

only 6% following the 5x5 procedure (Table 63). Disturbed and mixed forest were the only cover types with greater than 10% of their original area after the 5x5 homogeneity filter. Three hundred and eleven reference points were used to evaluate the every-pixel level (Table 64), while only 176 (Table 66) and 126 (Table 68) points were usable for the 3x3 and 5x5 assessment, respectively. The overall accuracy was fairly high (82.8%) after the 5x5 filter (Table 69). An overall accuracy of 76.7% was obtained following the 3x3 procedure (Table 67). An accuracy of 59.8% was found at the every-pixel level (Table 65). The final Kappa statistic was 0.783.

Scene 1635

Two reservoirs, Kerr in the east and Philpott in the northwest, are visible in scene 1635 (Figure 18). Dick Cross and White Oak Wildlife Management Areas were used as training data during the hypercluster aggregation of this image. Over 40% of the area is deciduous forest and 30.7% herbaceous (Table 70).

The homogeneity filters reduced the assessable area to 38.7% of the original area following the 3x3 procedure (Table 71) and to 14.4% of the original area following the 5x5 procedure (Table 72). Shrub and mixed forest each had less than 0.5% assessable area following the 5x5 filter. One hundred-seventeen reference points were used to assess the accuracy at the every-pixel level (Table 73). Seventy-eight of these points were usable in the 3x3 homogeneous assessment (Table 75), while only 14 were usable in the 5x5 homogeneous assessment (Table 77). The 3x3 assessment resulted in the highest overall accuracy (Table 76), 51.3%. The scene was 35.0% accurate at the every-pixel level (Table 74) and 42.9% accurate at the 5x5 filter level (Table 78). Both deciduous

