

were 0. This bias in the reference data also caused the Kappa statistics to be low in the every-pixel and 3x3 assessments, and it could not be calculated in the 5x5 filter results.

Scene 1734

Scene 1734 contained the Blacksburg study site, the primary training data source for classifying this mountainous area (Figure 20). The most abundant land cover type in this scene is deciduous forest (Table 88) followed by coniferous forest and herbaceous.

The 3x3 homogeneous filter reduced the assessable area to 49.5% of the every-pixel level (Table 89). The 5x4 homogeneous filter contained only 25.7% of the original land area (Table 90). Mixed forest, shrub, and coniferous forest were the categories most reduced in land area by the final 5x5 filter. To assess the every-pixel level, 395 reference points were used (Table 91). This number was reduced to 223 point for the 3x3 assessment (Table 93) and to 135 points for the 5x5 assessment (Table 95). The overall accuracies were fairly high for each level. The every-pixel level had an accuracy of 58.2% (Table 92). The 3x3 level had an overall accuracy of 74.4% (Table 94). The 5x5 level had an accuracy of 83.7% (Table 96). Both (user's and producer's) open water, disturbed user's, both deciduous, and both coniferous accuracies were over 80% (Table 96). The final Kappa was 0.742.

Scene 1735

Scene 1735 had a cloud front in the southeast corner, visible by a white semi-circle (Figure 21). A combination of expert knowledge, scene overlap, and the data on



Figure 20. Classification output for scene 1734 full, 3x3 homogeneous, and 5x5 homogeneous.

Table 88. Total area and proportion of each land cover type for scene 1734 when analyzed at the every-pixel level.

| | Pixels | Hectares | Acres | Proportion of Total Area |
|-------------------|------------|-------------|-------------|-----------------------------|
| Deciduous Forest | 10,589,916 | 953,092.0 | 2,355,091.0 | 0.480 |
| Coniferous Forest | 5,156,104 | 464,049.0 | 1,146,666.0 | 0.234 |
| Mixed Forest | 527 | 47.4 | 117.2 | 0.000 |
| Shrub/Scrub | 1,292,416 | 116,317.0 | 287,420.0 | 0.059 |
| Herbaceous | 4,364,561 | 392,810.0 | 970,635.0 | 0.198 |
| Open Water | 207,738 | 18,696.4 | 46,198.9 | 0.009 |
| Disturbed | 450,365 | 40,532.9 | 100,157.0 | 0.020 |
| Coastal Wetland | 0 | 0 | 0 | 0.000 |
| Total | 22,061,627 | 1,985,546.0 | 4,906,285.0 | 1.000 |

Table 89. Results of the 3x3 homogeneous filter on land cover types within scene 1734 in area, proportion of total area, and proportion remaining from the 1734 every-pixel level.

| | Pixels | Hectares | Acres | Proportion of Total Area | Proportion of Every-Pixel |
|-------------------|------------|-----------|-------------|-----------------------------|------------------------------|
| Deciduous Forest | 6,179,625 | 556,166.0 | 1,374,287.0 | 0.566 | 0.584 |
| Coniferous Forest | 1,866,092 | 167,948.0 | 415,000.0 | 0.170 | 0.362 |
| Mixed Forest | 1 | 0.1 | 0.2 | 0.000 | 0.002 |
| Shrub/Scrub | 191,180 | 17,206.2 | 42,516.5 | 0.018 | 0.148 |
| Herbaceous | 2,396,072 | 215,646.0 | 532,862.0 | 0.219 | 0.549 |
| Open Water | 121,184 | 10,906.6 | 26,950.1 | 0.011 | 0.583 |
| Disturbed | 168,780 | 15,190.2 | 37,535.0 | 0.015 | 0.375 |
| Coastal Wetland | 0 | 0 | 0 | 0.000 | 0.000 |
| Total | 10,922,934 | 983,064.0 | 2,429,151.0 | 1.000 | 0.495 |

Table 90. Results of the 5x5 homogeneous filter on land cover types within scene 1734 in area, proportion of total area, and proportion remaining from 1734 every-pixel level.

| | Pixels | Hectares | Acres | Proportion of Total Area | Proportion of Every-Pixel |
|-------------------|-----------|-----------|-------------|-----------------------------|------------------------------|
| Deciduous Forest | 3,578,363 | 322,052.7 | 795,792.0 | 0.632 | 0.338 |
| Coniferous Forest | 601,396 | 54,125.6 | 133,744.0 | 0.106 | 0.117 |
| Mixed Forest | 0 | 0 | 0 | 0.000 | 0.000 |
| Shrub/Scrub | 26,277 | 2,364.9 | 5,843.7 | 0.005 | 0.020 |
| Herbaceous | 1,298,508 | 116,865.7 | 288,775.0 | 0.229 | 0.298 |
| Open Water | 79,870 | 7,188.3 | 17,762.3 | 0.014 | 0.384 |
| Disturbed | 80,831 | 7,274.8 | 17,976.0 | 0.014 | 0.179 |
| Coastal Wetland | 0 | 0 | 0 | 0.000 | 0.000 |
| Total | 5,665,245 | 509,872.1 | 1,259,894.0 | 1.000 | 0.257 |

