Assignment #4

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Question 1

$\frac{\sqrt{2 \cdot 30^2}}{2} = 21.21m$

$\therefore$ the positional uncertainty due to the cell resolution of 30m is 21.21m.

Question 2

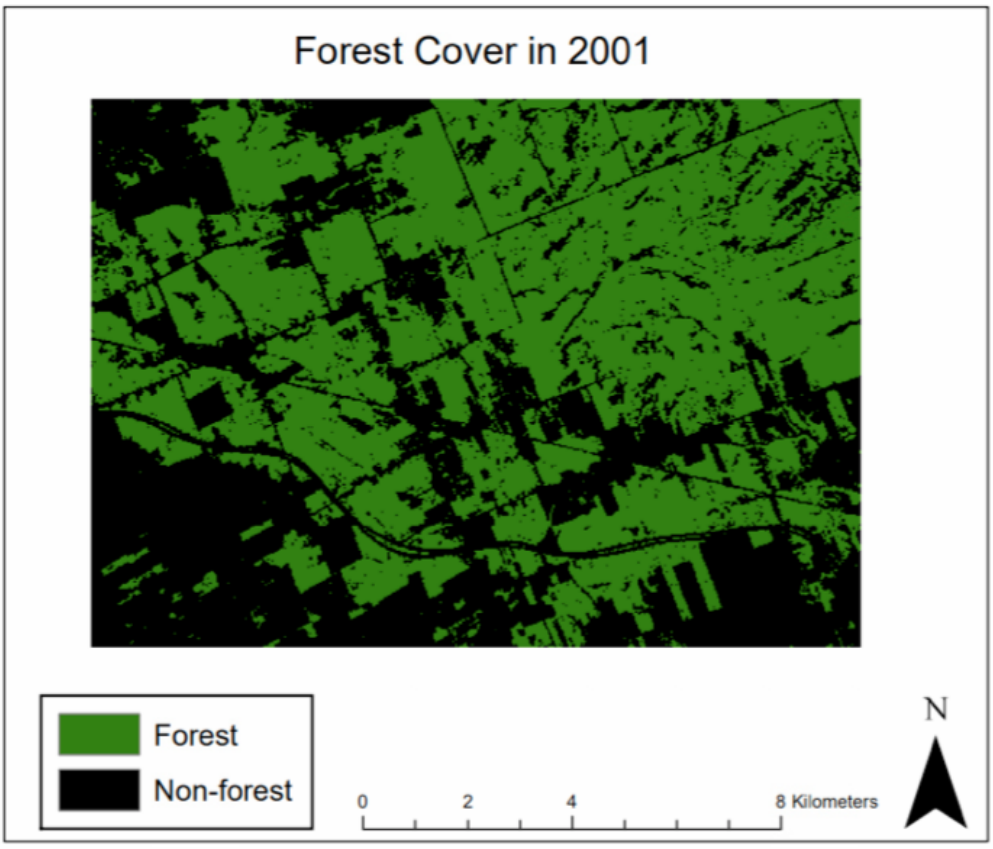

Figure 1 - Map analyzing the forest cover of the Ottawa area 2001

Table 1. Confusion Matrix for the forest cover in the Ottawa area (2001)

OBJECTID	ClassValue	C_1	C_2	Total	U_Accuracy	Kappa
1	C_1	11	0	11	1	0
2	C_2	3	7	10	0.7	0
3	Total	14	7	21	0	0
4	P_Accuracy	0.785714	1	0	0.857143	0
5	Kappa	0	0	0	0	0.709677

