

Quarterly Progress Meeting – November 15, 2018



# Land Use Methods & Metrics Development Outcome

*Peter Claggett, USGS  
LUWG Coordinator*

*Through the Chesapeake Bay Watershed Agreement, the Chesapeake Bay Program has committed to...*



## **Goal:** *Land Conservation*

**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.*



## What We Want



Photos: Will Parson

## To have Management Board:

1. Prioritize this Outcome relative to other GIS and TMDL related activities.
2. Delegate the updating of MS4, protected lands, sewer service areas, and any other jurisdiction specific datasets to the jurisdictions.
3. Support full-funding of the GeoSpatial Award in future out years.
4. Support recommended adaptations.

# 1

## **Setting the Stage:**

*What are our assumptions?*



## Logic Behind Our Outcome

## Following the Decision Framework:

### Factors

- Development of metrics at a resolution sufficient to inform county-level decisions.
- Methodology to quantify impacts to water quality, habitats and healthy watersheds, and communities.
- Sustainability of funding and management support.
- Agreement on the temporal and spatial scale at which to assess change.

### Gaps

- Continued full-funding support for Geospatial Award.
- Availability of high quality LiDAR data for all watershed counties.
- Methods to assess impacts to habitats, healthy watersheds, and communities.
- Affordable methods to assess wetland extent and change.



## Logic Behind Our Outcome (cont.)

## Following the Decision Framework:

### Approaches

- Assessment of land use change using the Land Image Analyst software.
- Development of retrospective land cover change histories.
- Assess wall-to-wall methodologies for mapping high-resolution land cover/use.
- Develop and implement methodologies to quantify land change impacts. Coordinate these methods with relevant GITs.
- Communicate and disseminate data and information via the web and published papers.

