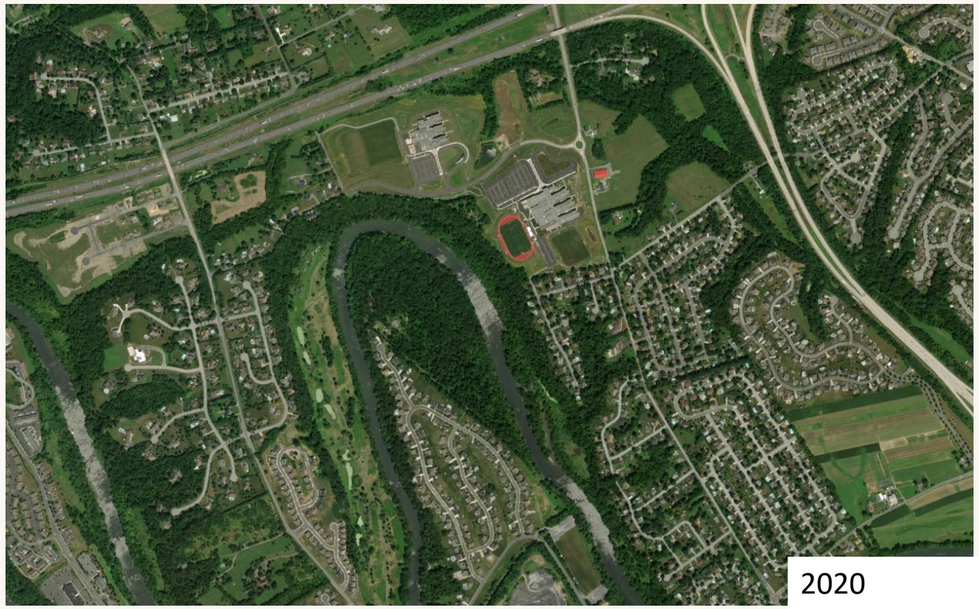
HIGH-RESOLUTION LAND COVER

LAND USE UPDATE for the

CHESAPEAKE BAY TMDL

KC Filippino, Senior Water Resources Planner
Hampton Roads Planning District Commission



Images from P. Claggett Mgmt. Board meeting 2/11/21

What are we talking about?

* History of land cover & land use at the Bay Program
* High-resolution land cover & land use update
* Data availability timeline
* Bay Program objectives
* How can these data products be useful to you?

UNDERSTANDING THE HISTORY of DATA PRODUCTION

Adapted from P. Claggett Mgmt. Board meeting 2/11/21

2004 – 2016

Moderate-resolution (30-meter) land use/ cover data coupled with Decennial Census of Population and Housing and USDA Agricultural Census data

2017– 2020

Produced and began using high-resolution (1-meter) land use/ cover with 16 classes, from 2013/ 14 imagery

2021– 2023

Produced and began using a second set of high-resolution land use/ cover with 60 classes, from 2017/ 18 imagery and the first high-resolution land use change dataset: 2013/ 14 to 2017/ 18.

2023 and beyond

Continue to produce comparable high-resolution land use/ cover data every four years through 2030.

