

C-2 Report on Multiple Discrete Returns

The USGS Lidar Base Specification Version 2.1 states: "Deriving and delivering multiple discrete returns are required in all conventional lidar data collection efforts. Data collection shall be capable of at least three returns per pulse. Full waveform collection is acceptable and is promoted; however, full waveform data are regarded as supplemental information."

The purpose of this section is to report on the presence and quantities of lidar returns in the LAS data. Empty return columns can indicate a collection or processing problem dealing with lidar return attribute information.

[Data Source - D:\00_Cherry\Swaths_LAS](#)

File	First return	Second return	Third return	Other returns	Total points
CS_00026.las	173,576,845	205,409	31,338	1,822	173,815,414
CS_00028.las	140,423,435	188,322	31,799	2,025	140,645,581
CS_00029.las	518,103,293	1,134,895	185,883	10,906	519,434,977
CS_00030.las	447,095,127	491,444	79,501	5,486	447,671,558
CS_00031.las	9,480,505	215,750	27,932	1,329	9,725,516
CS_00032.las	31,796,386	533,280	61,469	2,701	32,393,836
CS_00033.las	2,989,005	1,531	09	00	2,990,545
CS_00034.las	1,341,913	961	17	01	1,342,892
CS_00035.las	70,303,363	405,891	33,612	662	70,743,528
CS_00036.las	16,715,245	308,704	33,158	674	17,057,781
CS_00037.las	95,946,803	1,225,131	155,543	4,881	97,332,358
CS_00038.las	48,397,762	110,409	8,208	206	48,516,585
CS_00039.las	4,238,381	5,275	62	03	4,243,721
CS_00040.las	267,907,792	1,680,140	161,881	4,527	269,754,340
CS_00041.las	29,094,617	73,027	5,361	157	29,173,162
CS_00043.las	498,565,632	3,249,800	390,307	12,024	502,217,763
CS_00044.las	353,393,884	2,822,895	372,643	12,960	356,602,382
CS_00045.las	498,745,276	2,617,506	387,381	17,137	501,767,300
CS_00046.las	67,716,243	137,031	18,142	715	67,872,131
CS_00047.las	198,467,035	324,577	28,131	1,093	198,820,836
CS_00048.las	19,496,830	1,144,525	190,958	8,197	20,840,510
CS_00049.las	1,585,362	7,022	126	00	1,592,510
CS_00051.las	180,225,251	260,679	28,060	1,209	180,515,199
CS_00053.las	558,073,810	898,641	108,816	5,823	559,087,090
CS_00054.las	337,963,287	326,527	36,483	1,656	338,327,953
CS_00055.las	2,419,569	37,711	6,123	436	2,463,839
CS_00056.las	137,916	00	00	00	137,916

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File	First return	Second return	Third return	Other returns	Total points
CS_00057.las	53,390,424	180,740	25,384	1,676	53,598,224
CS_00058.las	550,245,947	493,979	49,226	2,274	550,791,426
CS_00059.las	390,003,396	525,262	53,314	2,423	390,584,395
CS_00060.las	549,734,658	567,966	60,654	2,233	550,365,511
CS_00061.las	375,150,110	554,733	67,628	3,547	375,776,018
CS_00062.las	539,170,565	637,699	62,305	2,558	539,873,127
CS_00063.las	374,607,156	475,432	42,598	1,775	375,126,961
CS_00064.las	518,430,512	1,091,306	98,417	3,884	519,624,119
CS_00065.las	388,013,779	852,396	78,924	3,098	388,948,197
CS_00067.las	543,454,306	851,773	61,674	1,671	544,369,424
CS_00068.las	374,110,283	564,811	45,028	1,351	374,721,473
CS_00069.las	544,703,990	901,620	64,967	1,634	545,672,211
CS_00070.las	389,473,097	2,130,508	239,374	6,575	391,849,554
CS_00071.las	105,571,705	4,589,956	948,757	74,286	111,184,704
CS_00073.las	303,110,703	15,217,694	3,680,368	359,350	322,368,115
CS_00075.las	263,168,470	19,980,135	4,828,453	468,141	288,445,199
CS_00076.las	298,246,502	24,506,226	5,422,686	458,323	328,633,737
CS_00077.las	265,150,121	18,320,727	4,199,845	382,647	288,053,340
CS_00078.las	292,604,460	10,770,375	1,920,929	133,731	305,429,495
CS_00079.las	257,350,082	6,039,239	1,009,178	73,168	264,471,667
CS_00080.las	301,059,667	10,900,427	2,031,340	159,912	314,151,346
CS_00081.las	265,812,998	13,219,570	2,857,087	233,535	282,123,190
CS_00082.las	298,256,705	10,827,908	2,258,640	178,930	311,522,183
CS_00083.las	280,672,666	11,453,989	2,404,698	199,260	294,730,613
CS_00084.las	333,680,087	17,334,810	3,571,948	284,605	354,871,450
CS_00086.las	303,977,035	15,708,252	3,134,993	237,380	323,057,660
CS_00088.las	343,715,235	16,431,910	3,108,010	215,451	363,470,606
CS_00090.las	305,030,487	7,079,403	1,191,267	75,836	313,376,993
CS_00091.las	350,991,037	5,544,695	839,011	48,015	357,422,758
CS_00092.las	302,219,865	7,066,763	1,147,833	69,716	310,504,177
CS_00093.las	347,545,721	14,178,745	2,417,729	146,138	364,288,333
CS_00094.las	296,703,882	12,661,707	2,283,269	140,000	311,788,858
CS_00095.las	353,225,448	8,297,774	1,399,112	82,315	363,004,649
CS_00098.las	362,850,759	8,928,049	1,623,381	113,733	373,515,922

