

3x3 and 5x5 homogeneous assessment, respectively. The overall accuracy increased following each filter. The overall accuracy started at 54.9%, for the every-pixel procedure (Table 56), increased to 71.4% following the 3x3 filter (Table 58), and ended at 87.2% following the 5x5 filter (Table 60). At the every-pixel level, deciduous forest user's, both herbaceous, and open water producer's displayed the highest accuracy. At the 3x3 homogeneous level, open water producer's, disturbed user's, and herbaceous producer's had the highest accuracies. At the 5x5 homogeneous level, mixed forest user's and shrub user's accuracies were not calculated due to lack of reference points. Mixed forest producer's and shrub producer's both had zero accuracies, while all but disturbed producer's and both coniferous accuracies were above 88%. The Kappa statistic ended at 0.807 following the 5x5 filter, which is relatively good compared to other scenes.

### **Scene 1634**

Scene 1634 is the only scene to fall completely within the 1 km buffer around the border of Virginia. The Shenandoah Valley and southern section of the National Park are visible in the northwest corner of this image (Figure 17). Even though more than half of this area is considered piedmont, enough mountainous terrain was present to classify this scene using the mountain-oriented supervised classification. The results indicate a landscape of mostly coniferous forest, deciduous forest, and herbaceous land cover (Table 61).

The homogeneity filters had a tremendous affect on this scene, reducing the assessable area to 53.2% of the original following the 3x3 procedure (Table 62) and to

