

Phase 7 Land Use

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May 1st, 2025

Land Use Products

There are three primary land use products used within the Chesapeake Bay Program:

1. Chesapeake Assessment Scenario Tool (CAST) Land Use
2. High-resolution Land Use/Land Cover (LULC)
3. Phase 7 Land Use Aggregation

The goals of today's presentation are to:

1. Define the three land use products
2. Describe how the products are related
3. Provide an overview of Phase 7 land use over time (1985-2040)
4. Provide an update on the land use decisions occurring at the sector workgroups

What is CAST Land Use (aka Load Source)?

A table of acres per load source (or land use) by land-river segment (counties x watersheds x orographic regions) in which BMPs are applied and loads are calculated.

CAST Land Use
49 classes (or load sources)

County	LRSEG	Land Use	Acres
ABC	1	Grass	100
ABC	1	CSS Roads	200
ABC	3	Pasture	50
DEF	4	Septic	35
DEF	4	True Forest	500

LRSEG = Land River Segment
CAST = Chesapeake Assessment Scenario Tool
BMP = Best Management Practice.

CAST Land Use (aka Load Source)

A table of acres per load source (or land use) by land-river segment (counties x watersheds x orographic regions) in which BMPs are applied and loads are calculated.



The screenshot shows a web browser window with the address bar displaying `cast.chesapeakebay.net/PublicReports`. The page header features a logo on the left and the title "Chesapeake Assessment Scenario Tool" in large, bold, white text. Below the header is a navigation menu with links: HOME, NEWS, PUBLIC REPORTS, LEARNING, ABOUT, and CONTACT US. The main content area is titled "PUBLIC REPORTS" in blue. A paragraph explains that public reports are data from official scenarios used for planning implementation to meet the Chesapeake Bay TMDL. Below this, there are three required fields: "Report Type" (a dropdown menu currently showing "Base Conditions Report"), "Report Name" (a text input field), and "Scenarios" (a dropdown menu currently showing "Select Scenarios"). At the bottom of the form is a blue button labeled "Generate Report".

← → ↻ 🔍 cast.chesapeakebay.net/PublicReports

 **Chesapeake Assessment Scenario Tool**

HOME NEWS PUBLIC REPORTS LEARNING ABOUT CONTACT US

PUBLIC REPORTS

Public reports are data from official scenarios that are used to plan implementation to meet the Chesapeake Bay TMDL.

* Required field

Report Type *

Base Conditions Report ▼

Report Name *

Scenarios *

Select Scenarios

Generate Report

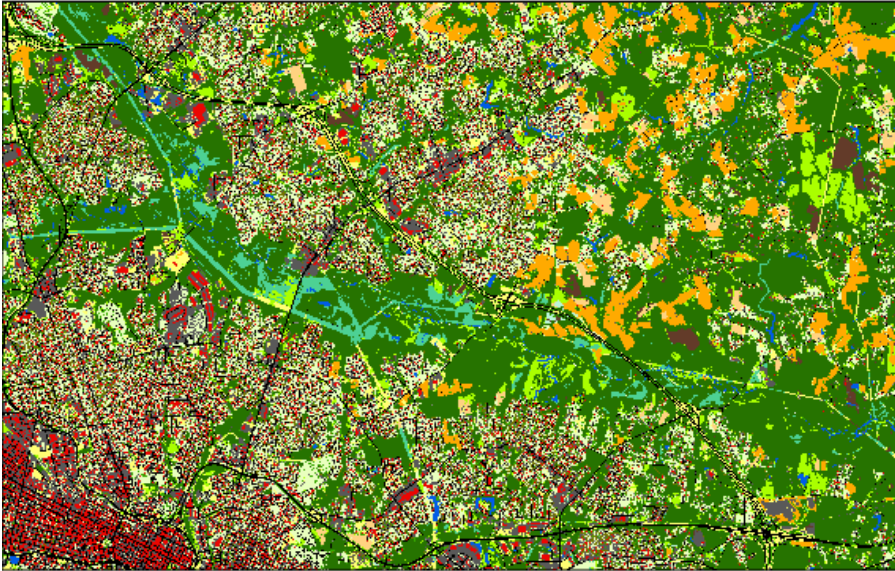
CAST Land Use (aka Load Source)

A table of acres per load source (or land use) by land-river segment (counties x watersheds x orographic regions) in which BMPs are applied and loads are calculated.

LRSEG	Geography (County)	State Basin	Load Source	Pre-BMP (Acres)	Post-BMP (Acres)
1	County A	Basin X	Ag Open Space	15	15
1	County A	Basin X	CSS Buildings and Other	1.5	1
1	County A	Basin X	CSS Construction	11	11
1	County A	Basin X	CSS Forest	53	70
2	County A	Basin X	CSS Mixed Open	28	15
2	County A	Basin X	CSS Roads	1	1
2	County A	Basin X	CSS Tree Canopy over Impervious	0.5	0.5
2	County A	Basin X	CSS Tree Canopy over Turf Grass	0.25	0.25
2	County A	Basin X	CSS Turf Grass	2.5	2.5
2	County A	Basin X	Double Cropped Land	16	16
3	County B	Basin X	Full Season Soybeans	3	3
3	County B	Basin X	Grain with Manure	7	7
4	County B	Basin X	Grain without Manure	5	5
4	County B	Basin X	Harvested Forest	10	10
4	County B	Basin X	Headwater or Isolated Wetland	6	6
4	County B	Basin X	Leguminous Hay	7	7
4	County B	Basin X	Mixed Open	17	7

What is High-Resolution Land Use/Land Cover (LULC)?

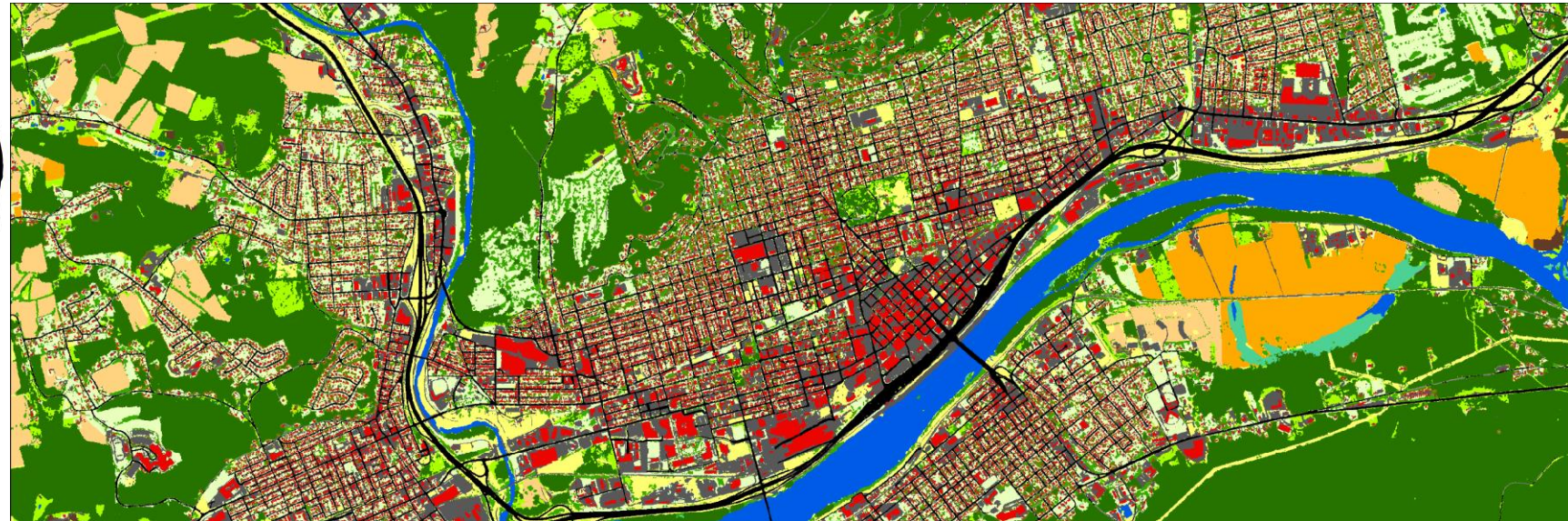
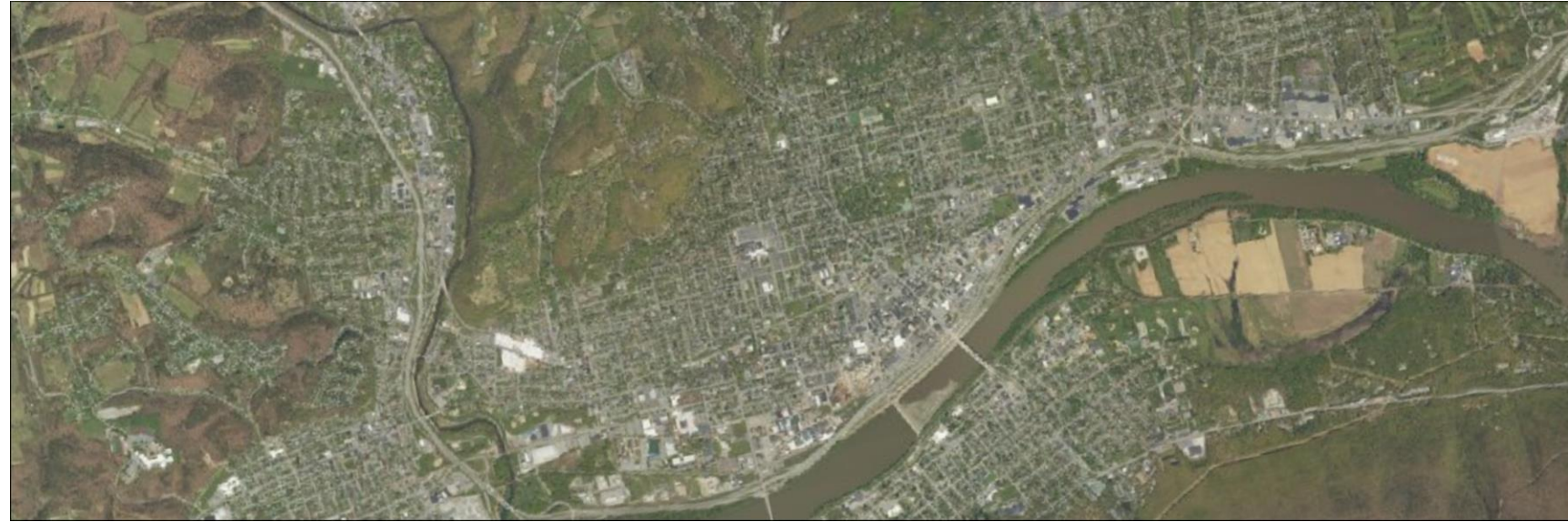
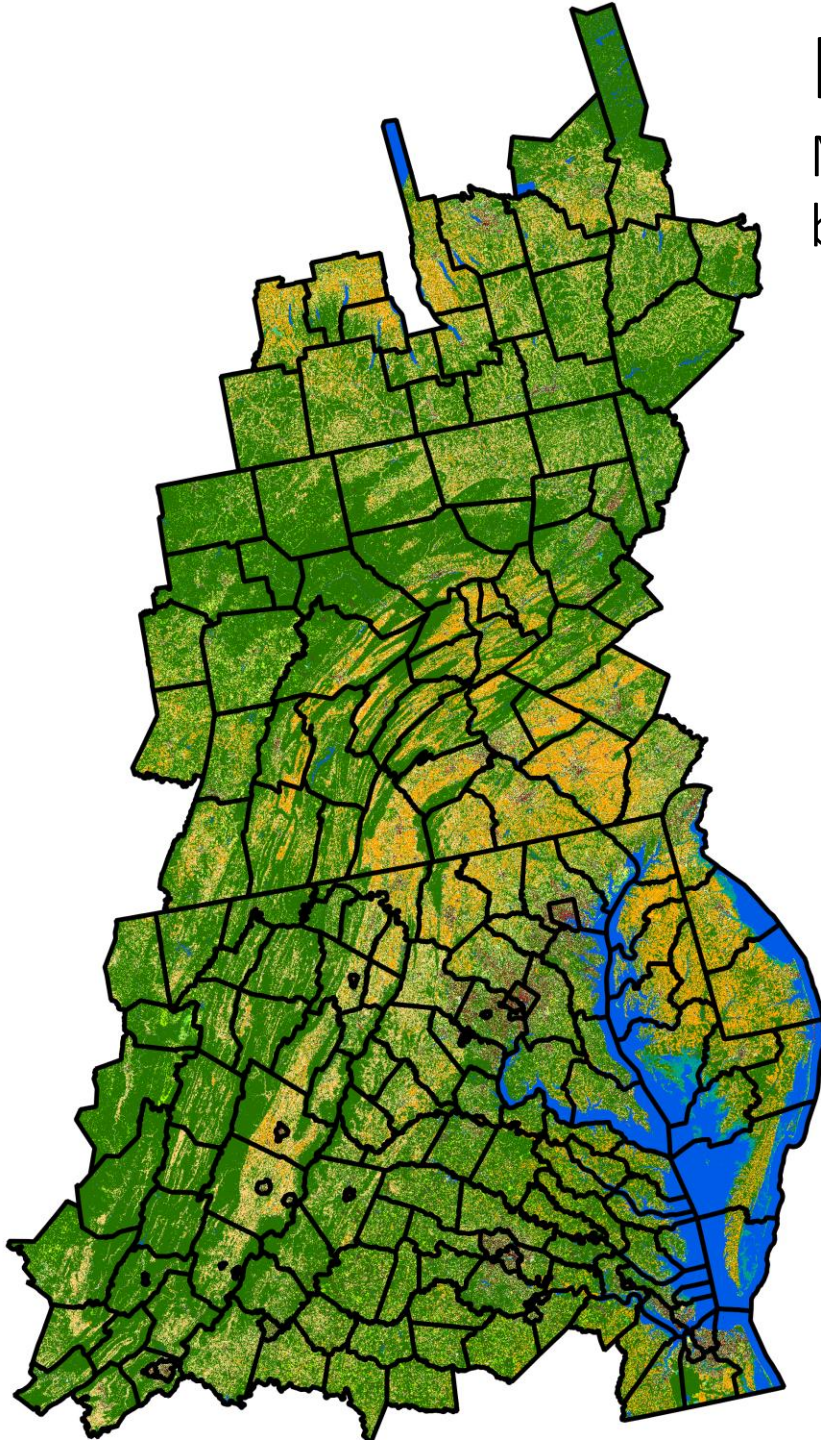
High-resolution LULC
56 classes



