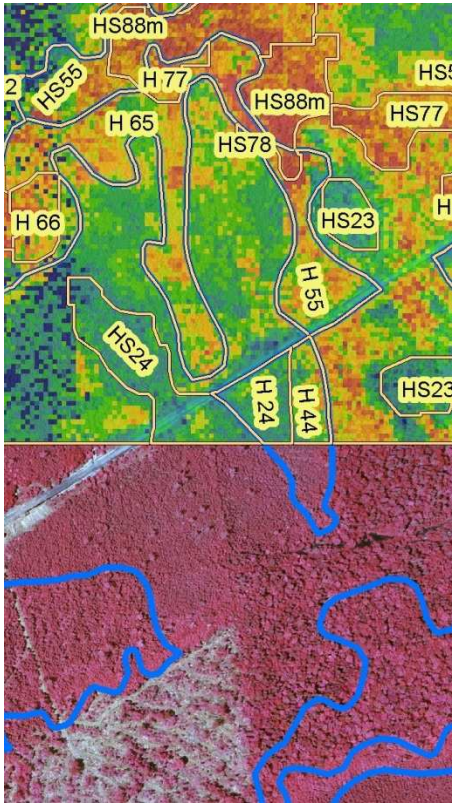

Top 10 Recent Changes in GIS and Remote Sensing… and Why They Matter

Wilfred J. Mercier

Analyst

March 14, 2017

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Criteria

- Recent: Within the last 10 years or so
- Utility for Foresters and Forestry
- A Fundamental Change in the Geospatial Industry
- Ability to Impact the World
- Demonstrated Impact on Forestry
- Potential to Significantly Impact Forestry

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European Union Copernicus Program

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10. EU Copernicus Program

- Earth Observation Satellites
- Family of 6 types of satellites
- Sentinel-1 (A & B) – Radar
  - 6 Day Revisit Time
  - Cloud Penetrating Capabilities
  - Elevation Measurement
- Sentinel-2 (A & B) - Multispectral
  - 5 Day Revisit Time
  - Increased Spatial Resolution (10m)

Sentinel-2
EU Version of Landsat

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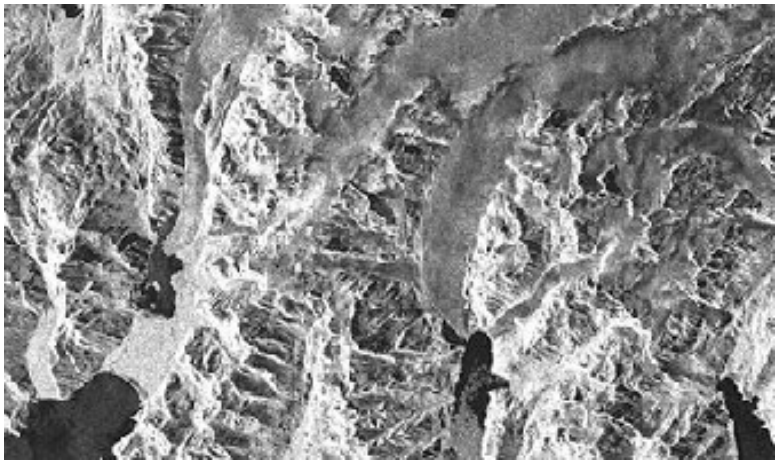
10. EU Copernicus Program

- Sentinel-1
  - Forest Height and Biomass
  - Tropical Forest Monitoring
- Sentinel-2
  - Increased Data Reliability
  - Finer Resolution Change Detection
  - Faster Detection, particularly important when monitoring for:
    - Timber Trespass
    - Weather Events
    - Pest and Disease

Sentinel-1 Data From



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The Cloud / Web Infrastructure

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9. The Cloud / Web Infrastructure

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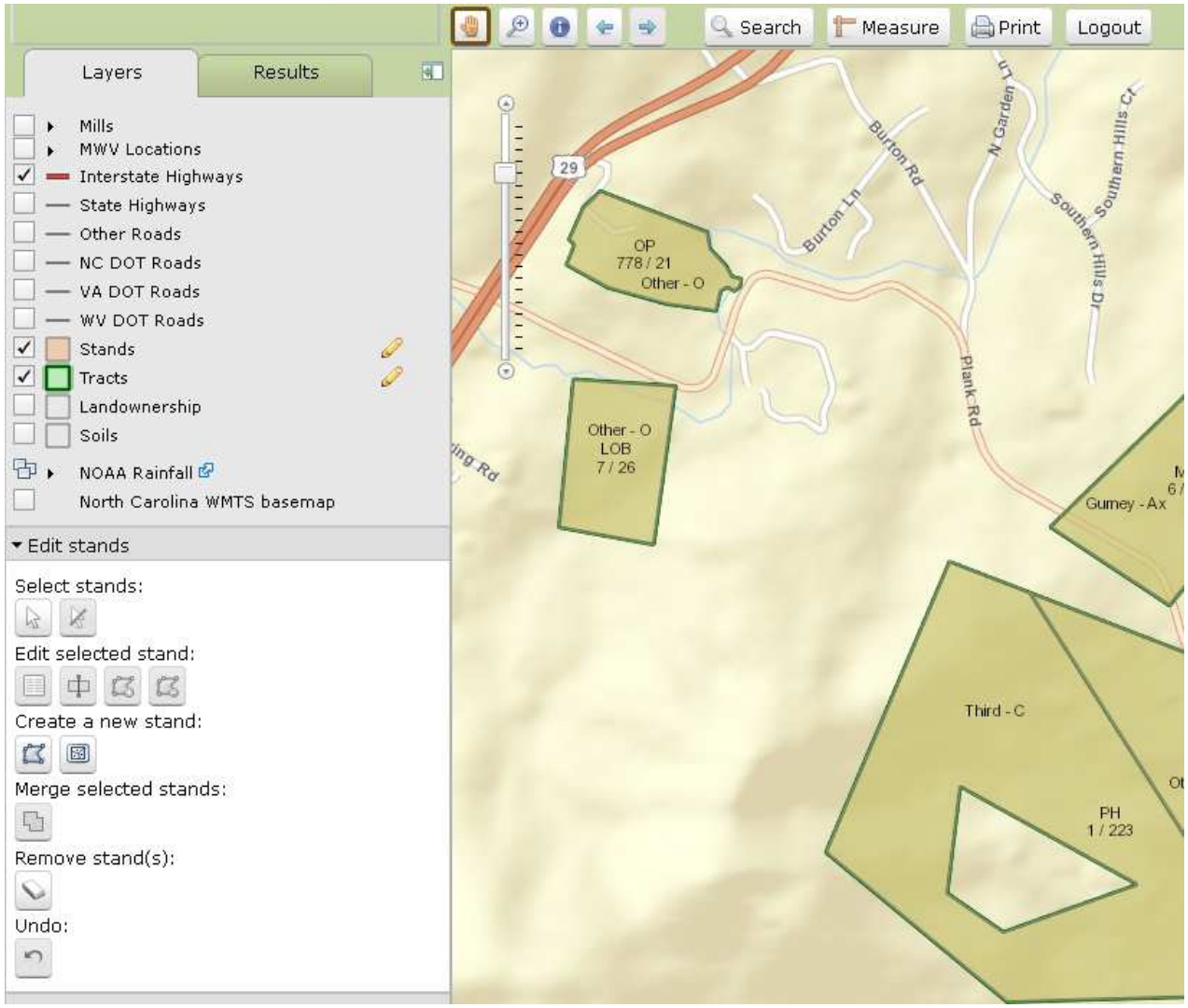
9. The Cloud / Web Infrastructure



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9. The Cloud / Web Infrastructure

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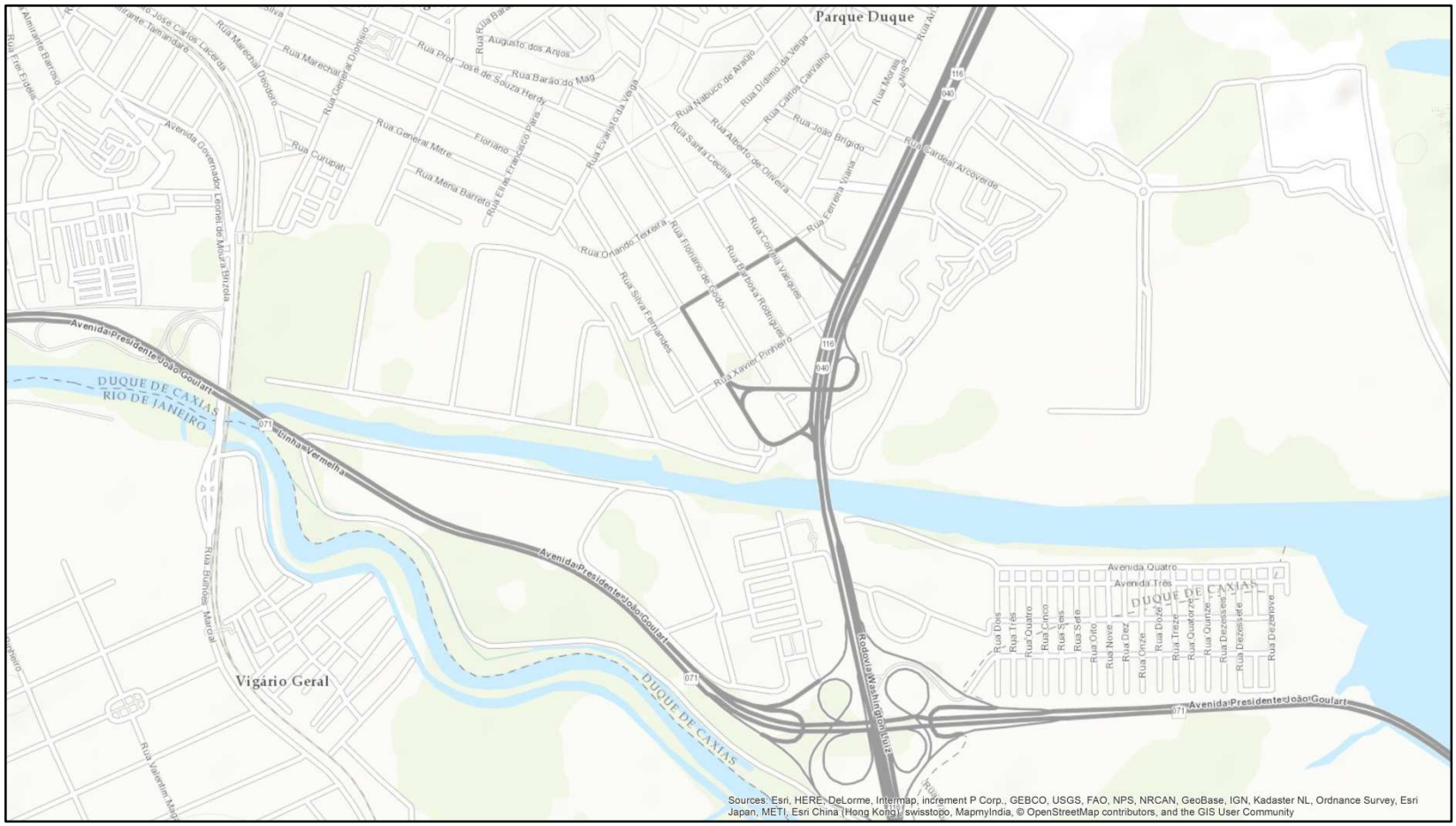