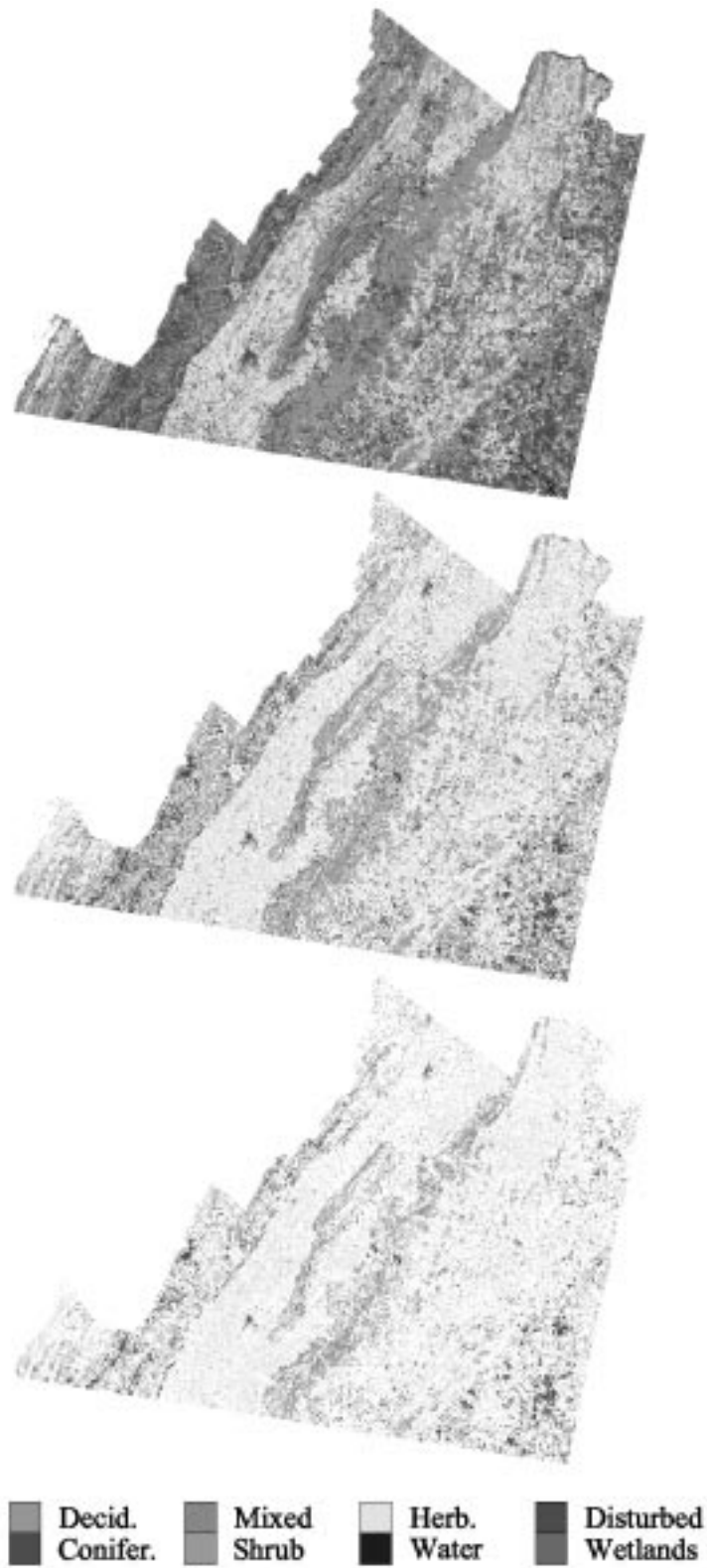


Figure 16. Classification output for scene 1633 full, 3x3 homogeneous, and 5x5 homogeneous.

Table 52. Total area and proportion of each land cover type for scene 1633 when analyzed at the every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area
Deciduous Forest	6,148,142	553,332.8	1,367,285.0	0.310
Coniferous Forest	4,542,707	408,843.6	1,010,253.0	0.229
Mixed Forest	496,809	44,712.81	110,485.4	0.025
Shrub/Scrub	1,410,969	126,987.2	313,785.4	0.071
Herbaceous	6,047,024	544,232.2	1,344,798.0	0.305
Open Water	246,604	22,194.4	54,842.3	0.012
Disturbed	918,406	82,656.5	204,244.3	0.046
Coastal Wetland	0	0	0	0.000
Total	19,810,661	1,782,959.0	4,405,693.0	1.000

Table 53. Results of the 3x3 homogeneous filter on land cover types within scene 1633 in area, proportion of total area, and proportion remaining from the 1633 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	3,589,114	323,020.3	798,183.1	0.349	0.584
Coniferous Forest	2,300,386	207,034.7	511,582.8	0.224	0.506
Mixed Forest	31,328	2,819.5	6,967.0	0.003	0.063
Shrub/Scrub	278,072	25,026.5	61,840.4	0.027	0.197
Herbaceous	3,755,738	338,016.4	835,238.6	0.366	0.621
Open Water	73,371	6,603.4	16,317.0	0.007	0.298
Disturbed	245,343	22,080.9	54,561.8	0.024	0.267
Coastal Wetland	0	0	0	0.000	0.000
Total	10,273,352	924,601.7	2,284,691.0	1.000	0.519

Table 54. Results of the 5x5 homogeneous filter on land cover types within scene 1633 in area, proportion of total area, and proportion remaining from 1633 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	2,083,942	187,554.8	463,447.9	0.366	0.339
Coniferous Forest	1,178,611	106,075.0	262,111.3	0.207	0.259
Mixed Forest	1,798	161.8	399.9	0.000	0.004
Shrub/Scrub	51,829	4,664.6	11,526.3	0.009	0.037
Herbaceous	2,271,442	204,429.8	505,146.0	0.399	0.376
Open Water	22,336	2,010.2	4,967.3	0.004	0.091
Disturbed	79,362	7,142.6	17,649.3	0.014	0.086
Coastal Wetland	0	0	0	0.000	0.000
Total	5,689,320	512,038.8	1,265,248.0	1.000	0.287

Table 55. Error matrix for scene 1633 at the every-pixel level. Reference data (aerial videography points) are shown as column headings, while actual pixel values are displayed in the left column as row headings. The number of points classified correctly in each cover-type is in bold.

