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State Cartographer's Office**



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Wiscland-2: Wisconsin Land Cover Map Update



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Overview

- Quick background and history
- Methodology
- Status and Preliminary Results
- Next Steps



Timeline

1999	Wiscland 1 dataset release
2006	Meetings between UW and DNR, unsuccessful grant proposals
2012	Deer Trustee Report
2013	Act 20 budget authorizations to DNR
May 2014	Official Wiscland 2 project start
June 2016	Project completion and delivery



Who's Involved

Department of Natural Resources

Represent stakeholders

Define deliverables

University of Wisconsin

Project management, Outreach (SCO)

Image processing (Project Team)

Science Advisory Committee

Review and advise methods



What will this dataset look like?

- Statewide, 30m coverage
- 2 acre minimum mapping unit
- 4-tier hierarchical classification
 - 8 broad cover types
 - 47 land cover classes at most detailed level
- Most classes are forest, wetland, and grassland subtypes

FOREST
Coniferous
Fir Spruce (FS)
Jack Pine (PJ)
Red Pine (PR)
White Pine (PW)
Hemlock Hardwoods (H)
Broad-leaved Deciduous
Aspen (A)
Paper Birch (BW)
Red Maple (MR)
Oak (O)
<i>N. Pin Oak, Black Oak</i>
<i>Red Oak</i>
<i>White Oak/Burr Oak</i>
Central Hardwoods (CH)
<i>Walnut</i>
Northern Hardwoods (NH)
<i>Sugar Maple</i>
Mixed Deciduous/Coniferous



How are we doing this?

- Landsat data 2009-2014 and ancillary datasets
- Training / validation pulled from existing datasets wherever possible
- Supplement sample data with field-collection
- Top-down classification with machine learning algorithm
- Post-classification segmentation



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What have we done so far?

✓ *Data Collection*

- 100+ Landsat images per scene, across all seasons
- Topographic, soil information
- Vegetation Indices
- Field samples from 21 data sources
 - DNR Projects
 - Forest inventories



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What have we done so far?

✓ *Compile sample database*

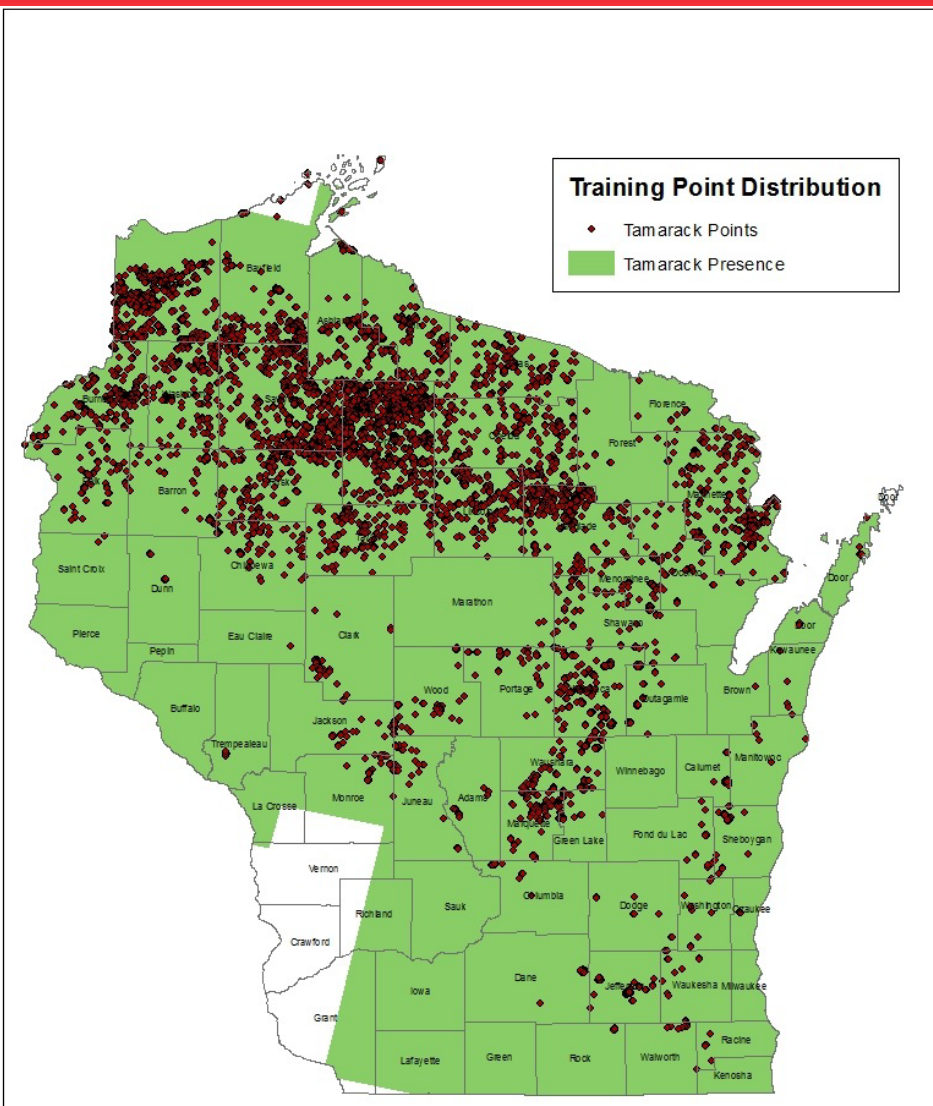
- Synthesize training/validation samples from existing sources of field samples
 - QA / subsetting
 - Crosswalking
 - Sampling
- Almost 1 million samples harvested from existing datasets
 - But redundancy