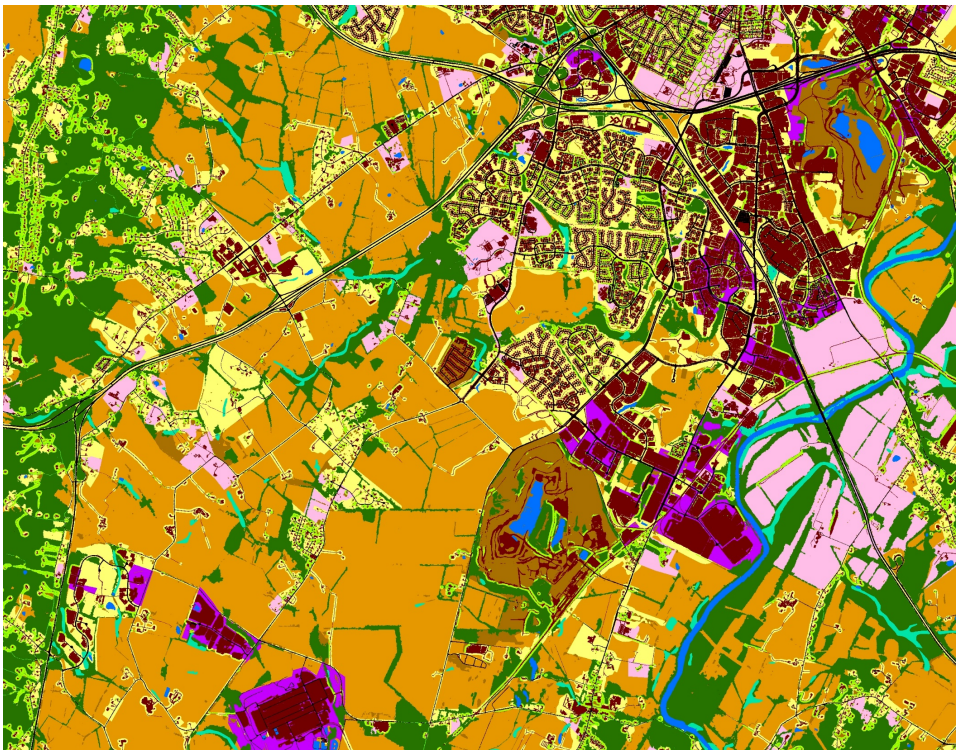
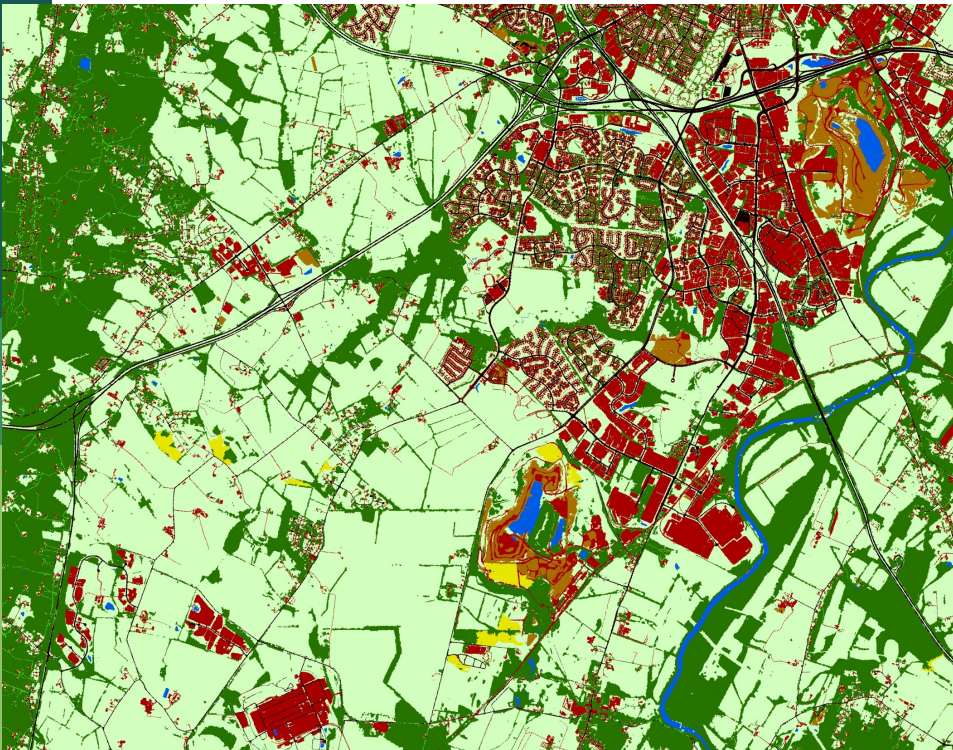
# 2

## **Progress:**

*Are we doing what we said we would do?*



## What is our progress?







# What is our progress?

Chesapeake Bay Phase 6 Land Use Viewer

USGS Home Contact USGS Search USGS

Chesapeake Bay Phase 6 Land Use Viewer back to main Chesbay P6 page

Map Layers

Phase 6 Land Use Datasets

- Impermeable Roads
- Impermeable Non-Roads
- Turf Grass
- Tree Canopy Over Impermeable
- Cropland
- Pasture
- Tree Canopy Over Turf Grass
- Mixed Open
- Forest
- Tidal Wetlands
- Non-tidal Floodplain Wetland
- Non-tidal Other Wetland

