USDA FOREST SERVICE

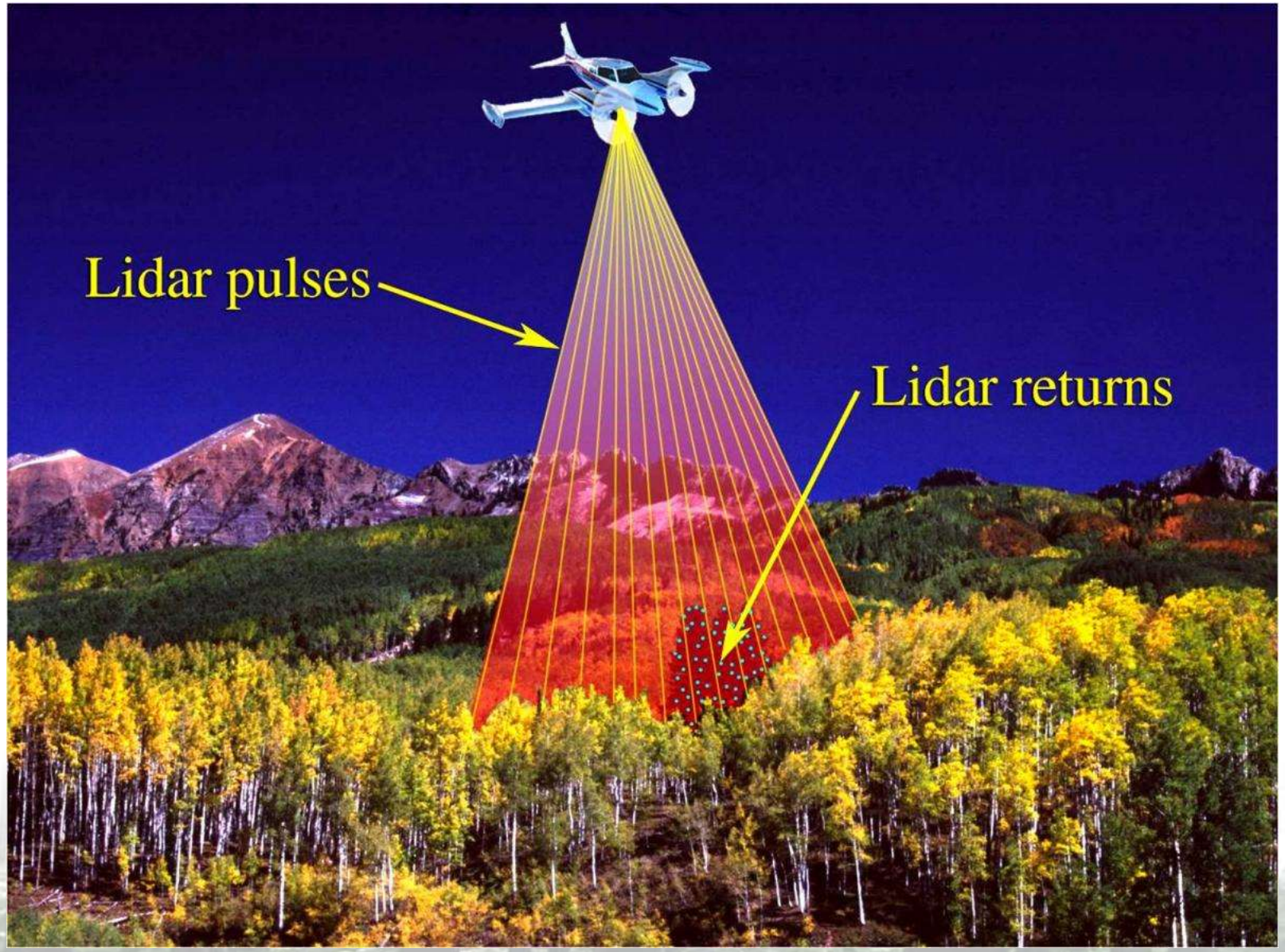
The multiple uses of LiDAR

CDA Basin WAG

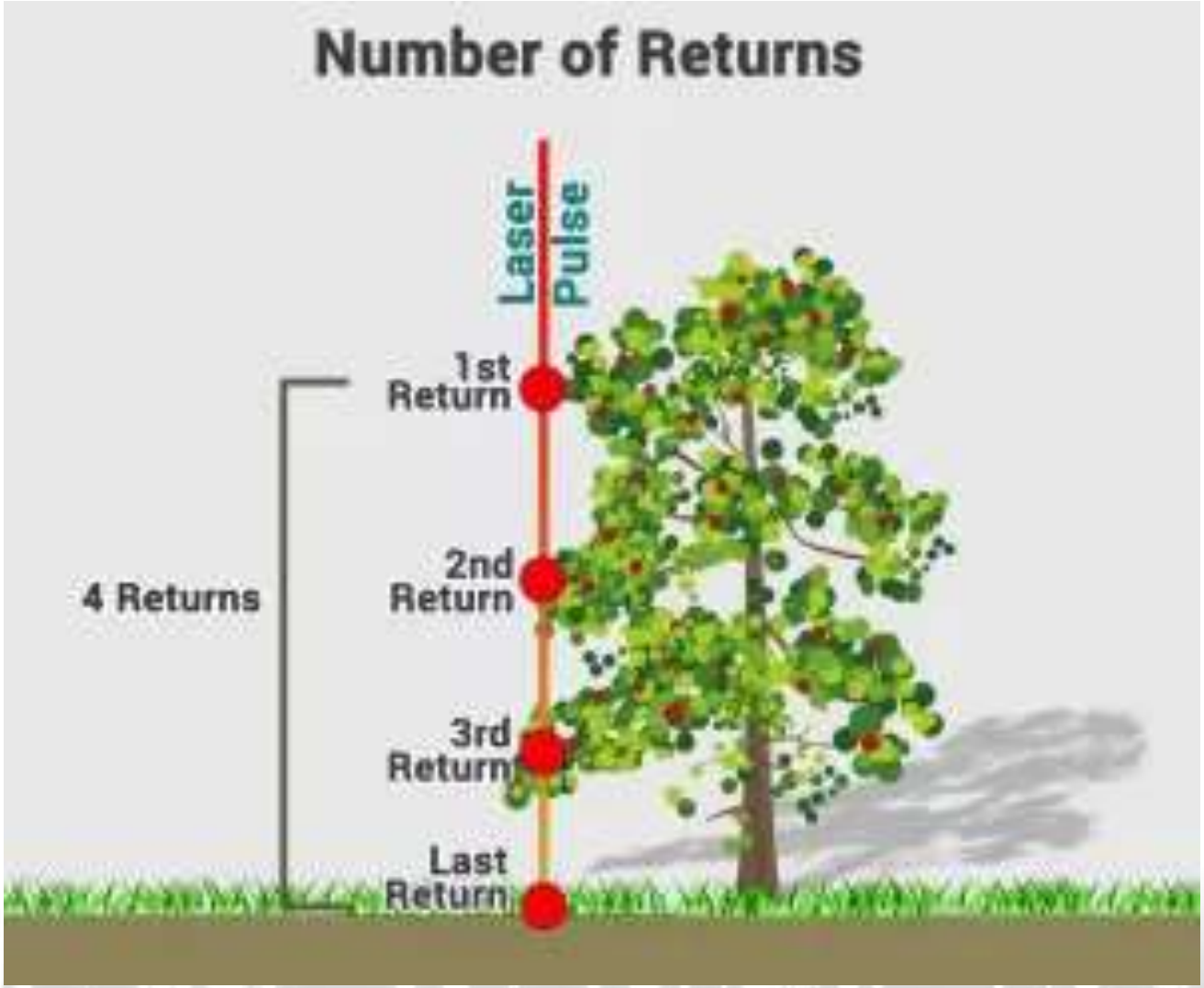
June 22nd, 2017

Melissa Hendrickson

What is LiDAR?



LiDAR Returns



- Distance = (Speed of Light x Time of Flight)/2

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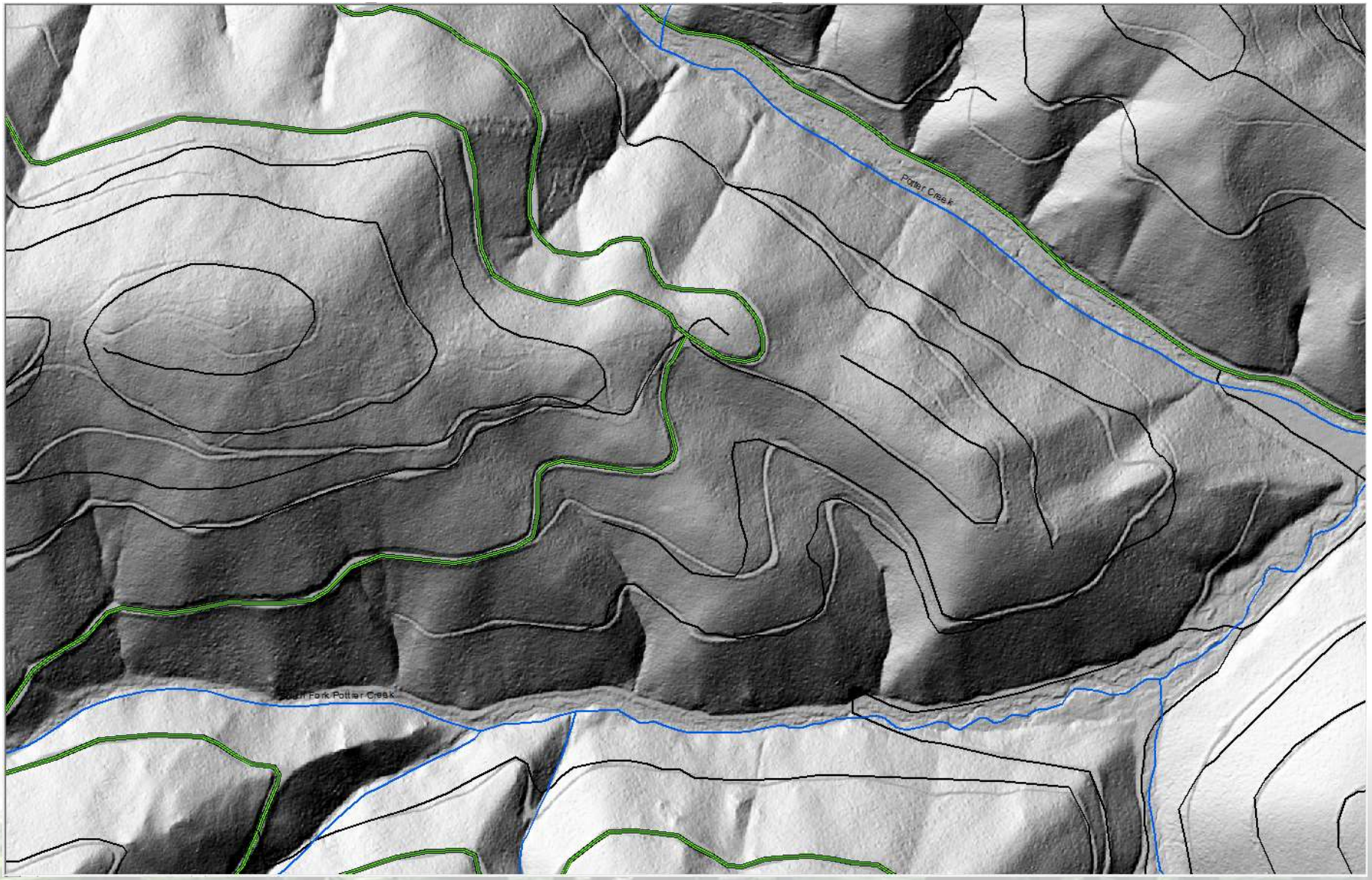
Correcting our Existing GIS Databases