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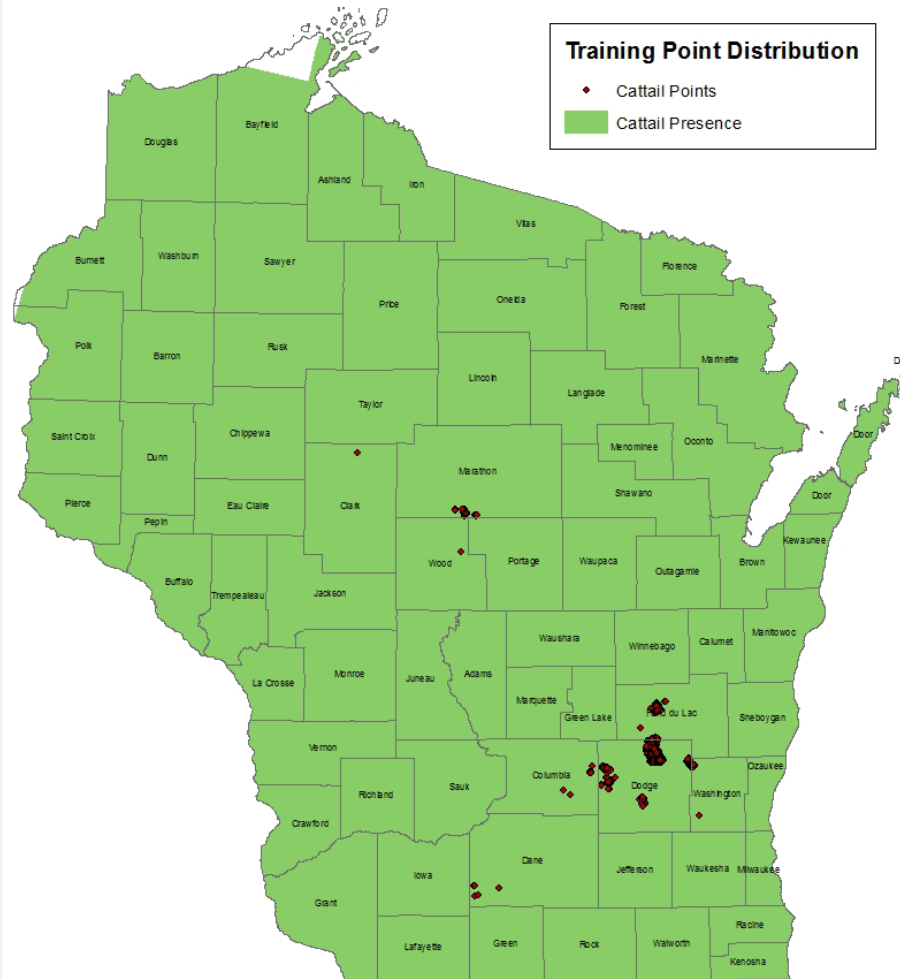