Phase 6 Future Land Use

Base Map

Data and Metadata Download

Submit Comments to USGS

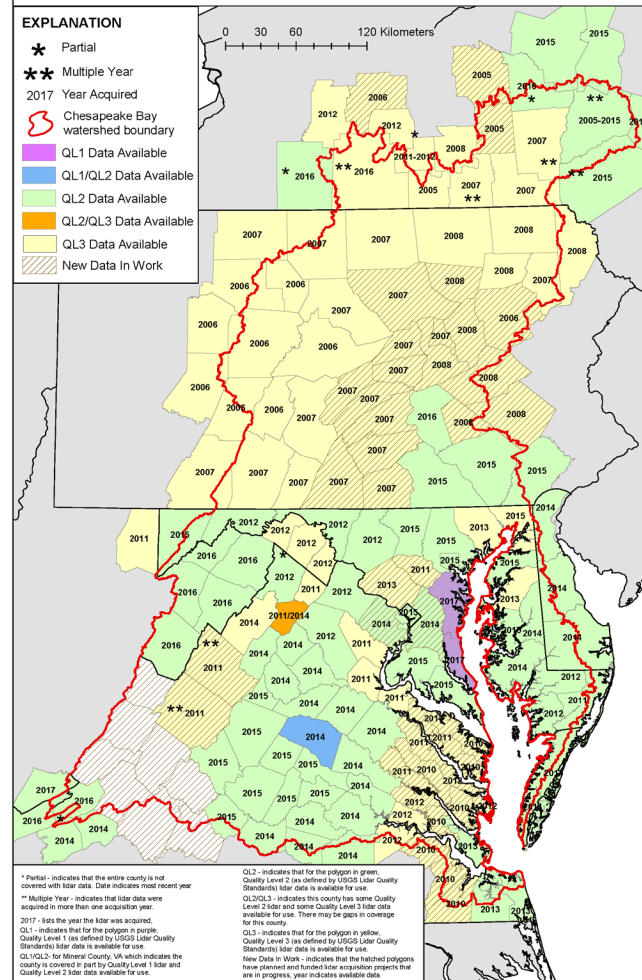
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## Chesapeake Bay Watershed Lidar Data by County, September 2018

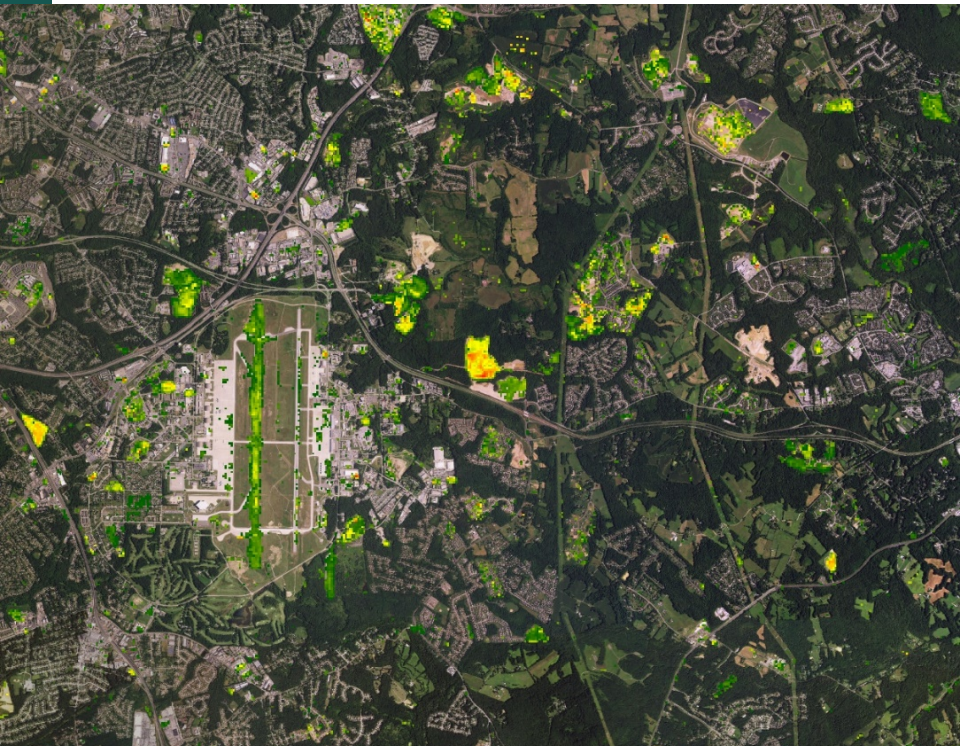
### EXPLANATION

- \* Partial
- \*\* Multiple Year
- Year Acquired
- Chesapeake Bay watershed boundary
- QL1 Data Available
- QL1/QL2 Data Available
- QL2 Data Available
- QL2/QL3 Data Available
- QL3 Data Available
- New Data In Work