Current Land Cover & Land Use Development

Chesapeake Conservancy

Conservation Innovation Center

Develop 1m Land Cover and Land Use datasets

Delineate stream channels and ditches

Map and track BMPs

Geospatial support

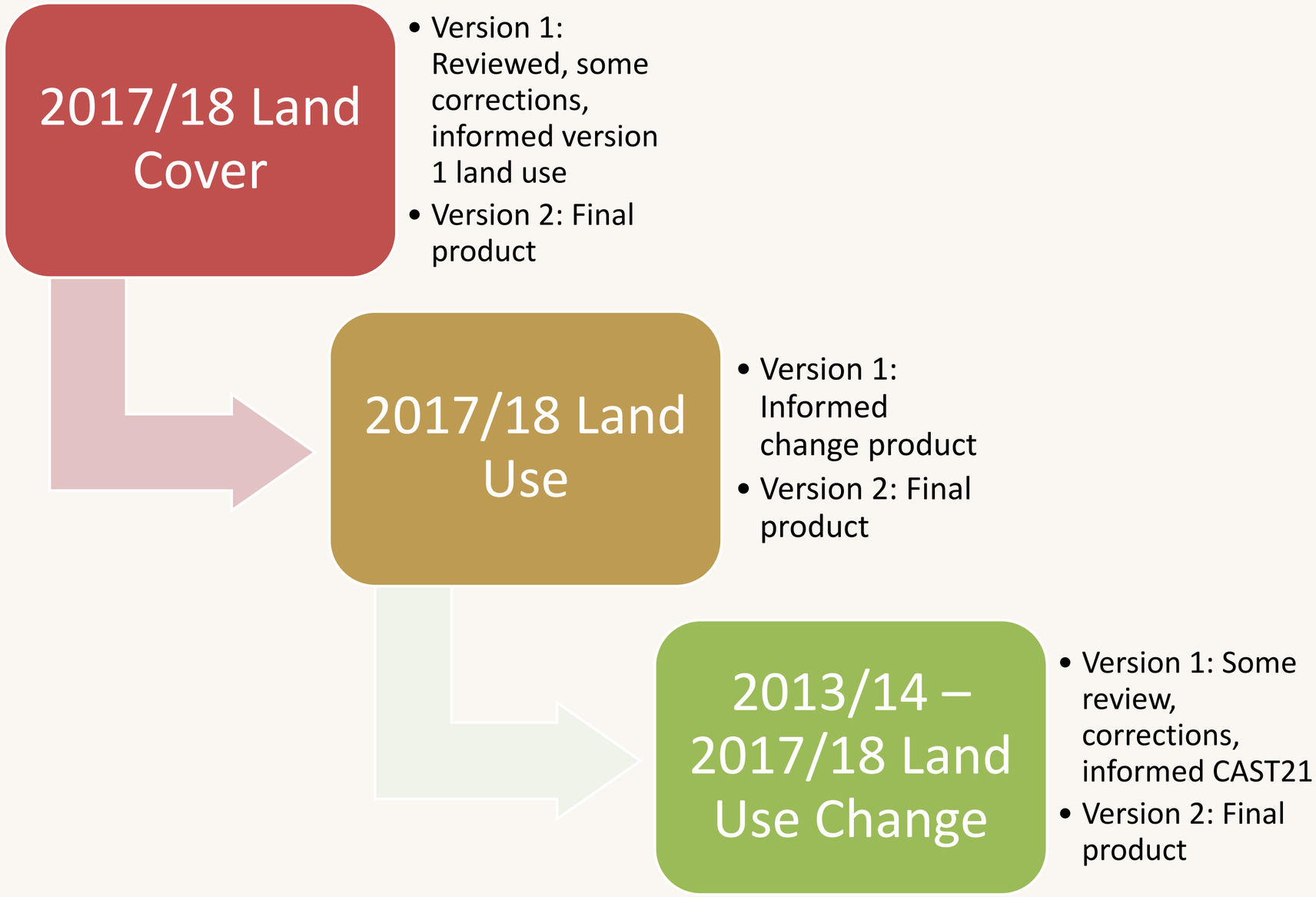
- 6-year Cooperative Agreement
  - CBP, USGS, CIC & partners
- 4 Objectives

