

Week#10 Image Classification Problems

Download and unzip **Week10_Classification_Problems.zip** from the class website http://nrm.salrm.uaf.edu/~dverbyla/nrm338/blackboard_data/

Fire Severity Classification

The image is from 2010-Aug-15 following the 2010 Mississippi Fire near Delta. What percentage of pixels inside the fire perimeter actually burned?

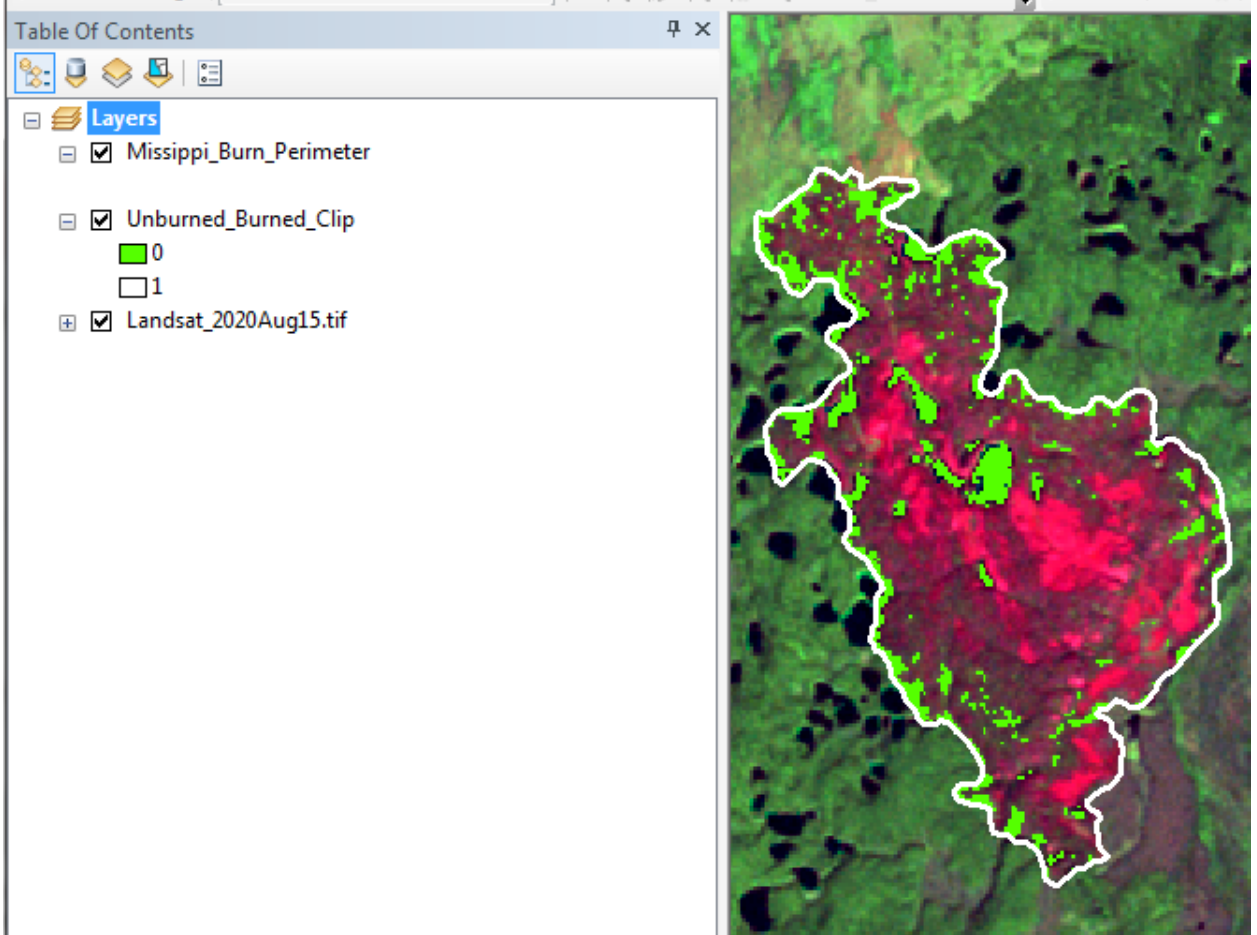
- 1) Create training polygons inside burned, unburned areas of image

	SHAPE *	BurnClass	PolygonID
1	Polygon	Unburned	1
2	Polygon	Unburned	2
3	Polygon	Unburned	3
4	Polygon	Unburned	4
7	Polygon	Burned	7
3	Polygon	Burned	8
3	Polygon	Burned	9
2	Polygon	Burned	10
1	Polygon	Burned	11
2	Polygon	Burned	12

