Chesapeake Bay Program
A Watershed Partnership

Land Use Metrics & Methods Outcome

Management Strategy

Peter Claggett
U.S. Geological Survey

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2014 Bay Agreement's Land Conservation Goal:

Conserve landscapes treasured by citizens in order to maintain water quality and habitat; sustain working forests, farms and maritime communities; and conserve lands of cultural, indigenous and community value.

Land Use Methods & Metrics Development Outcome:

Continually improve the knowledge of land conversion and the associated impacts throughout the watershed.

By 2016, develop a Chesapeake Bay watershed-wide methodology and local level metrics for characterizing the rate of farmland, forest and wetland conversion, measuring the extent and rate of change in impervious surface coverage and… quantifying the potential impacts of land conversion to water quality, healthy watersheds and communities.

Launch a public awareness campaign to share this information with citizens, local governments, elected officials and stakeholders.

Intent:

To prevent and mitigate adverse effects from land conversion, decision-makers need to be informed about land use changes occurring in their jurisdictions and provided with policy options, incentives, and tools to reduce the rate and magnitude of conversion.

Utility:

- Inform agencies and citizens about the rate and magnitude of land conversion at local levels.
- Target conservation efforts and investments;
- Target support to local governments for reducing the rate of conversion.

Elements:

1. Assess rate of conversion of forests, wetlands, and farmland.

2. Monitor changes in impervious surfaces.

3. Quantify impacts of land conversion on:
    a. Water quality
    b. Healthy watersheds
    c. Communities

4. Communicate results to the public, elected officials, and CBP partners.

What is the specific intent of this outcome?

- What messages do we want to communicate?
- With whom do we want to communicate?
- What are the technical specifications required to achieve the outcome?

Technical Issues:

1. What exactly are we monitoring? Loss? Loss & Gain?

2. Spatial scale? (e.g., small watersheds, counties, municipalities)

3. Frequency? (e.g., annual, 2-3 years, 5-7 years)

4. Accuracy?

5. Baseline? (fixed or variable?)

Two Common Approaches for Monitoring Impervious Cover Change

Option 1

Repeated Wall-to-Wall mapping

Pros:
Comprehensive
Flexible- multiple uses
Adaptable- changing objectives

Cons:
Cost
Accuracy
Interpretation
Level of expertise

Option 2

Stratified Random Sampling

Pros:
Cost
Accuracy
Interpretation
Level of expertise

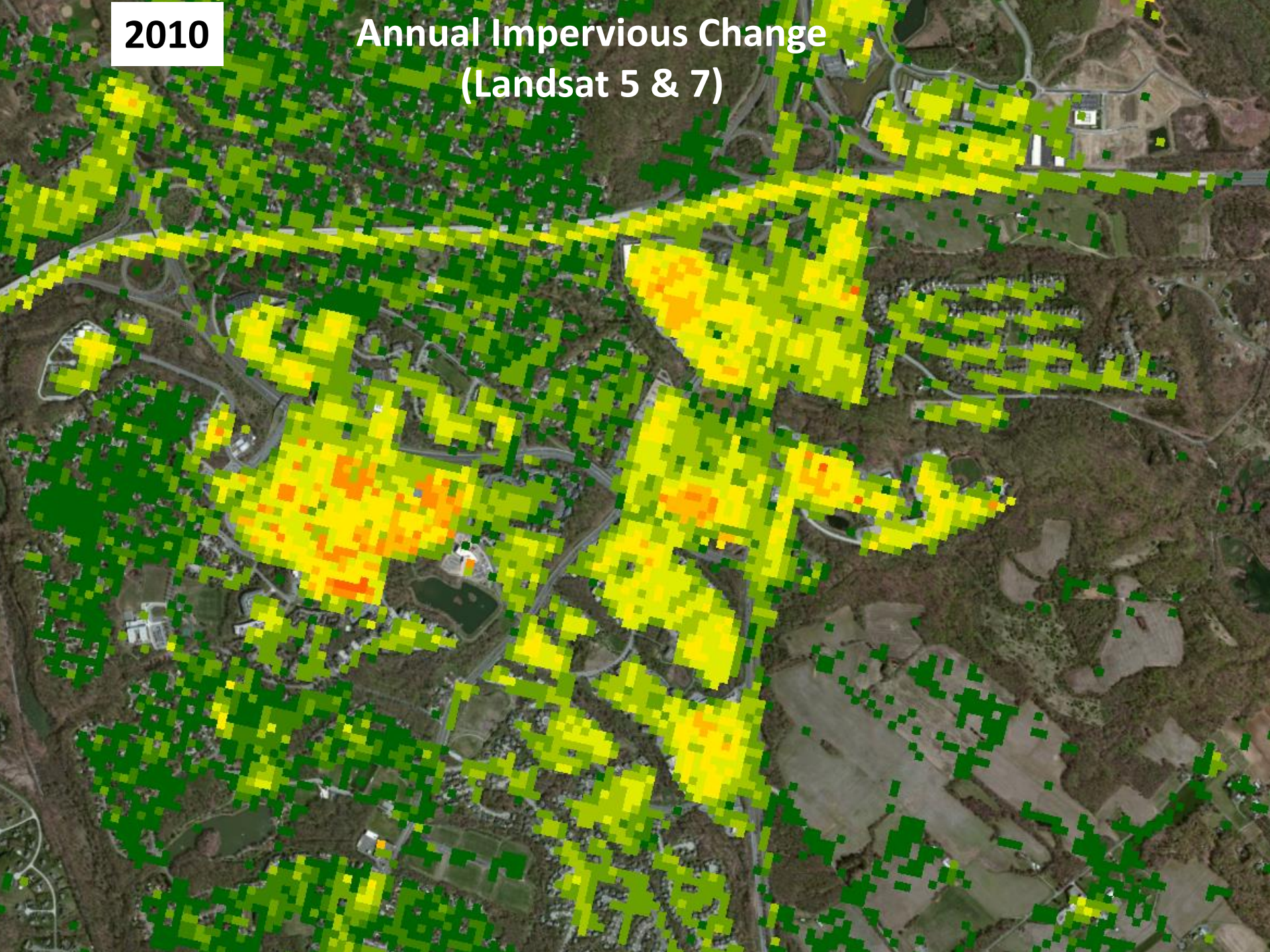
Cons:
Focused
Limited utility
Fixed
QA/QC