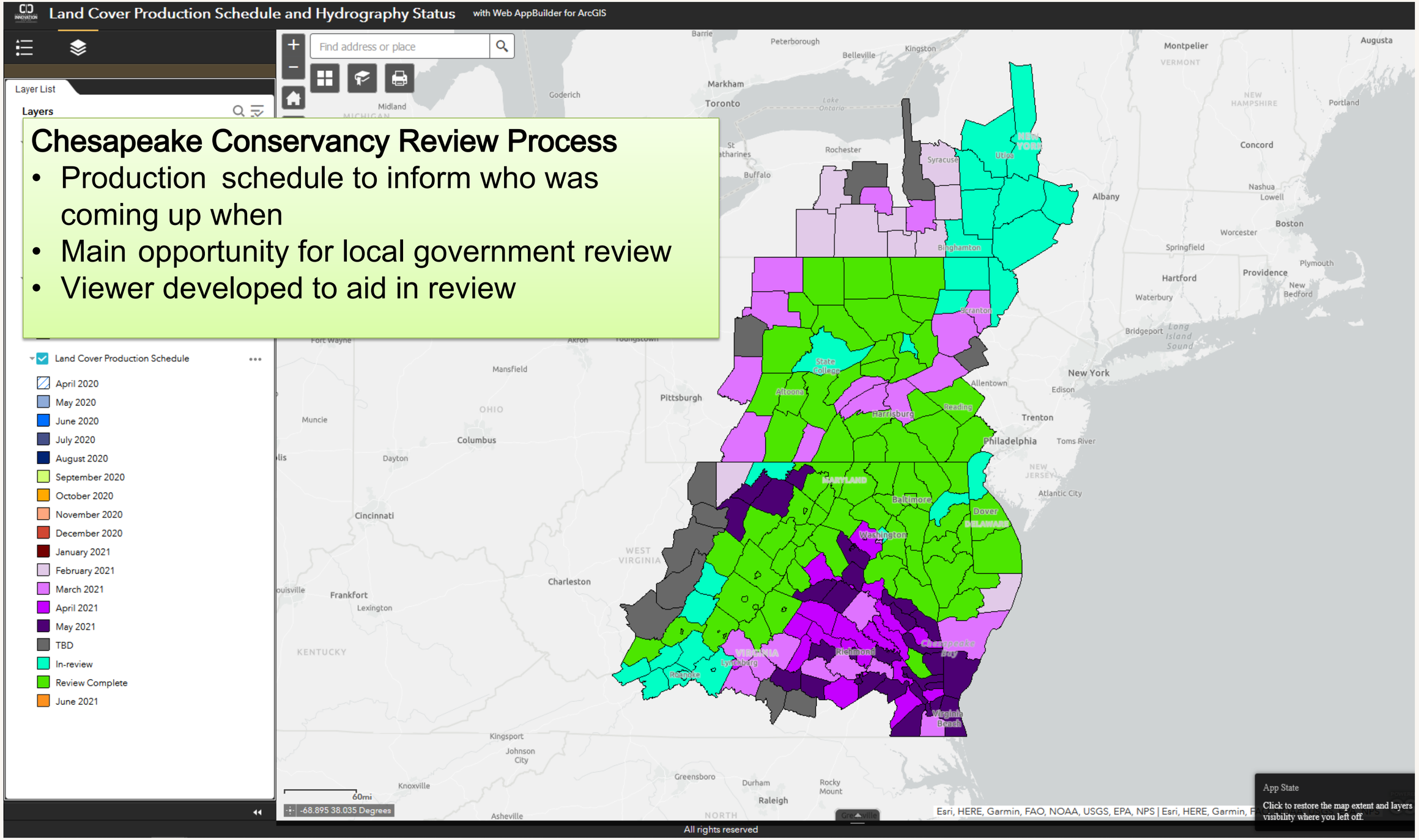
Current Land Cover & Land Use Development

Partnership Approac h

- Sector-specific workgroups evaluations
- Land Use Workgroup advises and vets datasets
- Water Quality GIT approves for incorporation into model

