

Supervised Classification and Change Detection Within Oregon's Coastal Forests

Joanna Berg
Geography 492
June 11, 2007

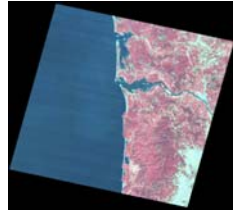
Introduction

- Study Area
 - Northern Coastal Range

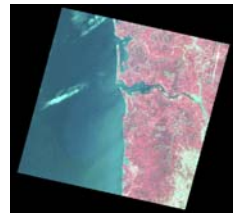


Data

- Landsat TM
 - September 1989
 - 30m Resolution
 - Bands 2, 3, and 4

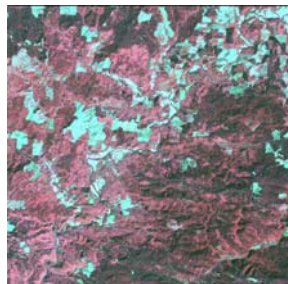


- Landsat ETM+
 - July 2001
 - 30m Resolution
 - Bands 2, 3, and 4

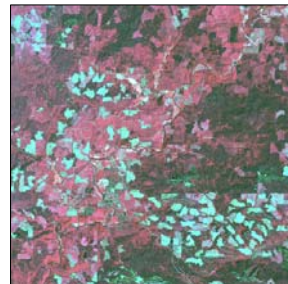


Methodology

1989



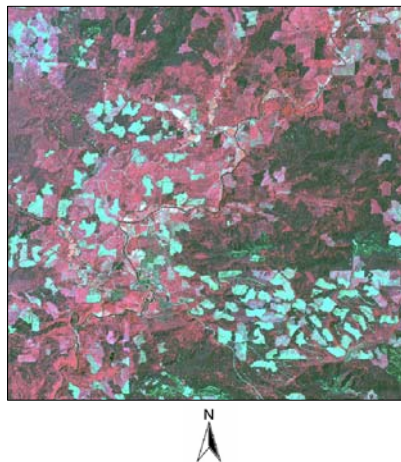
2001



A subset image was created for both years using an AOI layer

Radiometric Correction

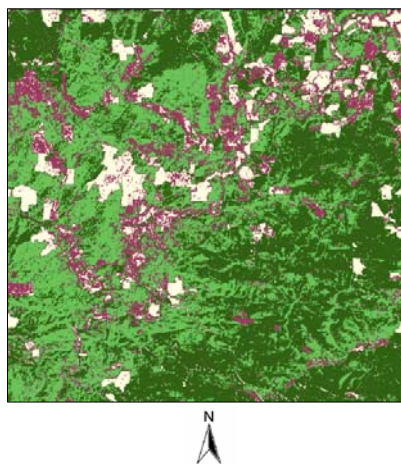
- Once the subset images were obtained, a histogram match was performed
- This matched the 2001 image to the 1989 image



Supervised Classification: 1989 Image

- Four final classes were generated, from 12 original classes

	Bare Soil
	Forest 1
	Forest 2
	Past Clear Cut



Accuracy Assessment

- 50 random points were generated
- Overall accuracy 81.63%
- Kappa coefficient 0.7841

Class Name	Reference Totals	Classified Totals	Number Correct	Producers Accuracy	Users Accuracy
Unclassified	0	0	0	---	---
bare soil1	3	3	3	100.00%	100.00%
bare soil2	0	0	0	---	---
forest 1	10	11	8	80.00%	72.73%
forest 2	12	11	9	75.00%	81.82%
forest 3	5	5	3	60.00%	60.00%
forest 4	3	3	3	100.00%	100.00%
forest 5	6	6	6	100.00%	100.00%
forest 6	1	1	1	100.00%	100.00%
clearcut1	5	6	5	100.00%	83.33%
clearcut2	2	0	0	---	---
clearcut3	2	3	2	100.00%	66.67%
Totals	49	49	40		

Overall Classification Accuracy = 81.63%

KAPPA (K ²) STATISTICS	
Overall Kappa Statistics = 0.7841	
Conditional Kappa For each Category:	
Class Name	Kappa
Unclassified	0.0000
bare soil1	1.0000
bare soil2	0.0000
forest 1	0.6573
forest 2	0.7902
forest 3	0.5545
forest 4	1.0000
forest 5	1.0000
forest 6	1.0000
clearcut1	0.8144
clearcut2	0.0000
clearcut3	0.6667

Supervised Classification: 2001 Image

- Again, four final classes were generated from 12 original classes

	Bare Soil
	Forest 1
	Forest 2
	Past Clear Cut



Accuracy Assessment

- 50 random points were again generated
- Overall accuracy 83.33%
- Kappa coefficient 0.7986

Class Name	Reference Totals	Classified Totals	Number Correct	Producers Accuracy	Users Accuracy
Unclassified	0	0	0		
bare soil1	0	0	0		
bare soil2	2	2	2	100.00%	100.00%
forest 1	9	11	0	00.00%	72.73%
forest 2	6	2	2	33.33%	100.00%
forest 3	8	11	8	100.00%	72.73%
forest 4	13	13	12	92.31%	92.31%
forest 5	3	2	2	66.67%	100.00%
clearcut1	1	1	1	100.00%	100.00%
clearcut2	3	2	2	66.67%	100.00%
clearcut3	3	4	3	100.00%	75.00%
Totals	48	48	48		

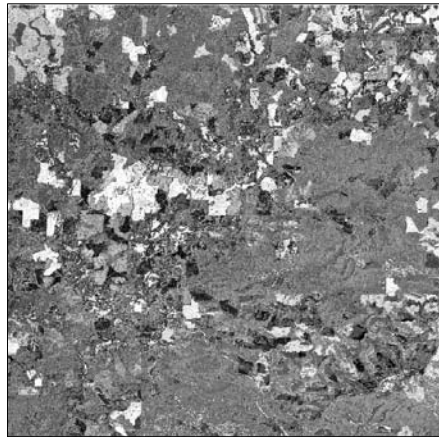
Overall Classification Accuracy = 83.33%

Overall Kappa Statistics = 0.7986	
Conditional Kappa for each Category:	
Class Name	Kappa
Unclassified	0.0000
bare soil1	0.0000
bare soil2	1.0000
forest 1	0.6643
forest 2	1.0000
forest 3	0.6727
forest 4	0.8945
forest 5	1.0000
clearcut1	1.0000
clearcut2	1.0000
clearcut3	0.7222

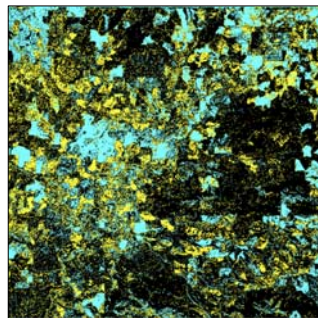
Change Detection Between 1989 and 2001

- From Interpreter in the icon panel, choose 'Utilities' and then 'Change Detection'
- Works by subtracting the later image (2001) from the earlier image (1989) in order to reflect change over time
- Two output files are generated:
 - **Image Difference**
 - Grayscale image that portrays the change in brightness values over time
 - **Highlight Change**
 - An image file which highlights the change areas, usually within the five of Background, Decrease, Some Decrease, Unchanged, Some Increase, and Increased

Image Difference



Highlight Change Image



Yellow = decreases of more than 20%
Cyan = increases of more than 20%

Conclusions

- There was land cover change in the area of study between 1989 and 2001
- More refined analysis is required
 - Better land cover classes
 - Signature generation was difficult on these images
 - More precise change detection and change magnitude analysis (as with Lab 4)
- More training in image processing