



Land Use/Land Cover Tree Canopy Planned Updates

Sarah McDonald (she/her), Geographer, U.S. Geological Survey

Lower Mississippi Gulf Water Science Center

Land Use Work Group and Forestry Work Group Joint Meeting
December 7, 2022

Introduction

- 2022 Ed.: Land Use/Land Cover (LULC) released in June 2022 for 2013/14 and 2017/18
- 2024 Ed.: Planned release of LULC for 2013/14, 2017/18, and 2021/22
- All model revisions will be applied to all 3 dates released in the 2024 edition



CBP Land Use/Cover Classification (65 planned for 2024 Ed., 54 classes mapped for 2022 Ed.)

1. Water (11)

- 1.1 Estuarine / Marine
- 1.2 Lentic (fresh)
 - 1.2.1. Lakes and reservoirs
 - 1.2.2 Riverine ponds
 - 1.2.3 Terrene ponds
- 1.3 Lotic (fresh)
 - 1.3.1 Channel
 - 1.3.1.1 Open Channel
 - 1.3.1.2 Tree Canopy over Channel
 - 1.3.1.3 Culverted
 - 1.3.2. Ditches
 - 1.3.2.1 Open Ditch
 - 1.3.2.2 Tree Canopy over Ditch
 - 1.3.2.3 Tree Canopy over Culverted

2. Developed (12)

- 2.1 Impervious
 - 2.1.1 Roads
 - 2.1.2 Structures
 - 2.1.3 Other Impervious
 - 2.1.4 Tree Canopy (TC) over Impervious
 - 2.1.4.1 TC over Roads
 - 2.1.4.2 TC over Structures
 - 2.1.4.3 TC over Other Impervious
- 2.2 Pervious
 - 2.2.1 Turf Grass
 - 2.2.2 Transitional Barren
 - 2.2.3 Suspended Succession
 - 2.2.3.1 Barren
 - 2.2.3.2 Herbaceous
 - 2.2.3.3 Scrub-shrub
 - 2.2.4 Tree Canopy over Turf Grass

3. Forested (7)

- 3.1 Forest
- 3.2 Other Tree Canopy
- 3.3 Harvested Forest
 - 3.3.1 Barren
 - 3.3.2 Herbaceous
- 3.4 Natural Succession
 - 3.4.1 Barren
 - 3.4.2 Herbaceous
 - 3.4.3 Scrub-shrub

4. Production (17)

- 4.1 Agriculture
 - 4.1.1 Cropland
 - 4.1.1.1 Barren
 - 4.1.1.2 Herbaceous
 - 4.1.2 Pasture/Hay
 - 4.1.2.1 Barren
 - 4.1.2.2 Herbaceous
 - 4.1.2.3 Scrub-shrub
 - 4.1.3 Orchard/vineyard
 - 4.1.3.1 Barren
 - 4.1.3.2 Herbaceous
 - 4.1.3.3 Scrub-shrub
 - 4.1.4 Animal Operations
 - 4.1.4.1 Impervious
 - 4.1.4.2 Barren
 - 4.1.4.3 Herbaceous

4.2 Solar fields

- 4.2.1 Impervious
- 4.2.2 Pervious
 - 4.2.2.1 Barren
 - 4.2.2.2 Herbaceous
 - 4.2.2.3 Scrub-shrub

4.3 Extractive (active mines)

- 4.3.1 Barren
- 4.3.2 Impervious

5. Wetlands and Water Margins (16)

5.1 Tidal

- 5.1.1 Barren
- 5.1.2 Herbaceous
- 5.1.3 Scrub-shrub
- 5.1.4 Other Tree Canopy
- 5.1.5 Forest
- 5.1.6 Harvested Forest

5.2 Riverine (Non-tidal)

- 5.2.1. Barren
- 5.2.2 Herbaceous
- 5.2.3 Scrub-shrub
- 5.2.4 Other Tree Canopy
- 5.2.5 Forest
- 5.2.6 Harvested Forest

5.3 Terrene/Isolated (Non-tidal)

- 5.3.1 Barren
- 5.3.2 Herbaceous
- 5.3.3 Scrub-shrub
- 5.3.4 Other Tree Canopy
- 5.3.5 Forest
- 5.3.6 Harvested Forest

5.4 Bare shore

CBP Land Use/Cover Classification (65 planned for 2024 Ed., 54 classes mapped for 2022 Ed.)