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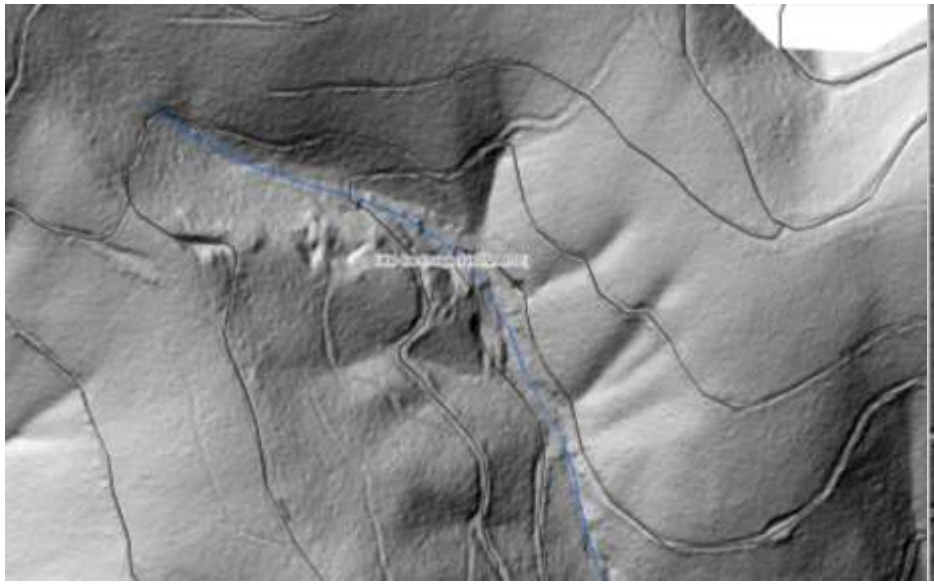
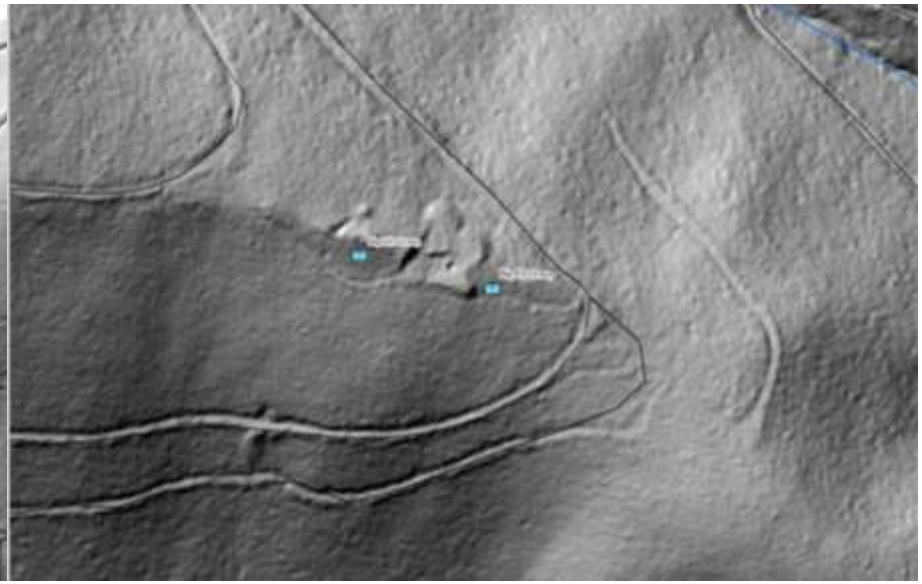
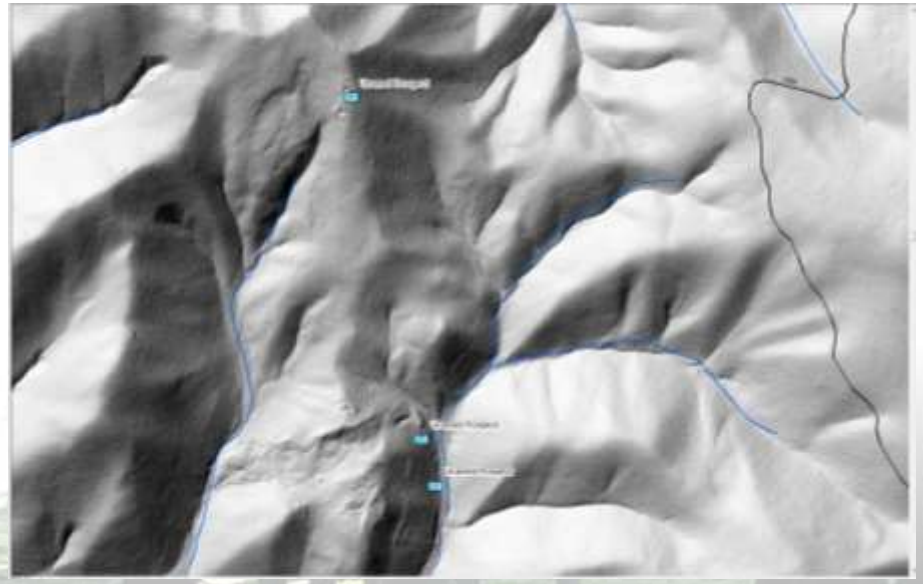
Mining and Geology







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Land Form Stability

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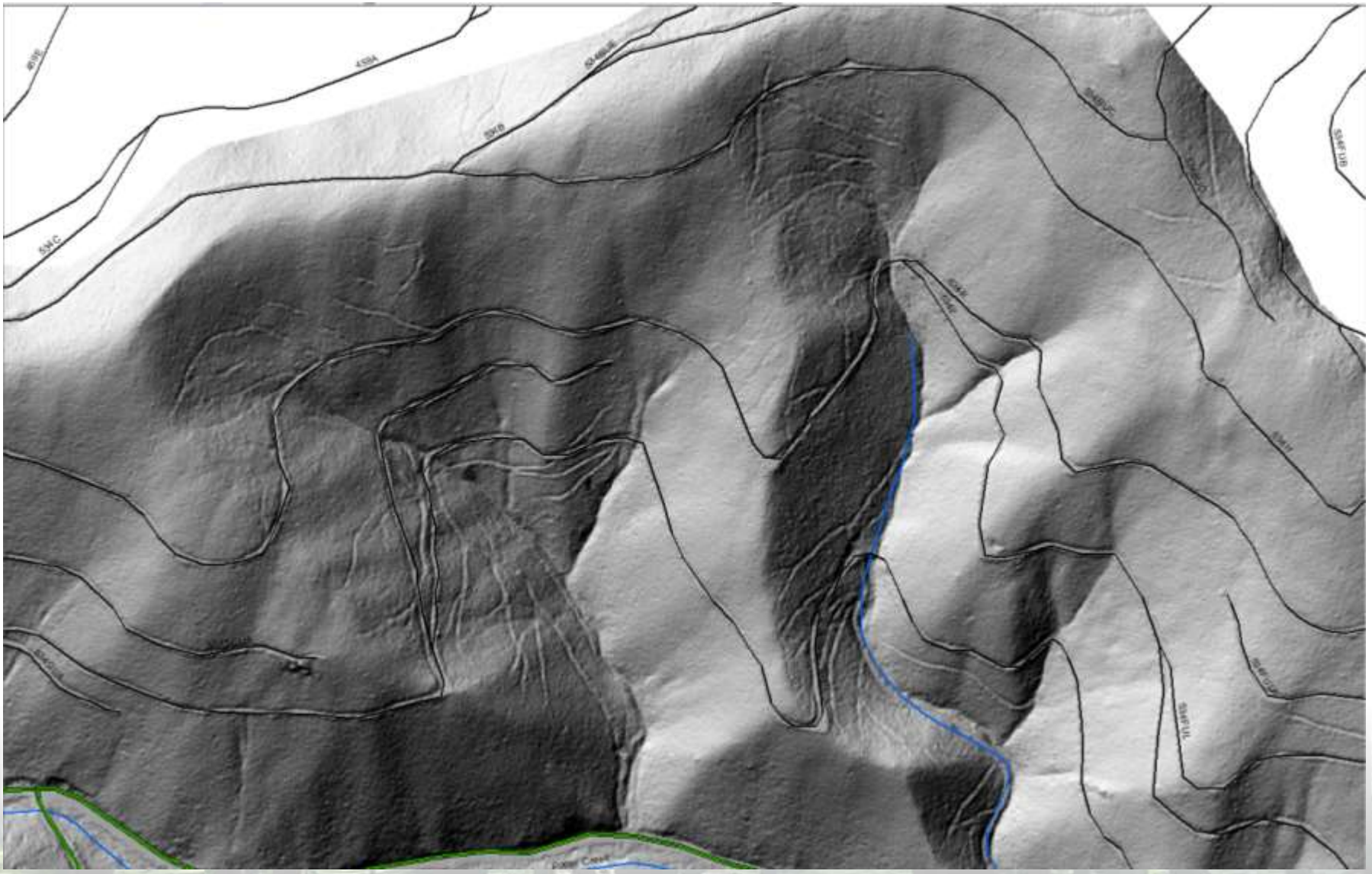
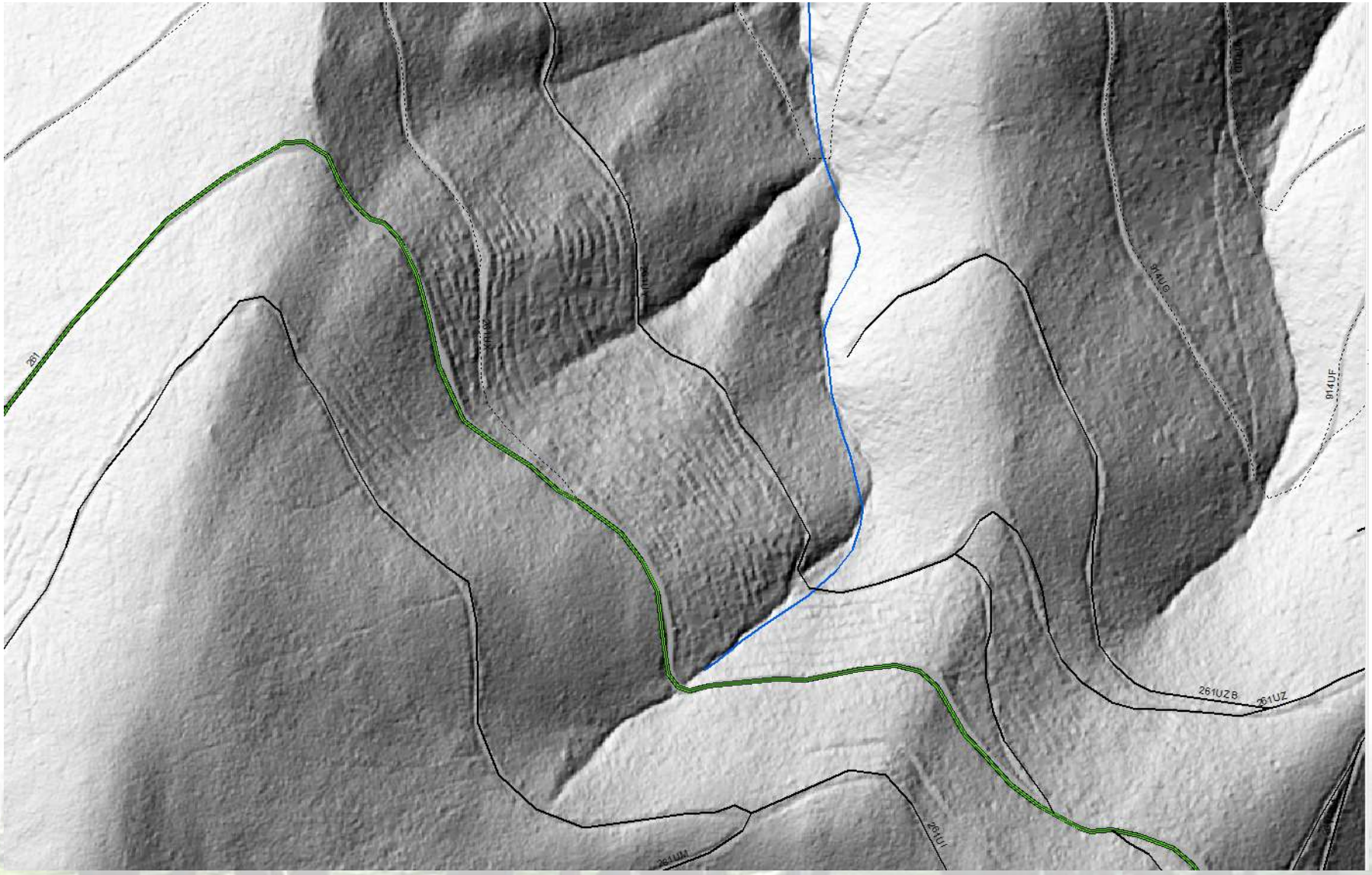
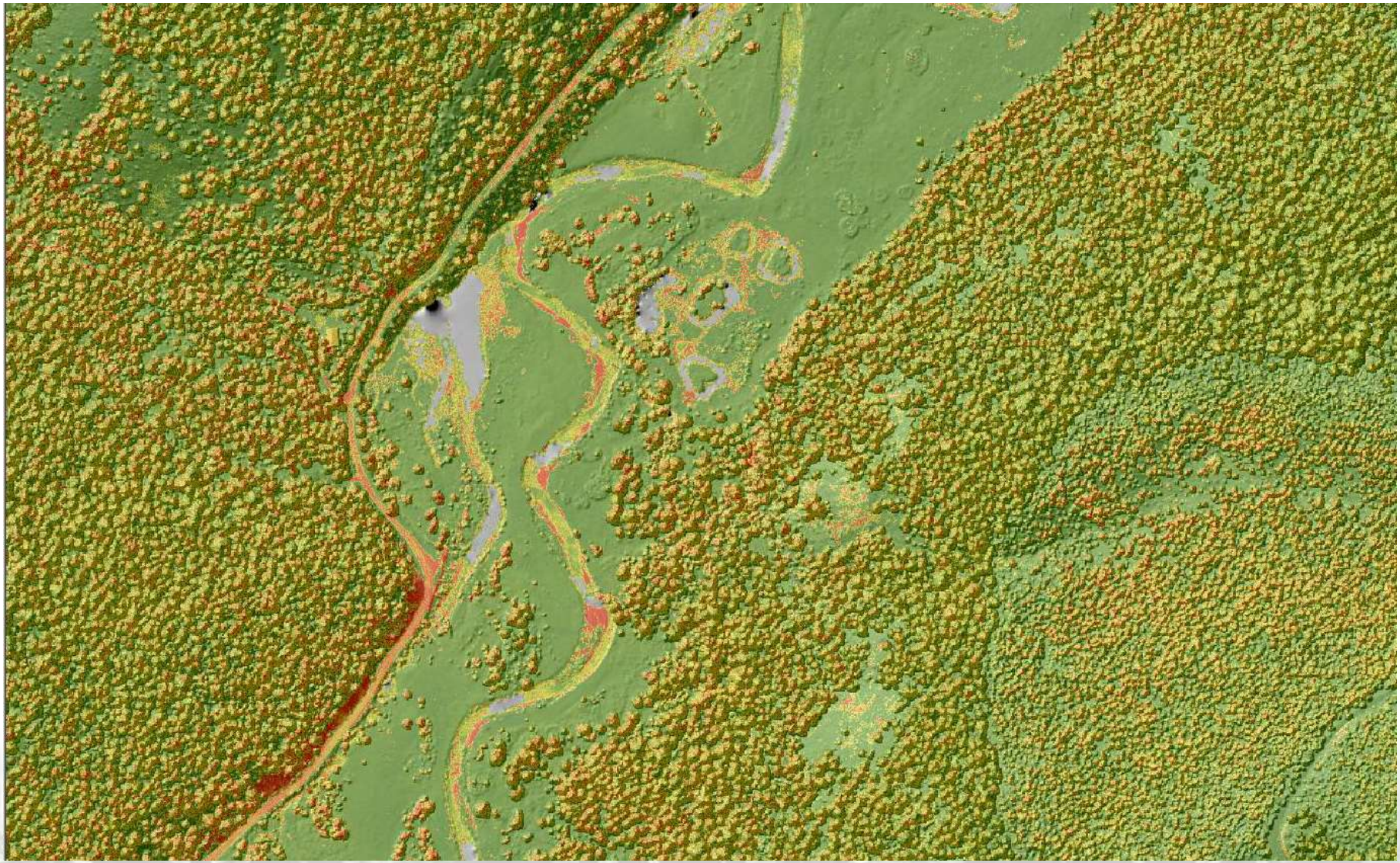
Confirming old Ground based units