Chesapeake Bay Land Cover Data Series

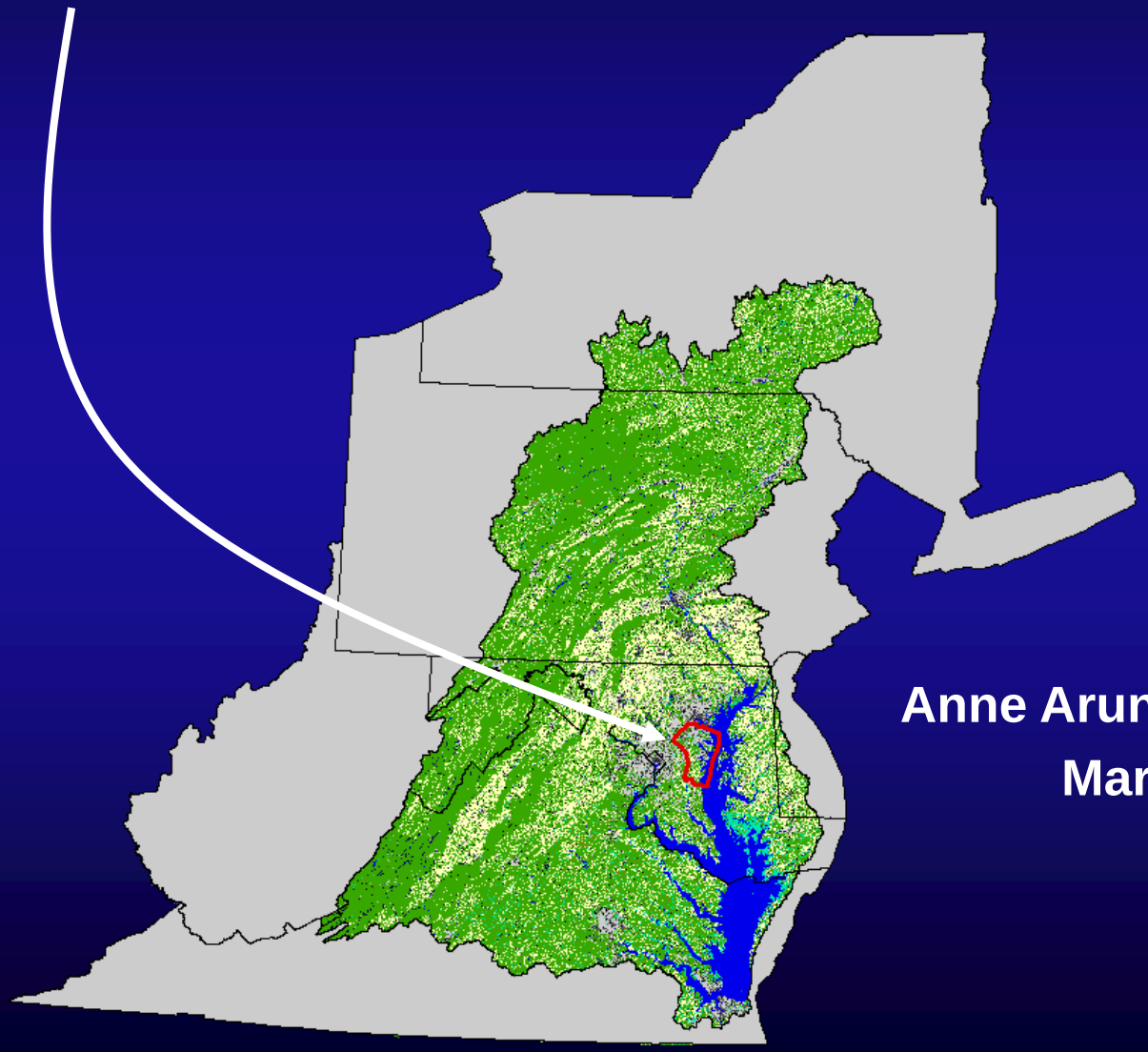
1984 1992 2001 2006 2011

Irani, F. M., & Claggett, P. (2010). Chesapeake Bay Watershed Land Cover Data Series. *US Geological Survey Data Series*, *505*.

