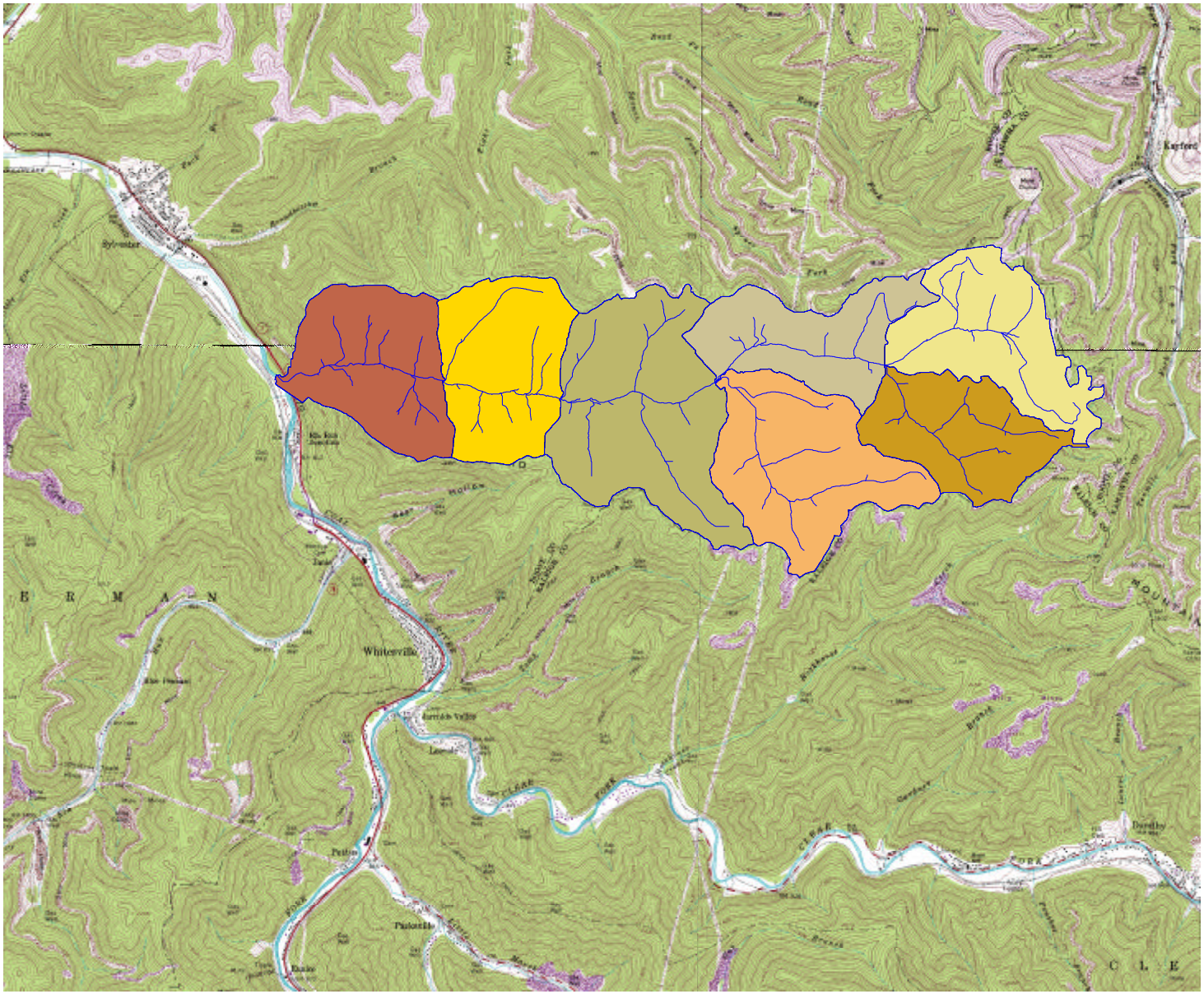
FATT Runoff Analyses

PART II

Data Input and Results Summary

Seng Creek Watershed



Streams

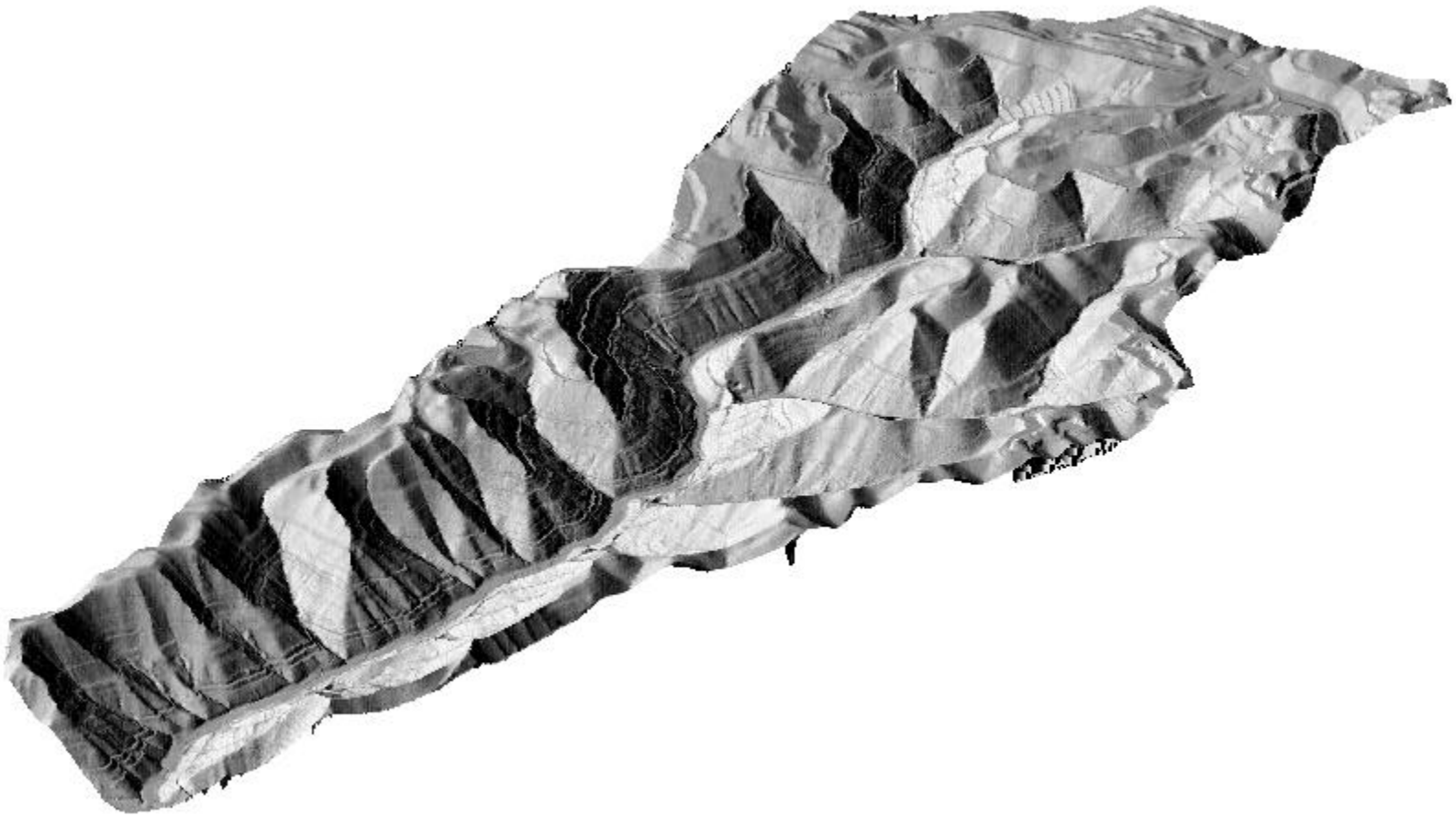
Drainage Areas

- **1B**
- **2B**
- **3B**
- **4aB**
- **4bB**
- **5aB**
- **5bB**

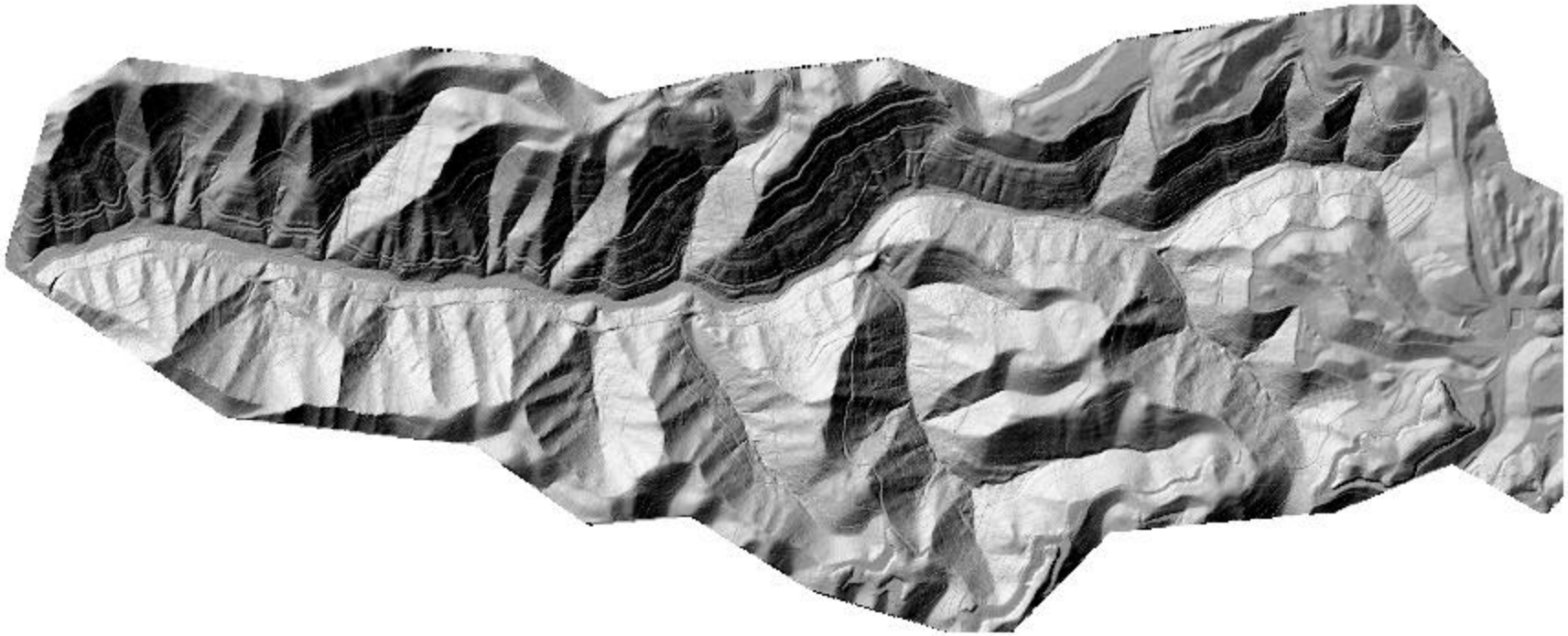
N
W E
S

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

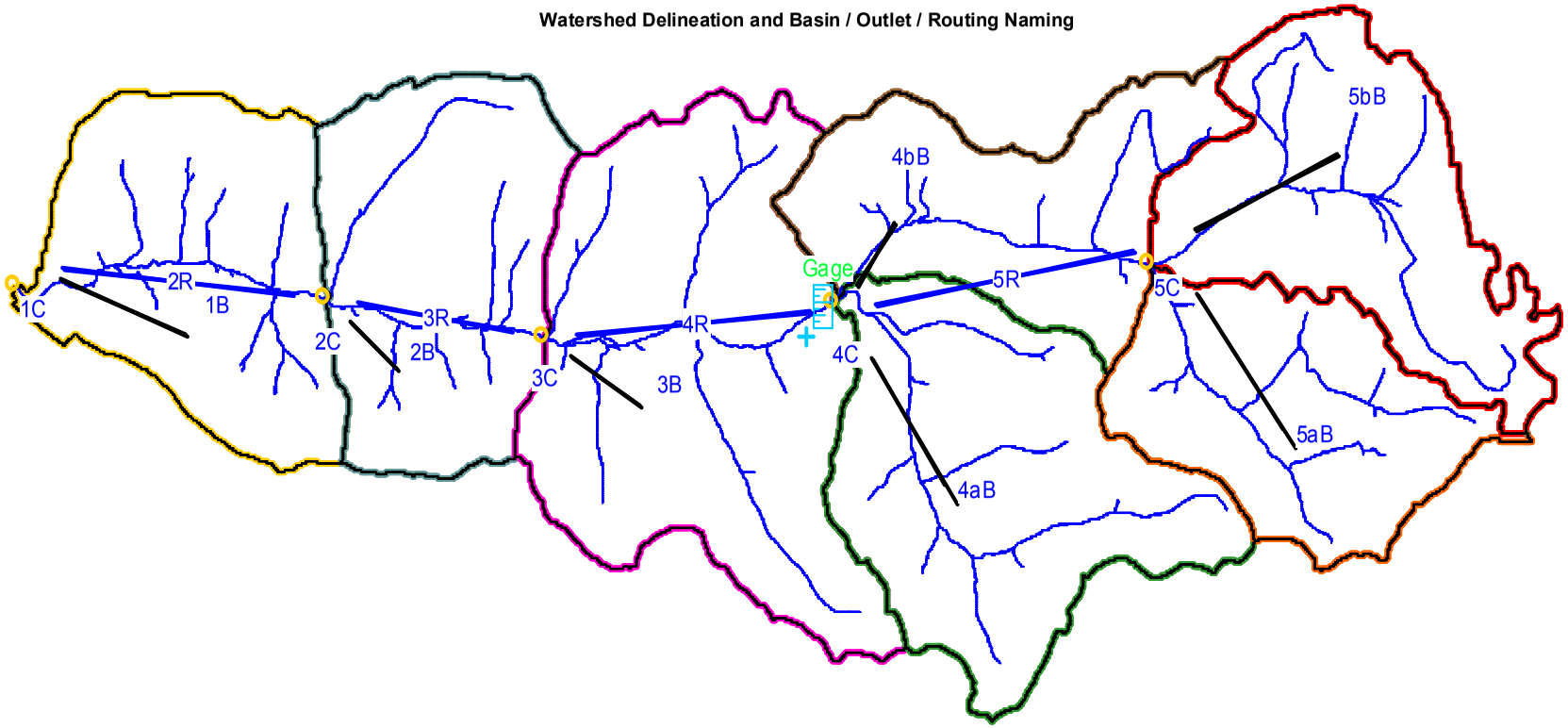
N
W E
S

3000 0 3000 6000 Feet

TAGIS

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

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)		
Bottom of Seng Creek at Node 1C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	2595	3467	4622	2451	3224	4350	2379	3118	4230	2457	3265	4431	2609	3545	4751
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	216	349	392	72	106	120				138	202	191	152	280	320
% Difference	9.1%	11.2%	9.3%	3.0%	3.4%	2.8%				5.6%	6.2%	4.3%	6.2%	8.6%	7.2%
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	144	243	272	-6	-41	-81				-78	-147	-201			
% Difference	5.9%	7.5%	6.3%	-0.2%	-1.3%	-1.9%				-3.3%	-4.7%	-4.8%			

At Node 2C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	2297	3209	4255	2171	2986	4008	2097	2861	3867	2190	3005	4065	2322	3248	4339
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	200	348	388	74	125	141				107	204	190	132	243	274
% Difference	9.5%	12.2%	10.0%	3.5%	4.4%	3.6%				4.9%	6.8%	4.7%	6.0%	8.1%	6.7%
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	126	223	247	-19	-19	-57				-93	-144	-198			
% Difference	5.8%	7.5%	6.2%	-0.9%	-0.6%	-1.4%				-4.4%	-5.0%	-5.1%			