Terracing



Intensity



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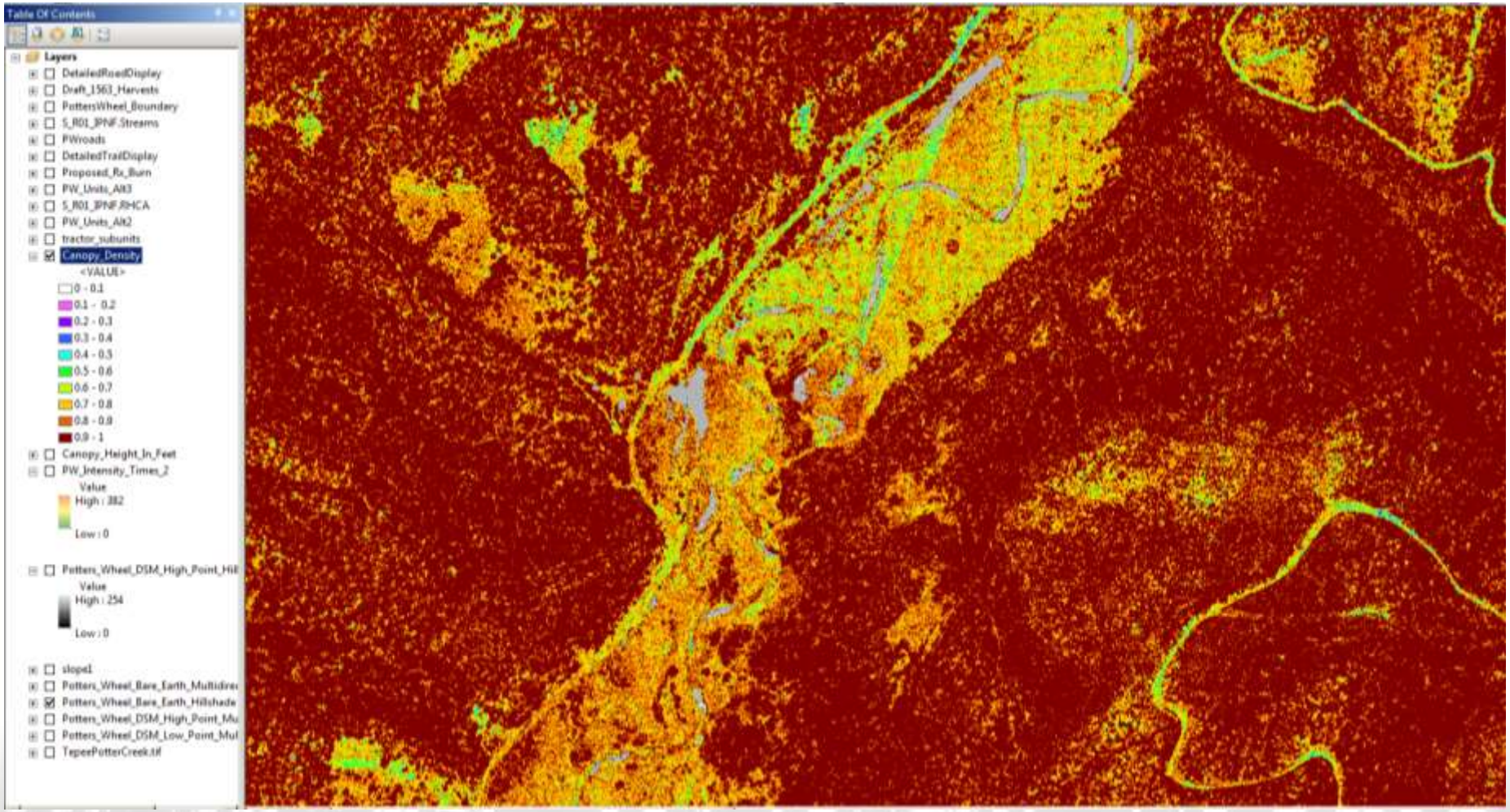
Canopy Density



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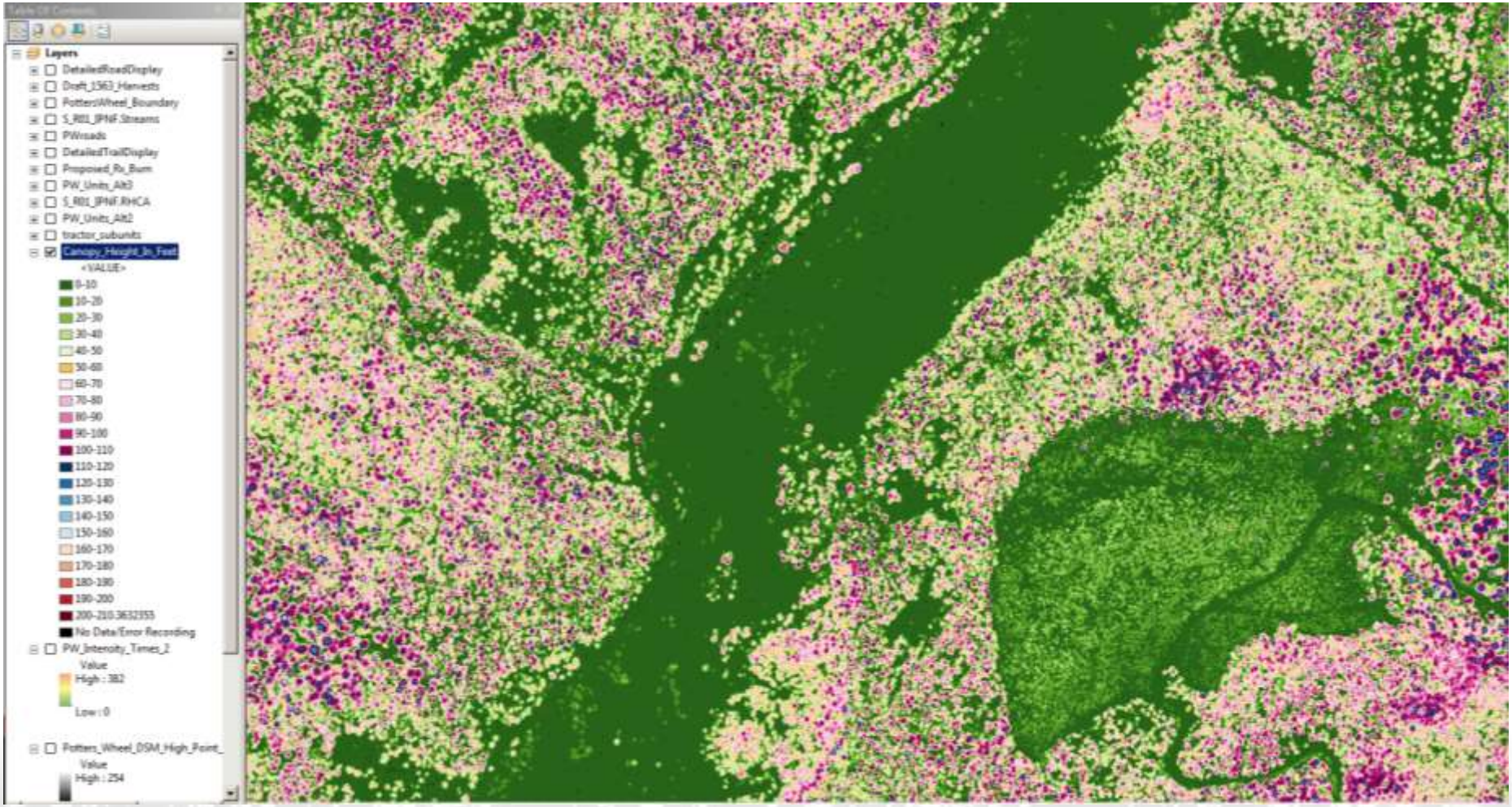
Canopy Height