Mapped data with high spatial (1-meter) and categorical (56-class) resolutions that can be aggregated (or rolled-up) to different schemas and summarized by any overlay geography to meet the needs of a variety of projects

High-Resolution Land Use/Land Cover (LULC)

Mapped data with high spatial and categorical resolutions that can be aggregated to different schemas and overlay geographies



Blue = LULC 56-class schema
White = General 18-class schema

General 18-class Schema for Visualization

1. Impervious Roads (1)

Roads

2. Impervious Structures (1)

Structures

3. Impervious, Other (2)

Other Impervious (Parking lots, driveways)
Solar Field Panel Arrays

4. Tree Canopy Over Impervious (3)

TC over Roads
TC over Structures
TC over Other Impervious

5. Turf Grass (1)

Turf Grass

6. Tree Canopy over Turf Grass (1)

Tree Canopy over Turf Grass

7. Pervious, Developed (7)

Bare Developed
Solar Field Barren
Solar Field Herbaceous
Solar Field Shrubland
Suspended Succession Barren
Suspended Succession Herbaceous
Suspended Succession Shrubland

8. Extractive (2)

Extractive Barren
Extractive Impervious

9. Forest (4)

Forest
Riverine Wetlands Forest
Terrene Wetlands Forest
Tidal Wetlands Forest

10. Forested, Other (4)

Forested, Other
Riverine Wetlands Tree Canopy
Terrene Wetlands Tree Canopy
Tidal Wetlands Tree Canopy

11. Natural Succession (4)

Natural Succession Barren
Natural Succession Herbaceous
Natural Succession Shrubland
Bare Shore

12. Harvested Forest (5)

Harvested Forest Barren
Harvested Forest Herbaceous
Riverine Wetlands Harvested Forest
Terrene Wetlands Harvested Forest
Tidal Wetlands Harvested Forest

13. Cropland (5)

Cropland Barren
Cropland Herbaceous
Orchards and Vineyards Barren
Orchards and Vineyards Herbaceous
Orchards and Vineyards Shrubland

14. Pasture and Hay (2)

Pasture and Hay Barren
Pasture and Hay Herbaceous

15. Wetlands, Riverine Non-forested (3)

Riverine Wetlands Barren
Riverine Wetlands Herbaceous
Riverine Wetlands Shrubland

16. Wetlands, Terrene Non-forested (3)

Terrene Wetlands Barren
Terrene Wetlands Herbaceous
Terrene Wetlands Shrubland

17. Wetlands, Tidal Non-forested (3)

Tidal Wetlands Barren
Tidal Wetlands Herbaceous
Tidal Wetlands Shrubland

18. Water (5)

Tidal Waters
Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)

Blue = LULC 56-class schema
White = General 18-class schema

General 18-class Schema for Visualization

1. Impervious Roads (1)

Roads

2. Impervious Structures (1)

Structures

3. Impervious, Other (2)

Other Impervious (Parking lots, driveways)
Solar Field Panel Arrays

4. Tree Canopy Over Impervious (3)

TC over Roads
TC over Structures
TC over Other Impervious

5. Turf Grass (1)

Turf Grass

6. Tree Canopy over Turf Grass (1)

Tree Canopy over Turf Grass

7. Pervious, Developed (7)

Bare Developed
Solar Field Barren
Solar Field Herbaceous
Solar Field Shrubland
Suspended Succession Barren
Suspended Succession Herbaceous
Suspended Succession Shrubland

8. Extractive (2)

Extractive Barren
Extractive Impervious

9. Forest (4)

Forest
Riverine Wetlands Forest
Terrene Wetlands Forest
Tidal Wetlands Forest

10. Forested, Other (4)

Forested, Other
Riverine Wetlands Tree Canopy
Terrene Wetlands Tree Canopy
Tidal Wetlands Tree Canopy

11. Natural Succession (4)

Natural Succession Barren

Classes in white are unique colors you see on the map and are aggregations of the LULC

Harvested Forest Herbaceous

Classes in blue are what is actually mapped in the LULC

13. Cropland (5)

Cropland Barren
Cropland Herbaceous
Orchards and Vineyards Barren
Orchards and Vineyards Herbaceous
Orchards and Vineyards Shrubland

14. Pasture and Hay (2)

Pasture and Hay Barren
Pasture and Hay Herbaceous

15. Wetlands, Riverine Non-forested (3)

Riverine Wetlands Barren
Riverine Wetlands Herbaceous
Riverine Wetlands Shrubland

16. Wetlands, Terrene Non-forested (3)

Terrene Wetlands Barren
Terrene Wetlands Herbaceous
Terrene Wetlands Shrubland

17. Wetlands, Tidal Non-forested (3)

Tidal Wetlands Barren
Tidal Wetlands Herbaceous
Tidal Wetlands Shrubland

18. Water (5)

Tidal Waters
Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)

Blue = LULC 56-class schema
White = General 18-class schema

General 18-class Schema for Visualization

1. **Impervious, Other** (2)

Roads
Structures

Land Use = How people use the land for human activities (e.g. crops, timber harvest)
In this example, the land use is Extractive (surface mining)

3. **Impervious, Other** (2)

Other Impervious (Parking lots, driveways)
Solar Field Panel Arrays

4. **Tree Canopy Over Impervious** (3)

TC over Roads
TC over Structures
TC over Other Impervious

5. **Turf Grass** (1)

Turf Grass

6. **Tree Canopy over Turf Grass** (1)

Tree Canopy over Turf Grass

7. **Pervious, Developed** (7)

Bare Developed
Solar Field Barren
Solar Field Herbaceous
Solar Field Shrubland
Suspended Succession Barren
Suspended Succession Herbaceous
Suspended Succession Shrubland

8. **Extractive** (2)

Extractive Barren
Extractive Impervious

9. **Forest** (4)

Forest
Riverine Wetlands Forest
Terrene Wetlands Forest
Tidal Wetlands Forest

12. **Harvested Forest** (5)

Harvested Forest Barren
Harvested Forest Herbaceous
Riverine Wetlands Harvested Forest
Terrene Wetlands Harvested Forest
Tidal Wetlands Harvested Forest

13. **Cropland** (5)

Land Cover = Land surface features that can be observed from imagery (e.g. tree canopy, fields)
In this example, the land covers are Barren and Impervious

14. **Pasture and Hay** (4)

Pasture and Hay Barren
Pasture and Hay Herbaceous

15. **Wetlands, Riverine Non-forested** (3)

Riverine Wetlands Barren
Riverine Wetlands Herbaceous
Riverine Wetlands Shrubland

16. **Wetlands, Terrene Non-forested** (3)

Terrene Wetlands Barren
Terrene Wetlands Herbaceous
Terrene Wetlands Shrubland

17. **Wetlands, Tidal Non-forested** (3)

Tidal Wetlands Barren
Tidal Wetlands Herbaceous
Tidal Wetlands Shrubland

18. **Water** (5)

Tidal Waters
Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)

Why 56-classes?

Each class represents the combination of land use and land cover. The LULC has 28 unique land uses and 11 unique land covers

High-Resolution Land Use/Land Cover (LULC)

Mapped data with high spatial and categorical resolutions that can be aggregated to different schemas and overlay geographies

With 56 classes, there are many ways to aggregate the data.

General 18-classes for Visualization

- Roads
- Structures
- Other Impervious
- Tree Canopy over Other Impervious
- Tree Canopy over Turf
- Turf Grass
- Pervious, Developed
- Cropland
- Pasture and Hay
- Forest
- Forested, Other
- Natural Succession
- Harvested Forest
- Tidal Wetlands, Non-forested
- Riverine Wetlands, Non-forested
- Terrene Wetlands, Non-forested
- Water



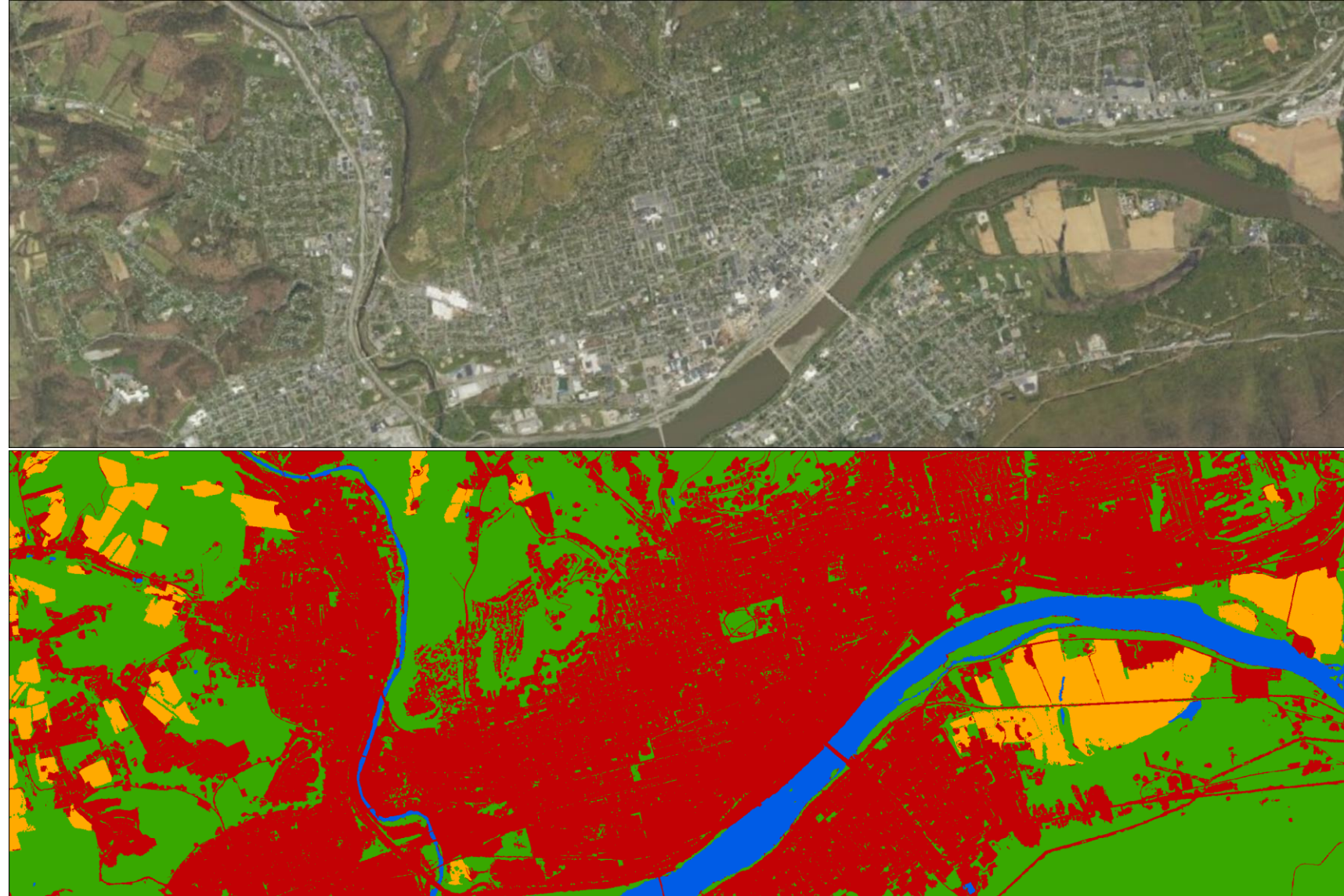
High-Resolution Land Use/Land Cover (LULC)

Mapped data with high spatial and categorical resolutions that can be aggregated to different schemas and overlay geographies

With 56 classes, there are many ways to aggregate the data.

