Tyrrell County, Pasquotank Basin

The preliminary checkpoint spreadsheets were received from NCGS on March 21, 2002. Two spreadsheets were included which compared the independent QA/QC survey checkpoints with the interpolated LIDAR "Z" value as provided by the contractors. The spreadsheet summaries included:

1. All the checkpoints with the RMSE calculation for combined land cover
2. 95% of the checkpoints with the RMSE calculation (5% of points having the largest error removed)

All data was reviewed and further analyzed to assess the quality of the data. The review process examined the statistics for the combined land cover and the trends for each specific land cover type. The following graphs and figures illustrate the data quality as per the RMSE criteria.

Table 1 summarizes the RMSE using:

- 100% of the checkpoints
- 95% of the checkpoints
- Checkpoints categorized by land cover type

Table 1. RMSE by Land Class

%	RMSE (cm)	# of Points	Land Class	RMSE Criteria (cm)
100	20.4	174	All	
95	**14.4**	**165**	**All**	**20**
20	14.9	34	Grass	
19	14.5	33	Weeds/Crop	
16	14.6	27	Scrub	
29	12.9	50	Forest	
12	16.2	21	Built-up	

The LIDAR data for Tyrrell County, Pasquotank Basin meets the specification as per the RMSE criteria of 20 cm.

All figures represent the data with the 95% data set. The data is of good quality.

Figure 1 illustrates the RMSE by specific land cover type.

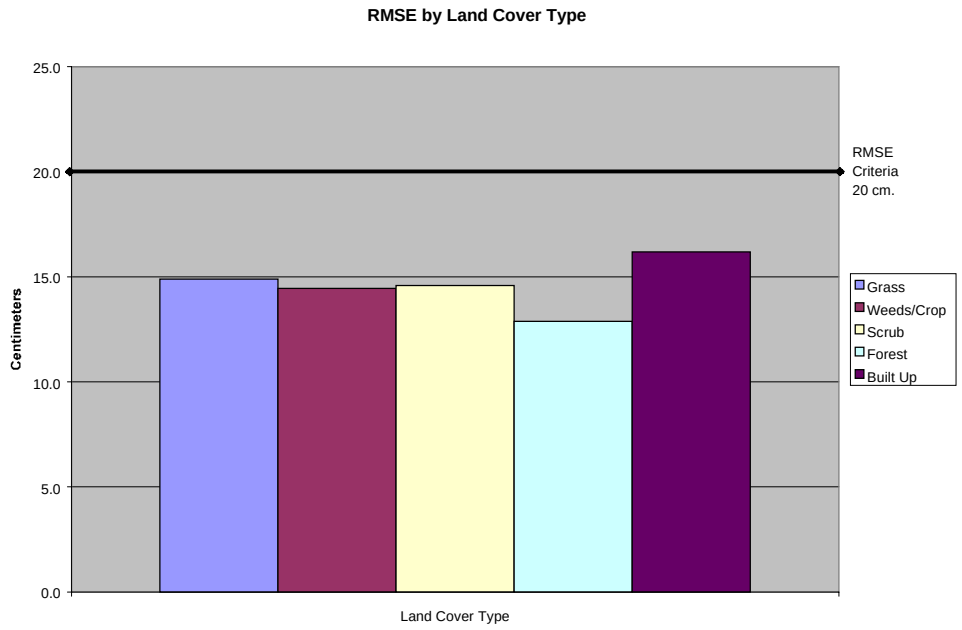

Figure 1

Figure 2 illustrates the magnitude of the differences between the checkpoints and LIDAR data by specific land cover type and sorted from lowest to highest.