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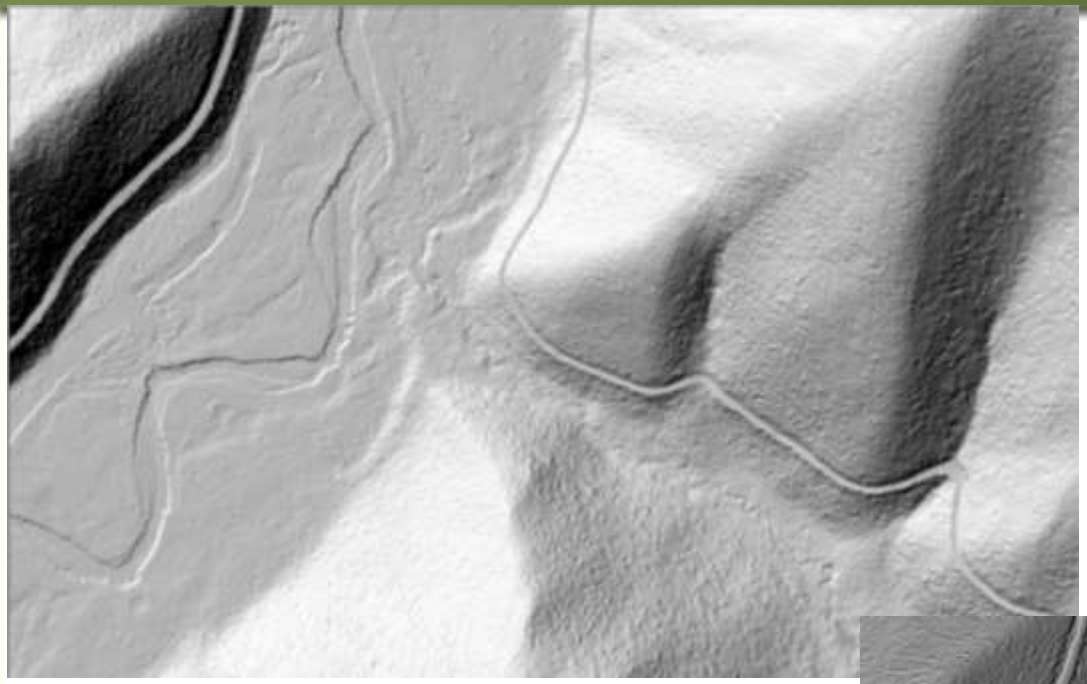
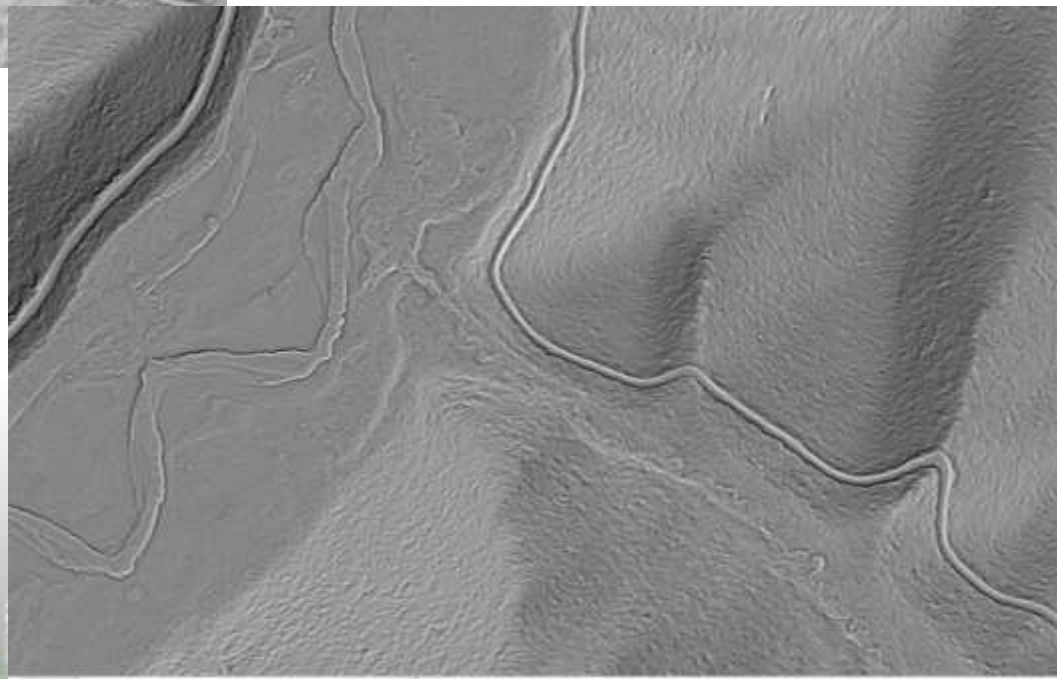
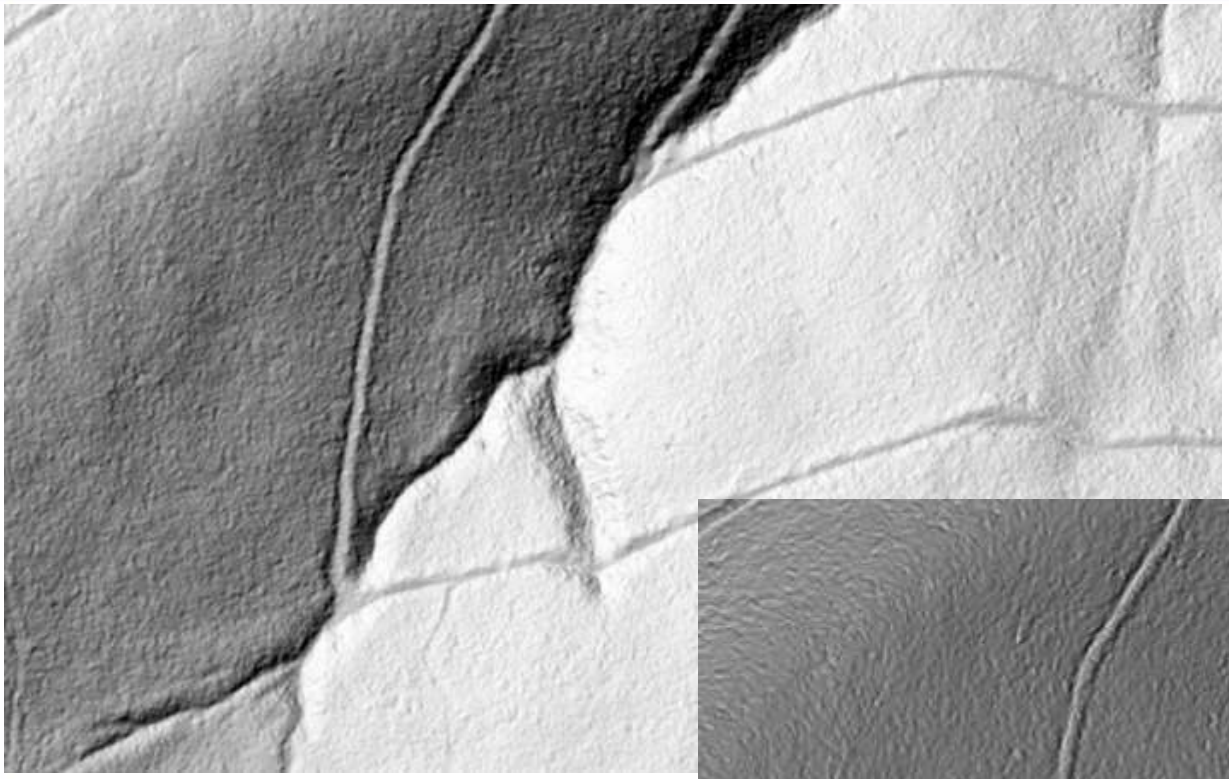
Curvature