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9. The Cloud / Web Infrastructure

Rio de Janeiro, Brazil

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8

Geospatial PDFs and Mobile PDF Maps

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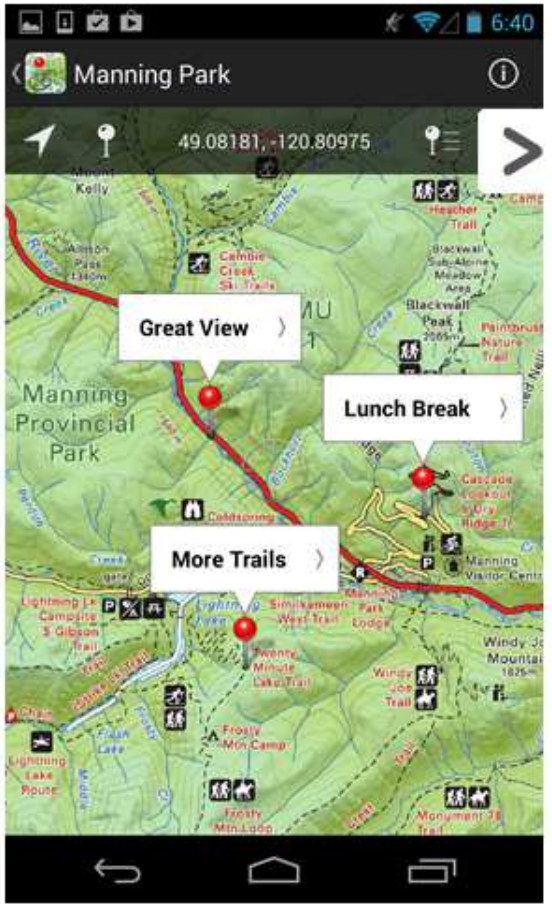
8. Geospatial PDFs and Mobile PDF Maps

- Standardized format significantly simplifies the process of getting a georeferenced map into the field

- Modern apps effectively turn smartphones into mini mobile GIS systems:
  - Collect Data



Avenza Maps Android app - Drop placemarks at locations

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8. Geospatial PDFs and Mobile PDF Maps

- Standardized format significantly simplifies the process of getting a georeferenced map into the field

- Modern apps effectively turn smartphones into mini mobile GIS systems:
  - Collect Data
  - Make Measurements
  - Supporting Navigation

Avenza Maps Android app - Use tools to measure area/distance

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UAVs / UAS

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7. UAVs / UAS

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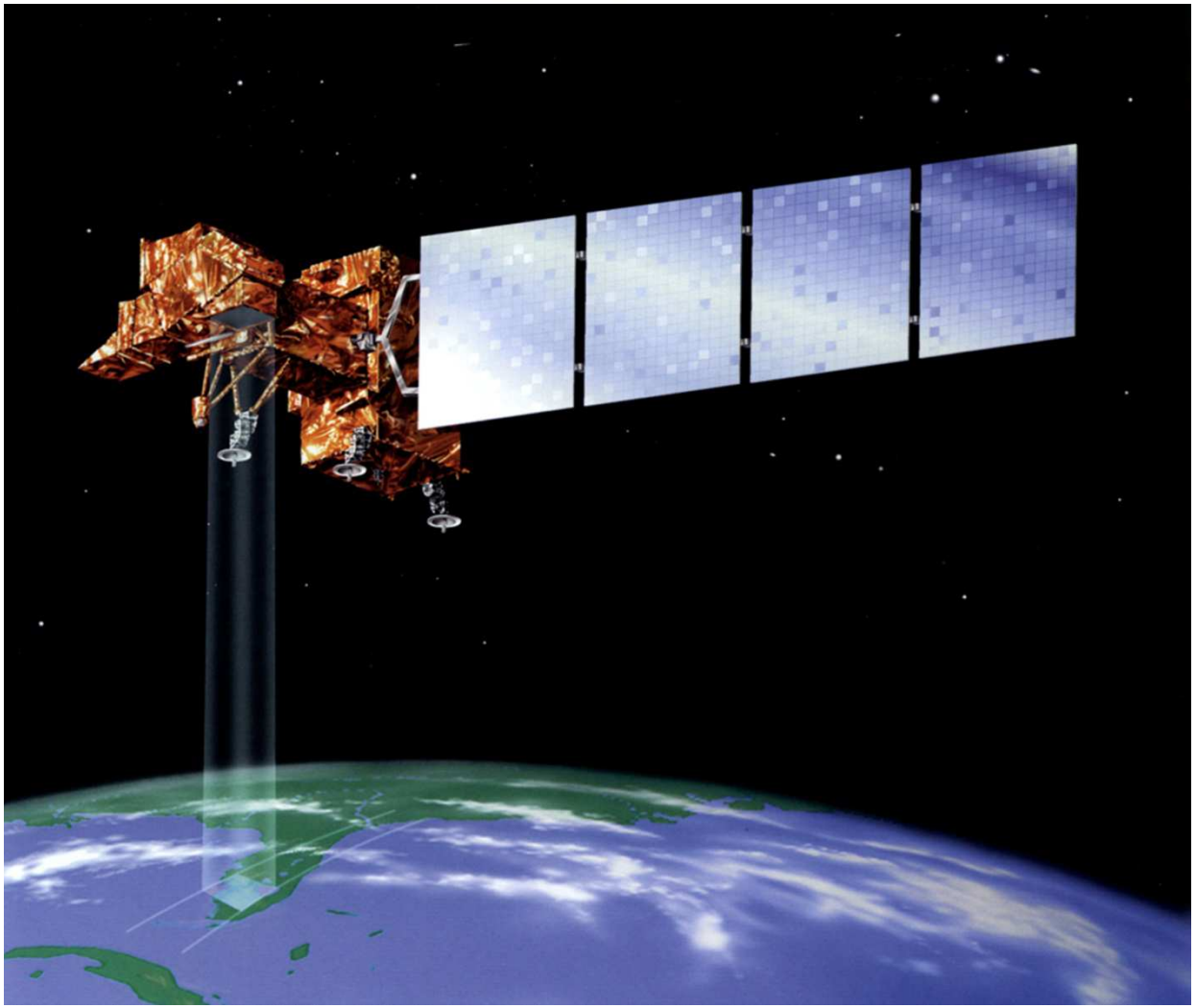
6

Release of the Landsat Archive

6. Release of the Landsat Archive



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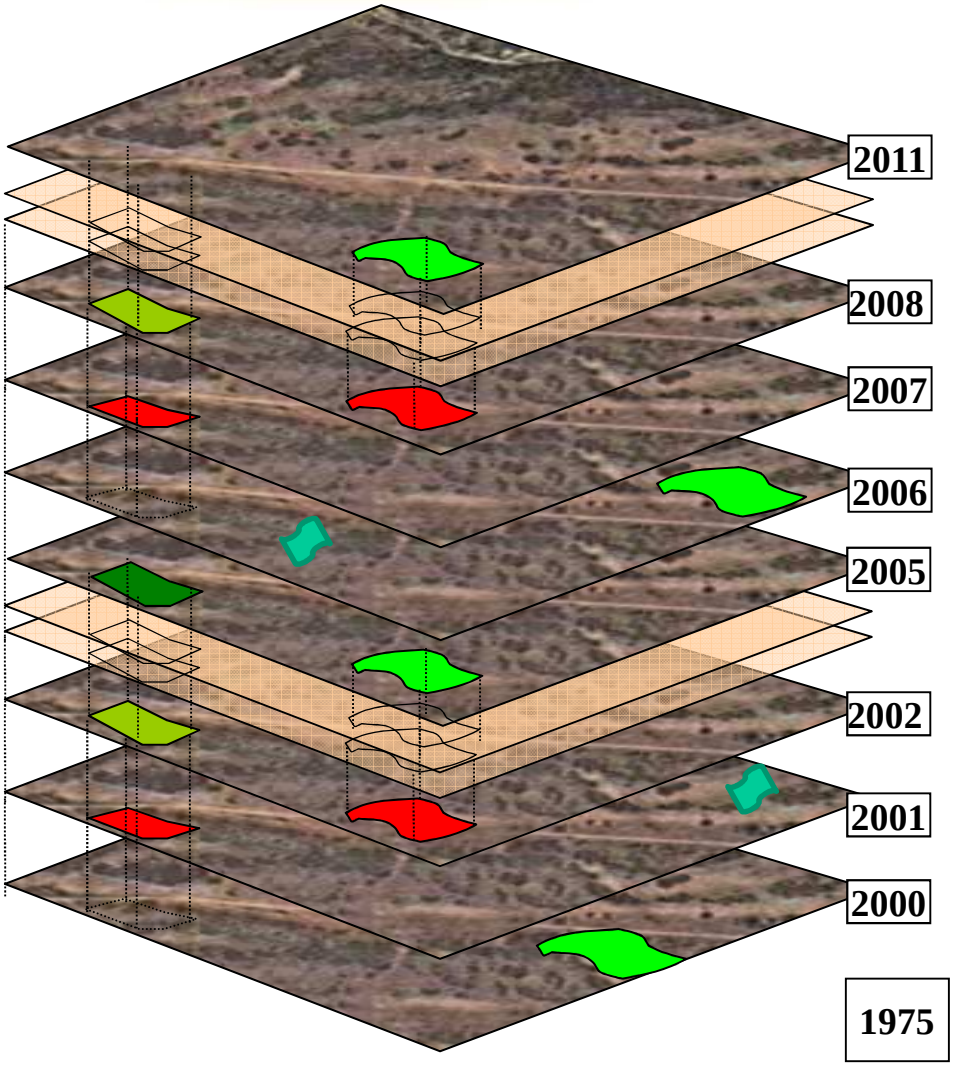