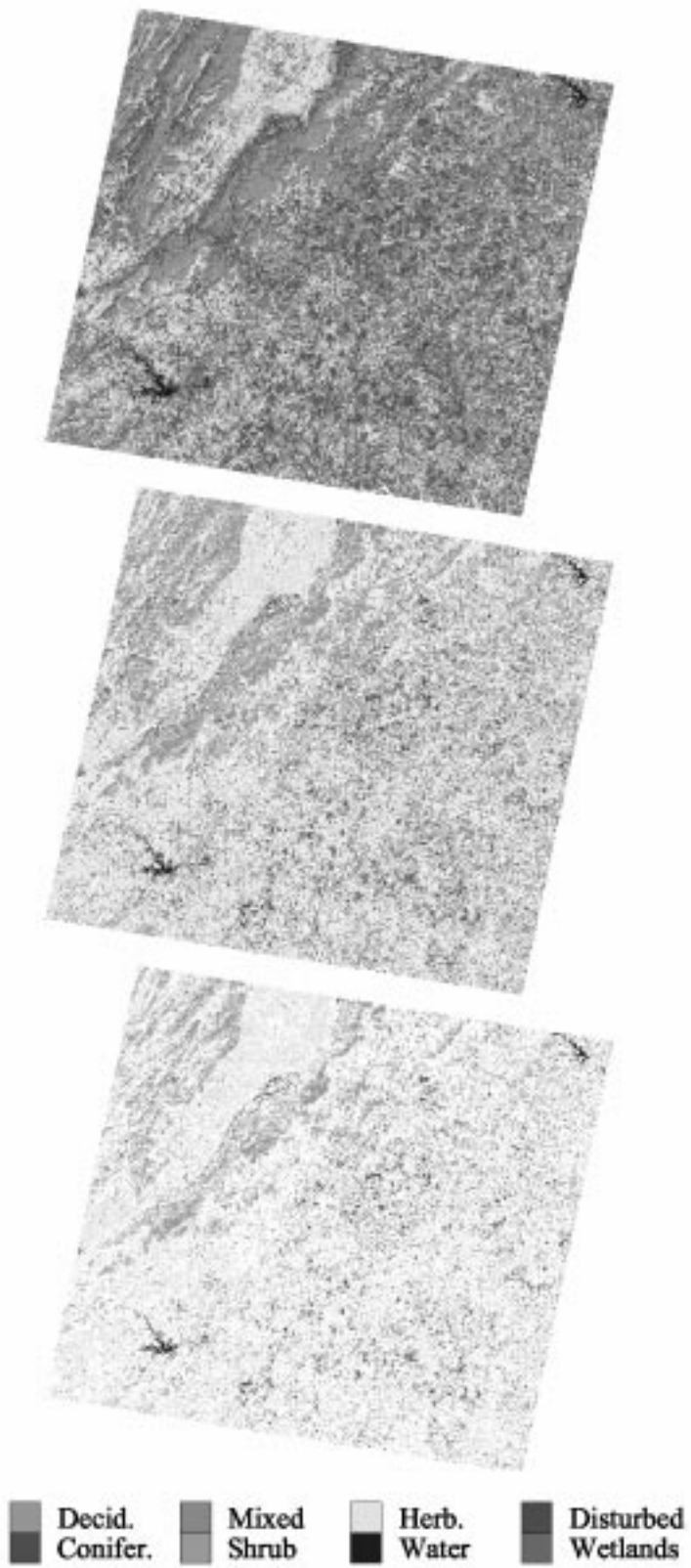


Figure 17. Classification output for scene 1634 full, 3x3 homogeneous, and 5x5 homogeneous.

Table 61. Total area and proportion of each land cover type for scene 1634 when analyzed at the every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area
Deciduous Forest	11,273,814	1,014,643.0	2,507,183.0	0.323
Coniferous Forest	11,548,072	1,039,326.0	2,568,176.0	0.331
Mixed Forest	8,848	796.3	1,967.7	0.000
Shrub/Scrub	1,076,881	96,919.3	239,487.6	0.031
Herbaceous	10,328,972	929,607.5	2,297,060.0	0.296
Open Water	263,246	23,692.1	58,543.3	0.008
Disturbed	437,637	39,387.3	97,326.1	0.013
Coastal Wetland	0	0	0	0.000
Total	34,937,470	3,144,372.0	7,769,744.0	1.000

Table 62. Results of the 3x3 homogeneous filter on land cover types within scene 1634 in area, proportion of total area, and proportion remaining from the 1634 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	6,314,242	568,281.8	1,404,224.0	0.339	0.560
Coniferous Forest	5,643,530	507,917.7	1,255,065.0	0.303	0.489
Mixed Forest	19	1.7	4.2	0.000	0.002
Shrub/Scrub	143,303	12,897.3	31,869.1	0.008	0.133
Herbaceous	6,271,866	564,467.9	1,394,800.0	0.337	0.607
Open Water	149,883	13,489.5	33,332.5	0.008	0.569
Disturbed	75,967	6,837.0	16,894.3	0.004	0.174
Coastal Wetland	0	0	0	0.000	0.000
Total	18,598,810	1,673,893.0	4,136,189.0	1.000	0.532

Table 63. Results of the 5x5 homogeneous filter on land cover types within scene 1634 in area, proportion of total area, and proportion remaining from 1634 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	896,678	80,701.0	199,412.2	0.430	0.080
Coniferous Forest	248,929	22,403.6	55,359.3	0.119	0.022
Mixed Forest	1,362	122.6	302.9	0.001	0.154
Shrub/Scrub	39,889	3,590.0	8,870.9	0.019	0.037
Herbaceous	842,000	75,780.0	187,252.4	0.403	0.082
Open Water	6,420	577.8	1,427.7	0.003	0.024
Disturbed	52,363	4,712.7	11,645.0	0.025	0.120
Coastal Wetland	0	0	0	0.000	0.000
Total	2,087,641	187,887.7	464,270.5	1.000	0.060

Table 64. Error matrix for scene 1634 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	86	2	13	3	7		1		112
Coniferous Forest	38	25	20	3	3		4		93
Mixed Forest									0
Shrub/Scrub	2	1		3	6				12
Herbaceous	4		3	4	65	3	3		82
Open Water	1		1			5			7
Disturbed	1				2		2		5
Coastal Wetland									0
Other									0
Total	132	28	37	13	83	8	10	0	311

Table 65. User's and producer's accuracy for each land cover class, along with overall accuracy and the Kappa statistic, for scene 1634 at the every-pixel level.