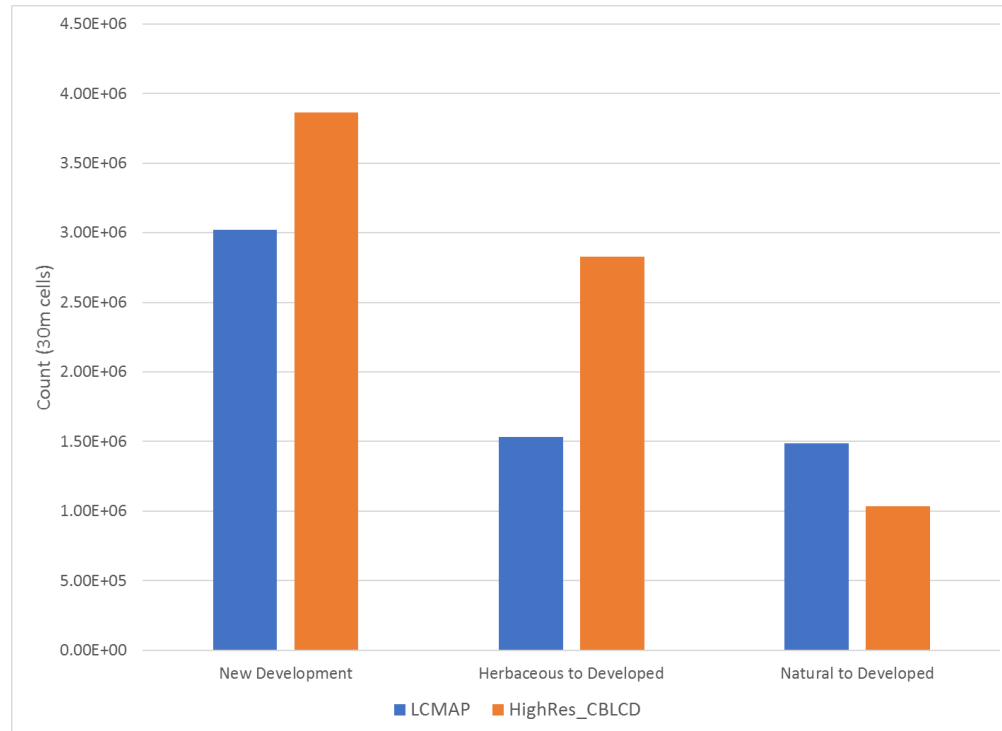
## What is our progress?





## What is our progress?

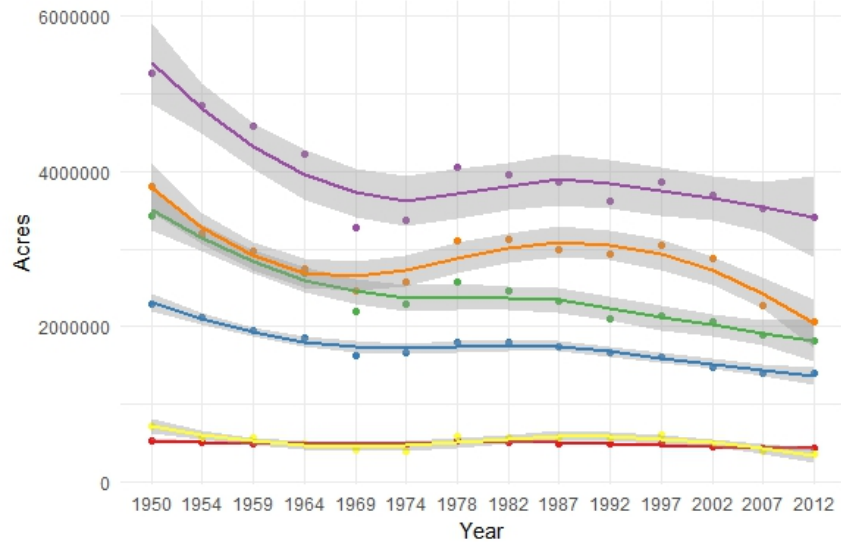
Incorporating high-resolution data into our historic assessments of land use change reveal that agricultural conversions to development are much greater than expected based exclusively on moderate resolution data.