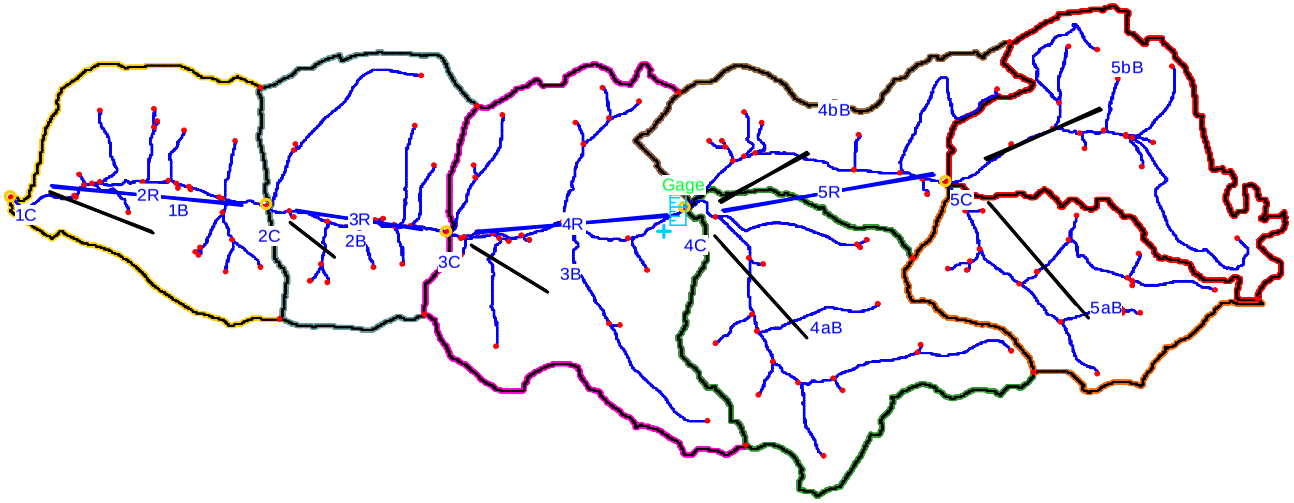
At Node 3C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	1995	2816	3722	1883	2622	3507	1810	2490	3359	1828	2534	3418	1942	2733	3641
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	185	326	363	73	132	148				167	282	304	114	199	223
% Difference	10.2%	13.1%	10.8%	4.0%	5.3%	4.4%				9.1%	11.1%	8.9%	6.2%	7.9%	6.5%
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	112	194	215	55	88	89				-18	-44	-59			
% Difference	5.9%	7.4%	6.1%	3.0%	3.5%	2.6%				-1.0%	-1.8%	-1.8%			

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	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	*1440*	*2155*	*2872*	*1364*	*1991*	*2689*	*1293*	*1864*	*2545*	*1374*	*1941*	*2654*	*1452*	*2112*	*2847*
										Total Influence			Logging Influence Cross Check		
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	*147*	*291*	*327*	*71*	*127*	*144*				*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%*	*5.7%*	*8.8%*	*7.3%*
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	*76*	*164*	*183*	*-10*	*50*	*35*				*-81*	*-77*	*-109*			
% 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	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	*713*	*1145*	*1511*	*686*	*1092*	*1452*	*618*	*961*	*1306*	*705*	*1078*	*1465*	*732*	*1131*	*1524*
										Total Influence			Logging Influence Cross Check		
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	*95*	*184*	*205*	*68*	*131*	*146*				*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%*	*3.8%*	*4.9%*	*4.0%*
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	*27*	*53*	*59*	*-19*	*14*	*-13*				*-87*	*-117*	*-159*			
% Difference	*3.9%*	*4.9%*	*4.1%*	*-2.8%*	*1.3%*	*-0.9%*				*-14.1%*	*-12.2%*	*-12.2%*			

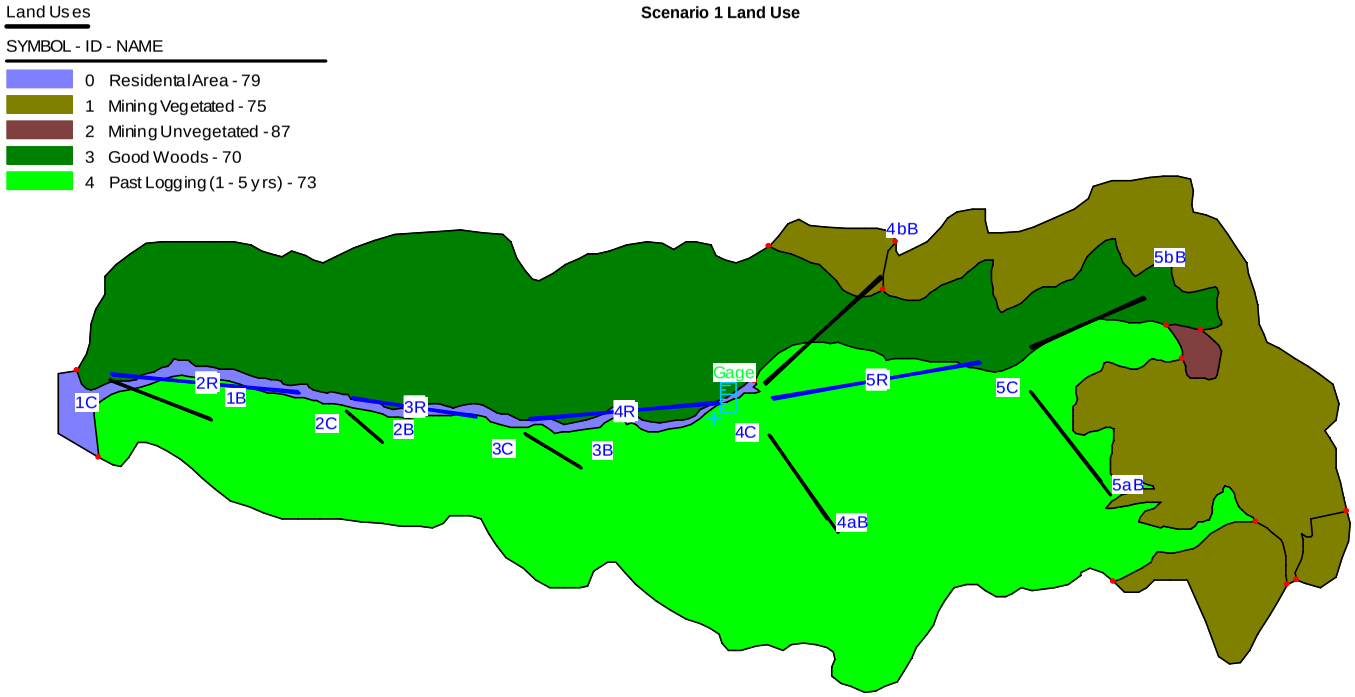
Seng Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (CN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

Watershed Delineation and Basin / Outlet / Routing Naming



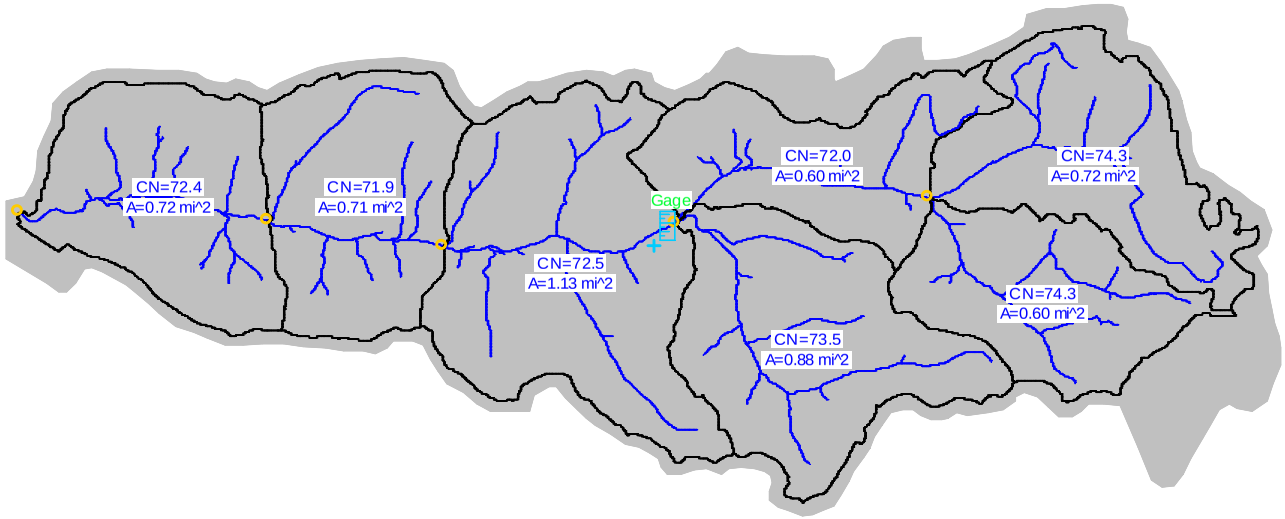
Seng Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (CN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

Scenario 1 Land Use



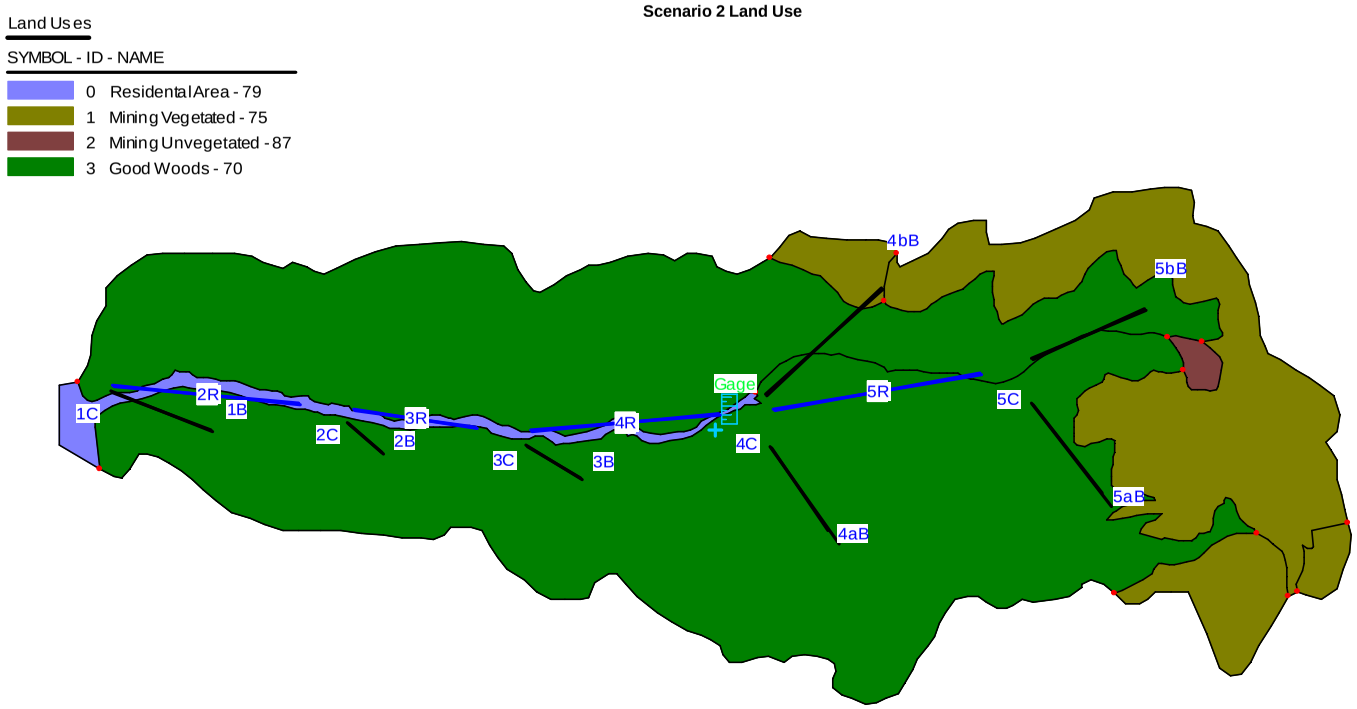
Seng Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (CN 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 1 Watershed Boundaries
and Composite CN and Computed Areas



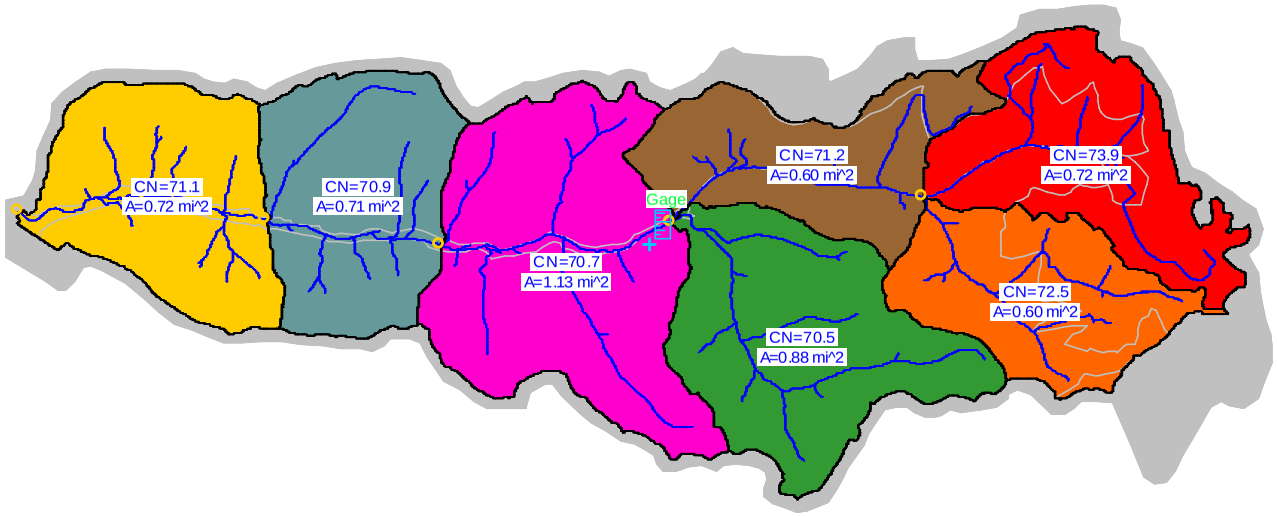
Seng Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (CN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

Scenario 2 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 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)

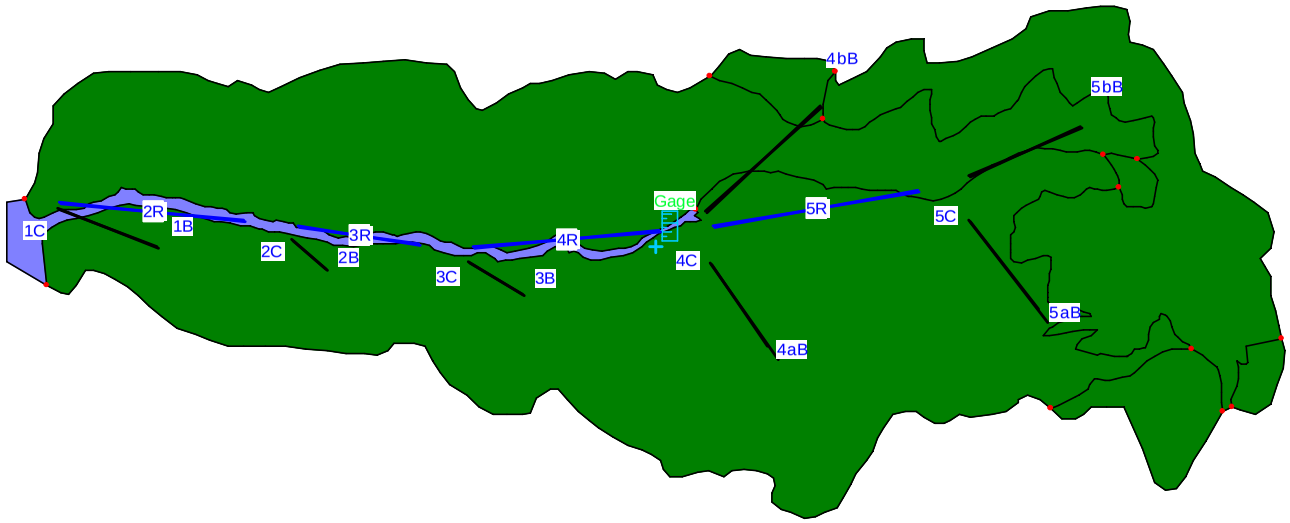
Scenario 3 Land Use

Land Uses

SYMBOL - ID - NAME

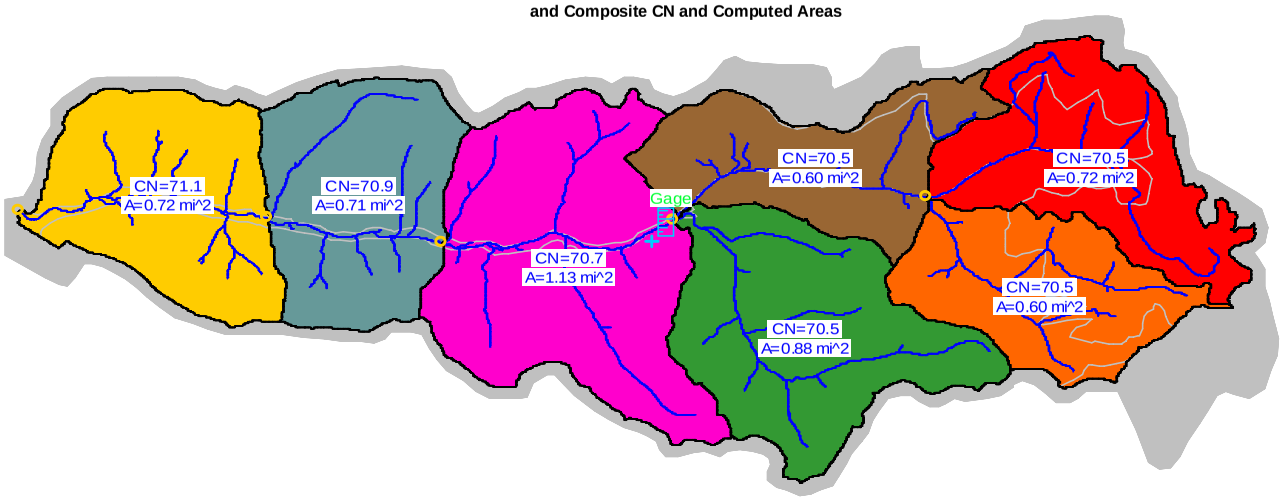
0 Residental Area - 79

3 Good Woods - 70



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 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)