Macro 4-classes for High-level Assessments

- Developed
- Natural
- Agricultural
- Water



Macro 4-Class Schema for High-Level Assessments

1. Water and Water Margins (6)

Tidal Waters
Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)
Bare Shore

2. Development (18)

Roads
Structures
Other Impervious (Parking lots, driveways)
TC over Roads
TC over Structures
TC over Other Impervious
Extractive Impervious
Solar Field Panel Arrays
Tree Canopy over Turf Grass
Turf Grass
Bare Developed
Extractive Barren
Solar Field Barren
Solar Field Herbaceous
Solar Field Shrubland
Suspended Succession Barren
Suspended Succession Herbaceous
Suspended Succession Shrubland

3. Natural Lands (25)

Forest
Forested, Other
Natural Succession Barren
Natural Succession Herbaceous
Natural Succession Shrubland
Harvested Forest Barren
Harvested Forest Herbaceous
Riverine Wetlands Barren
Riverine Wetlands Herbaceous
Riverine Wetlands Shrubland
Riverine Wetlands Tree Canopy
Riverine Wetlands Forest
Riverine Wetlands Harvested Forest
Terrene Wetlands Barren
Terrene Wetlands Herbaceous
Terrene Wetlands Shrubland
Terrene Wetlands Tree Canopy
Terrene Wetlands Forest
Terrene Wetlands Harvested Forest
Tidal Wetlands Barren
Tidal Wetlands Herbaceous
Tidal Wetlands Shrubland
Tidal Wetlands Tree Canopy
Tidal Wetlands Forest
Tidal Wetlands Harvested Forest

4. Agriculture (7)

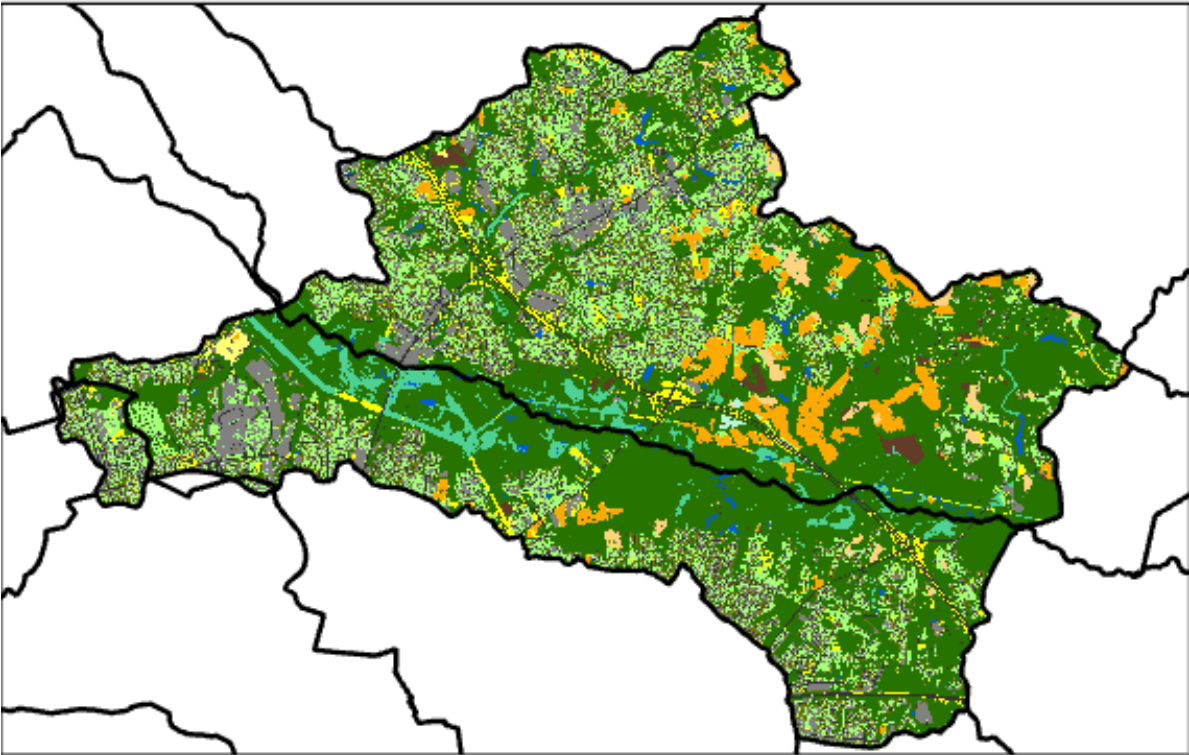
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Orchards and Vineyards Barren
Orchards and Vineyards Herbaceous
Orchards and Vineyards Shrubland
Pasture and Hay Barren
Pasture and Hay Herbaceous

Aggregation, or roll-up, simply moves the mapped 56-classes in blue into different classes, or groupings, in white to address the needs of different use cases

What is the Phase 7 Aggregate Land Use?

Phase 7 Aggregate Land Use

*16 classes



The aggregated LULC schema that is summarized as acres by LRSEG and delivered to CAST to assess water quality

LULC = Land Use/Land Cover

LRSEG = Land River Segment

CAST = Chesapeake Assessment Scenario Tool

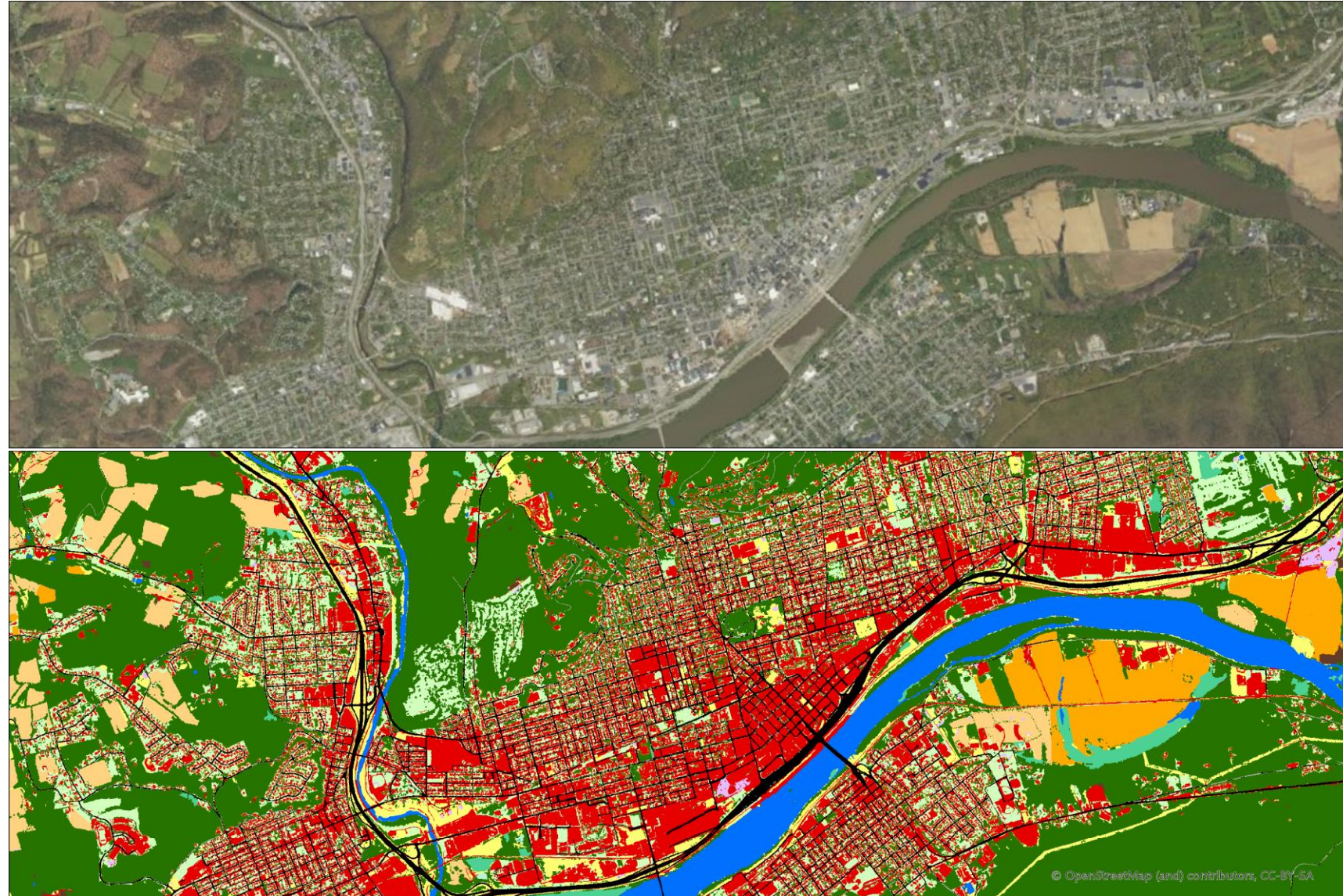
* Final classification schema for Phase 7 has not yet been approved.

Phase 7 Land Use Roll-Up

The aggregated LULC schema that is summarized as acres by LRSEG and delivered to CAST to assess water quality

Proposed 16-classes for Phase 7 Water Quality Modeling

- Impervious Roads
- Impervious Non-Roads
- Tree Canopy over Impervious
- Tree Canopy over Turf
- Turf Grass
- Compacted Pervious
- Solar Infrastructure
- Solar Pervious
- Construction
- Cropland
- Pasture and Hay
- Forest
- Harvested Forest
- Riverine Wetlands, Non-forested
- Terrene Wetlands, Non-forested
- Water



Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads

Roads

2. Impervious, Non-Roads

Structures

Other Impervious (Parking lots, driveways)

Extractive Impervious

3. Tree Canopy Over Impervious

TC over Roads

TC over Structures

TC over Other Impervious

4. Turf Grass

Turf Grass

5. Tree Canopy over Turf Grass

Tree Canopy over Turf Grass

6. Solar Infrastructure

Solar Field Panel Arrays

7. Solar Pervious

Solar Field Herbaceous

Solar Field Shrubland

8. Compacted Pervious

Extractive Barren

Suspended Succession Barren

Suspended Succession Herbaceous

Suspended Succession Shrubland

Natural Succession Herbaceous (urban areas)

9. Construction

Bare Developed (Urban areas?)

Solar Field Barren

Natural Succession Barren (Urban areas)

Reported Data from States

10. Forest

Forest

Forested, Other

Natural Succession Herbaceous (rural areas)

Natural Succession Shrubland

Riverine Wetlands Tree Canopy

Riverine Wetlands Forest

Terrene Wetlands Tree Canopy

Terrene Wetlands Forest

11. Harvested Forest (2)

Harvested Forest Barren

Harvested Forest Herbaceous

Natural Succession Barren (Rural areas)

Reported Data from States

12. Wetlands, Riverine Non-forested

Riverine Wetlands Barren

Riverine Wetlands Herbaceous

Riverine Wetlands Shrubland

Riverine Wetlands Harvested Forest

13. Wetlands, Terrene Non-forested

Terrene Wetlands Barren

Terrene Wetlands Herbaceous

Terrene Wetlands Shrubland

Terrene Wetlands Harvested Forest

14. Cropland

Cropland Barren

Cropland Herbaceous

Orchards and Vineyards Barren

Orchards and Vineyards Herbaceous

Orchards and Vineyards Shrubland

15. Pasture and Hay

Pasture and Hay Barren

Pasture and Hay Herbaceous

16. Water

Lakes & Reservoirs

Riverine Ponds

Terrene Ponds

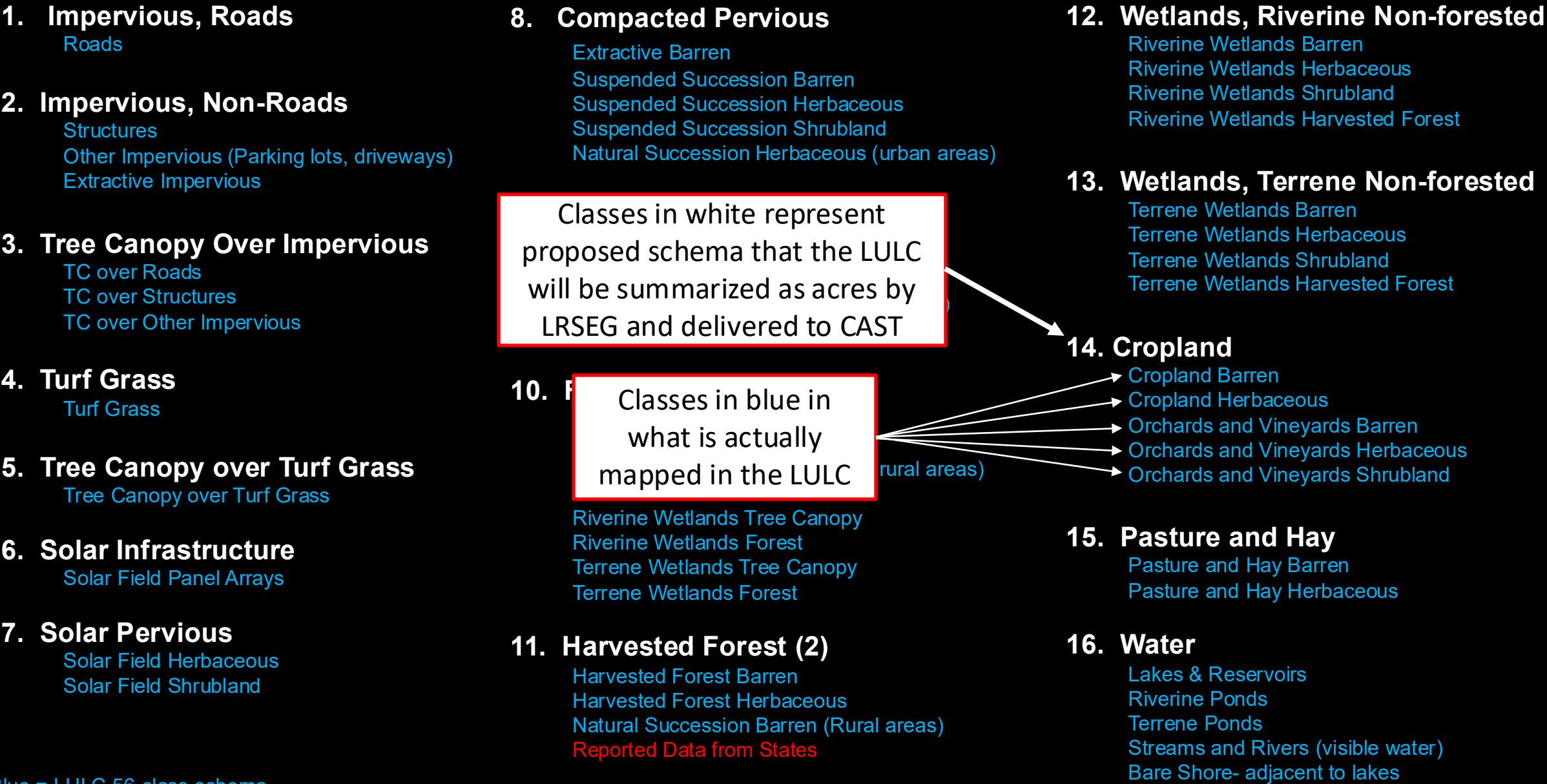
Streams and Rivers (visible water)

Bare Shore- adjacent to lakes

Blue = LULC 56-class schema

White = Phase 7 Rollup schema

Proposed Aggregation of High-Res LULC for Phase 7



Blue = LULC 56-class schema
White = Phase 7 Rollup schema

Why is the Phase 7 Aggregation Important?