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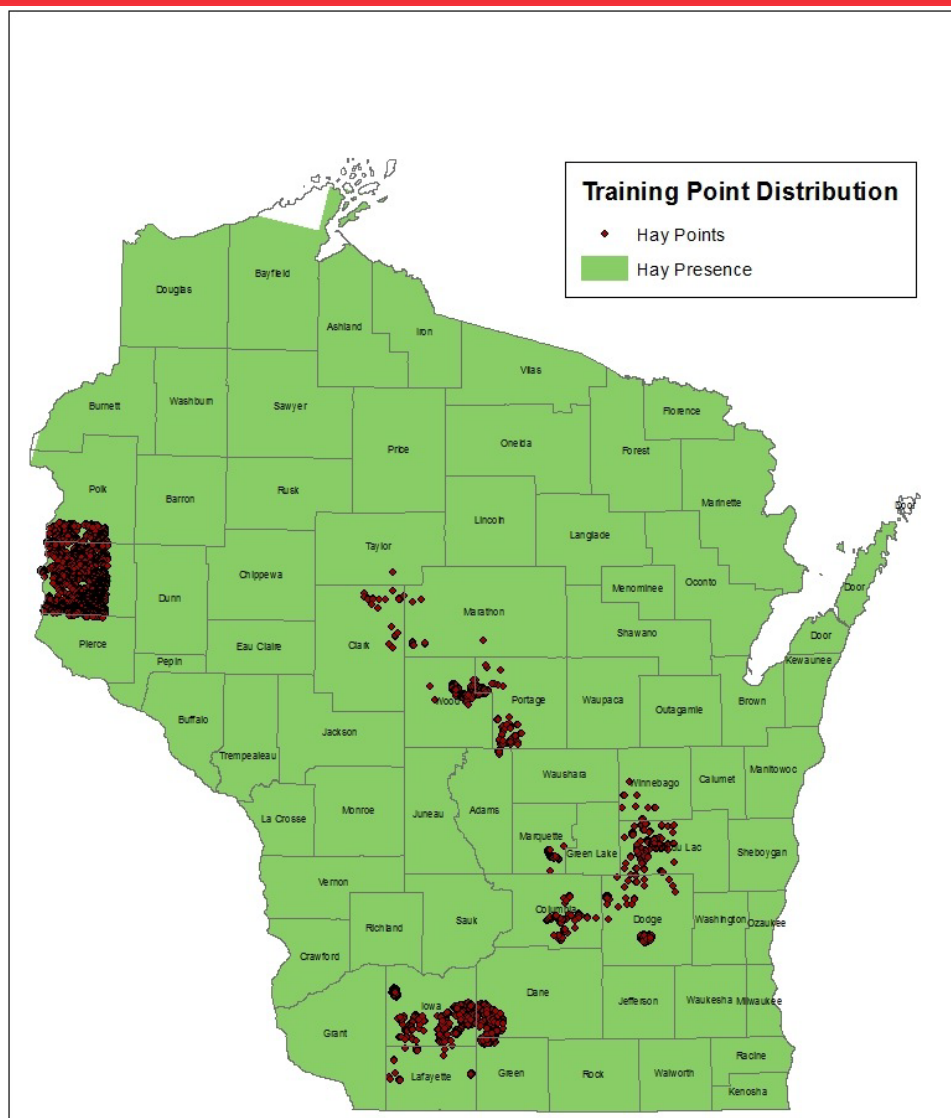




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What have we done so far?

✓ *Assess field work needs*

- Target at least 125 points / class for each footprint within the species' range
 - All footprints require some additional field collection
 - Collection will happen by county:
50-600 points needed per county



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What have we done so far?

✓ *Develop field reporting tool*

LAND COVER FIELD REPORTER

SEARCH FOR LAT/LON:

Collector Name...

County

Identification Method

Date...