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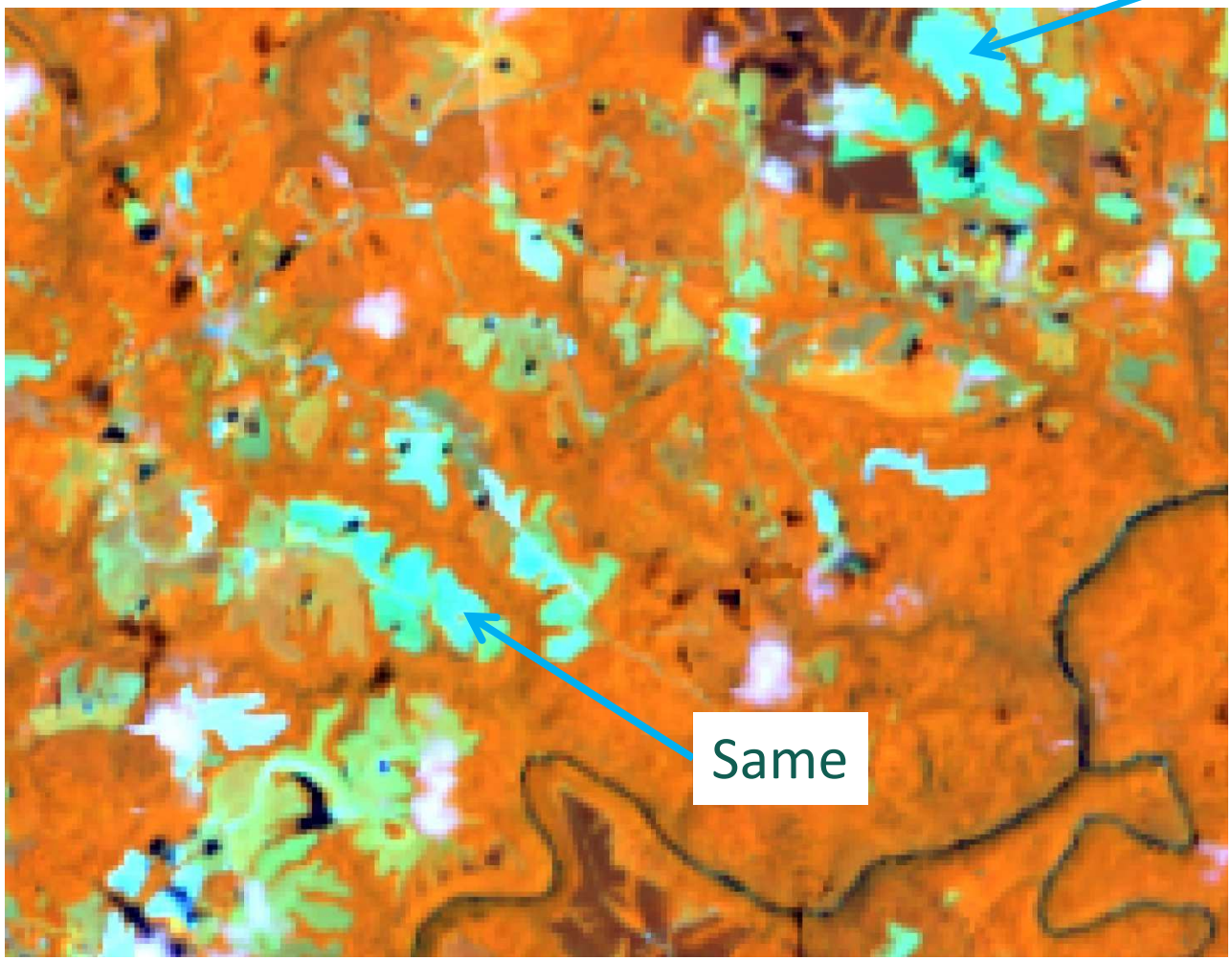

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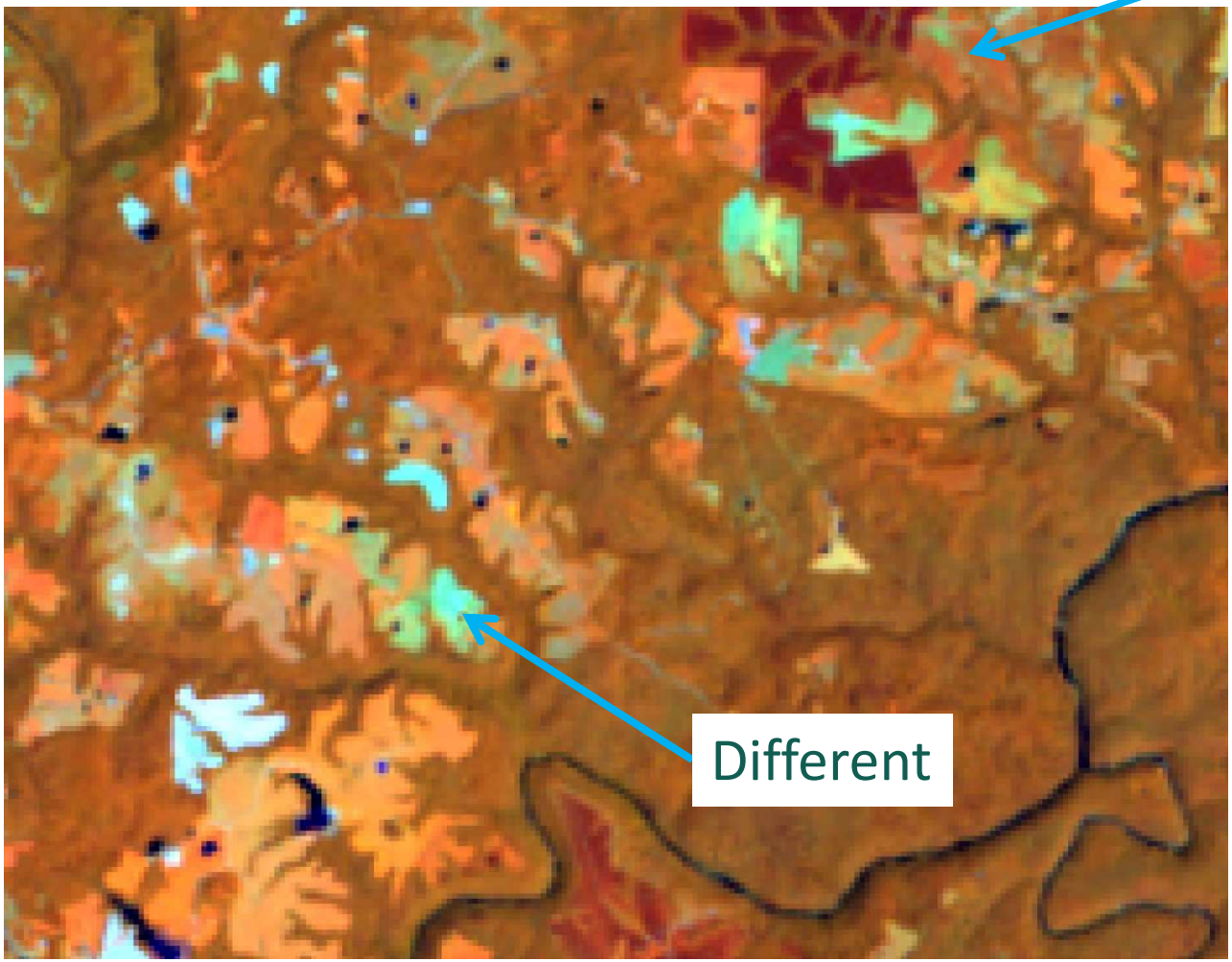

