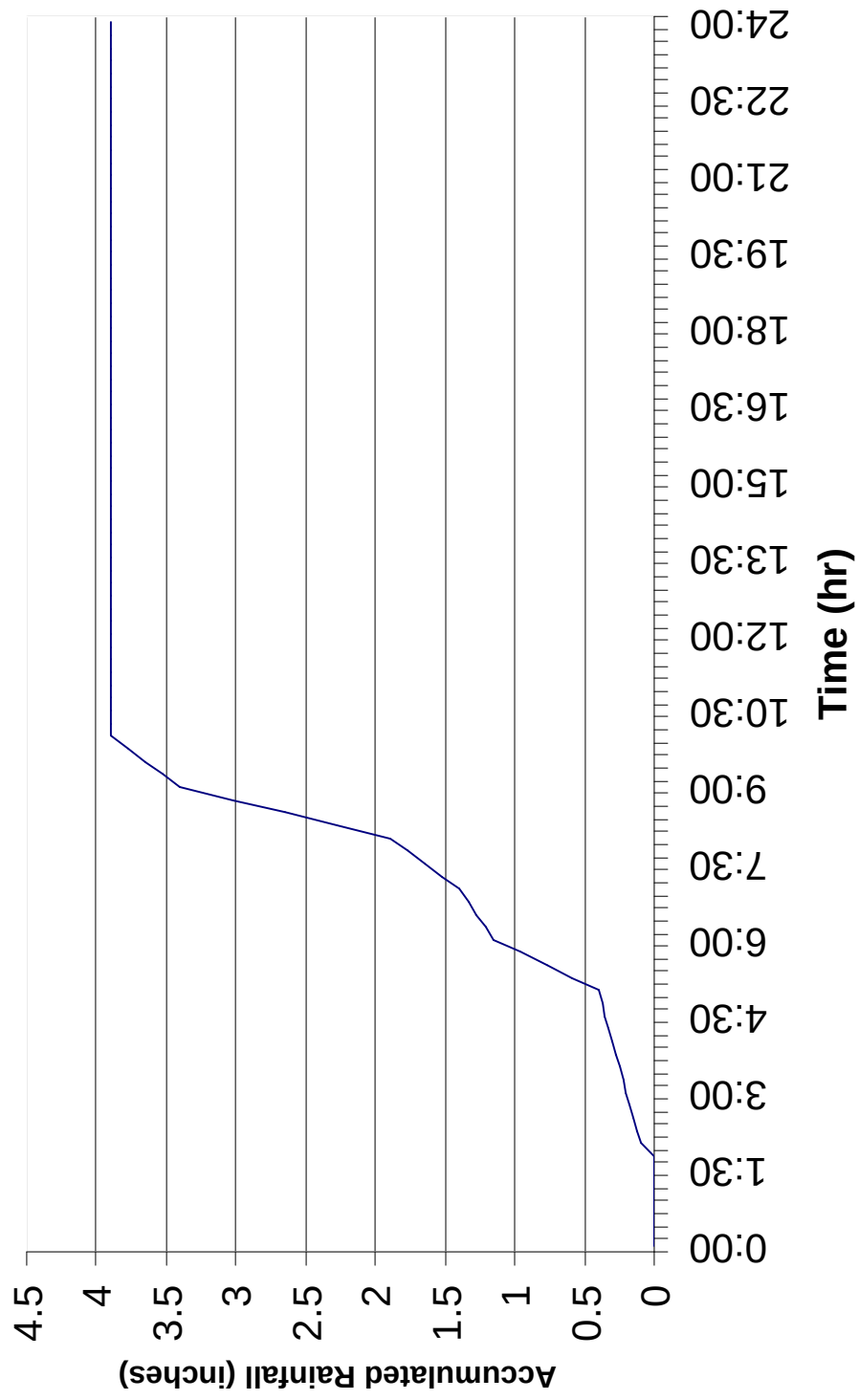
Scenario 5 Watershed Boundaries
and Composite CN and Computed Areas



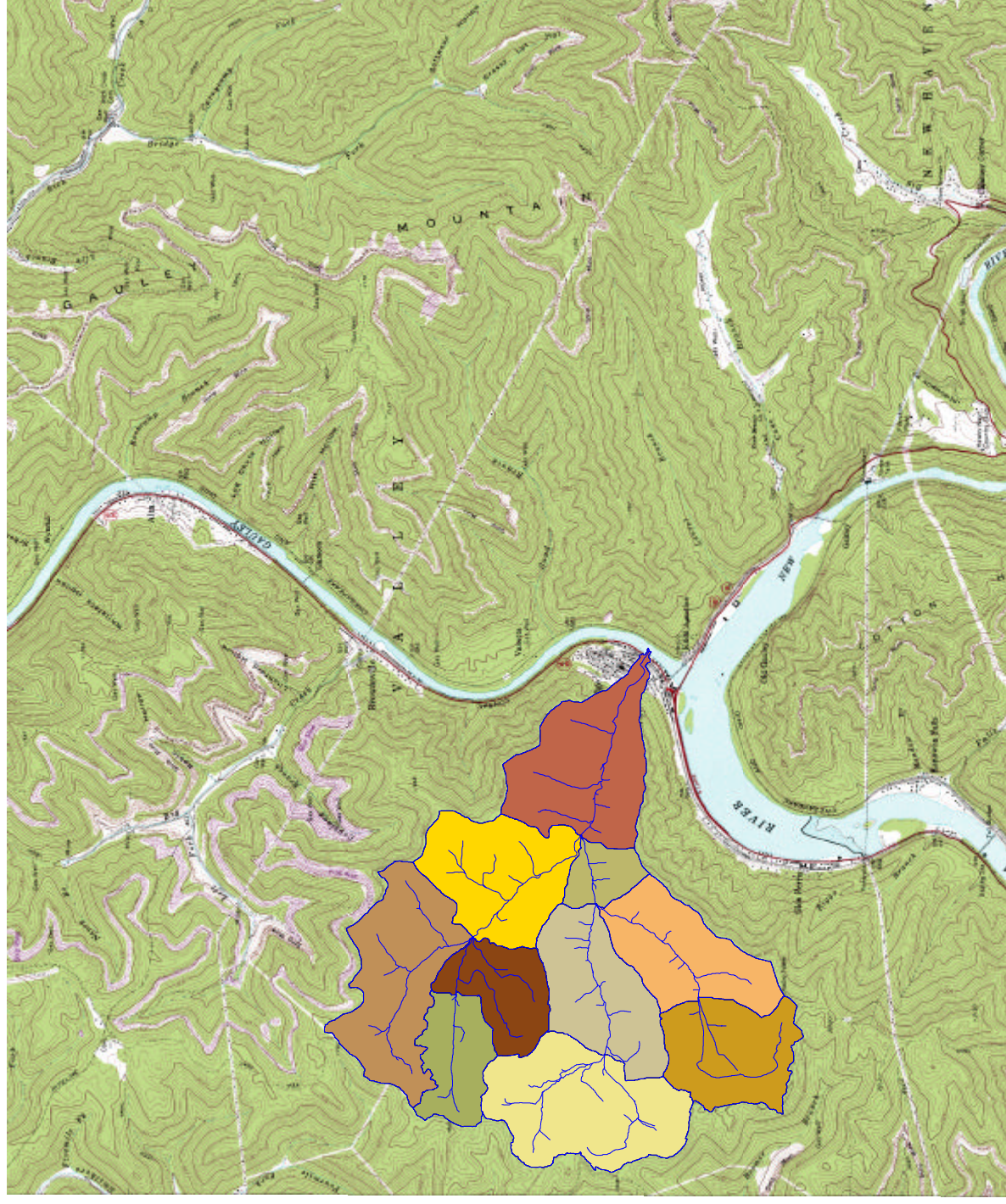
July 8, 2001 Storm Event in Seng Creek



July 8, 2001 Storm Event for Seng Creek

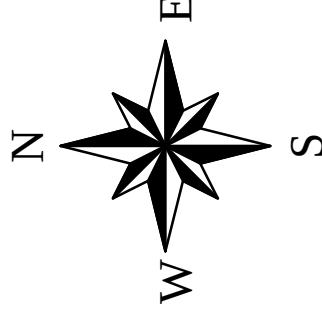
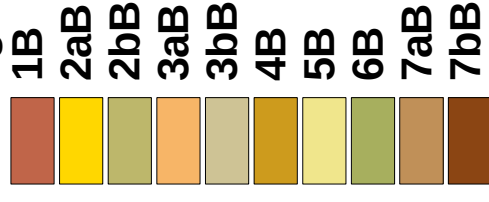