Loading Implications

- Each land use has unique sediment, Nitrogen, and Phosphorus loading rates
 - Moving acres from one class to another results in a change in loads

Simplified Example

Changing the roll-up changes loads

Phase 6 Roll-Up

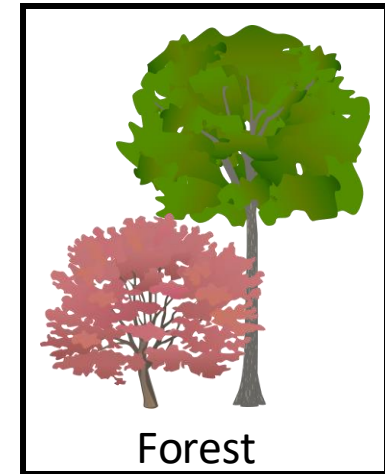


LULC (56-class)



100-acres

Phase 7 Roll-Up



Nitrogen (N) and Phosphorus (P) Loads

N: 2.45 lbs/acre/year * 100-acres = 245 lbs/year

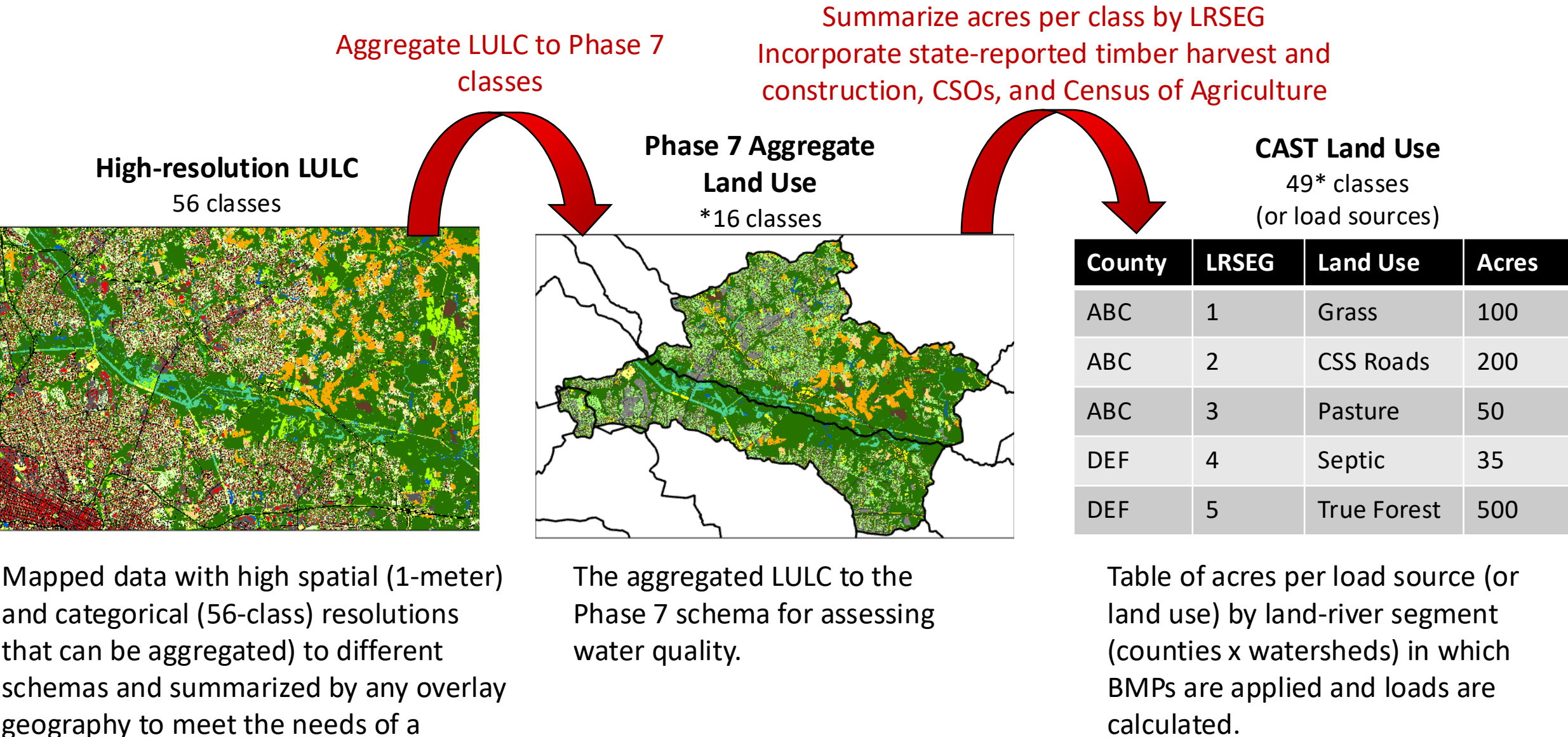
P: 0.43 lbs/acre/year * 100-acres = 43 lbs/year

Nitrogen (N) and Phosphorus (P) Loads

N: 1.68 lbs/acre/year * 100-acres = 168 lbs/year

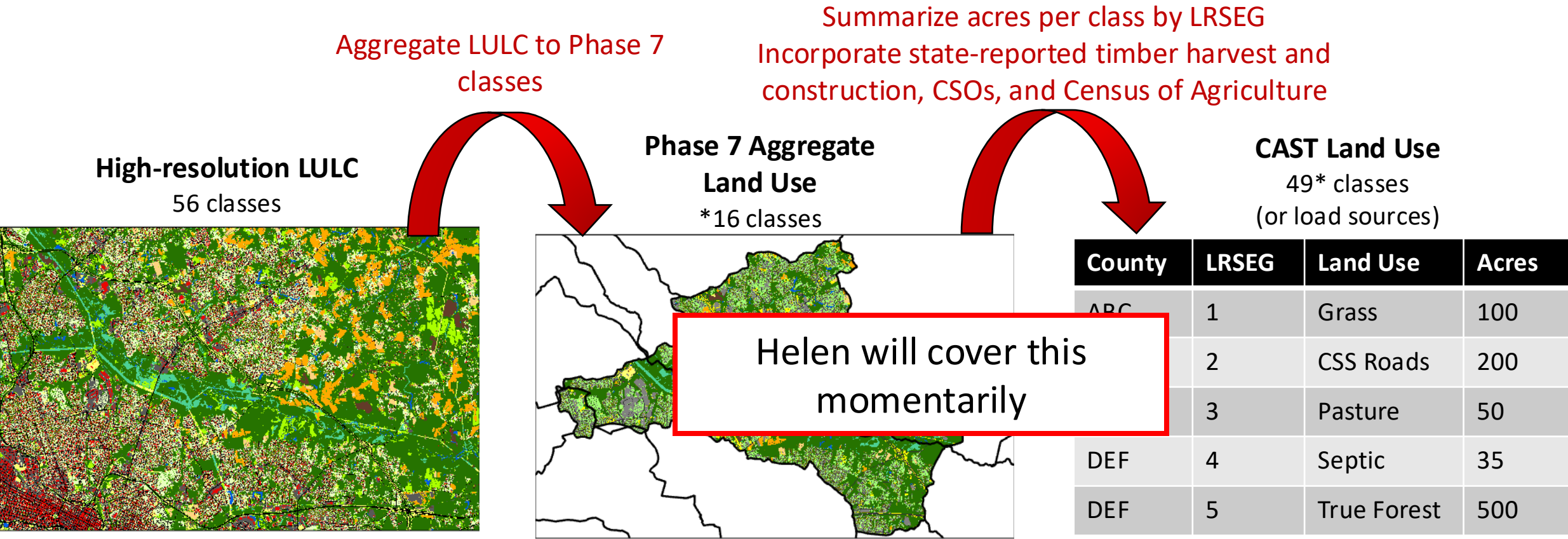
P: 0.08 lbs/acre/year * 100-acres = 8 lbs/year

Summary: How are the Land Use Products Related?



CSO = Combined Sewer Overflows
* Final classification schema for Phase 7 has not yet been approved.

Summary: How are the Land Use Products Related?



Mapped data with high spatial (1-meter) and categorical (56-class) resolutions that can be aggregated to different schemas and summarized by any overlay geography to meet the needs of a variety of projects

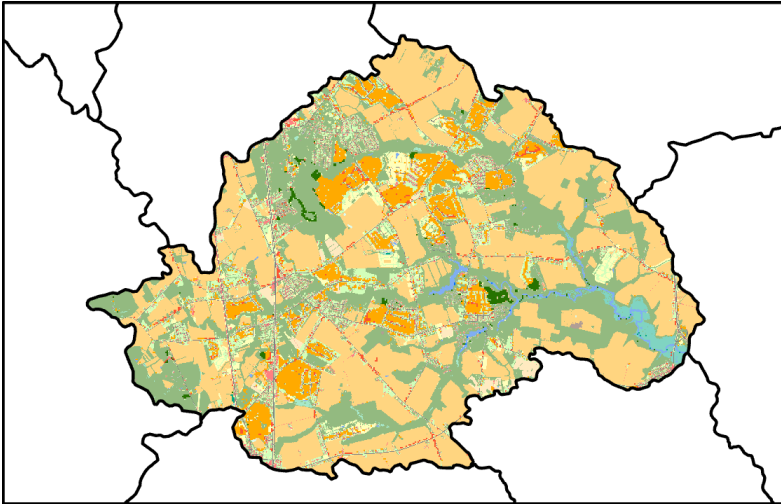
The aggregated LULC to the Phase 7 schema for assessing water quality.

Table of acres per load source (or land use) by land-river segment (counties x watersheds) in which BMPs are applied and loads are calculated.

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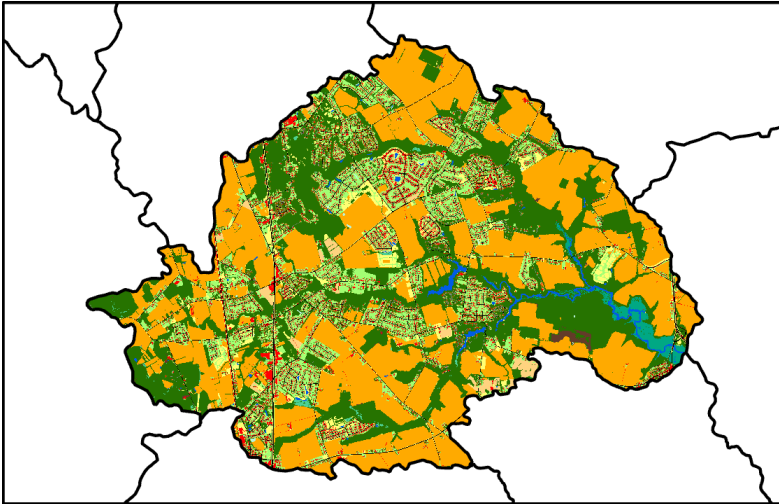
How do we assess land use over time?

Past Land Use (30m)
1985-2012



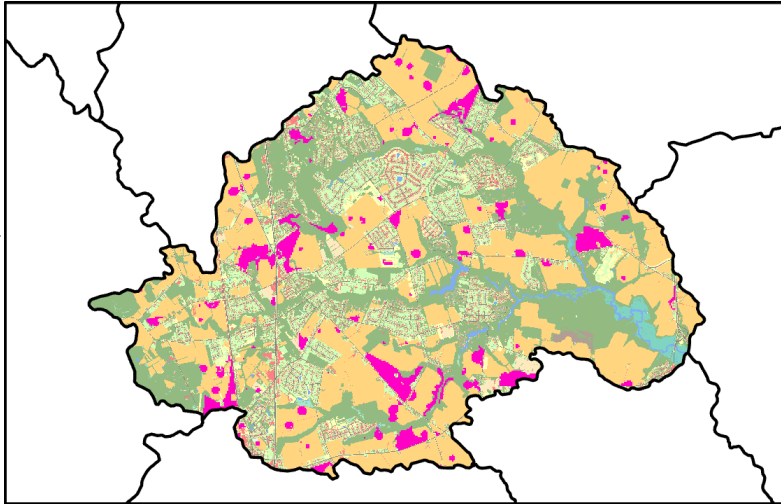
2013
←

Present Land Use (1m)
2013-2022



2022
→

Future Land Use (30m)
2023-2100



Annual historic land use condition and trends by summary unit. The present is deconstructed where change is detected back through time.