Table 91. Error matrix for scene 1734 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 | 138 | 2 | 13 | 20 | 15 | | 4 | | 192 |
| Coniferous Forest | 34 | 5 | 13 | 9 | 4 | | 4 | | 69 |
| Mixed Forest | | | | | | | | | 0 |
| Shrub/Scrub | | | 2 | 8 | 22 | | | | 32 |
| Herbaceous | 4 | 2 | 1 | 4 | 72 | | 6 | | 89 |
| Open Water | | 3 | 1 | | | 3 | | | 7 |
| Disturbed | | 1 | | | | | 4 | | 5 |
| Coastal Wetland | | | | | | | | | 0 |
| Other | | | | | | | 1 | | 1 |
| Total | 176 | 13 | 30 | 41 | 113 | 3 | 19 | 0 | 395 |

Table 92. User's and producer's accuracy for each land cover class, along with overall accuracy and the Kappa statistic, for scene 1734 at the every-pixel level.

| | User's | Producer's |
|-------------------|--------|------------|
| Deciduous Forest | 0.719 | 0.784 |
| Coniferous Forest | 0.072 | 0.385 |
| Mixed Forest | | 0.000 |
| Shrub/Scrub | 0.250 | 0.195 |
| Herbaceous | 0.809 | 0.637 |
| Open Water | 0.429 | 1.000 |
| Disturbed | 0.800 | 0.210 |
| Coastal Wetland | | |
| Overall Accuracy | 0.582 | |
| Kappa | 0.472 | |

Table 93. Error matrix for scene 1734 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 | 102 | 2 | 4 | 13 | 6 | | 2 | | 129 |
| Coniferous Forest | 10 | 4 | 4 | 3 | 3 | | | | 24 |
| Mixed Forest | | | | | | | | | 0 |
| Shrub/Scrub | | | | 3 | 5 | | | | 8 |
| Herbaceous | 1 | 1 | | | 54 | | 3 | | 59 |
| Open Water | | | | | | 2 | | | 2 |
| Disturbed | | | | | | | 1 | | 1 |
| Coastal Wetland | | | | | | | | | 0 |
| Other | | | | | | | | | 0 |
| Total | 113 | 7 | 8 | 19 | 68 | 2 | 6 | 0 | 223 |
| Non-Homogeneous | 63 | 6 | 22 | 22 | 45 | 1 | 13 | | 172 |

Table 94. User's and producer's accuracy for each category, along with overall accuracy and Kappa statistic, for scene 1734 at the 3x3 homogeneous level.

| | User's | Producer's |
|-------------------|--------|------------|
| Deciduous Forest | 0.790 | 0.903 |
| Coniferous Forest | 0.167 | 0.571 |
| Mixed Forest | | 0.000 |
| Shrub/Scrub | 0.375 | 0.158 |
| Herbaceous | 0.915 | 0.794 |
| Open Water | 1.000 | 1.000 |
| Disturbed | 1.000 | 0.167 |
| Coastal Wetland | | |
| Overall Accuracy | 0.744 | |
| Kappa | 0.644 | |

Table 95. Error matrix for scene 1734 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 | 81 | 1 | 1 | 8 | 3 | | 1 | | 95 |
| Coniferous Forest | 2 | 2 | | | 1 | | | | 5 |
| Mixed Forest | | | | | | | | | |
| Shrub/Scrub | | | | 1 | 2 | | | | 3 |
| Herbaceous | 1 | 1 | | | 26 | | 1 | | 29 |
| Open Water | | | | | | 2 | | | 2 |
| Disturbed | | | | | | | 1 | | 1 |
| Coastal Wetland | | | | | | | | | 0 |
| Other | | | | | | | | | 0 |
| Total | 84 | 4 | 1 | 9 | 32 | 2 | 3 | 0 | 135 |
| Non- Homogeneous | 92 | 9 | 29 | 32 | 81 | 1 | 16 | | 260 |

Table 96. User's and producer's accuracy for each land cover class, along with overall accuracy and Kappa statistic, for scene 1734 at the 5x5 homogeneous level.

| | User's | Producer's |
|------------------|--------|------------|
| Deciduous Forest | 0.853 | 0.964 |
| Conifer Forest | 0.400 | 0.500 |
| Mixed Forest | | 0.000 |
| Shrub/Scrub | 0.333 | 0.111 |
| Herbaceous | 0.897 | 0.812 |
| Open Water | 1.000 | 1.000 |
| Disturbed | 1.000 | 0.333 |
| Coastal Wetland | | |
| Overall Accuracy | 0.837 | |
| Kappa | 0.742 | |