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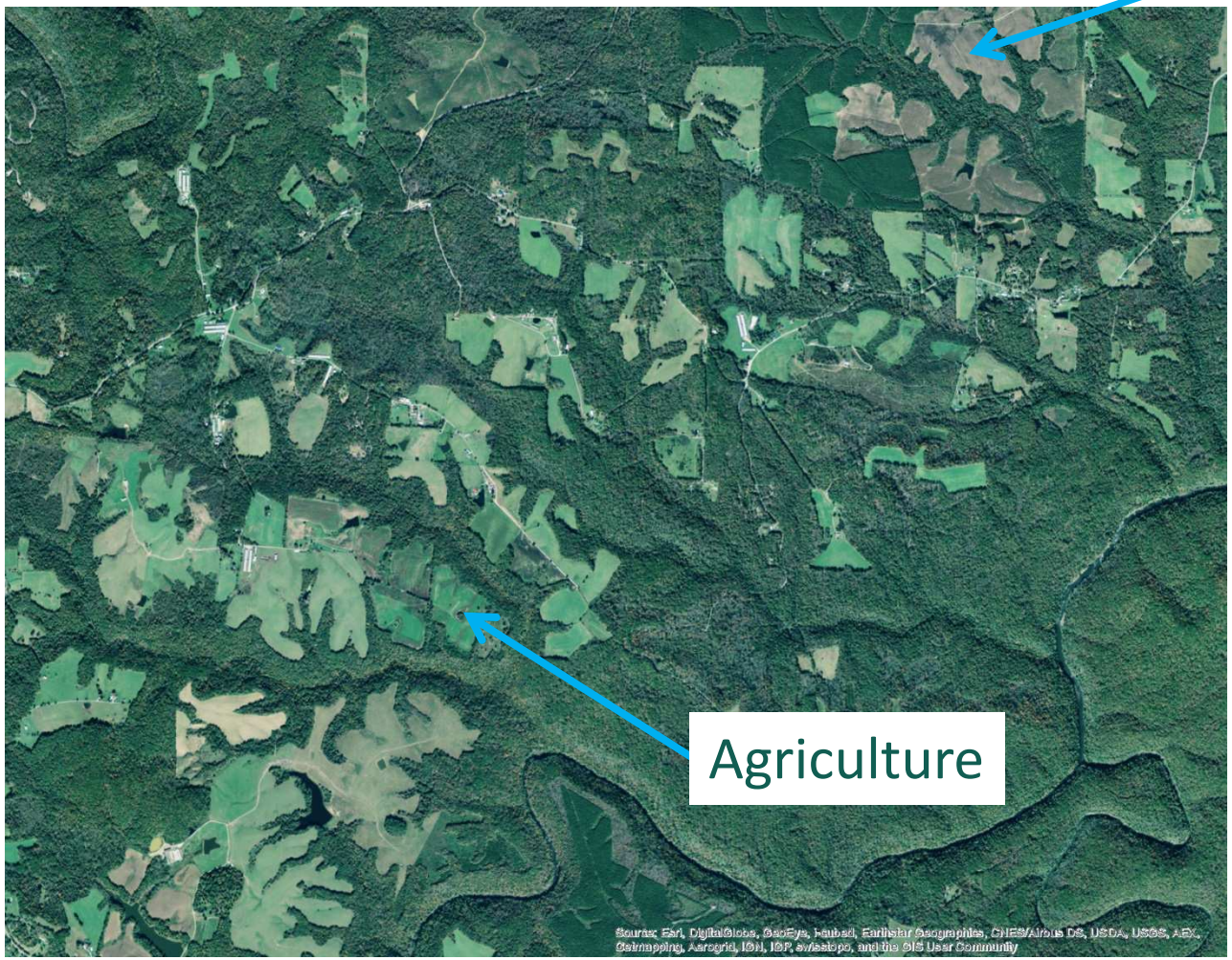

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6. Release of the Landsat Archive

Harvests By Year

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5

Image-Based Point Clouds

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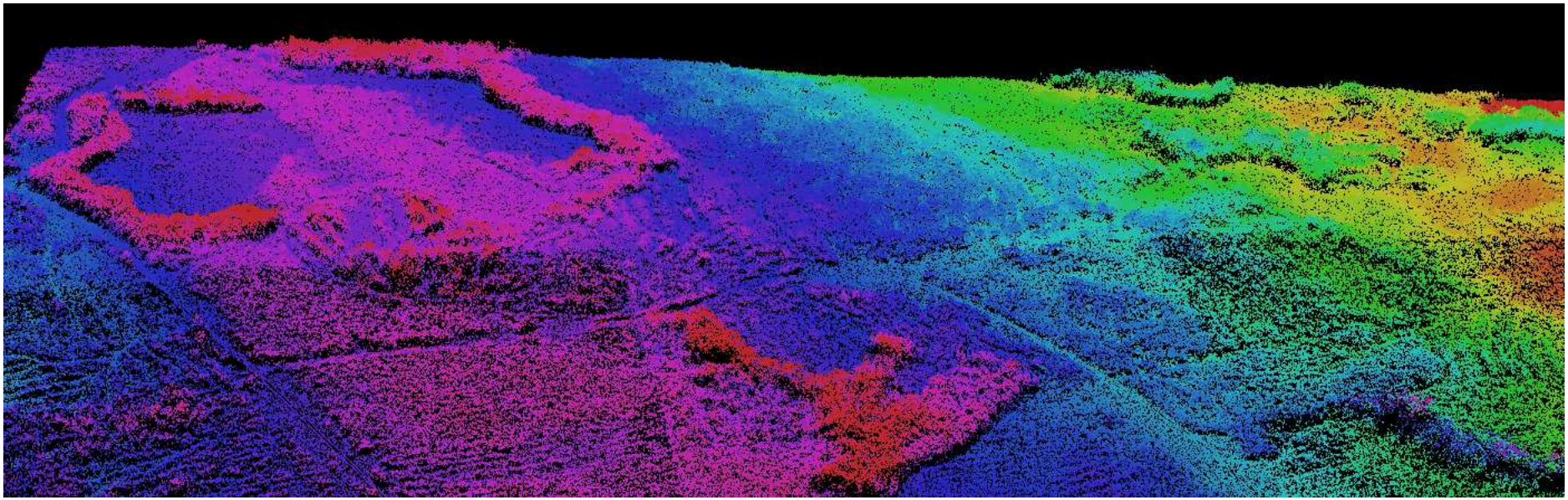
5. Image-Based Point Clouds



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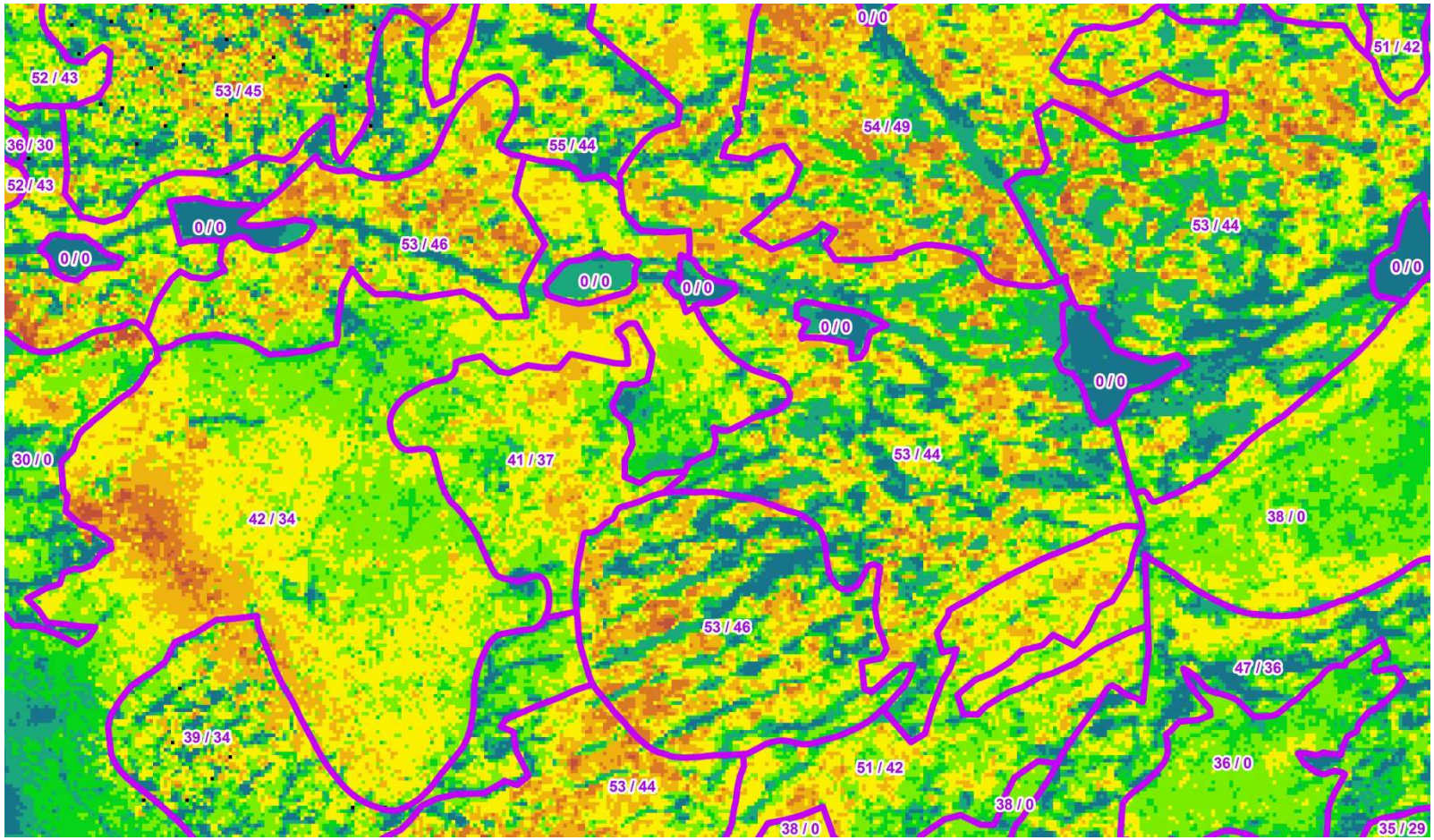
5. Image-Based Point Clouds