Current Land Cover & Land Use Development





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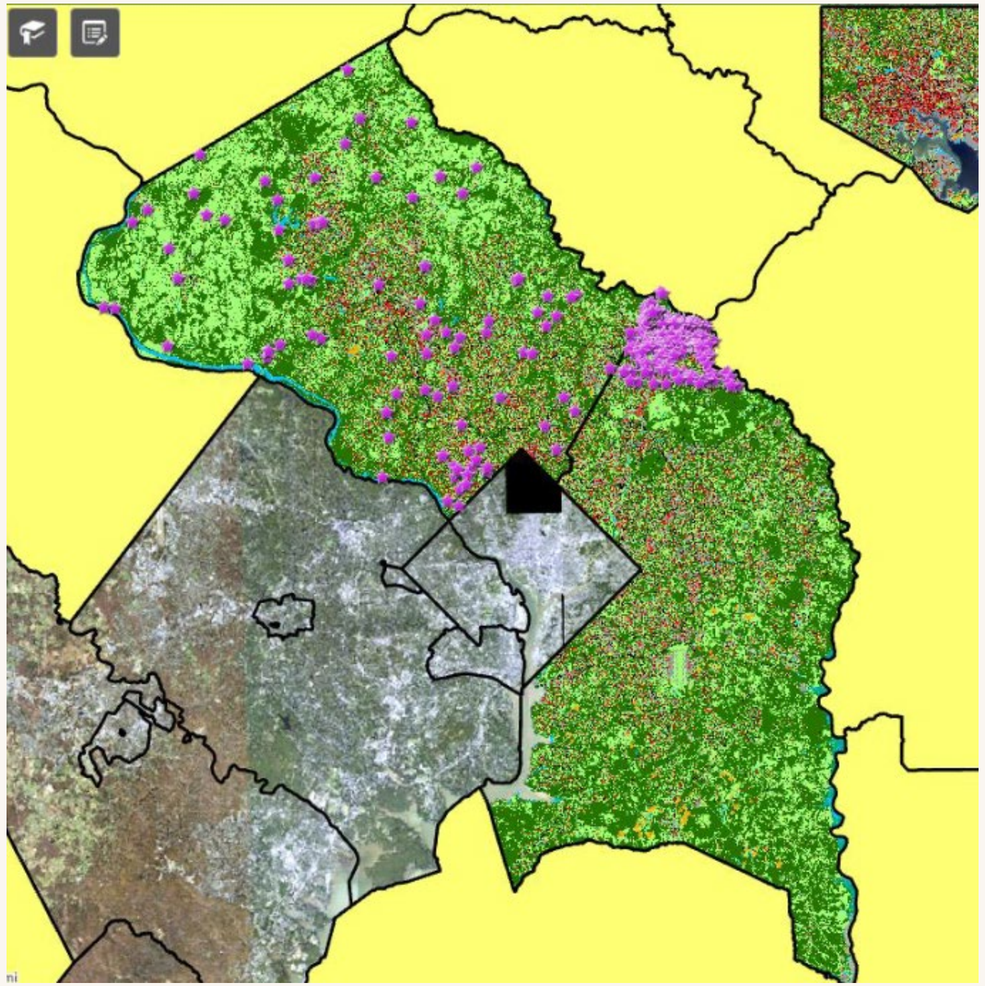


Land Cover Data Production & Review

- Opportunity for detailed review of land cover data by all 206 localities in Bay watershed
- Consistent process across localities and jurisdictions
- Over-classification of agriculture, turf grass, tree canopy in agriculture, & tree canopy over turf grass
- Under-classification of natural succession, harvested forest, wetlands, bare shore, suspended succession, & forest
- Developed a Version 1 Land Cover to inform Land Use

Land Cover

Water, Impervious surfaces, trees, wetlands, structures, herbaceous, shrubland, tree canopy, etc.

Land Use

Water
- **Lentic**
  - Estuary
  - Lakes and Ponds

Wetlands and Water Margins
- **Tidal**
- **Riverine (non-tidal)**
- **Terrene/Isolated (non-tidal)**
- **Bare Shore**