3. Forested (7)

- 3.1 Forest
- 3.2 Other Tree Canopy
- 3.3 Harvested Forest
 - 3.3.1 Barren
 - 3.3.2 Herbaceous

5. Wetlands and Water Margins (16)

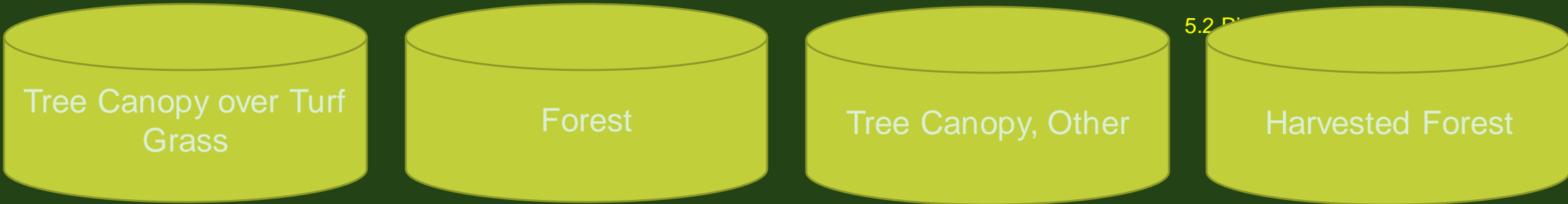
5.1 Tidal

- 5.1.4 Other Tree Canopy
- 5.1.5 Forest
- 5.1.6 Harvested Forest

5.2 P

5.3 Terrene/Isolated (Non-tidal)

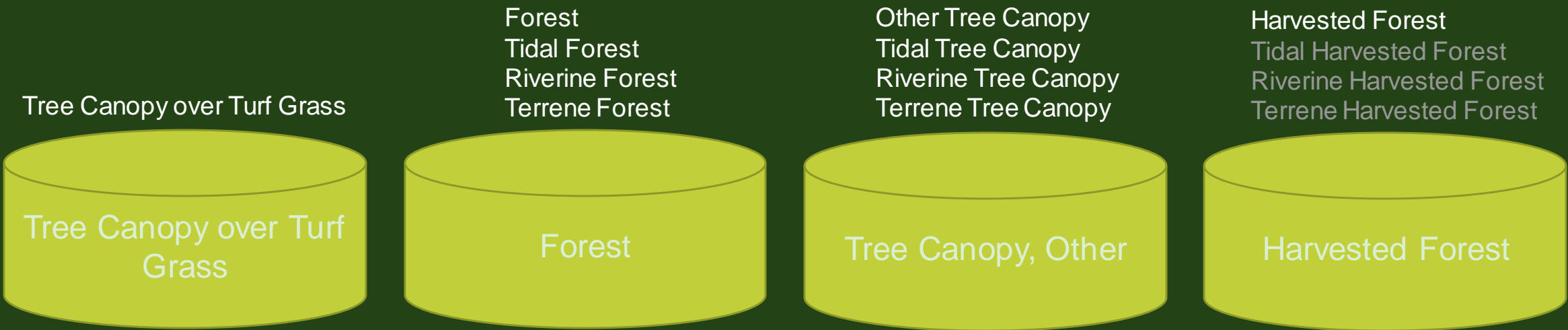
- 5.3.4 Other Tree Canopy
- 5.3.5 Forest
- 5.3.6 Harvested Forest



2.2.4 Tree Canopy over Turf Grass

Note: Yellow and blue classes mapped for 2022 Ed.. Grey classes are planned for 2024 Ed.

CBP Land Use/Cover Tree Canopy and Forestry Classes



Note: White classes mapped for 2022 Ed. Grey classes are planned for 2024 Ed.

