

to lack of homogeneous reference points. The Kappa statistic also increased with each level of assessment.

Scene 1435

The Great Dismal Swamp area is the obvious feature on scene 1435 (Figure 12). The Great Dismal Swamp National Wildlife Refuge was the primary training dataset used for classifying this haze-corrected image. Deciduous forest, 82,293 ha, and herbaceous, 64,334 ha, were the most dominant land cover types (Table 16). Water and coniferous forest followed with 39,493 and 37,360 ha respectively.

The homogeneous filters reduced the land area from 293,946 ha to 177,269 ha (60.3%) at the 3x3 level (Table 17), and 116320.7 ha (39.6%) at the 5x5 level (Table 18). Mixed forest, shrub, and disturbed land were the categories with the greatest decline in area. Two hundred and nineteen reference points were used in the accuracy assessment (Table 19). This number was reduced to 124 at the 3x3 level (Table 21) and finally to 90 at the 5x5 level (Table 23). The overall accuracy started at 47.5% (Table 20), increased to 66.1% following the 3x3 filter (Table 22), and reached 76.7% after the 5x5 filter (Table 24). The results of the individual class accuracies show that deciduous forest user's and producer's, coniferous forest producer's, and herbaceous user's and producer's accuracies increased following progressive use of homogeneity filters. The other categories decreased or dropped out due to lack of homogeneous reference data. The Kappa statistic increased from 0.392 in the every-pixel analysis, to 0.591 with the 3x3 results, and finally to 0.715 with the 5x5 evaluation.

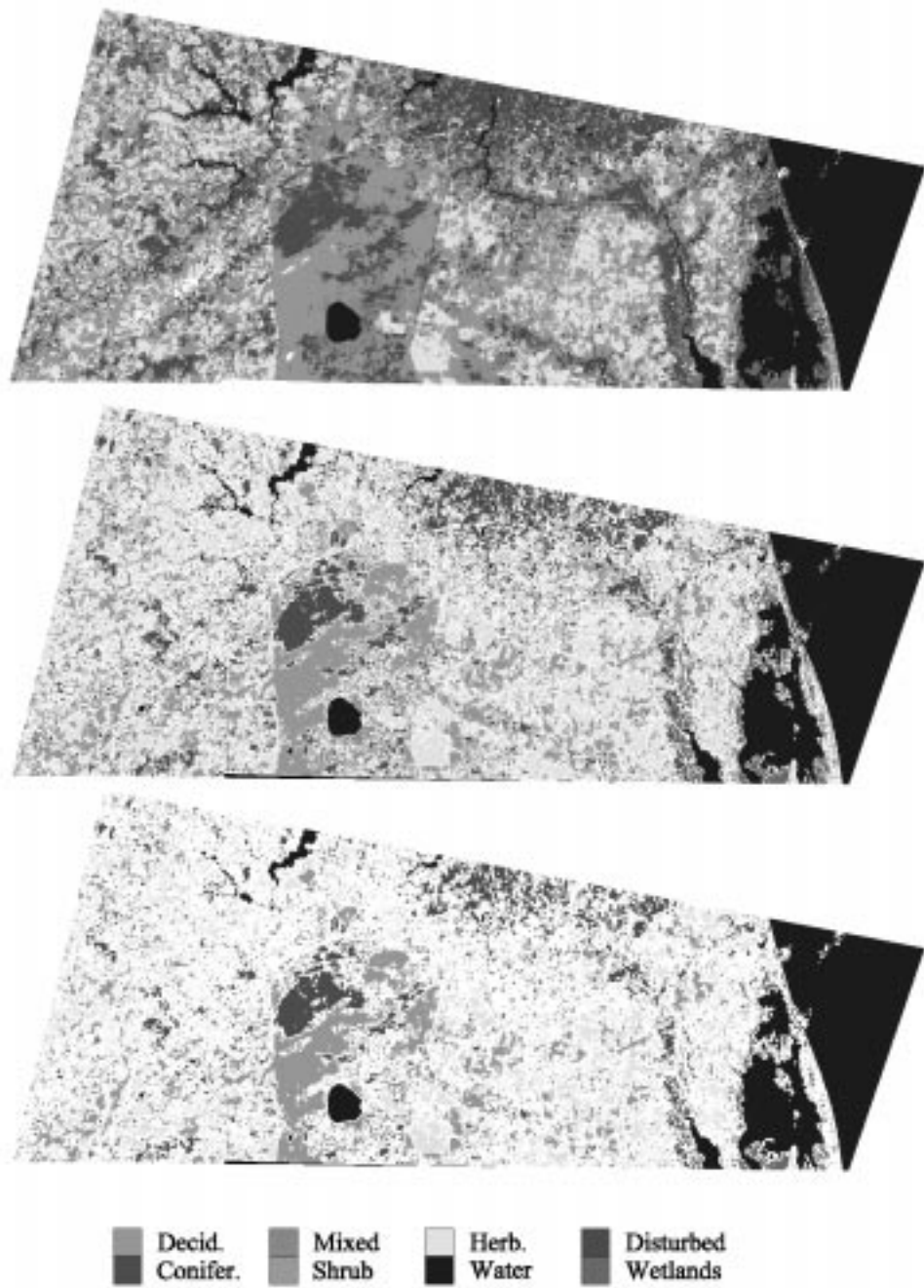


Figure 12. Classification output for scene 1435 full, 3x3 homogeneous, and 5x5 homogeneous.