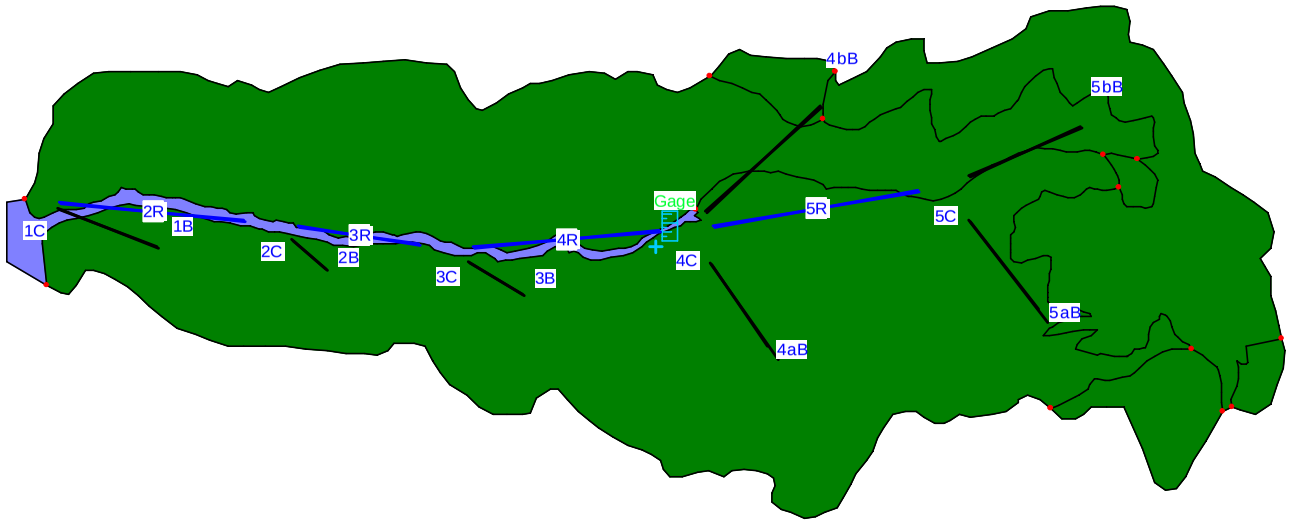
Scenario 4 Land Use

Land Uses

SYMBOL - ID - NAME

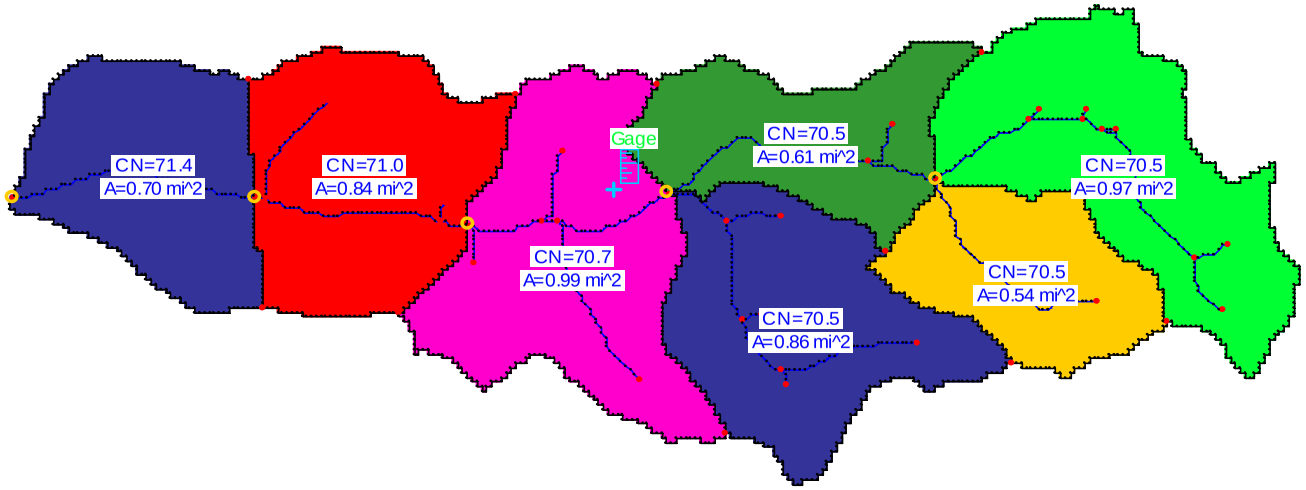
0 Residental Area - 79

3 Good Woods - 70



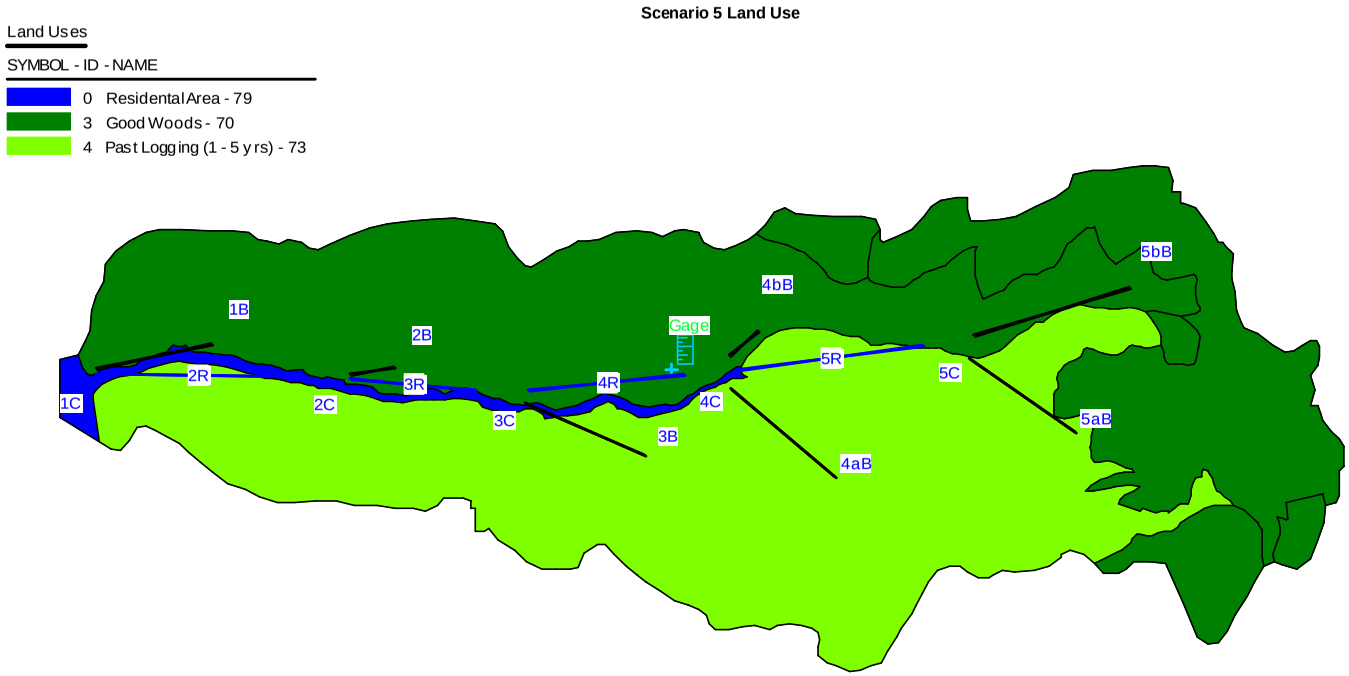
Seng Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (CN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



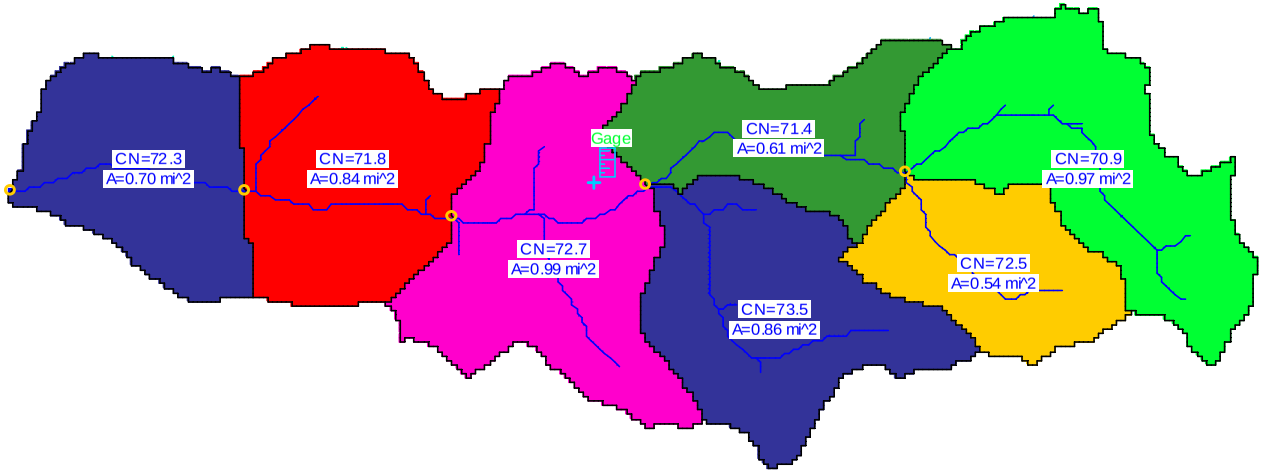
Seng Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (CN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

