Wayne County - Neuse Basin

The preliminary checkpoint spreadsheets were received from NCGS on November 20, 2001. 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	61.9	119	All	
95	**17.0**	**113**	**All**	**25**
15	9.7	18	Grass	
16	11.2	19	Weeds/Crop	
18	19.4	21	Scrub	
29	18.2	35	Forest	
17	21.3	20	Built-up	

The LIDAR data for Wayne County, Neuse 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. This data is a good example of how two outliers can skew the RMSE criteria which in turn supports the reasoning behind using the best 95%.

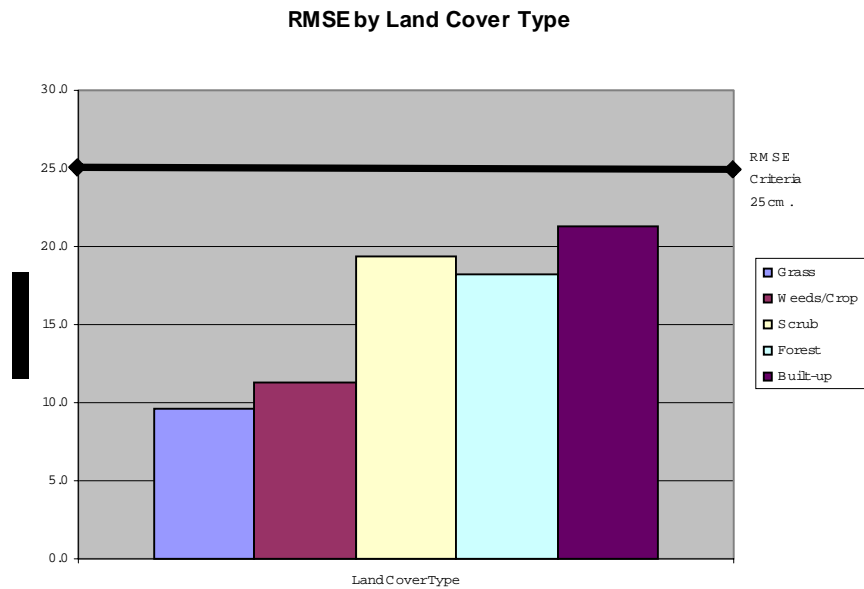Figure 1 illustrates the RMSE by specific land cover type.

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.
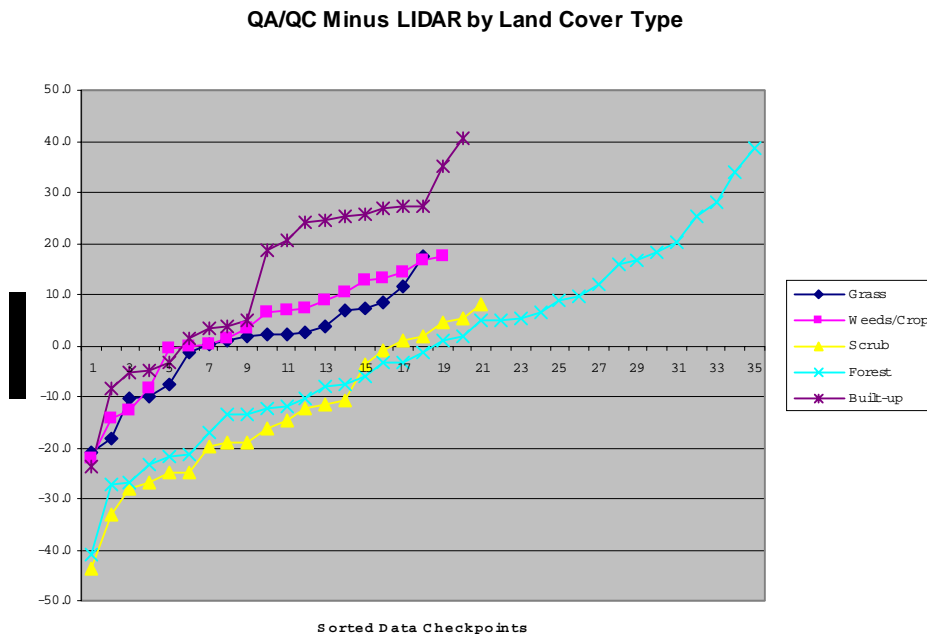
QA/QC Minus LIDAR by Land Cover Type

