Wake County - Cape Fear plus Neuse/Cape Fear Basins Combined

The preliminary checkpoint spreadsheets for Wake County, Cape Fear Basin were received from NCGS on March 27, 2002. Since this county spans two watershed basins, with one being relatively small (Cape Fear Basin with 22 checkpoints) in comparison to the Neuse Basin portion, both series of checkpoints were combined. The preliminary statistics of The Neuse Basin portion has been previously assessed. Therefore the following statistics shall consist of the RMSE of the Cape Fear portion and a second RMSE for the combined County. 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 of the County in the Cape Fear portion using:

- 100% of the checkpoints
- 95% of the checkpoints

Table 1. RMSE by Land Class				
%	**RMSE (cm)**	**# of Points**	**Land Class**	**RMSE Criteria (cm)**
100	11.7	22	All	
95	**11.1**	**21**	**All**	**25**

Table 2 summarizes the RMSE of the County with the combined basins of Neuse and Cape Fear portions using:

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

Table 2. RMSE by Land Class				
%	**RMSE (cm)**	**# of Points**	**Land Class**	**RMSE Criteria (cm)**
100	16.3	132	All	
95	**13.2**	**125**	**All**	**25**
17	13.2	23	Grass	
15	12.4	20	Weeds/Crop	
11	15.8	15	Scrub	
33	13.0	43	Forest	
18	12.3	24	Built-up	

The LIDAR data for Wake County, Neuse and 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.

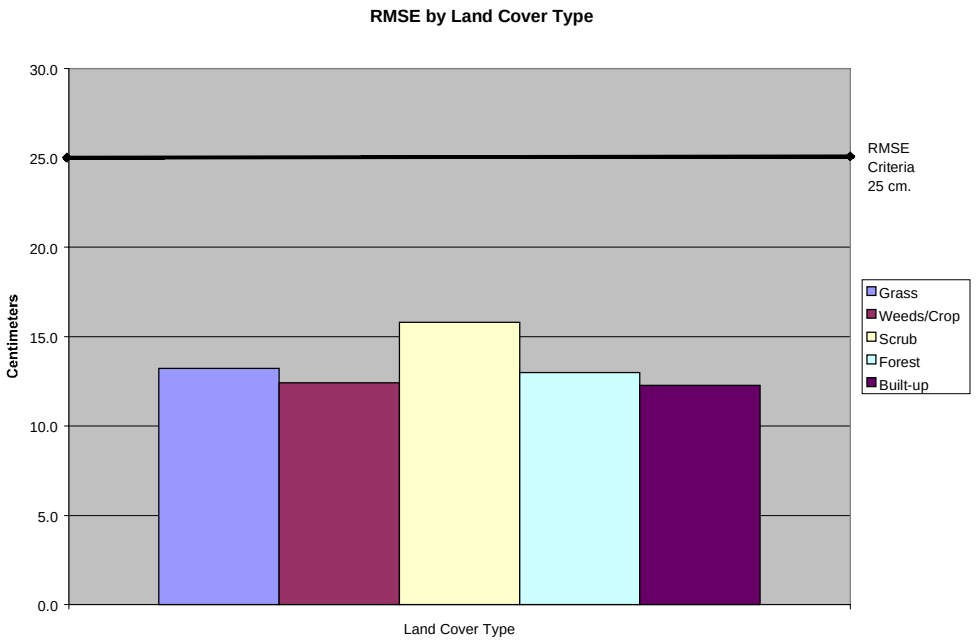

Figure 1

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.