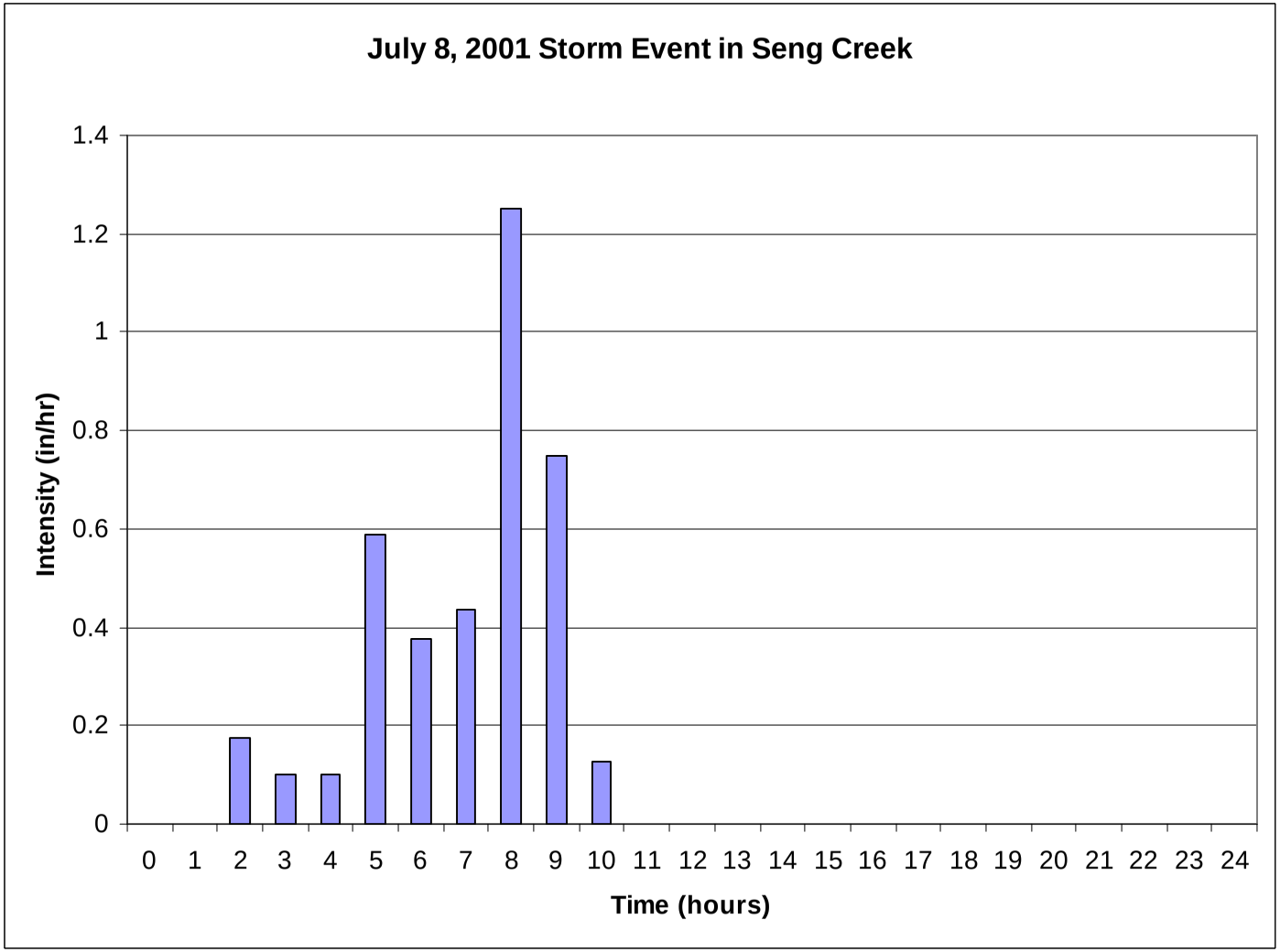
Scenario 5 Land Use

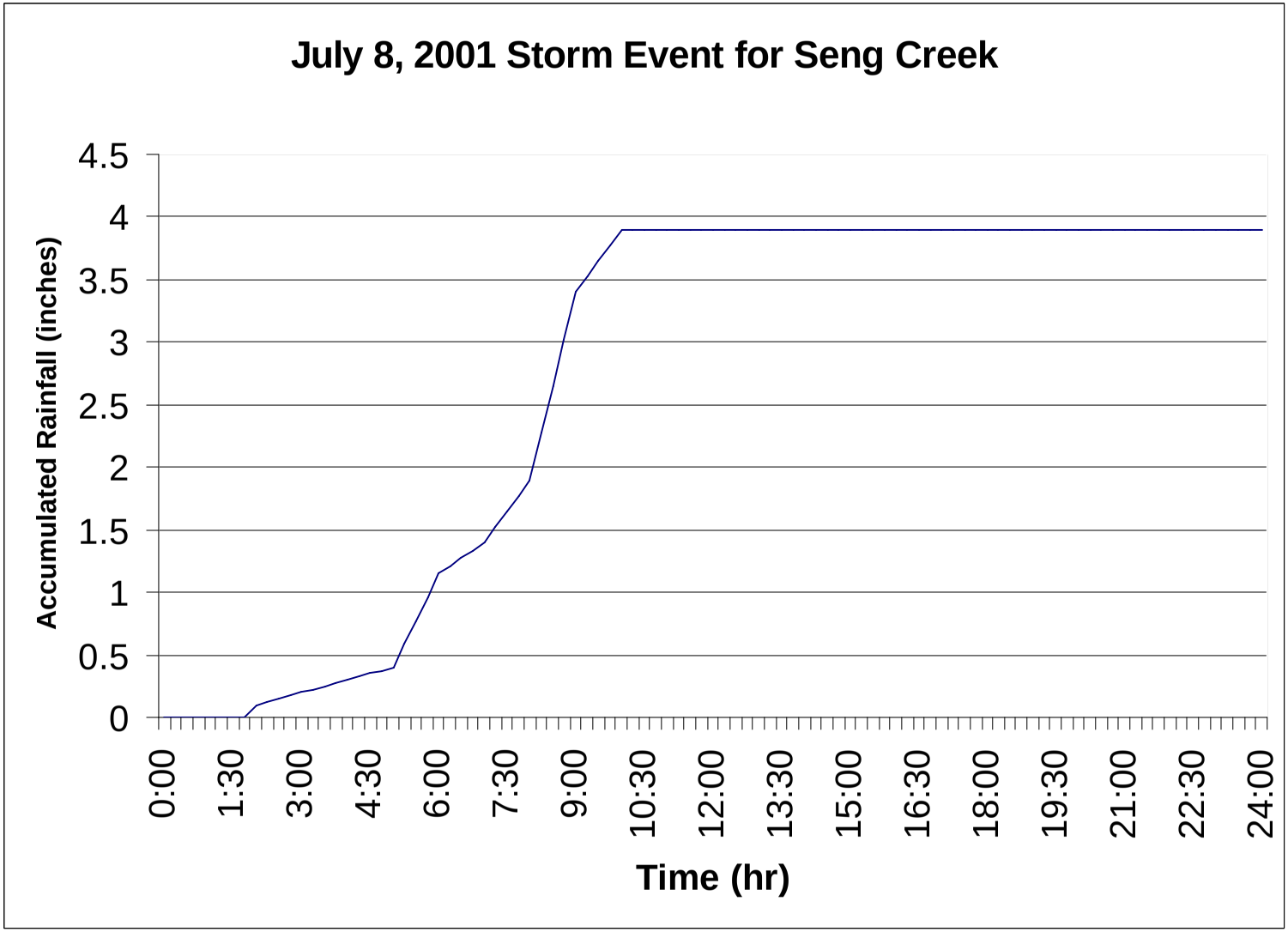


Seng Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (CN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

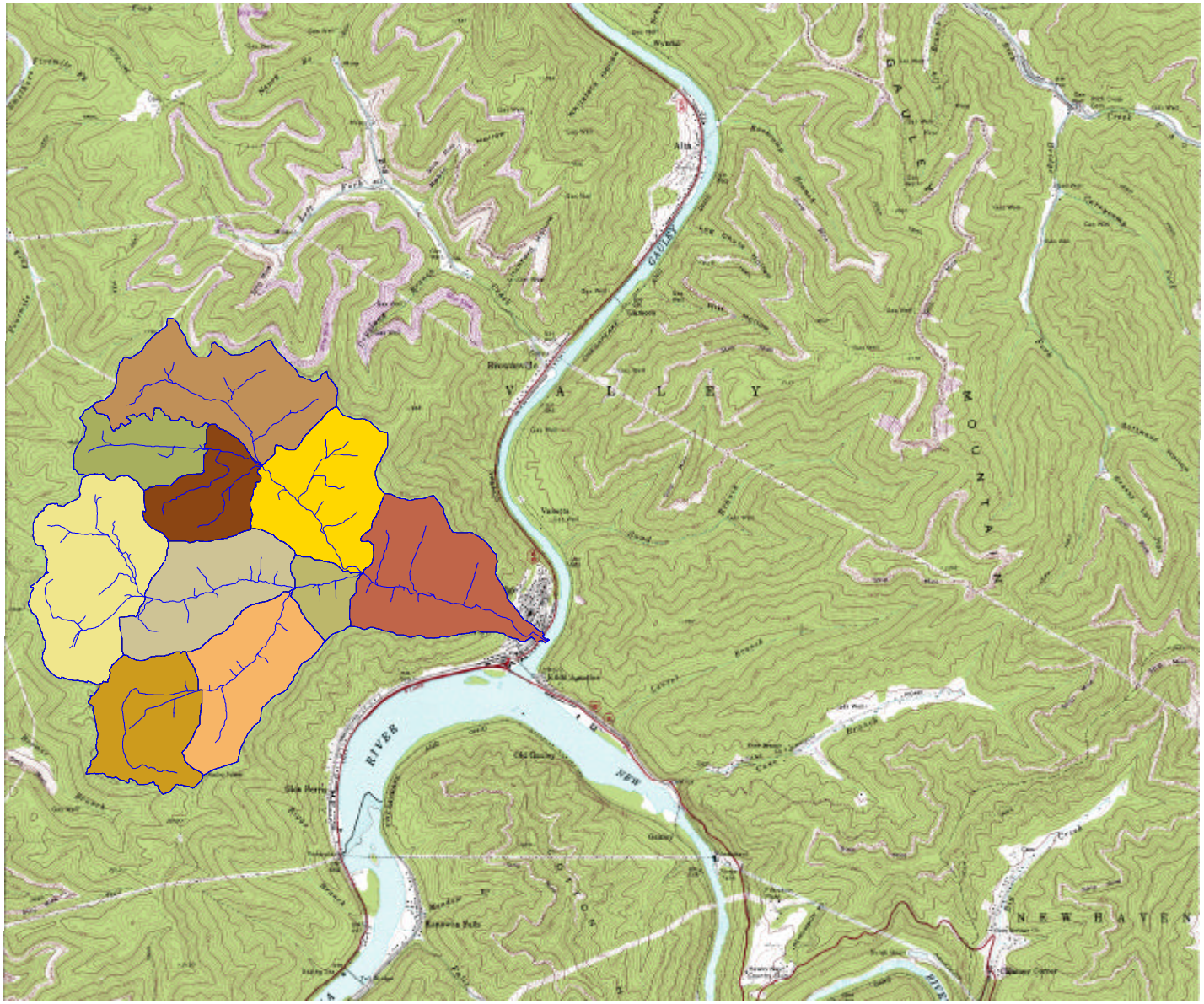
Scenario 5 Watershed Boundaries
and Composite CN and Computed Areas




July 8, 2001 Storm Event in Seng Creek
Intensity (in/hr)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)


July 8, 2001 Storm Event for Seng Creek
Accumulated Rainfall (inches)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0:00
1:30
3:00
4:30
6:00
7:30
9:00
10:30
12:00
13:30
15:00
16:30
18:00
19:30
21:00
22:30
24:00
Time (hr)

Scrabble Creek Watershed



Streams

Drainage Areas

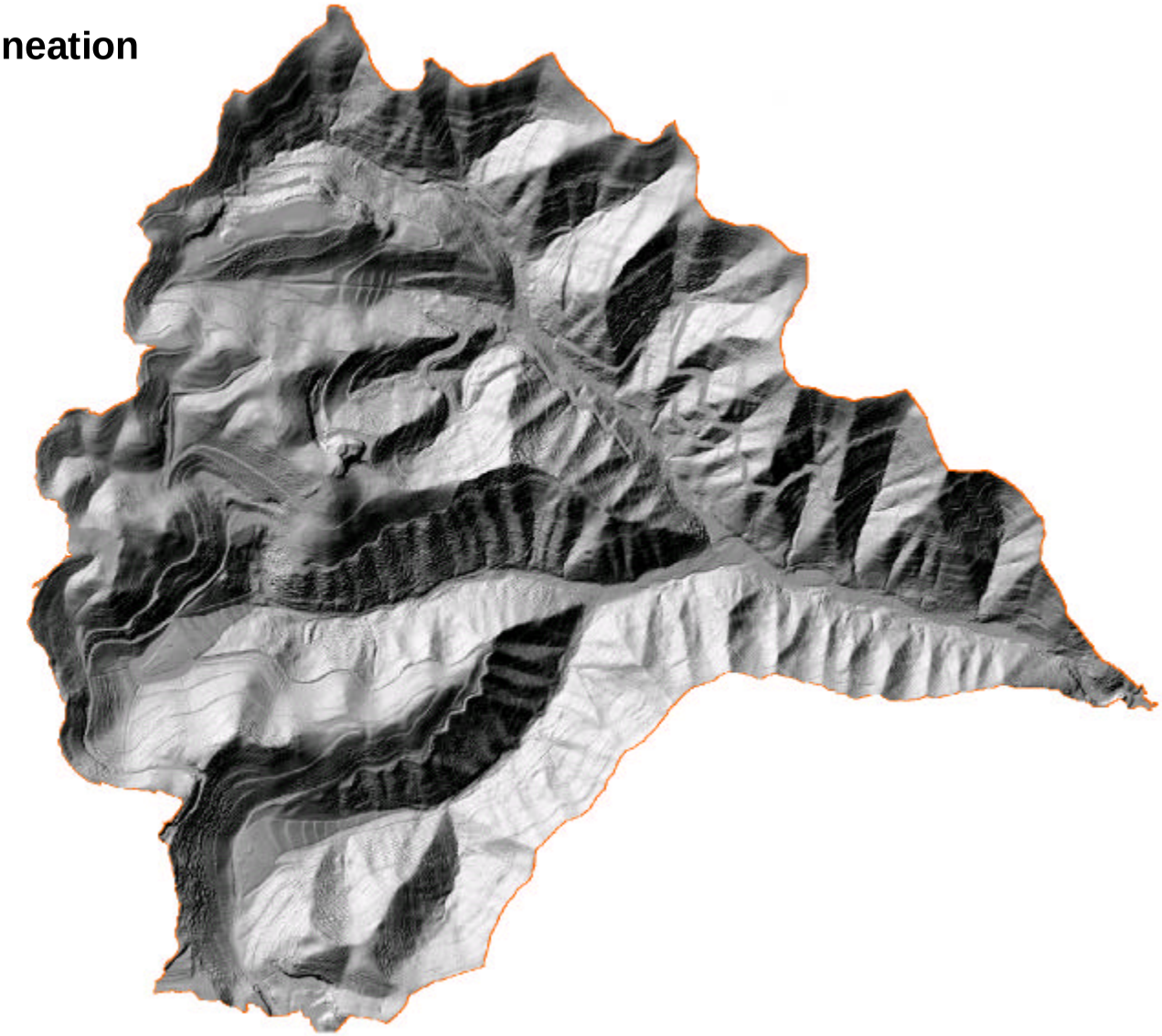
- 1B
- 2aB
- 2bB
- 3aB
- 3bB
- 4B
- 5B
- 6B
- 7aB
- 7bB

N
W E
S

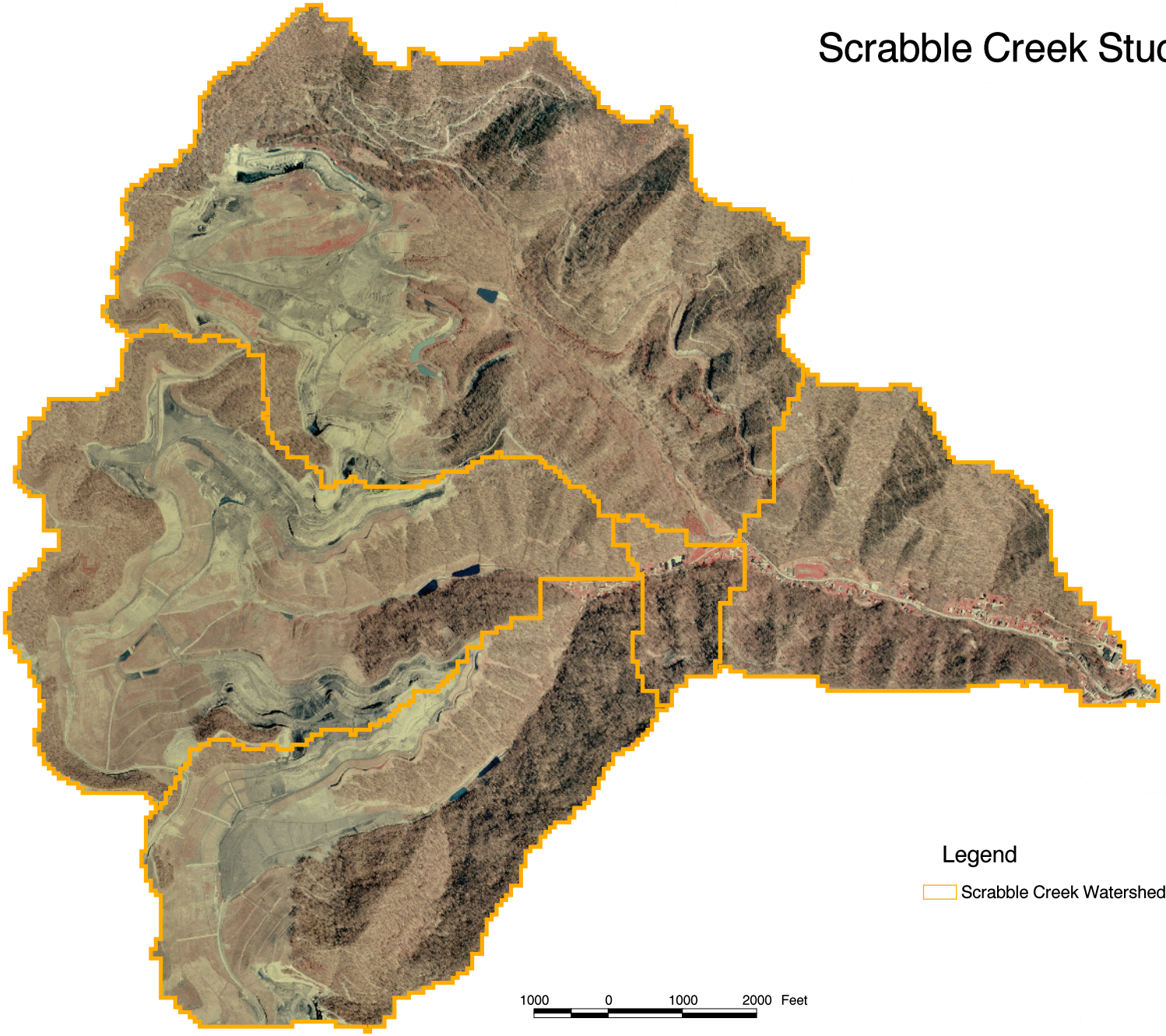
Printed March 27, 2002

Scrabble Creek LIDAR
3D View
Watershed Delineation

Scrabble Creek LIDAR
Plan View
Watershed Delineation



Scrabble Creek Study Area

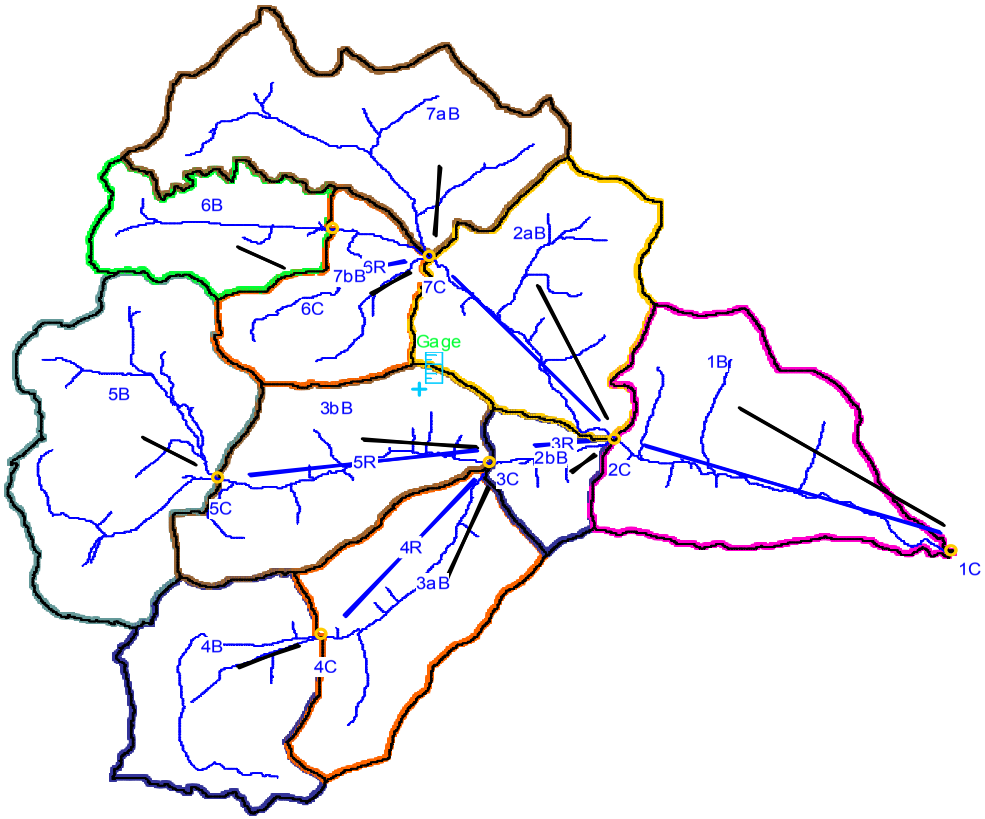


Legend

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)			
	With Mining (CN 75 & 87)			With Mining (CN 75 & 87)			Reclaimed Mining (CN 70)			Without Mining (CN 70)			Without Mining (CN 70)			
	Topography w Mining (LIDAR Data)			Topography w Mining (LIDAR Data)			Topography w Mining			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	14 fps
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	