Land Cover Type

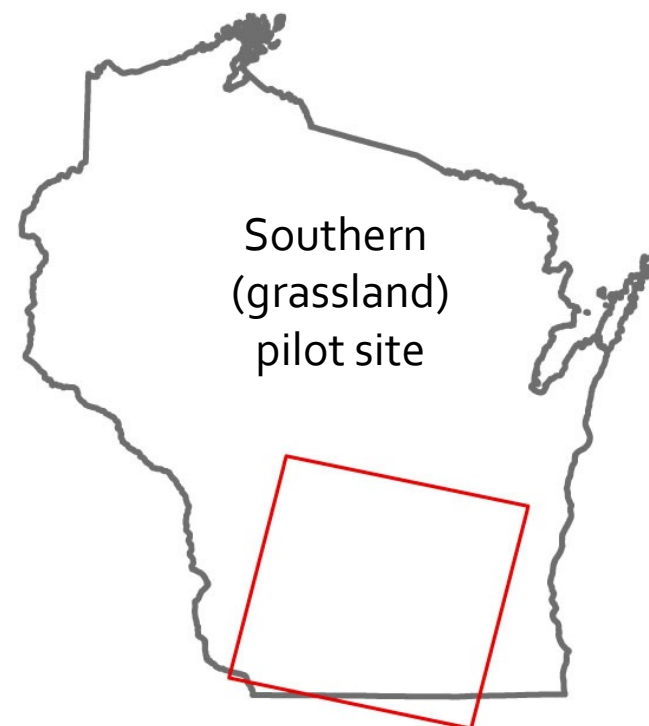
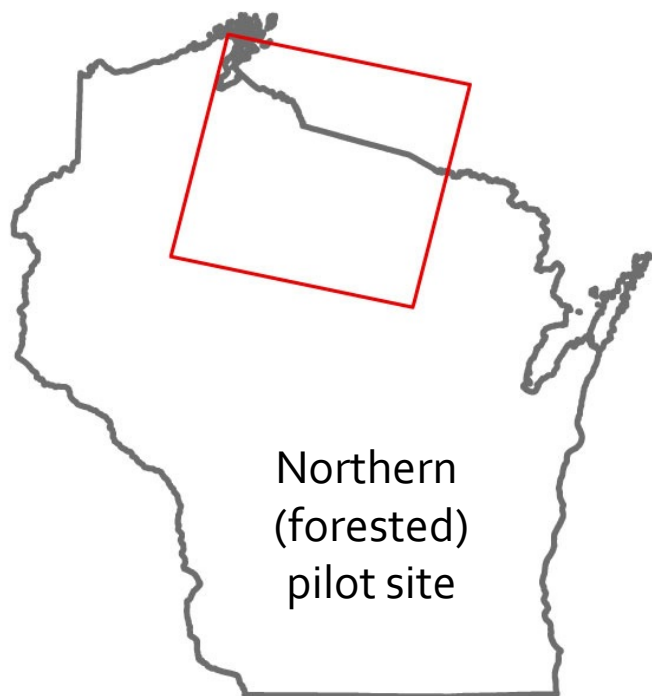


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What have we done so far?