Traditional stand map with point cloud heights

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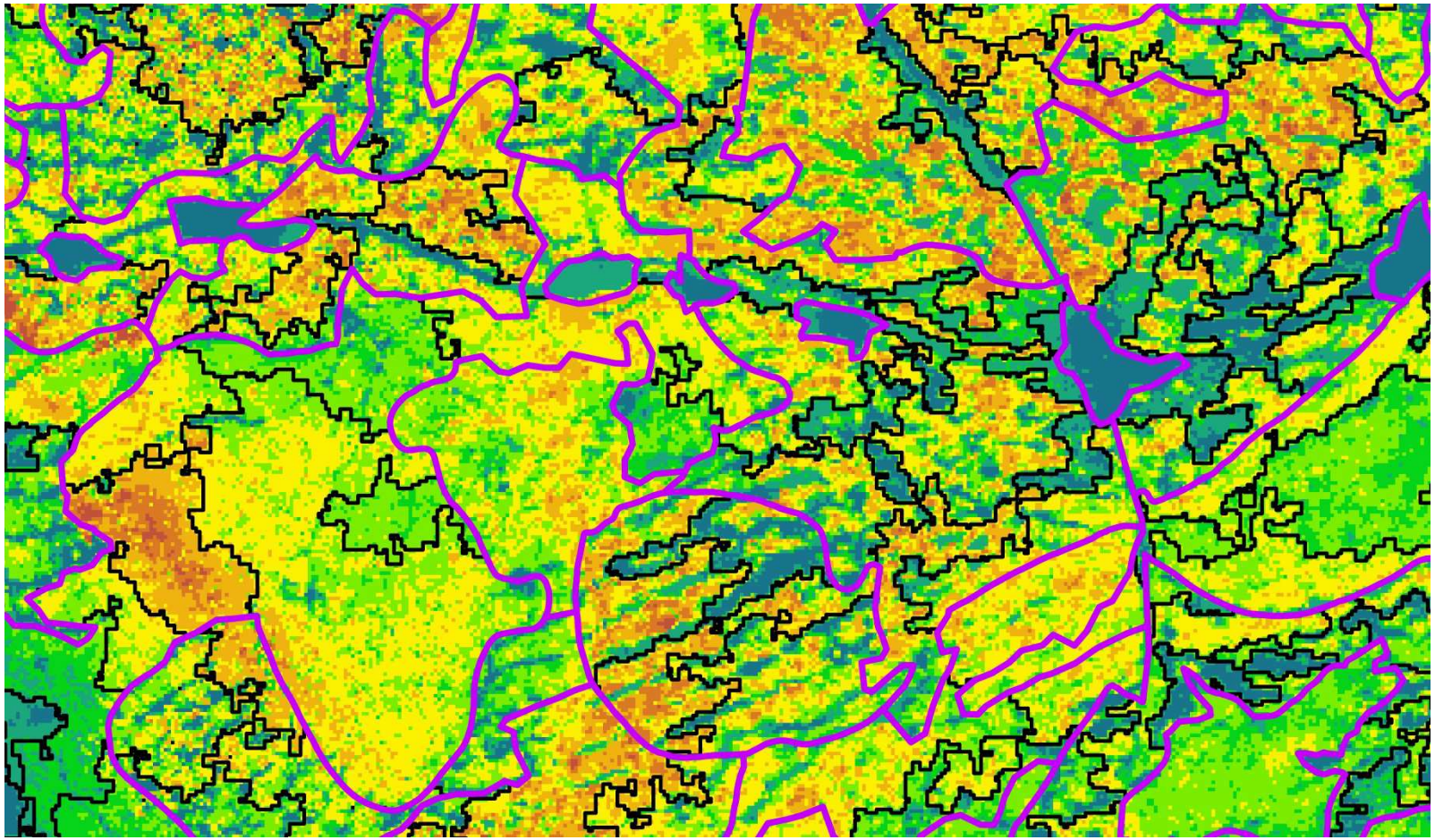
5. Image-Based Point Clouds



Sub-stand polygons derived from height rasters

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Digital Sensors / Imagery

4. Digital Sensors / Imagery

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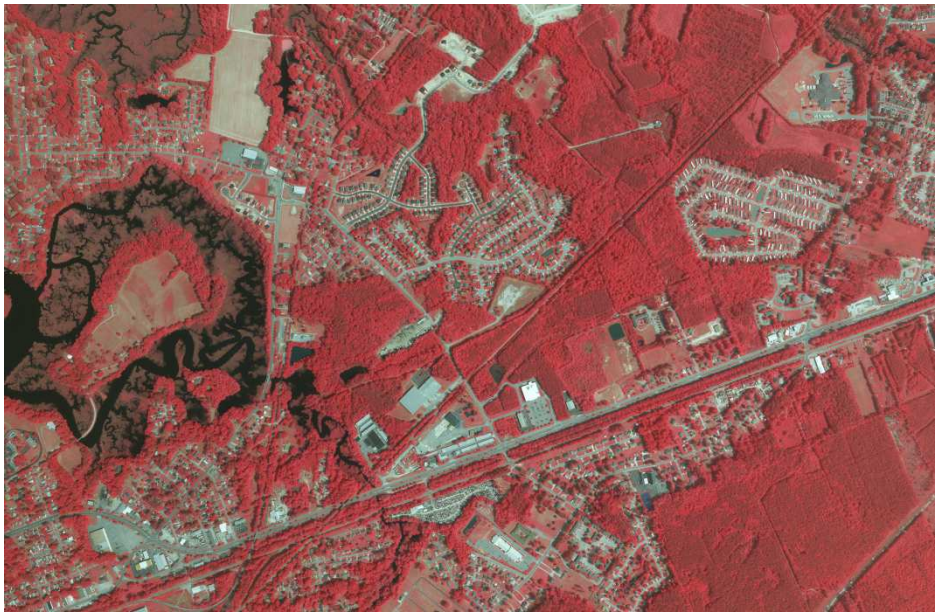
4. Digital Sensors / Imagery



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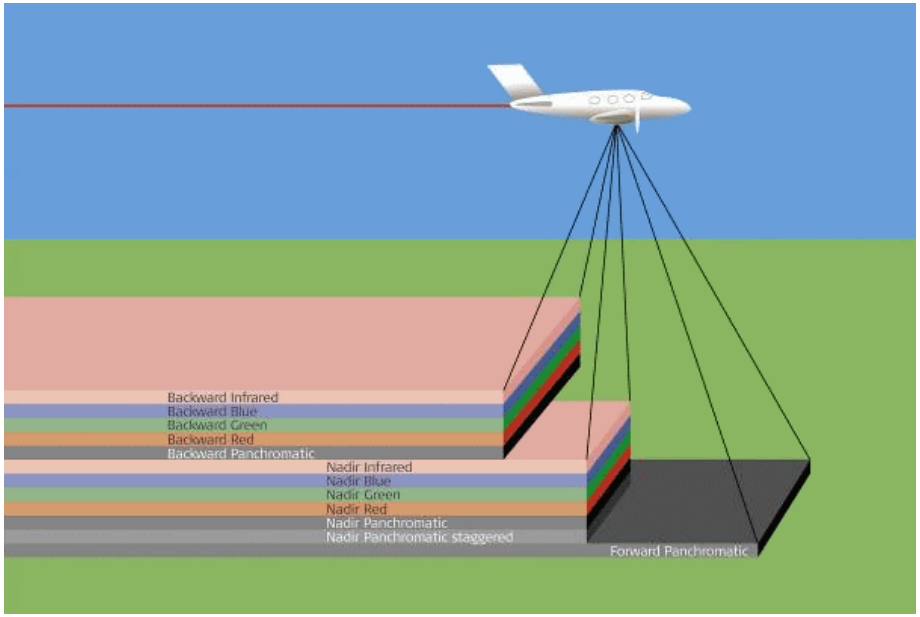
4. Digital Sensors / Imagery

- GSD (Ground Sample Distance) has replaced scale
  - 30cm GSD typical for forest cover type mapping
- Cost Structures for Acquisition Have Changed
  - Idea that lower resolution reduces price no longer really holds above 30cm
  - Monoscopic no longer saves



Source: Leica Geosystems

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LiDAR

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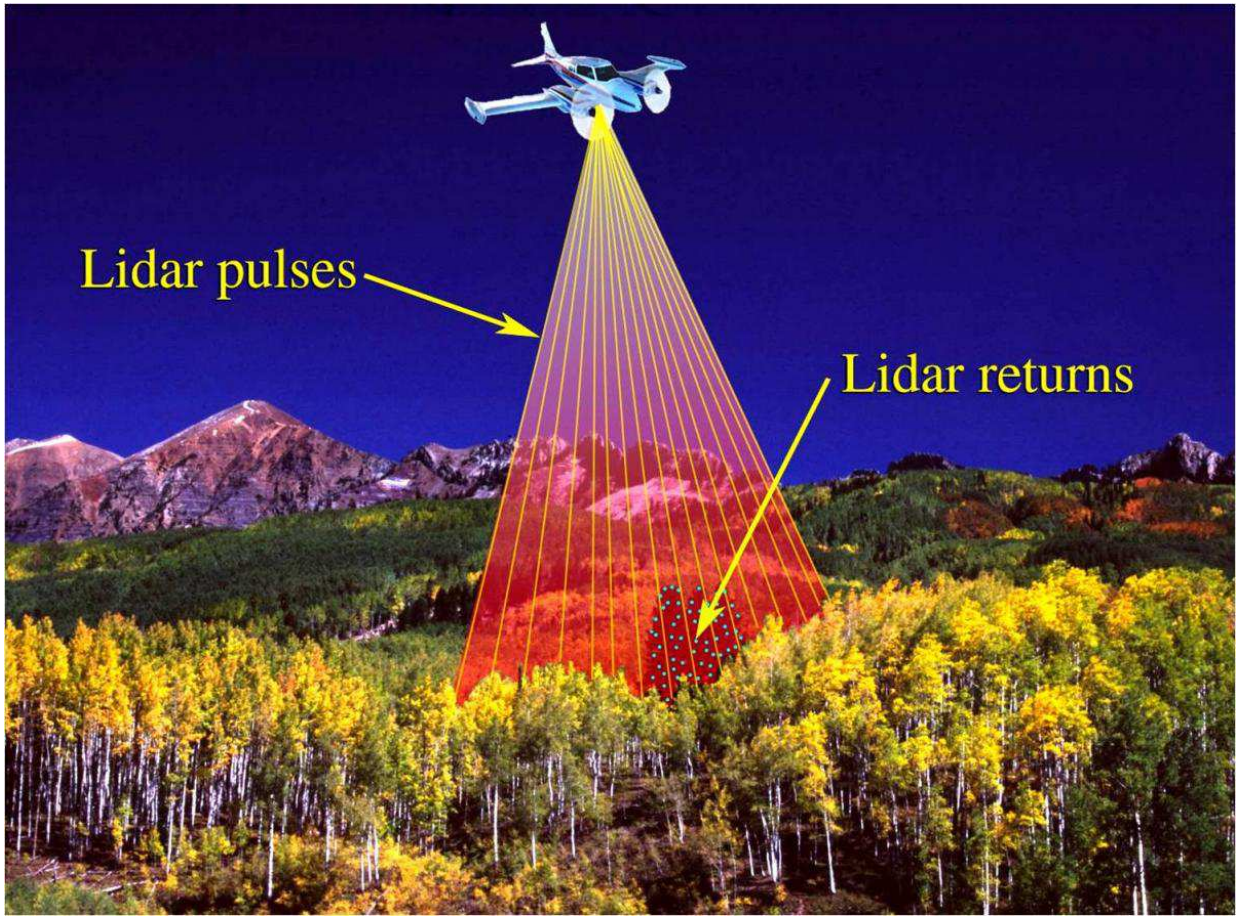
3. LiDAR