Scrabble Creek Watershed



Streams

Drainage Areas

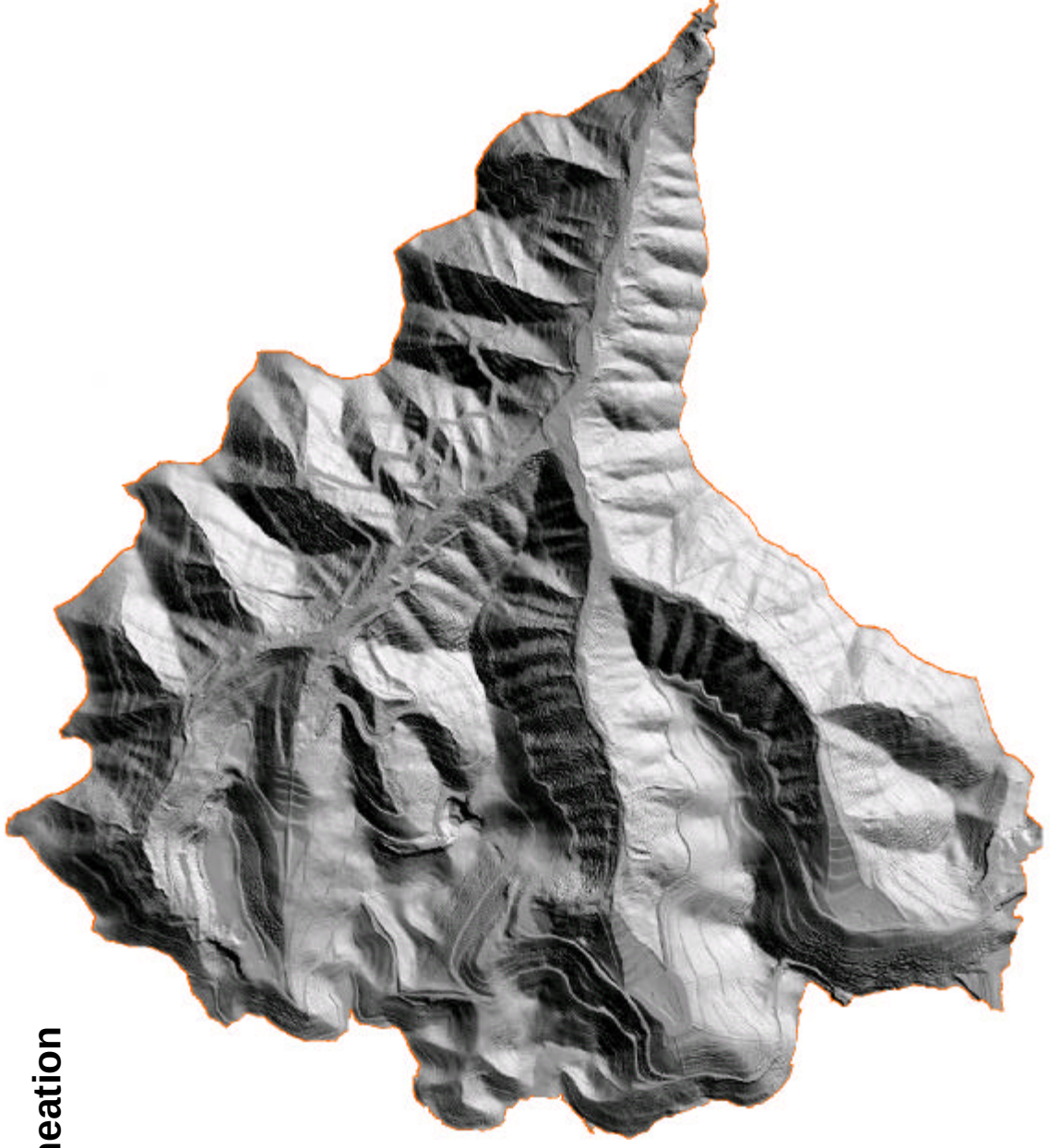


Printed March 27, 2002

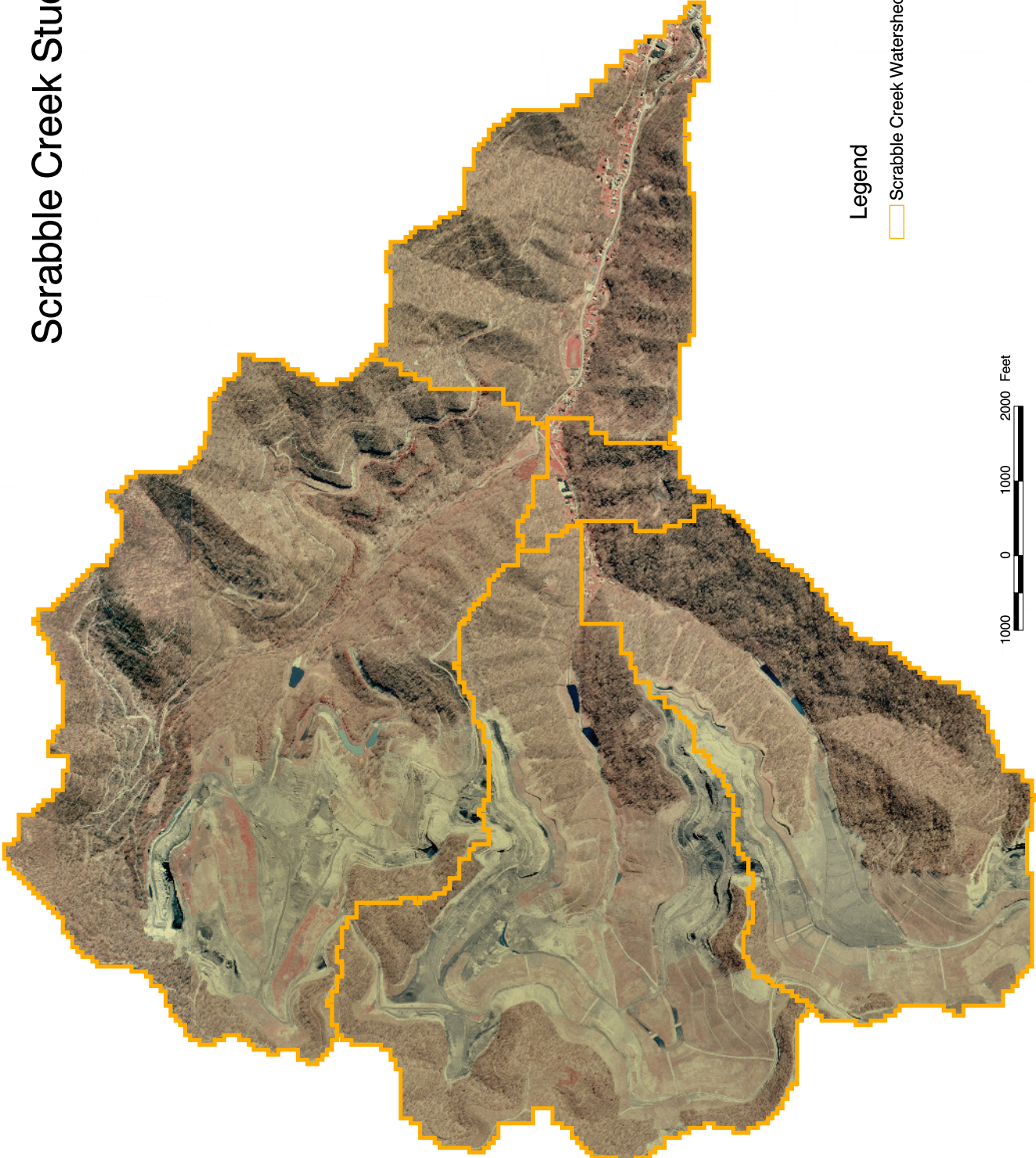
**Scrabble Creek LIDAR
3D View
Watershed Delineation**



**Scrabble Creek LIDAR
Plan View
Watershed Delineation**



Scrabble Creek Study Area



Legend

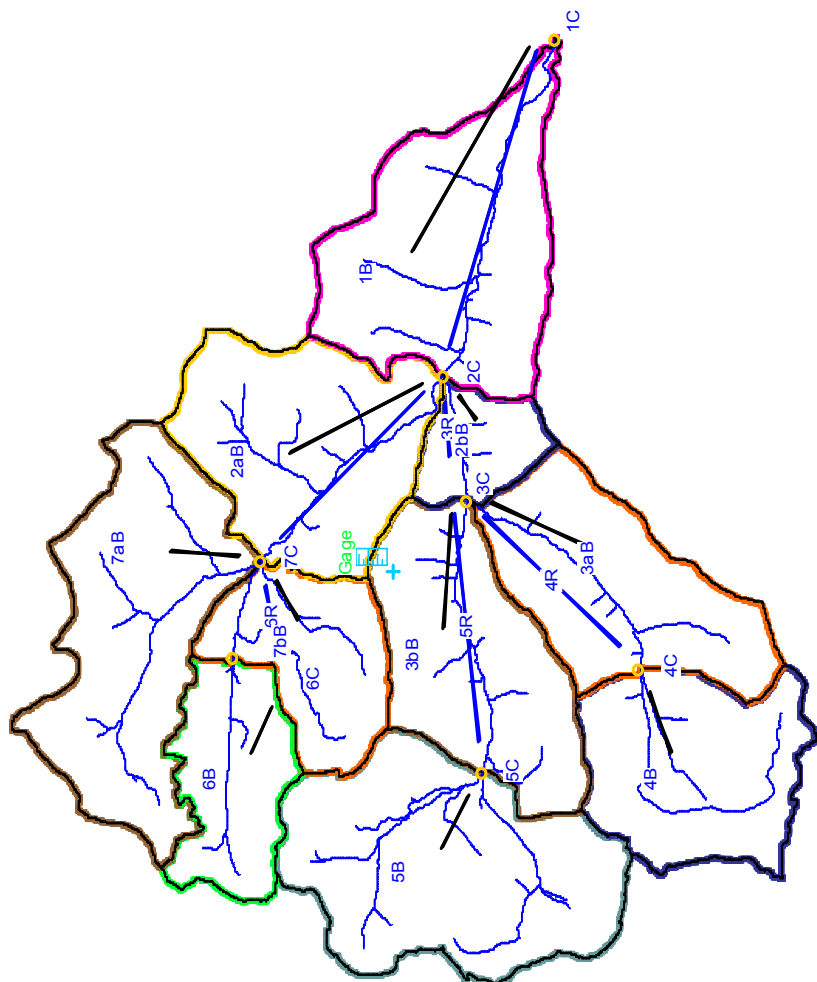
 Scrabble Creek Watershed Boundaries.



Scrabble Creek	Scenario 1				Scenario 2				Scenario 3				Scenario 4				Scenario 5			
	With Logging (CN 70 & 73)				Without Logging (CN 70)				Without Logging (CN 70)				Without Logging (CN 70)				With Logging (CN 70 & 73)			
	Topography w Mining (CN 75 & 87)				Topography w Mining (LIDAR Data)				Reclaimed Mining (CN 70)				Pristine Topography (USGS DEM Data)				Pristine Topography (USGS DEM Data)			
Outlet Node	Event	25 yr	100 yr		Event	25 yr	100 yr		Event	25 yr	100 yr		Event	25 yr	100 yr		Event	25 yr	100 yr	
1C	2045	3760	5165		1970	3595	4980		1663	2745	3879		1802	3242	4573		1877	3405	4755	
2C	1803	3621	4926		1738	3515	4808		1426	2004	2848		1533	3041	4254		1586	3143	4368	
3C	938	1886	2568		928	1867	2547		767	1320	1864		818	1634	2294		827	1654	2316	
4C	203	395	535		203	395	535		171	336	470		173	341	477		173	341	477	
5C	338	682	932		338	682	932		278	552	785		279	530	747		279	530	747	
6C	134	286	392		134	286	392		113	238	337		112	228	324		112	228	324	
7C	594	1489	2032		571	1422	1958		470	1108	1560		503	1241	1748		525	1307	1821	

14 fps

Watershed Delineation and Basin / Outlet / Routing Naming



Scrabble Creek Hydrology Analysis

Scrabble Creek Watershed Hydrology Analysis	Scenario 1				Scenario 2				Scenario 3				Scenario 4				Scenario 5			
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)				Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)				Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)				Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)				With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)			
Bottom of Scrabble Creek at Node 1C	Storm Event	25 Yr Storm	100 yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	100 yr Storm
Max Flow	2045	3760	5165	4980	1970	3595	4980	4980	1663	2745	3879	3879	1802	3242	4573	4573	1877	3405	4755	4755

Comparison with Scenario 3				Comparison with Scenario 3				Total Influence				Logging Influence Cross Check			
Difference	382	1015	1286	1101	307	850	1101	243	518	592	163	75	163	163	182
% Difference	23.0%	37.0%	33.2%	28.4%	18.5%	31.0%	28.4%	13.5%	16.0%	12.9%	4.2%	4.2%	5.0%	5.0%	4.0%

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comparison with Scenario 3				Comparison with Scenario 3				Total Influence				Logging Influence Cross Check			
Difference	1803	3621	4926	4808	1738	3515	4808	1533	3041	4254	3743	1566	3743	4368	4368

Comparison with Scenario 3				Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 4			
Difference	377	1617	2078	1960	312	1511	1960	270	580	672	102	53	102	114	114
% Difference	26.4%	80.7%	73.0%	68.8%	21.9%	75.4%	68.8%	17.6%	19.1%	15.8%	3.5%	3.5%	3.4%	2.7%	2.7%