The land use conditions in the present, derived from the LULC at 1-meter resolution and by summary unit. Serves as the starting point for the back-cast and forecasts.

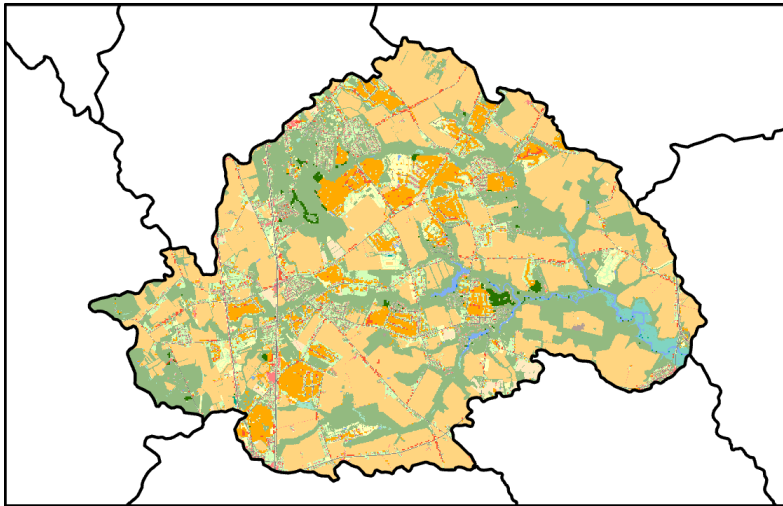
Future land use trends modeled with the Chesapeake Bay Land Change Model (CBLCM). Urban growth model that converts forest and farmland to development to allocate for population growth.

LULC = Land Use/Land Cover
LRSEG = Land River Segment
NLCD = National Land Cover Database

How do we assess land use over time?

Past Land Use (30m)

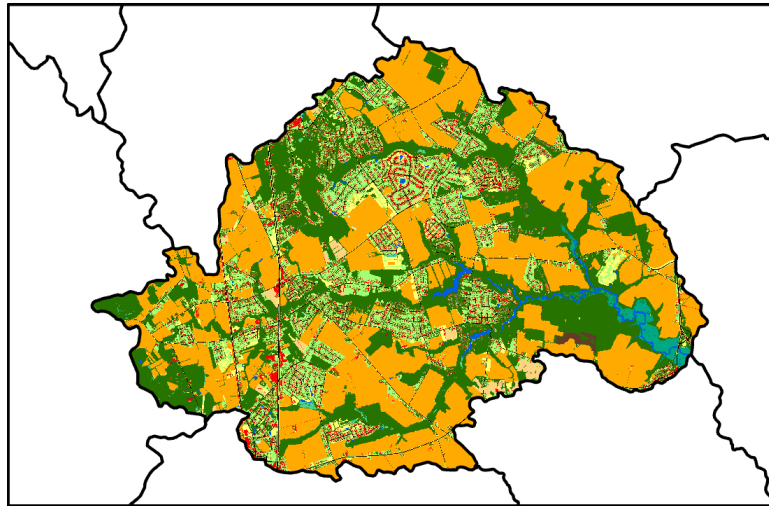
1985-2012



Annual historic land use condition and trends by summary unit. The present is deconstructed where change is detected back through time.

Present Land Use (1m)

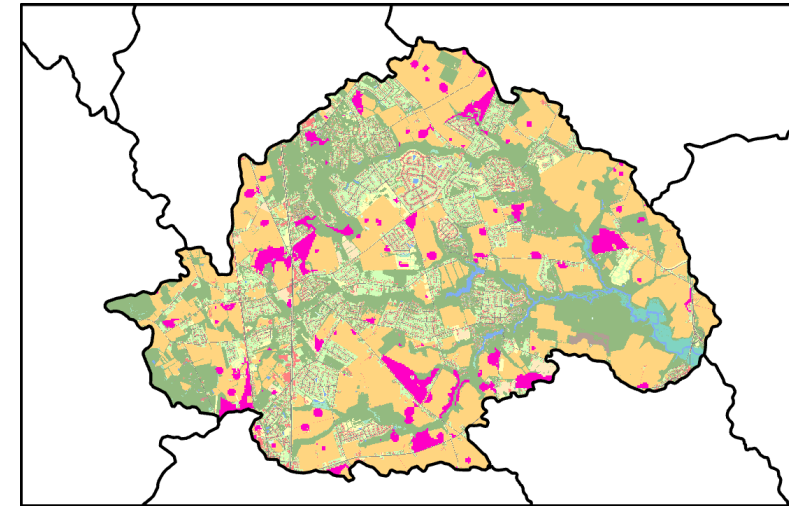
2013-2022



The land use conditions in the present, derived from the LULC at 1-meter resolution and by summary unit. Serves as the starting point for the back-cast and forecasts.

Future Land Use (30m)

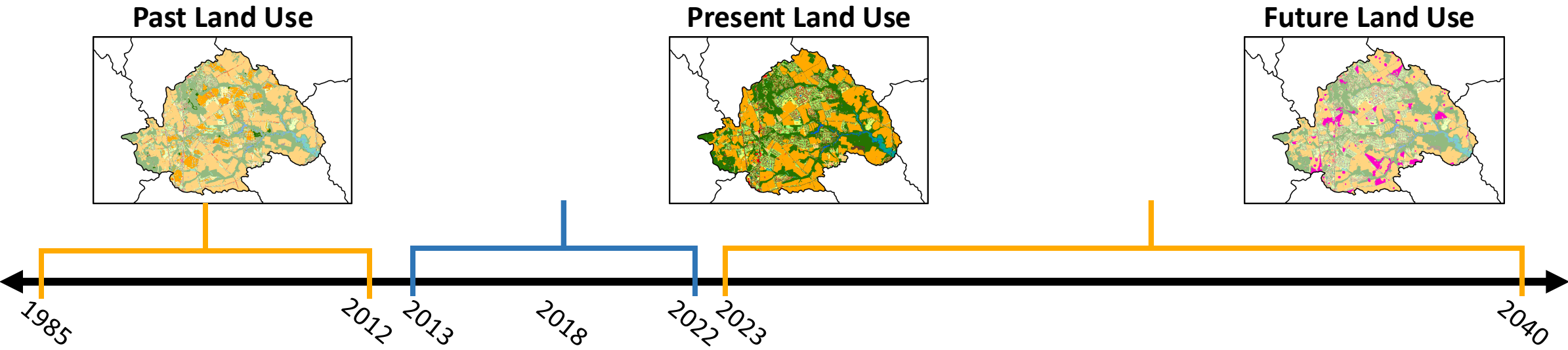
2023-2100



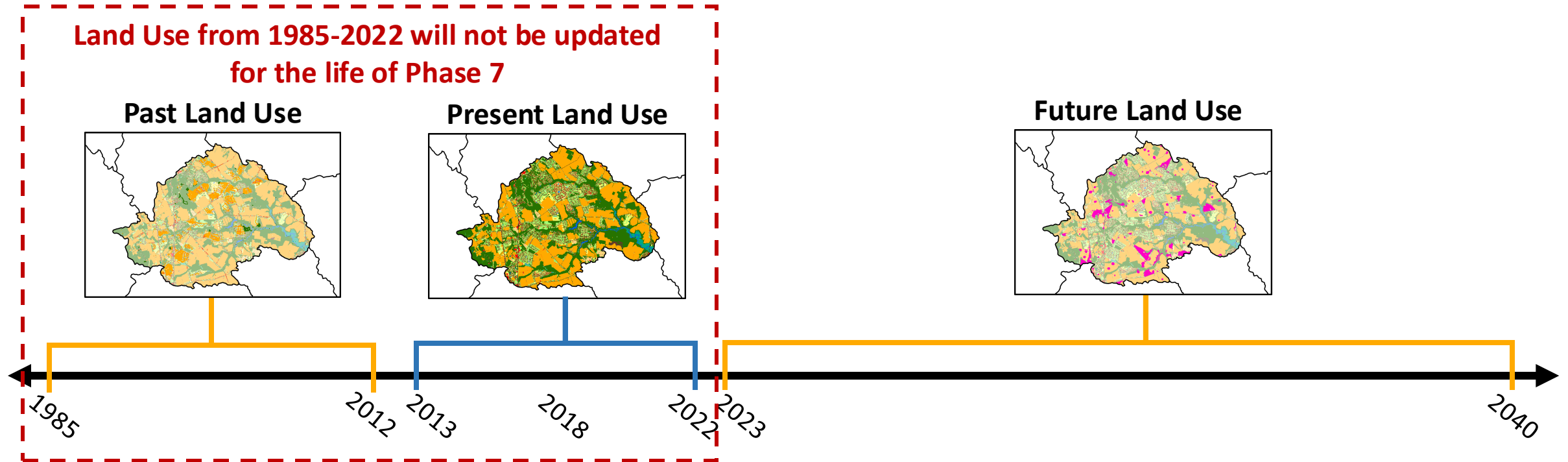
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How do we assess land use over time?

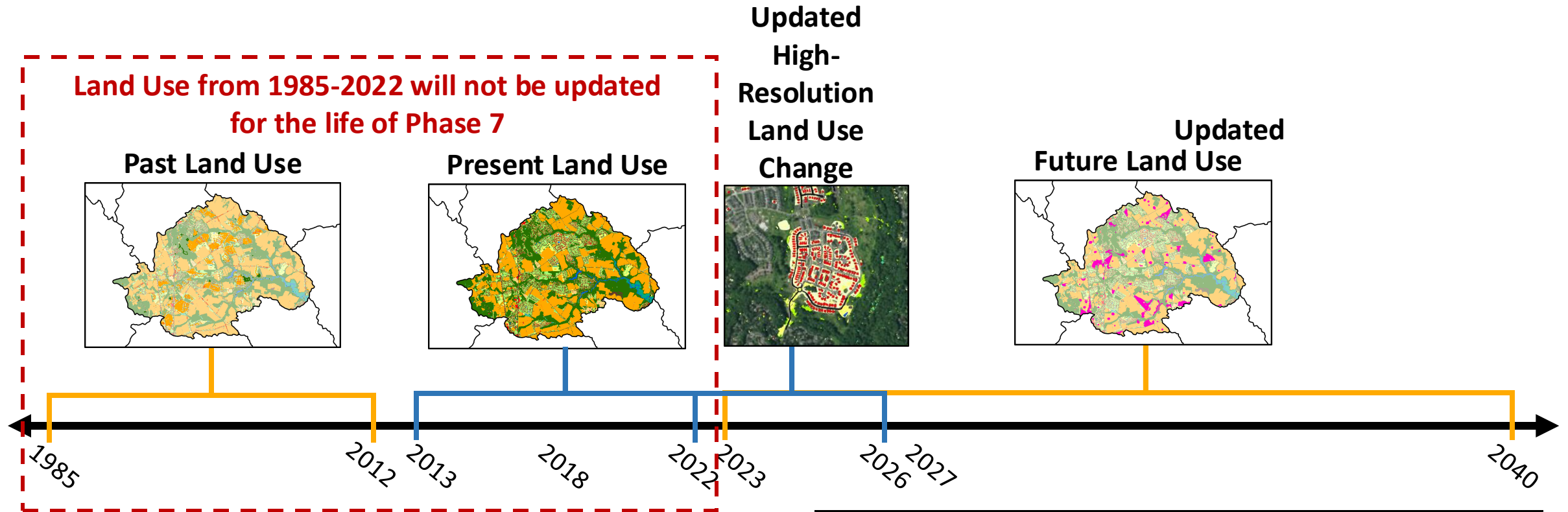
Land Use Timeline



How do we assess land use over time?



How do we assess land use over time?