Table 16. Total area and proportion of each land cover type for scene 1435 when analyzed at the every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area
Deciduous Forest	914,369	82,293.2	203,346.5	0.280
Coniferous Forest	415,105	37,359.5	92,315.2	0.127
Mixed Forest	127,131	11,441.8	28,272.7	0.039
Shrub/Scrub	272,456	24,521.0	60,591.5	0.083
Herbaceous	714,822	64,334.0	158,969.3	0.219
Open Water	438,807	39,492.6	97,586.3	0.134
Disturbed	308,522	27,767.0	68,612.2	0.094
Coastal Wetland	74,853	6,736.8	16,646.6	0.023
Total	3,266,065	293,945.9	726,340.2	1.000

Table 17. Results of the 3x3 homogeneous filter on land cover types within scene 1435 in area, proportion of total area, and proportion remaining from the 1435 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	570,736	51,366.2	126,926.0	0.290	0.624
Coniferous Forest	239,933	21,594.0	53,358.7	0.122	0.578
Mixed Forest	40,632	3,656.9	9,036.2	0.021	0.320
Shrub/Scrub	99,239	8,931.5	22,069.8	0.050	0.364
Herbaceous	406,119	36,550.7	90,316.8	0.206	0.568
Open Water	405,508	36,495.7	90,180.9	0.206	0.924
Disturbed	165,183	14,866.5	36,735.1	0.084	0.535
Coastal Wetland	42,302	3,807.2	9,407.5	0.021	0.565
Total	1,969,652	177,268.7	438,030.9	1.000	0.603

Table 18. Results of the 5x5 homogeneous filter on land cover types within scene 1435 in area, proportion of total area, and proportion remaining from 1435 every-pixel level.

	Pixels	Hectares	Acres	Proportion of Total Area	Proportion of Every-Pixel
Deciduous Forest	365,454	32,890.9	81,273.3	0.283	0.400
Coniferous Forest	144,111	12,970.0	32,048.9	0.112	0.347
Mixed Forest	15,333	1,380.0	3,409.9	0.012	0.121
Shrub/Scrub	33,627	3,026.4	7,478.3	0.026	0.123
Herbaceous	233,923	21,053.1	52,022.1	0.181	0.327
Open Water	381,041	34,293.7	84,739.7	0.295	0.868
Disturbed	93,809	8,442.8	20,862.2	0.073	0.304
Coastal Wetland	25,154	2,263.9	5,594.0	0.019	0.336
Total	1,292,452	116,320.7	287,428.4	1.000	0.396

Table 19. Error matrix for scene 1435 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	44	2	2	2	7		1		58
Coniferous Forest	21	4	7	1					33
Mixed Forest	5	1	5	1					12
Shrub/Scrub	1	3	1	3	2				10
Herbaceous	1	1	1		41				44
Open Water						6			6
Disturbed	1						1	1	3
Coastal Wetland									0
Other	25	7	11		10				53
Total	98	18	27	7	60	6	2	1	219

Table 20. User's and producer's accuracy for each land cover class, along with overall accuracy and the Kappa statistic, for scene 1435 at the every-pixel level.

	User's	Producer's
Deciduous Forest	0.759	0.449
Coniferous Forest	0.121	0.222
Mixed Forest	0.417	0.185
Shrub/Scrub	0.300	0.429
Herbaceous	0.932	0.683
Open Water	1.000	1.000
Disturbed	0.333	0.500
Coastal Wetland		0.000
Overall Accuracy	0.475	
Kappa	0.392	

Table 21. Error matrix for scene 1435 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	40	1	2	1	6		1		51
Coniferous Forest	17	3	3						23
Mixed Forest	3								3
Shrub/Scrub		2	1		1				4
Herbaceous	1	1			32				34
Open Water						6			6
Disturbed							1		1
Coastal Wetland									0
Other	1				1				2
Total	62	7	6	1	40	6	2	0	124
Non- Homogeneous	36	11	21	6	20			1	95

Table 22. User's and producer's accuracy for each category, along with overall accuracy and Kappa statistic, for scene 1435 at the 3x3 homogeneous level.

	User's	Producer's
Deciduous Forest	0.784	0.645
Coniferous Forest	0.130	0.429
Mixed Forest	0.000	0.000
Shrub/Scrub	0.000	0.000
Herbaceous	0.941	0.800
Open Water	1.000	1.000
Disturbed	1.000	0.500
Coastal Wetland		
Overall Accuracy	0.661	
Kappa	0.591	

Table 23. Error matrix for scene 1435 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	34	1	1		3				39
Coniferous Forest	12	1	2						15
Mixed Forest									0
Shrub/Scrub									0
Herbaceous	1				28				29
Open Water						6			6
Disturbed									0
Coastal Wetland									0
Other					1				1
Total	47	2	3	0	32	6	0	0	90
Non-Homogeneous	51	16	24	7	28		2	1	129

Table 24. User's and producer's accuracy for each land cover class, along with overall accuracy and Kappa statistic, for scene 1435 at the 5x5 homogeneous level.

	User's	Producer's
Deciduous Forest	0.872	0.723
Conifer Forest	0.067	0.500
Mixed Forest		0.000
Shrub/Scrub		
Herbaceous	0.966	0.875
Open Water	1.000	1.000
Disturbed		
Coastal Wetland		
Overall Accuracy	0.767	
Kappa	0.715	