Comparison with Scenario 2				Comparison with Scenario 4				Comparison with Scenario 3			
Difference	65	106	118	205	474	554	-107	-1037	-1406		
% Difference	3.7%	3.0%	2.5%	13.4%	15.6%	13.0%	-7.5%	-51.7%	-49.4%		

Comparison with Scenario 3				Comparison with Scenario 3				Total Influence				Logging Influence Cross Check			
Difference	938	1886	2568	2547	928	1867	2547	818	1634	2294	1654	827	1654	2378	2378

Comparison with Scenario 3				Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 4			
Difference	171	566	704	683	161	547	683	120	252	274	20	9	20	22	22
% Difference	22.3%	42.9%	37.8%	36.6%	21.0%	41.4%	36.6%	14.7%	15.4%	11.9%	1.1%	1.1%	1.2%	1.0%	1.0%

Comparison with Scenario 2				Comparison with Scenario 4				Comparison with Scenario 3			
Difference	10	19	21	253	110	233	253	-57	-314	-430	
% Difference	1.1%	1.0%	0.8%	13.4%	14.3%	11.0%		-6.6%	-23.8%	-23.1%	

Comparison with Scenario 3				Comparison with Scenario 3				Total Influence				Logging Influence Cross Check			
Difference	203	395	535	535	203	395	535	173	341	477	341	173	341	477	477

Comparison with Scenario 3				Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 4			
Difference	32	59	65	65	32	59	65	30	54	58	0	0	0	0	0
% Difference	18.7%	17.6%	13.8%	13.8%	18.7%	14.9%	13.8%	17.3%	15.8%	12.2%	0.0%	0.0%	0.0%	0.0%	0.0%

Comparison with Scenario 2				Comparison with Scenario 4				Comparison with Scenario 3			
Difference	0	0	0	30	54	58	-2	-5	-7		
% Difference	0.0%	0.0%	0.0%	17.3%	15.8%	12.2%	-1.2%	-1.5%	-1.5%		

Comparison with Scenario 2				Comparison with Scenario 4				Comparison with Scenario 3			
Difference	0	0	0	30	54	58	-2	-5	-7		
% Difference	0.0%	0.0%	0.0%	17.3%	15.8%	12.2%	-1.2%	-1.5%	-1.5%		

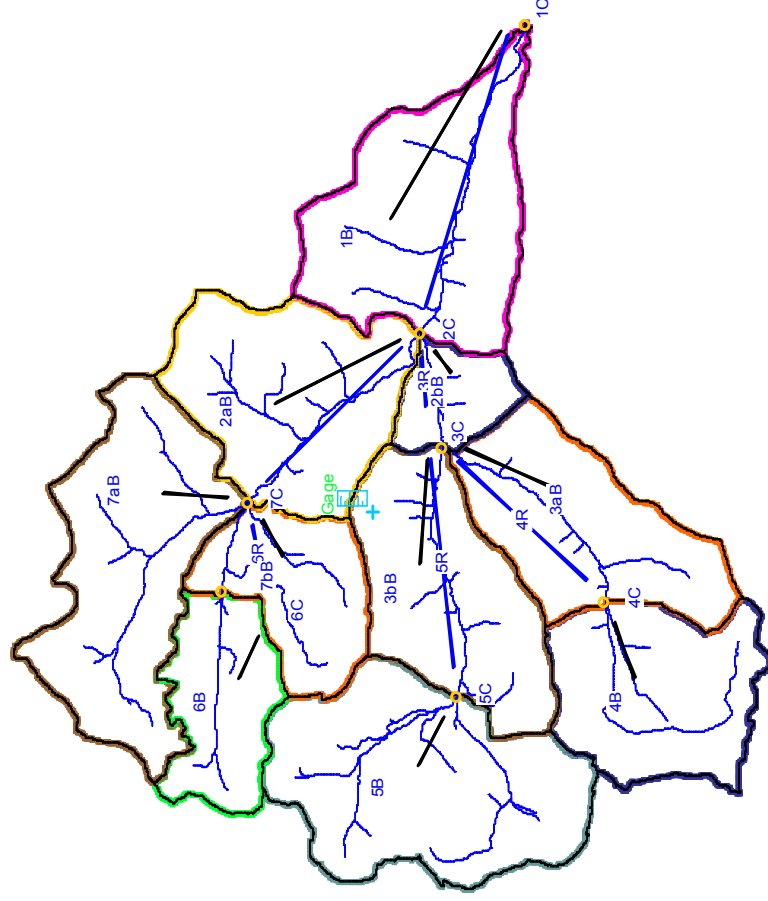
Scrabble Creek Hydrology Analysis

Scrabble Creek Watershed Hydrology Analysis	Scenario 1				Scenario 2				Scenario 3				Scenario 4				Scenario 5			
	With Logging (CN 70 & 73) Topography w Mining (LIDAR Data)				Without Logging (CN 70) Topography w Mining (LIDAR Data)				Without Logging (CN 70) Topography w Mining (LIDAR Data)				Without Logging (CN 70) Pristine Topography (10m DEM Data)				With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)			
Downstream of Valley Fill at Node 5C	Storm Event	25 Yr Storm	100 yr Storm	932	Storm Event	25 Yr Storm	100 yr Storm	682	Storm Event	25 Yr Storm	100 yr Storm	932	Storm Event	25 Yr Storm	100 yr Storm	785	Storm Event	25 Yr Storm	100 yr Storm	747
Max Flow	338	682	932		338	682	932		278	552	785		279	530	747		279	530	747	
	Comparison with Scenario 3				Comparison with Scenario 3				Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 4			
Difference	60	130	147		60	130	147		60	130	147		59	152	185		0	0	0	
% Difference	21.6%	23.6%	18.7%		21.6%	23.6%	18.7%		21.6%	23.6%	18.7%		21.1%	28.7%	24.8%		0.0%	0.0%	0.0%	
	Logging Influence				Mining Influence				Mining Influence				Topography Influence				Logging Influence Cross Check			
	Comparison with Scenario 2				Comparison with Scenario 4				Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 4			
Difference	0	0	0		59	152	185		-1	22	38		-0.4%	4.2%	5.1%		0	0	0	
% Difference	0.0%	0.0%	0.0%		21.1%	28.7%	24.8%		-0.4%	4.2%	5.1%						0.0%	0.0%	0.0%	
Downstream of Valley Fill at Node 6C	Storm Event	25 Yr Storm	100 yr Storm	392	Storm Event	25 Yr Storm	100 yr Storm	286	Storm Event	25 Yr Storm	100 yr Storm	392	Storm Event	25 Yr Storm	100 yr Storm	337	Storm Event	25 Yr Storm	100 yr Storm	324
Max Flow	134	286	392		134	286	392		113	238	337		112	228	324		112	228	324	
	Comparison with Scenario 3				Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 1				Comparison with Scenario 4			
Difference	21	48	55		21	48	55		22	58	68		22	58	68		0	0	0	
% Difference	18.6%	20.2%	16.3%		18.6%	20.2%	16.3%		19.6%	25.4%	21.0%		19.6%	25.4%	21.0%		0.0%	0.0%	0.0%	
	Logging Influence				Mining Influence				Mining Influence				Topography Influence				Logging Influence Cross Check			
	Comparison with Scenario 2				Comparison with Scenario 4				Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 4			
Difference	0	0	0		22	58	68		1	10	13		1	10	13		0	0	0	
% Difference	0.0%	0.0%	0.0%		19.6%	25.4%	21.0%		0.9%	4.4%	4.0%		0.9%	4.4%	4.0%		0.0%	0.0%	0.0%	
Node 7C	Storm Event	25 Yr Storm	100 yr Storm	2032	Storm Event	25 Yr Storm	100 yr Storm	1422	Storm Event	25 Yr Storm	100 yr Storm	1560	Storm Event	25 Yr Storm	100 yr Storm	1560	Storm Event	25 Yr Storm	100 yr Storm	1821
Max Flow	594	1489	2032		571	1422	1958		470	1108	1560		503	1241	1748		525	1307	1821	
	Comparison with Scenario 3				Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 1				Comparison with Scenario 4			
Difference	124	381	472		101	314	398		91	248	284		91	248	284		22	66	73	
% Difference	26.4%	34.4%	30.3%		21.5%	28.3%	25.5%		18.1%	20.0%	16.2%		18.1%	20.0%	16.2%		4.4%	5.3%	4.2%	
	Logging Influence				Mining Influence				Mining Influence				Topography Influence				Logging Influence Cross Check			
	Comparison with Scenario 2				Comparison with Scenario 4				Comparison with Scenario 3				Comparison with Scenario 1				Comparison with Scenario 4			
Difference	23	67	74		68	181	210		-33	-133	-188		-33	-133	-188		-7.0%	-12.0%	-12.1%	
% Difference	4.0%	4.7%	3.8%		13.5%	14.6%	12.0%		-7.0%	-12.0%	-12.1%		-7.0%	-12.0%	-12.1%					

Scrabble Creek Hydrology Analysis

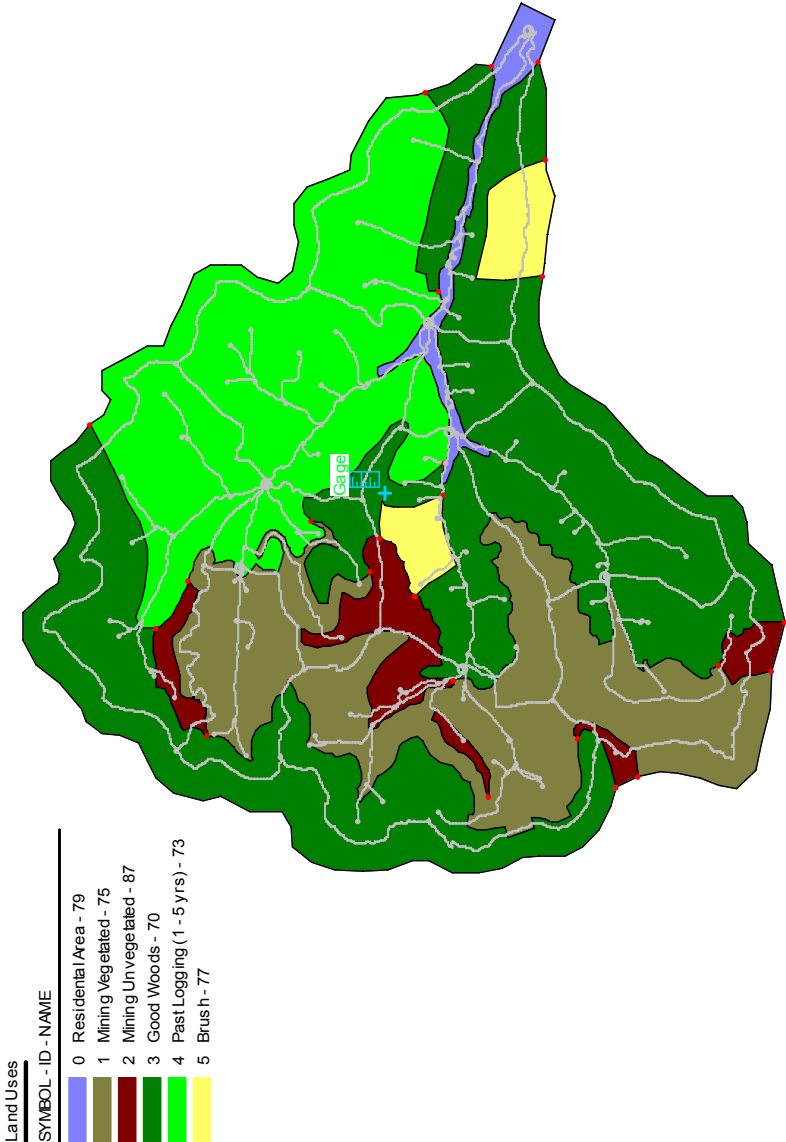
Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)