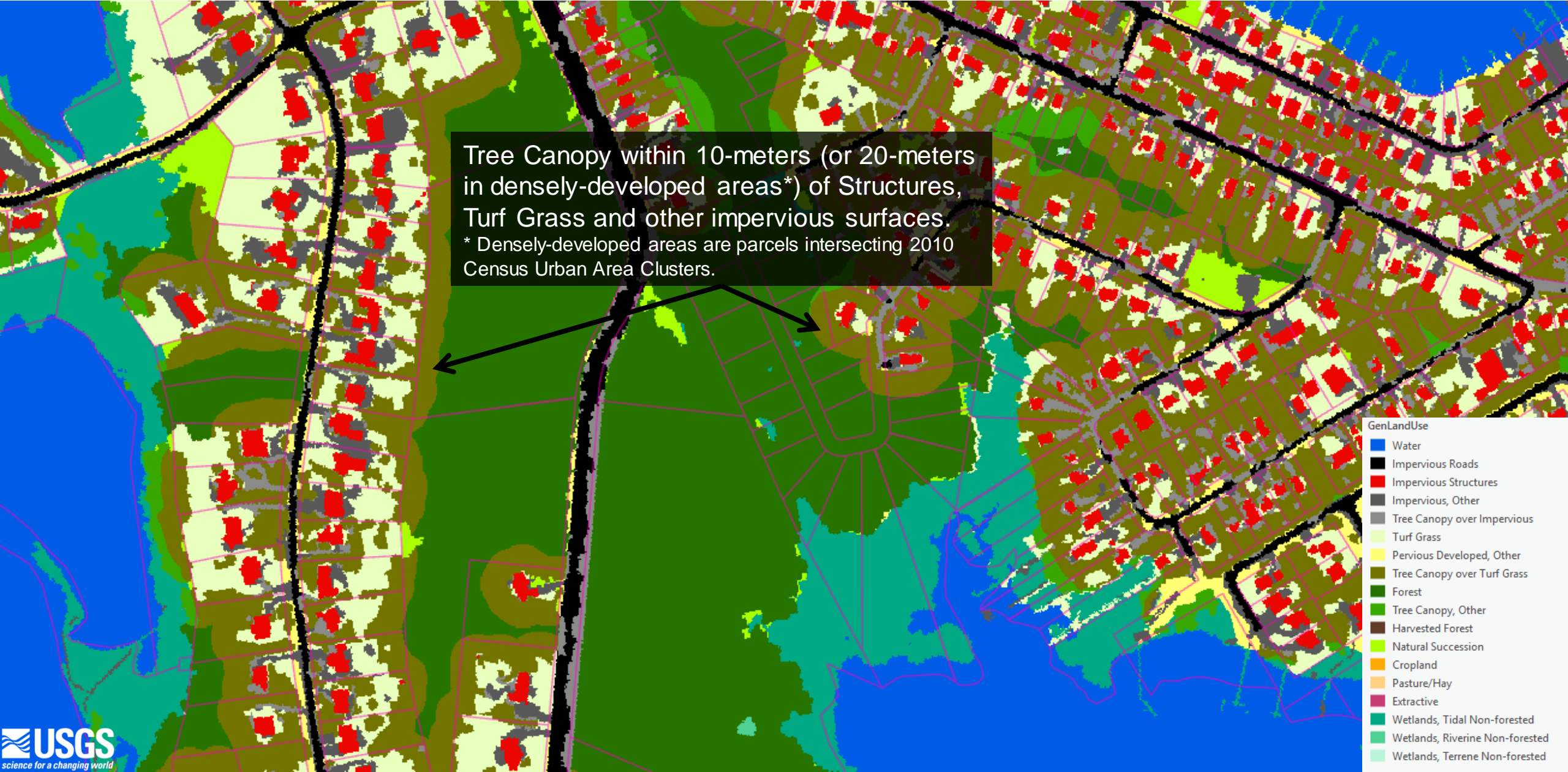
Tree Canopy over Turf Grass (TCTG): NAIP Imagery

“Tree canopy overlapping managed low vegetation in developed areas that is assumed to be turf grass or otherwise altered through compaction, removal of surface organic material, and/or fertilization.”