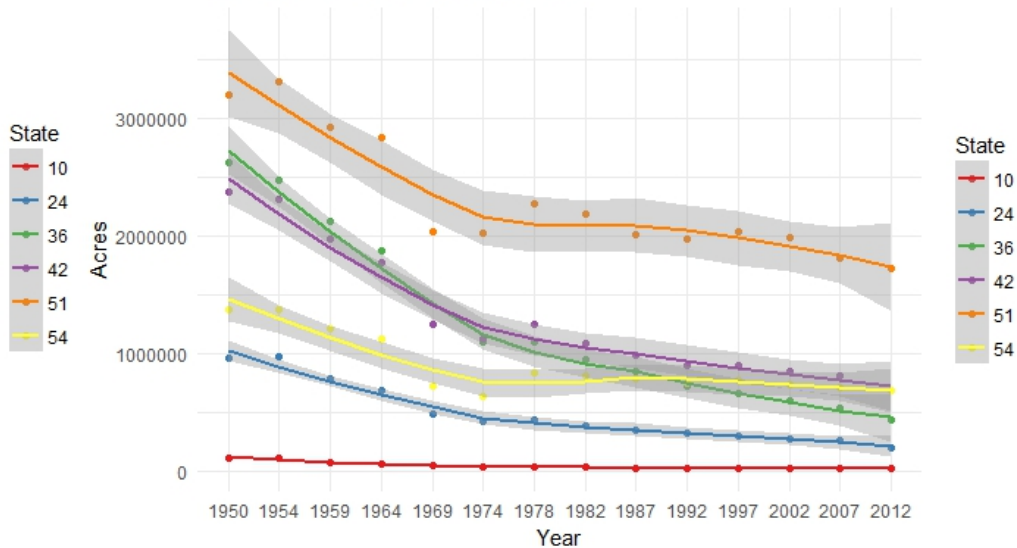


# What is our progress?

### Cropland Trends for Bay Counties



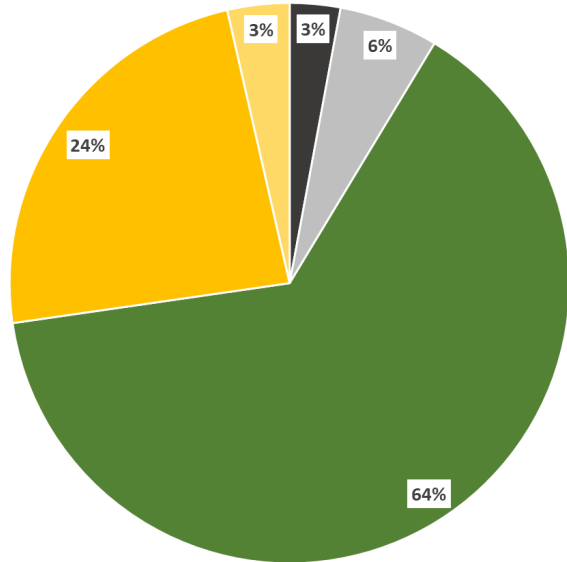
### Pasture Trends for Bay Counties





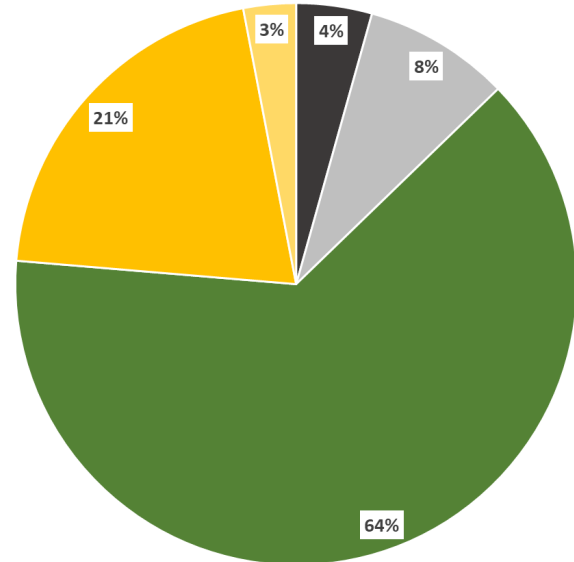
## What is our progress?