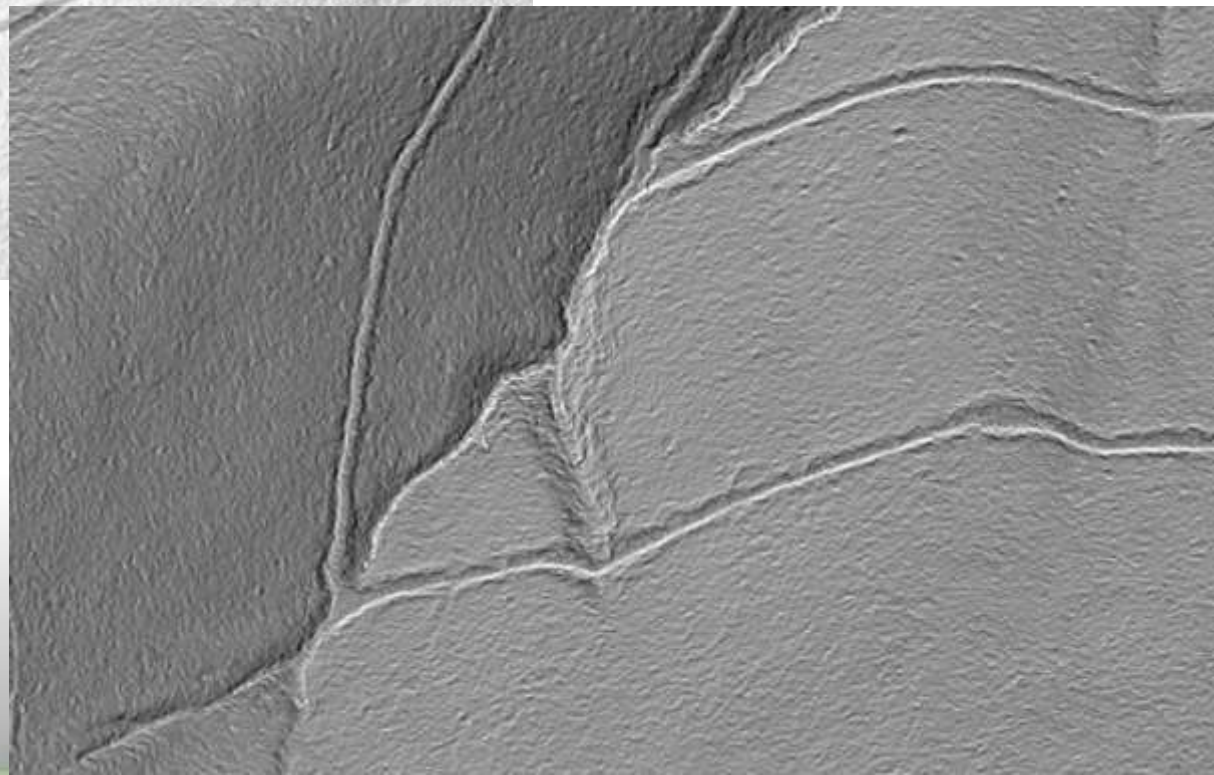




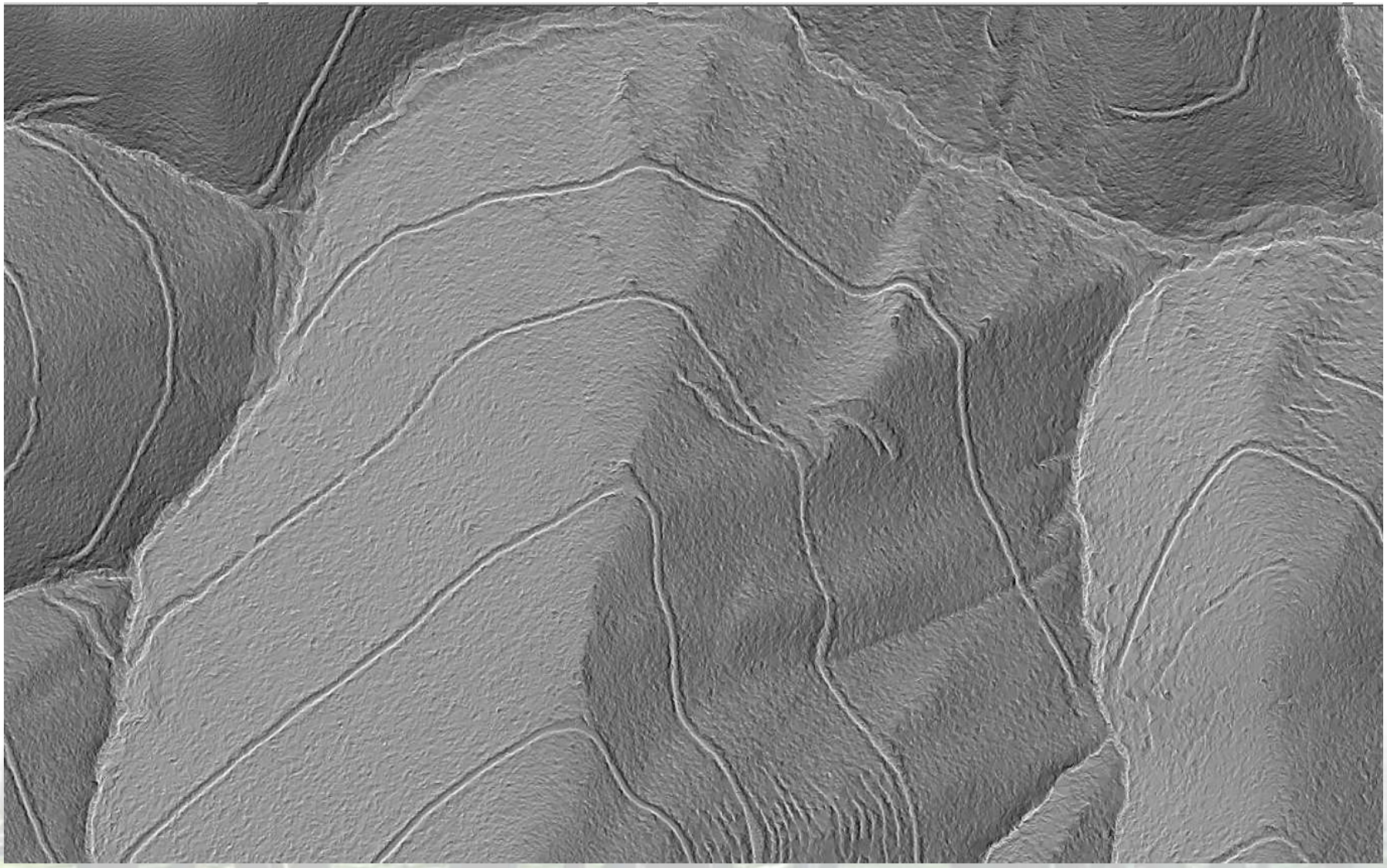
USDA FOREST SERVICE

Curvature





Verify Previous Work



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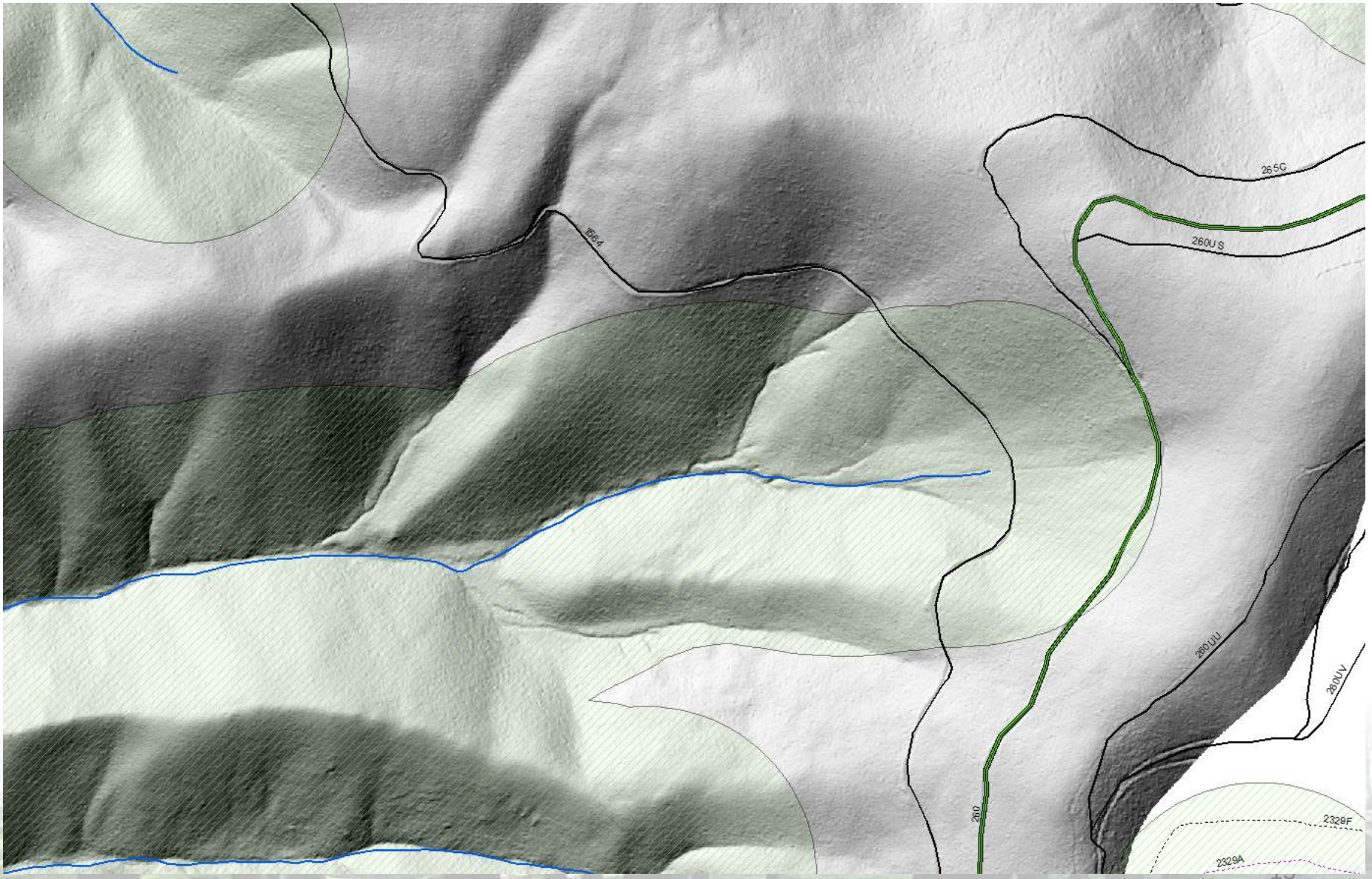
Prioritize Watershed surveys



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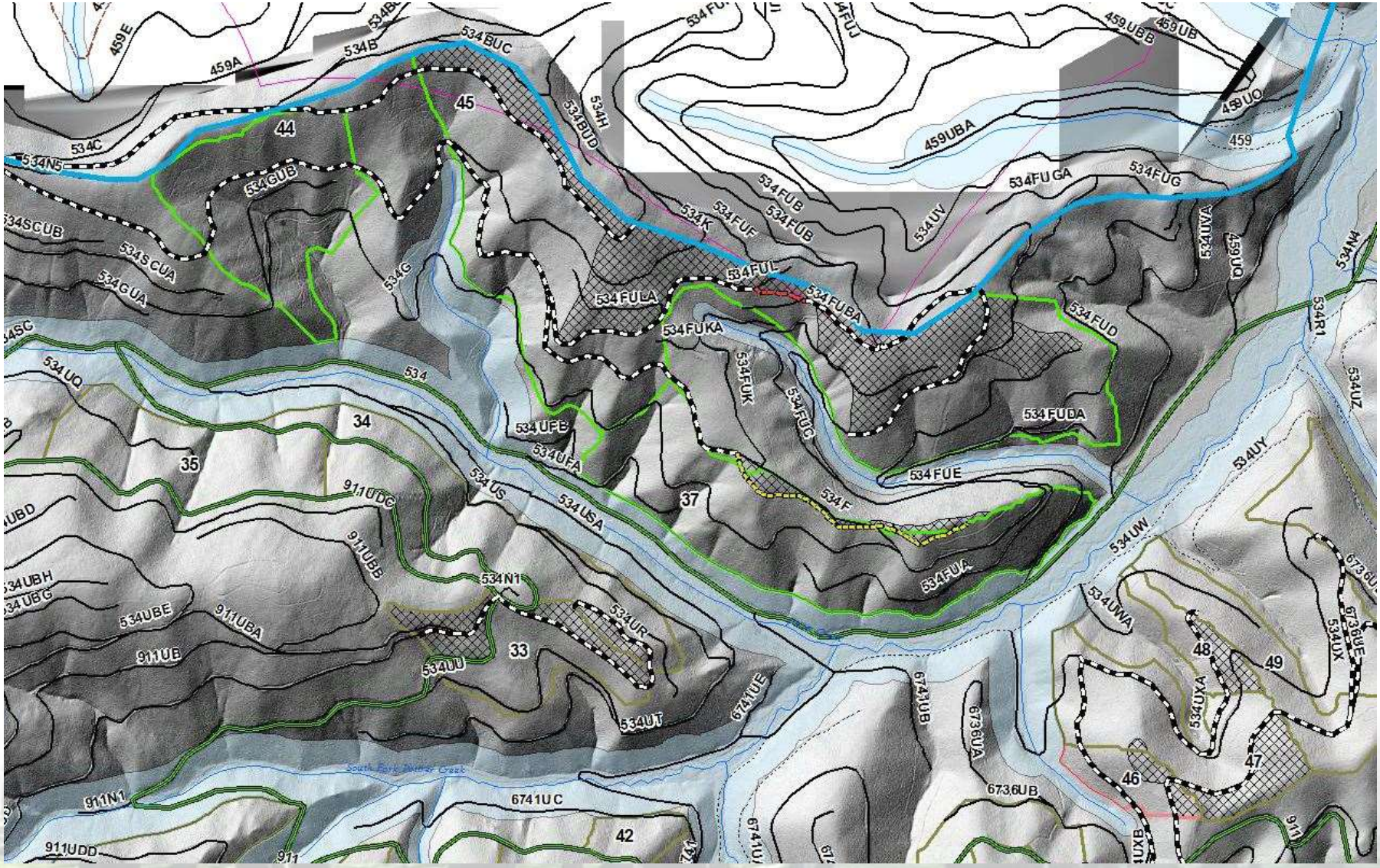
Wildlife