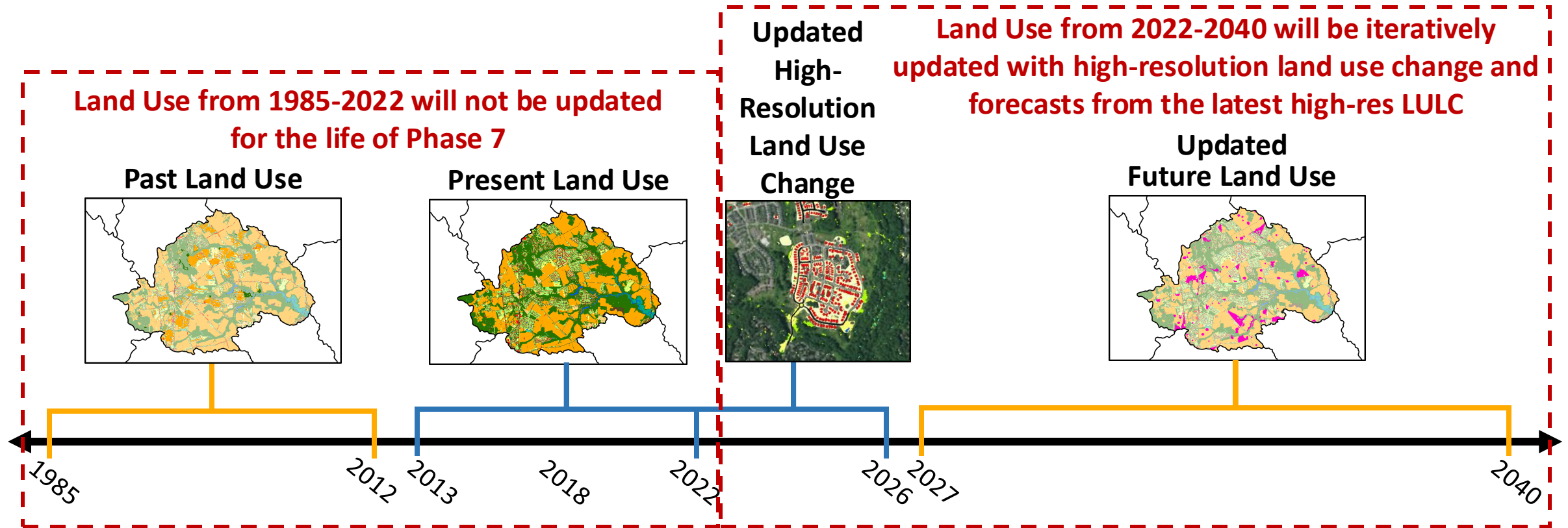


If we follow suit with what was done for Phase 6
Before 2022: Wall-to-wall products
After 2022: Change products

Something to Consider for Phase 7

The high-resolution time series (present land use) is remapped (e.g. 2013-2022) each time we add a new time period (e.g. 2026). Should we update the whole time series?

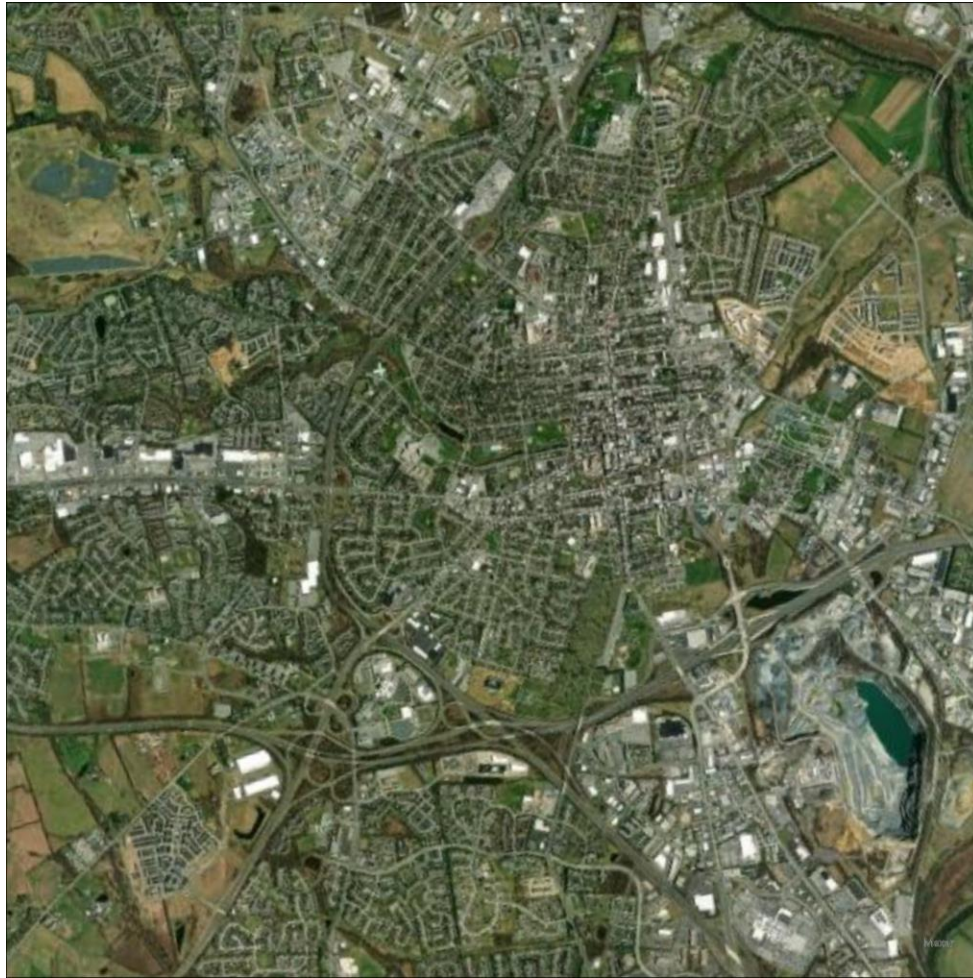
How do we assess land use over time?



Between 2013 and 2022, the LULC mapped ~3.6% of the watershed area as change. If this rate continues, it can be expected that ~93% of the land use in 2040 will be the same as what is mapped in 2022.

How Has Land Use Improved Since Phase 6?

National Agricultural Imagery Program (NAIP)



LULC 2013: First high-res model released in 2017, 16-17 classes

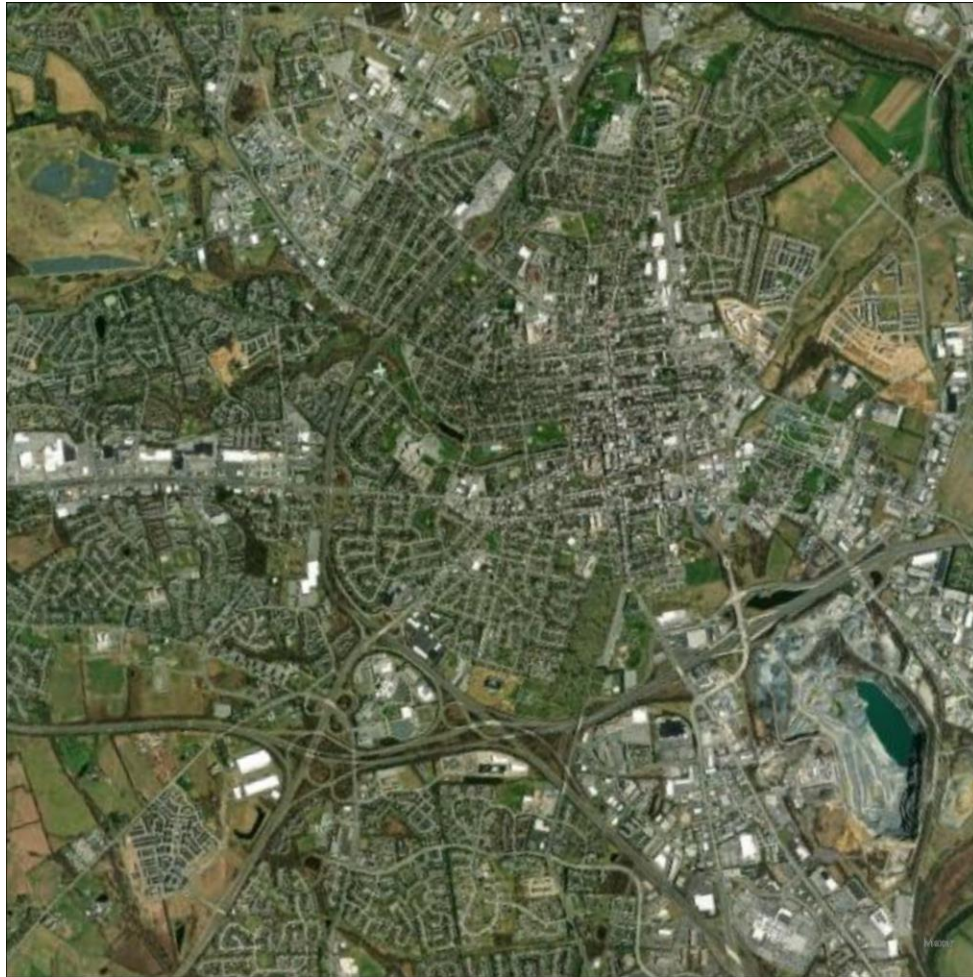


- | | | | |
|-------------------------------|-----------------------|---------------------------|-----------------------|
| ■ Impervious Roads | ■ Turf Grass | ■ Fractional (impervious) | ■ Tidal Wetlands |
| ■ Impervious Non-Roads | ■ Fractional (small) | ■ Forest | ■ Floodplain Wetlands |
| ■ Tree Canopy over Impervious | ■ Fractional (medium) | ■ Agriculture | ■ Other Wetlands |
| ■ Tree Canopy over Turf | ■ Fractional (large) | ■ Barren | ■ Water |

This version of the LULC was the first of its kind and was created for the development of the Phase 6 model.

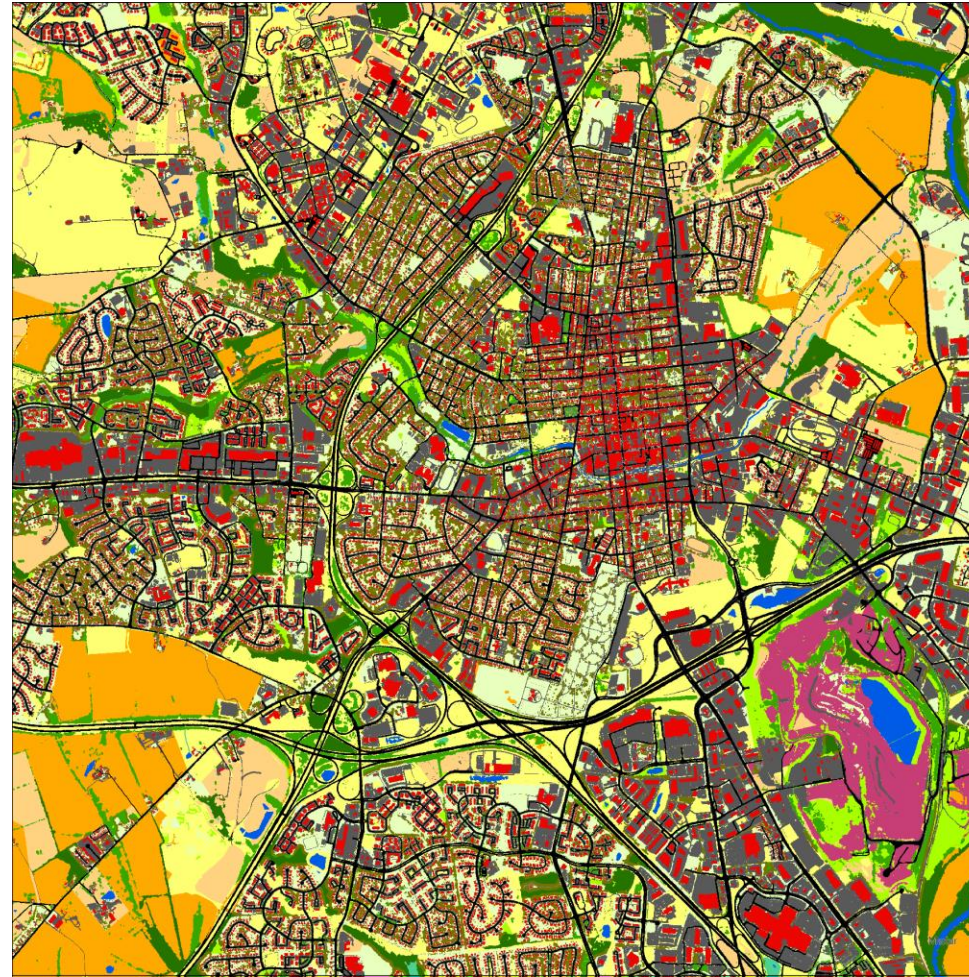
How Has Land Use Improved Since Phase 6?