Watershed Delineation and Basin / Outlet / Routing Naming



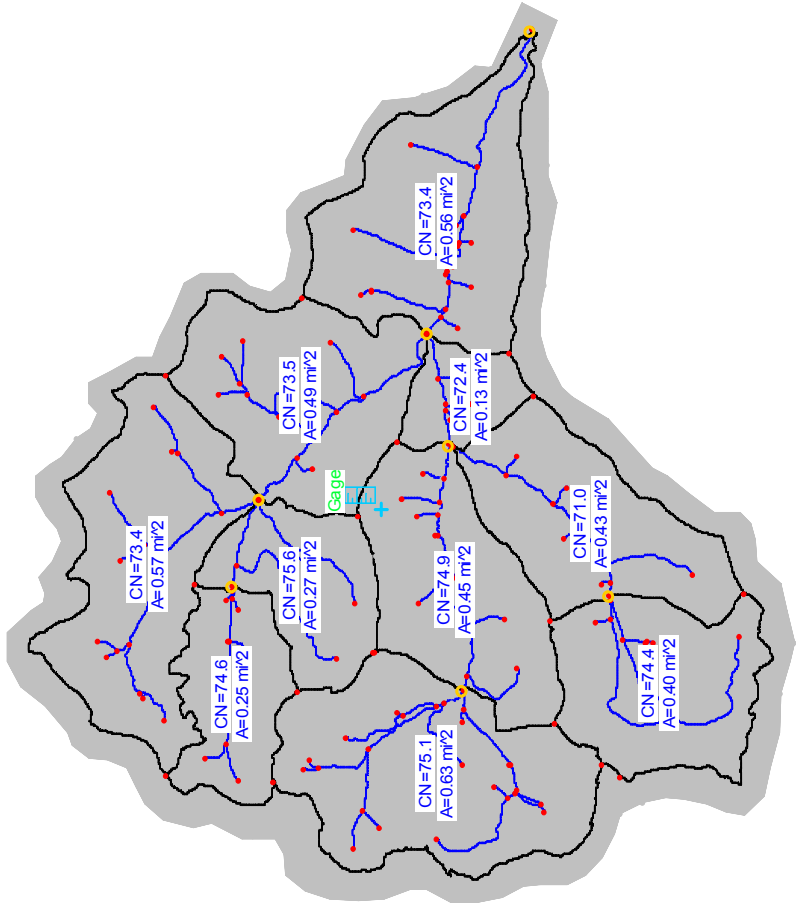
Scrabble Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)

Scenario 1 Land Use

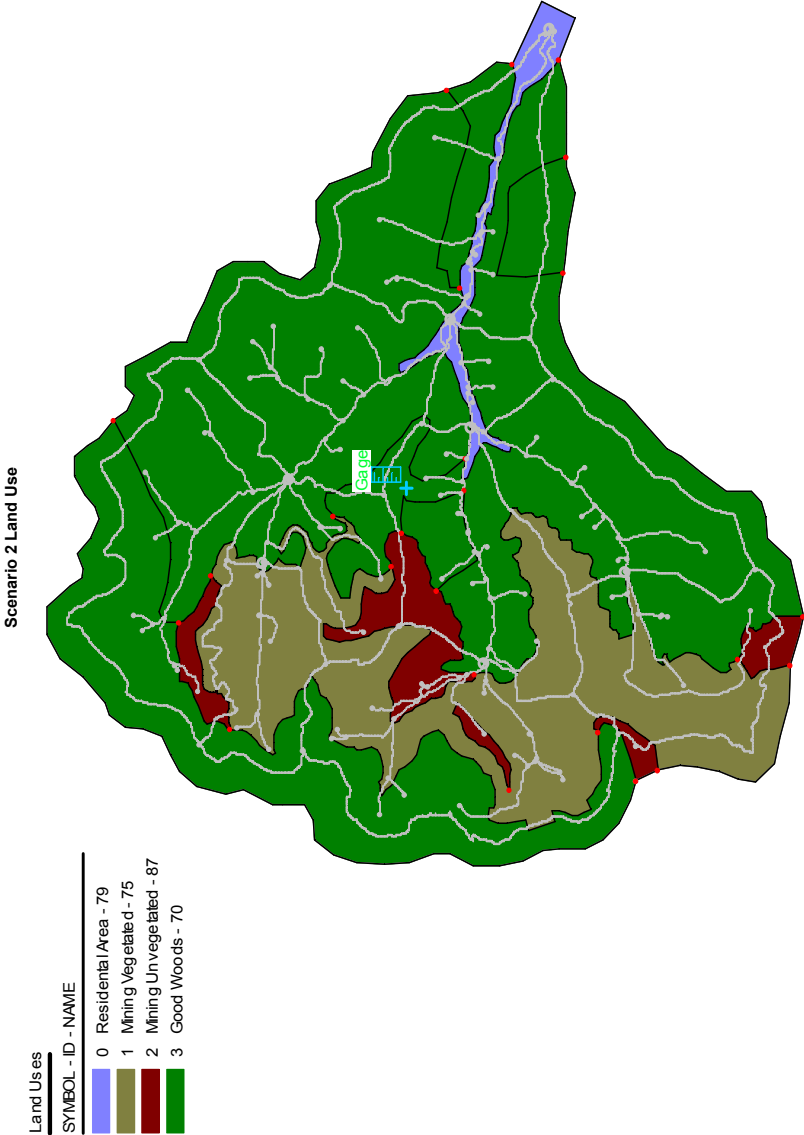


Scrabble Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)

Scenario 1 Watershed Boundaries and Composite CN and Computed Areas

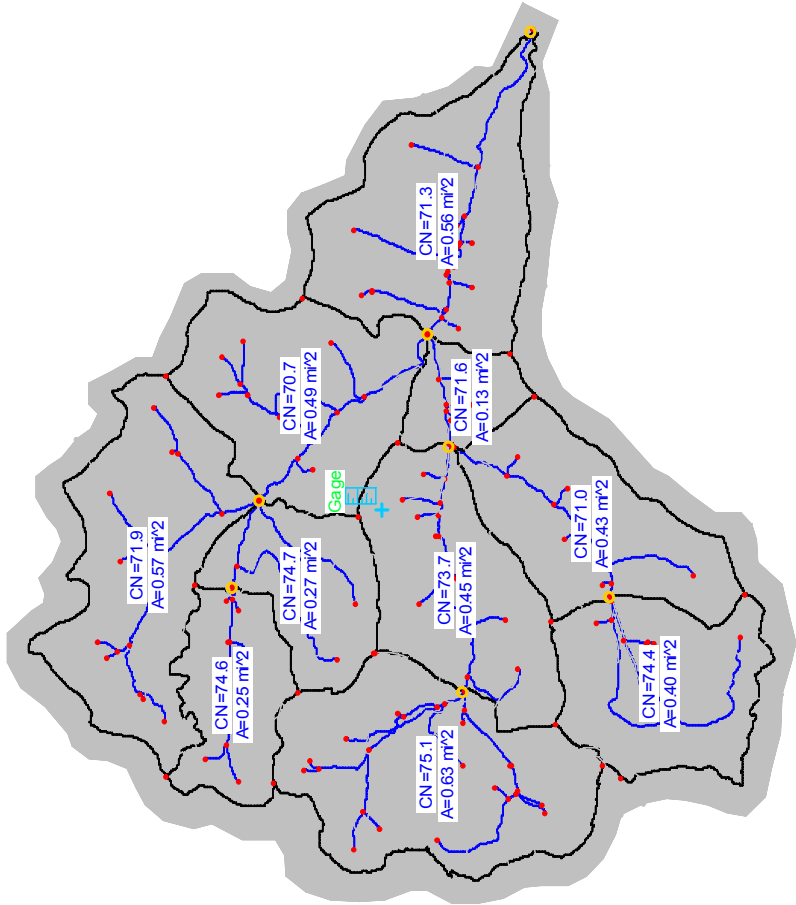


Scrabble Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)



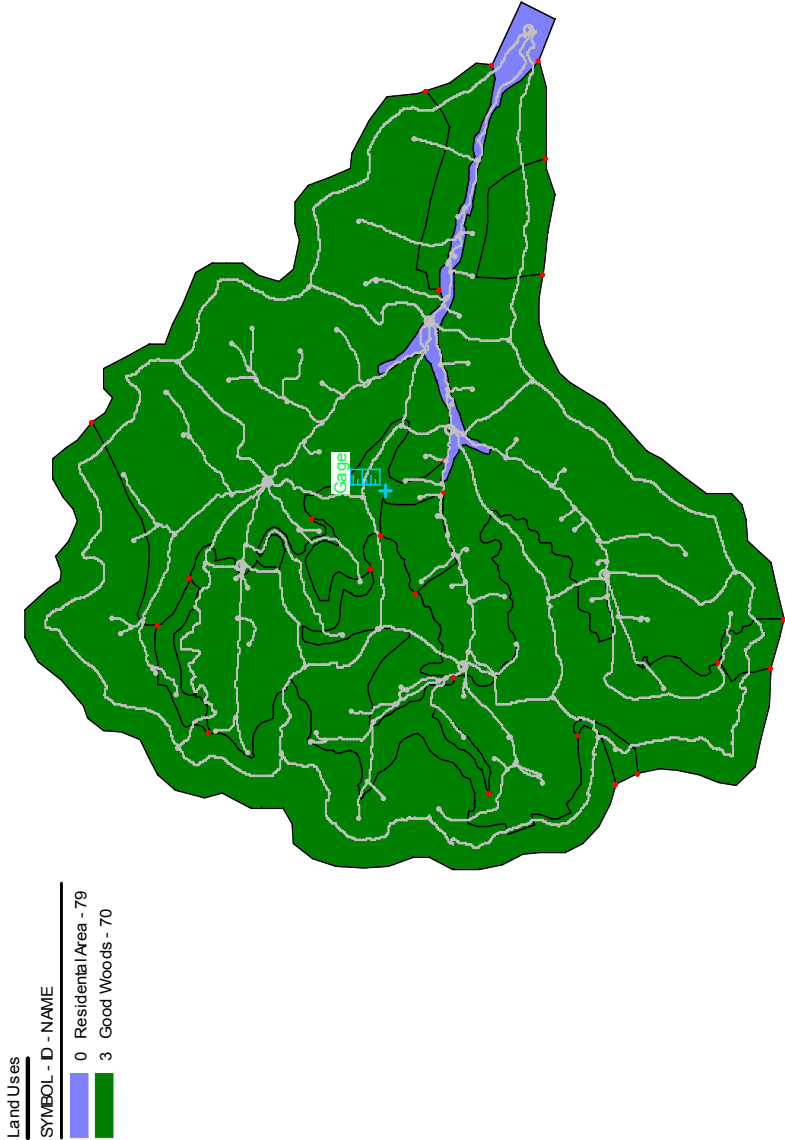
Scrabble Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)