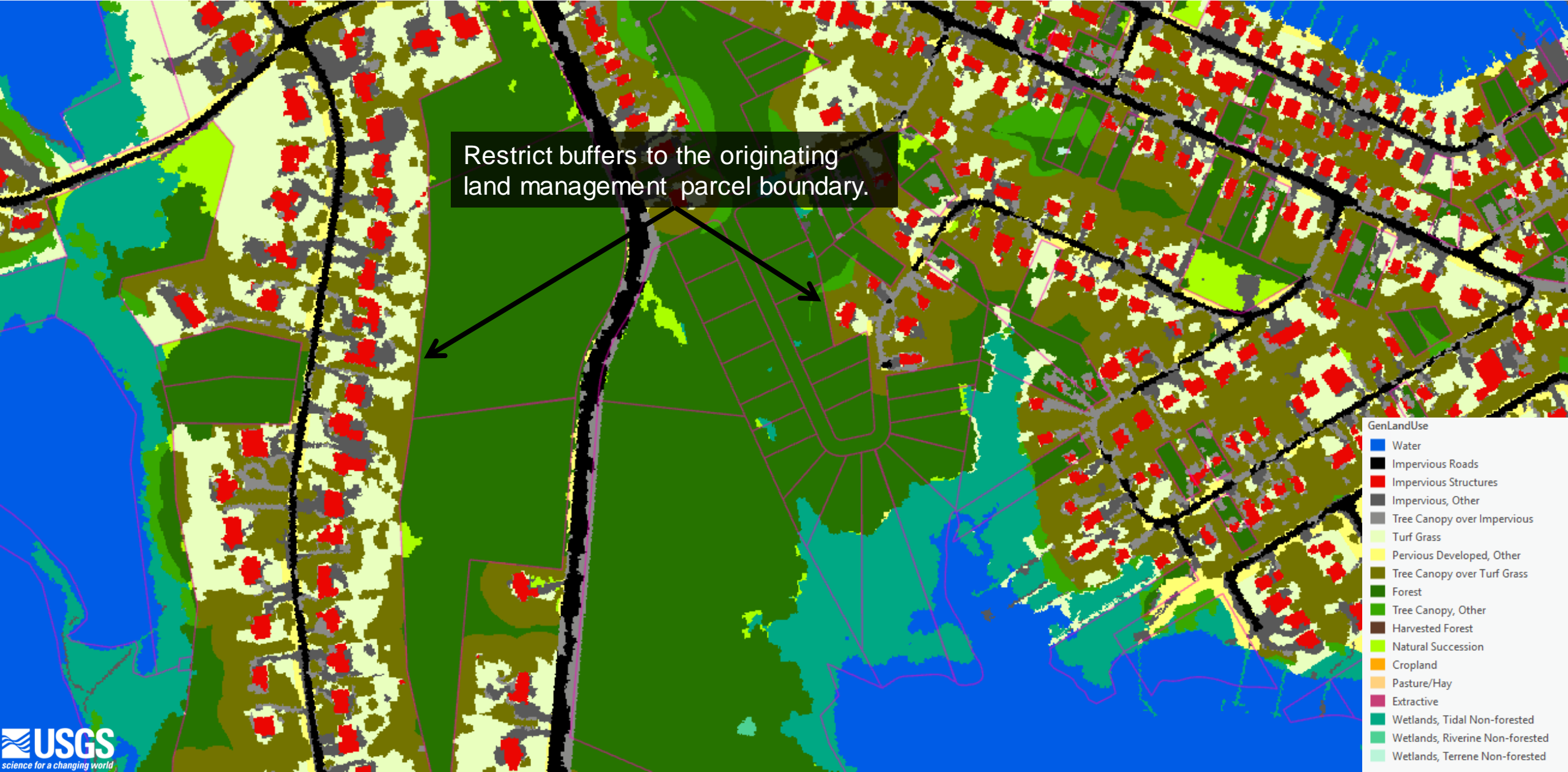
Tree Canopy over Turf Grass (TCTG): 2022 Ed.

“Tree canopy overlapping managed low vegetation in developed areas that is assumed to be turf grass or otherwise altered through compaction, removal of surface organic material, and/or fertilization.”



Tree Canopy over Turf Grass (TCTG): 2024 Ed.

“Tree canopy overlapping managed low vegetation in developed areas that is assumed to be turf grass or otherwise altered through compaction, removal of surface organic material, and/or fertilization.”



Tree Canopy over Turf Grass (TCTG): Decisions

“Tree canopy overlapping managed low vegetation in developed areas that is assumed to be turf grass or otherwise altered through compaction, removal of surface organic material, and/or fertilization.”

1. Restrict TCTG buffers to land management parcels?
 - Assumes management and compaction from the development process ends at property lines (fences?)
2. Change buffer sizes? Should rural, forested, and densely developed areas have different buffer sizes?
 - 10-meter in rural and forested, 20-meter in densely developed