National Agricultural Imagery Program (NAIP)



- | | |
|-------------------------------------|-----------------------|
| ■ Roads | ■ Turf Grass |
| ■ Structures | ■ Pervious, Developed |
| ■ Other Impervious | ■ Cropland |
| ■ Tree Canopy over Other Impervious | ■ Pasture and Hay |
| ■ Tree Canopy over Turf | ■ Extractive |

LULC 2013: Second high-res model released in 2022, 52 classes

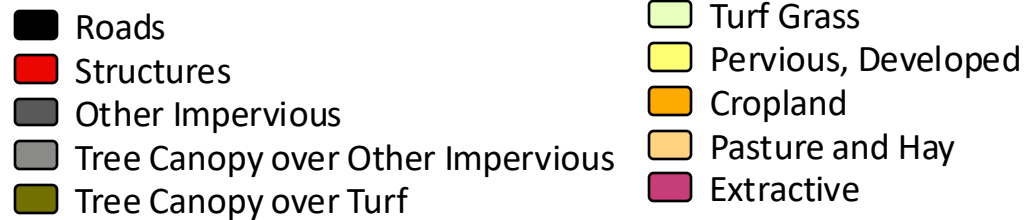
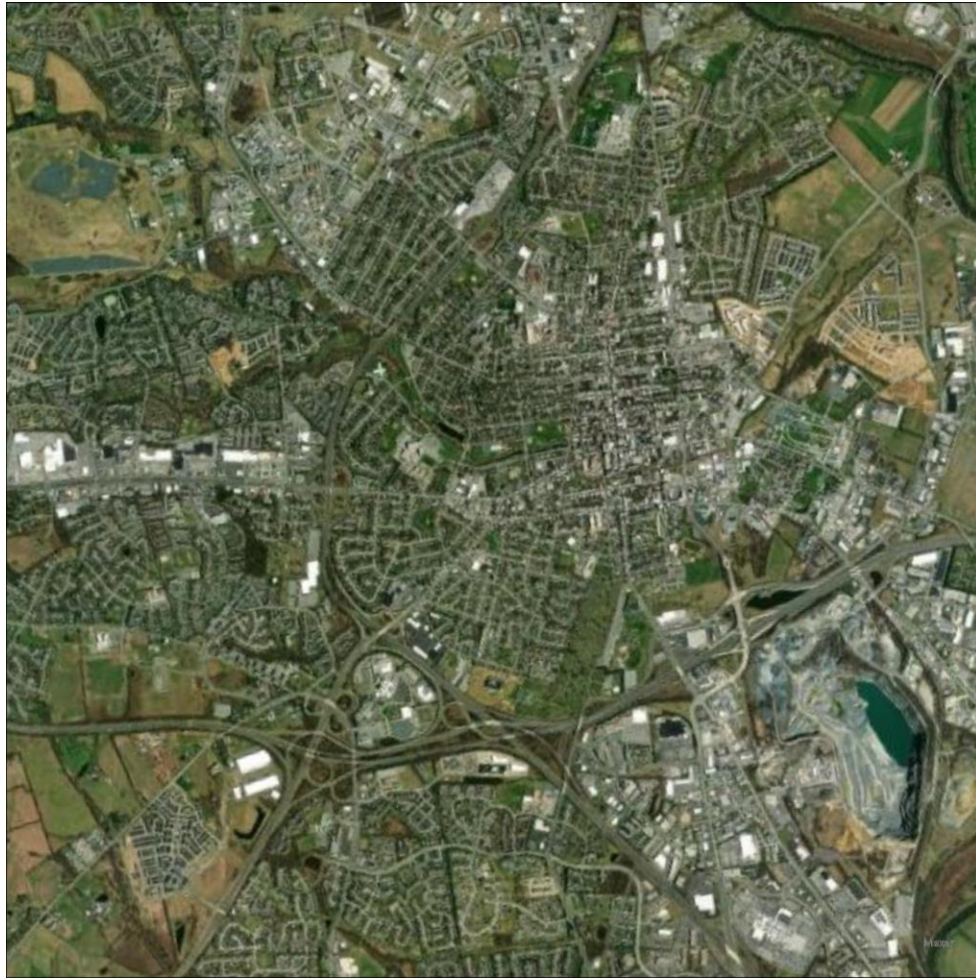


- | | |
|----------------------|-----------------------------------|
| ■ Forest | ■ Tidal Wetlands, Non-forested |
| ■ Forested, Other | ■ Riverine Wetlands, Non-forested |
| ■ Natural Succession | ■ Terrene Wetlands, Non-forested |
| ■ Harvested Forest | ■ Water |

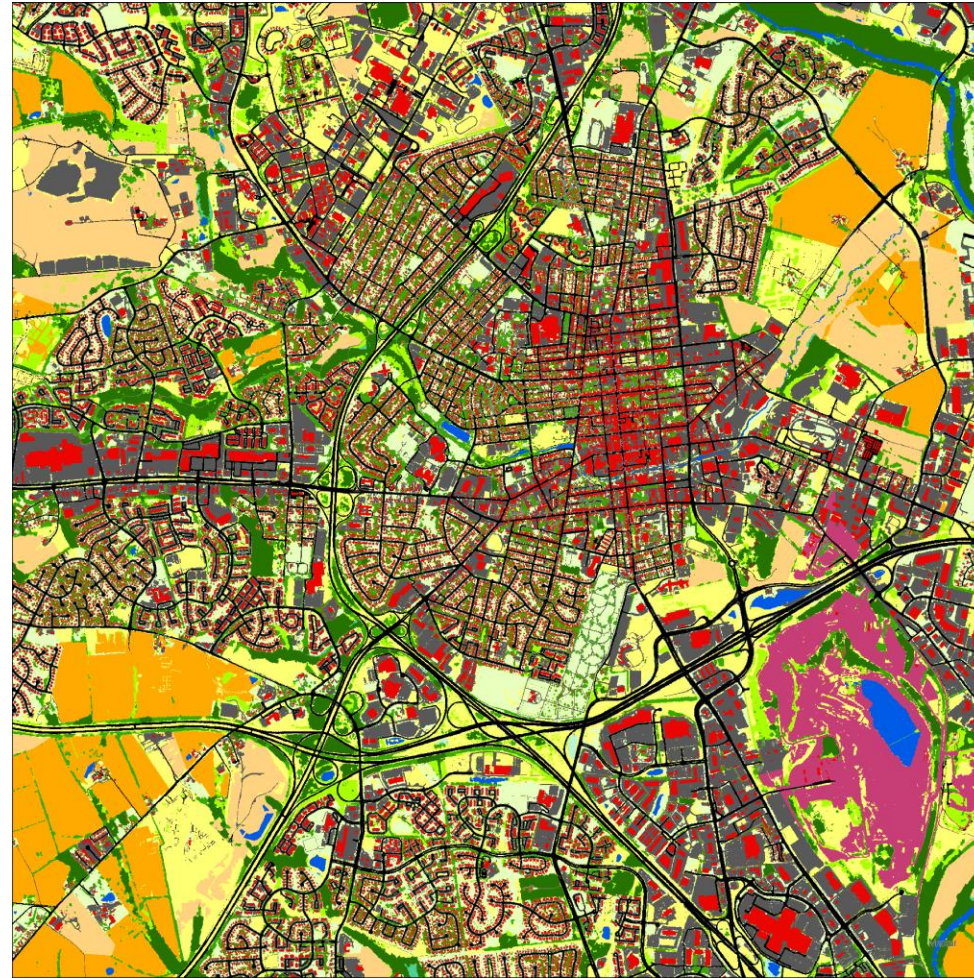
This version of LULC included the first high-resolution LULC change product from 2013 to 2018, which was incorporated as a land use update into CAST-23

How Has Land Use Improved Since Phase 6?

National Agricultural Imagery Program (NAIP)



LULC 2013: The third high-res model to be released in 2025, 56 classes



This version of LULC includes high-res LULC for three dates in time (2013/14, 2017/18, 2021/22) and change from 2013 to 2022. This product will be used in the development of the Phase 7 model.

Questions?

Sarah McDonald

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Mississippi Gulf Water Science Center

Land Use Work Group Coordinator, Chesapeake Bay
Program

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads

Roads
2. Impervious, Non-Roads

Structures
Other Impervious (Parking lots, driveways)
Extractive Impervious
3. Tree Canopy Over Impervious

TC over Roads
TC over Structures
TC over Other Impervious
4. Turf Grass

Turf Grass
5. Tree Canopy over Turf Grass

Tree Canopy over Turf Grass
6. Solar Infrastructure

Solar Field Panel Arrays
7. Solar Pervious

Solar Field Herbaceous
Solar Field Shrubland
8. Compacted Pervious

Extractive Barren
Suspended Succession Barren
Suspended Succession Herbaceous
Suspended Succession Shrubland
Natural Succession Herbaceous (urban areas)
9. Construction

Bare Developed (Urban areas?)
Solar Field Barren
Natural Succession Barren (Urban areas)
Reported Data from States
10. Forest

Forest
Forested, Other
Natural Succession Herbaceous (rural areas)
Natural Succession Shrubland
Riverine Wetlands Tree Canopy
Riverine Wetlands Forest
Terrene Wetlands Tree Canopy
Terrene Wetlands Forest
11. Harvested Forest (2)

Harvested Forest Barren
Harvested Forest Herbaceous
Natural Succession Barren (Rural areas)
Reported Data from States
12. Wetlands, Riverine Non-forested

Riverine Wetlands Barren
Riverine Wetlands Herbaceous
Riverine Wetlands Shrubland
Riverine Wetlands Harvested Forest
13. Wetlands, Terrene Non-forested

Terrene Wetlands Barren
Terrene Wetlands Herbaceous
Terrene Wetlands Shrubland
Terrene Wetlands Harvested Forest
14. Cropland

Cropland Barren
Cropland Herbaceous
Orchards and Vineyards Barren
Orchards and Vineyards Herbaceous
Orchards and Vineyards Shrubland
15. Pasture and Hay

Pasture and Hay Barren
Pasture and Hay Herbaceous
16. Water

Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)
Bare Shore- adjacent to lakes

Blue = LULC 56-class schema
White = Phase 7 Rollup schema

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads

Roads
2. Impervious, Non-Roads

Structures

Other Impervious (Parking lots, driveways)

Extractive Impervious
3. Tree Canopy Over Impervious

TC over Roads

TC over Structures

TC over Other Impervious
4. Turf Grass

Turf Grass
5. Tree Canopy over Turf Grass

Tree Canopy over Turf Grass
6. Solar Infrastructure

Solar Field Panel Arrays
7. Solar Pervious

Solar Field Herbaceous

Solar Field Shrubland
8. Compacted Pervious

Extractive Barren

Suspended Succession Barren

Suspended Succession Herbaceous

Suspended Succession Shrubland

Natural Succession Herbaceous (urban areas)
9. Construction

Bare Developed (Urban areas?)

Solar Field Barren

Natural Succession Barren (Urban areas)

Reported Data from States
10. Forest

Forest

Forested, Other

Natural Succession Herbaceous (rural areas)

Natural Succession Shrubland

Riverine Wetlands Tree Canopy

Riverine Wetlands Forest

Terrene Wetlands Tree Canopy

Terrene Wetlands Forest
11. Harvested Forest (2)

Harvested Forest Barren

Harvested Forest Herbaceous

Natural Succession Barren (Rural areas)

Reported Data from States
12. Wetlands, Riverine Non-forested

Riverine Wetlands Barren

Riverine Wetlands Herbaceous

Riverine Wetlands Shrubland

Riverine Wetlands Harvested Forest
13. Wetlands, Terrene Non-forested

Terrene Wetlands Barren

Terrene Wetlands Herbaceous

Terrene Wetlands Shrubland

Terrene Wetlands Harvested Forest
14. Cropland

Cropland Barren

Cropland Herbaceous

Orchards and Vineyards Barren

Orchards and Vineyards Herbaceous

Orchards and Vineyards Shrubland
15. Pasture and Hay

Pasture and Hay Barren

Pasture and Hay Herbaceous
16. Water

Lakes & Reservoirs

Riverine Ponds

Terrene Ponds

Streams and Rivers (visible water)

Bare Shore- adjacent to lakes

Blue = LULC 56-class schema (no proposed change)
White = Phase 7 Rollup schema (no proposed change)
Yellow = LULC 56-class schema (proposed change)
Orange = Phase 7 Rollup schema (proposed change)

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads
Roads

2. Impervious, Non-Roads
Structures
Other Impervious (Parking lots, driveways)
Extractive Impervious

3. Tree Canopy Over Impervious
TC over Roads
TC over Structures
TC over Other Impervious

4. Turf Grass
Turf Grass

5. Tree Canopy over Turf Grass
Tree Canopy over Turf Grass

6. Solar Infrastructure
Solar Field Panel Arrays

7. Solar Pervious
Solar Field Herbaceous
Solar Field Shrubland

8. Compacted Pervious
Extractive Barren

What's the Recommendation?

Two new classes representing solar infrastructure and pervious surrounding field-mounted solar panel arrays.

What was it in Phase 6?

Pervious was Mixed Open
Infrastructure was Impervious, Non-Roads.

Who's leading?

Urban Stormwater Workgroup (USWG)

What's the recommendation status?

USWG approved loading rates for the two new classes. The decision is set to be revisited upon the completion of ongoing studies. Ready for WQGIT update.

11. Harvested Forest (2)
Harvested Forest Barren
Harvested Forest Herbaceous
Natural Succession Barren (Rural areas)
Reported Data from States

12. Wetlands, Riverine Non-forested
Riverine Wetlands Barren

16. Water
Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)
Bare Shore- adjacent to lakes

Blue = LULC 56-class schema (no proposed change)
White = Phase 7 Rollup schema (no proposed change)
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Orange = Phase 7 Rollup schema (proposed change)

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads

20 Roads

2. Impervious, Non-Roads

- 21 Structures
- 22 Other Impervious (Parking lots, driveways)
- 31 Extractive Impervious

3. Tree Canopy Over Impervious

- 23 TC over Roads
- 24 TC over Structures
- 25 TC over Other Impervious

4. Turf Grass

27 Turf Grass

5. Tree Canopy over Turf Grass

26 Tree Canopy over Turf Grass

6. Solar Infrastructure

32 Solar Field Panel Arrays

7. Solar Pervious

- 34 Solar Field Herbaceous
- 35 Solar Field Shrubland

8. Compacted Pervious

- Extractive Barren
- Suspended Succession Barren
- Suspended Succession Herbaceous
- Suspended Succession Shrubland
- Natural Succession Herbaceous (urban areas)

9. Construction

- Bare Developed (Urban areas?)
- Solar Field Barren
- Natural Succession Barren (Urban areas)
- Reported Data from States

10. Forest

- Forest
- Forested, Other
- Natural Succession Herbaceous (rural areas)
- Natural Succession Shrubland
- Riverine Wetlands Tree Canopy
- Riverine Wetlands Forest
- Terrene Wetlands Tree Canopy
- Terrene Wetlands Forest

11. Harvested Forest (2)

- Harvested Forest Barren
- Harvested Forest Herbaceous
- Natural Succession Barren (Rural areas)
- Reported Data from States

12. Wetlands, Riverine Non-forested

What's the Recommendation?