Scenario 2 Watershed Boundaries and Composite CN and Computed Areas



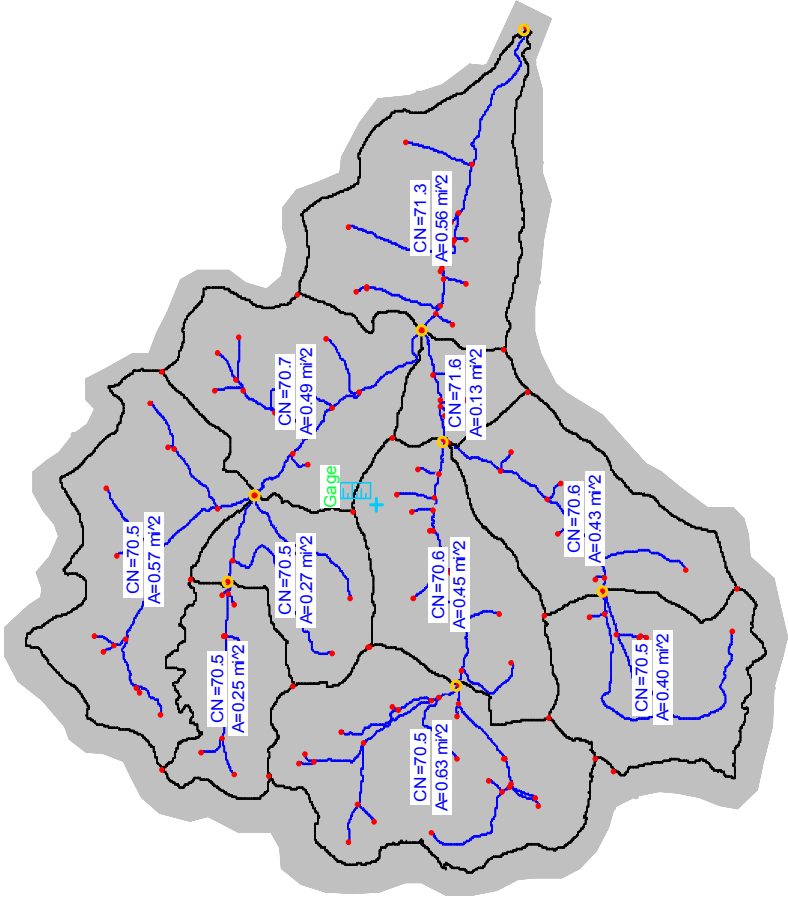
Scrabble Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)

Scenario 3 Land Use



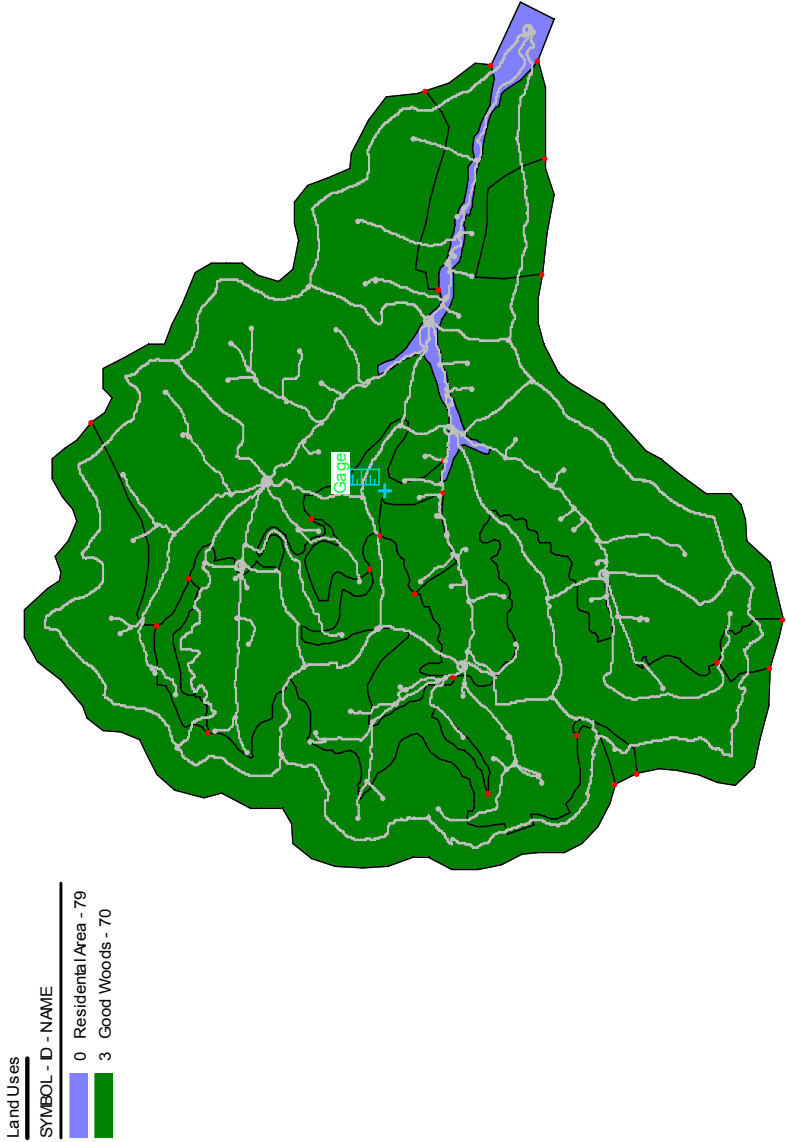
Scrabble Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Scenario 4 Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	Scenario 5 With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)
---	---	---	--	---	---

Scenario 3 Watershed Boundaries and Composite CN and Computed Areas



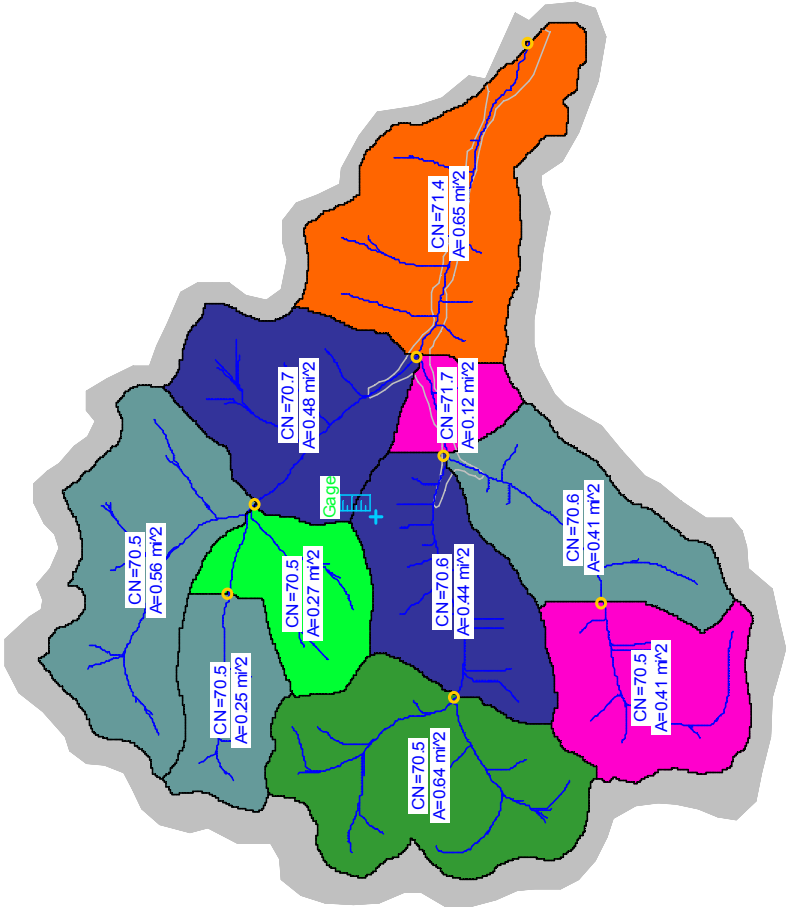
Scrabble Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)

Scenario 4 Land Use



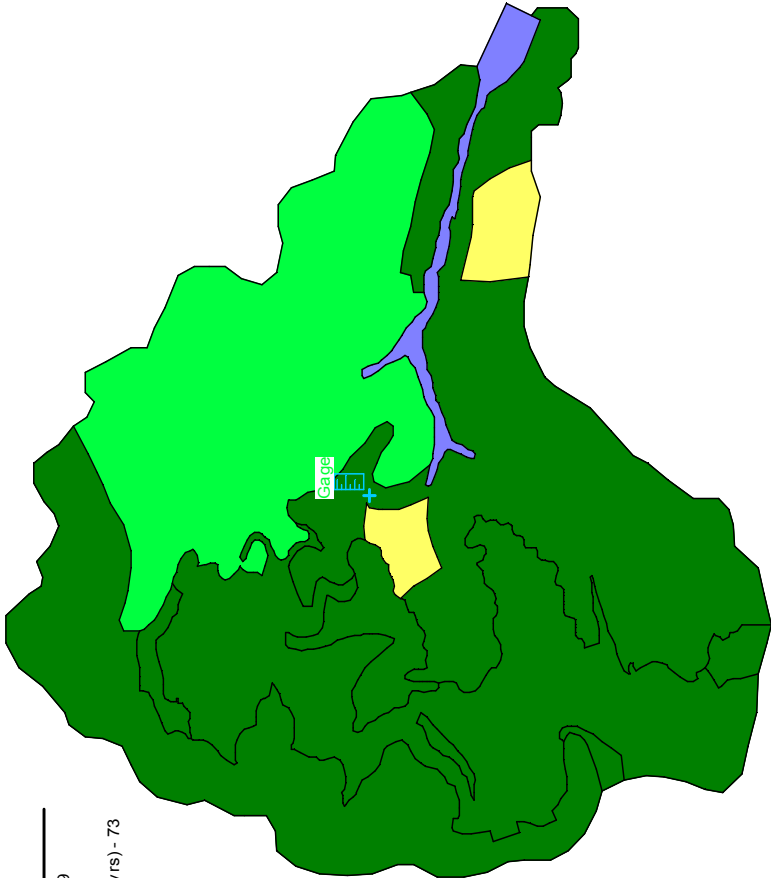
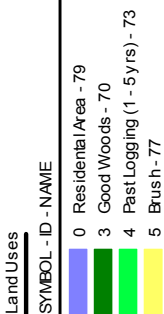
Scrabble Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Scenario 4 Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	Scenario 5 With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)
---	---	---	--	---	---

