

filter (Table 227). Shrub, mixed forest, and coniferous forest were the land cover types most reduced.

A mix of aerial videography and SAA photo-interpretation resulted in 155 reference points (Table 118). Eighty-eight of these were used for the 3x3 assessment (Table 120). Fifty-two were used for the 5x5 evaluation (Table 122). The overall accuracy was very low at the every-pixel level (5.8%, Table 119). The Kappa statistic was also very low (-0.042). A drastic increase in accuracy resulted following the 3x3 homogeneous assessment (Table 121). A final accuracy of 90.4% was achieved using the 5x5 filter assessment (Table 123). The dramatic increase in overall accuracy and Kappa statistic was probably an indication of the poor spatial fidelity in the videography reference data. Several individual class accuracies could not be calculated due to lack of homogeneous points at both the 3x3 and 5x5 assessment levels. The Kappa statistic rose dramatically following the use of homogeneous filters. The final Kappa value was 0.719.

Scene 1935

With 88,907.2 ha (219,690 acres), scene 1935 (Figure 24) contains the smallest area of any scene in Virginia (Table 124). Expert knowledge and scene overlap were used to classify this mountainous image. Approximately 55.9% of the area is covered in deciduous forest. The herbaceous category accounts for 21.2% of the land.

The 3x3 homogeneity filter reduced the assessable area to 79.6% of the original (Table 126). The results of the 5x5 filter retained 49.8% of the original (Table 126). Twenty-nine reference points from SAA photo-interpretation were used in the accuracy assessment (Table 127). Of these points, 10 were also used for the 3x3 assessment

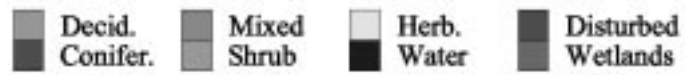


Figure 23. Classification output for scene 1835 full, 3x3 homogeneous, and 5x5 homogeneous.

Table 115. Total area and proportion of each land cover type for scene 1835 when analyzed at the every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area
Deciduous Forest	2,656,835	239,115.0	590,854.0	0.574
Coniferous Forest	462,290	41,606.1	102,809.0	0.100
Mixed Forest	76,040	6,843.6	16,910.5	0.016
Shrub/Scrub	440,079	39,607.1	97,869.2	0.095
Herbaceous	925,108	83,259.7	205,735.0	0.200
Open Water	14,466	1,301.9	3,217.1	0.003
Disturbed	51,096	4,598.6	11,363.2	0.011
Coastal Wetland	0	0	0	0.000
Total	4,625,914	416,332.0	1,028,757.0	1.000

Table 116. Results of the 3x3 homogeneous filter on land cover types within scene 1835 in area, proportion of total area, and proportion remaining from the 1835 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	1,714,910	154,342.0	381,379.0	0.718	0.645
Coniferous Forest	108,922	9,803.0	24,223.2	0.046	0.236
Mixed Forest	12,511	1,126.0	2,782.3	0.005	0.165
Shrub/Scrub	64,127	5,771.4	14,261.2	0.027	0.146
Herbaceous	468,173	42,135.6	104,117.0	0.196	0.506
Open Water	5,043	453.9	1,121.5	0.002	0.349
Disturbed	14,357	1,292.1	3,192.9	0.006	0.281
Coastal Wetland	0	0	0	0.000	0.000
Total	2,388,043	214,924.0	531,077.0	1.000	0.516

Table 117. Results of the 5x5 homogeneous filter on land cover types within scene 1835 in area, proportion of total area, and proportion remaining from 1835 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	1,076,793	96,911.4	239,468.0	0.805	0.405
Coniferous Forest	27,057	2,435.1	6,017.2	0.020	0.059
Mixed Forest	2,528	227.5	562.2	0.002	0.033
Shrub/Scrub	6,240	561.6	1,387.7	0.005	0.014
Herbaceous	217,056	19,535.0	48,271.1	0.162	0.235
Open Water	3,345	301.1	743.9	0.003	0.231
Disturbed	4,987	448.8	1,109.1	0.004	0.098
Coastal Wetland	0	0	0	0.000	0.000
Total	1,338,006	120,420.5	297,559.0	1.000	0.289

Table 118. Error matrix for scene 1835 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	4	3	1	3	7				18
Coniferous Forest	1				2		4		7
Mixed Forest					1				1
Shrub/Scrub	4			1	3				8
Herbaceous	8				4		3		15
Open Water									0
Disturbed									0
Coastal Wetland									0
Other	73	2	3	5	21		2		106
Total	90	5	4	9	38	0	9	0	155

Table 119. User's and producer's accuracy for each land cover class, along with overall accuracy and the Kappa statistic, for scene 1835 at the every-pixel level.

	User's	Producer's
Deciduous Forest	0.222	0.044
Coniferous Forest	0.000	0.000
Mixed Forest	0.000	0.000
Shrub/Scrub	0.125	0.111
Herbaceous	0.267	0.105
Open Water		
Disturbed		0.000
Coastal Wetland		
Overall Accuracy	0.058	
Kappa	-0.042	

Table 120. Error matrix for scene 1835 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	56		1	3					60
Coniferous Forest	4	1	1						6
Mixed Forest	8								8
Shrub/Scrub									0
Herbaceous					13		1		14
Open Water									0
Disturbed									0
Coastal Wetland									0
Other									0
Total	68	1	2	3	13	0	1	0	88
Non- Homogeneous	29	4	2	6	25		8		74

Table 121. User's and producer's accuracy for each category, along with overall accuracy and Kappa statistic, for scene 1835 at the 3x3 homogeneous level.

	User's	Producer's
Deciduous Forest	0.933	0.824
Coniferous Forest	0.167	1.000
Mixed Forest	0.000	0.000
Shrub/Scrub		0.000
Herbaceous	0.929	1.000
Open Water		
Disturbed		0.000
Coastal Wetland		
Overall Accuracy	0.795	
Kappa	0.542	

Table 122. Error matrix for scene 1835 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	39								39
Coniferous Forest	1								1
Mixed Forest	4								4
Shrub/Scrub									0
Herbaceous					8				8
Open Water									0
Disturbed									0
Coastal Wetland									0
Other									0
Total	44	0	0	0	8	0	0	0	52
Non- Homogeneous	53	5	4	9	30		9		110

Table 123. User's and producer's accuracy for each land cover class, along with overall accuracy and Kappa statistic, for scene 1835 at the 5x5 homogeneous level.

	User's	Producer's
Deciduous Forest	1.000	0.886
Conifer Forest	0.000	
Mixed Forest	0.000	
Shrub/Scrub		
Herbaceous	1.000	1.000
Open Water		
Disturbed		
Coastal Wetland		
Overall Accuracy	0.904	
Kappa	0.719	