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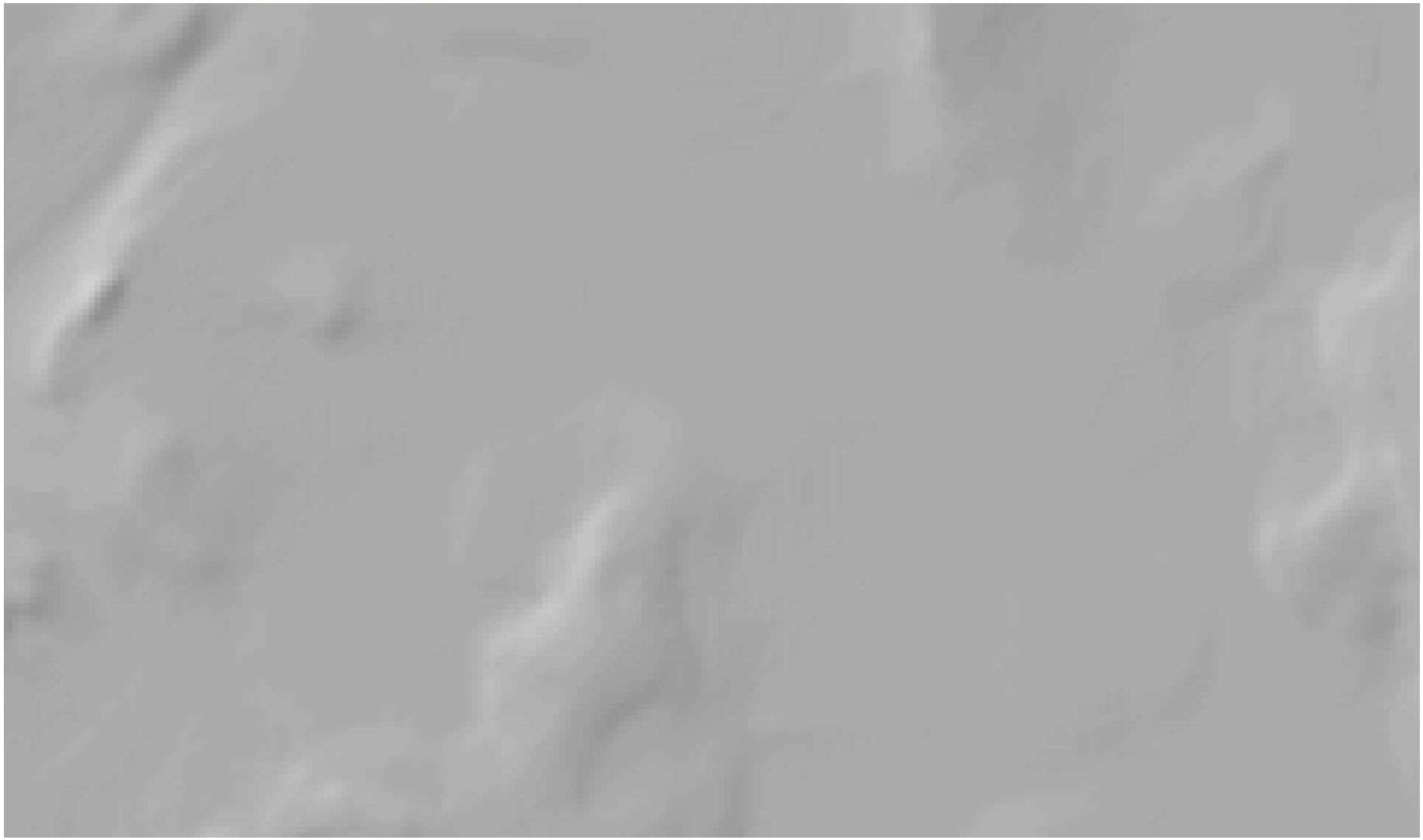
3. LiDAR

10m USGS DEM



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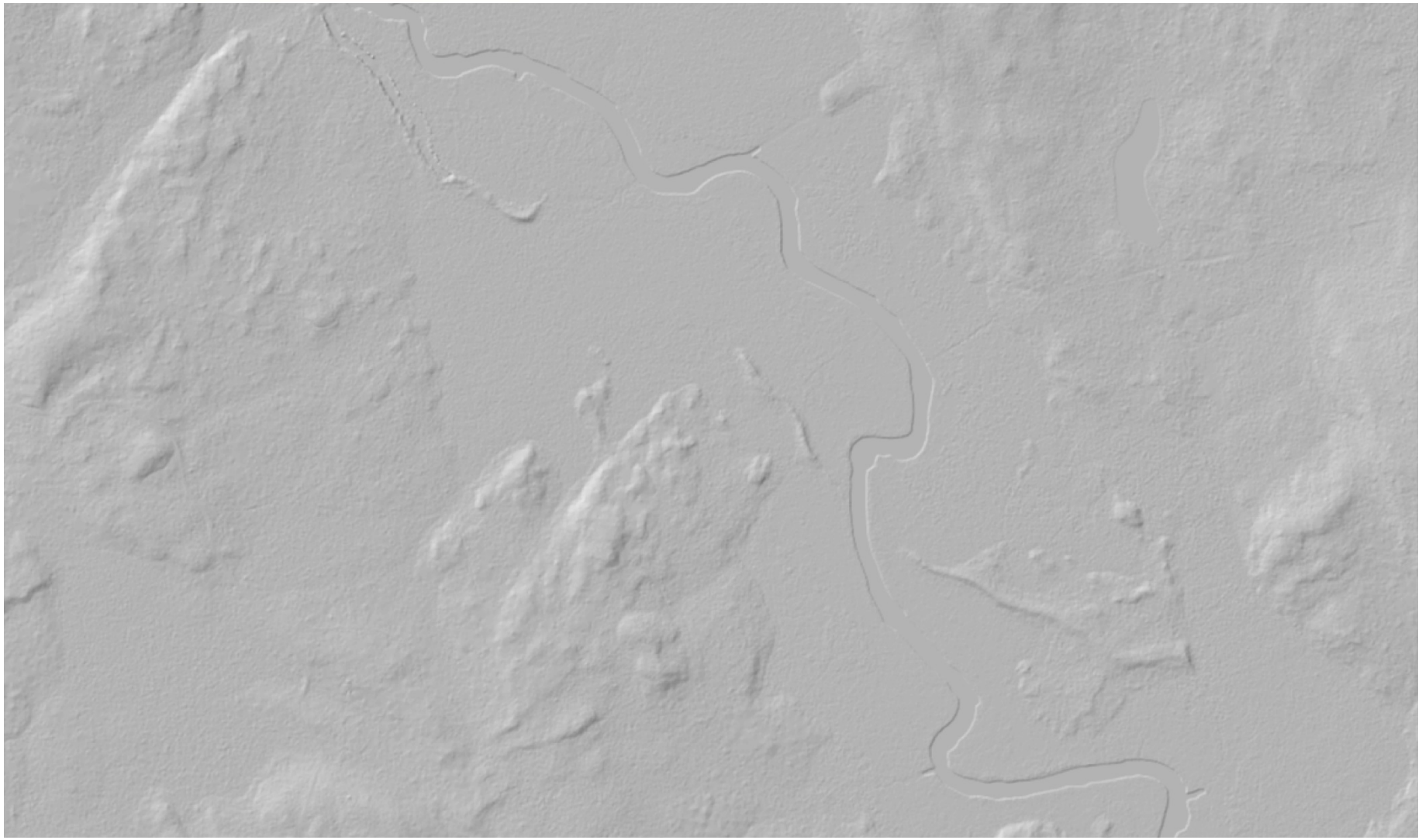
3. LiDAR