USGS


2010
Annual Impervious Change
(Landsat 5 & 7)

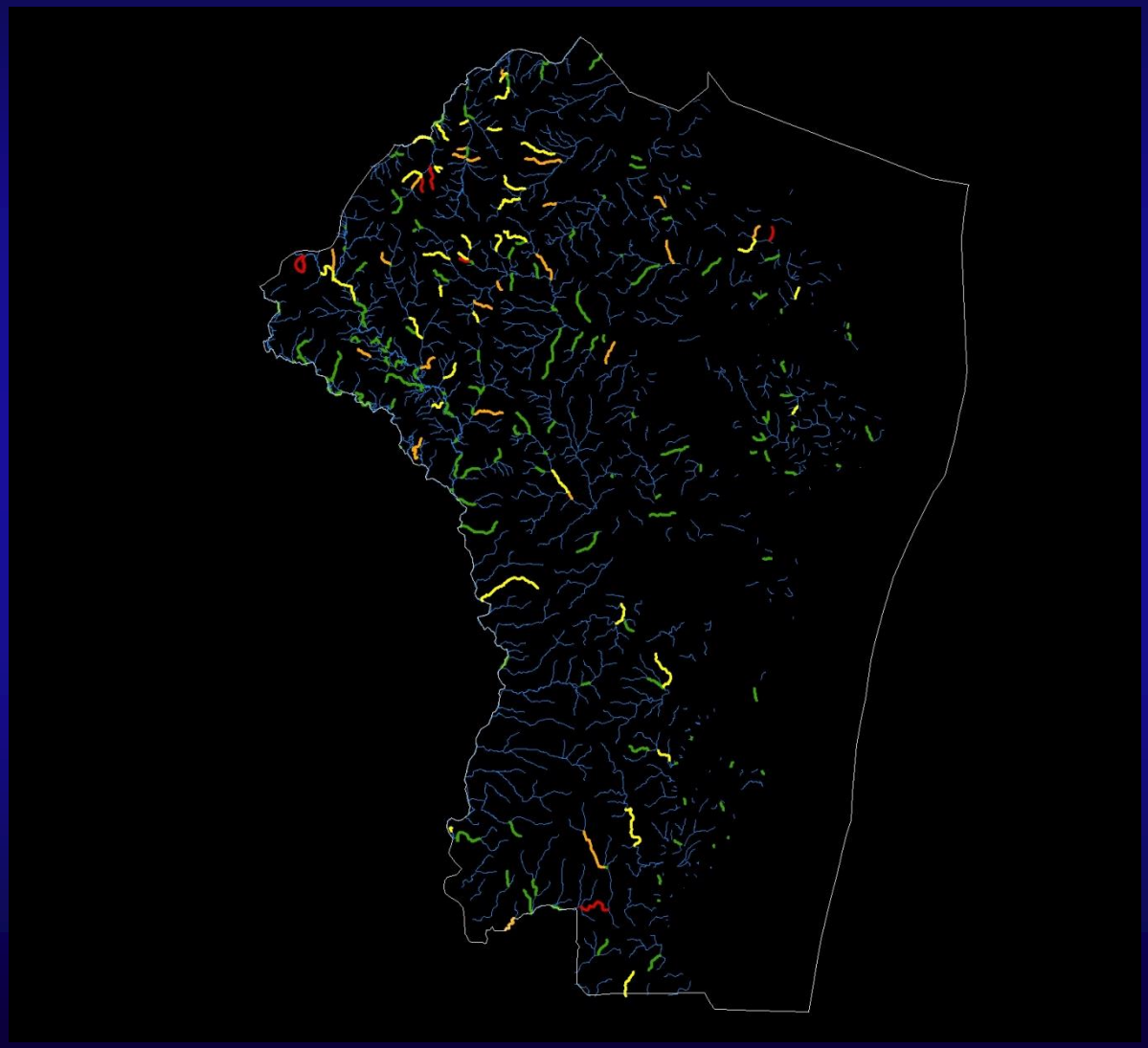
County-based Sampling Framework



Anne Arundel County, Maryland