- 2) Classify raster as unburned/burned

- Unburned_Burned
 - 0
 - 1
- MLClassifyOutput
 - 1
 - 2
 - 3
 - 4
 - 7
 - 8
 - 9
 - 10
 - 11
 - 12

- 3) Clip pixels with burn perimeter



4) Compute percentage burned..varies depending on training polygons used

Unburned_Burned_Clip				
	Value	Count	Class	Percent
	0	1903	UnBurned	14.4%
	1	11300	Burned	85.6%

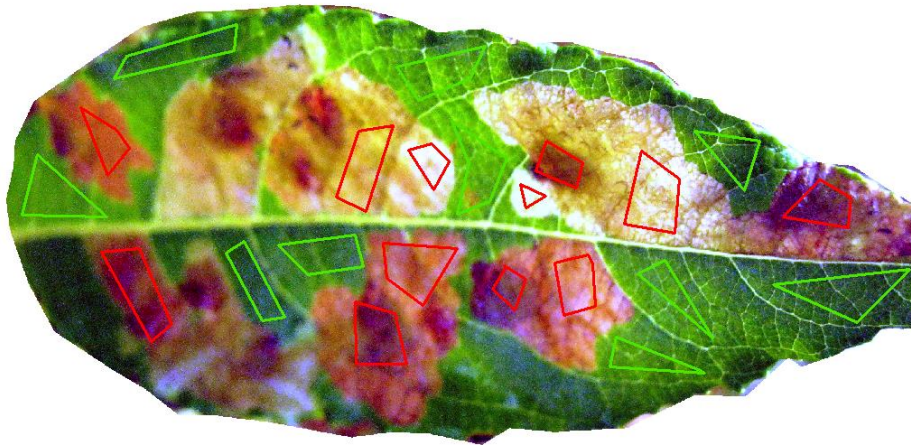
Unburn_Burned_Clip	
Count	Percent
3313	25.1%
9890	74.9%

Photo Classification

The brown areas are area mined by the willow leaf blotch miner. What percentage of the willow leaf as been mined by this insect.



1) Create training polygons



2) Use training polygons to classify leaf image



3) Compute percentage mined

The screenshot shows a table with the following data:

Count	LeafMined	Percent
1871495	YES	48.9%
1953031	NO	51.1%

To the right, the 'Statistics of WillowLeaf_Min' panel shows the following statistics for the 'Percent' field:

- Field: Percent
- Statistics:
 - Count: 2
 - Minimum: 48.934038
 - Maximum: 51.065962
 - Sum: 100
 - Mean: 50

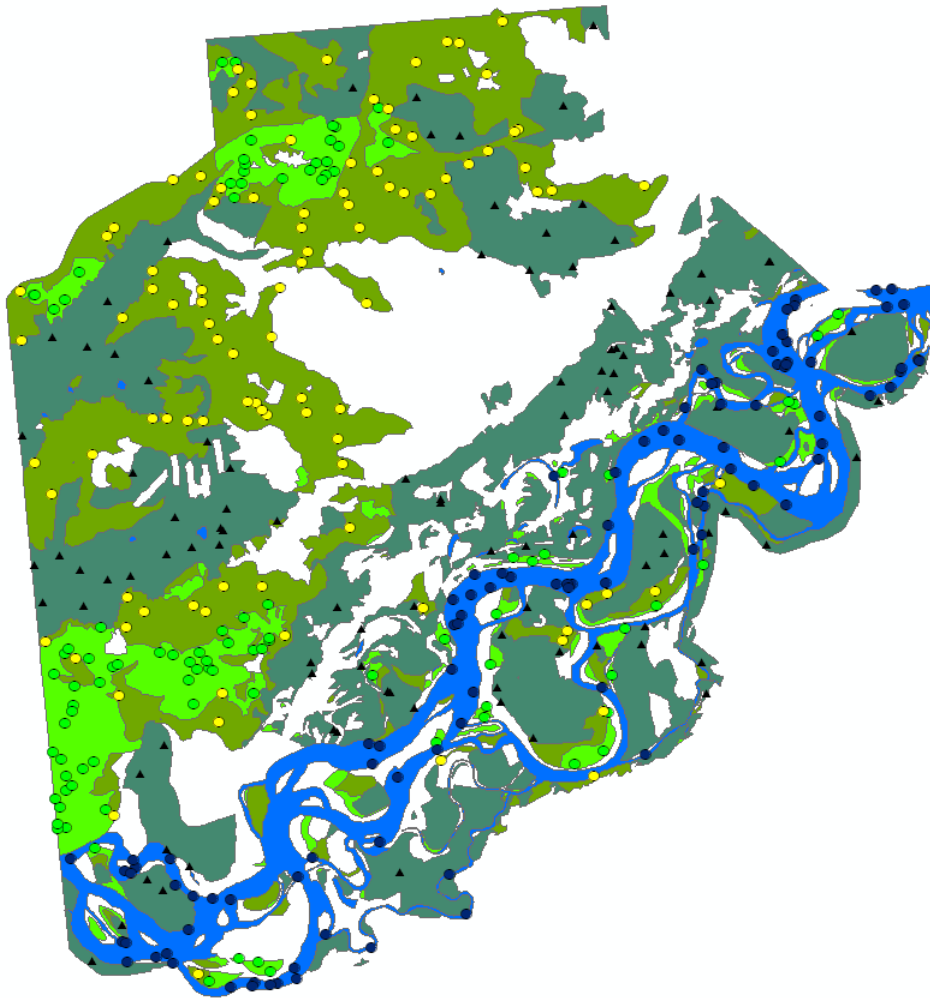
Results vary depending on training polygons used..