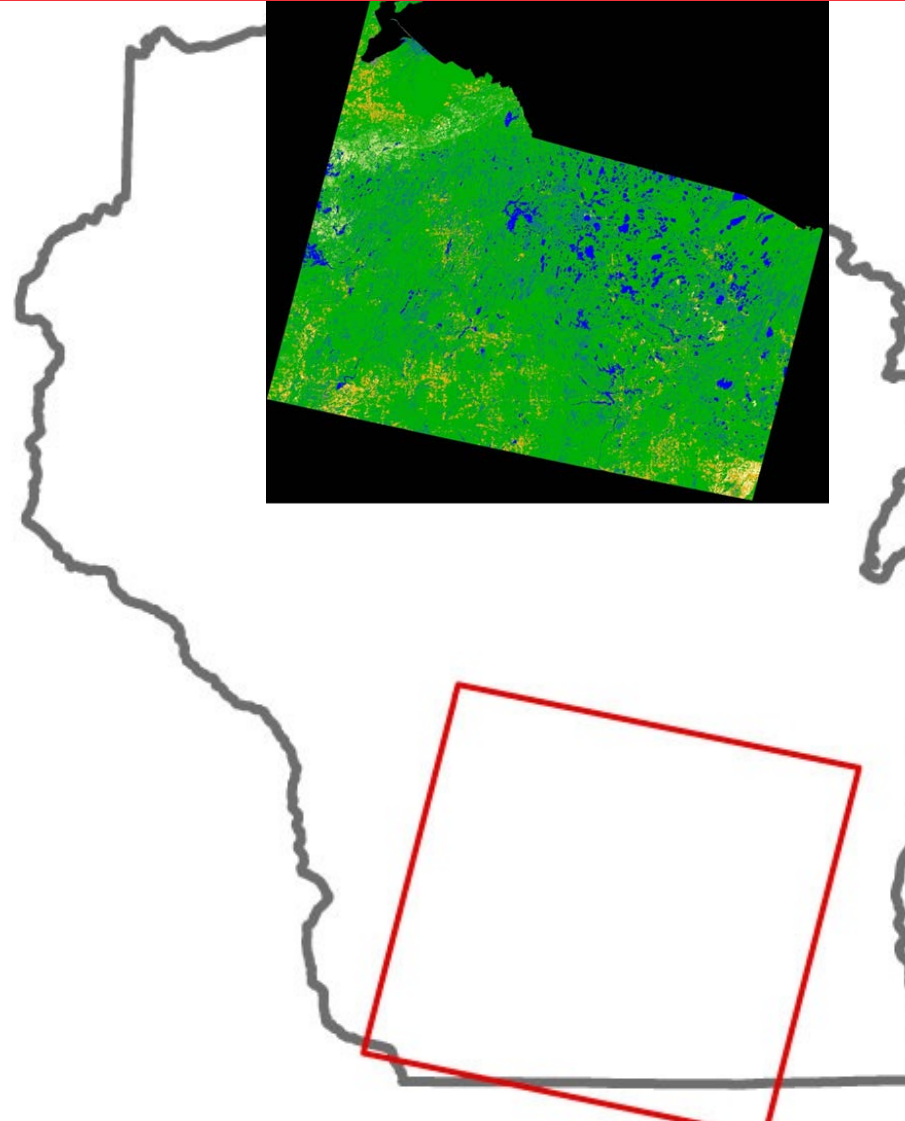
✓ *Conduct pilot study*





Pilot Study Results

- Imbalance in samples database (classes, distribution)
- Higher accuracy in northern (forested) site
 - Forestry data
 - Fewer categories
 - Uniformity of landscape





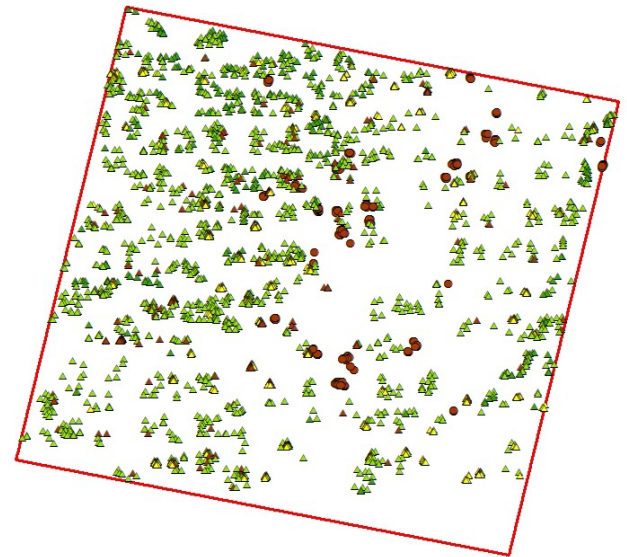
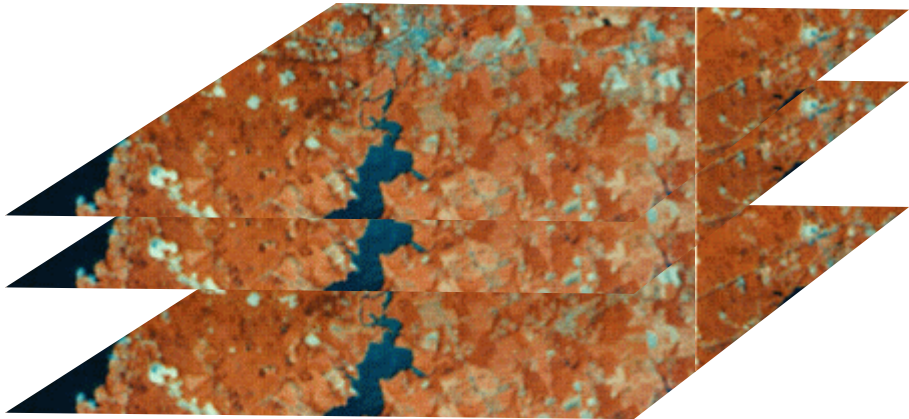
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What have we done so far?