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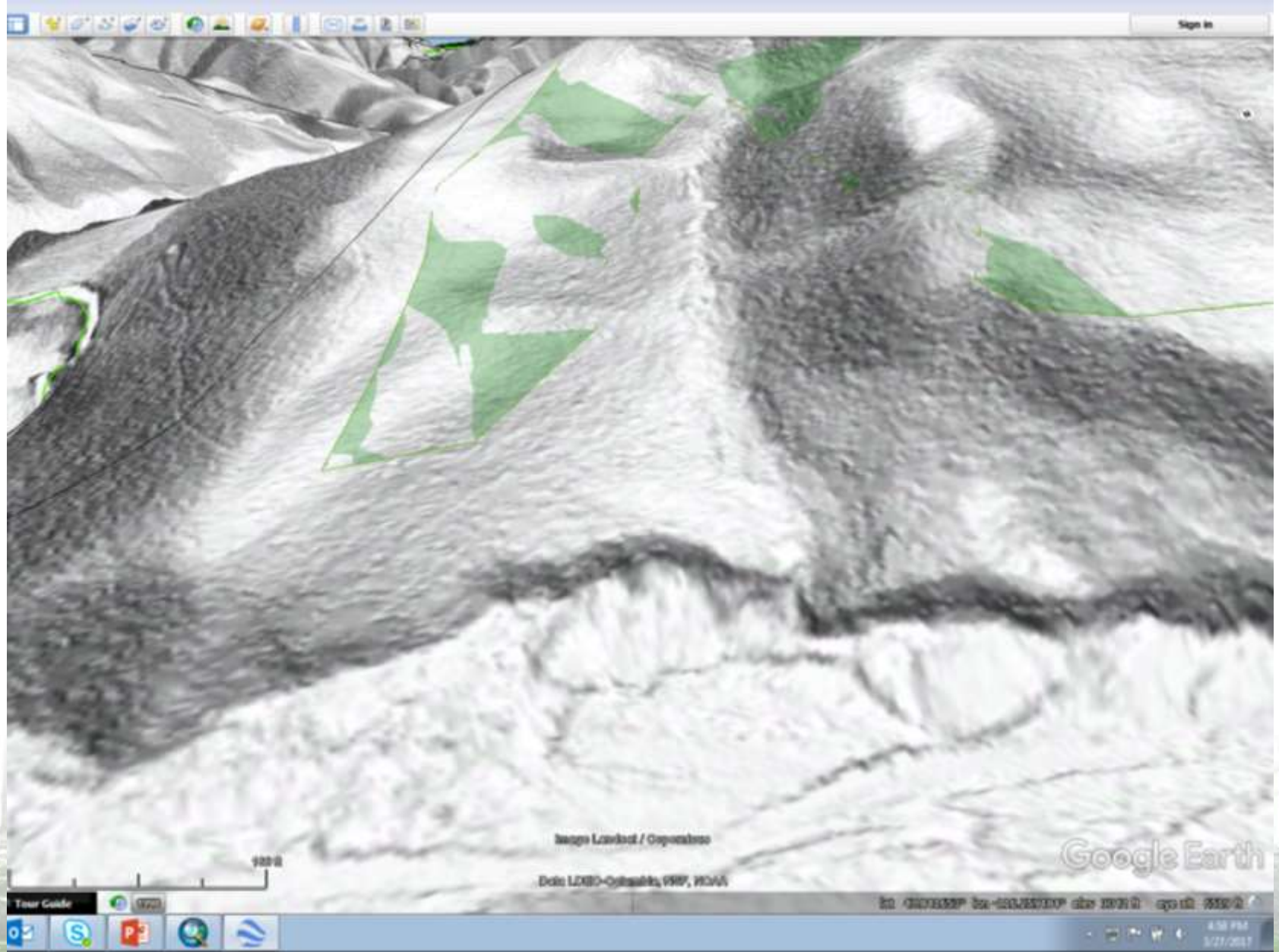
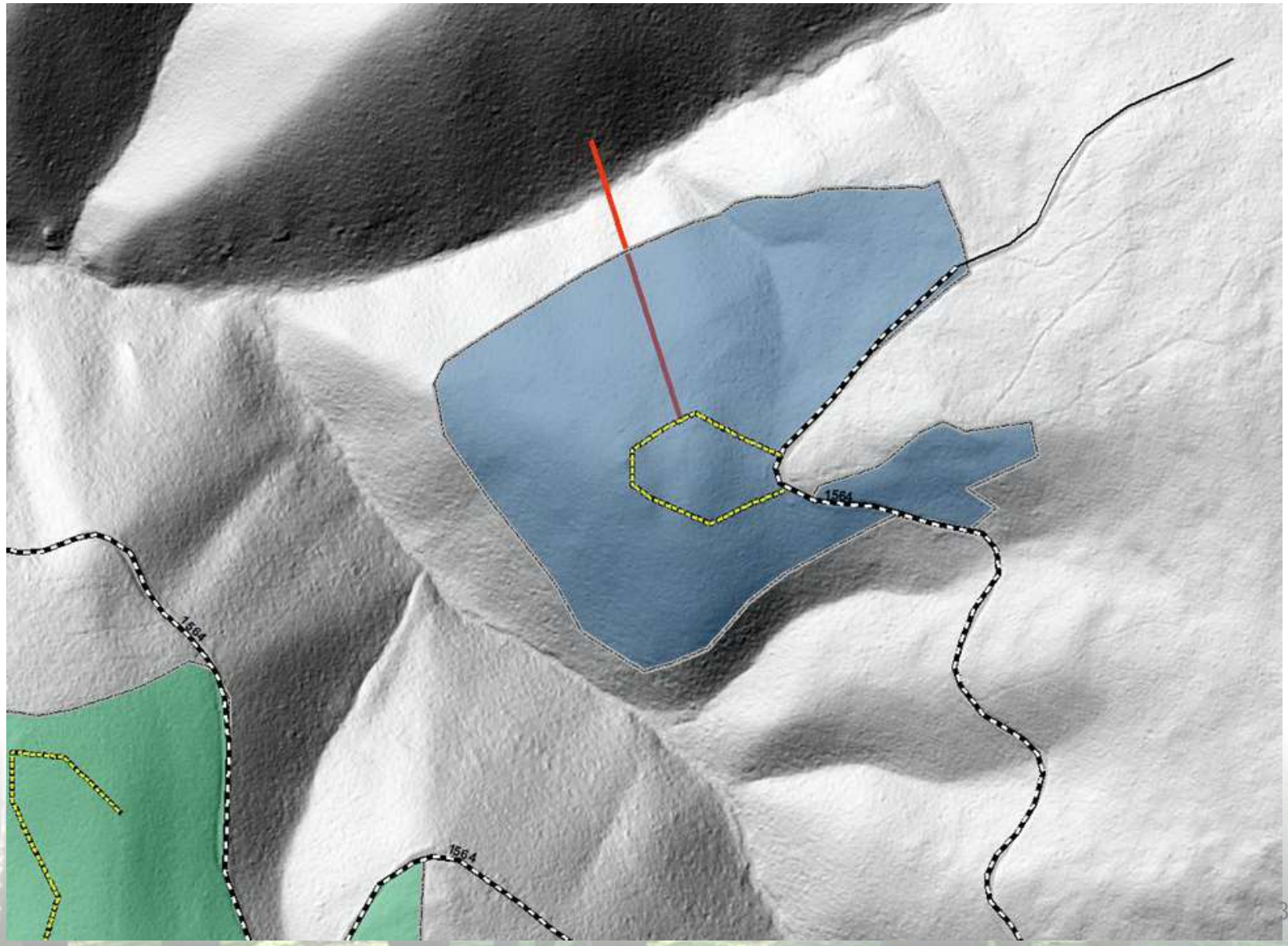
Recreation



Setting up of logging units



SkylineXL 15.1 Skyline Analysis - Analysis Input - Standing Skyline System

Analysis type	Selected yarder	Selected carriage
Standing	Avg medium yarder - 3 drum	Eagle Eaglet, motorized

goto Phase 2

clear load path

Supports Table	At terrain point	Rigging height (ft)
head spar	1	45
tail spar	23	5
int support 1		
int support 2		
int support 3		

print phase 1 analysis

refresh view

create new terrain point on profile

Yarding Parameters Table	Inner dist terrain pt.	Outer dist terrain pt
yarding limits	2	12

landing cut (-) or fill (+) - (ft)

To change the yarder and/or the carriage, navigate to the "Yarders & Carriages" screen and make new selection(s).

Log Geometry Table	
tag length - (ft)	10.0
log length - (ft)	32.0
log diameter - (in)	12.00

Min payload-(lbs)	At terrain point
2,233	10

Susp. type	Log Susp. and Clearance Table	Log clearance (ft)
partial		1.5

Analysis name:

Units: English

Pro date:

Data source:

Pro name:

Analysis phase: 1

Analyst:

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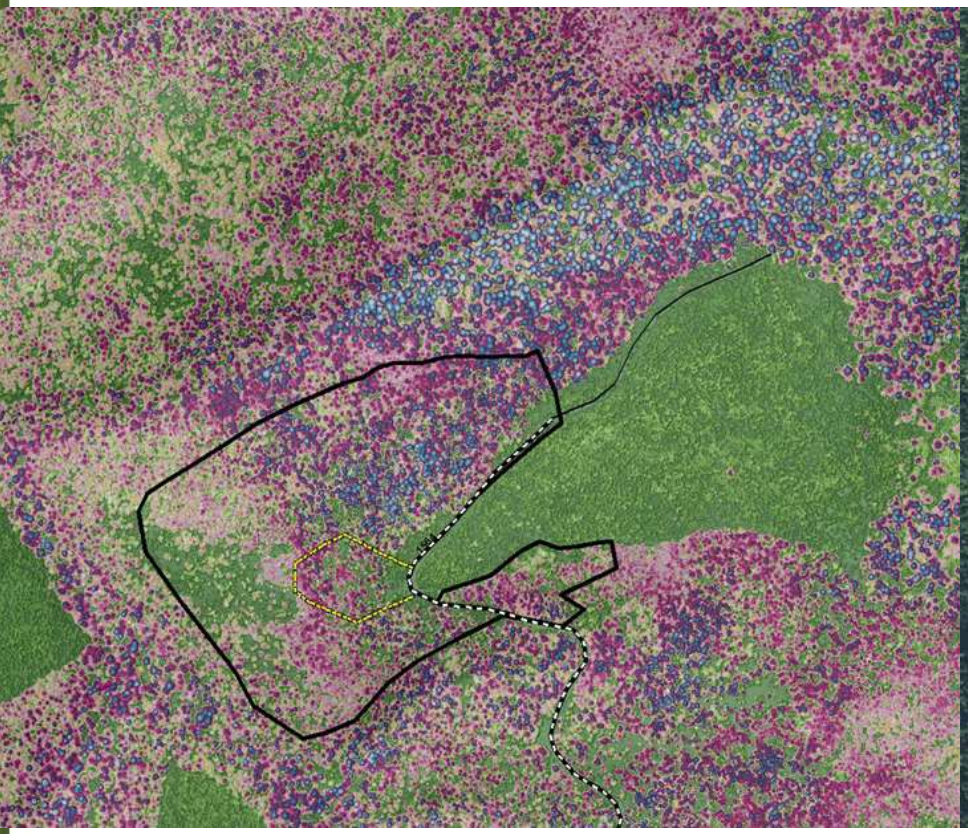
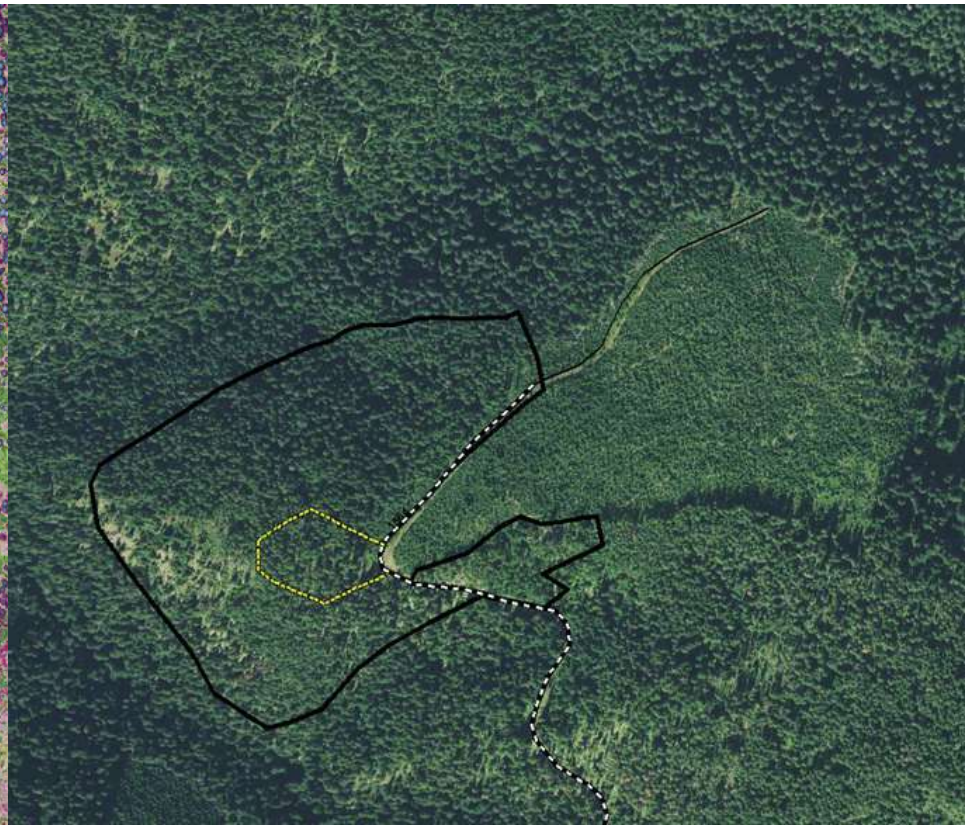
Stand information





Canopy_Height_In_Feet

<VALUE>

0-10	70-80	140-150
10-20	80-90	150-160
20-30	90-100	160-170
30-40	100-110	170-180
40-50	110-120	180-190
50-60	120-130	190-200
60-70	130-140	200-210.3632355