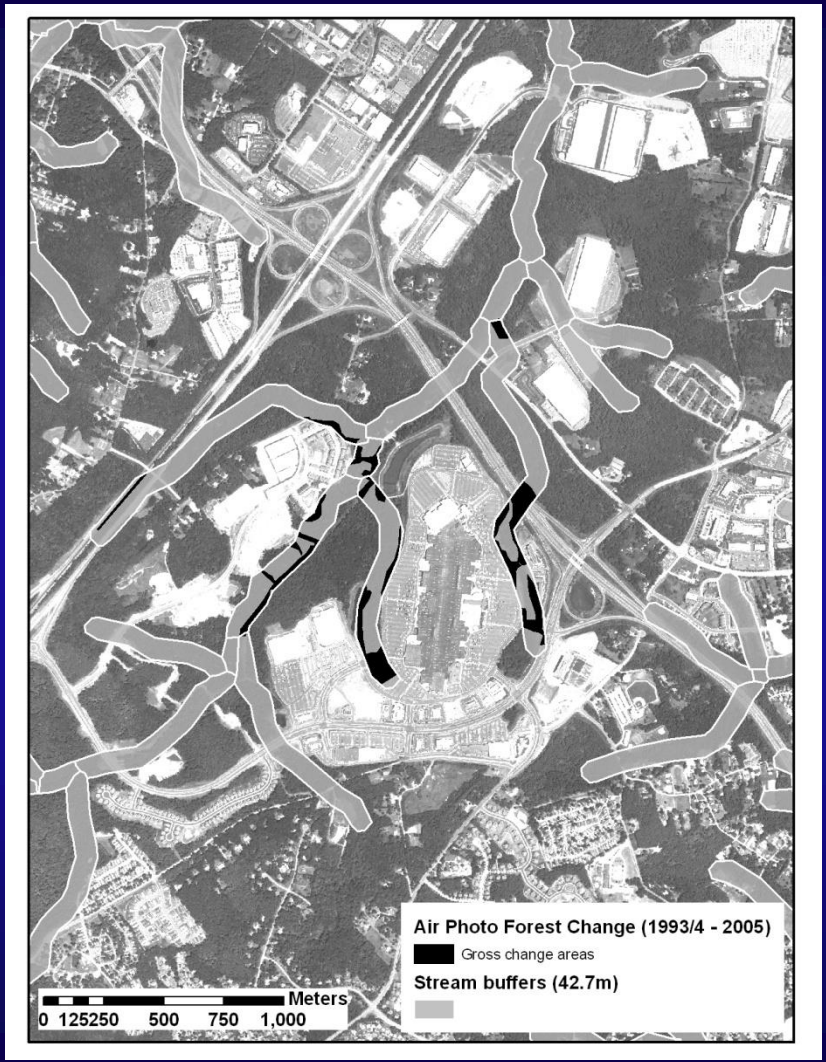
USGS

Sampling Framework for Assessing Riparian Forest Buffer Change in Anne Arundel County, MD