Explicit mapping of construction in high-res LULC to be reconciled with reported construction and potentially replace reporting.

What was it in Phase 6?

Mixed Open

Who's leading?

Watershed Technical Workgroup (WTWG)

What's the recommendation status?

No formal recommendation has yet occurred at the WTWG. This topic will be discussed at the June meeting (June 5th). Recommendation will go to Urban Stormwater after that.

15 Bare Shore- adjacent to lakes

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Orange = Phase 7 Rollup schema (proposed change)

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads
Roads

2. Impervious, Non-Roads
Structures
Other Impervious (Parking lots, driveways)
Extractive Impervious

3. Tree Canopy Over Impervious
TC over Roads
TC over Structures
TC over Other Impervious

4. Turf Grass
Turf Grass

5. Tree Canopy over Turf Grass
Tree Canopy over Turf Grass

6. Solar Infrastructure
Solar Field Panel Arrays

7. Solar Pervious
Solar Field Herbaceous
Solar Field Shrubland

8. Compacted Pervious
Extractive Barren
Suspended Succession Barren
Suspended Succession Herbaceous
Suspended Succession Shrubland
Natural Succession Herbaceous (urban areas)

9. Construction
Bare Developed (Urban areas?)
Solar Field Barren
Natural Succession Barren (Urban areas)
Reported Data from States

10. Forest
Forest
Forested, Other
Natural Succession Herbaceous (rural areas)
Natural Succession Shrubland
Riverine Wetlands Tree Canopy
Riverine Wetlands Forest
Terrene Wetlands Tree Canopy
Terrene Wetlands Forest

11. Harvested Forest (2)
Harvested Forest Barren
Harvested Forest Herbaceous
Natural Succession Barren (Rural areas)
Reported Data from States

What's the Recommendation?
Recommendations include moving NATS Shrubland and NATS Herbaceous (rural areas) to Forest, NATS Barren (rural areas) to Harvested Forest, NATS Barren (urban areas) to Construction, and keeping NATS Herbaceous (urban areas) in Compacted Pervious (previously called Mixed Open).

What was it in Phase 6?
Mixed Open

Who's leading?
Forestry Workgroup (FWG)

What's the recommendation status?
Approved recommendation by FWG. NATS Barren (urban) to construction needs approval by WTWG. Ready for WQGIT update.

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Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads
Roads

2. Impervious, Non-Roads
Structures
Other Impervious (Parking lots, etc.)
Extractive Impervious

3. Tree Canopy Over Impervious
TC over Roads
TC over Structures
TC over Other Impervious

4. Turf Grass
Turf Grass

5. Tree Canopy over Turf Grass
Tree Canopy over Turf Grass

6. Solar Infrastructure
Solar Field Panel Arrays

7. Solar Pervious
Solar Field Herbaceous
Solar Field Shrubland

8. Compacted Pervious

What's the Recommendation?

Retain Cropland and Pasture and Hay classes in the roll-up. Use the mapped Cropland acres and Pasture and Hay acres in Phase 7. Explore improving distinction between Cropland and Pasture and Hay with relevant supplemental data.

Who's leading?

Agriculture Modeling Team (AMT)

What's the recommendation status?

Informational session at the May 9th AMT meeting covering:

- 1. the mapped agricultural footprint (Cropland + Pasture and Hay) for use in Phase 7
- 2. the mapped acres of Cropland and Pasture and Hay

12. Wetlands, Riverine Non-forested
Riverine Wetlands Barren
Riverine Wetlands Herbaceous
Riverine Wetlands Shrubland
Riverine Wetlands Harvested Forest

13. Wetlands, Terrene Non-forested
Terrene Wetlands Barren
Terrene Wetlands Herbaceous
Terrene Wetlands Shrubland
Terrene Wetlands Harvested Forest

14. Cropland
Cropland Barren
Cropland Herbaceous
Orchards and Vineyards Barren
Orchards and Vineyards Herbaceous
Orchards and Vineyards Shrubland

15. Pasture and Hay
Pasture and Hay Barren
Pasture and Hay Herbaceous

16. Water
Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)
Bare Shore- adjacent to lakes

Blue = LULC 56-class schema (no proposed change)
White = Phase 7 Rollup schema (no proposed change)
Yellow = LULC 56-class schema (proposed change)
Orange = Phase 7 Rollup schema (proposed change)

Natural Succession Barren (Rural areas)
Reported Data from States

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads
Roads

2. Impervious, Non-Roads
Structures
Other Impervious (Parking lots, etc)
Extractive Impervious

3. Tree Canopy Over Impervious
TC over Roads
TC over Structures
TC over Other Impervious

4. Turf Grass
Turf Grass

5. Tree Canopy over Turf Grass
Tree Canopy over Turf Grass

6. Solar Infrastructure
Solar Field Panel Arrays

7. Solar Pervious
Solar Field Herbaceous
Solar Field Shrubland

8. Compacted Pervious

Extractive Barren
Suspended Succession Barren
Suspended Succession Herbaceous
Suspended Succession Shrubland

CAST Land Use Recommendation

Add managed and unmanaged pasture
and managed and unmanaged hay
classes as unique land sources

Who’s leading?

Agriculture Modeling Team (AMT)

What’s the recommendation status?

Approved by AMT

(urban areas)

(urban areas)

(rural areas)

Riverine Wetlands Forest
Terrene Wetlands Tree Canopy
Terrene Wetlands Forest

11. Harvested Forest (2)

Harvested Forest Barren
Harvested Forest Herbaceous
Natural Succession Barren (Rural areas)
Reported Data from States

12. Wetlands, Riverine Non-forested

Riverine Wetlands Barren
Riverine Wetlands Herbaceous
Riverine Wetlands Shrubland
Riverine Wetlands Harvested Forest

13. Wetlands, Terrene Non-forested

Terrene Wetlands Barren
Terrene Wetlands Herbaceous
Terrene Wetlands Shrubland
Terrene Wetlands Harvested Forest

14. Cropland

Cropland Barren
Cropland Herbaceous
Orchards and Vineyards Barren
Orchards and Vineyards Herbaceous
Orchards and Vineyards Shrubland

15. Pasture and Hay

Pasture and Hay Barren
Pasture and Hay Herbaceous

16. Water

Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)
Bare Shore- adjacent to lakes

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Orange = Phase 7 Rollup schema (proposed change)

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads
Roads

2. Impervious, Non-Roads
Structures
Other Impervious (Parking lots, driveways)
Extractive Impervious

3. Tree Canopy Over Impervious
TC over Roads
TC over Structures
TC over Other Impervious

4. Turf Grass
Turf Grass

5. Tree Canopy over Turf Grass
Tree Canopy over Turf Grass

6. Solar Infrastructure
Solar Field Panel Arrays

7. Solar Pervious
Solar Field Herbaceous
Solar Field Shrubland

8. Compacted Pervious

Extractive Barren
Suspended Succession Barren
Suspended Succession Herbaceous
Suspended Succession Shrubland
Natural Succession Herbaceous (urban areas)

What's the Recommendation?
Name change of Mixed Open to Compacted Pervious.

Who's leading?
Land Use Workgroup (LUWG)

What's the recommendation status?
Approved by LUWG. Ready for WQGIT update.

Terrene Wetlands Forest
Terrene Wetlands Tree Canopy
Terrene Wetlands Forest

11. Harvested Forest (2)
Harvested Forest Barren
Harvested Forest Herbaceous
Natural Succession Barren (Rural areas)
Reported Data from States

12. Wetlands, Riverine Non-forested
Riverine Wetlands Barren
Riverine Wetlands Herbaceous
Riverine Wetlands Shrubland
Riverine Wetlands Harvested Forest

13. Wetlands, Terrene Non-forested
Terrene Wetlands Barren
Terrene Wetlands Herbaceous
Terrene Wetlands Shrubland
Terrene Wetlands Harvested Forest

14. Cropland
Cropland Barren
Cropland Herbaceous
Orchards and Vineyards Barren
Orchards and Vineyards Herbaceous
Orchards and Vineyards Shrubland

15. Pasture and Hay
Pasture and Hay Barren
Pasture and Hay Herbaceous

16. Water
Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)
Bare Shore- adjacent to lakes

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Yellow = LULC 56-class schema (proposed change)
Orange = Phase 7 Rollup schema (proposed change)

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads
Roads

2. Impervious, Non-Roads
Structures
Other Impervious (Parking lots, driveways)
Extractive Impervious

3. Tree Canopy Over Impervious
TC over Roads
TC over Structures
TC over Other Impervious

4. Turf Grass
Turf Grass

5. Tree Canopy over Turf Grass
Tree Canopy over Turf Grass

6. Solar Infrastructure
Solar Field Panel Arrays

7. Solar Pervious
Solar Field Herbaceous
Solar Field Shrubland

8. Compacted Pervious
Extractive Barren
Suspended Succession Barren
Suspended Succession Herbaceous
Suspended Succession Shrubland
Natural Succession Herbaceous (urban areas)

11. Harvested Forest (2)
Harvested Forest Barren
Harvested Forest Herbaceous
Natural Succession Barren (Rural areas)
Reported Data from States

12. Wetlands, Riverine Non-forested
Riverine Wetlands Barren
Riverine Wetlands Herbaceous
Riverine Wetlands Shrubland
Riverine Wetlands Harvested Forest

13. Wetlands, Terrene Non-forested
Terrene Wetlands Barren
Terrene Wetlands Herbaceous
Terrene Wetlands Shrubland
Terrene Wetlands Harvested Forest

14. Cropland
Cropland Barren
Cropland Herbaceous
Orchards and Vineyards Barren
Orchards and Vineyards Herbaceous
Orchards and Vineyards Shrubland

15. Pasture and Hay
Pasture and Hay Barren
Pasture and Hay Herbaceous

16. Water
Lakes & Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers (visible water)

What's the Recommendation?
Bare shore adjacent to lakes be moved to water.

What was it in Phase 6?
Mixed Open

Who's leading?
Land Use Workgroup (LUWG)

What's the recommendation status?
Feedback request (vote June 18th LUWG)

Bare Shore- adjacent to lakes

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Yellow = LULC 56-class schema (proposed change)
Orange = Phase 7 Rollup schema (proposed change)

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads

Roads

2. Impervious, Non-Roads

Structures

Other Impervious (Parking lots, driveways)

Extractive Impervious

3. Tree Canopy Over Impervious

TC over Roads

TC over Structures

TC over Other Impervious

4. Turf Grass

Turf Grass

5. Tree Canopy over Turf Grass

Tree Canopy over Turf Grass

8. Compacted Pervious

Extractive Barren

Suspended Succession Barren

Suspended Succession Herbaceous

Suspended Succession Shrubland

Natural Succession Herbaceous (urban areas)

9. Construction

Bare Developed (Urban areas?)

Solar Field Barren

Natural Succession Barren (Urban areas)

Reported Data from States

10. Forest

Forest

Forested, Other

Natural Succession Herbaceous (rural areas)

Natural Succession Shrubland

Riverine Wetlands Tree Canopy

Riverine Wetlands Forest

Terrene Wetlands Tree Canopy

Terrene Wetlands Forest

1. Harvested Forest (2)

Harvested Forest Barren

Harvested Forest Herbaceous

Natural Succession Barren (Rural areas)

Reported Data from States

12. Wetlands, Riverine Non-forested

Riverine Wetlands Barren

Riverine Wetlands Herbaceous

Riverine Wetlands Shrubland

Riverine Wetlands Harvested Forest

13. Wetlands, Terrene Non-forested

Terrene Wetlands Barren

Terrene Wetlands Herbaceous

Terrene Wetlands Shrubland

Terrene Wetlands Harvested Forest

14. Cropland

Cropland Barren

Cropland Herbaceous

Orchards and Vineyards Barren

Orchards and Vineyards Herbaceous

Orchards and Vineyards Shrubland

15. Pasture and Hay

Pasture and Hay Barren

Pasture and Hay Herbaceous

16. Water

Lakes & Reservoirs

Riverine Ponds

Terrene Ponds

Streams and Rivers (visible water)

Bare Shore- adjacent to lakes

What’s the Recommendation?

Keep the same as Phase 6.

Who’s leading?

Land Use Workgroup (LUWG)

What’s the recommendation status?

Feedback request (vote June 18th LUWG)

Summary of Phase 7 Aggregation Decisions

Recommendation	Phase 6 Class	Workgroup Lead	Recommendation Status	Next update
Add two Solar classes (infrastructure and pervious)	Mixed Open and Impervious, Non-Roads	Urban Stormwater	Approved by USWG	Update WQGIT
Add Construction class	Mixed Open	Watershed Technical	Ongoing	WTWG June 5 th
Move Natural Succession LULC classes	Mixed Open	Forestry	Approved by FWG	Update WQGIT
Use mapped agricultural footprint as acres of ag. Use mapped distinction of Cropland and Pasture/Hay acres.	Cropland and Pasture	Ag Modeling Team	Pending future discussion	AMT May 9 th
Rename Mixed Open to Compacted Pervious	Mixed Open	Land Use	Approved by LUWG	Update WQGIT
Move Bare Shore LULC class to Water	Mixed Open	Land Use	Ongoing	LUWG June 18 th
Keep Phase 6 rollup the same for remaining classes		Land Use	Ongoing	LUWG June 18 th