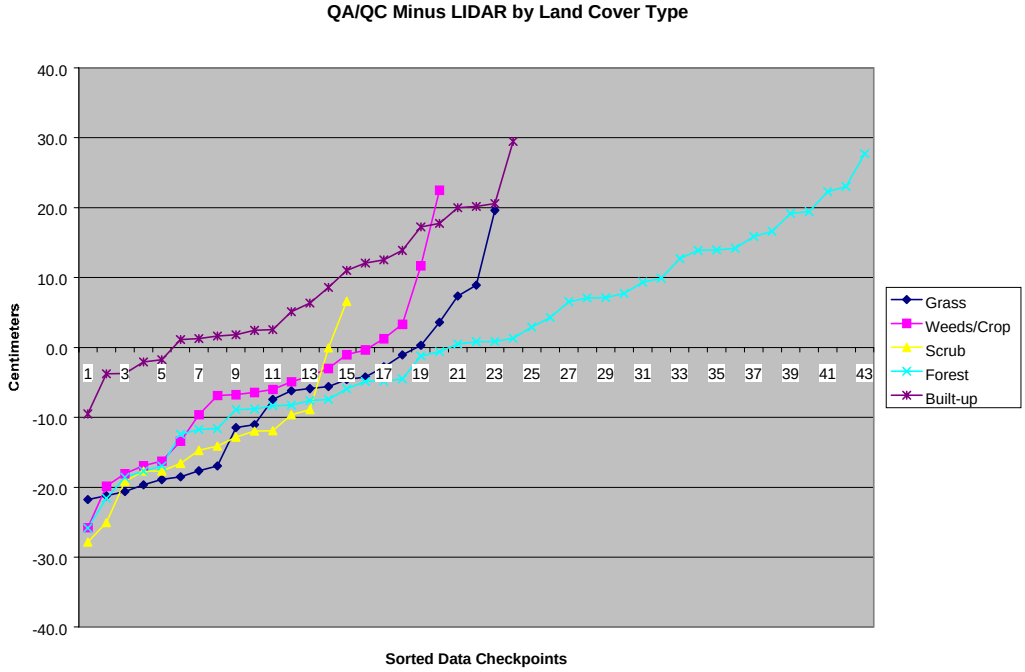

Figure 2

Table 3 illustrates the Delta between the QA/QC survey checkpoints and that of the interpolated LIDAR.

Table 3. Elevation Delta	
Delta (cm)	**Land Cover**
-21.8	Grass
-21.2	Grass
-20.6	Grass
-19.6	Grass
-18.9	Grass
-18.5	Grass
-17.7	Grass
-16.9	Grass
-11.5	Grass
-11.1	Grass
-7.4	Grass
-6.2	Grass
-5.9	Grass
-5.6	Grass
-4.6	Grass
-4.2	Grass
-2.8	Grass
-1.1	Grass
0.3	Grass
3.6	Grass
7.3	Grass
8.9	Grass
19.6	Grass
-25.8	Weeds/Crop
-19.8	Weeds/Crop
-18.1	Weeds/Crop
-16.9	Weeds/Crop
-16.3	Weeds/Crop
-13.4	Weeds/Crop
-9.6	Weeds/Crop
-6.9	Weeds/Crop
-6.8	Weeds/Crop
-6.4	Weeds/Crop
-6.0	Weeds/Crop
-4.9	Weeds/Crop
-4.1	Weeds/Crop
-3.0	Weeds/Crop
-1.0	Weeds/Crop
-0.4	Weeds/Crop
1.3	Weeds/Crop
3.3	Weeds/Crop
11.7	Weeds/Crop
22.5	Weeds/Crop
-27.8	Scrub
-25.1	Scrub
-19.1	Scrub
-17.7	Scrub
-17.7	Scrub
-16.6	Scrub
-14.7	Scrub
-14.1	Scrub
-12.8	Scrub
-12.0	Scrub
-11.9	Scrub
-9.6	Scrub
-8.9	Scrub
0.0	Scrub
6.6	Scrub
-25.8	Forest
-21.6	Forest
-18.6	Forest
-17.7	Forest
-17.0	Forest
-12.4	Forest
-11.7	Forest
-11.6	Forest
-8.9	Forest
-8.8	Forest
-8.3	Forest
-8.3	Forest
-7.6	Forest
-7.4	Forest
-5.9	Forest
-4.9	Forest
-4.8	Forest
-4.5	Forest
-1.2	Forest
-0.6	Forest
0.5	Forest
0.8	Forest
0.9	Forest
1.3	Forest
2.9	Forest
4.3	Forest
6.6	Forest
7.1	Forest
7.1	Forest
7.7	Forest
9.4	Forest
9.9	Forest
12.7	Forest
13.9	Forest
13.9	Forest
14.2	Forest
15.9	Forest
16.6	Forest
19.2	Forest
19.4	Forest
22.3	Forest
23.0	Forest
27.7	Forest
-9.5	Built-up
-3.8	Built-up
-3.7	Built-up
-2.1	Built-up
-1.8	Built-up
1.1	Built-up
1.3	Built-up
1.6	Built-up
1.8	Built-up
2.4	Built-up
2.5	Built-up
5.1	Built-up
6.4	Built-up
8.6	Built-up
11.0	Built-up
12.1	Built-up
12.5	Built-up
13.9	Built-up
17.3	Built-up
17.8	Built-up
20.0	Built-up
20.2	Built-up
20.6	Built-up
29.5	Built-up