Scenario 4 Watershed Boundaries
and Composite CN and Computed Areas



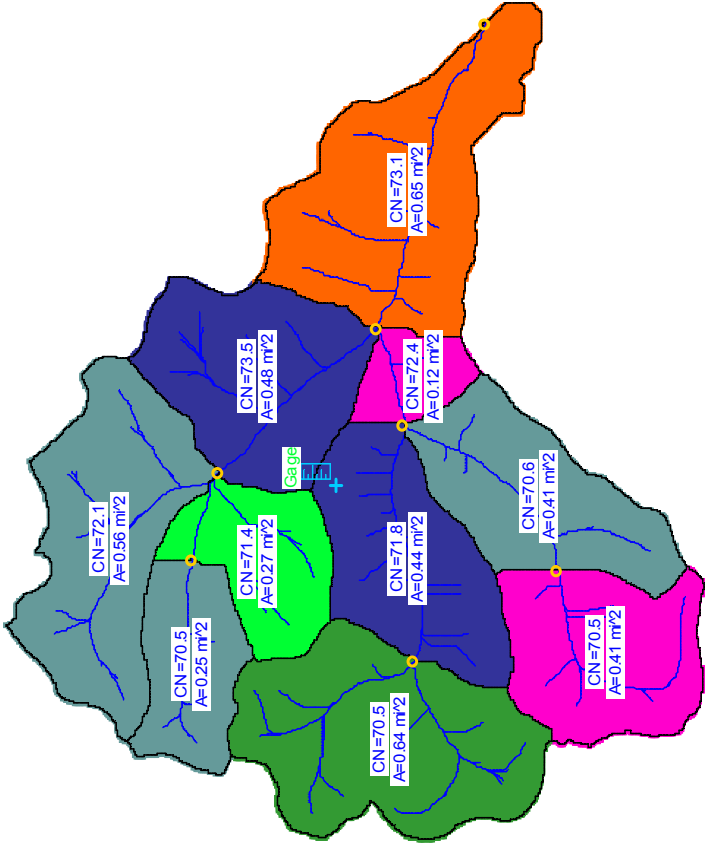
Scrabble Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)

Scenario 5 Land Use

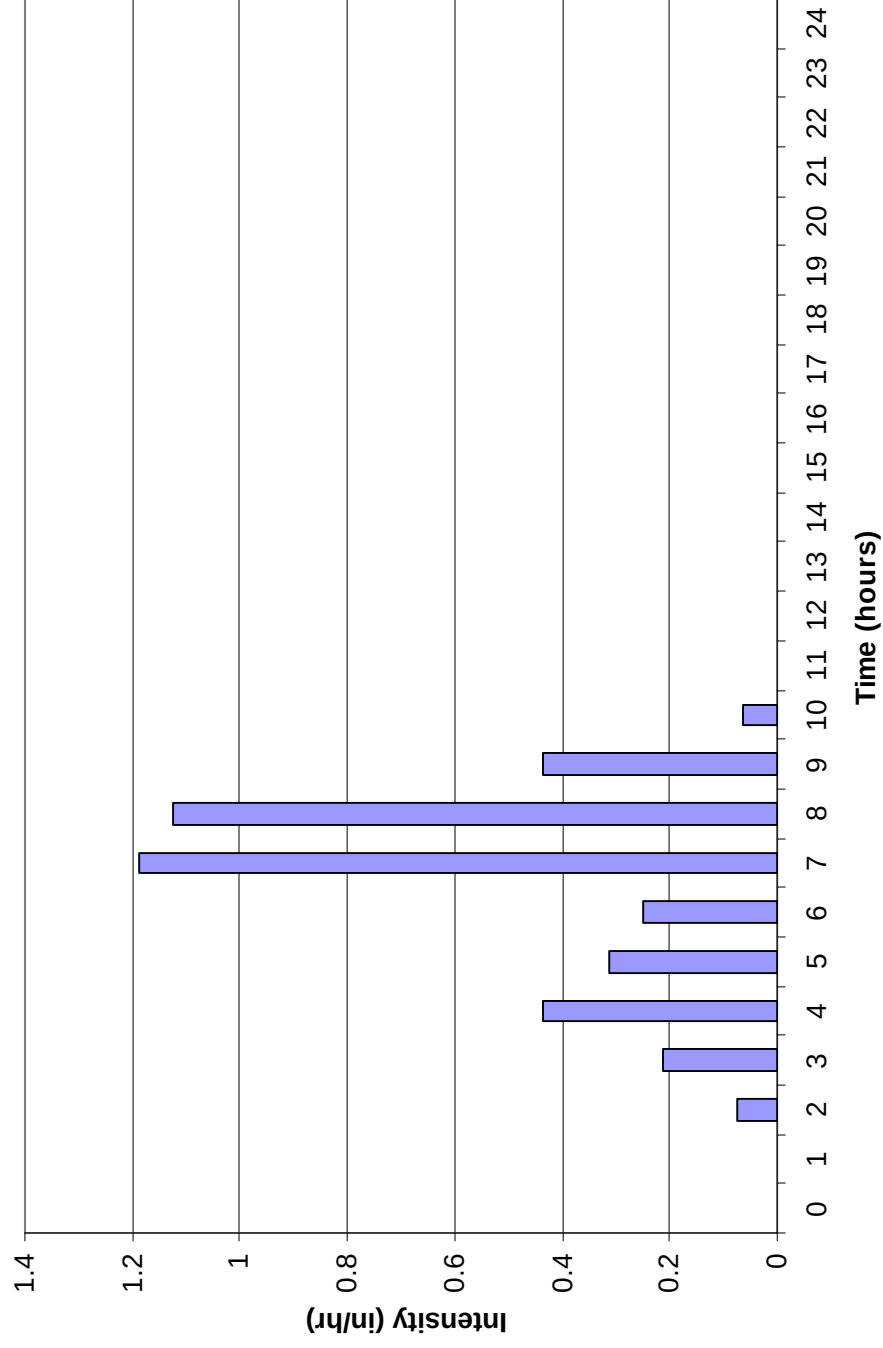


Scrabble Creek Watershed Hydrology Analysis	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography w Mining (LIDAR Data)	Without Logging (CN 70) Without Mining (CN 70) Pristine Topography (10m DEM Data)	With Logging (CN 70 & 73) Without Mining (CN 70) Pristine Topography (10m DEM Data)

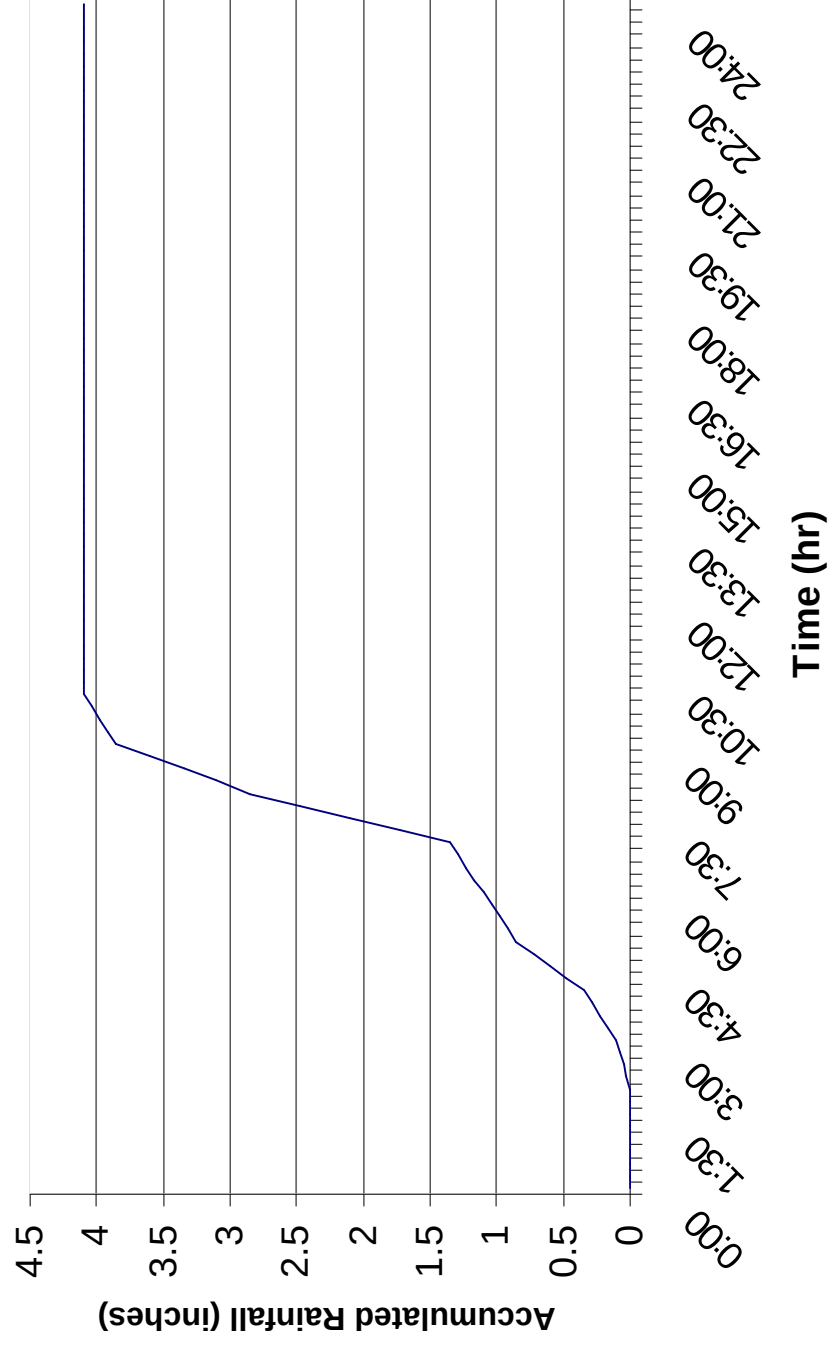
Scenario 5 Watershed Boundaries
and Composite CN and Computed Areas