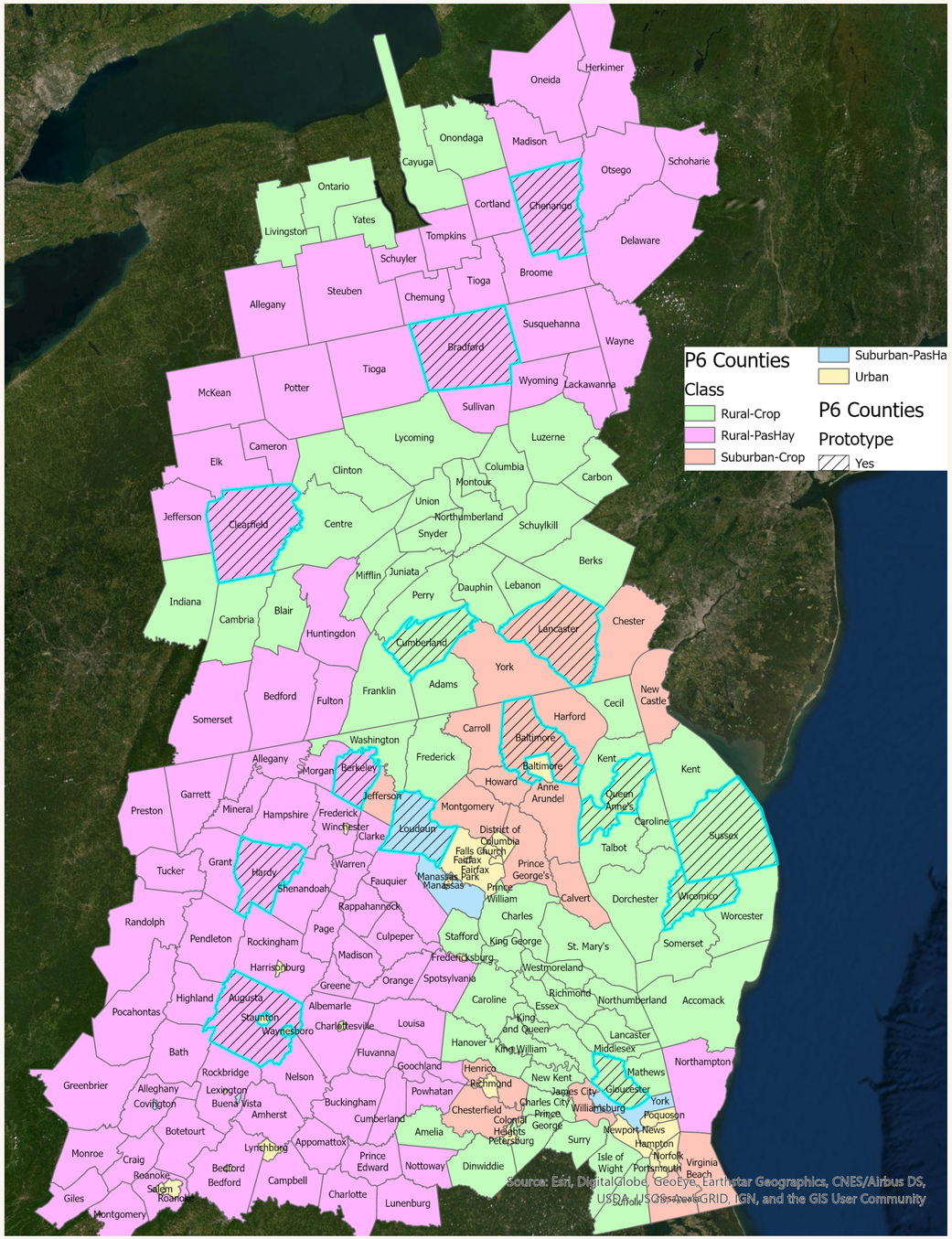
Forest
- **Forest (>= 1 acre, 240-ft width)**
- **Other Tree Canopy**
- **Harvested Forest (<= 3 years)**
- **Natural Succession**

Production
- **Agriculture**
  - Cropland
  - Pasture/Hay
  - Orchard/Vineyard
- **Extractive (active mines)**
- **Solar Fields**
  - Impervious
  - Pervious

Developed
- **Impervious**
  - Roads
  - Structures
  - Other Impervious (Parking Lots, Driveways, Railroads, etc.)
  - Tree Canopy over Impervious
- **Pervious**
  - Turf Grass
  - Bare Developed
  - Suspended Succession
  - Tree Canopy over Turf Grass

