Harnett County, Cape Fear Basin

The preliminary checkpoint spreadsheets were received from NCGS on February 8, 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.
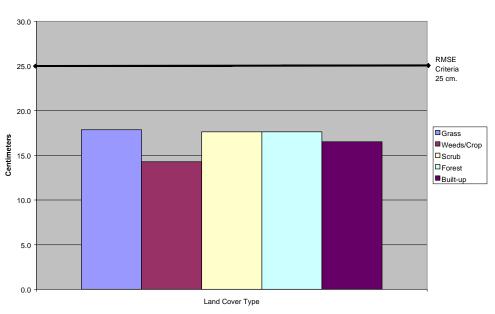
Table 1 summarizes the RMSE using:
- 100% of the checkpoints
- 95% of the checkpoints
- Checkpoints categorized by land cover type

Table 1. RMSE by Land Class				
%	RMSE (cm)	# of Points	Land Class	RMSE Criteria (cm)
100	20.7	150	All	
95	**17.0**	**142**	**All**	**25**
17	17.9	26	Grass	
15	14.3	23	Weeds/Crop	
15	17.6	22	Scrub	
31	17.6	47	Forest	
16	16.5	24	Built-up	

The LIDAR data for Harnett County, Cape Fear Basin meets the specification as per the RMSE criteria of 25 cm.

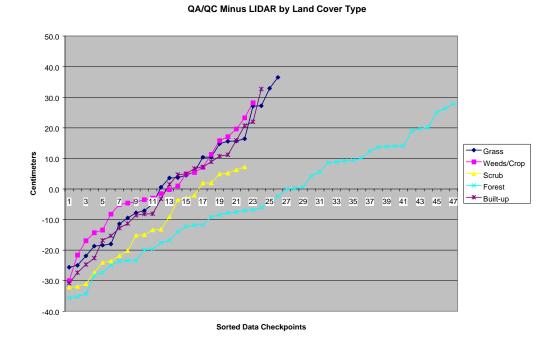All figures represent the data with the 95% data set. The data is of good quality.

Figure 1 illustrates the RMSE by specific land cover type.

RMSE by 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.

QA/QC Minus LIDAR by Land Cover Type

Figure 2

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

Table 2. Elevation Delta		Delta	Land Cover	Delta	Land Cover
Delta (cm)	Land Cover	7.1	Weeds/Crop	-11.8	Forest
-25.6	Grass	11.3	Weeds/Crop	-11.6	Forest
-25.0	Grass	15.8	Weeds/Crop	-9.1	Forest
-21.9	Grass	17.1	Weeds/Crop	-8.5	Forest
-18.7	Grass	19.6	Weeds/Crop	-7.8	Forest
-18.4	Grass	23.3	Weeds/Crop	-7.6	Forest
-18.0	Grass	28.2	Weeds/Crop	-7.0	Forest
-11.4	Grass	-32.1	Scrub	-6.8	Forest
-9.5	Grass	-31.9	Scrub	-6.1	Forest
-7.8	Grass	-31.0	Scrub	-4.5	Forest
-7.1	Grass	-27.3	Scrub	-2.4	Forest
-4.9	Grass	-24.0	Scrub	-0.1	Forest
0.6	Grass	-23.6	Scrub	0.2	Forest
3.6	Grass	-21.8	Scrub	0.7	Forest
3.7	Grass	-20.2	Scrub	4.3	Forest
4.5	Grass	-15.2	Scrub	5.6	Forest
5.6	Grass	-15.0	Scrub	8.6	Forest
10.4	Grass	-13.4	Scrub	8.8	Forest
10.4	Grass	-13.2	Scrub	9.3	Forest
14.8	Grass	-9.1	Scrub	9.4	Forest
15.6	Grass	-3.6	Scrub	10.1	Forest
15.7	Grass	-3.0	Scrub	12.4	Forest
16.4	Grass	-2.1	Scrub	13.7	Forest
27.1	Grass	2.0	Scrub	13.9	Forest
27.2	Grass	2.0	Scrub	14.1	Forest
32.9	Grass	4.9	Scrub	14.1	Forest
36.5	Grass	5.2	Scrub	19.0	Forest
-30.0	Weeds/Crop	6.3	Scrub	19.7	Forest
-21.6	Weeds/Crop	7.2	Scrub	20.2	Forest
-16.9	Weeds/Crop	-35.7	Forest	25.1	Forest
-14.3	Weeds/Crop	-35.2	Forest	26.4	Forest
-13.4	Weeds/Crop	-34.2	Forest	27.9	Forest
-8.2	Weeds/Crop	-28.3	Forest	-30.8	Built-up
-5.1	Weeds/Crop	-27.2	Forest	-27.4	Built-up
-4.6	Weeds/Crop	-25.0	Forest	-24.7	Built-up
-4.3	Weeds/Crop	-23.6	Forest	-22.6	Built-up
-3.5	Weeds/Crop	-23.4	Forest	-16.8	Built-up
-3.0	Weeds/Crop	-23.4	Forest	-15.3	Built-up
-1.5	Weeds/Crop	-19.9	Forest	-12.8	Built-up
-0.2	Weeds/Crop	-19.6	Forest	-11.3	Built-up
1.0	Weeds/Crop	-17.6	Forest	-8.6	Built-up
4.9	Weeds/Crop	-16.8	Forest	-8.2	Built-up
5.4	Weeds/Crop	-14.0	Forest	-8.1	Built-up
		-12.3	Forest	-3.2	Built-up

1.5	Built-up		7.2	Built-up		15.9	Built-up
4.7	Built-up		8.9	Built-up		20.7	Built-up
4.9	Built-up		10.7	Built-up		22.0	Built-up
6.7	Built-up		11.2	Built-up		32.7	Built-up

Table 3 illustrates the overall statistics for the checkpoint data.

Table 3. Overall Descriptive Statistics								
	RMSE (cm)	Mean (cm)	Median (cm)	Skew	Std Dev (cm)	# of Points	Min (cm)	Max (cm)
Total	17.0	-2.9	-3.3	0.1	16.8	142	-35.7	36.5
Grass	17.9	2.2	3.6	0.2	18.1	26	-25.6	36.5
Weeds/Crop	14.3	0.3	-1.5	0.0	14.6	23	-30.0	28.2
Scrub	17.6	-11.8	-13.3	-0.1	13.4	22	-32.1	7.2
Forest	17.6	-3.7	-6.1	0.0	17.4	47	-35.7	27.9
Built-up	16.5	-1.8	-0.8	0.1	16.8	24	-30.8	32.7

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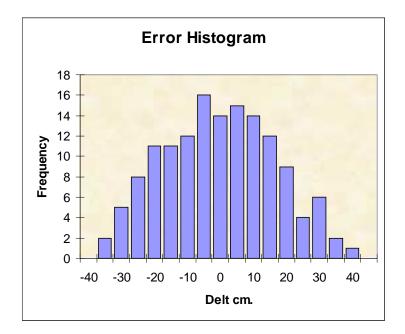

Figure 3