Turf Grass to Tree Canopy Transitions: 2013 Imagery

Turf Grass to Tree Canopy Transitions: 2018 Imagery



Turf Grass to Tree Canopy Transitions: 2013 LULC



Turf Grass to Tree Canopy Transitions: 2018 Imagery



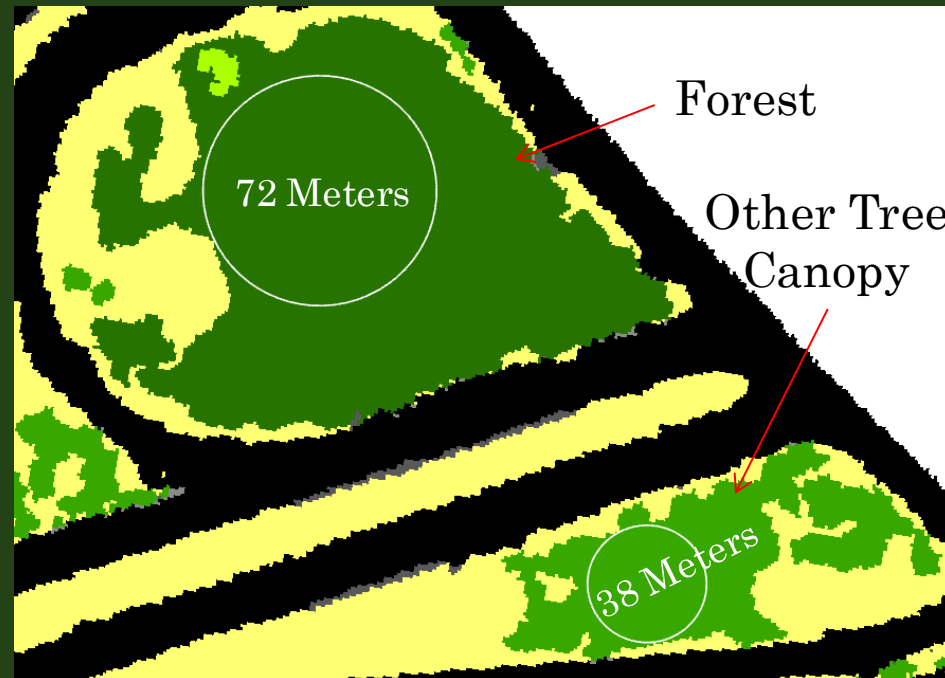
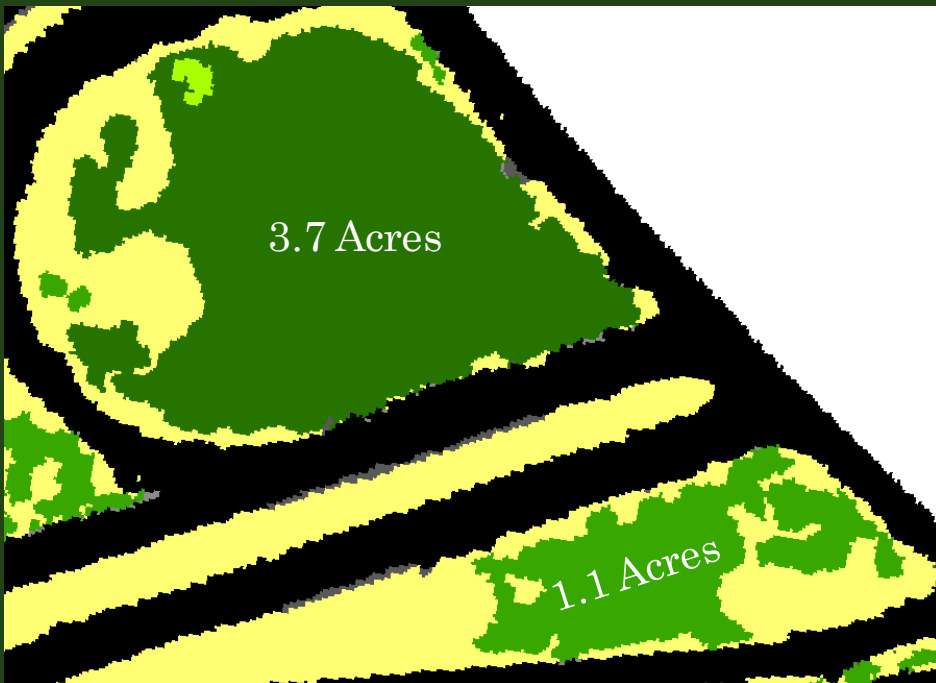
Turf Grass to Tree Canopy Transitions: Decisions

1. Turf Grass transitioning to Forest or Other Tree Canopy (small patches of Tree Canopy with undisturbed understory). Should this transition always be Turf Grass to Tree Canopy over Turf Grass?
 - Turf Grass in early date implies the ground was compacted due to the development process.