Figure 2

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

Delta (cm)	Land Cover	Delta (cm)	Land Cover	Delta (cm)	Land Cover
Table 2. Elevation Delta		-43.9	Scrub	1.1	Forest
-21.0	Grass	-33.2	Scrub	1.9	Forest
-18.2	Grass	-28.0	Scrub	5.0	Forest
-10.5	Grass	-26.7	Scrub	5.0	Forest
-9.9	Grass	-25.0	Scrub	5.5	Forest
-7.8	Grass	-24.8	Scrub	6.6	Forest
-1.5	Grass	-19.9	Scrub	8.8	Forest
0.2	Grass	-19.1	Scrub	9.6	Forest
1.1	Grass	-18.9	Scrub	12.1	Forest
1.6	Grass	-16.4	Scrub	15.9	Forest
2.0	Grass	-14.8	Scrub	16.5	Forest
2.2	Grass	-12.4	Scrub	18.1	Forest
2.4	Grass	-11.7	Scrub	20.1	Forest
3.5	Grass	-10.9	Scrub	25.2	Forest
7.0	Grass	-3.8	Scrub	27.9	Forest
7.3	Grass	-0.8	Scrub	33.8	Forest
8.3	Grass	1.1	Scrub	38.7	Forest
11.7	Grass	1.9	Scrub	-23.8	Built-up
17.4	Grass	4.3	Scrub	-8.3	Built-up
-22.1	Weeds/Crop	5.5	Scrub	-5.2	Built-up
-14.3	Weeds/Crop	8.2	Scrub	-5.0	Built-up
-12.9	Weeds/Crop	-40.8	Forest	-3.2	Built-up
-8.6	Weeds/Crop	-27.1	Forest	1.3	Built-up
-0.6	Weeds/Crop	-26.7	Forest	3.5	Built-up
-0.3	Weeds/Crop	-23.3	Forest	3.8	Built-up
0.3	Weeds/Crop	-21.9	Forest	4.8	Built-up
1.4	Weeds/Crop	-21.4	Forest	18.7	Built-up
3.5	Weeds/Crop	-17.0	Forest	20.7	Built-up
6.6	Weeds/Crop	-13.7	Forest	24.0	Built-up
6.9	Weeds/Crop	-13.6	Forest	24.6	Built-up
7.2	Weeds/Crop	-12.2	Forest	25.4	Built-up
8.8	Weeds/Crop	-11.9	Forest	25.5	Built-up
10.5	Weeds/Crop	-10.4	Forest	26.9	Built-up
12.8	Weeds/Crop	-7.9	Forest	27.3	Built-up
13.1	Weeds/Crop	-7.7	Forest	27.4	Built-up
14.2	Weeds/Crop	-5.9	Forest	35.1	Built-up
16.8	Weeds/Crop	-3.2	Forest	40.4	Built-up
17.3	Weeds/Crop	-3.2	Forest		
		-1.5	Forest		

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**	0.1	1.3	0.0	17.1	113	-43.9	40.4
Grass	**9.7**	-0.2	1.8	-0.6	10.0	18	-21.0	17.4
Weeds/Crop	**11.2**	3.2	6.6	-0.8	11.1	19	-22.1	17.3
Scrub	**19.4**	-13.8	-14.8	-0.2	14.0	21	-43.9	8.2
Forest	**18.2**	-0.5	-1.5	0.1	18.5	35	-40.8	38.7
Built-up	**21.3**	13.2	19.7	-0.4	17.2	20	-23.8	40.4

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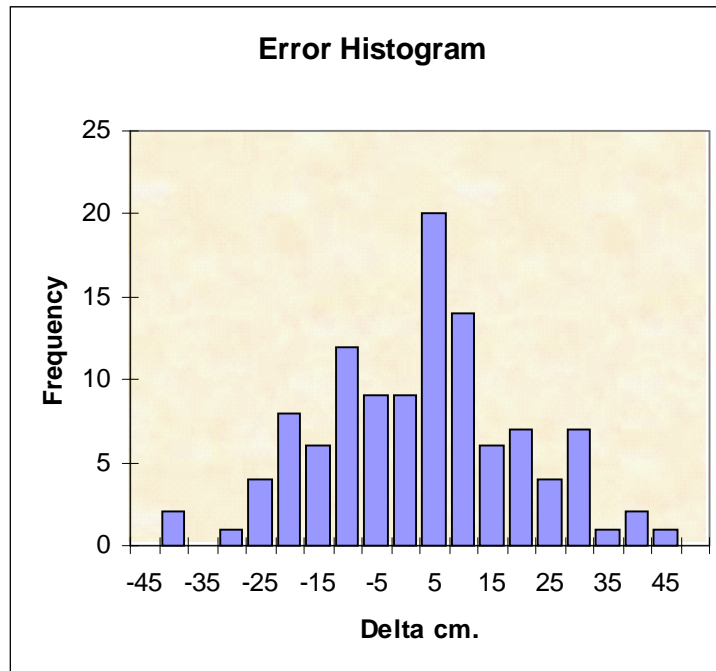

Figure 3