2m LiDAR DEM



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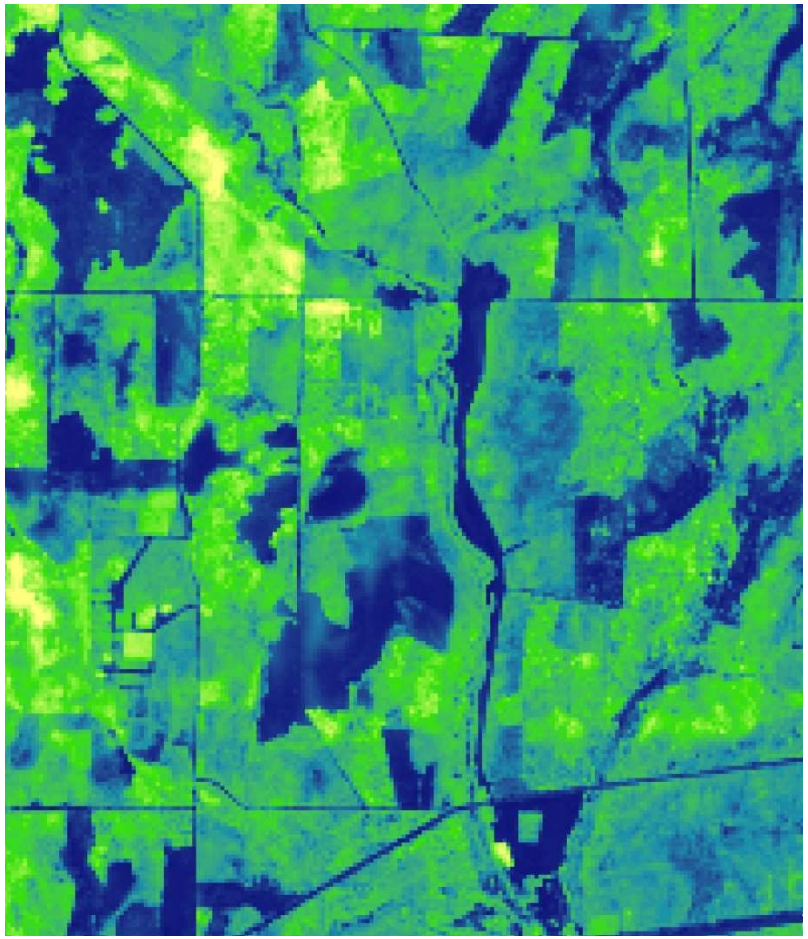
3. LiDAR



Basal area for mixedwoods

- Forest Inventory Metrics
- Individual Tree Analysis

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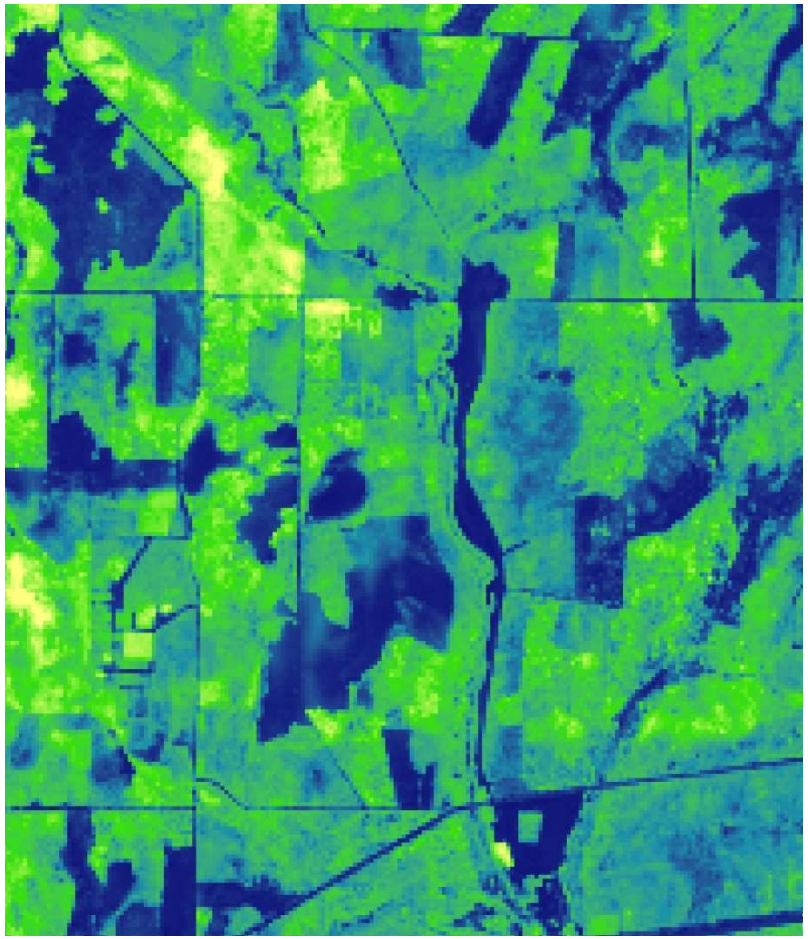
3. LiDAR



Basal area for mixedwoods

- Forest Inventory Metrics
- Individual Tree Analysis
- Inspired a significant change in how we think about and use forest data

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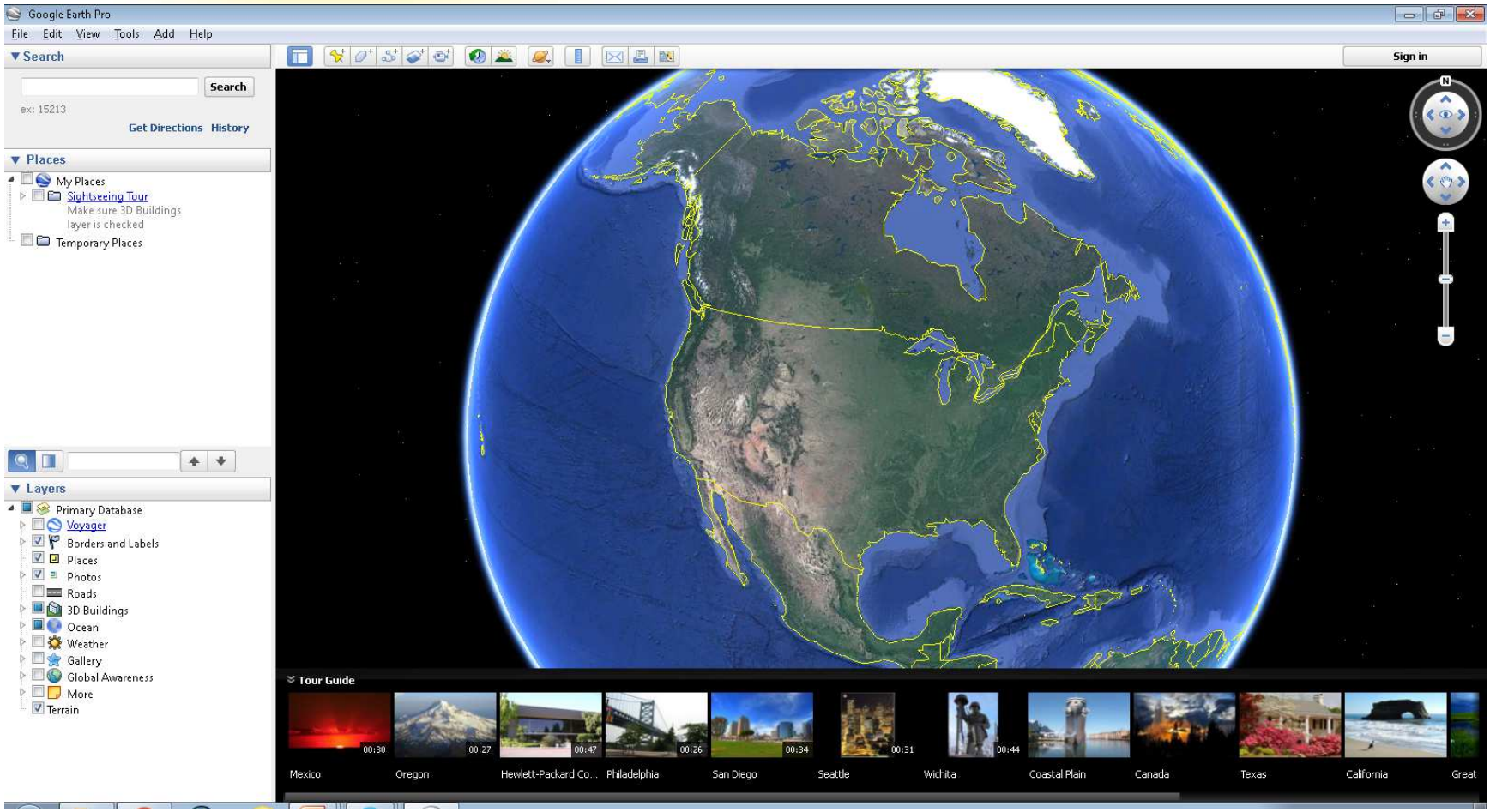
Google Earth

2. Google Earth



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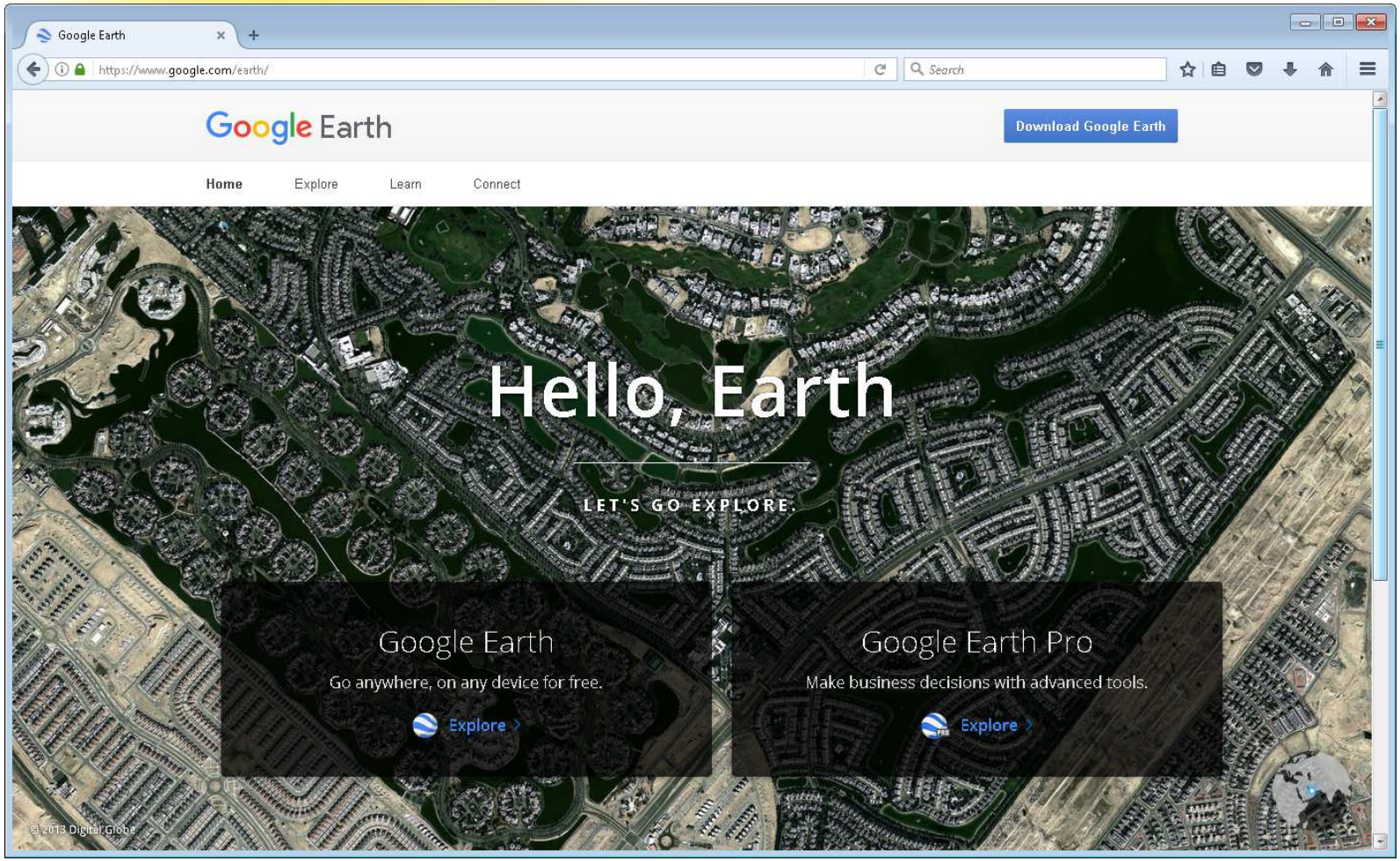
2. Google Earth