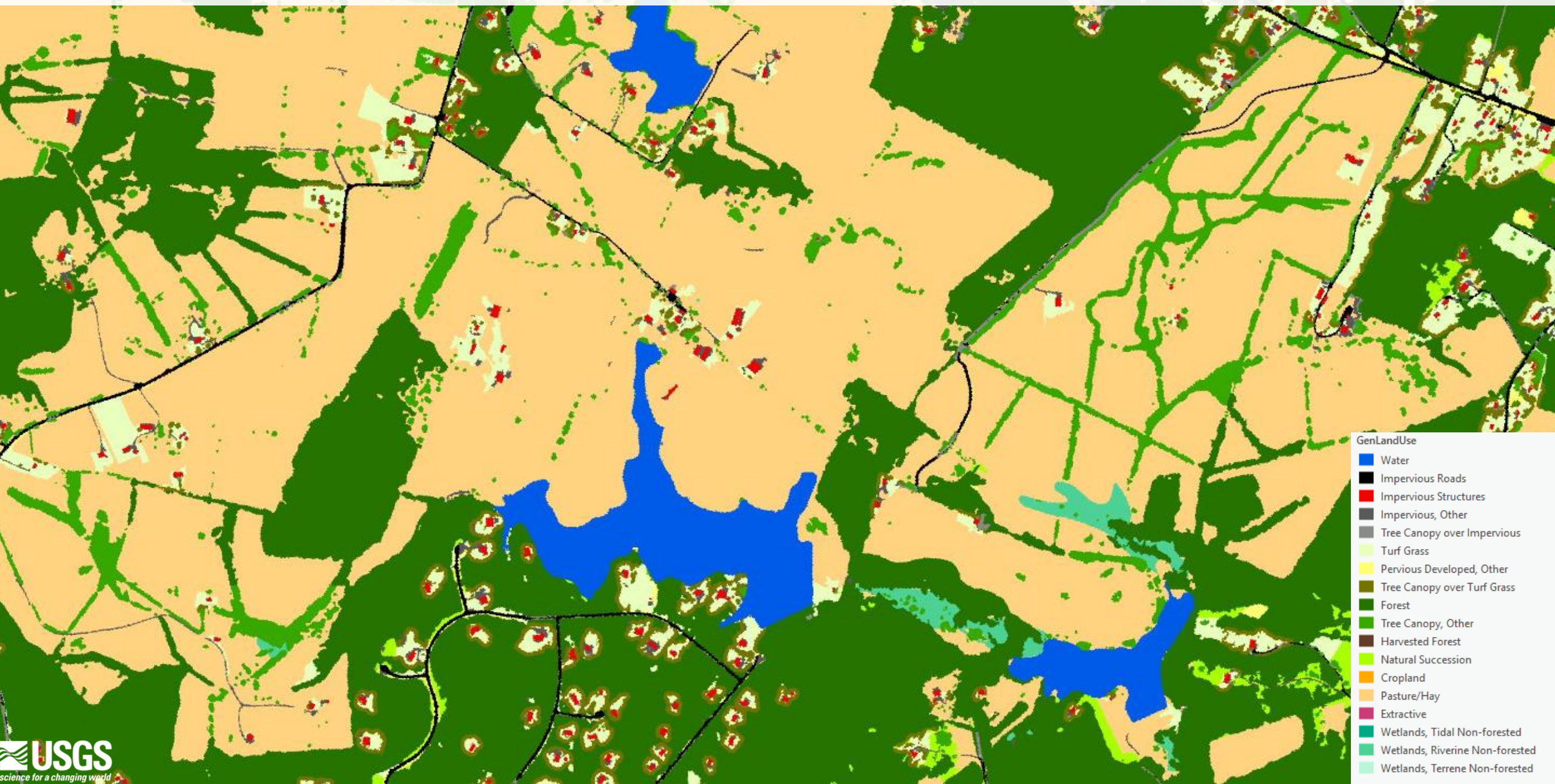


Forest and Tree Canopy, Other

- Forest (FORE) is any contiguous patch of Tree Canopy that is at least 1 acre in area and has a width (diameter) of at least 72-meters
- Other Tree Canopy (TCOT) is any Tree canopy patches with unmanaged understories that do not meet forest requirements, including agricultural windbreaks and woodlots.