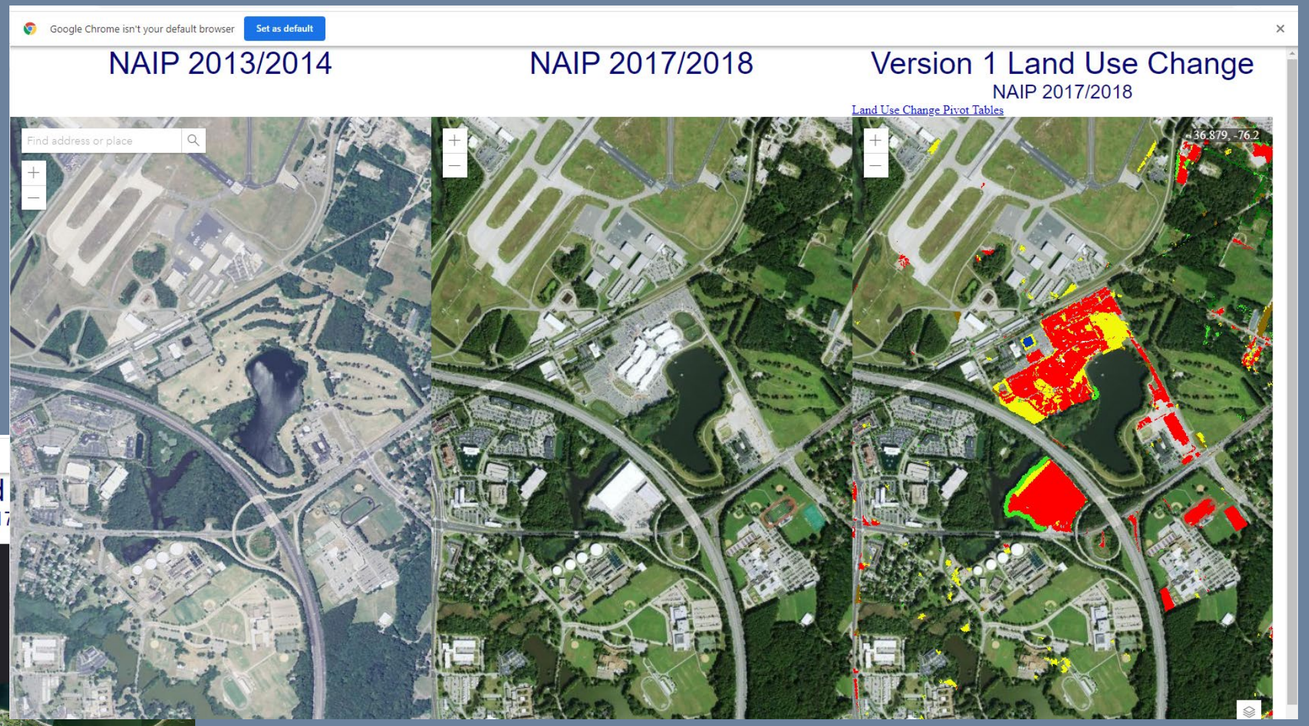
Land Use Development

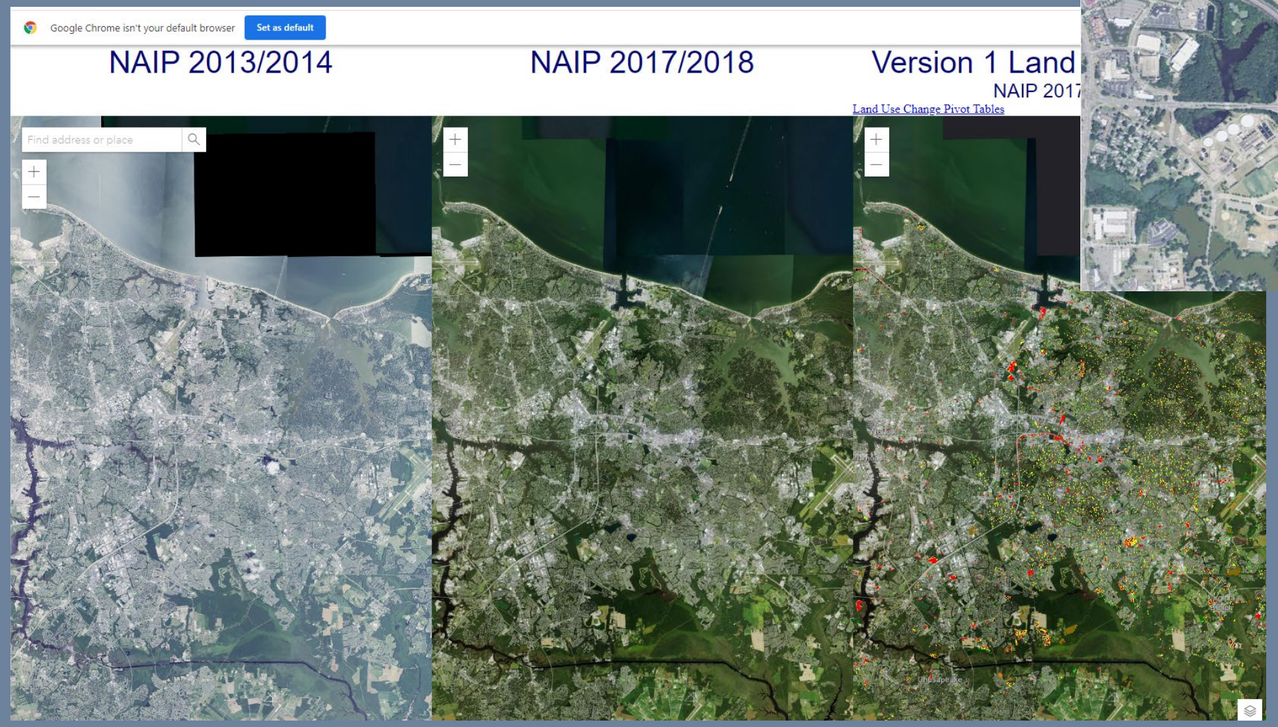
- 14 prototype counties chosen
- Represented a range of land use types to evaluate
- Opportunity to test decision rules for conversion of land cover to land use
- Two-fold analysis – Is the new land use accurate? And Is the change detection accurate?
- Automate for remaining Bay watershed localities



Land Use Change Analysis

- Viewer aided in capturing Land Use change from 2013/14 to 2017/18
- Discrepancies and inaccuracies documented
- Final (Version 2) of land use change being developed