	User's	Producer's
Deciduous Forest	0.768	0.652
Coniferous Forest	0.269	0.893
Mixed Forest		0.000
Shrub/Scrub	0.250	0.230
Herbaceous	0.793	0.783
Open Water	0.714	0.625
Disturbed	0.400	0.200
Coastal Wetland		
Overall Accuracy	0.598	
Kappa	0.531	

Table 66. Error matrix for scene 1634 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	58		6		2				66
Coniferous Forest	15	16	9	1	2		2		45
Mixed Forest									0
Shrub/Scrub					1				1
Herbaceous	1		1	1	56				59
Open Water						4			4
Disturbed							1		1
Coastal Wetland									0
Other									0
Total	74	16	16	2	61	4	3	0	176
Non- Homogeneous	58	12	21	11	22	4	7		135

Table 67. User's and producer's accuracy for each category, along with overall accuracy and Kappa statistic, for scene 1634 at the 3x3 homogeneous level.

	User's	Producer's
Deciduous Forest	0.879	0.784
Coniferous Forest	0.356	1.000
Mixed Forest		0.000
Shrub/Scrub	0.000	0.000
Herbaceous	0.949	0.918
Open Water	1.000	1.000
Disturbed	1.000	0.333
Coastal Wetland		
Overall Accuracy	0.767	
Kappa	0.710	

Table 68. Error matrix for scene 1634 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	40		4		1				45
Coniferous Forest	9	10	6		1		1		27
Mixed Forest									0
Shrub/Scrub									0
Herbaceous	1		1	1	47				50
Open Water						4			4
Disturbed									0
Coastal Wetland									0
Other									0
Total	50	10	11	1	49	4	1	0	126
Non-Homogeneous	82	18	26	12	34	4	9	0	185

Table 69. User's and producer's accuracy for each land cover class, along with overall accuracy and Kappa statistic, for scene 1634 at the 5x5 homogeneous level.

	User's	Producer's
Deciduous Forest	0.889	0.800
Conifer Forest	0.370	1.000
Mixed Forest		0.000
Shrub/Scrub		0.000
Herbaceous	0.940	0.959
Open Water		1.000
Disturbed		0.000
Coastal Wetland		
Overall Accuracy	0.828	
Kappa	0.783	

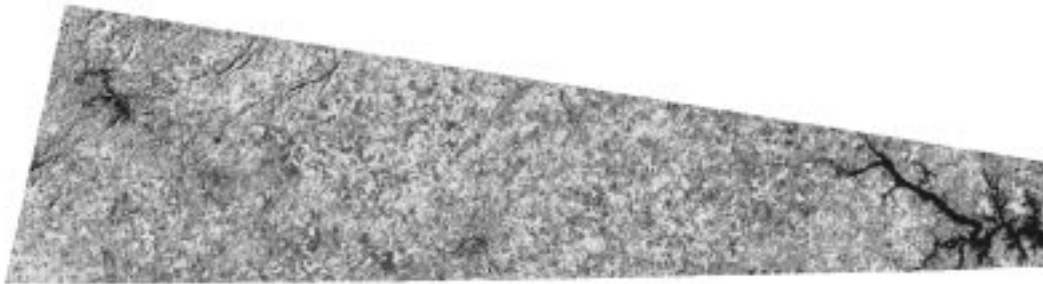


Figure 18. Classification output for scene 1635 full, 3x3 homogeneous, and 5x5 homogeneous.

Table 70. Total area and proportion of each land cover type for scene 1635 when analyzed at the every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area
Deciduous Forest	2,428,587	218,572.8	540,093.5	0.410
Coniferous Forest	922,544	83,029.0	205,164.6	0.156
Mixed Forest	161,168	14,505.1	35,842.2	0.027
Shrub/Scrub	229,698	20,672.8	51,082.5	0.039
Herbaceous	1,817,935	163,614.2	404,290.6	0.307
Open Water	233,267	20,994.0	51,876.3	0.039
Disturbed	125,135	11,262.2	27,828.8	0.021
Coastal Wetland	0	0	0	0.000
Total	5,918,334	532,650.1	1,316,178.0	1.000