1985



■ Impervious ■ Pervious ■ Natural ■ Agriculture ■ MixedOpen

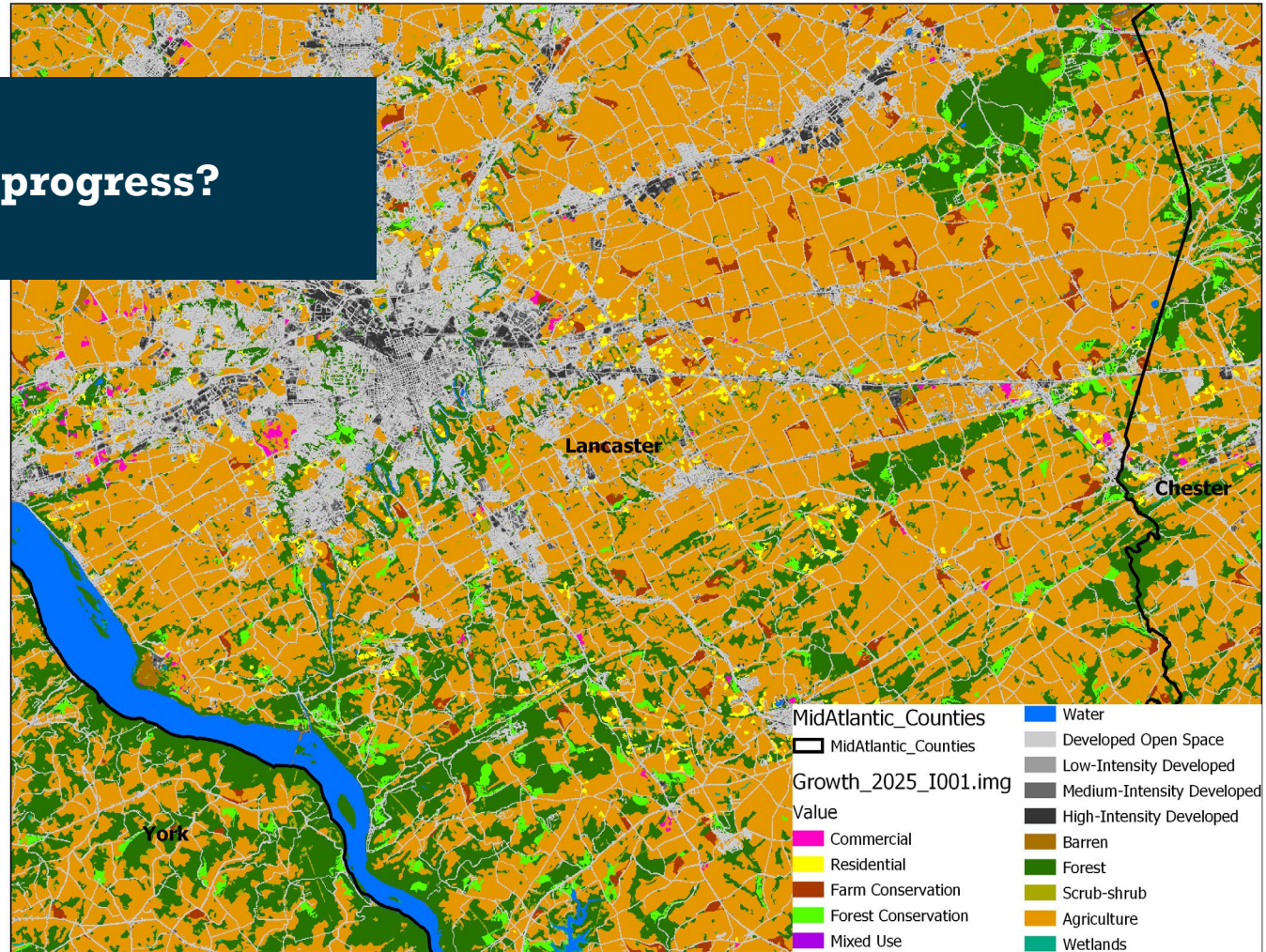
2013



■ Impervious ■ Pervious ■ Natural ■ Agriculture ■ MixedOpen



# What is our progress?





## Are we on track?

- We're on track to complete monitoring of land cover/use change throughout the watershed at 1-meter resolution by 2020 – four years past the original deadline of 2016.
- Continued progress on assessing and communicating the impacts of land use change will depend on CBP management priorities and continued funding support for the GeoSpatial Award.