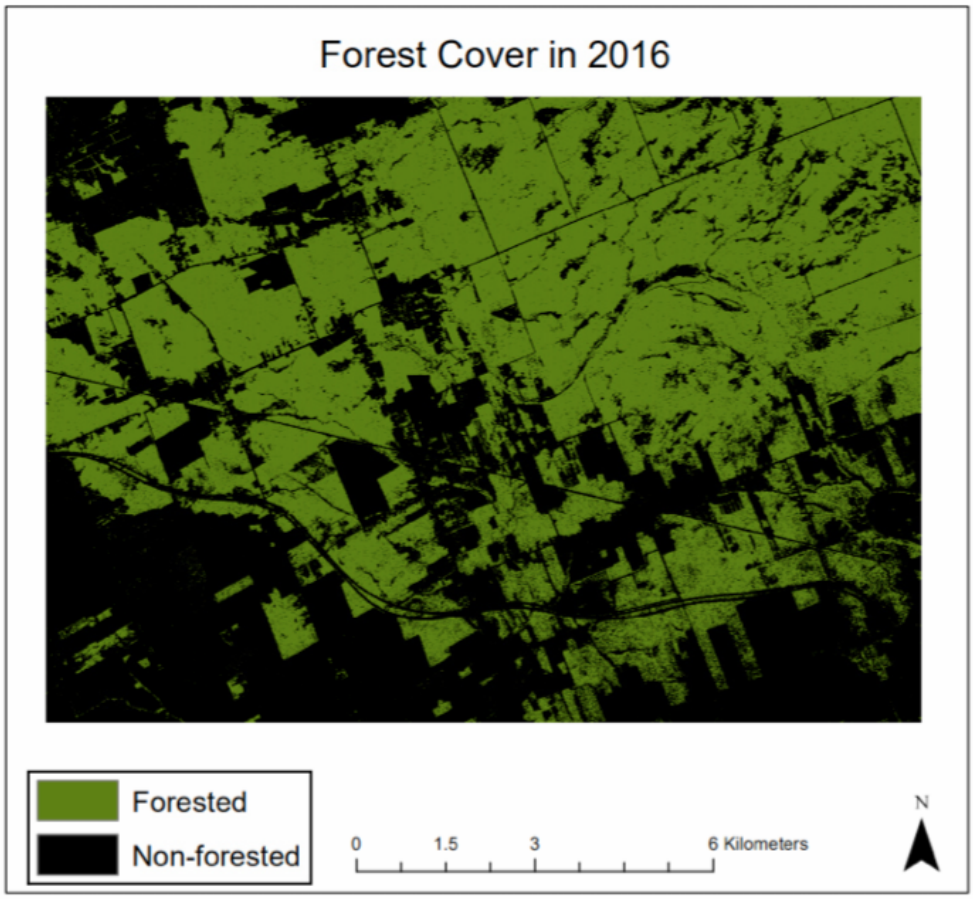

Figure 2 - Map analyzing the forest cover of the Ottawa area in 2016

Table 2. Confusion Matrix for the forest cover in the Ottawa area (2016)

OBJECTID	ClassValue	C_1	C_2	Total	U_Accuracy	Kappa
1	C_1	7	3	10	0.7	0
2	C_2	0	10	10	1	0
3	Total	7	13	20	0	0
4	P_Accuracy	1	0.769231	0	0.85	0
5	Kappa	0	0	0	0	0.7

$\therefore$ The results from the 2001 confusion matrix are ever so slightly more accurate since the kappa value is $(0.709677 - 0.7 = 0.009677)$ slightly higher than that of the 2016 matrix.