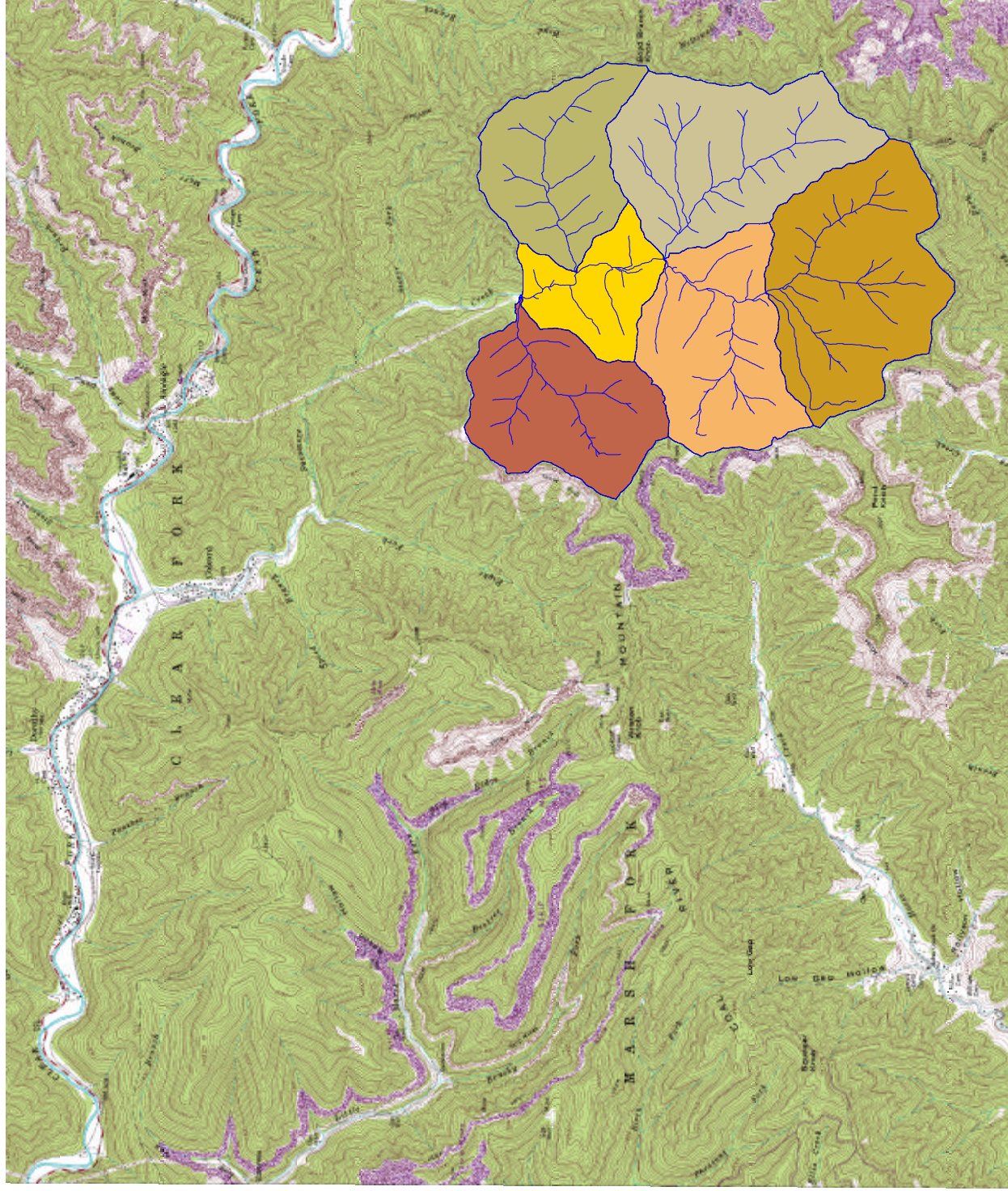
July 8, 2001 Storm Event in Scrabble Creek



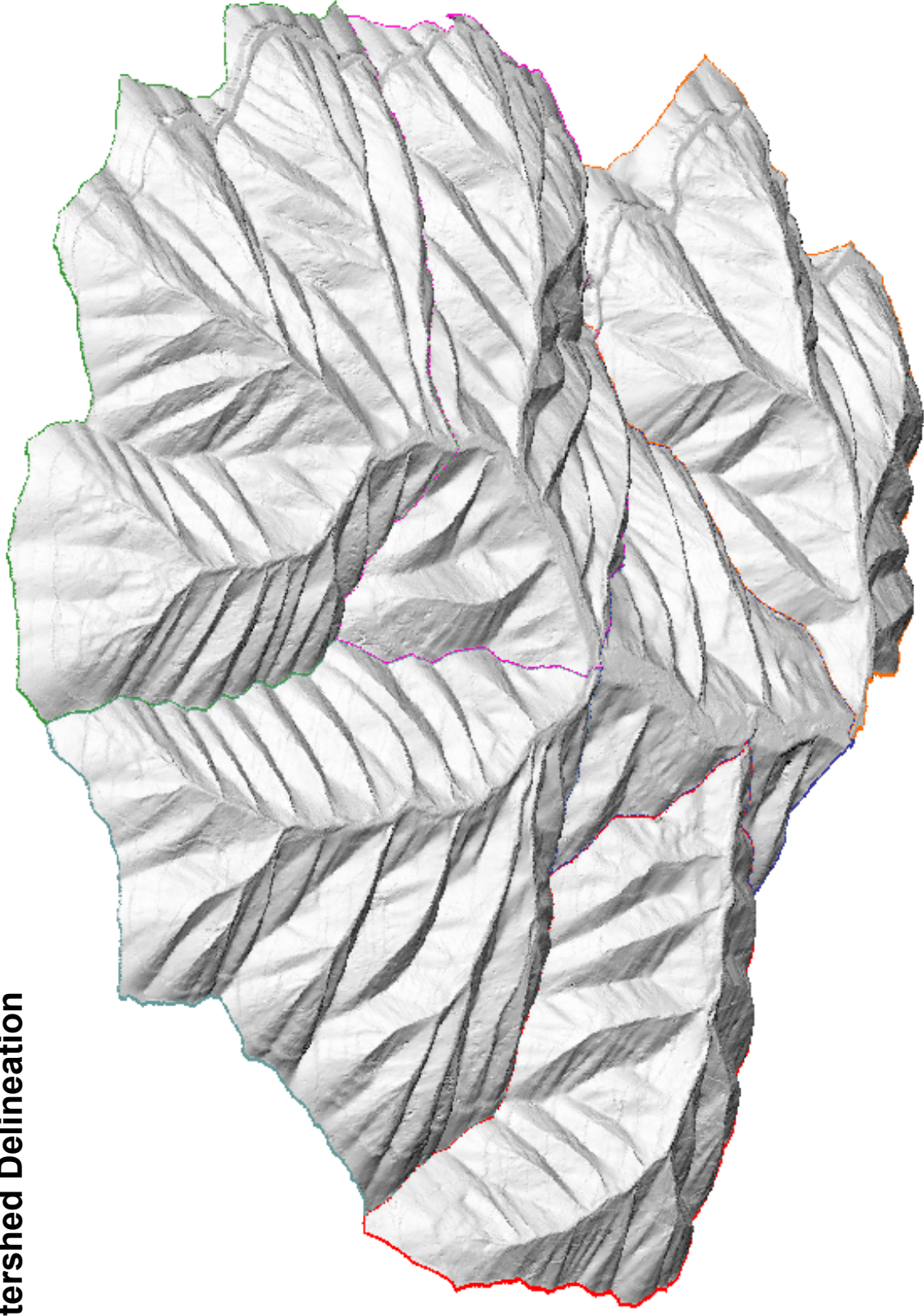
July 8, 2001 Storm Event for Scrabble Creek