Forest and Tree Canopy, Other

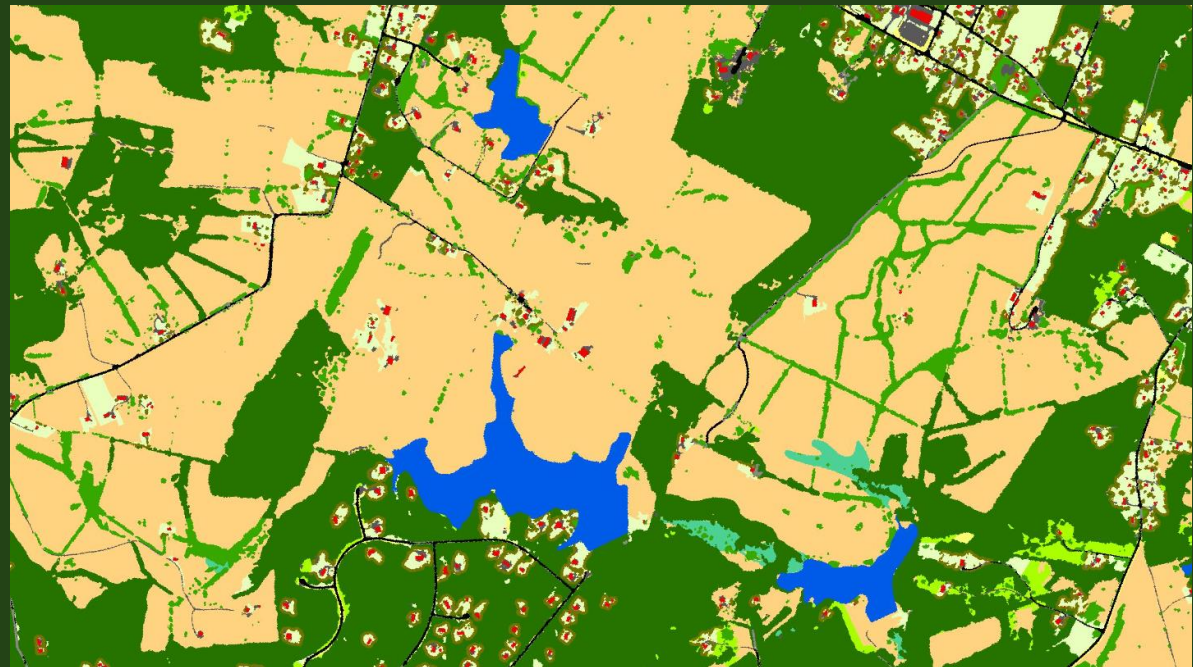
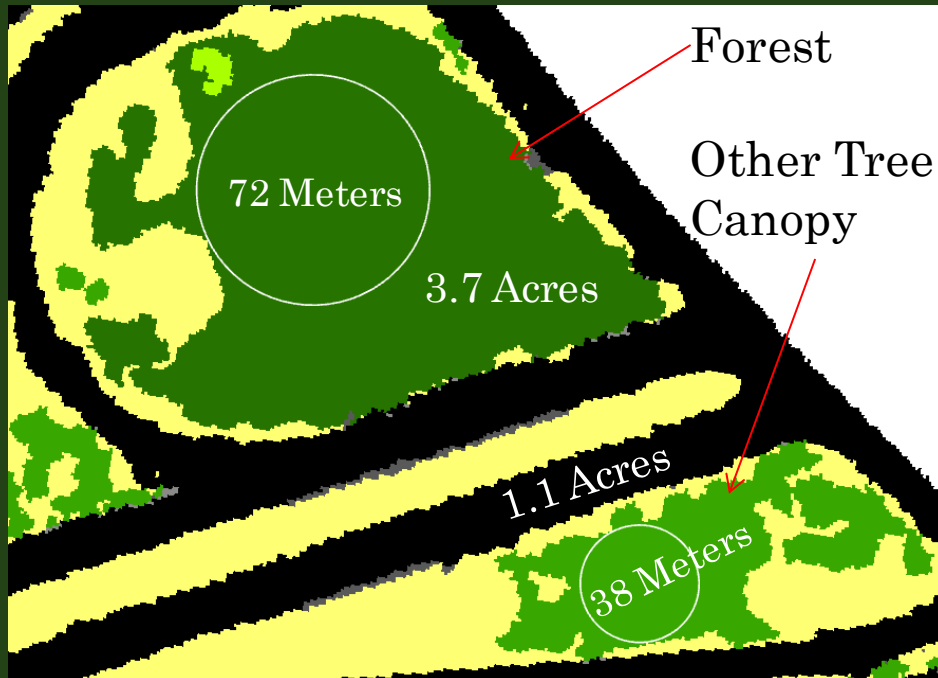