	Deciduous Forest	Coniferous Forest	Mixed Forest	Shrub/ Scrub	Herbaceous	Water Open	Disturbed	Coastal Wetland	Total
Deciduous Forest	<b>55</b>	4	3	5	4				71
Coniferous Forest	24	<b>6</b>	7	2	1	1	1		42
Mixed Forest	3						1		4
Shrub/Scrub	2			<b>2</b>	3				7
Herbaceous	4		1	1	<b>23</b>		2		31
Open Water				1		<b>2</b>	1		4
Disturbed		1		2			<b>2</b>		5
Coastal Wetland									0
Other									0
<b>Total</b>	<b>88</b>	<b>11</b>	<b>11</b>	<b>13</b>	<b>31</b>	<b>3</b>	<b>7</b>	<b>0</b>	<b>164</b>

Table 56. User's and producer's accuracy for each land cover class, along with overall accuracy and the Kappa statistic, for scene 1633 at the every-pixel level.

	User's	Producer's
Deciduous Forest	0.775	0.625
Coniferous Forest	0.143	0.545
Mixed Forest	0.000	0.000
Shrub/Scrub	0.286	0.154
Herbaceous	0.742	0.742
Open Water	0.500	0.667
Disturbed	0.400	0.286
Coastal Wetland		
Overall Accuracy	0.549	
Kappa	0.411	

Table 57. Error matrix for scene 1633 at the 3x3 homogeneous level. Reference data (aerial videography points) are shown as column headings, while actual pixel values are displayed in the left column as row headings. The number of points classified correctly in each cover-type is in bold. The number of reference points for each category that falls on non-homogeneous pixels is shown in the last row.

	Deciduous Forest	Conifer Forest	Mixed Forest	Shrub/ Scrub	Herbaceous	Open Water	Disturbed	Coastal Wetland	Total
Deciduous Forest	<b>36</b>	2	2	3	2				45
Coniferous Forest	5	<b>4</b>	2						11
Mixed Forest									0
Shrub/Scrub									0
Herbaceous	4		1		<b>16</b>		1		22
Open Water				1		<b>2</b>	1		4
Disturbed							<b>2</b>		2
Coastal Wetland									0
Other									0
Total	45	6	5	4	18	2	4	0	84
Non-Homogeneous	43	5	6	9	13	1	3		80

Table 58. User's and producer's accuracy for each category, along with overall accuracy and Kappa statistic, for scene 1633 at the 3x3 homogeneous level.

	User's	Producer's
Deciduous Forest	0.800	0.800
Coniferous Forest	0.364	0.667
Mixed Forest		0.000
Shrub/Scrub		0.000
Herbaceous	0.727	0.889
Open Water	0.500	1.000
Disturbed	1.000	0.500
Coastal Wetland		
Overall Accuracy	0.714	
Kappa	0.598	

Table 59. Error matrix for scene 1633 at the 5x5 homogeneous level. Reference data (aerial videography points) are shown as column headings, while actual pixel values are displayed in the left column as row headings. The number of points correctly classified in each cover-type is in bold. The number of reference points for each category that falls on non-homogeneous pixels is shown in the last row.

	Deciduous Forest	Coniferous Forest	Mixed Forest	Shrub/ Shrub	Herbaceous	Open Water	Disturbed	Coastal Wetland	Total
Deciduous Forest	<b>24</b>	2		1					27
Coniferous Forest	1	<b>4</b>	1						6
Mixed Forest									0
Shrub/Scrub									0
Herbaceous					<b>11</b>		1		12
Open Water						<b>1</b>			1
Disturbed							<b>1</b>		1
Coastal Wetland									0
Other									0
Total	25	6	1	1	11	1	2	0	47
Non-Homogeneous	63	5	10	12	20	2	5		117



Table 60. User's and producer's accuracy for each land cover class, along with overall accuracy and Kappa statistic, for scene 1633 at the 5x5 homogeneous level.

	User's	Producer's
Deciduous Forest	0.889	0.960
Conifer Forest	0.667	0.667
Mixed Forest		0.000
Shrub/Scrub		0.000
Herbaceous	0.917	1.000
Open Water	1.000	1.000
Disturbed	1.000	0.500
Coastal Wetland		
Overall Accuracy	0.872	
Kappa	0.807	