✓ *Develop tools*

- Developed image preprocessing, data extraction, cross-validation routines





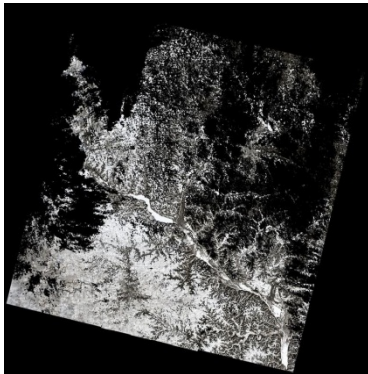
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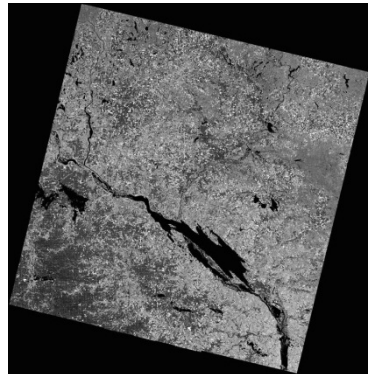
What's next?

☐ *Feature Selection*

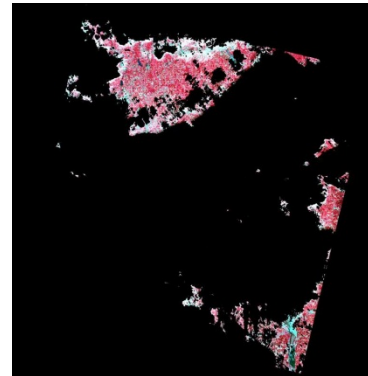
- > 100GB spectral data acquired for each footprint



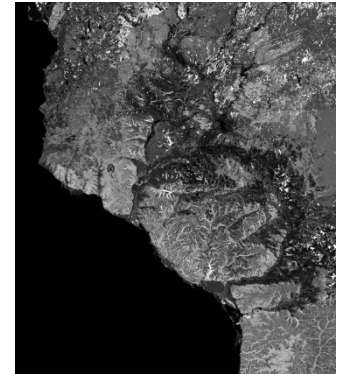
Time of year?



Vegetation Indices?



Missing data?



Soils, topography?



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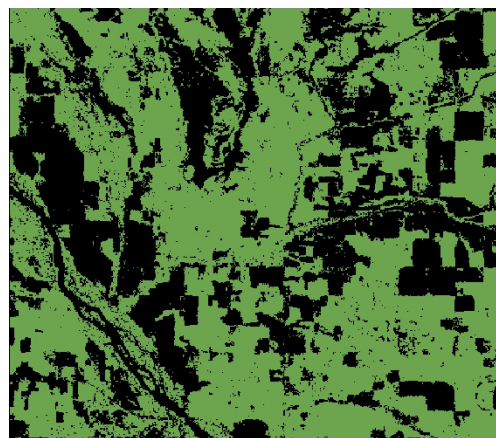
What's next?

