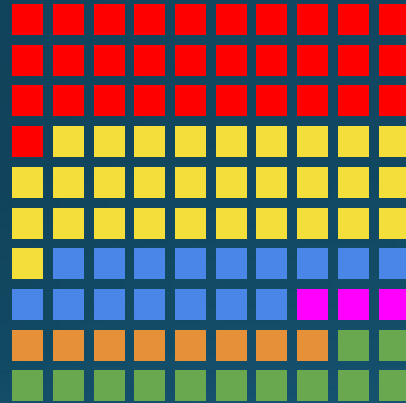


High-Resolution Land Cover Change Accuracy Assessment



LUWG: November 3, 2021

Jacob Czawlytko, Geospatial Data Engineer
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Overview

- Scope
- Dataset
- Developing Methods
- Execution
- Documentation
- Questions

Scope

- Assess the accuracy of the 13/14 - 17/18 1m land cover change data product
- Complete dataset coverage
 - Counties intersecting Chesapeake watershed
- 7 states (including DC) will have separate AA metrics



Dataset

2013 NAIP
V2 LCC



Dataset

2013 NAIP



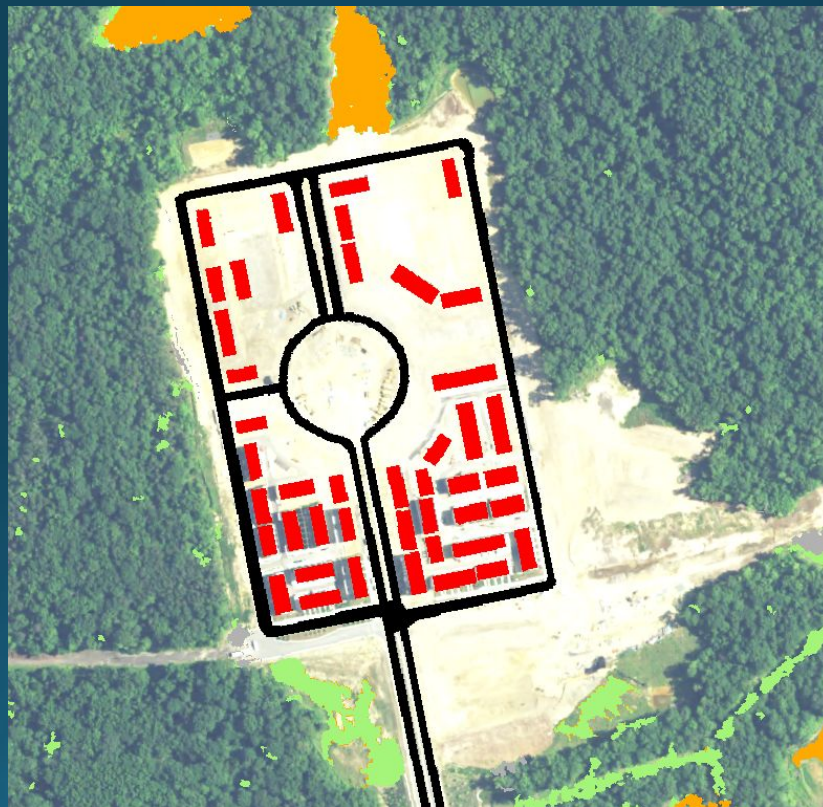
Dataset

2017 NAIP



Dataset

2017 NAIP
V2 LCC



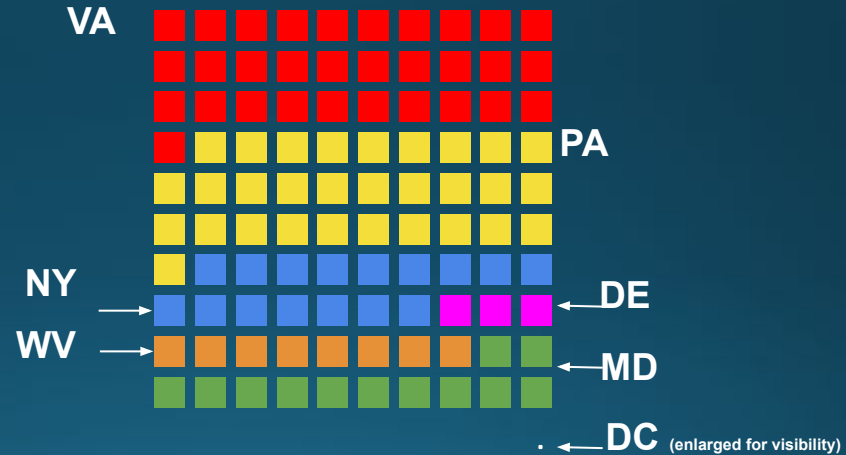
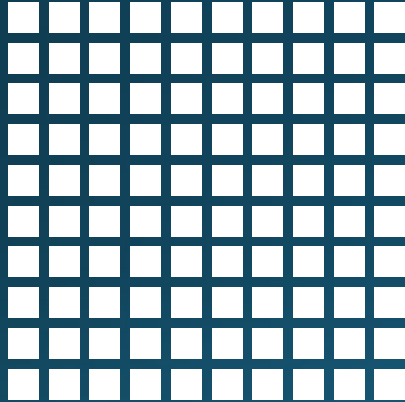
Method: In Development