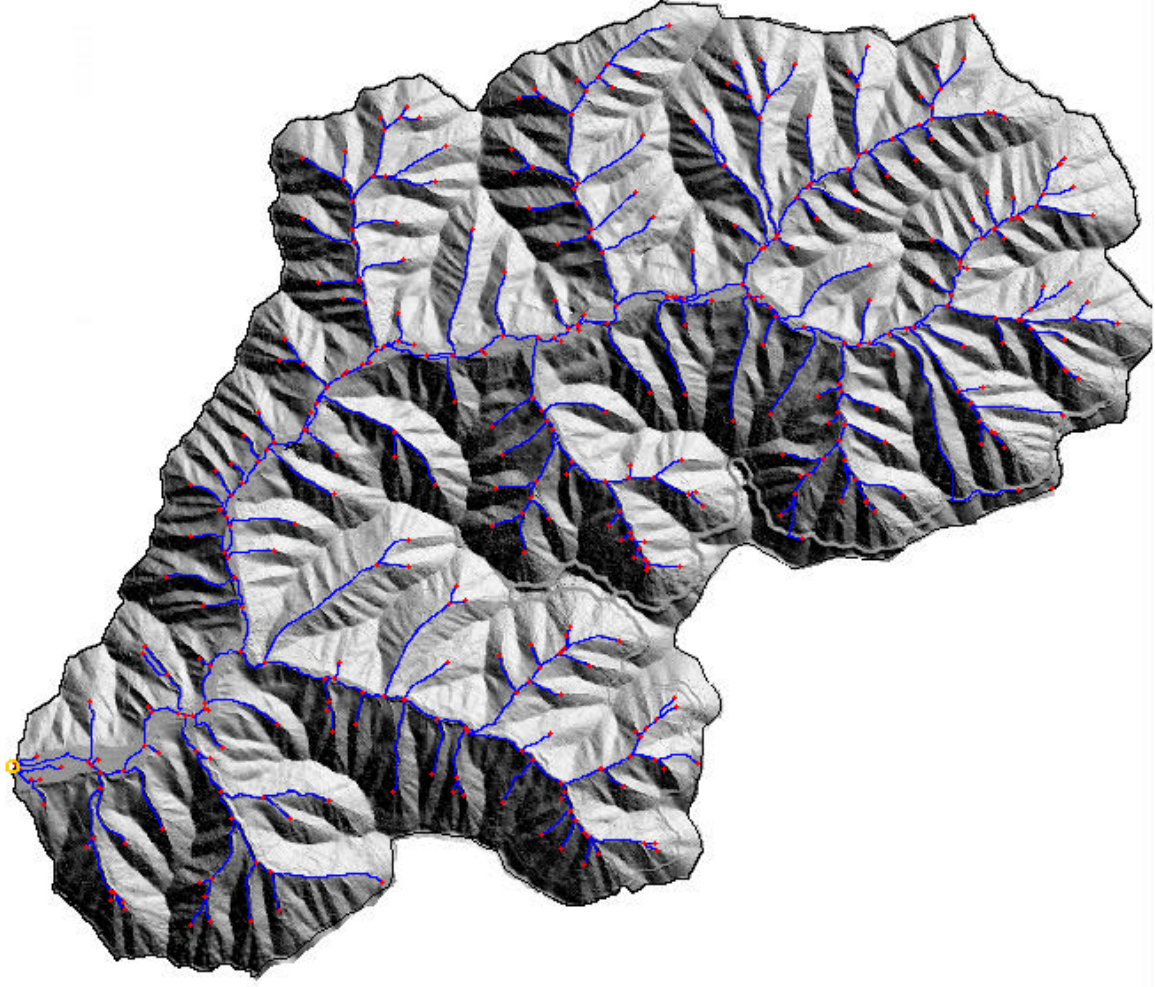
Sycamore Creek Watershed



**Sycamore Creek LIDAR
3D View
Watershed Delineation**



**Sycamore Creek LIDAR
Plan View
Watershed Delineation**



Sycamore Creek Study Area



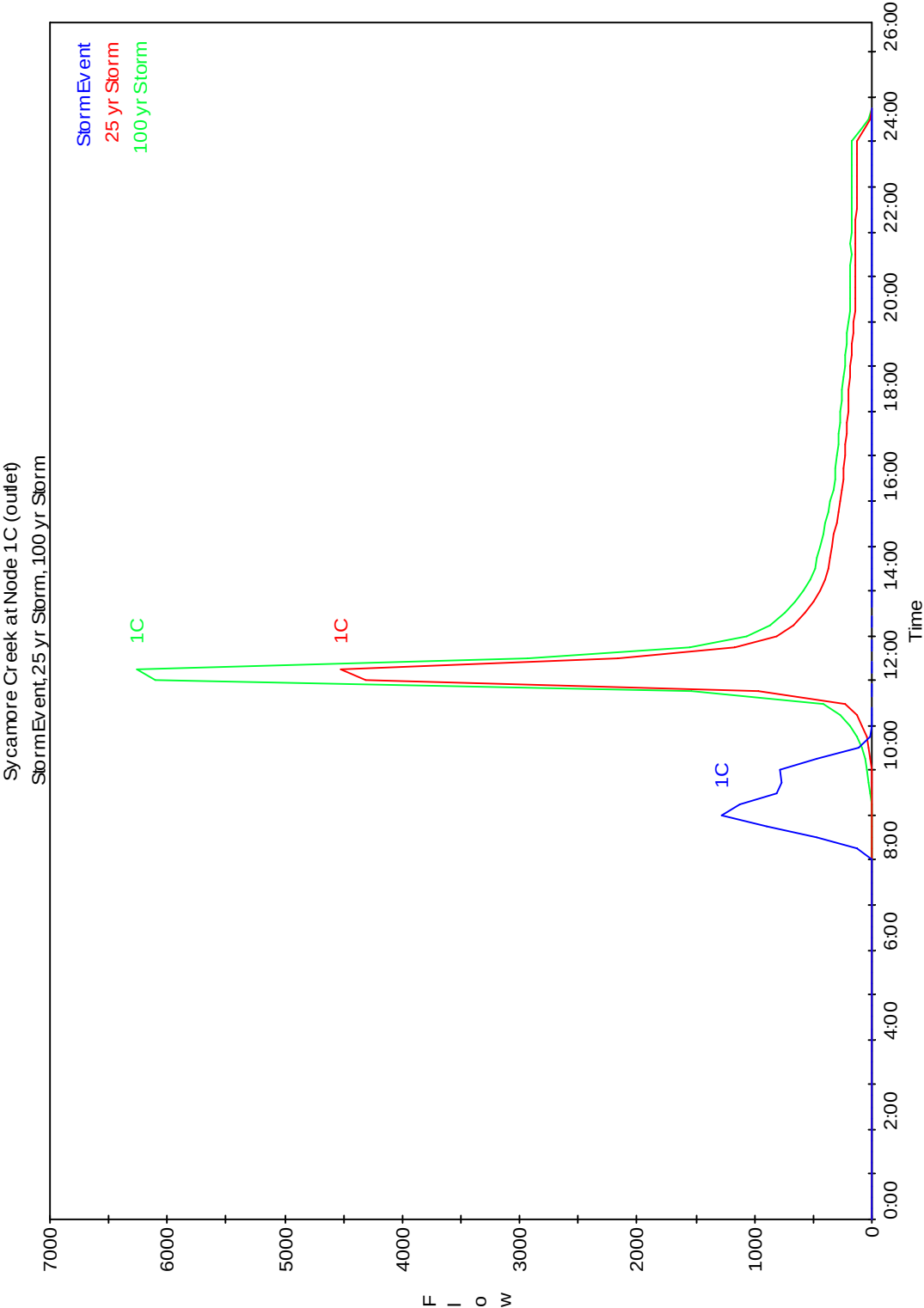
Legend

 Sycamore Creek Watershed Boundaries



Sycamore Creek Hydrology Analysis

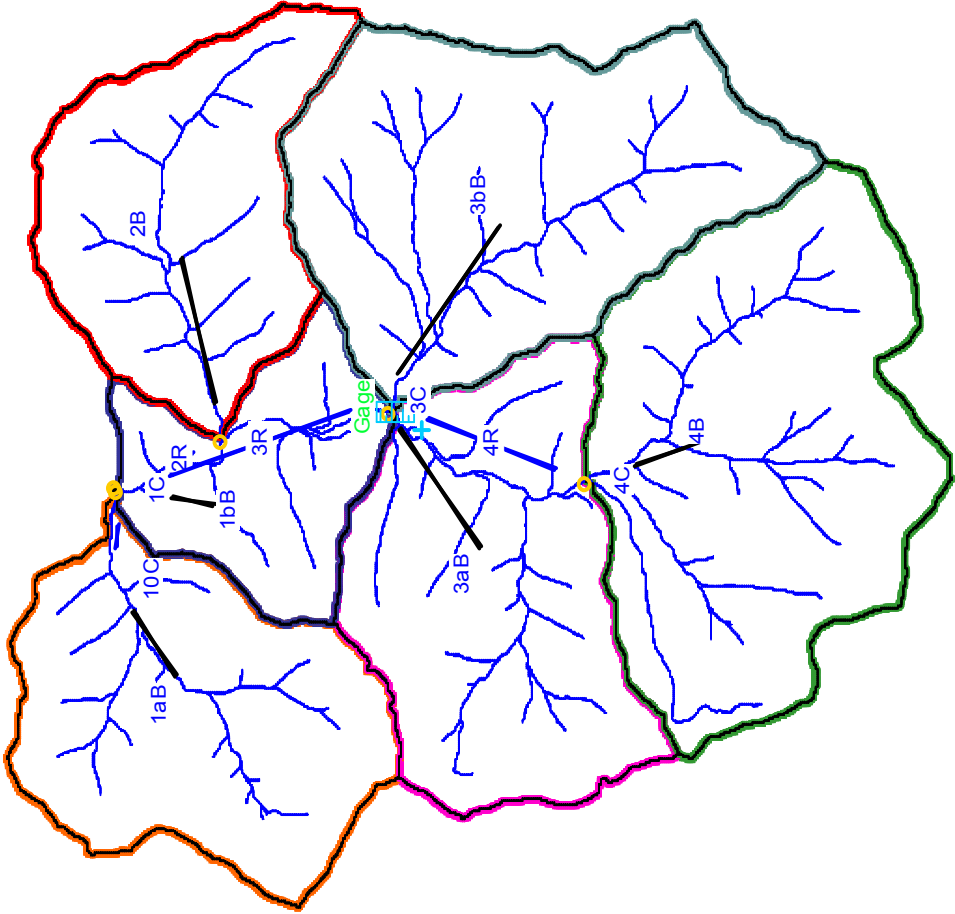
Bottom of Sycamore Creek	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	1211	4378	6078



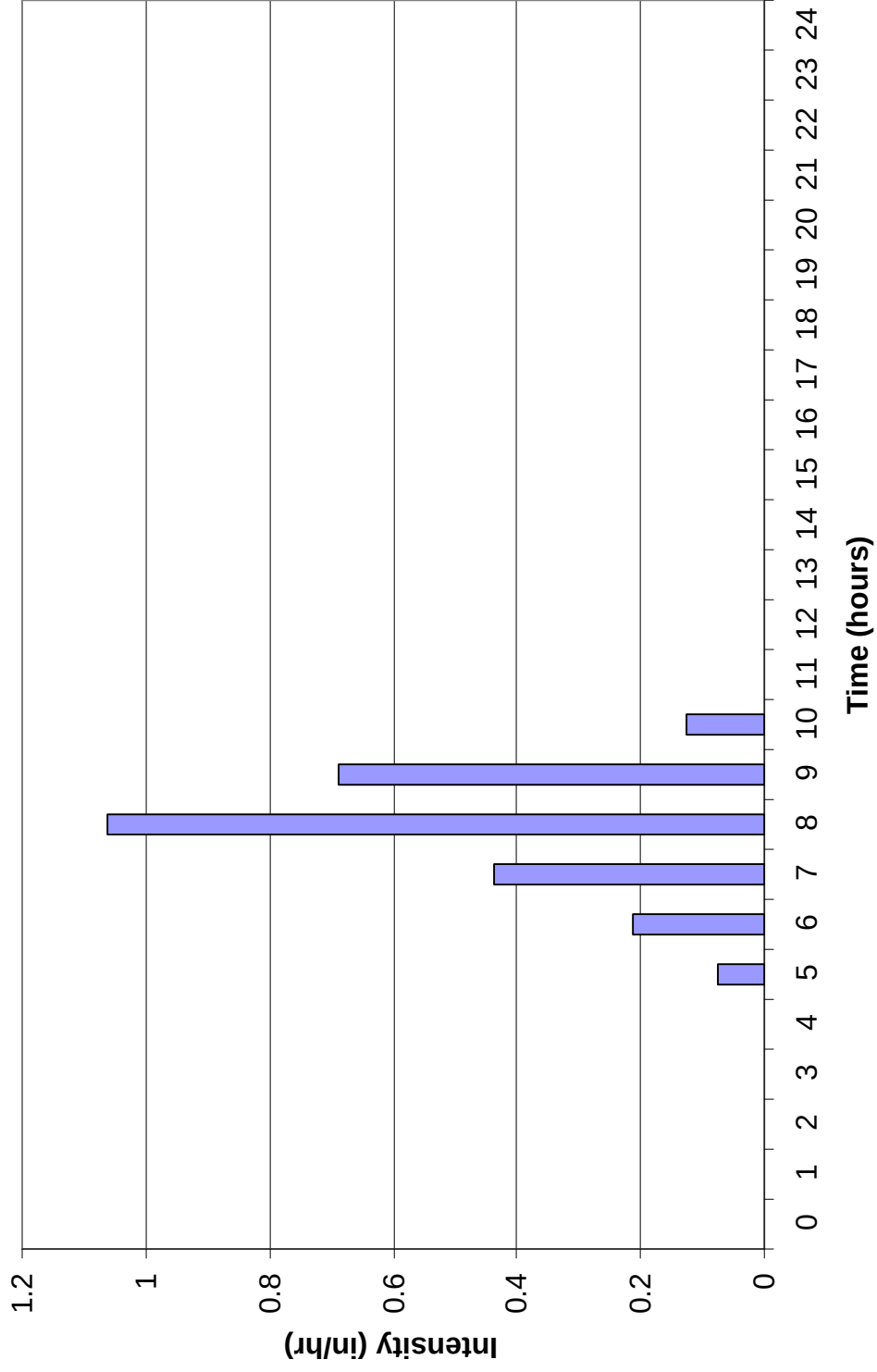
Sycamore Creek LIDAR (wo Mining & wo Logging)			
Outlet Node	Event	25 yr	100 yr
1C	1211	4378	6078
2C	198	901	1255
3C	840	3374	4737
4C	333	1513	2109

9 fps

Watershed Delineation and Basin / Outlet / Routing Naming



July 8, 2001 Storm Event in Sycamore Creek



July 8, 2001 Storm Event for Sycamore Creek