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1

Expansion of the National Agricultural Imaging Program (NAIP)

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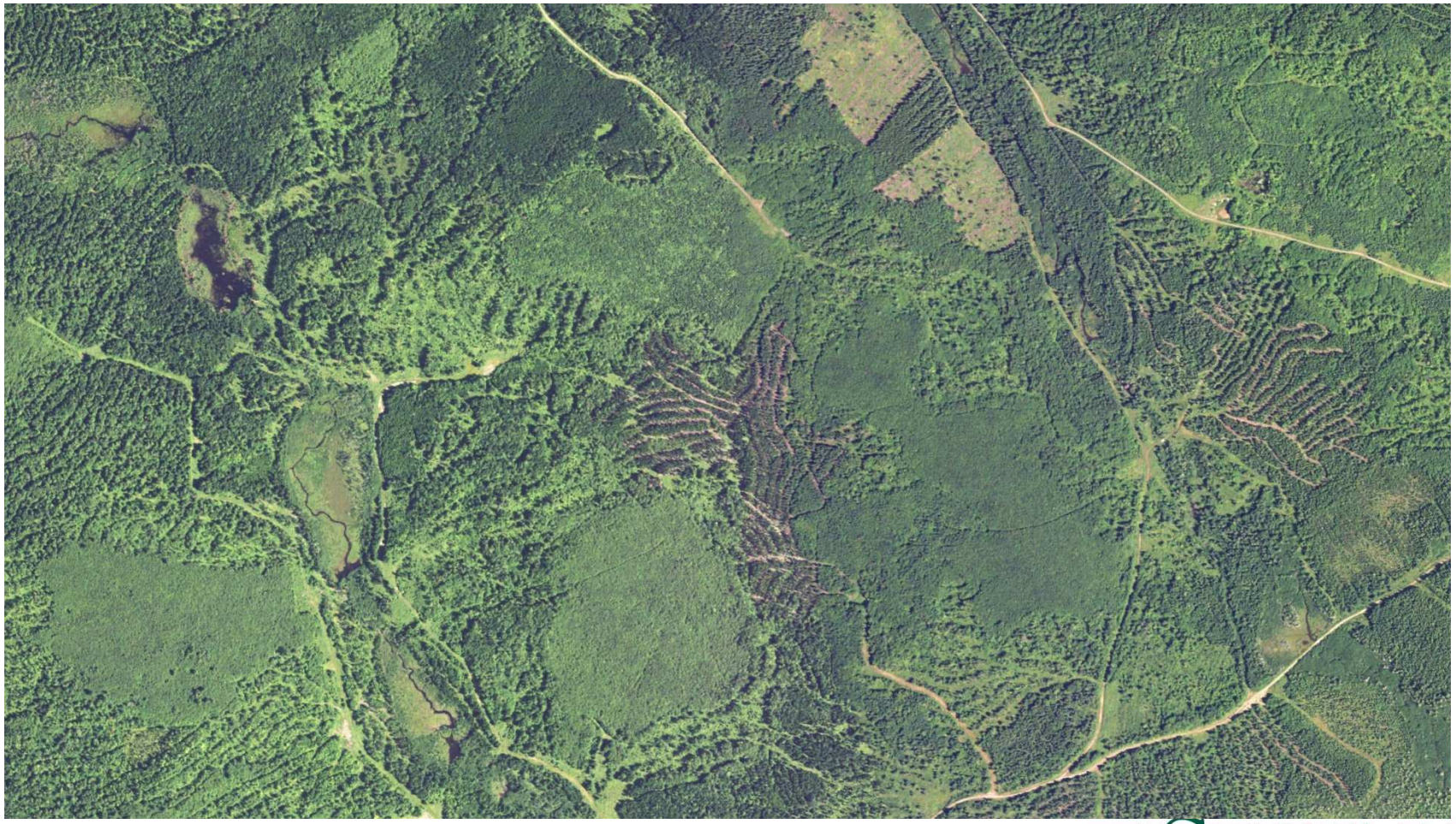
1. Expansion of NAIP



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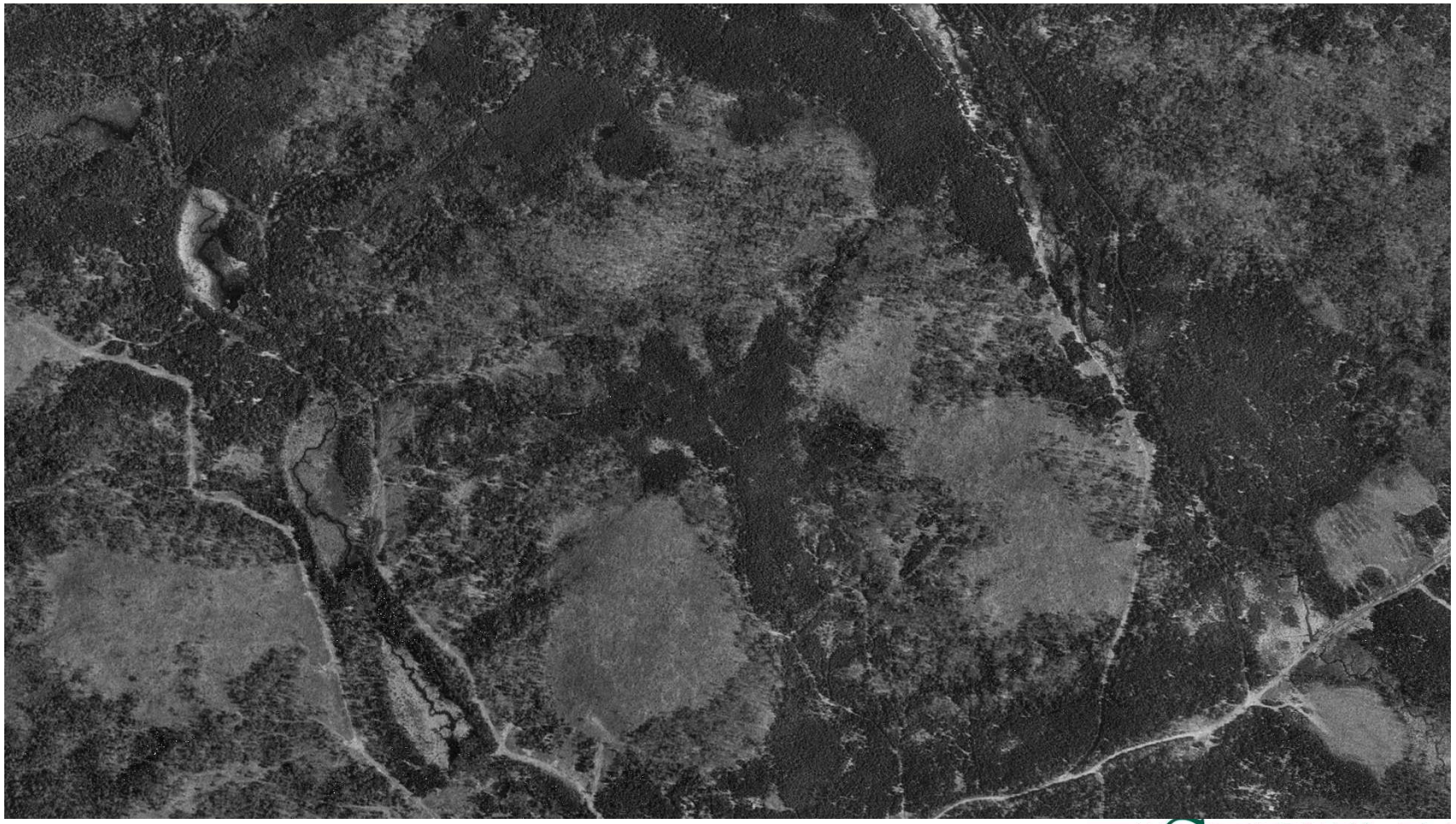
1. Expansion of NAIP



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1. Expansion of NAIP

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Wrap - Up

- Don’t forget about advancements in support infrastructure.
- It takes time for some technologies to truly show their value and benefit.
- Watch for the technologies that change how we think about things.
- Pay attention to technology that changes how others interact with forestry and the world.
- Significant changes do not necessarily come from earth shattering technological advancements.

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