Watershed Delineation and Basin / Outlet / Routing Naming



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)		
Bottom of Scrabble Creek at Node 1C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	2045	3760	5165	1970	3595	4980	1663	2745	3879	1802	3242	4573	1877	3405	4755
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	382	1015	1286	307	850	1101				243	518	592	75	163	182
% Difference	23.0%	37.0%	33.2%	18.5%	31.0%	28.4%				13.5%	16.0%	12.9%	4.2%	5.0%	4.0%
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	75	165	185	168	353	407				-139	-497	-694			
% Difference	3.8%	4.6%	3.7%	9.3%	10.9%	8.9%				-8.4%	-18.1%	-17.9%			
At Node 2C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	1803	3621	4926	1738	3515	4808	1426	2004	2848	1533	3041	4254	1586	3143	4368
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	377	1617	2078	312	1511	1960				270	580	672	53	102	114
% Difference	26.4%	80.7%	73.0%	21.9%	75.4%	68.8%				17.6%	19.1%	15.8%	3.5%	3.4%	2.7%
		Logging Influence			Mining Influence						Topography Influence				
	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%			
At Node 3C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	938	1886	2568	928	1867	2547	767	1320	1864	818	1634	2294	827	1654	2316
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	171	566	704	161	547	683				120	252	274	9	20	22
% Difference	22.3%	42.9%	37.8%	21.0%	41.4%	36.6%				14.7%	15.4%	11.9%	1.1%	1.2%	1.0%
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	10	19	21	110	233	253				-51	-314	-430			
% Difference	1.1%	1.0%	0.8%	13.4%	14.3%	11.0%				-6.6%	-23.8%	-23.1%			
Downstream of Valley Fill at Node 4C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	203	395	535	203	395	535	171	336	470	173	341	477	173	341	477
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	32	59	65	32	59	65				30	54	58	0	0	0
% Difference	18.7%	17.6%	13.8%	18.7%	14.9%	13.8%				17.3%	15.8%	12.2%	0.0%	0.0%	0.0%
		Logging Influence			Mining Influence						Topography Influence				
	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%			

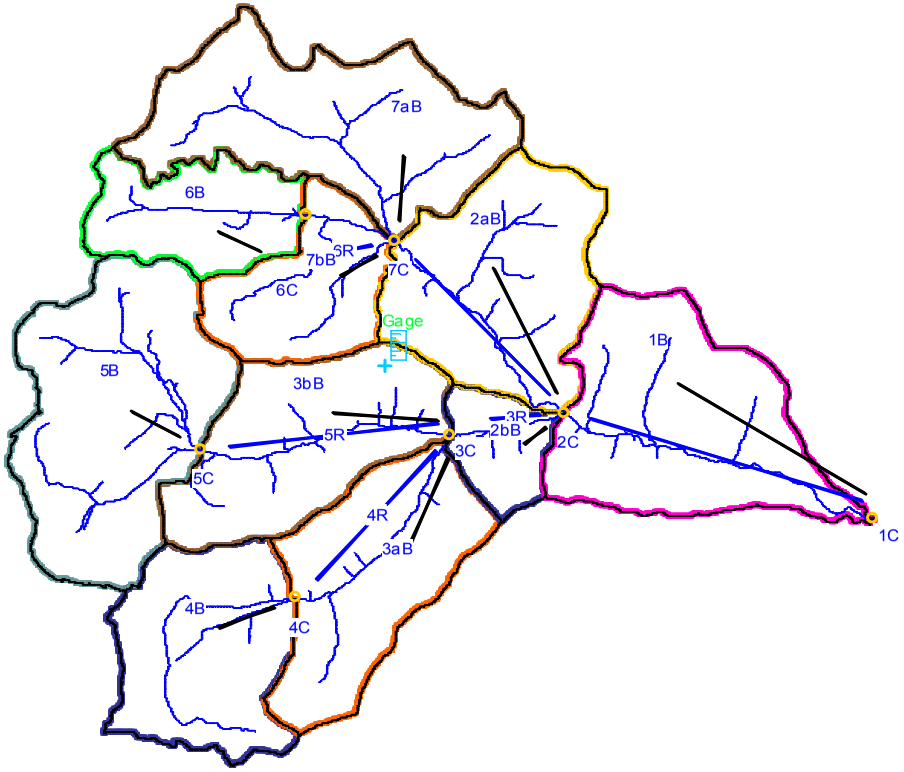
Scrabble Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)			**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)			**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (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)		
Downstream of Valley Fil at Node 5C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	338	682	932	338	682	932	278	552	785	279	530	747	279	530	747
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	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%				21.1%	28.7%	24.8%	0.0%	0.0%	0.0%
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	0	0	0	59	152	185				-1	22	38			
% Difference	0.0%	0.0%	0.0%	21.1%	28.7%	24.8%				-0.4%	4.2%	5.1%			

Downstream of Valley Fil at Node 6C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	134	286	392	134	286	392	113	238	337	112	228	324	112	228	324
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	21	48	55	21	48	55				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%	0.0%	0.0%	0.0%
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	0	0	0	22	58	68				1	10	13			
% Difference	0.0%	0.0%	0.0%	19.6%	25.4%	21.0%				0.9%	4.4%	4.0%			

Node 7C	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	594	1489	2032	571	1422	1958	470	1108	1560	503	1241	1748	525	1307	1821
											Total Influence			Logging Influence Cross Check	
	Comparison with Scenario 3			**Comparison with Scenario 3**						**Comparison with Scenario 1**			**Comparison with Scenario 4**		
Difference	124	381	472	101	314	398				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%	4.4%	5.3%	4.2%
		Logging Influence			Mining Influence						Topography Influence				
	Comparison with Scenario 2			**Comparison with Scenario 4**						**Comparison with Scenario 3**					
Difference	23	67	74	68	181	210				-33	-133	-188			
% Difference	4.0%	4.7%	3.8%	13.5%	14.6%	12.0%				-7.0%	-12.0%	-12.1%			

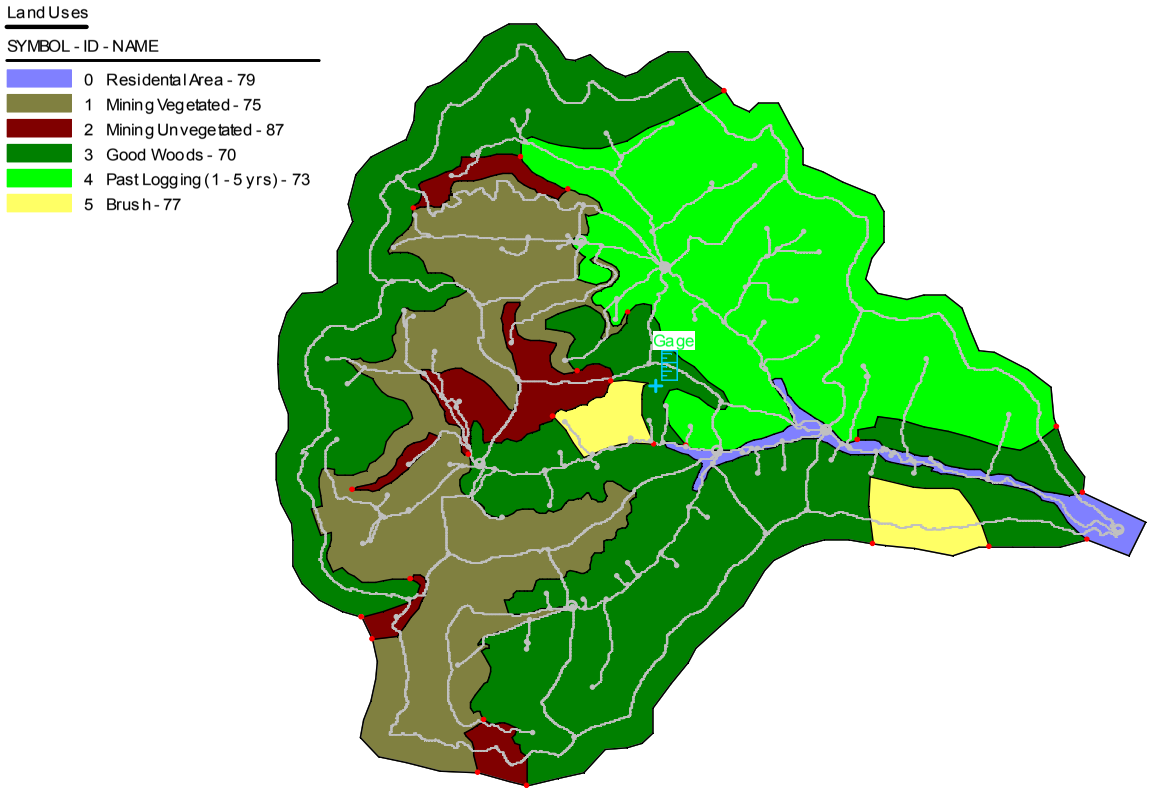
Scrabble Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography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

Watershed Delineation and Basin / Outlet / Routing Naming



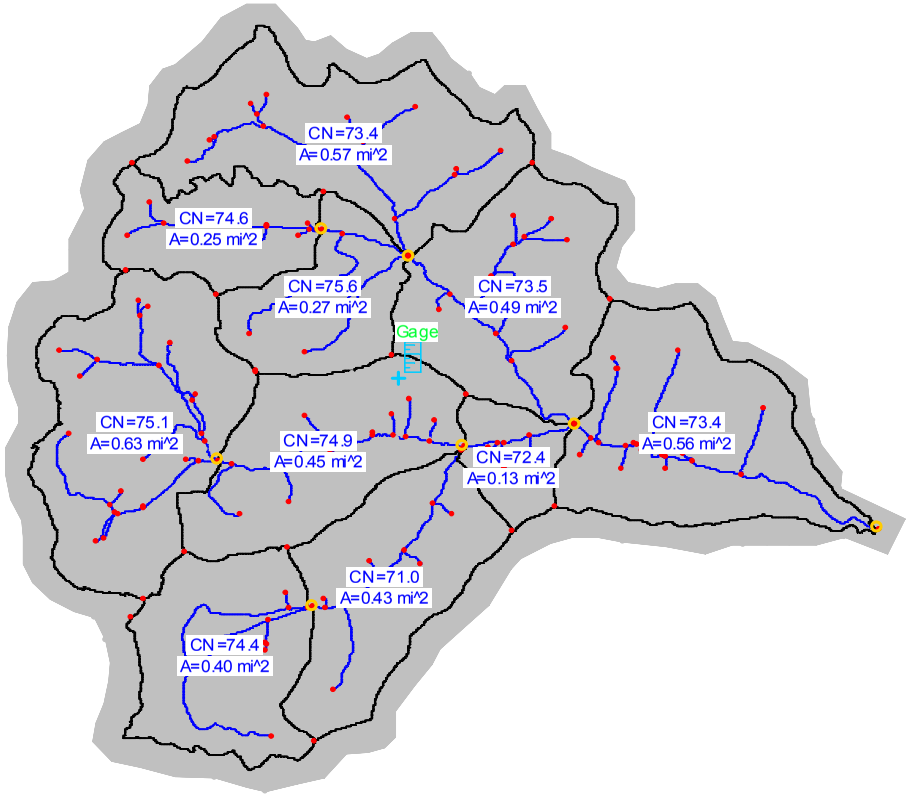
Scrabble Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (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 1 Land Use



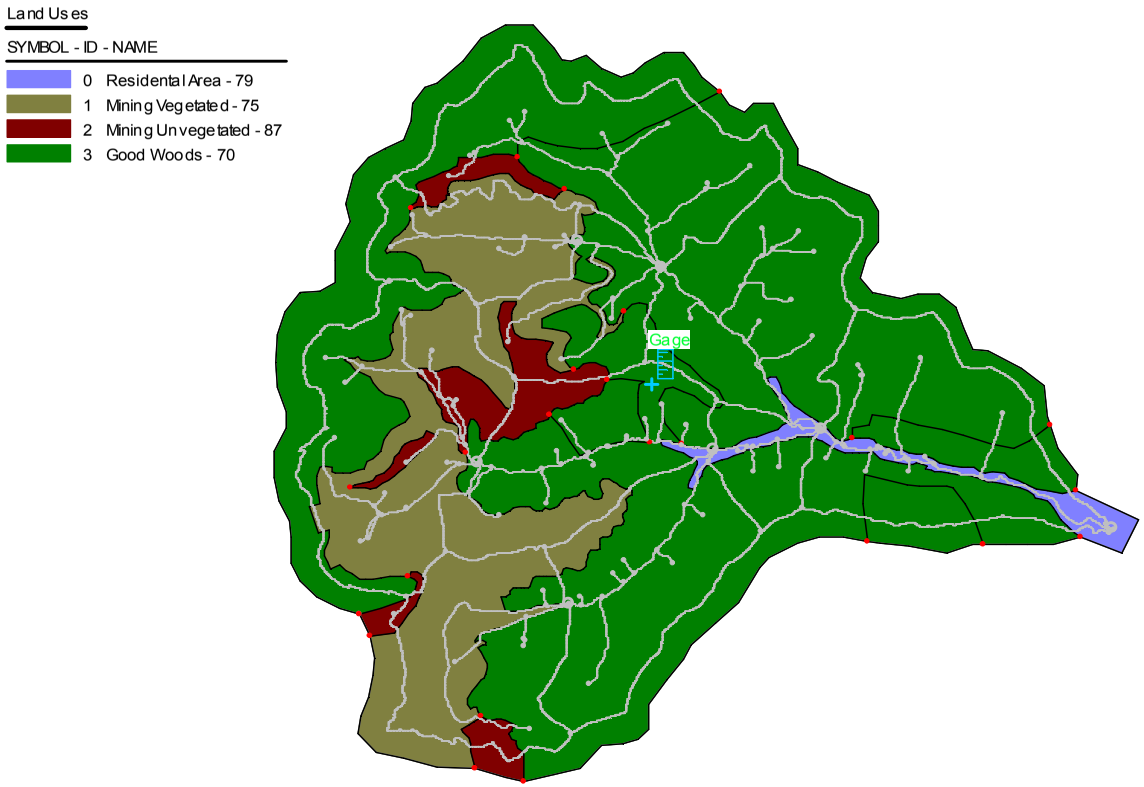
Scrabble Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography 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 1 Watershed Boundaries and Composite CN and Computed Areas



