

C-2 Report on Multiple Discrete Returns

The USGS Lidar Base Specification 2022 rev. A 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."

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 Nevada\QL1 Temp Swaths](#)

File	First return	Second return	Third return	Other returns	Total points
CS_00001.las	124,607,471	2,164,015	244,089	35,377	127,050,952
CS_00002.las	161,419,744	2,682,122	278,833	29,081	164,409,780
CS_00003.las	202,135,712	4,504,647	609,311	63,623	207,313,293
CS_00004.las	221,359,350	6,705,296	973,256	105,613	229,143,515
CS_00005.las	225,007,866	8,137,490	1,114,020	114,686	234,374,062
CS_00006.las	210,830,381	8,755,304	1,160,282	115,394	220,861,361
CS_00007.las	176,306,504	8,915,494	1,169,421	111,726	186,503,145
CS_00008.las	159,851,931	9,641,794	1,318,421	132,141	170,944,287
CS_00009.las	150,227,328	9,819,949	1,358,273	134,861	161,540,411
CS_00010.las	153,584,753	11,065,383	1,517,529	154,252	166,321,917
CS_00011.las	145,784,725	10,372,436	1,449,739	146,009	157,752,909
CS_00012.las	172,947,992	10,714,745	1,495,506	150,103	185,308,346
CS_00013.las	175,225,545	7,417,741	937,776	87,817	183,668,879
CS_00014.las	318,573,309	6,802,412	710,400	53,848	326,139,969
CS_00015.las	197,424,623	6,099,809	684,915	55,960	204,265,307
CS_00016.las	392,384,092	9,021,838	1,015,005	87,546	402,508,481
CS_00017.las	366,360,581	12,626,645	1,598,695	141,695	380,727,616
CS_00018.las	401,510,225	21,884,136	2,868,880	263,468	426,526,709
CS_00019.las	343,674,887	22,921,188	2,963,642	269,919	369,829,636
CS_00020.las	370,554,293	26,930,668	3,582,203	354,159	401,421,323
CS_00021.las	67,791,104	5,900,560	888,327	82,120	74,662,111
CS_00022.las	344,000,801	26,870,013	3,842,238	418,105	375,131,157
CS_00023.las	436,994,170	34,352,757	4,990,620	532,042	476,869,589
CS_00024.las	409,528,979	32,260,400	4,856,985	538,733	447,185,097
CS_00025.las	510,882,782	41,047,525	6,386,407	718,586	559,035,300
CS_00026.las	483,665,234	46,188,315	7,430,489	840,484	538,124,522
CS_00027.las	478,390,614	50,977,631	8,410,136	948,972	538,727,353
CS_00028.las	489,109,175	53,451,954	8,965,555	1,027,996	552,554,680

C-2 Report on Multiple Discrete Returns - continued

File	First return	Second return	Third return	Other returns	Total points
CS_00029.las	450,749,972	48,390,903	8,018,904	892,969	508,052,748
CS_00030.las	477,204,438	49,687,082	8,084,152	891,917	535,867,589
CS_00031.las	443,779,451	44,266,370	6,885,518	730,676	495,662,015
CS_00032.las	482,010,723	42,035,852	6,186,007	619,587	530,852,169
CS_00033.las	459,799,026	36,677,208	5,278,756	528,464	502,283,454
CS_00034.las	503,358,325	37,589,260	5,353,001	537,449	546,838,035
CS_00035.las	484,522,460	34,674,048	4,998,082	510,966	524,705,556
CS_00036.las	539,964,442	36,453,427	5,288,725	553,099	582,259,693
CS_00037.las	504,046,067	34,078,491	5,128,106	560,988	543,813,652
CS_00038.las	535,425,338	37,335,070	5,690,898	661,212	579,112,518
CS_00039.las	510,279,560	37,723,936	5,987,469	692,046	554,683,011
CS_00040.las	485,886,305	37,472,844	5,901,813	652,212	529,913,174
CS_00041.las	517,704,922	38,057,651	5,736,862	610,810	562,110,245
CS_00042.las	480,505,417	38,859,169	5,872,878	624,239	525,861,703
CS_00043.las	497,283,108	43,356,693	6,696,894	731,517	548,068,212
CS_00044.las	430,648,092	44,566,992	7,080,314	801,566	483,096,964
CS_00045.las	454,167,255	44,999,907	7,122,473	822,001	507,111,636
CS_00046.las	431,583,508	40,349,111	6,377,718	730,342	479,040,679
CS_00047.las	455,466,634	43,504,210	7,116,898	825,835	506,913,577
CS_00048.las	443,115,976	43,532,937	7,183,791	805,582	494,638,286
CS_00049.las	476,232,500	48,880,991	8,100,936	890,724	534,105,151
CS_00050.las	457,268,719	46,515,415	7,801,518	853,366	512,439,018
CS_00051.las	461,647,460	46,567,395	7,914,720	862,572	516,992,147
CS_00052.las	422,234,546	44,736,060	8,395,469	1,084,906	476,450,981
CS_00053.las	466,945,532	49,447,615	9,328,163	1,212,533	526,933,843
CS_00054.las	426,886,443	45,588,701	8,415,311	1,076,396	481,966,851
CS_00055.las	450,526,996	41,978,051	7,476,774	919,236	500,901,057
CS_00056.las	426,958,026	37,593,381	6,674,896	791,742	472,018,045
CS_00057.las	468,064,604	37,519,044	6,554,999	745,273	512,883,920
CS_00058.las	382,199,993	27,258,589	4,671,930	517,223	414,647,735
CS_00059.las	387,983,898	24,083,894	4,175,146	469,037	416,711,975
CS_00060.las	269,546,940	14,101,769	2,347,632	256,984	286,253,325
CS_00061.las	238,021,229	10,387,951	1,547,689	153,916	250,110,785
CS_00062.las	160,514,394	5,840,428	630,015	49,495	167,034,332