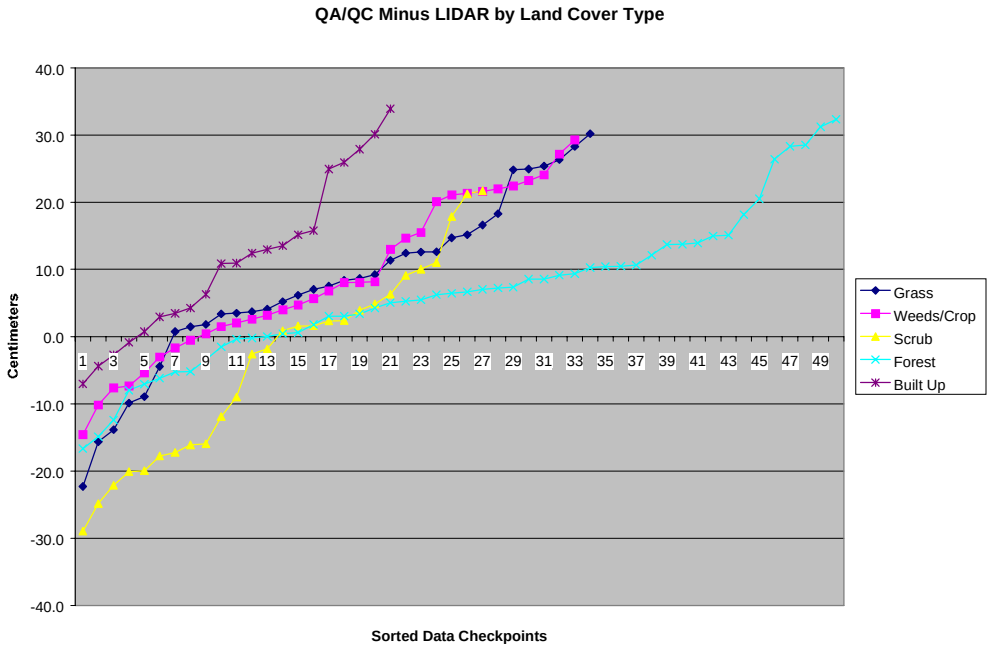

Figure 2

Table 2 illustrates the Delta between the QA/QC survey checkpoints and that of the interpolated LIDAR.

Table 2. Elevation Delta	
Delta (cm)	**Land Cover**
-22.3	Grass
-15.6	Grass
-13.8	Grass
-9.9	Grass
-8.9	Grass
-4.5	Grass
0.8	Grass
1.5	Grass
1.8	Grass
3.4	Grass
3.5	Grass
3.7	Grass
4.1	Grass
5.2	Grass
6.2	Grass
7.0	Grass
7.5	Grass
8.4	Grass
8.7	Grass
9.3	Grass
11.4	Grass
12.4	Grass
12.6	Grass
12.6	Grass
14.7	Grass
15.2	Grass
16.6	Grass
18.3	Grass
24.8	Grass
24.9	Grass
25.4	Grass
26.3	Grass
28.3	Grass
30.2	Grass
-14.6	Weeds/Crop
-10.2	Weeds/Crop
-7.6	Weeds/Crop
-7.3	Weeds/Crop
-5.4	Weeds/Crop
-3.0	Weeds/Crop
-1.7	Weeds/Crop
-0.5	Weeds/Crop
0.4	Weeds/Crop
1.5	Weeds/Crop
2.1	Weeds/Crop
2.6	Weeds/Crop
3.2	Weeds/Crop
4.0	Weeds/Crop
4.7	Weeds/Crop
5.6	Weeds/Crop
6.8	Weeds/Crop
8.0	Weeds/Crop
8.1	Weeds/Crop
8.2	Weeds/Crop
13.0	Weeds/Crop
14.7	Weeds/Crop
15.5	Weeds/Crop
20.1	Weeds/Crop
21.1	Weeds/Crop
21.3	Weeds/Crop
21.6	Weeds/Crop
22.0	Weeds/Crop
22.4	Weeds/Crop
23.2	Weeds/Crop
24.1	Weeds/Crop
27.2	Weeds/Crop
29.3	Weeds/Crop
-28.9	Scrub
-24.8	Scrub
-22.1	Scrub
-20.1	Scrub
-20.0	Scrub
-17.8	Scrub
-17.2	Scrub
-16.1	Scrub
-16.0	Scrub
-11.9	Scrub
-9.0	Scrub
-2.6	Scrub
-1.8	Scrub
0.9	Scrub
1.6	Scrub
1.6	Scrub
2.3	Scrub
2.4	Scrub
3.9	Scrub
4.9	Scrub
6.3	Scrub
9.1	Scrub
10.0	Scrub
11.1	Scrub
17.9	Scrub
21.3	Scrub
21.7	Scrub
-16.7	Forest
-14.9	Forest
-12.4	Forest
-8.0	Forest
-7.1	Forest
-6.2	Forest
-5.2	Forest
-5.2	Forest
-3.4	Forest
-1.5	Forest
-0.4	Forest
-0.2	Forest
0.0	Forest
0.4	Forest
0.6	Forest
1.8	Forest
3.1	Forest
3.1	Forest
3.4	Forest
4.3	Forest
5.0	Forest
5.2	Forest
5.5	Forest
6.2	Forest
6.5	Forest
6.7	Forest
7.0	Forest
7.3	Forest
7.4	Forest
8.6	Forest
8.6	Forest
9.1	Forest
9.3	Forest
10.3	Forest
10.4	Forest
10.5	Forest