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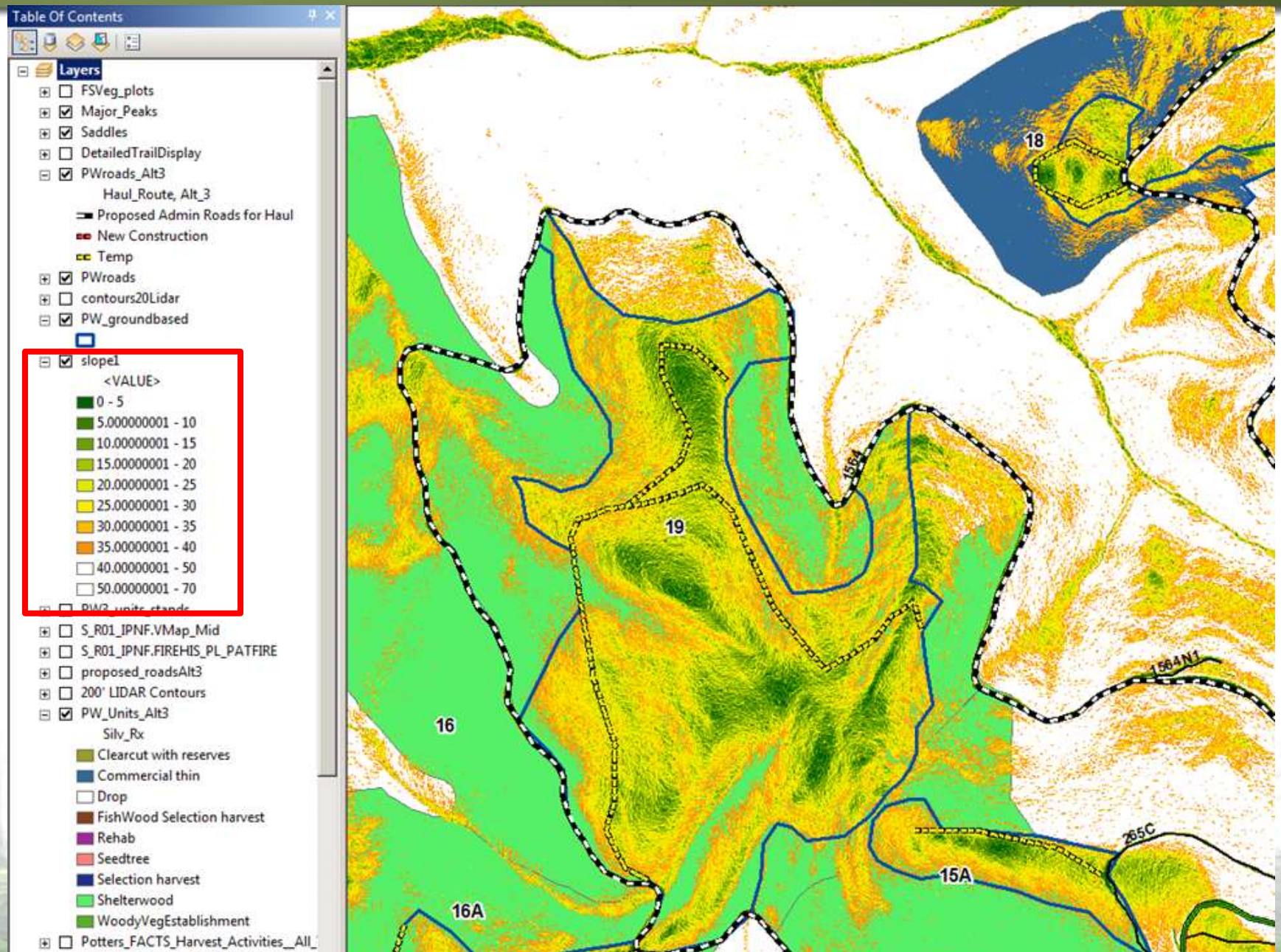
Unit Layout and road design using Slope Layer



LIDAR Forestry Metrics

AGB	Above-ground biomass
BA	Basal area
CCF	Crown competition factor (where CCF of 100 means no competition for light, everything over 100 indicates competition); can be used sort of like canopy cover
MCUFT	merchantable volume
QMD	quadratic mean diameter - useful metric but not directly comparable to stand exam data (run a regression first)
SDI	stand density index
TCUFT	total volume - *this variable seems to be the most comparable to stand exam data*
TOPHT	average canopy height
TPA	trees per acre

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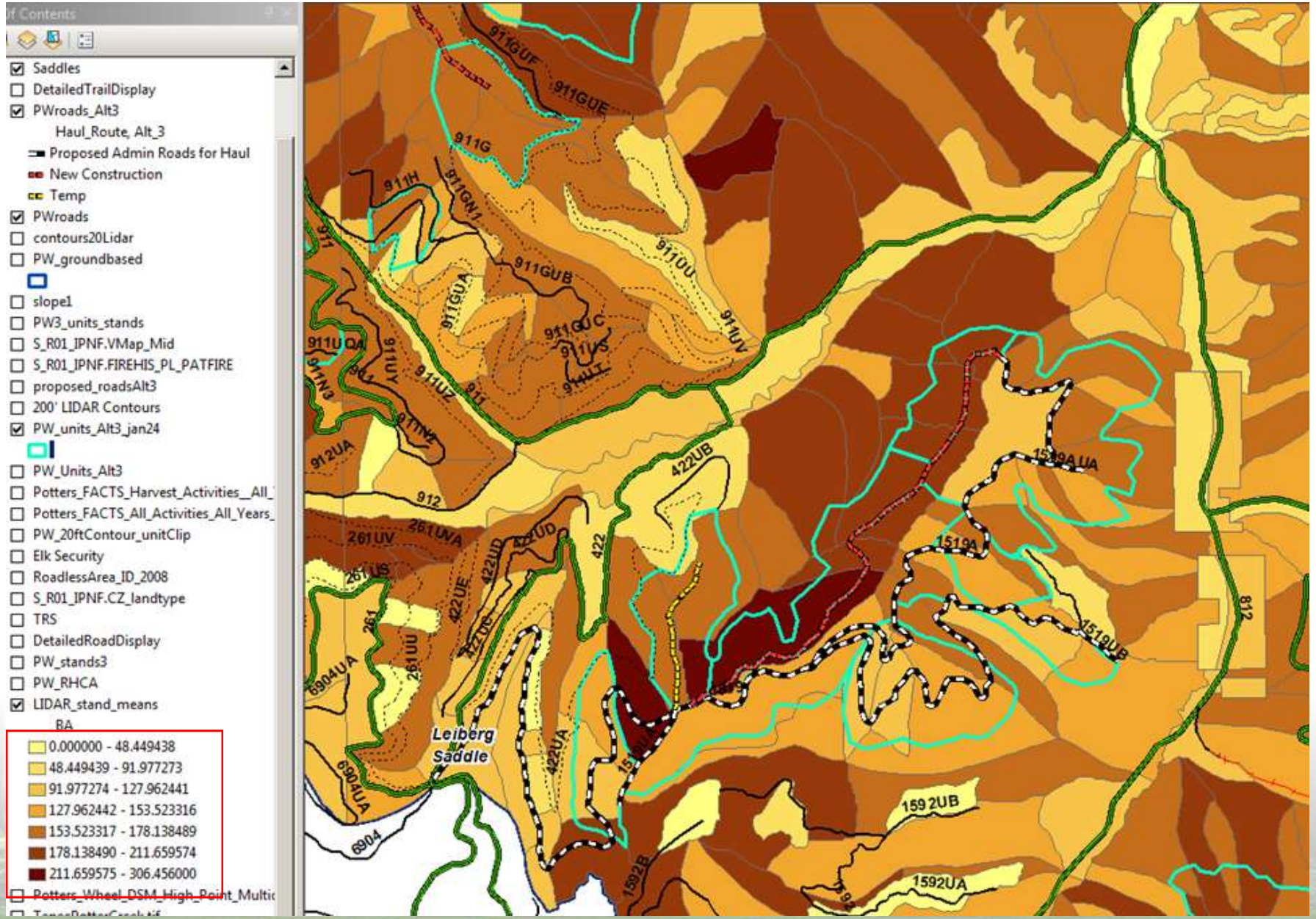
Summarize LIDAR statistics to polygons



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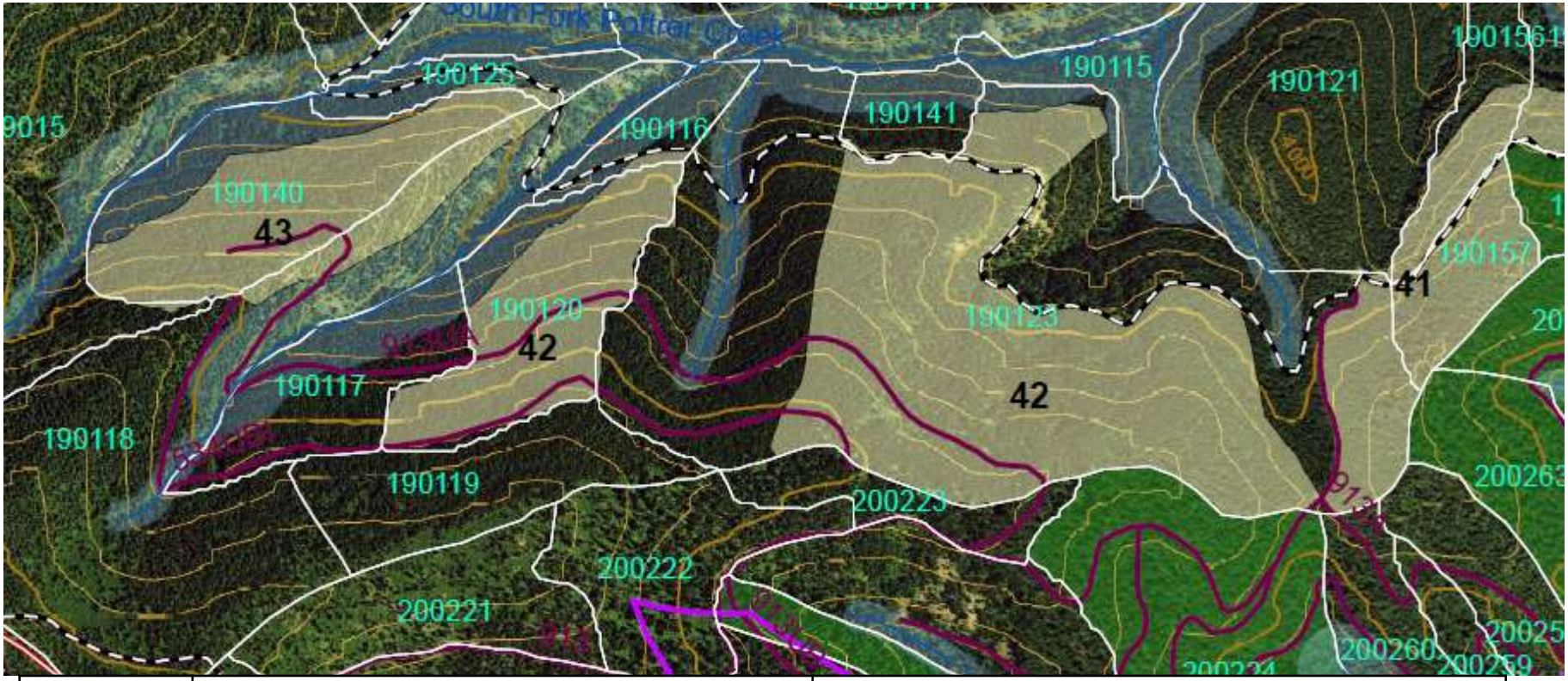
Extrapolate stand exam data



	LIDAR DATA									STAND EXAM DATA									
SETTING_ID	AGB	BA	CCF	MCUFT	QMD	SDI	TCUFT	TOPHT	TPA	INV_ YEAR	SE_ AGB	SE_ BA	SE_ CCF	SE_ MCUFT	SE_ QMD	SE_ SDI	SE_ TCUFT	SE_ TOPHT	SE_ TPA
1040306080003	9	19	27	83	0.6	83	218	26	3740	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
1040306080010	119	72	75	1949	7.1	174	2244	69	919	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
1040307010001	11	15	18	156	3.1	53	266	39	1992	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
1040307010002	14	18	23	201	3.1	66	324	41	2447	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
1040319010001	222	166	183	4543	8.2	331	5308	89	745	2014	137	158	170	5383	9.3	298	6009	102	332
1040319010002	195	156	179	4185	7.0	329	4890	85	789	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
1040319010003	140	141	165	3107	6.7	305	3763	75	856	2014	118	134	147	4076	6.7	287	4574	93	545
1040319010004	127	120	136	2777	6.7	263	3338	74	800	2015	82	99	127	1995	5.9	225	2781	85	526
1040319010005	100	102	118	2163	6.1	224	2637	67	961	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