C-2 Report on Multiple Discrete Returns - continued

File	First return	Second return	Third return	Other returns	Total points
CS_00063.las	85,997,263	3,444,400	307,122	18,808	89,767,593
CS_00064.las	96,165,065	2,041,810	91,804	2,845	98,301,524
CS_00065.las	76,718,101	1,196,356	38,535	1,596	77,954,588
CS_00066.las	85,951,598	1,182,075	31,756	955	87,166,384
CS_00067.las	48,950,272	794,611	29,407	1,313	49,775,603
CS_00068.las	26,986,711	625,321	29,145	1,362	27,642,539
CS_00069.las	332,838,420	2,104,191	148,041	11,034	335,101,686
CS_00070.las	33,921,917	652,631	31,134	1,628	34,607,310
CS_00071.las	449,157,085	42,564,594	7,104,757	882,047	499,708,483
CS_00072.las	203,344,230	12,666,898	2,153,121	220,576	218,384,825
CS_00073.las	269,806,611	11,001,938	1,815,182	194,411	282,818,142
CS_00074.las	182,304,754	13,344,741	1,930,640	239,729	197,819,864
CS_00075.las	1,773,590	15,631	875	98	1,790,194
CS_00076.las	5,577,172	28,303	1,191	98	5,606,764
CS_00077.las	10,139,988	200,480	33,224	5,300	10,378,992
CS_00078.las	22,497,673	453,949	43,966	6,172	23,001,760
CS_00079.las	36,036,855	478,744	26,261	2,589	36,544,449
CS_00080.las	51,439,403	381,899	13,589	355	51,835,246
CS_00081.las	64,697,693	939,144	100,202	7,759	65,744,798
CS_00082.las	103,878,255	2,285,151	245,831	18,594	106,427,831
CS_00083.las	152,516,667	3,215,396	321,252	21,906	156,075,221
CS_00084.las	210,174,286	3,314,748	261,148	14,900	213,765,082
CS_00085.las	234,831,843	3,993,816	449,232	45,924	239,320,815
CS_00086.las	262,435,471	4,753,466	587,881	64,043	267,840,861
CS_00087.las	269,258,505	7,315,322	1,070,389	112,155	277,756,371
CS_00088.las	301,329,267	10,528,678	1,576,638	169,965	313,604,548
CS_00089.las	316,754,996	15,169,373	2,750,393	387,961	335,062,723
CS_00090.las	339,635,598	19,241,026	3,513,007	485,404	362,875,035
CS_00091.las	371,962,966	25,483,249	4,654,741	587,542	402,688,498
CS_00092.las	342,641,395	21,765,129	3,526,357	338,865	368,271,746
CS_00093.las	434,511,144	25,158,010	3,991,077	371,398	464,031,629
CS_00094.las	411,105,498	22,892,739	3,633,046	354,892	437,986,175
CS_00095.las	465,283,023	24,016,585	3,745,034	363,426	493,408,068
CS_00096.las	424,320,098	18,769,101	2,709,357	244,180	446,042,736