USGS

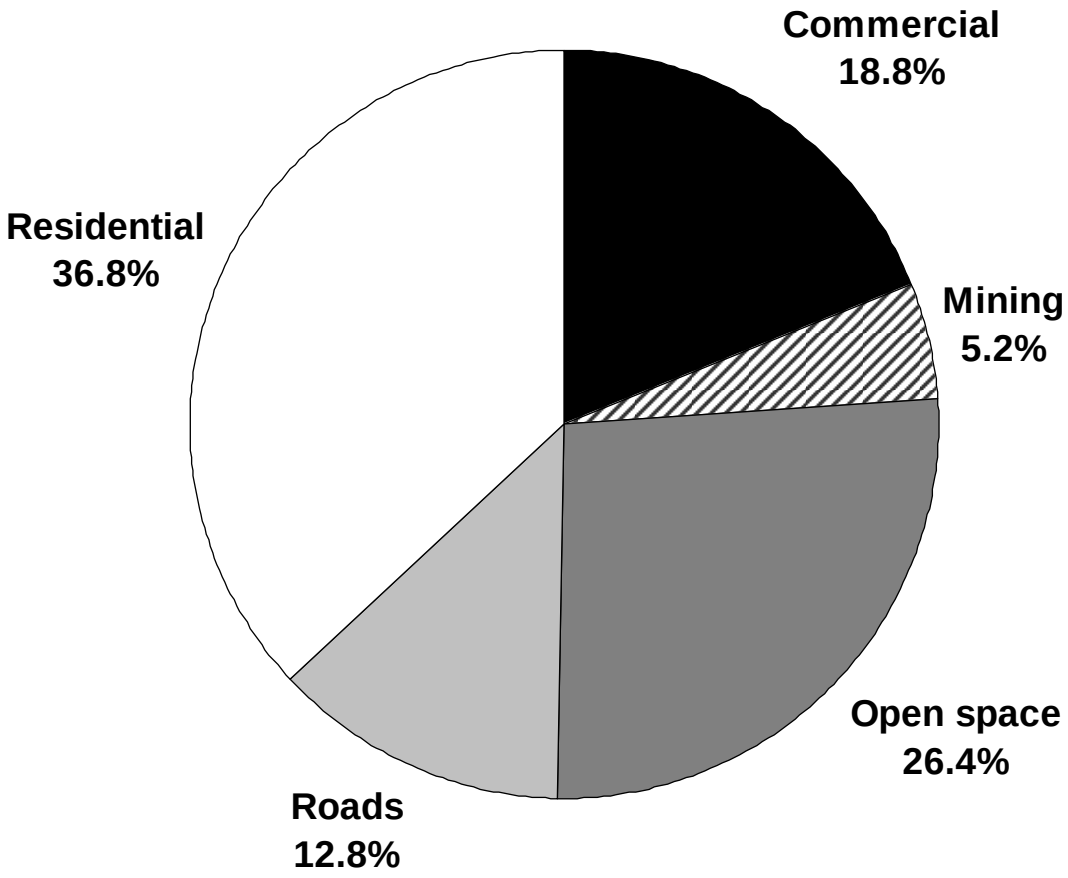
1.83% (SE 0.22%) Gross Forest Change
1994 – 2005 Air Photo Interpretation