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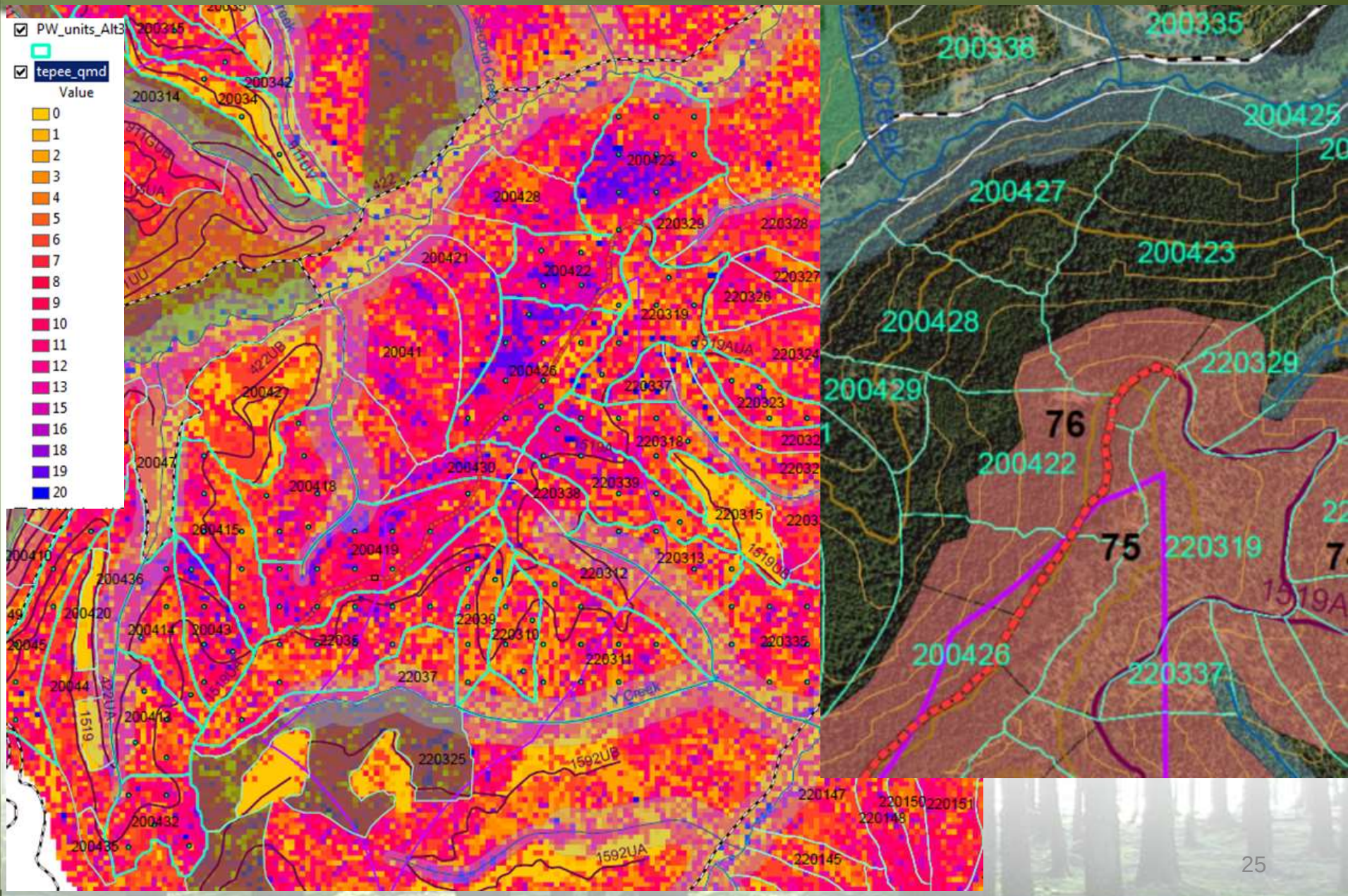
Quantifying spatial variation



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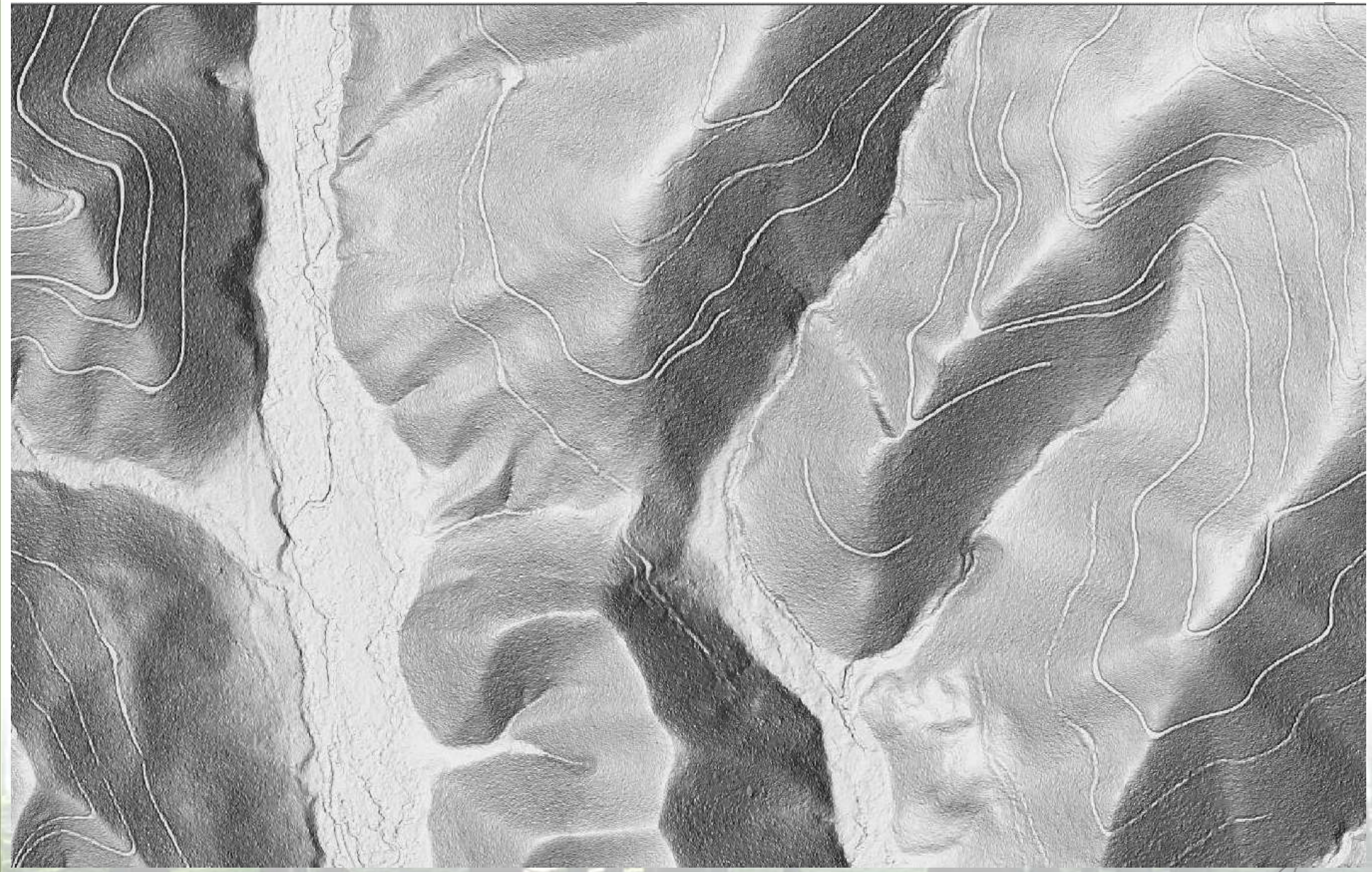
Moose Drool

USDA FOREST SERVICE

Moose Drool



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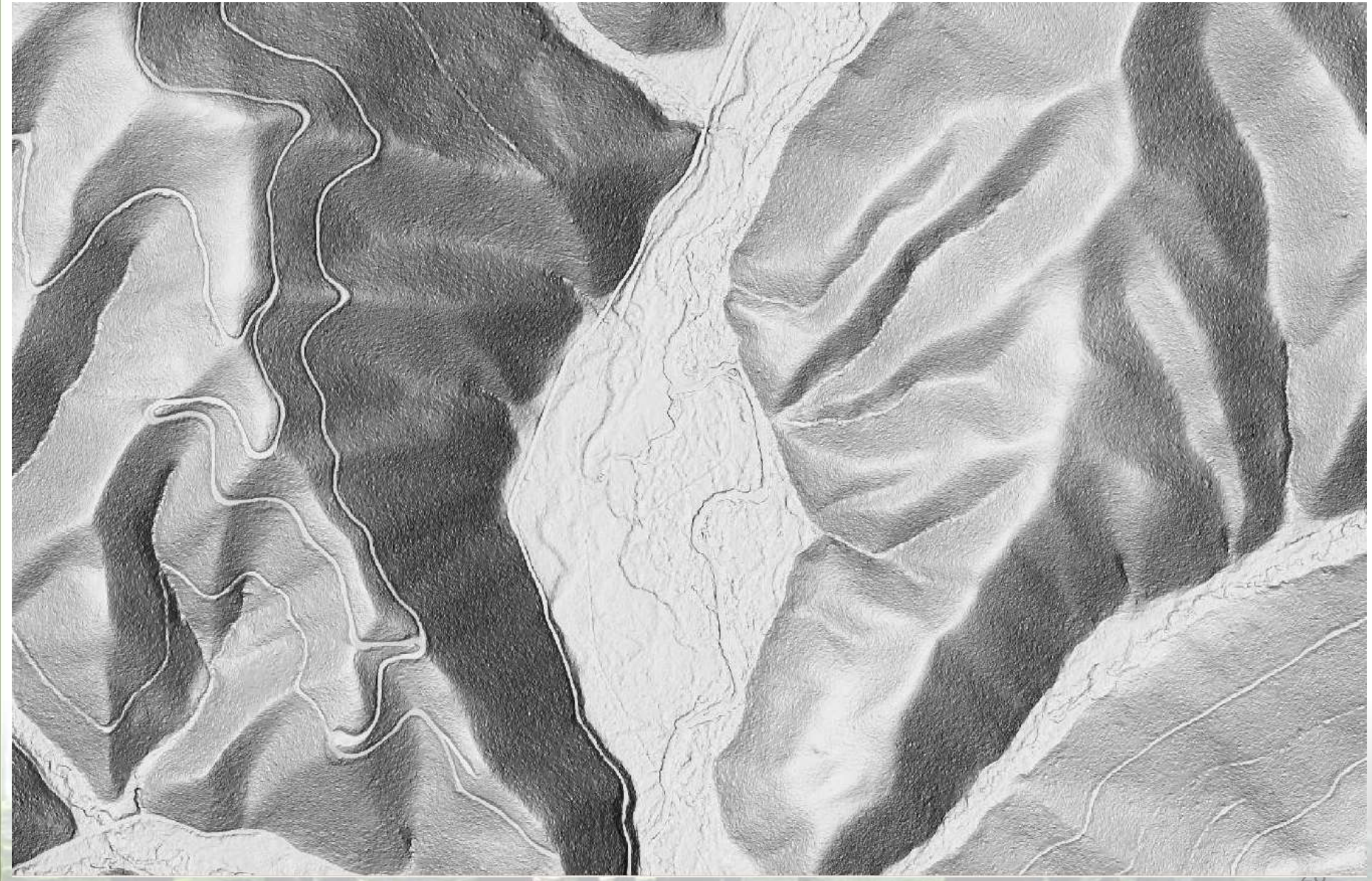
Moose Drool