C-2 Report on Multiple Discrete Returns - continued

<u>File</u>	<u>First return</u>	<u>Second return</u>	<u>Third return</u>	<u>Other returns</u>	<u>Total points</u>
CS_00097.las	478,967,530	17,178,945	2,284,191	204,219	498,634,885
CS_00098.las	435,979,234	13,447,129	1,711,698	163,053	451,301,114
CS_00099.las	444,046,448	12,127,815	1,444,515	133,918	457,752,696
CS_00100.las	262,683,042	7,219,305	870,945	81,850	270,855,142
CS_00101.las	118,051,050	3,123,371	359,326	27,120	121,560,867
CS_00102.las	17,966,736	1,807,191	286,904	25,180	20,086,011
CS_00103.las	105,508,752	835,206	45,571	4,340	106,393,869
CS_00104.las	85,823,916	19,251,006	3,347,032	328,635	108,750,589
CS_00105.las	50,346,599	800,580	36,384	2,479	51,186,042
CS_00106.las	78,831,609	1,714,975	214,236	19,548	80,780,368
CS_00107.las	6,563,158	142,061	2,791	36	6,708,046
CS_00108.las	13,191,394	222,864	4,514	47	13,418,819
CS_00109.las	58,378,250	1,622,634	126,269	7,742	60,134,895
CS_00110.las	76,767,085	1,104,332	41,837	1,836	77,915,090
CS_00111.las	105,939,324	1,950,338	133,538	9,029	108,032,229
CS_00112.las	88,028,682	975,268	41,858	3,171	89,048,979
CS_00113.las	80,566,742	1,055,467	72,061	6,792	81,701,062
CS_00114.las	57,284,930	654,986	44,337	4,708	57,988,961
CS_00115.las	52,309,336	539,876	34,900	2,918	52,887,030
CS_00116.las	32,109,962	336,186	26,167	2,330	32,474,645
CS_00117.las	31,436,739	296,646	18,521	1,299	31,753,205
CS_00118.las	19,383,283	163,769	5,956	118	19,553,126
CS_00119.las	103,700,581	457,018	26,738	2,138	104,186,475
CS_00121.las	89,786,164	405,203	19,270	1,157	90,211,794
CS_00122.las	94,141,795	575,694	22,818	1,180	94,741,487
CS_00123.las	96,752,091	598,819	17,358	373	97,368,641
CS_00124.las	94,207,329	562,716	16,445	260	94,786,750
CS_00125.las	75,242,715	460,131	13,358	216	75,716,420
CS_00126.las	57,037,415	248,251	7,657	195	57,293,518
CS_00127.las	48,580,877	147,538	3,792	46	48,732,253
CS_00128.las	43,528,731	116,427	2,734	108	43,648,000
CS_00129.las	26,281,942	52,784	634	14	26,335,374
CS_00130.las	14,048,671	28,473	481	16	14,077,641
CS_00131.las	90,850,563	1,037,091	49,952	4,053	91,941,659