Table 71. Results of the 3x3 homogeneous filter on land cover types within scene 1635 in area, proportion of total area, and proportion remaining from the 1635 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	904,538	81,408.4	201,160.2	0.395	0.372
Coniferous Forest	285,320	25,678.8	63,452.3	0.125	0.309
Mixed Forest	3,119	280.7	693.6	0.001	0.019
Shrub/Scrub	14,879	1,339.1	3,308.9	0.007	0.065
Herbaceous	922,052	82,984.7	205,055.1	0.403	0.507
Open Water	131,778	11,860.0	29,306.1	0.058	0.565
Disturbed	27,148	2,443.3	6,037.4	0.012	0.217
Coastal Wetland	0	0	0	0.000	0.000
Total	2,288,834	205,995.1	509,013.8	1.000	0.387

Table 72. Results of the 5x5 homogeneous filter on land cover types within scene 1635 in area, proportion of total area, and proportion remaining from 1635 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	240,053	21,604.8	53,385.4	0.282	0.099
Coniferous Forest	83,590	7,523.1	18,589.6	0.098	0.091
Mixed Forest	40	3.6	8.9	0.000	0.000
Shrub/Scrub	838	75.4	186.4	0.001	0.004
Herbaceous	425,048	38,254.3	94,526.4	0.499	0.234
Open Water	93,090	8,378.1	20,702.3	0.109	0.399
Disturbed	8,669	780.2	1,927.9	0.010	0.069
Coastal Wetland	0	0	0	0.000	
Total	851,328	76,619.5	189,326.8	1.000	0.144

Table 73. Error matrix for scene 1635 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	20	2	5	5	7		3		42
Coniferous Forest	7	5	2	1	4		1		20
Mixed Forest	3	3	1						7
Shrub/Scrub			1	1	4				6
Herbaceous	9		2	2	11		2		26
Open Water	2	1							3
Disturbed	3	1					3		7
Coastal Wetland									0
Other	1	1	2		2				6
Total	45	13	13	9	28	0	9	0	117

Table 74. User's and producer's accuracy for each land cover class, along with overall accuracy and the Kappa statistic, for scene 1635 at the every-pixel level.

	User's	Producer's
Deciduous Forest	0.476	0.444
Coniferous Forest	0.250	0.385
Mixed Forest	0.143	0.077
Shrub/Scrub	0.167	0.111
Herbaceous	0.423	0.393
Open Water	0.000	
Disturbed	0.429	0.333
Coastal Wetland		
Overall Accuracy	0.350	
Kappa	0.161	

Table 75. Error matrix for scene 1635 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	8		4	4	2		1		19
Coniferous Forest	1	2			1				4
Mixed Forest									0
Shrub/Scrub				1					1
Herbaceous	3			1	7				11
Open Water	1								1
Disturbed		1					2		3
Coastal Wetland									0
Other									0
Total	13	3	4	6	10	0	3	0	39
Non- Homogeneous	32	10	9	3	18		6		78

Table 76. User's and producer's accuracy for each category, along with overall accuracy and Kappa statistic, for scene 1635 at the 3x3 homogeneous level.

	User's	Producer's
Deciduous Forest	0.421	0.615
Coniferous Forest	0.500	0.667
Mixed Forest		0.000
Shrub/Scrub	1.000	0.167
Herbaceous	0.636	0.700
Open Water	0.000	
Disturbed	0.667	0.667
Coastal Wetland		
Overall Accuracy	0.513	
Kappa	0.348	

Table 77. Error matrix for scene 1635 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			2	2			1		5
Coniferous Forest	1	1							2
Mixed Forest									0
Shrub/Scrub									0
Herbaceous	1			1	5				7
Open Water									0
Disturbed									0
Coastal Wetland									0
Other									0
Total	2	1	2	3	5	0	1	0	14
Non-Homogeneous	43	12	11	6	23		8		103

Table 78. User's and producer's accuracy for each land cover class, along with overall accuracy and Kappa statistic, for scene 1635 at the 5x5 homogeneous level.

	User's	Producer's
Deciduous Forest	0.000	0.000
Conifer Forest	0.500	1.000
Mixed Forest		0.000
Shrub/Scrub		0.000
Herbaceous	0.714	1.000
Open Water		
Disturbed		0.000
Coastal Wetland		
Overall Accuracy	0.429	
Kappa	0.248	