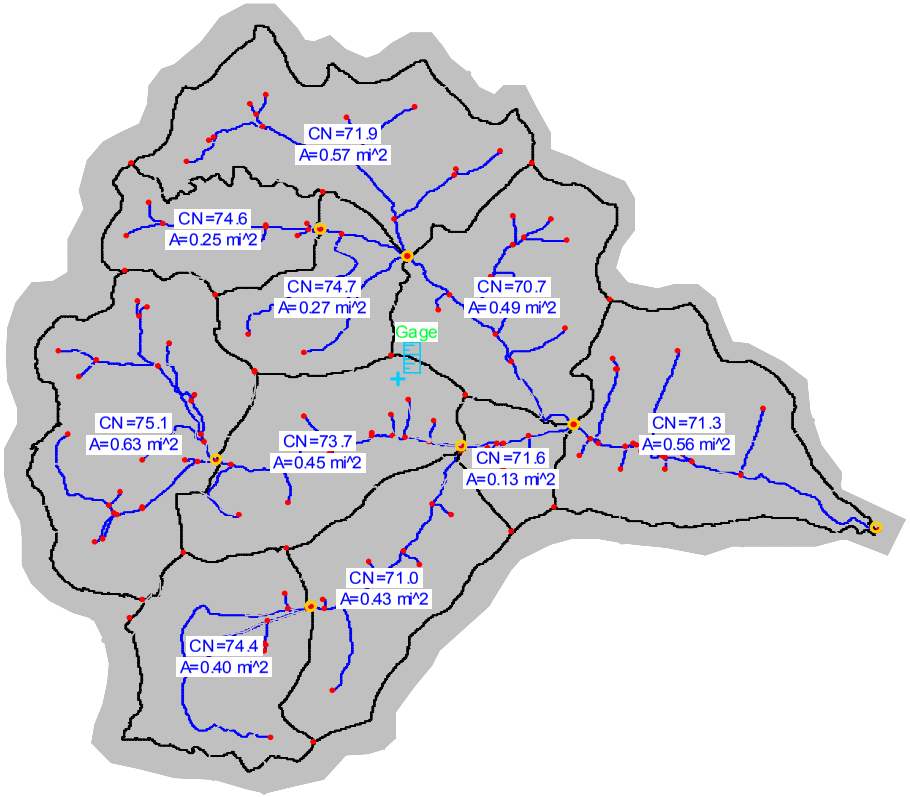
Scrabble Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (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 2 Land Use



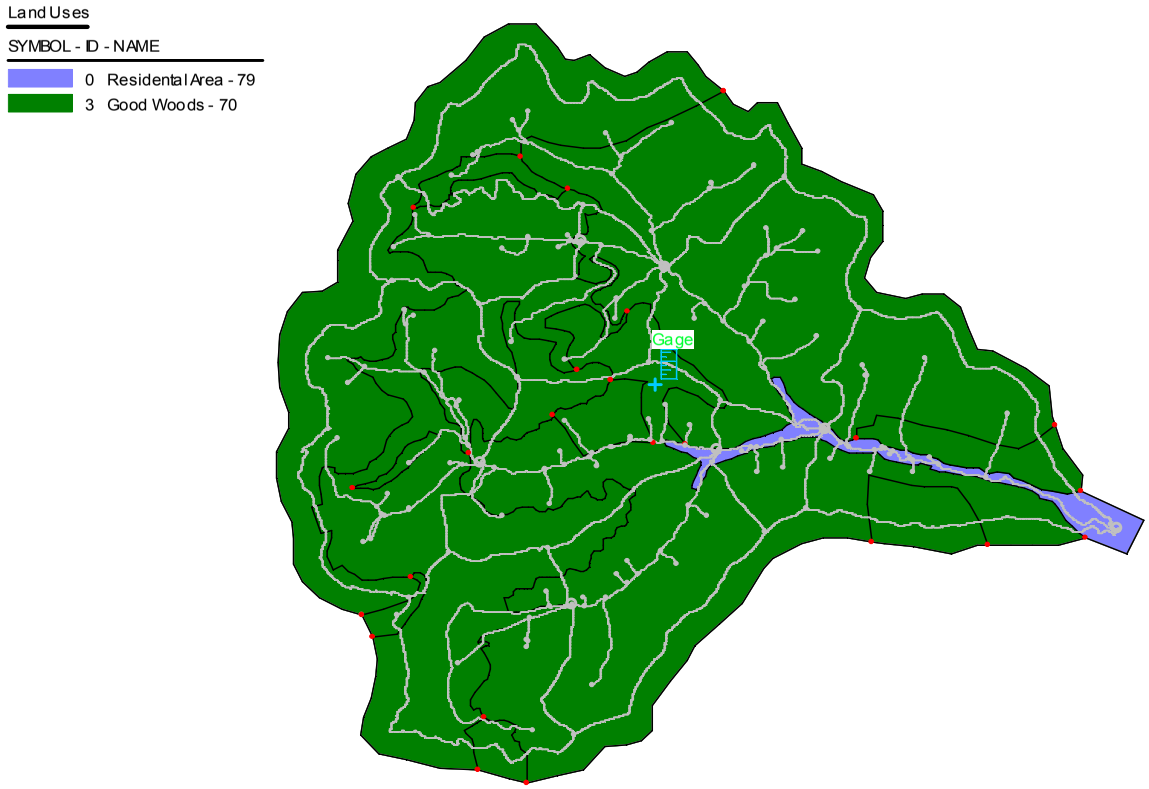
Scrabble Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (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 2 Watershed Boundaries and Composite CN and Computed Areas



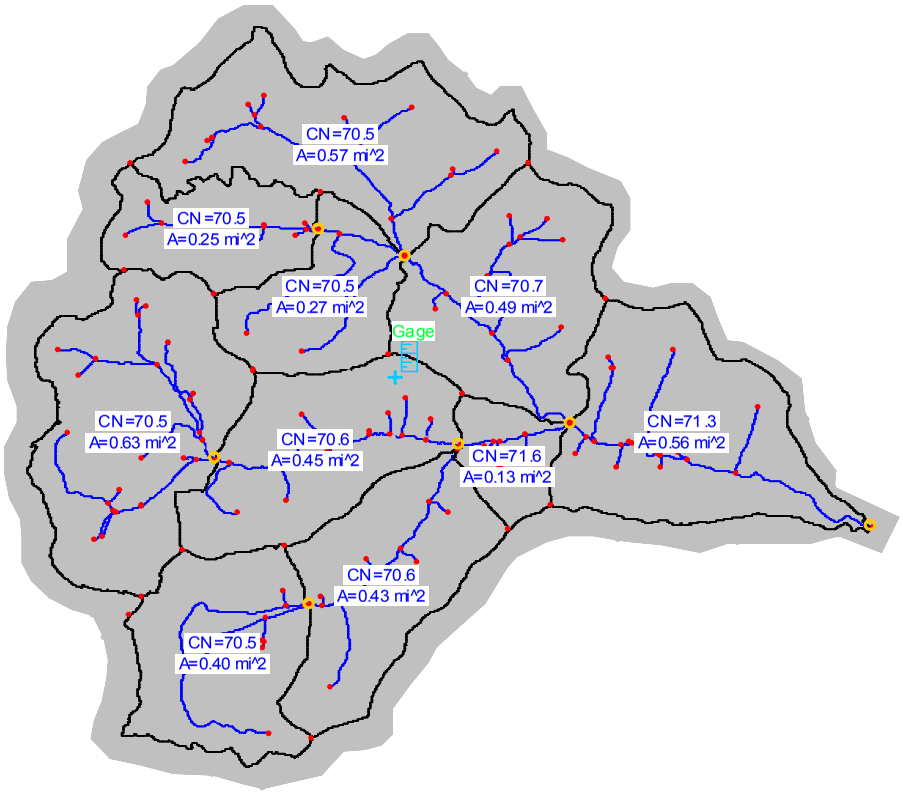
Scrabble Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography 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 Land Use



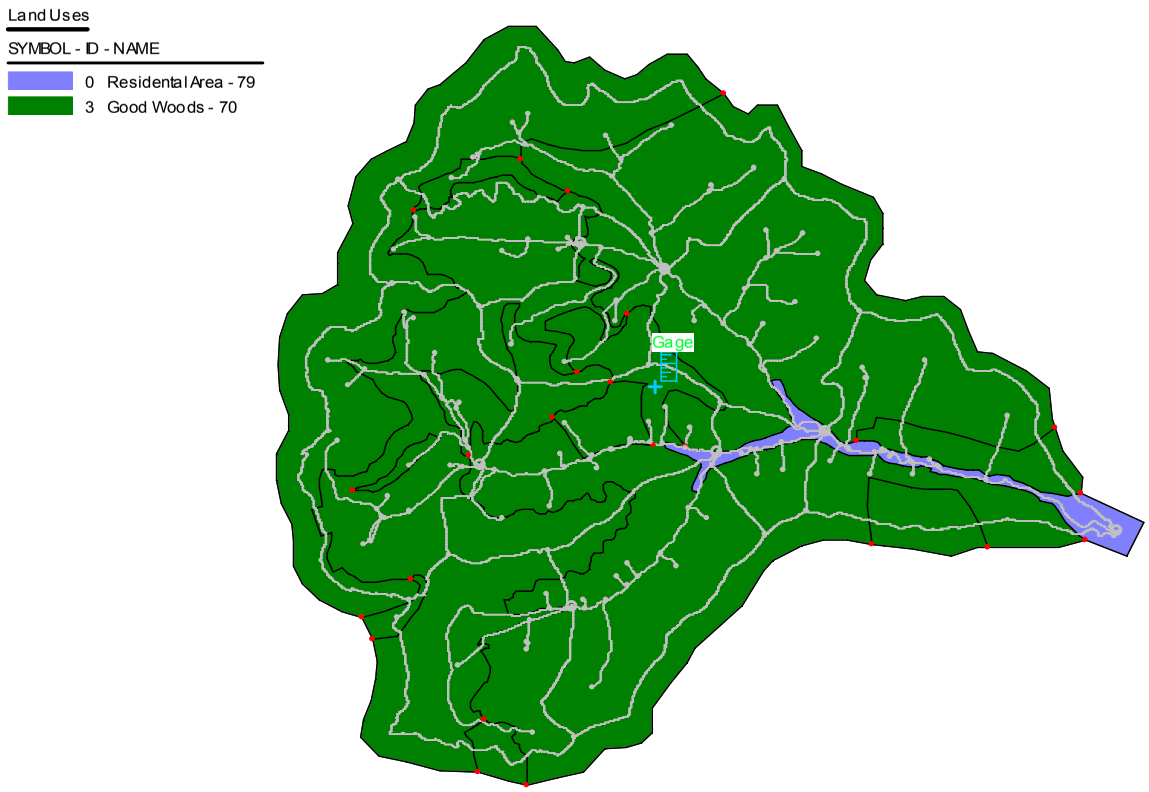
Scrabble Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography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



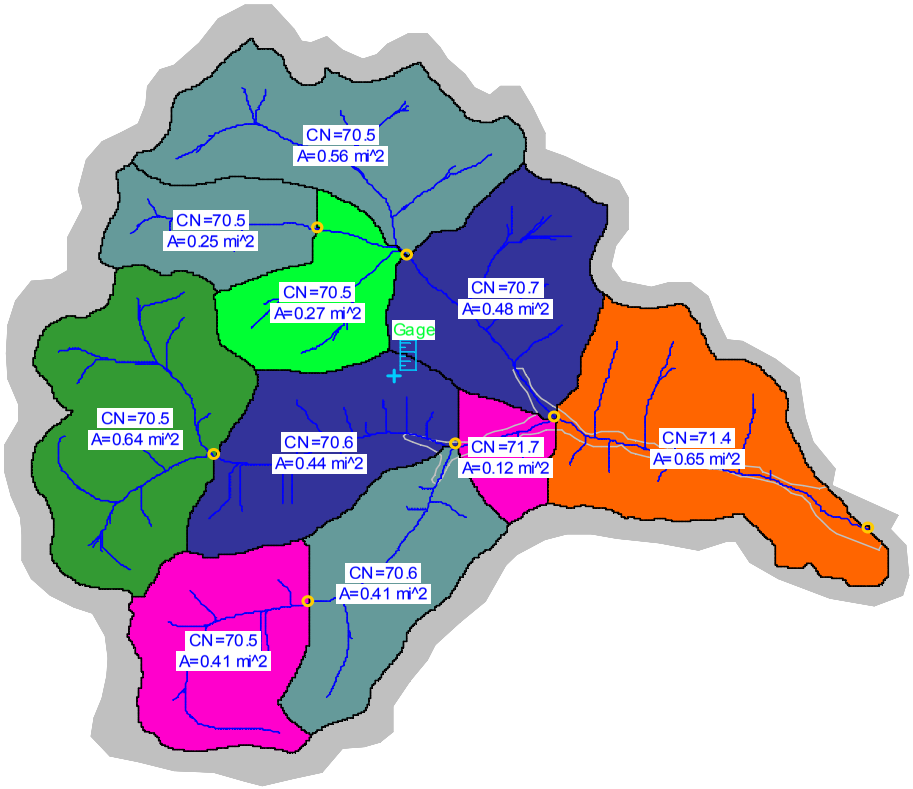
Scrabble Creek Watershed Hydrology Analysis	**Scenario 1** With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 2** Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	**Scenario 3** Without Logging (CN 70) With Reclaimed Mining (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 Land Use



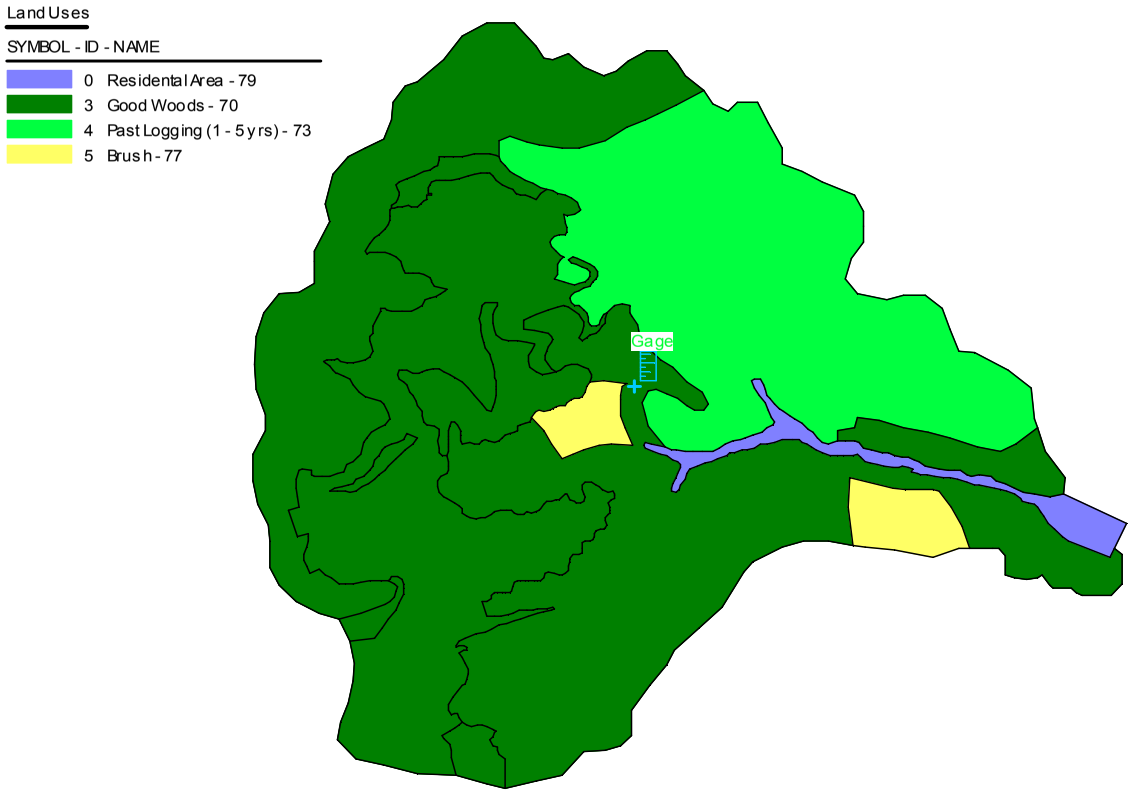
Scrabble Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography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