C-2 Report on Multiple Discrete Returns - continued

File	First return	Second return	Third return	Other returns	Total points
CS_00132.las	112,286,872	561,898	18,317	577	112,867,664
CS_00133.las	36,931,207	122,395	2,332	43	37,055,977
CS_00134.las	34,992,296	127,024	3,007	88	35,122,415
CS_00135.las	62,999,152	228,403	7,665	595	63,235,815
CS_00136.las	114,929,121	716,955	16,969	2,050	115,665,095
CS_00137.las	108,861,064	1,162,409	16,334	1,575	110,041,382
CS_00138.las	132,470,658	1,709,095	33,586	5,911	134,219,250
CS_00139.las	135,451,192	1,605,502	80,883	10,850	137,148,427
CS_00140.las	28,762,977	1,089,721	9,282	738	29,862,718
CS_00141.las	7,626,289	395,936	3,931	299	8,026,455
CS_00142.las	150,730,836	1,575,241	71,961	7,574	152,385,612
CS_00143.las	158,065,618	1,188,063	36,873	1,824	159,292,378
CS_00144.las	189,536,577	1,485,387	52,604	2,684	191,077,252
CS_00145.las	183,401,500	1,547,055	57,147	3,623	185,009,325
CS_00146.las	201,302,631	2,264,535	76,930	7,341	203,651,437
CS_00147.las	181,537,718	1,659,135	54,355	4,900	183,256,108
CS_00148.las	172,198,649	1,646,315	38,946	1,351	173,885,261
CS_00149.las	135,567,785	1,205,998	48,338	2,286	136,824,407
CS_00150.las	114,737,084	966,265	48,522	3,428	115,755,299
CS_00151.las	116,465,600	1,100,601	57,984	3,309	117,627,494
CS_00152.las	100,518,338	907,986	51,329	3,426	101,481,079
CS_00153.las	156,730,544	1,328,162	65,068	8,912	158,132,686
CS_00154.las	115,887,613	1,963,046	22,867	3,757	117,877,283
CS_00155.las	117,528,745	1,147,855	77,361	4,689	118,758,650
CS_00156.las	15,508,277	75,711	1,925	81	15,585,994
CS_00157.las	49,165,498	188,255	4,447	187	49,358,387
CS_00158.las	108,147,188	385,655	7,044	174	108,540,061
CS_00159.las	124,847,937	493,317	10,712	316	125,352,282
CS_00160.las	167,414,207	675,870	16,261	572	168,106,910
CS_00161.las	149,914,569	609,007	15,146	476	150,539,198
CS_00162.las	141,712,053	682,284	22,511	874	142,417,722
CS_00163.las	75,106,755	565,476	31,709	2,553	75,706,493
CS_00164.las	39,632,854	352,716	22,483	1,469	40,009,522
CS_00165.las	38,940,678	118,257	2,179	25	39,061,139

C-2 Report on Multiple Discrete Returns - continued

File	First return	Second return	Third return	Other returns	Total points
CS_00166.las	46,592,947	116,643	1,756	29	46,711,375
CS_00167.las	12,951,811	151,265	21,243	2,821	13,127,140
CS_00168.las	32,843,305	731,709	165,770	31,688	33,772,472
CS_00169.las	40,321,988	681,614	121,033	17,687	41,142,322
CS_00170.las	36,733,173	372,712	45,945	6,541	37,158,371
CS_00171.las	30,407,783	304,766	40,140	5,143	30,757,832
CS_00172.las	23,439,920	119,290	2,046	66	23,561,322
CS_00173.las	13,887,830	78,201	978	19	13,967,028
CS_00174.las	3,690,117	23,099	370	06	3,713,592
CS_00175.las	32,615,362	538,906	96,417	15,356	33,266,041
CS_00176.las	36,814,747	596,217	107,172	16,064	37,534,200
CS_00177.las	16,929,996	769,361	106,595	12,865	17,818,817
CS_00178.las	70,091,811	1,653,158	236,523	34,754	72,016,246
CS_00179.las	88,906,393	1,442,905	169,707	19,867	90,538,872
CS_00180.las	135,097,758	1,125,790	75,239	5,703	136,304,490
CS_00181.las	102,735,128	786,552	59,408	5,835	103,586,923
CS_00182.las	139,506,374	1,417,871	136,098	12,814	141,073,157
CS_00183.las	104,076,885	1,367,899	159,091	18,138	105,622,013
CS_00184.las	140,231,431	2,947,887	337,358	36,122	143,552,798
CS_00185.las	107,222,816	2,672,206	284,915	27,710	110,207,647
CS_00186.las	150,808,204	3,522,544	292,243	22,813	154,645,804
CS_00187.las	117,768,729	1,567,854	76,105	3,190	119,415,878
CS_00188.las	106,323,926	1,254,682	45,318	1,634	107,625,560
CS_00189.las	35,294,704	391,044	11,283	306	35,697,337
CS_00190.las	2,619,965	178,758	21,769	1,765	2,822,257
CS_00191.las	77,956,485	531,536	27,467	1,611	78,517,099
CS_00192.las	276,532,529	3,711,302	488,355	51,658	280,783,844
CS_00193.las	148,653,100	8,044,989	1,267,475	141,511	158,107,075
CS_00194.las	18,780,508	932,726	170,892	22,825	19,906,951
CS_00195.las	20,386,901	405,067	36,564	3,900	20,832,432
CS_00196.las	27,411,517	427,587	20,243	1,502	27,860,849
CS_00197.las	40,569,969	646,975	29,863	1,812	41,248,619
CS_00198.las	60,667,435	1,115,165	65,345	4,501	61,852,446
CS_00199.las	74,402,084	1,511,993	155,525	19,665	76,089,267