Value	Count	Percent
1	1746637	45.7%
2	2077889	54.3%

Random Points By Vegetation Class

Use the LandCover Polygons to create 100 random points within four classes:

- 1) deciduous forest,
- 2) mixed forest,
- 3) coniferous forest
- 4) water.



Create zone values of 1,2,3,4 for Deciduous,Mixed, Conifer, Water

LandCover_Polygons				
Shape *	Id	Level_I	zone	
Polygon	4	White Spruce	3	
Polygon	5	Deciduous	1	
Polygon	6	White Spruce	3	
Polygon	7	White Spruce	3	
Polygon	8	Deciduous	1	
Polygon	9	White Spruce	3	
Polygon	12	White Spruce	3	
Polygon	13	Mixed Forest	2	
Polygon	14	White Spruce	3	
Polygon	15	Black Spruce	3	
Polygon	18	Deciduous	1	
Polygon	19	Deciduous	1	

Dissolve based on zone field...

dissolved_LandCover_Polygons	
zone	Class
1	Deciduous Forest
2	Mixed Forest
3	Conifer Forest
4	Water

Create 100 points in each class.

Create Random Points

Output Location: C:\temp\week10_classification

Output Point Feature Class: Random_Points

Constraining Feature Class (optional): dissolved_LandCover_Polygons

Constraining Extent (optional):