10.7	Forest
12.1	Forest
13.7	Forest
13.7	Forest
13.9	Forest
15.0	Forest
15.1	Forest
18.2	Forest
20.5	Forest
26.4	Forest
28.3	Forest
28.5	Forest

31.2	Forest
32.3	Forest
-7.0	Built-up
-4.4	Built-up
-2.7	Built-up
-0.9	Built-up
0.7	Built-up
2.9	Built-up
3.5	Built-up
4.2	Built-up
6.3	Built-up
10.9	Built-up

10.9	Built-up
12.4	Built-up
13.0	Built-up
13.5	Built-up
15.2	Built-up
15.8	Built-up
24.9	Built-up
25.9	Built-up
27.9	Built-up
30.1	Built-up
33.9	Built-up

Table 3 illustrates the overall statistics for the checkpoint data.

Table 3. Overall Descriptive Statistics

	RMSE (cm)	Mean (cm)	Median (cm)	Skew (cm)	Std Dev (cm)	# of Points	Min (cm)	Max (cm)
Total	**14.4**	6.3	6.2	-0.2	13.0	165	-28.9	33.9
Grass	**14.9**	7.9	7.9	-0.3	12.8	34	-22.3	30.2
Weeds/Crop	**14.5**	8.5	6.8	0.0	11.9	33	-14.6	29.3
Scrub	**14.6**	-3.5	0.9	0.0	14.4	27	-28.9	21.7
Forest	**12.9**	6.8	6.6	0.3	11.1	50	-16.7	32.3
Built Up	**16.2**	11.3	10.9	0.4	11.9	21	-7.0	33.9

Figure 3 illustrates a histogram of the associated delta errors between the data checkpoints and the interpolated TIN values.

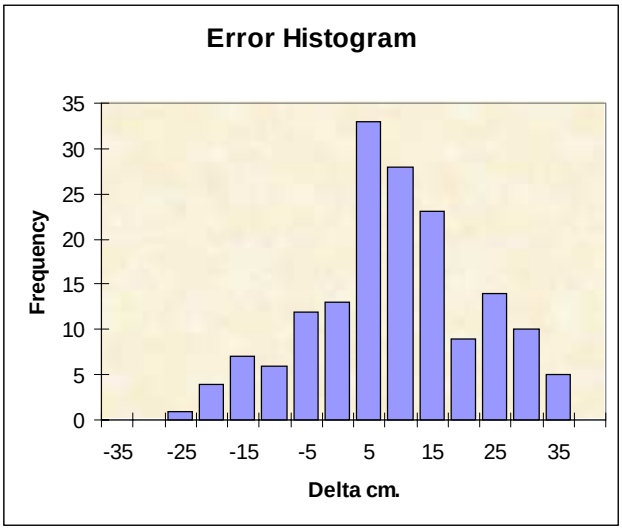

Figure 3