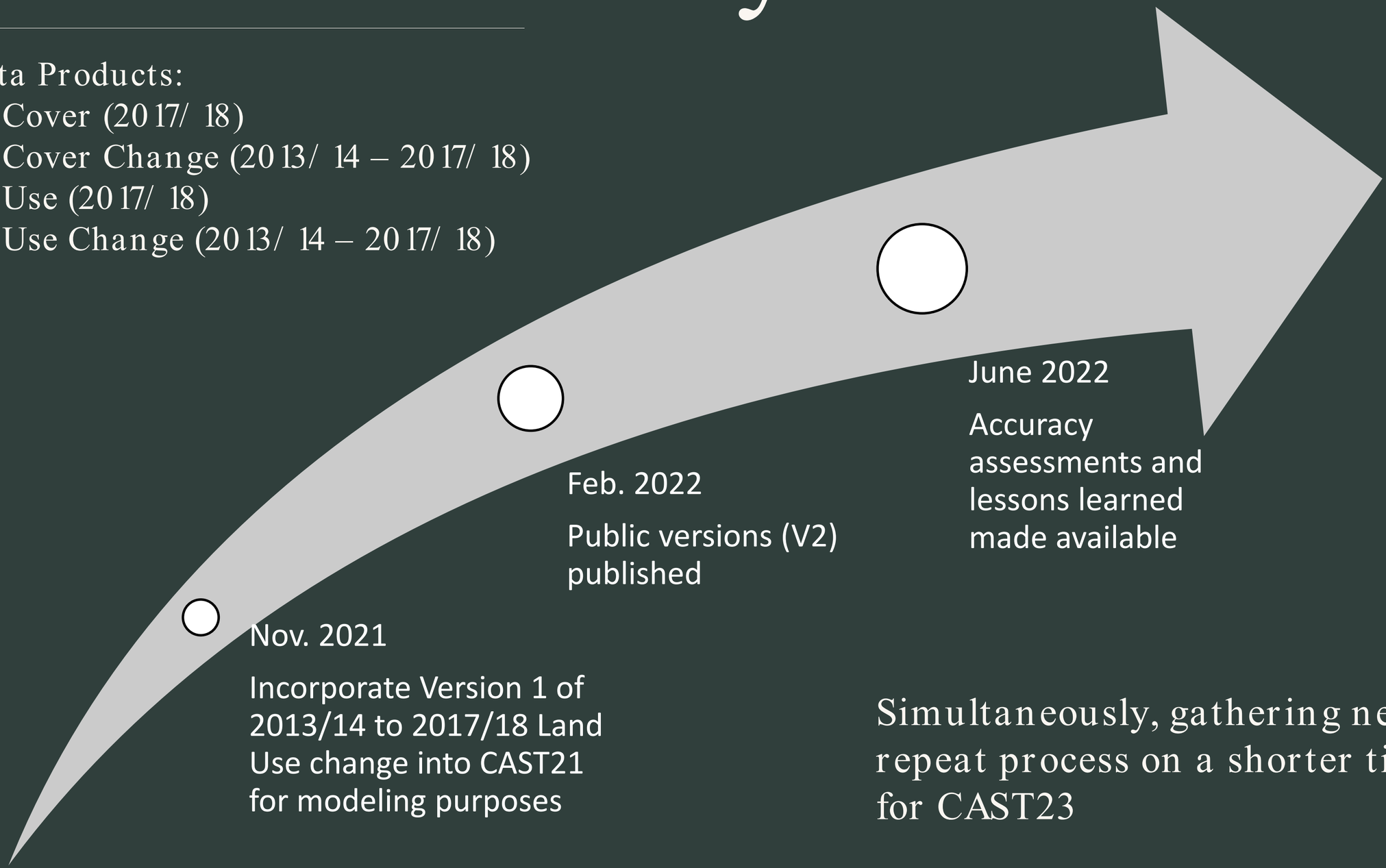




- Forest to impervious non-roads
- Forest to tree canopy over turf grass
- Mixed open to turf grass

Data Availability Timeline

Final Data Products:
V2 Land Cover (2017/ 18)
V2 Land Cover Change (2013/ 14 – 2017/ 18)
V2 Land Use (2017/ 18)
V2 Land Use Change (2013/ 14 – 2017/ 18)



Nov. 2021

Incorporate Version 1 of 2013/14 to 2017/18 Land Use change into CAST21 for modeling purposes

Feb. 2022

Public versions (V2) published

June 2022

Accuracy assessments and lessons learned made available

Simultaneously, gathering new data to repeat process on a shorter time scale for CAST23

Big picture CBP data objectives

1. *Measure rate of farmland, forest and wetland conversion, and the extent and rate of change in impervious surface coverage.*

2. *Quantify the potential impacts of land conversion to water quality, healthy watersheds and communities.*

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

Expectations and outcomes as presented by P. Claggett to Management board

Uses in Hampton Roads & Beyond

- Impervious cover calculations to inform policy decisions for using Intensity, Duration, & Frequency safety factors
- Development patterns, change over time to inform loading rate estimates
- Tree canopy assessments
- Regional conservation corridors, resilience, and flooding evaluations
- Chesapeake Conservancy already has long list of use cases

What about your local or regional needs?

- How is this data meaningful to you?
- What can you do with high-resolution, 1-m, land use/land cover data?
- How often would you need it to be updated?
- Would it replace the need for locality's to do this on their own?
- How should data be delivered? (Viewers, spreadsheets, GIS, etc.)

More details about the multi-year effort and potential outcomes can be found at the Chesapeake Conservancy's website.