Top: 250.000000

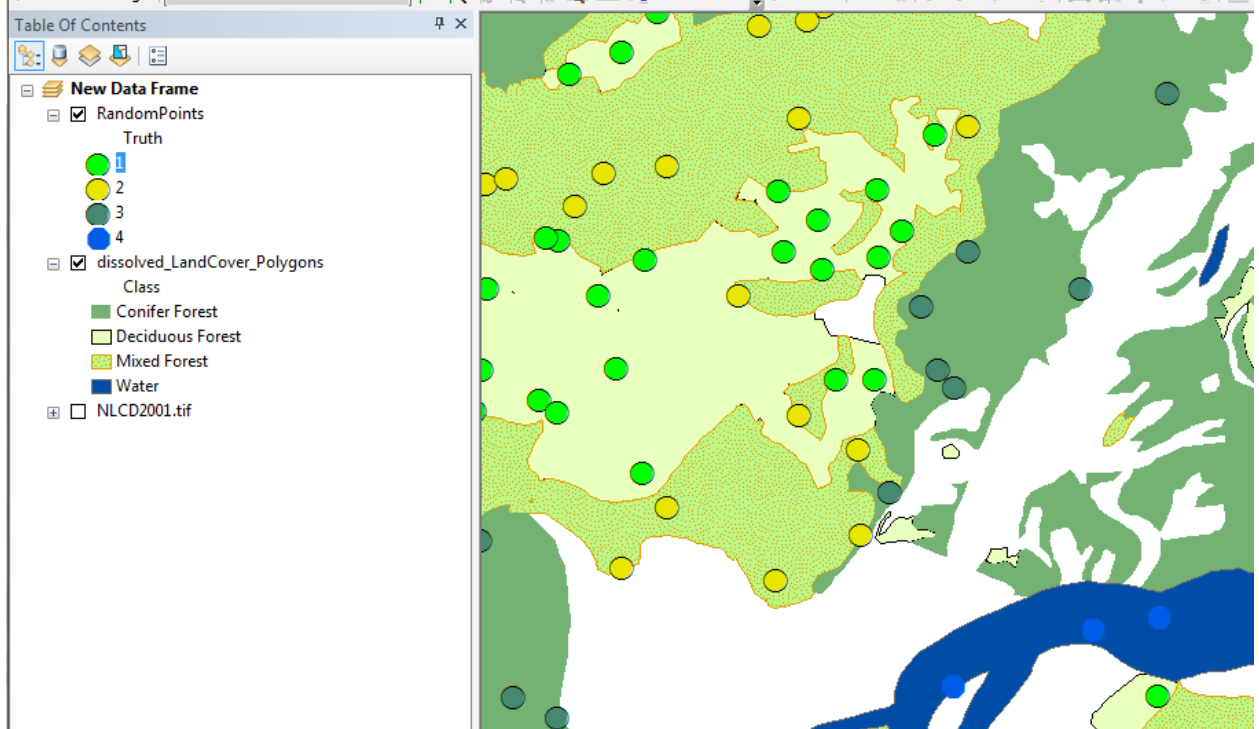
Left: 0.000000

Right: 250.000000

Bottom: 0.000000

Number of Points [value or field] (optional): Long 100

Clear



National Land Cover Classification

The entire US has been classified using Landsat imagery (http://www.mrlc.gov/nlcd01_data.php)

Use your 400 random points to assess the overall classification accuracy of NLCD2001.tif.

NLCD2001.tif		
Value	Count	Land_Cover
11	21060	Open Water
22	951	Developed, Low Intensity
31	3914	Barren Land
41	55931	Deciduous Forest
42	133661	Evergreen Forest
43	22283	Mixed Forest
51	7	Dwarf Shrub
52	9997	Shrub/Scrub
72	91	Sedge/Herbaceous
81	9	Pasture/Hay
82	281	Cultivated Crops
90	79367	Woody Wetlands
95	1843	Emergent Herbaceous Wetlands

Step 1) Determine Land_Cover of each of the 400 points

Extract_RandomP1				
Shape *	CID	RASTERVALU	Land_Cover	Truth
Point	1	42	Evergreen Forest	Conifer
Point	1	42	Evergreen Forest	Conifer
Point	1	11	Open Water	Conifer
Point	1	42	Evergreen Forest	Conifer
Point	4	42	Evergreen Forest	Conifer

Step 3) Use Frequency tool to create summary table:

Extract_RandomP1_Frequency			
	Land_Cover	Truth	FREQUENCY
	Barren Land	Water	7
	Deciduous Forest	Conifer	2
	Deciduous Forest	Deciduous	90
	Deciduous Forest	Mixed Forest	34
	Deciduous Forest	Water	1
	Developed, Low Intensi	Deciduous	1
	Emergent Herbaceous	Water	1
	Evergreen Forest	Conifer	65
	Evergreen Forest	Deciduous	4
	Evergreen Forest	Mixed Forest	29
	Evergreen Forest	Water	1
	Mixed Forest	Conifer	7
	Mixed Forest	Deciduous	2
	Mixed Forest	Mixed Forest	34
	Open Water	Conifer	6
	Open Water	Deciduous	1
	Open Water	Mixed Forest	1
	Open Water	Water	90
	Shrub/Scrub	Mixed Forest	2
	Woody Wetlands	Conifer	20
	Woody Wetlands	Deciduous	2

(279 correct points/400 total points) * 100= percent overall classification accuracy

Land_Cover	Truth	FREQUENCY
Barren Land	Water	7
Deciduous Forest	Conifer	2
Deciduous Forest	Deciduous	90
Deciduous Forest	Mixed Forest	34
Deciduous Forest	Water	1
Developed, Low Intensi	Deciduous	1
Emergent Herbaceous	Water	1
Evergreen Forest	Conifer	65
Evergreen Forest	Deciduous	4
Evergreen Forest	Mixed Forest	29
Evergreen Forest	Water	1
Mixed Forest	Conifer	7
Mixed Forest	Deciduous	2
Mixed Forest	Mixed Forest	34
Open Water	Conifer	6
Open Water	Deciduous	1
Open Water	Mixed Forest	1
Open Water	Water	90
Shrub/Scrub	Mixed Forest	2
Woody Wetlands	Conifer	20
Woody Wetlands	Deciduous	2

Selection Statistics

Field: FREQUENCY

Statistics:

Count: 4
 Minimum: 34
 Maximum: 90
 Sum: 279
 Mean: 69.75
 Standard Deviation:

Results will vary depending on random points:

Field
FREQUENCY
Statistics:
Count: 4
Minimum: 28
Maximum: 89
Sum: 284