Question 3

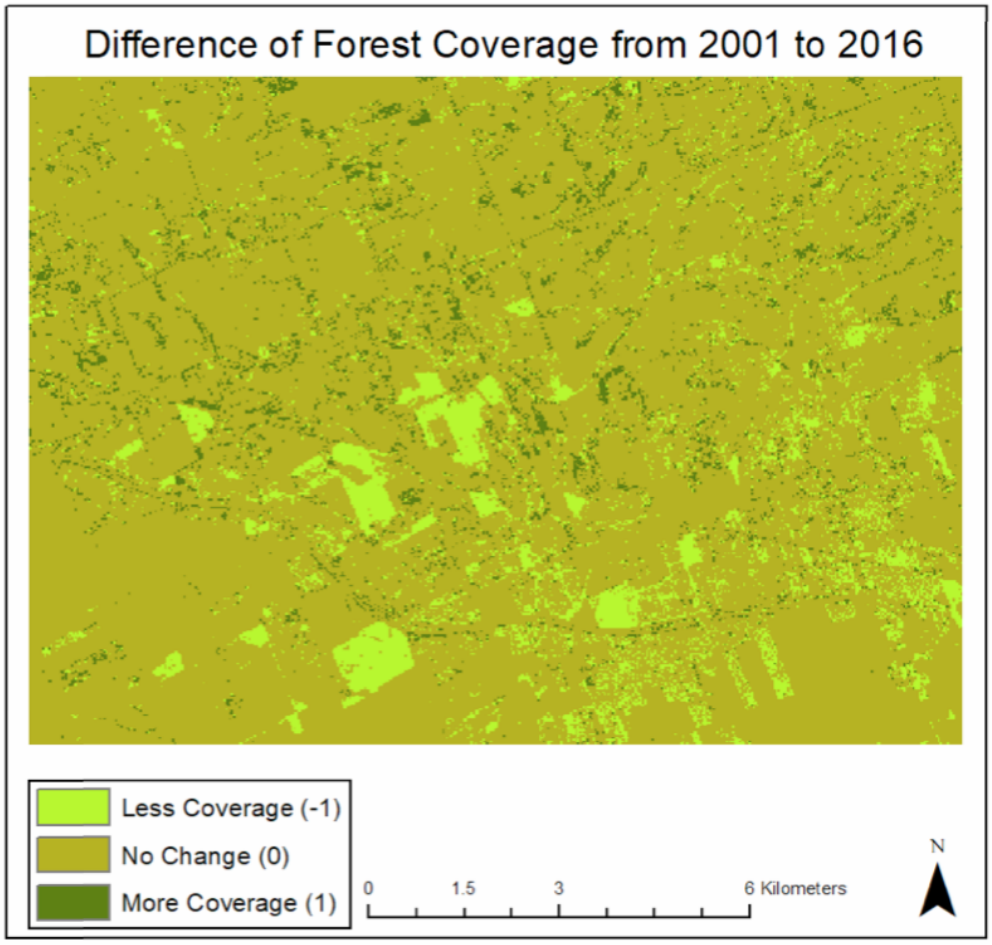

Figure 3 - Map analyzing the difference of forest coverage between 2001 and 2016 in the Ottawa region.

In the map a -1 represents an area with of the map with less coverage thus having a less dense forest. A 0 represents no change in the forest density. A +1 represents more coverage thus a higher density in that area.

Question 4

The region group tool allows the us to process a large group of contiguous set of cells of the same zone type.
The link column in the attributes table links the group back to the value created during the set minus operation in question 3 (-1, 0, 1).

Table 3. Top 10 counts from the region group attribute table

OBJECTID	Value	Count	Link
8499	8499	993	-1
5608	5608	787	-1
4804	4804	765	-1
7855	7855	452	-1
4441	4441	222	-1
4951	4951	206	-1
7823	7823	198	-1
7135	7135	157	-1
4590	4590	153	-1
6490	6490	146	-1