☐ *Begin classification runs*

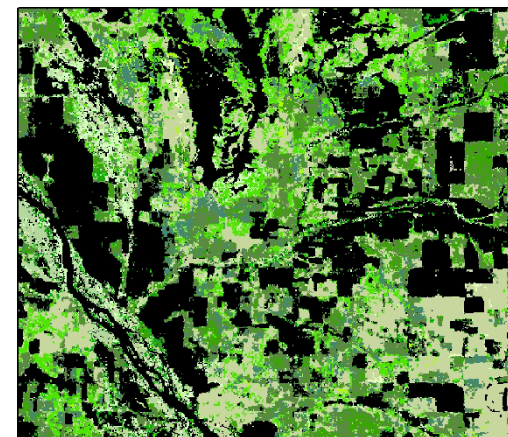
- Statewide Level 1 classifications
- Footprints with most sample data



Statewide Level 1
(all classes)



Level 1 Forest



Level 4 Forest



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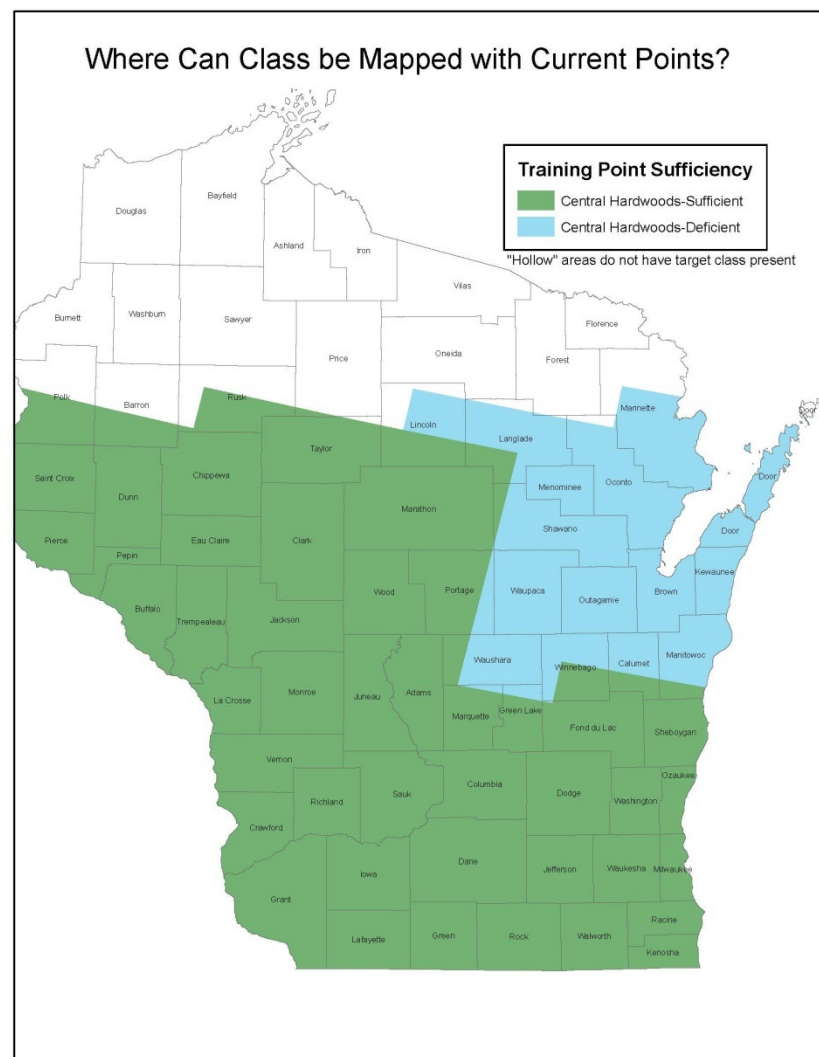


What's next?