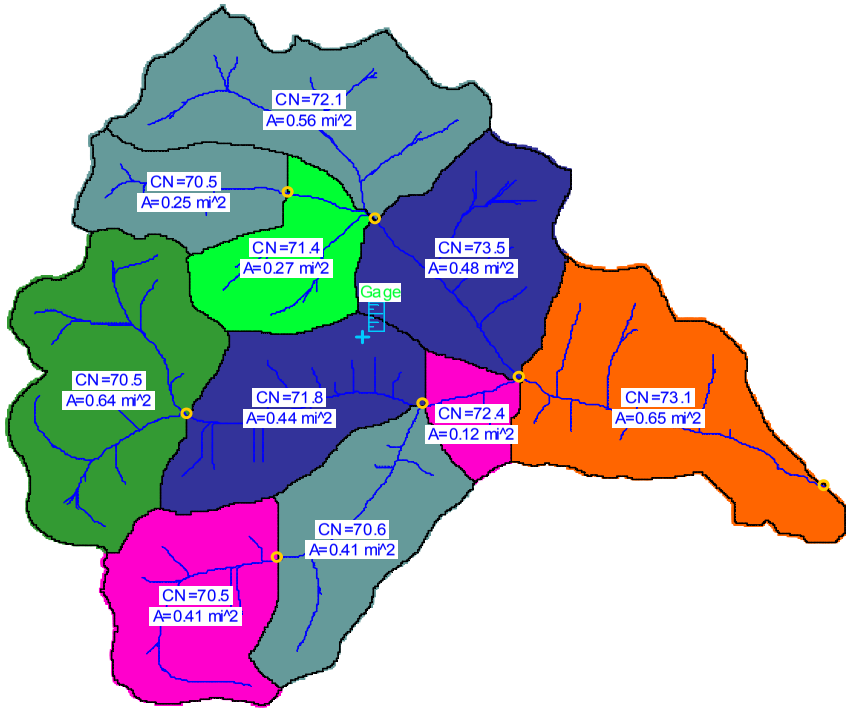
Scrabble Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography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

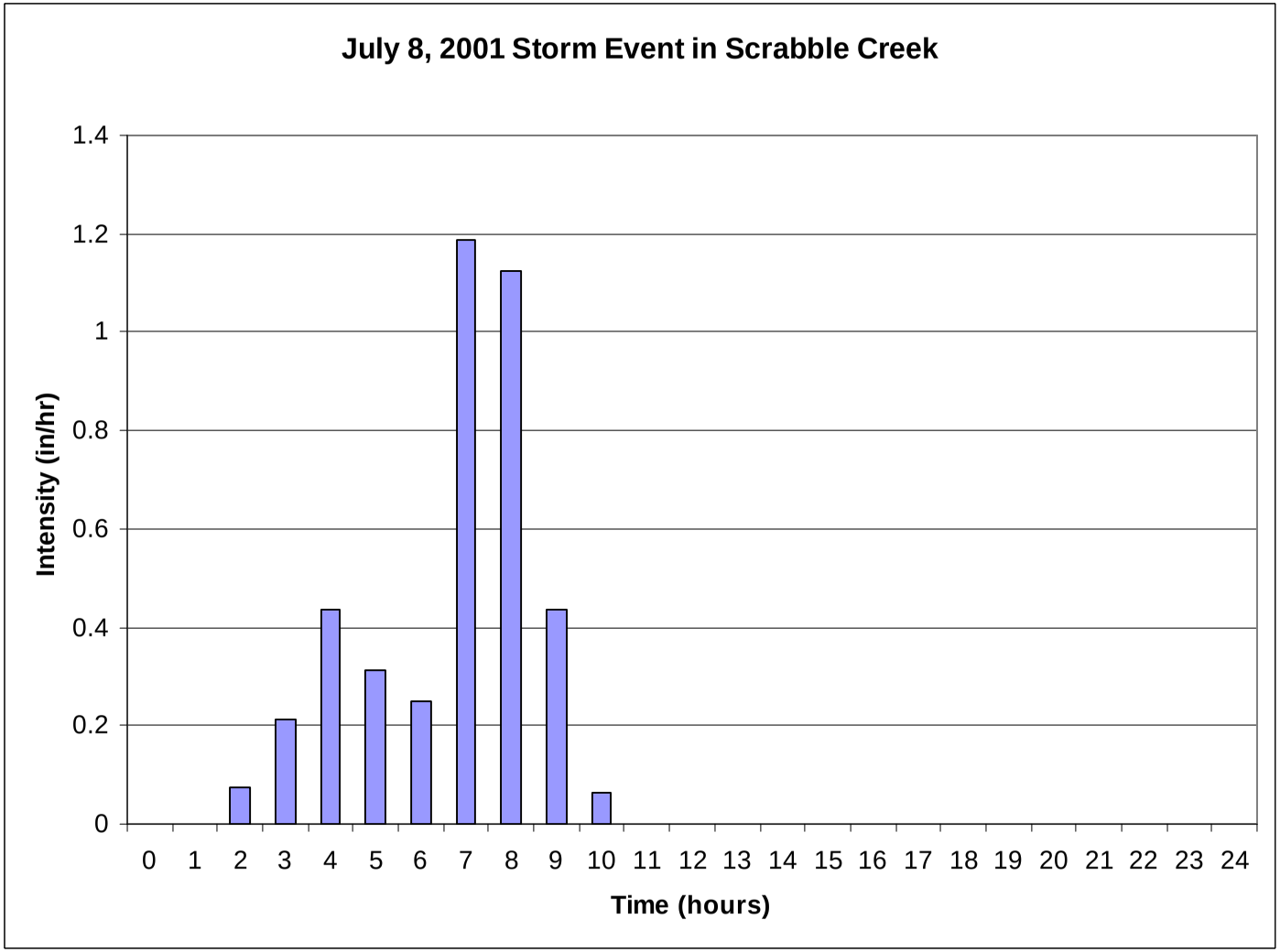
Scenario 5 Land Use

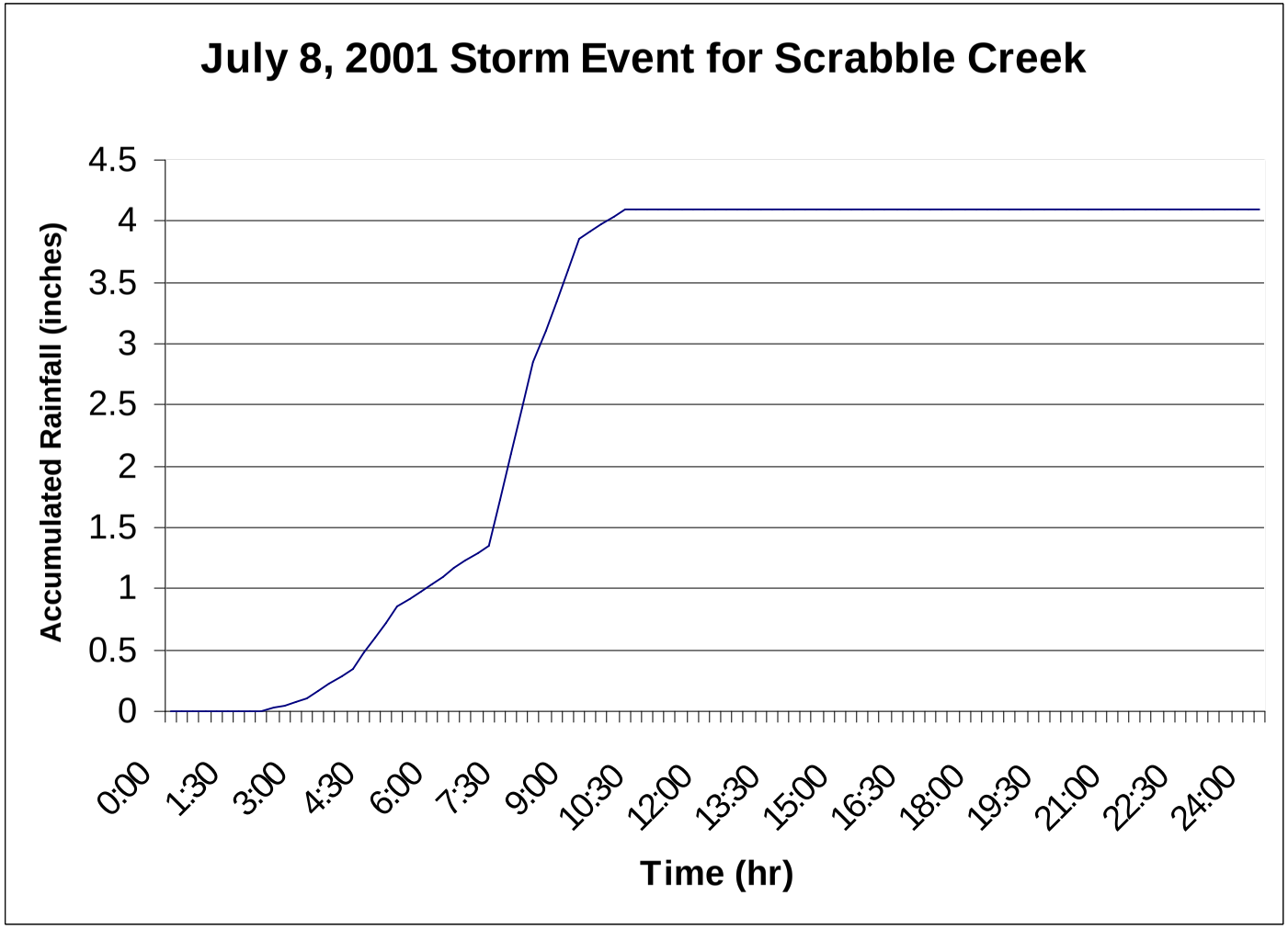


Scrabble Creek Watershed Hydrology Analysis	Scenario 1 With Logging (CN 70 & 73) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 2 Without Logging (CN 70) With Mining (CN 75 & 87) Topography w Mining (LIDAR Data)	Scenario 3 Without Logging (CN 70) With Reclaimed Mining (CN 70) Topography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

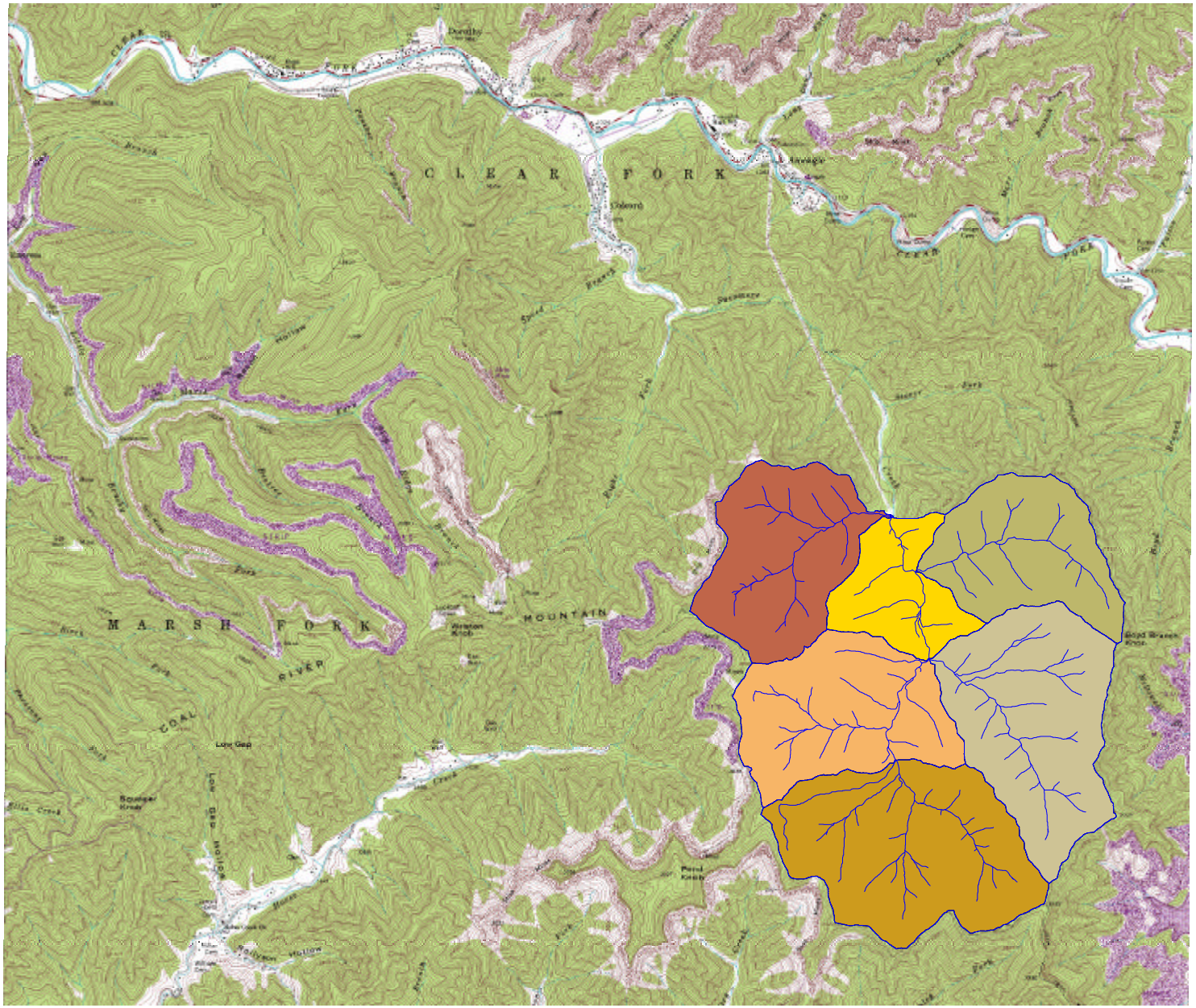
Scenario 5 Watershed Boundaries and Composite CN and Computed Areas




July 8, 2001 Storm Event in Scrabble Creek
Intensity (in/hr)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)


July 8, 2001 Storm Event for Scrabble Creek
Accumulated Rainfall (inches)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0:00
1:30
3:00
4:30
6:00
7:30
9:00
10:30
12:00
13:30
15:00
16:30
18:00
19:30
21:00
22:30
24:00
Time (hr)