- Who?
 - CIC Staff - Jacob Czawlytko, [Kumar Mainali, Ph.D.](#)
 - Peter Claggett
 - [Stephen Stehman, Ph.D.](#)
- What?
 - literature review
 - accuracy assessment design
 - Define map classes
 - Define strata
 - Sample framing
 - Develop code to produce sample points (Python/R)
 - Write clear review instructions ([Original 1m LC AA paper](#))
- When?
 - Now! August - December

Method: Stratified Random Sampling

10,000 samples

Total samples TBD
each square represents 100 samples



Method: Multiple Strata

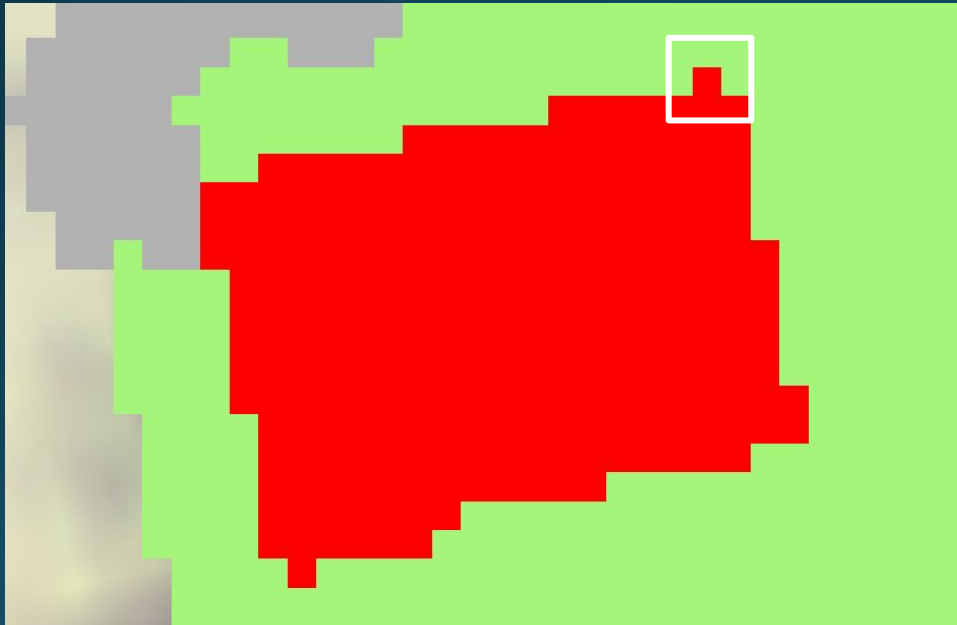
- 7 State
- Possible class strata options
 - 144 possible change classes
 - Ignoring low-frequency change classes
 - Ex. - 16 classes account for approximately 95% of *mapped* change in PG County, 56 classes make up the remaining 5%
 - Changes
 - Simplified change classes
 - Combe impervious classes and TC over impervious
- Adjustable sample distribution across strata
 - DC is 0.07% of bay area but should receive more than 0.07% of total sample points
- Proportional sample distribution + square root transformation
 - Adjusting number for more equal distribution but still weighted proportionally

Method: Sample Selection

- “Random” placement for each strata
- Create 3x3 pixel window, throw out sample if surrounding 8 pixels include another land change value (no change is acceptable)
- Throw out samples directly adjacent to other samples unless no other possible location
- Locating change omission. Assess validity of stratification by distance to change patch of same T1 LC value for no change samples
 - *"everything is related to everything else, but near things are more related than distant things."* - Tobler's First Law of Geography