☐ *Field collection*

- DNR-lead collection effort, guided by UW field request

- Starting soon and ramping up through the summer



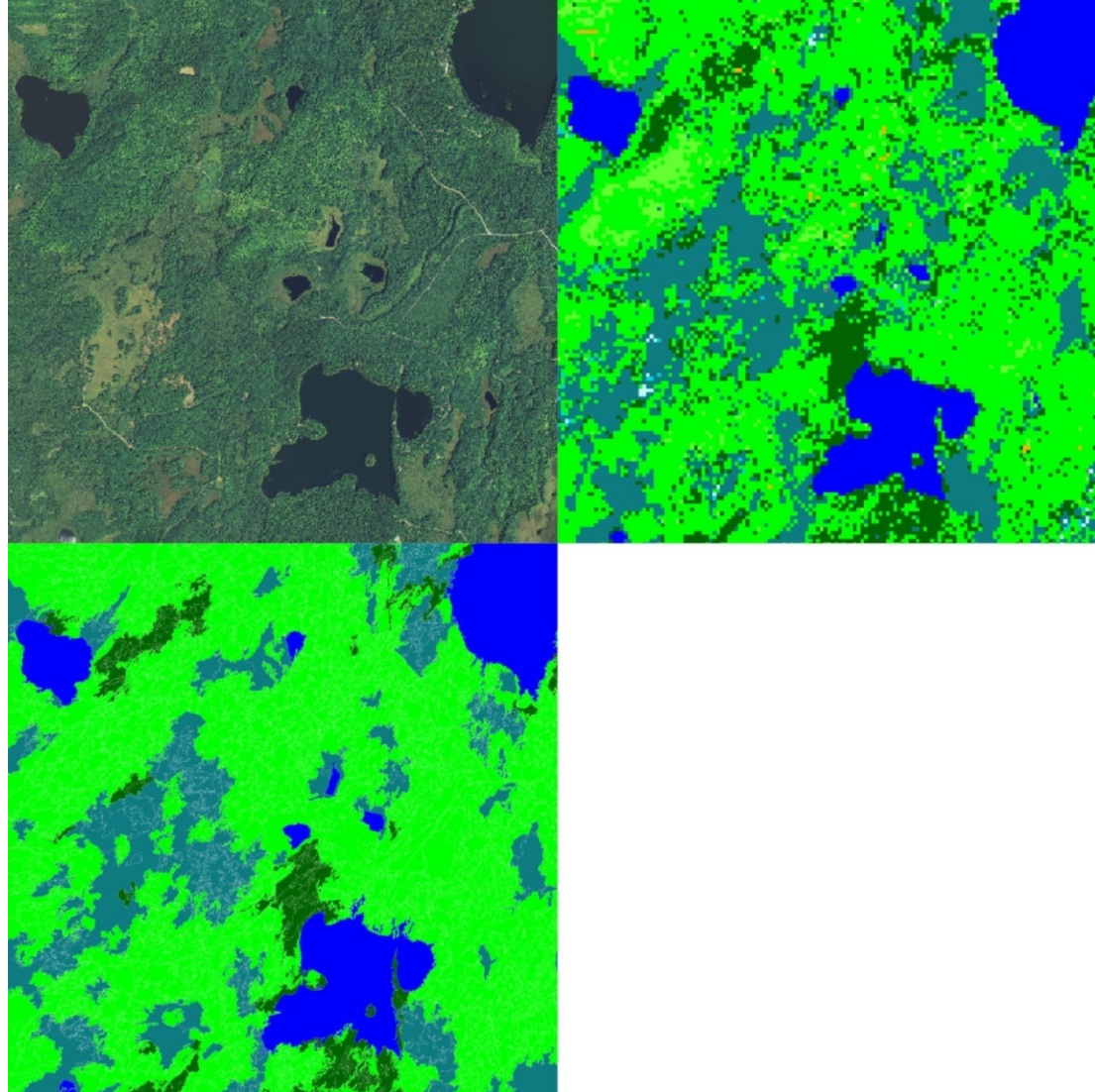


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What's next?

- ☐ *Finalize processing workflow*
- Develop routines for map generation and segmentation
- Center for High Throughput Computing (CHTC)





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What's next?

☐ *Delivery*

- Land cover database
 - Single file with Level 1-4 classifications
 - Metadata
 - Users' guide
 - Final report
- June 30, 2016 project completion



Further Details

- SCO Project Website
 - <http://www.sco.wisc.edu/projects/landcover.html>
 - Pilot report, project updates, staff bios, mailing list sign-up, etc.
- Deer Trustee Report
 - <http://dnr.wi.gov/topic/wildlifehabitat/documents/trusteeereport.PDF>
- The Wiscland-2 project is a cooperative effort between UW-Madison and the Wisconsin DNR with funding from the Federal Aid in Wildlife Restoration Program, grant# W-160-P-25



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