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<u>File</u>	<u>First return</u>	<u>Second return</u>	<u>Third return</u>	<u>Other returns</u>	<u>Total points</u>
CS_00100.las	336,602,992	9,285,132	1,695,237	125,296	347,708,657
CS_00101.las	347,981,205	6,088,753	1,056,307	77,171	355,203,436
CS_00102.las	345,444,931	4,343,860	695,867	45,174	350,529,832
CS_00103.las	337,985,310	3,029,899	454,019	29,945	341,499,173
CS_00104.las	338,740,924	2,283,131	330,276	21,259	341,375,590
CS_00105.las	318,487,996	1,751,439	254,558	16,807	320,510,800
CS_00106.las	265,884,255	1,212,022	169,788	11,057	267,277,122
CS_00107.las	558,946,430	3,070,204	434,402	27,092	562,478,128
CS_00109.las	394,235,400	1,958,620	286,026	16,772	396,496,818
CS_00110.las	566,955,747	2,084,884	326,425	22,108	569,389,164
CS_00111.las	395,993,909	2,211,604	333,388	20,931	398,559,832
CS_00112.las	107,036,515	288,603	40,984	2,777	107,368,879
CS_00113.las	558,611,424	2,274,176	332,503	20,259	561,238,362
CS_00114.las	413,472,533	1,412,930	205,215	13,399	415,104,077
CS_00115.las	550,215,486	1,934,219	312,266	21,971	552,483,942
CS_00117.las	116,536,502	894,768	188,794	12,570	117,632,634
CS_00119.las	355,256,994	461,505	65,789	3,332	355,787,620
CS_00120.las	43,355,038	42,791	5,937	405	43,404,171
CS_00122.las	277,006,712	204,512	19,181	1,219	277,231,624
CS_00123.las	551,900,538	435,672	42,230	2,875	552,381,315
CS_00124.las	437,903,358	334,468	20,847	823	438,259,496
CS_00125.las	567,371,523	464,153	42,477	2,018	567,880,171
CS_00126.las	433,728,275	347,138	47,938	2,925	434,126,276
CS_00127.las	578,461,086	169,793	18,205	1,216	578,650,300
CS_00128.las	440,110,133	188,009	15,450	716	440,314,308
CS_00129.las	593,576,086	462,614	48,779	2,988	594,090,467
CS_00130.las	439,808,562	436,409	46,171	2,904	440,294,046
CS_00131.las	607,140,350	744,778	68,242	3,727	607,957,097
CS_00133.las	453,600,123	530,749	50,363	2,771	454,184,006
CS_00134.las	568,872,574	597,114	54,058	3,455	569,527,201
CS_00135.las	449,268,496	332,171	27,773	1,317	449,629,757
CS_00136.las	582,853,659	1,597,905	193,303	10,690	584,655,557
CS_00137.las	455,118,479	533,908	39,865	1,836	455,694,088
CS_00138.las	574,668,609	1,395,195	130,914	5,068	576,199,786

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CS_00139.las	448,206,392	4,611,455	700,095	39,485	453,557,427
CS_00140.las	602,362,014	699,336	53,045	2,771	603,117,166
CS_00142.las	447,765,353	55,635	3,250	227	447,824,465
CS_00143.las	583,804,026	82,621	2,069	50	583,888,766
CS_00144.las	439,202,454	276,851	33,872	1,925	439,515,102
CS_00145.las	400,534,796	2,374,291	397,130	16,921	403,323,138
CS_00146.las	326,173,278	3,121,560	606,069	32,017	329,932,924
CS_00147.las	420,012,856	517,930	47,627	2,507	420,580,920
CS_00148.las	312,157,533	377,914	28,826	1,117	312,565,390
CS_00149.las	112,234,440	239,317	34,241	2,204	112,510,202
CS_00150.las	84,624,066	1,166,961	181,860	12,824	85,985,711
CS_00151.las	218,379,249	550,039	85,186	6,533	219,021,007
Total	35,154,221,036	354,770,700	65,837,817	4,919,255	35,579,748,808