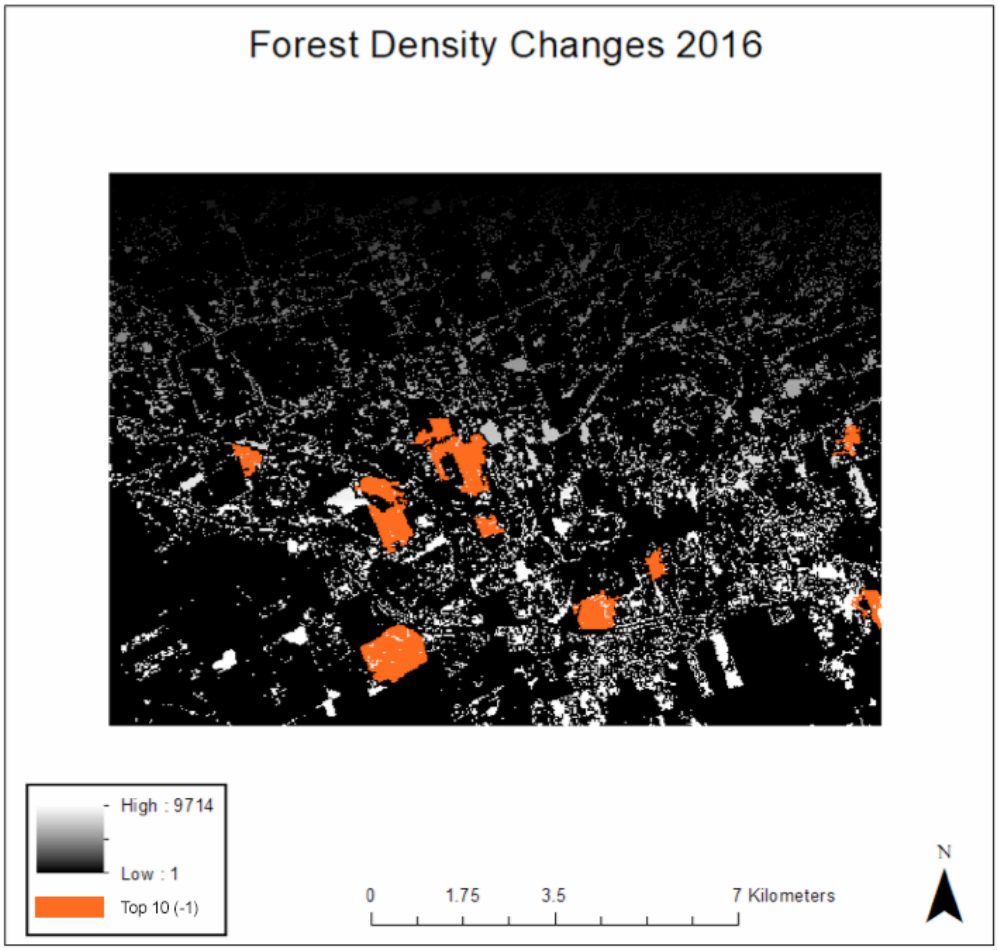

Figure 4 - Map analyzing the difference of forest coverage between 2001 and 2016 in the Ottawa region. The orange regions are the top 10 regions where the density has decreased.

Question 5

The mean was calculated by converting the number pixels from the count column into m^2. Since the layer is using 30m pixels I was able to compute a new column in the attributes table using `(!Count!/30)*Math.pow(30, 2)`.

The average area computed was: $12237m^2$ for the top 10 regions.

Question 6

Question 7

The DNs in Landsat 8 are greater than those in Landsat 7 because the Landsat 8 is picking up more intense wavelengths (as seen on slide 68 of lecture 8).

Question 8

The map shows the difference between the healthy vegetation and the degraded vegetation on the land. NVDI stands for the normalized difference vegetation index, thus showing the difference in the vegetation's health.

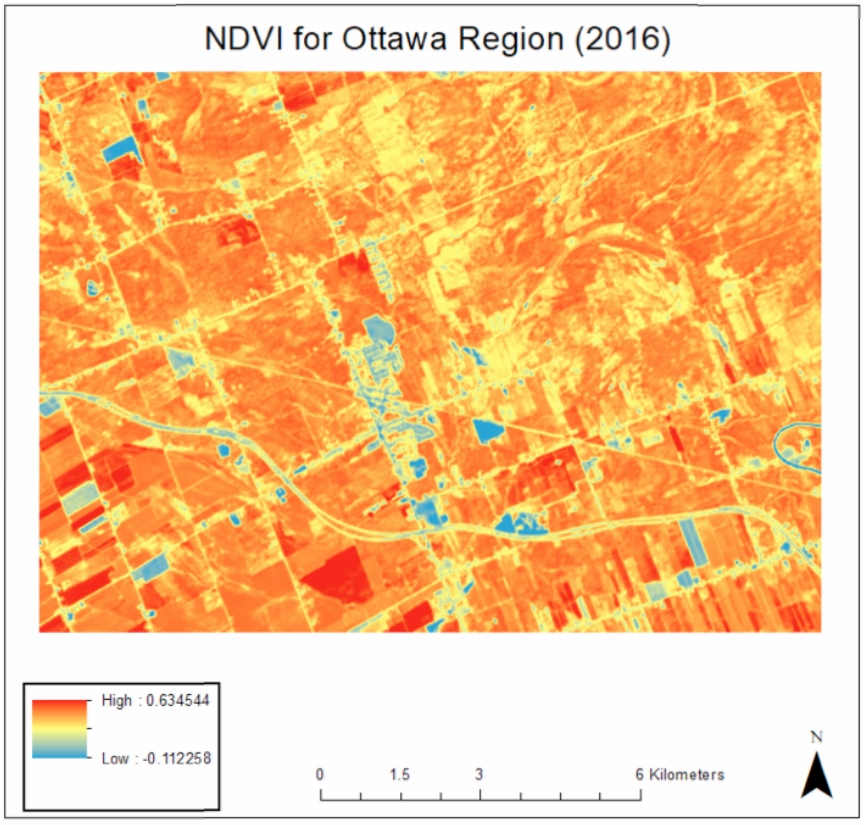

Figure 5 - NDVI Map for the Ottawa area in 2016