

# Road Feature Extraction

Geography 582

Tom Kuhn

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## Introduction

- Linear features such as road, trail or stream networks are important to map
- Automatic methods to create and update GIS layers from timely, remotely sensed data could be less costly, less prone to error
- Ambiguity in spectral attributes: Is it a road, building or parking lot ? (river, creek, lake, pond?)

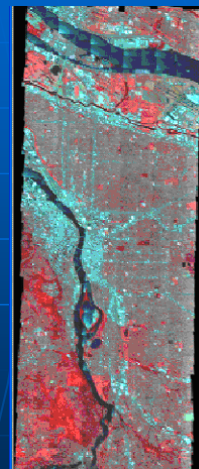
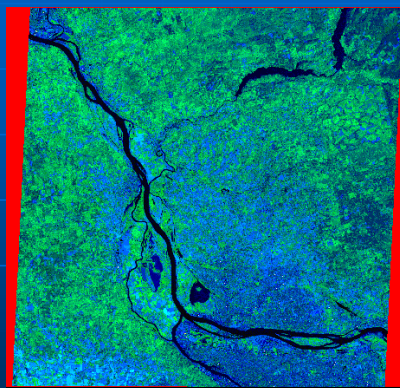
## Spatial Component

- "all public roads shall have a width of not less than 40 feet nor more than 66 feet to be determined by the County Board."
- Road width has location and temporal dependencies
- 15 meter ~ 50 feet

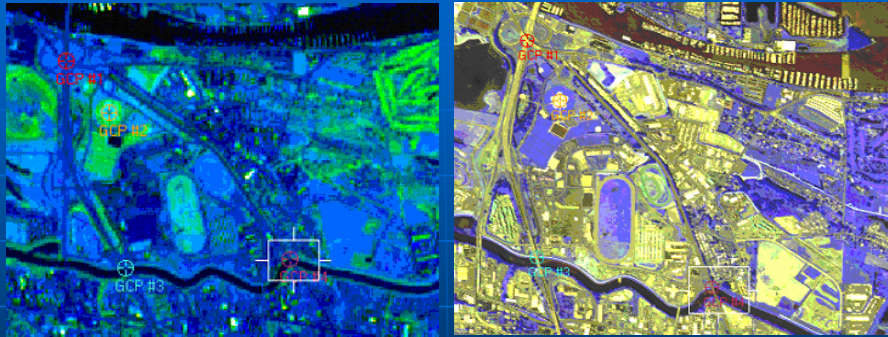


## Data

- Portland, Oregon
- ASTER – VNIR – 15 meter
- [http://wetlands.pdx.edu/Data/SatImagery/PDX\\_1M\\_NIR-Color/](http://wetlands.pdx.edu/Data/SatImagery/PDX_1M_NIR-Color/)



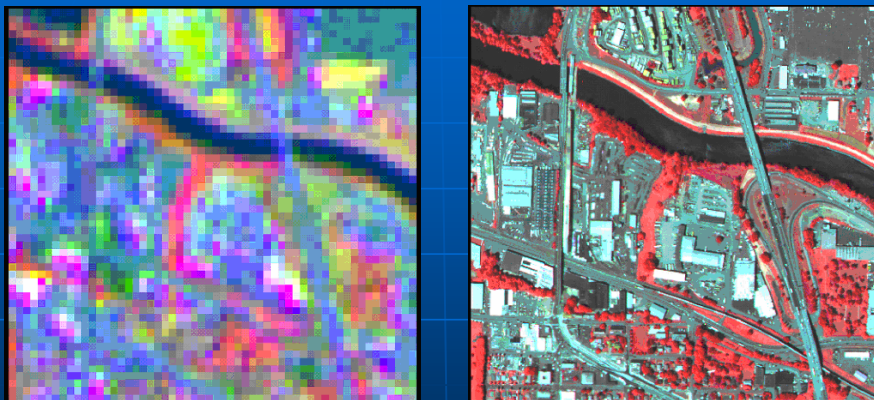
# Image Registration



Current Reference Map Projection:

Projection:	State Plane
Spheroid:	GRS 1980
Zone Number:	-3601
Datum:	NAD83

# Scene Selection

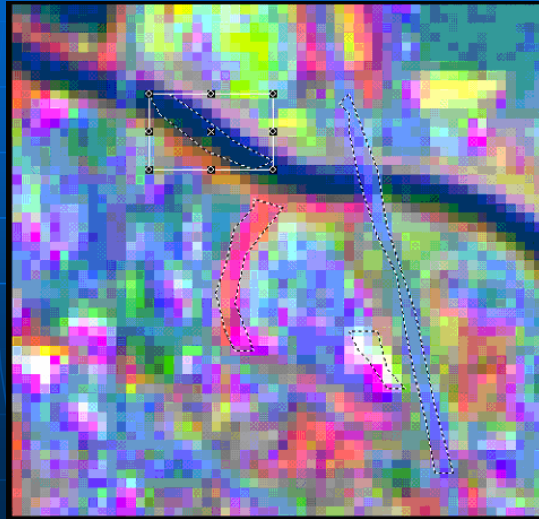


Pixel Size X: 58.0  
Unit: feet

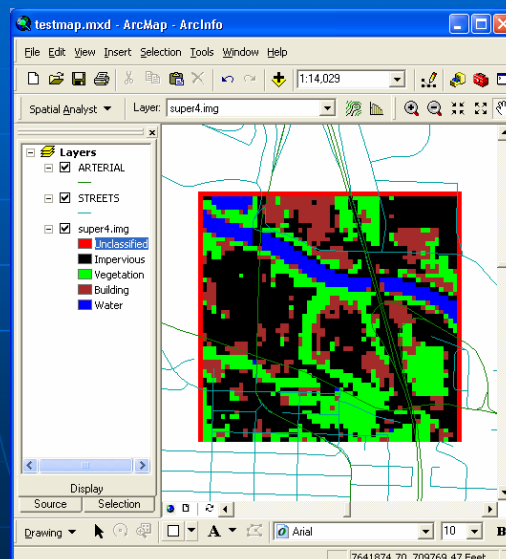
Pixel Size Y: 58.0  
Geo. Model: Map Info

# Supervised Classification

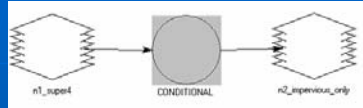
- Impervious
- Water
- Building
- Vegetation



# Visual Assessment

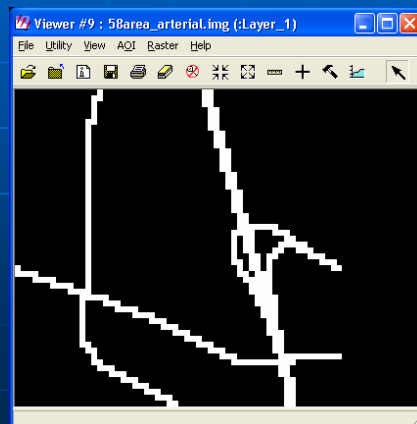
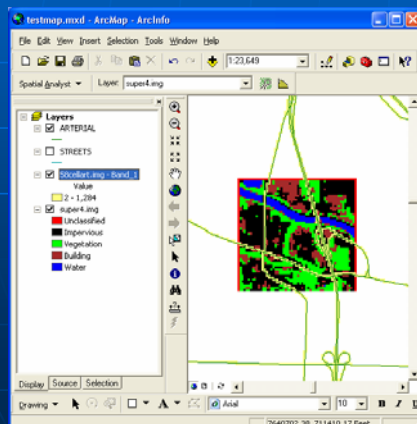