Table 4 illustrates the overall statistics for the checkpoint data.

Table 4. Overall Descriptive Statistics								
	RMSE (cm)	Mean (cm)	Median (cm)	Skew	Std Dev (cm)	# of Points	Min (cm)	Max (cm)
Total	**13.2**	-2.1	-3.7	0.3	13.1	125	-27.8	29.5
Grass	**13.2**	-7.6	-6.2	0.6	11.0	23	-21.8	19.6
Weeds/Crop	**12.4**	-6.0	-6.2	0.7	11.1	20	-25.8	22.5
Scrub	**15.8**	-13.4	-14.1	0.7	8.6	15	-27.8	6.6
Forest	**13.0**	1.2	0.8	0.0	13.1	43	-25.8	27.7
Built-up	**12.3**	7.7	5.7	0.4	9.8	24	-9.5	29.5

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

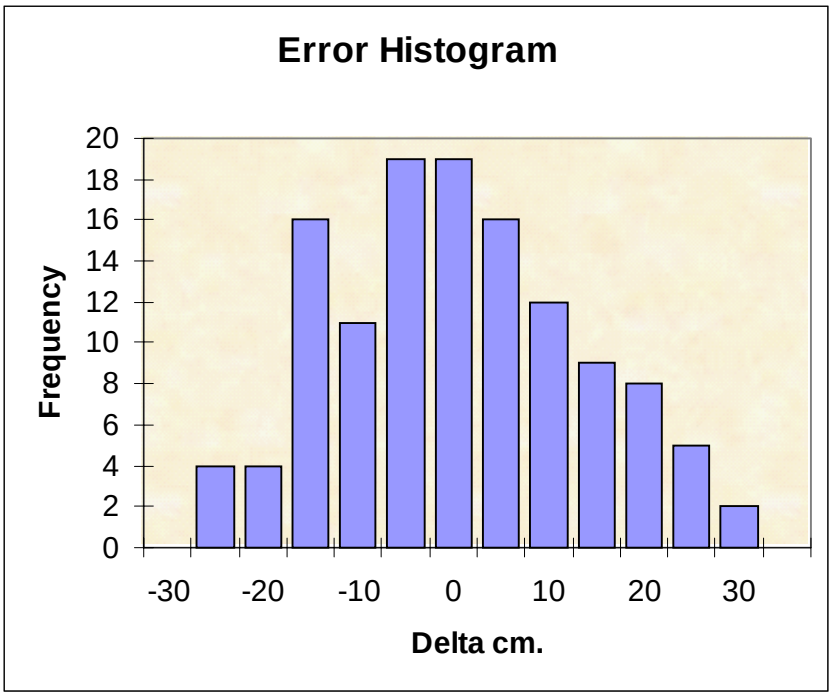

Figure 3