Method: Sample Selection

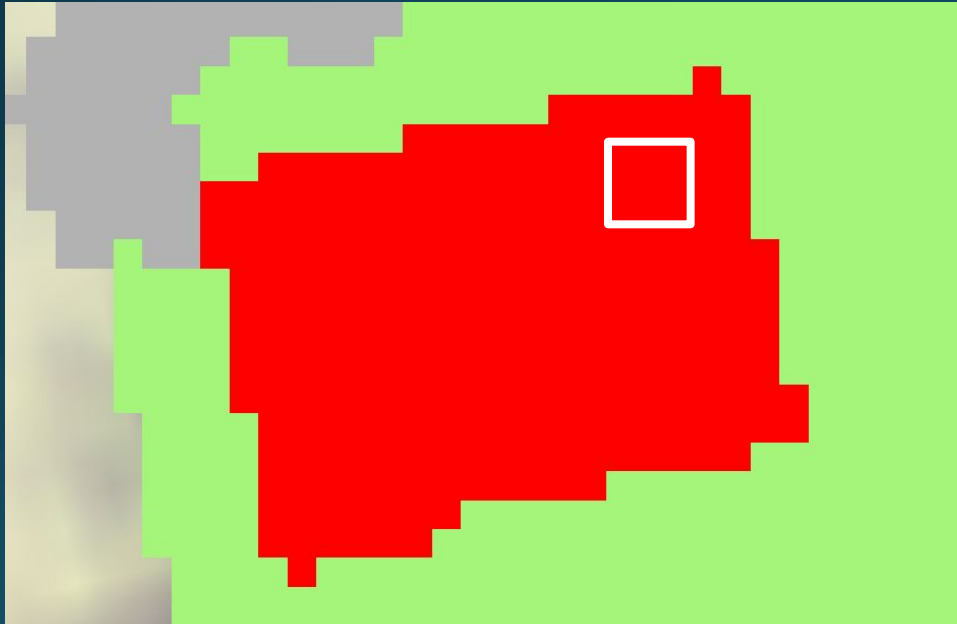
- Create 3x3 pixel window, throw out sample if surrounding 8 pixels include another land change value (no change is acceptable)



INVALID SAMPLE POINT

Method: Sample Selection

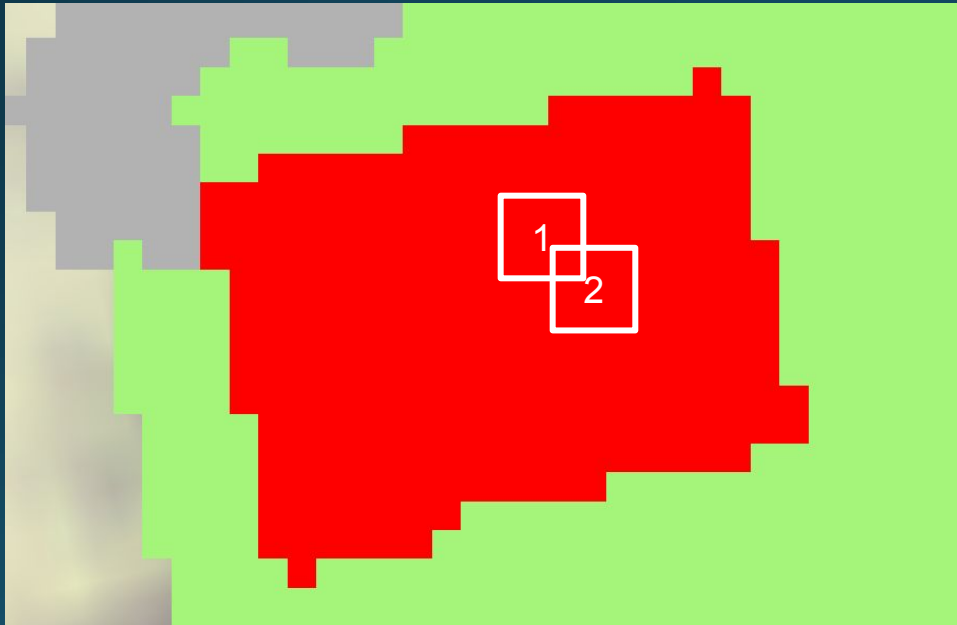
- Create 3x3 pixel window, throw out sample if surrounding 8 pixels include another land change value (no change is acceptable)



VALID SAMPLE POINT

Method: Sample Selection

- Throw out samples directly adjacent to other samples unless no other possible location



INVALID SAMPLE POINT
(do not place point #2)

Method: Sample Selection

- Locating change omission. Assess validity of stratification by distance to change patch of same T1 LC value for no change samples

2013 NAIP
V2 LCC



Method: Sample Selection

- Locating change omission. Assess validity of stratification by distance to change patch of same T1 LC value for no change samples

2017 NAIP
V2 LCC



Method: Concerns and Constraints

- Sample frame - what are we measuring
- Margin of Error - sample size and distribution
- Selection Bias - autocorrelations due to point selection methods
- Budget
- Timeline

Execution

What?

ArcGIS Pro or custom web application with imagery from T1, T2, and LCC data. Ideally would include nDSM.

Who?

Reviewers will be required to have expertise in land cover and GIS

When?

Accuracy Assessment: December through February
Documentation/Paper: Spring (TBD)

Questions?

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