# Spatial Modeler



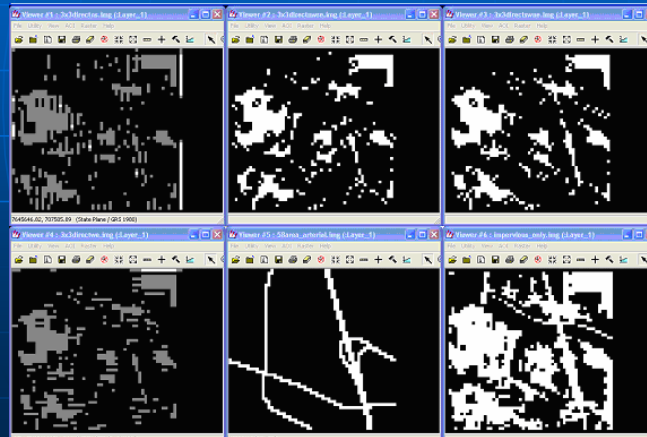
# Ancillary Data

- Spatial Analyst - Features to Raster
- Cell size – 58 feet -> Reference Image



## Directional Filter

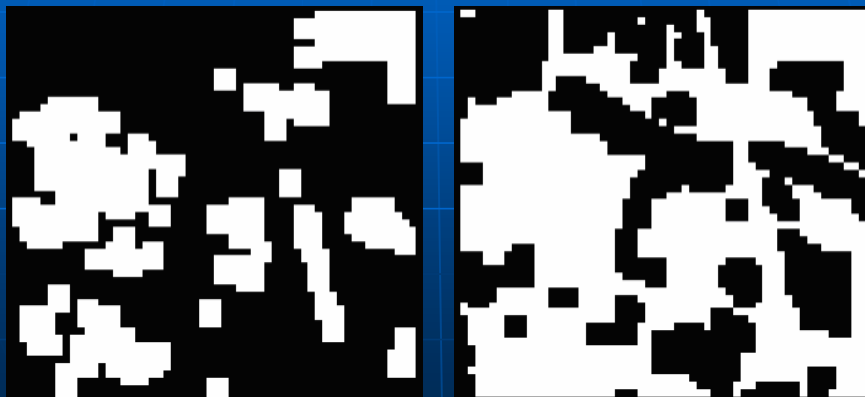
- CONVOLVE ( \$n1\_impervious\_only, MATRIX ("C:\User\_Folders\This\_Term\thomask\Project\default.klb", "3x3DirectNW-SE "))



-1.000	1.000	-1.000
-1.000	1.000	-1.000
-1.000	1.000	-1.000

## Morphological Operators

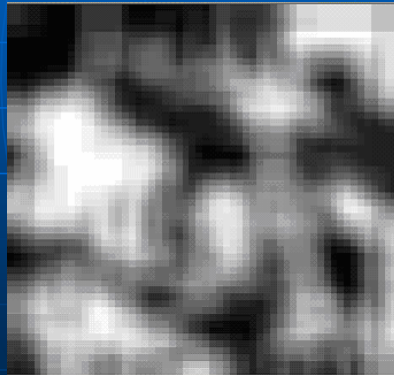
- Erosion, Dilation, *Open*, *Close*, 3x3





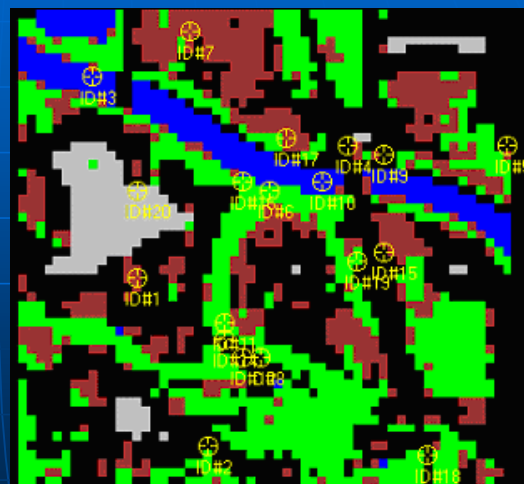
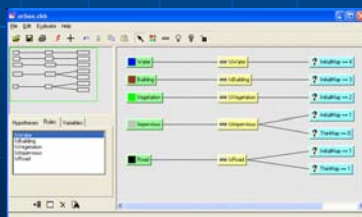
# Improvisation

- 7x7 Sum to approximate "width" or "thickness"
- Pruned pixels too "wide" for road



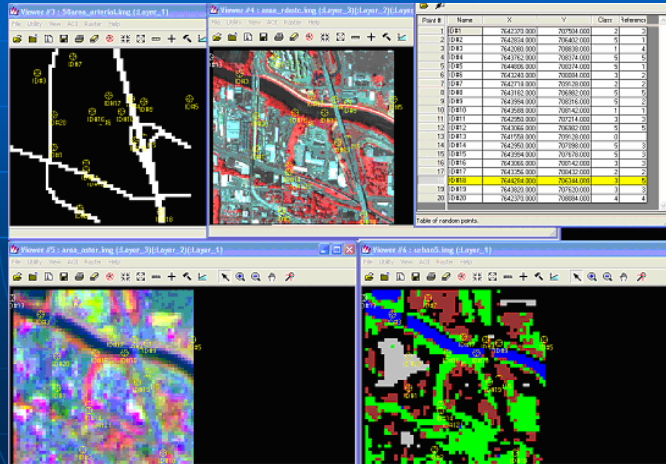
# Hybrid Classification

- Road
- Water
- Building
- Vegetation
- Impervious



# Accuracy Assessment

- 52.63% Overall; 0.3871 Kappa



## Conclusions

- Spatial resolution of 15 meters is limiting; sufficient for wide roads?
- Some methods easily automated, some intensely interactive
- Revisit initial classification to include Road, Non-Road classes
- Revisit directional filter usage, gray scale vs. binary images
- Test other scenes