Sycamore Creek Watershed



Streams

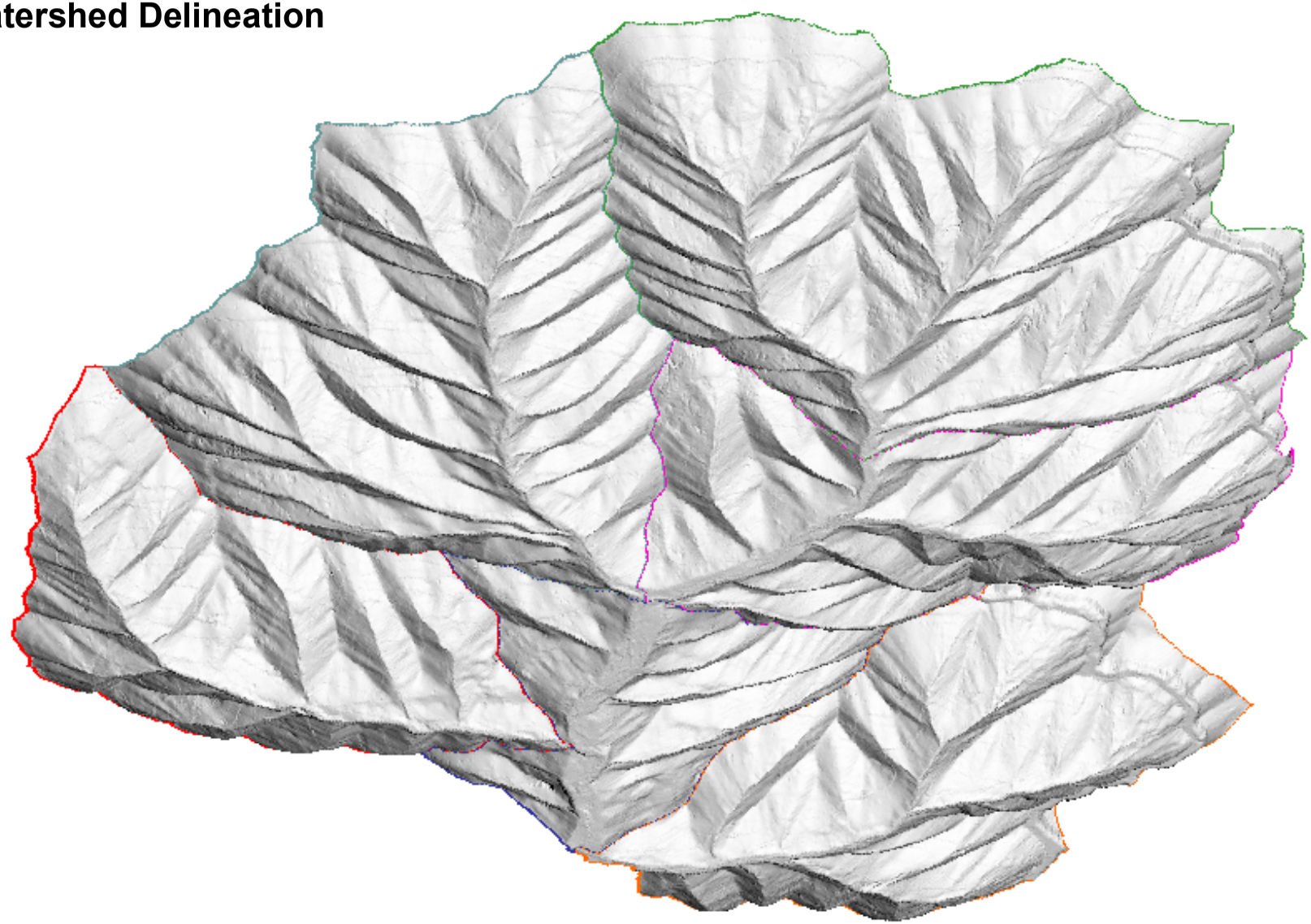
Drainage Areas

- 1aB
- 1bB
- 2B
- 3aB
- 3bB
- 4B

N
W E
S

Printed March 27, 2002

Sycamore Creek LIDAR
3D View
Watershed Delineation



Sycamore Creek LIDAR
Plan View
Watershed Delineation

Sycamore Creek Study Area

Legend

Sycamore Creek Watershed Boundaries

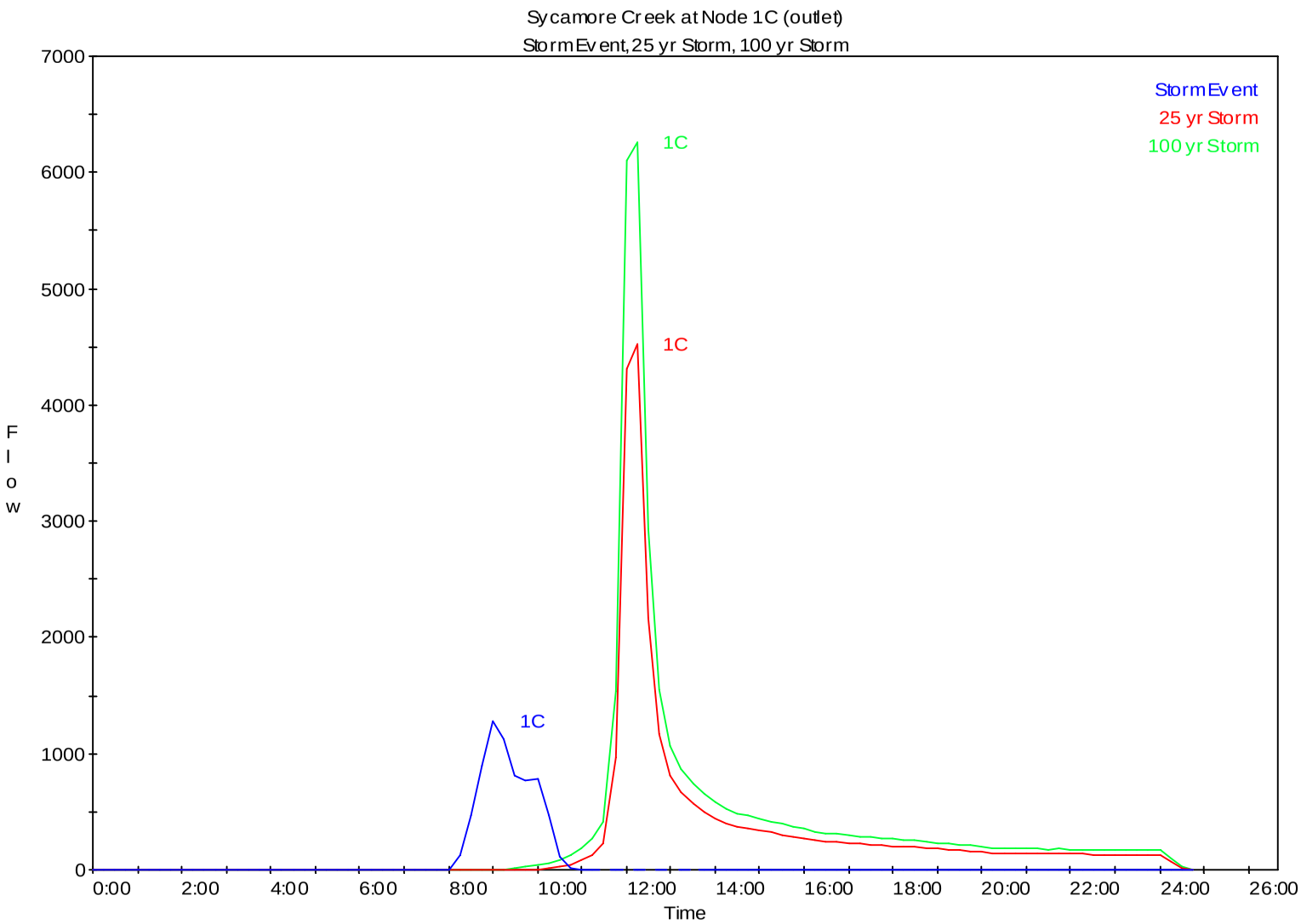
N
W E
S

3000 0 3000 6000 Feet

TAGIS

Sycamore Creek Hydrology Analysis

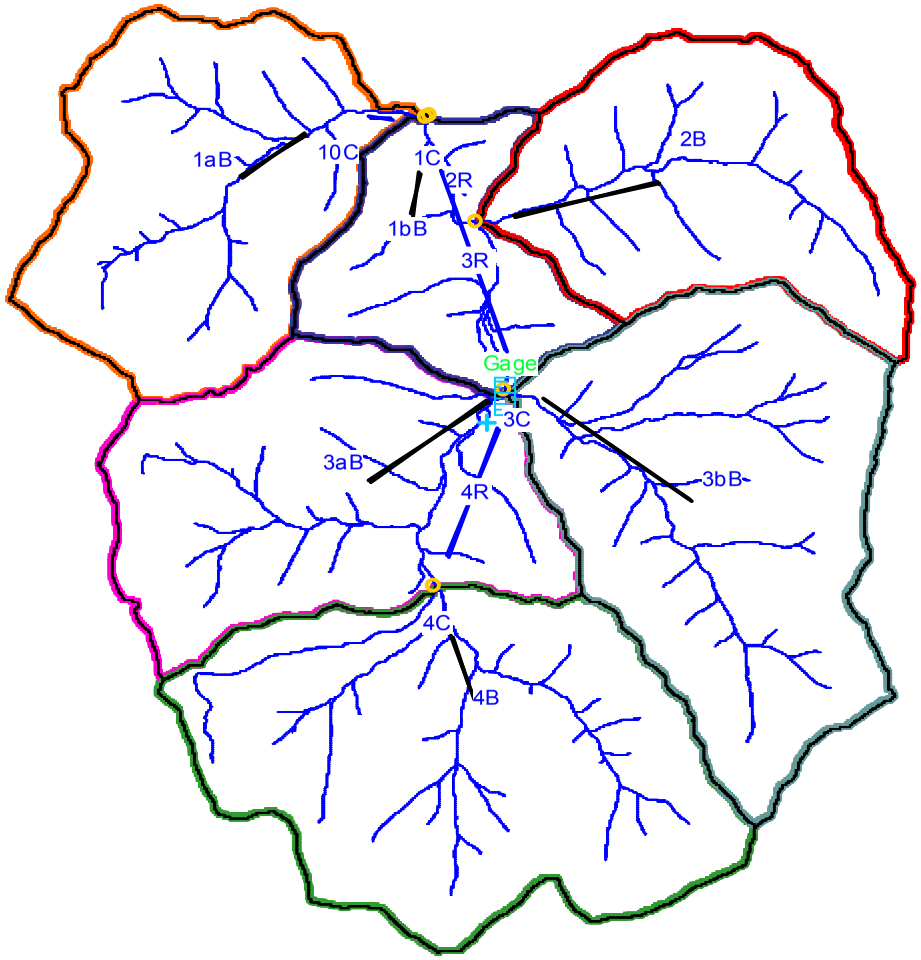
Bottom of Sycamore Creek	Storm Event	25 Yr Storm	100 yr Storm
Max Flow	*1211*	*4378*	*6078*

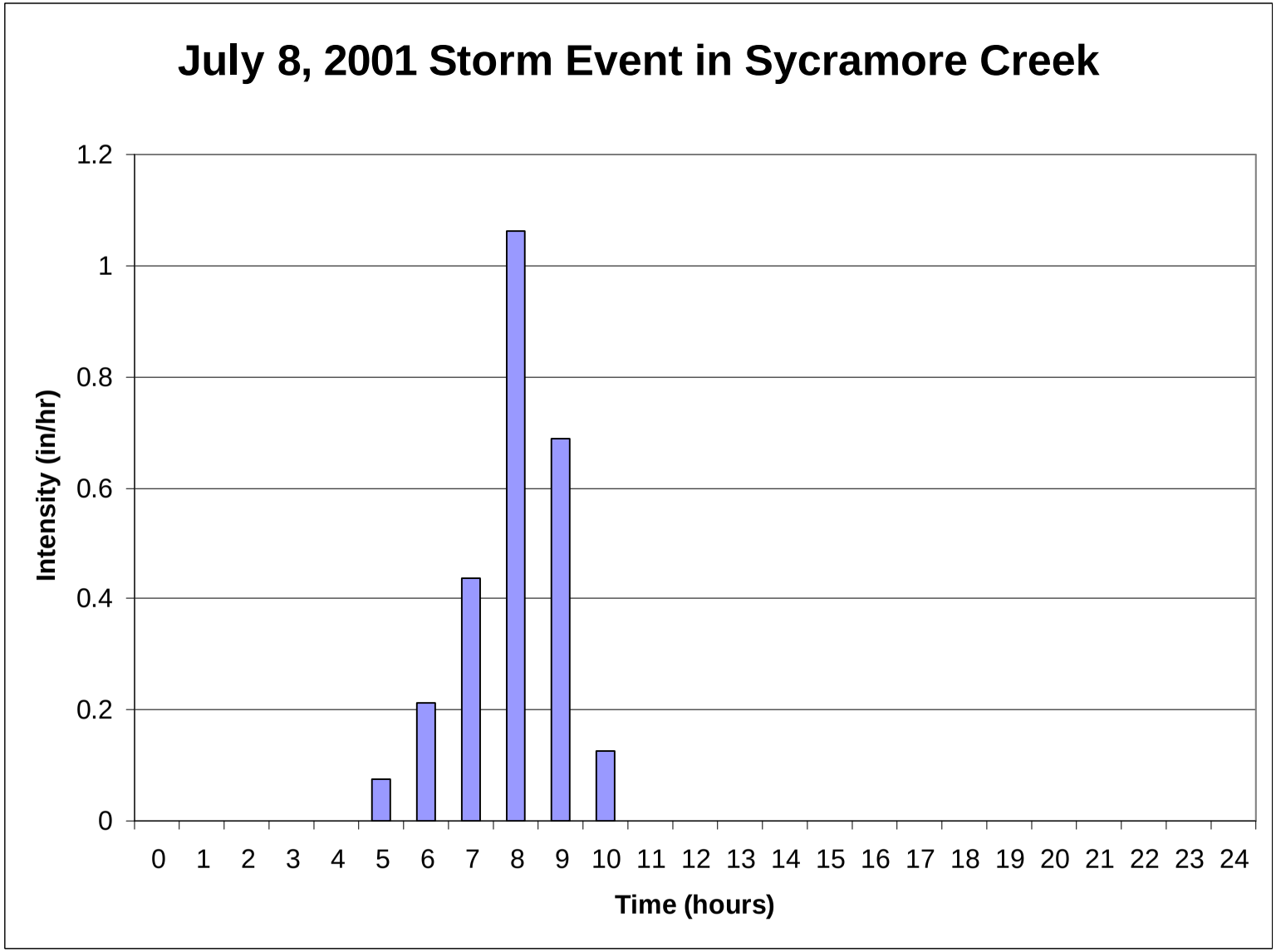


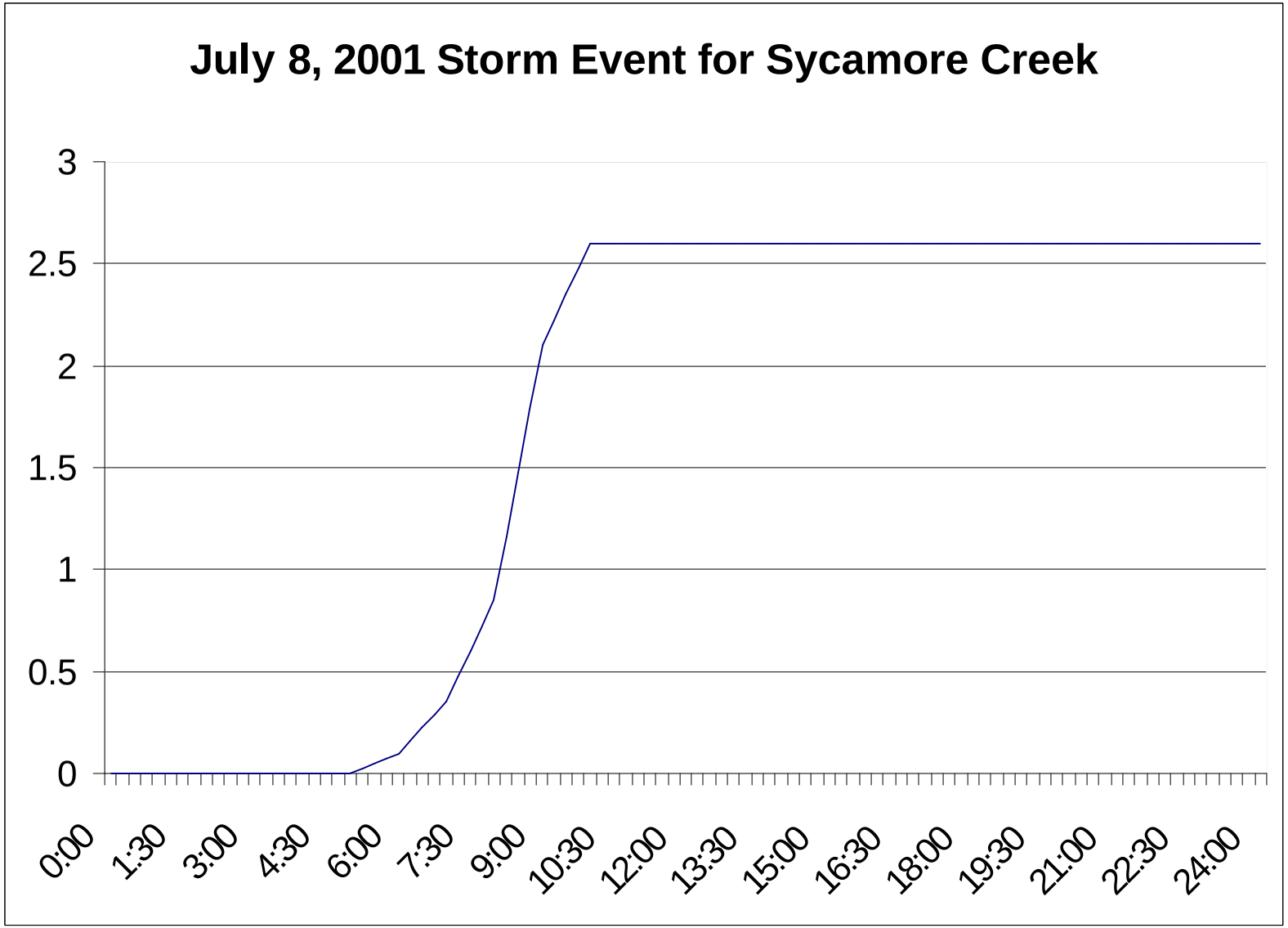
Sycamore Creek	LIDAR (wo Mining & wo Logging)		
Outlet Node	Event	25 yr	100 yr
1C	1211	4378	6078
2C	198	901	1255
3C	840	3374	4737
4C	333	1513	2109

9 fps

Watershed Delineation and Basin / Outlet / Routing Naming




July 8, 2001 Storm Event in Sycramore Creek
Intensity (in/hr)
1.2
1
0.8
0.6
0.4
0.2
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)


July 8, 2001 Storm Event for Sycamore Creek
3
2.5
2
1.5
1
0.5
0
0:00
1:30
3:00
4:30
6:00
7:30
9:00
10:30
12:00
13:30
15:00
16:30
18:00
19:30
21:00
22:30
24:00