USGS

Claggett, et al., 2010

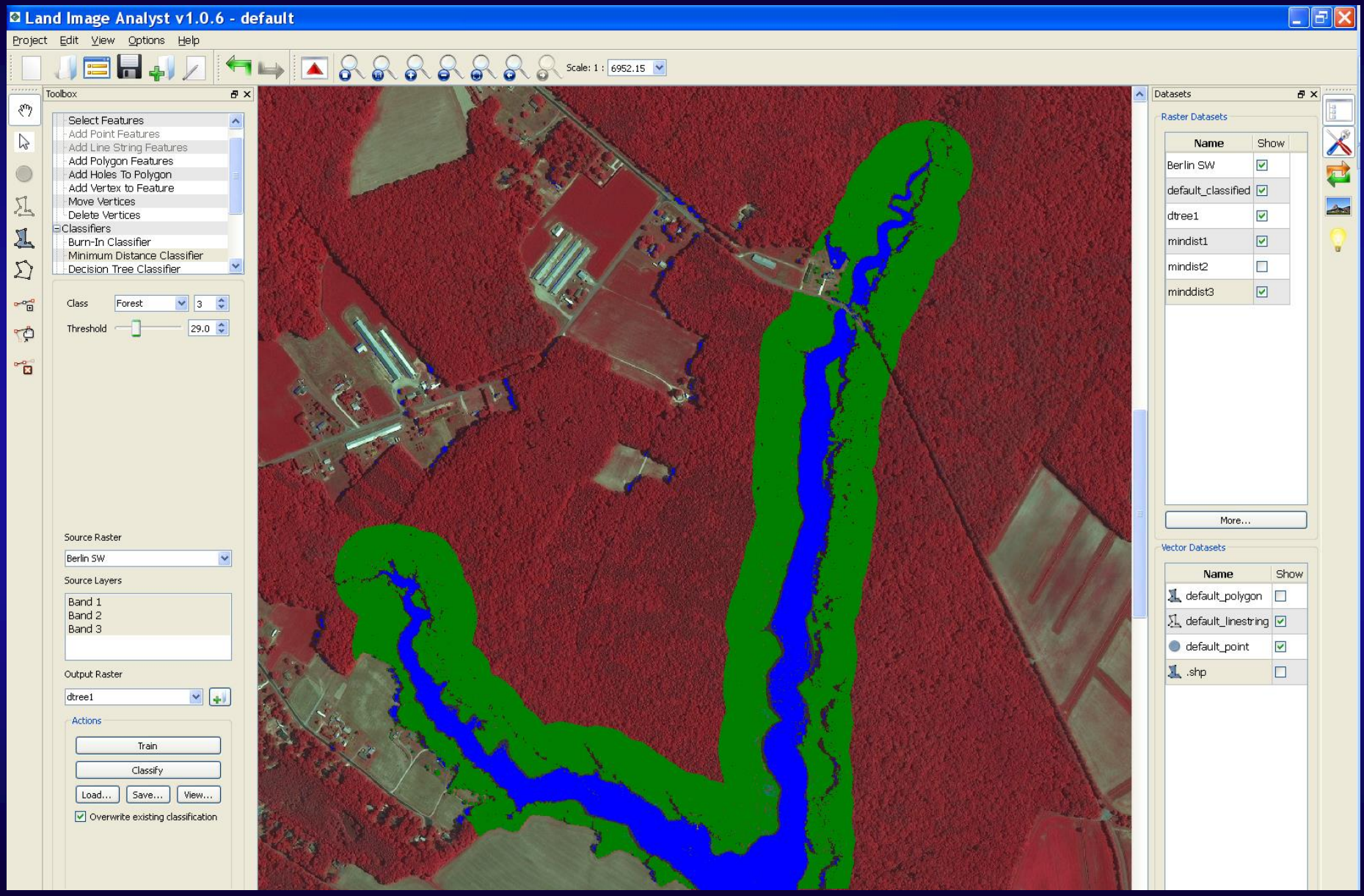
Reasons for Riparian Forest Loss



USGS

Claggett, et al., 2010

Land Image Analyst v1.0.6



USGS

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