## Most Critical Actions for Progress to Date

- Additional USGS funding for LiDAR acquisitions in the Bay watershed.
- CBP Funding of the first high-resolution land cover/use dataset and the GeoSpatial Award to continue monitoring land cover/use at high-resolution.





## Most Critical Actions for Future Progress

- Prioritization of this outcome relative to other geospatial activities.
- Delegation of updating of MS4s, protected lands, sewer service areas, and other jurisdiction specific datasets to the jurisdictions.
- Support for full-funding of the GeoSpatial Award in future out years.
- Development of a coordinated cross-GIT strategy for assessing the impacts of land change on habitats, healthy watersheds, and communities.

# 3

## **Challenges:**

*Are our actions having the expected effect?*



## Challenges

- Addressing this outcome is resource intensive- requiring dedicated large blocks of time from the CBPO GIS Team. This will continue to be the case despite the GeoSpatial Award because members of the CBPO GIS Team must oversee Objective 1 of the GeoSpatial Award (high-res land cover/use mapping) and because the Award does not cover the interpretation of land change nor the assessment of impacts to water quality, habitats, watersheds, and communities.
- Resources to conduct a scientific literature review on high-resolution methods (Action 1.4).
- Activities associated with the TMDL Mid-Point Assessment all but consumed the attention of the CBPO GIS Team and Land Use Workgroup from 2013 – 2018.
- Tracking of wetland change is contingent on the emergence of new affordable technologies.

# 4

## **Adaptations:**

*How should we adapt?*



## **Based on what we've learned, we plan to...**

- Extend the time frame to fulfill this outcome to December 2021.
- Modify Action 1.2 in the Work Plan, extending the timeline for land use change assessment from 1984-2011 to 1984 - 2050 using the best available data and models.

# Agreement Goals and Outcomes

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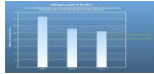
## Sustainable Fisheries

- Blue Crab Abundance
- Blue Crab Management
- Oyster
- Forage Fish
- Fish Habitat



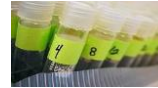
## Vital Habitats Goal

- Wetlands
- Black Duck
- Stream Health
- Brook Trout
- Fish Passage
- Submerged Aquatic Vegetation (SAV)
- Forest Buffer
- Tree Canopy



## Water Quality Goal

- 2017 Watershed Implementation Plans (WIP)
- 2025 WIP
- Water Quality Standards Attainment and Monitoring



## Toxic Contaminants Goal

- Toxic Contaminants Research
- Toxic Contaminants Policy and Prevention



## Healthy Watersheds Goal

- Healthy Waters



## Stewardship Goal

- Citizen Stewardship
- Local Leadership
- Diversity



## Land Conservation Goal

- Protected Lands
- Land Use Methods and Metrics Development
- Land Use Options Evaluation



## Public Access Goal

- Public Access Site Development



## Environmental Literacy Goal

- Student
- Sustainable Schools
- Environmental Literacy Planning



## Climate Resiliency Goal

- Monitoring and Assessment
- Adaptation Outcome



## Cross-Outcome Considerations

**Water Quality** – Updating land conditions for 2-year milestones; validating Land Policy BMPs in Phase III WIPs.

**Fisheries** – Assessing threats to near-shore habitats.

**Vital Habitats** – Assessing threats to black ducks, brook trout, stream health; status and trends in forest buffers and tree canopy; and change in wetlands (may be dropped).

**Healthy Watersheds** – Assessing threats to healthy watersheds; targeting outreach to local governments to improve planning actions.

**Land Conservation** – Crediting conservation under the TMDL; Assessing the vulnerability of unprotected lands to urban development.

**Climate Resiliency** – Combining forecasts of land change with those of climate change for future out year assessments of Bay health.



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# Discussion