C-2 Report on Multiple Discrete Returns - continued

File	First return	Second return	Third return	Other returns	Total points
CS_00200.las	74,761,794	3,219,204	497,781	66,853	78,545,632
CS_00201.las	55,851,449	3,038,821	508,357	75,026	59,473,653
CS_00202.las	43,715,122	2,252,898	391,455	64,644	46,424,119
CS_00203.las	24,795,678	612,707	62,098	7,753	25,478,236
CS_00204.las	12,510,693	177,509	6,893	183	12,695,278
CS_00205.las	3,843,733	68,538	2,373	34	3,914,678
CS_00206.las	768,793	16,525	439	06	785,763
CS_00207.las	75,621,372	2,568,889	142,852	17,447	78,350,560
CS_00208.las	14,075,974	760,629	96,025	11,785	14,944,413
CS_00209.las	88,784,397	24,112,061	11,632,275	15,373,776	139,902,509
CS_00210.las	72,742,031	2,198,425	117,628	16,468	75,074,552
CS_00211.las	66,329,191	1,138,227	44,821	2,492	67,514,731
CS_00212.las	15,504,796	176,985	3,810	251	15,685,842
CS_00213.las	35,374,224	482,628	19,038	1,863	35,877,753
CS_00214.las	50,885,338	737,166	28,105	2,410	51,653,019
CS_00215.las	57,008,718	1,096,199	54,286	4,382	58,163,585
CS_00216.las	58,231,681	1,495,133	84,494	6,546	59,817,854
CS_00217.las	77,146,607	2,765,506	238,312	22,920	80,173,345
CS_00218.las	82,297,213	2,830,445	259,935	26,100	85,413,693
CS_00219.las	78,829,939	2,582,265	274,114	27,169	81,713,487
CS_00220.las	82,533,204	2,371,260	272,398	31,864	85,208,726
CS_00221.las	88,849,707	3,644,225	601,487	93,602	93,189,021
CS_00222.las	89,951,890	4,666,634	804,248	124,389	95,547,161
CS_00223.las	94,949,911	5,104,790	879,934	139,376	101,074,011
CS_00224.las	100,731,830	4,754,755	778,540	118,043	106,383,168
CS_00225.las	97,256,547	4,188,220	674,552	106,647	102,225,966
CS_00226.las	96,599,853	3,461,821	582,571	95,896	100,740,141
CS_00227.las	95,273,854	2,948,998	414,653	73,692	98,711,197
CS_00228.las	88,254,326	2,882,315	308,736	39,841	91,485,218
CS_00229.las	81,398,704	3,466,668	102,295	11,591	84,979,258
CS_00230.las	59,125,486	2,582,146	55,355	1,965	61,764,952
CS_00231.las	33,772,610	929,792	14,355	709	34,717,466
CS_00244.las	23,615,879	395,419	17,416	600	24,029,314
CS_00245.las	50,860,184	596,543	22,665	798	51,480,190

C-2 Report on Multiple Discrete Returns - continued

<u>File</u>	<u>First return</u>	<u>Second return</u>	<u>Third return</u>	<u>Other returns</u>	<u>Total points</u>
CS_00246.las	66,582,517	271,578	12,831	690	66,867,616
CS_00248.las	64,848,106	1,602,756	255,118	29,009	66,734,989
CS_00250.las	49,727,594	1,984,835	349,696	40,758	52,102,883
CS_00256.las	38,121,214	980,167	135,867	10,297	39,247,545
CS_00257.las	23,768,692	452,153	901	13	24,221,759
CS_00258.las	30,134,618	384,607	2,718	93	30,522,036
CS_00259.las	26,488,576	182,197	2,462	33	26,673,268
CS_00260.las	10,028,344	173,980	3,965	40	10,206,329
CS_00265.las	2,915,216	32,163	683	12	2,948,074
CS_00268.las	17,497,309	169,769	10,428	341	17,677,847
CS_00271.las	21,862,426	31,647	1,066	43	21,895,182
CS_00272.las	109,404,177	1,787,220	199,803	17,301	111,408,501
CS_00274.las	62,063,629	1,880,548	215,801	18,538	64,178,516
CS_00281.las	19,956,224	88,056	1,167	60	20,045,507
CS_00284.las	12,084,373	72,080	1,096	13	12,157,562
Total	42,012,852,014	2,364,032,217	368,296,690	54,921,990	44,800,102,911