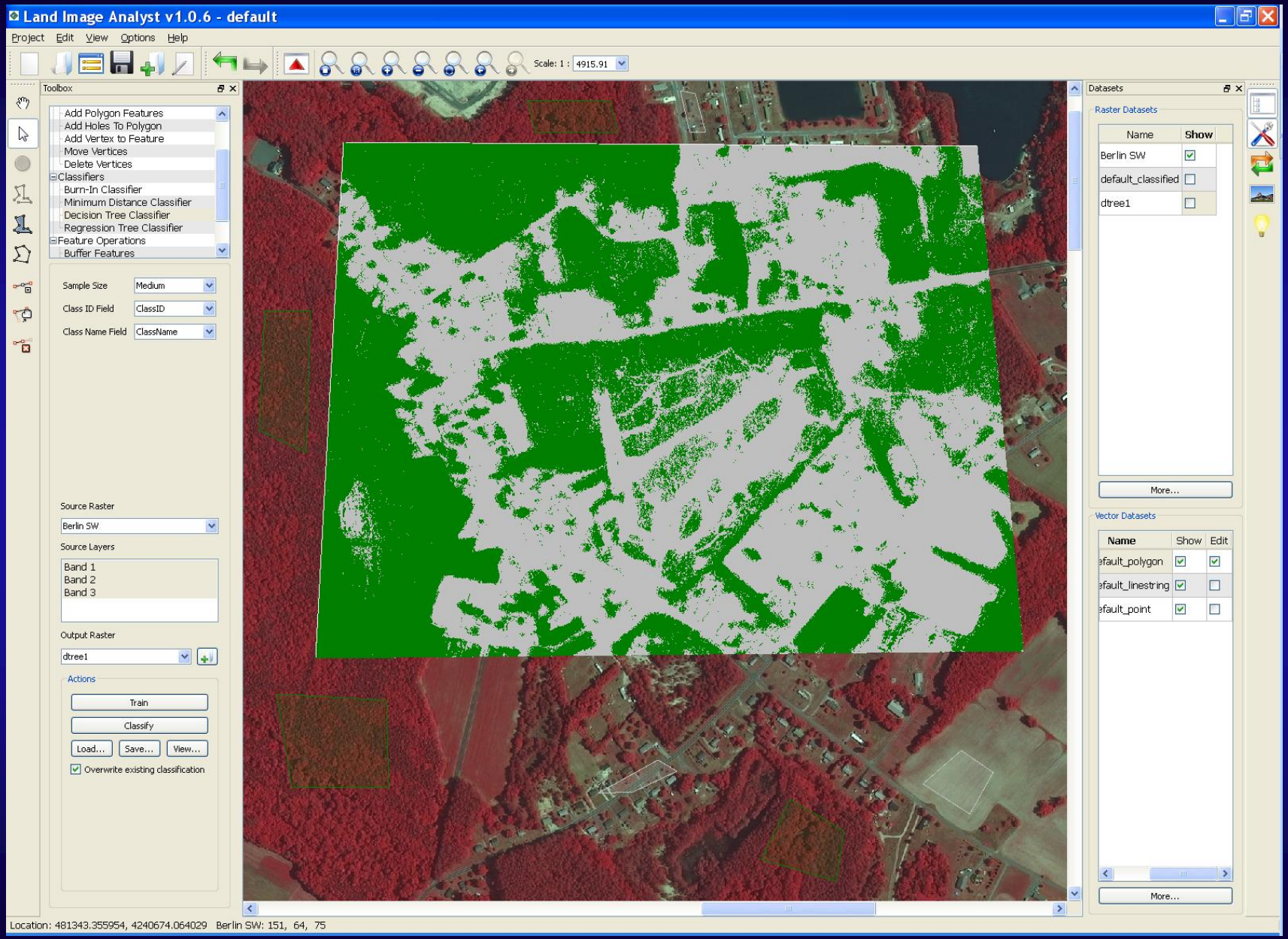
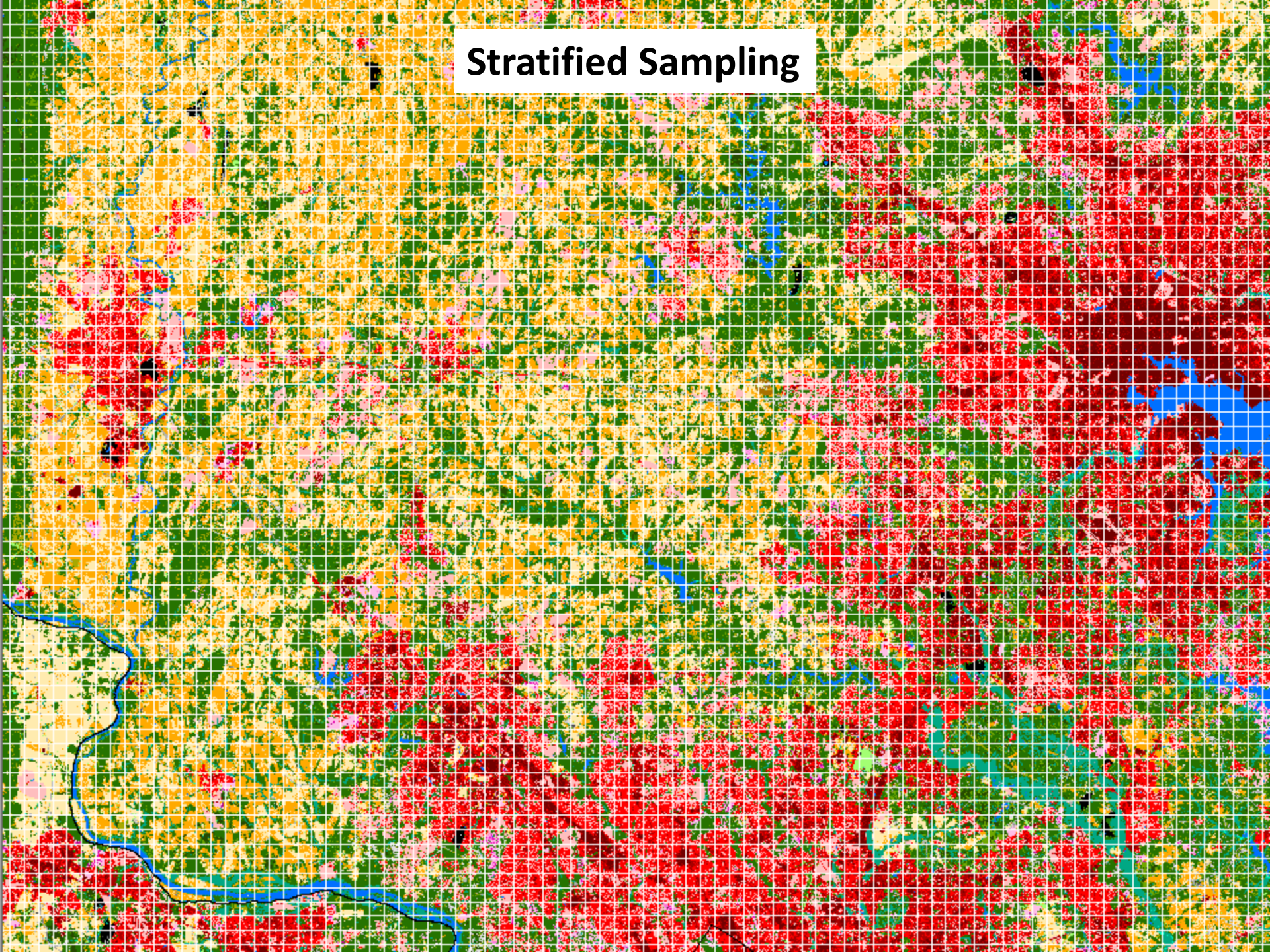
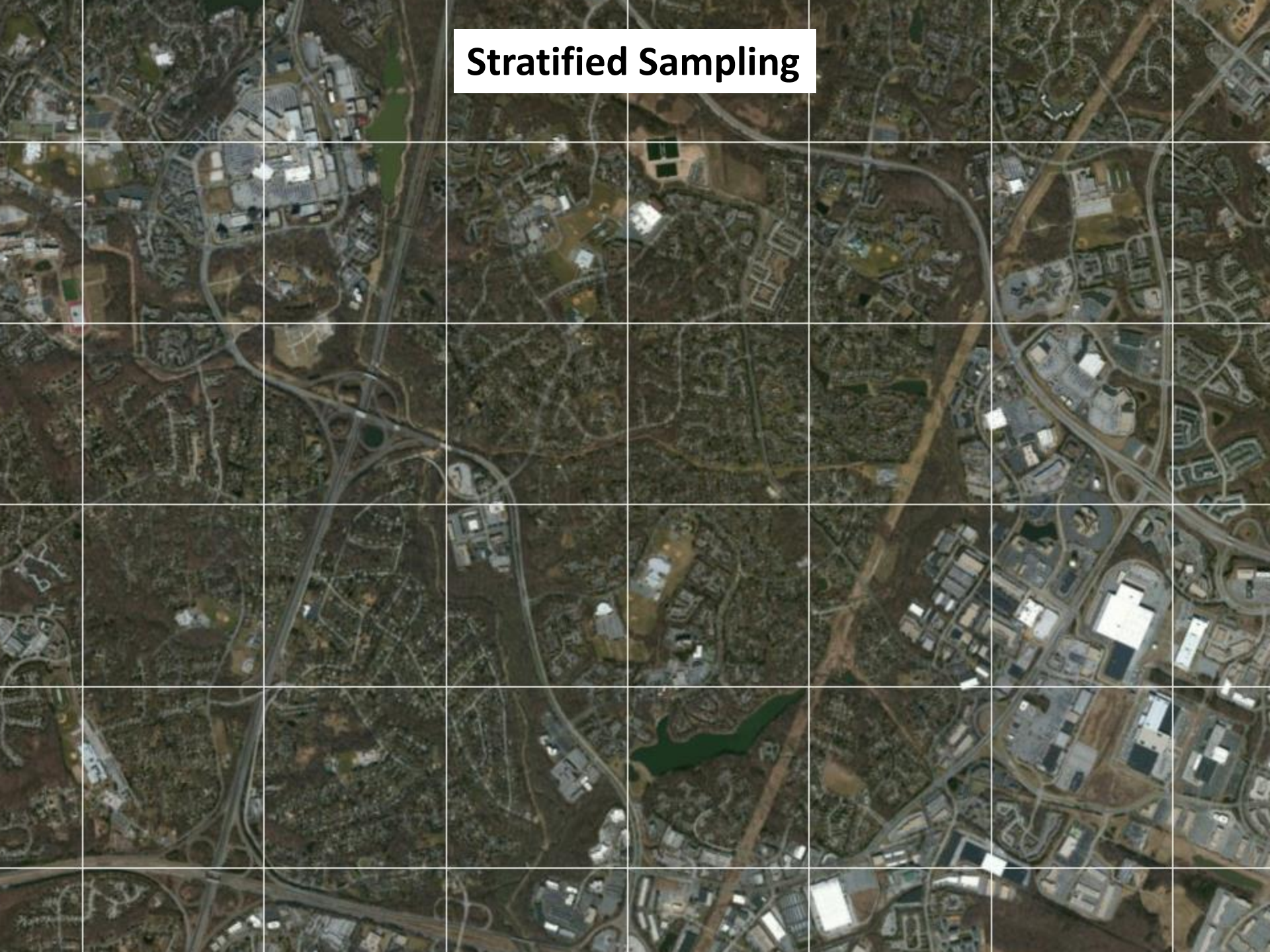


USGS


Stratified Sampling


Stratified Sampling

Relevant Ongoing or Anticipated Activities?

Roles:

1. Assess rate of conversion of forests, wetlands, and farmland.

2. Monitor changes in impervious surfaces.

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