Forest and Tree Canopy, Other



Forest and Tree Canopy, Other: Decisions

1. Windbreaks and other long narrow Tree Canopy features connected to large forest patches should be Tree Canopy, Other (not forest)
2. Change Forest metrics?
 - 72-meter width diameter and 1-acre area threshold



Harvested Forest Wetlands: NAIP Imagery 2018

“Barren and herbaceous lands resulting from recently cleared forests and other tree canopy in association with a timber harvest permit (DE, MD, PA, VA, WV) or having a land use history of forest rotation since the mid 1980’s”



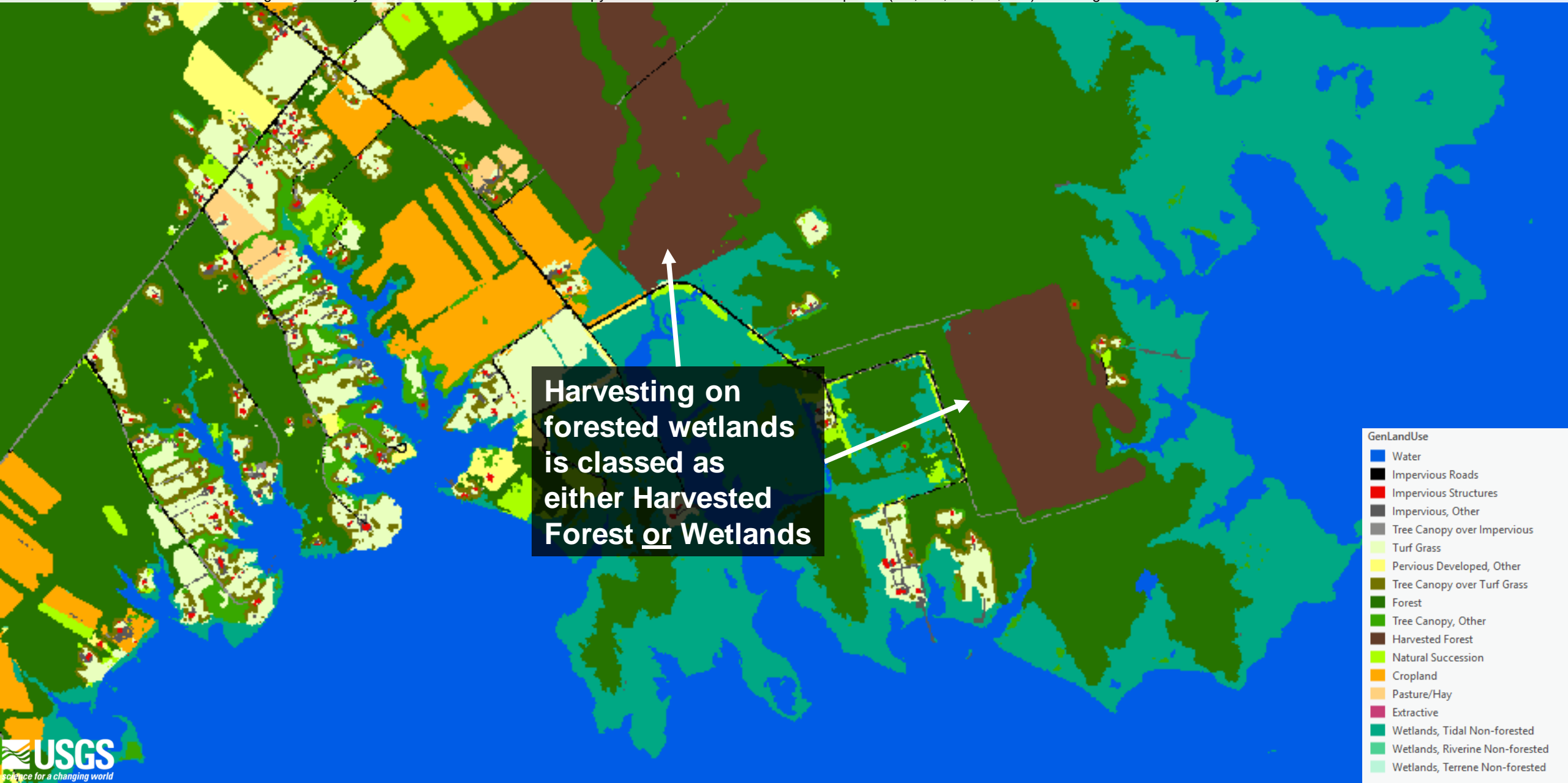
Harvested Forest Wetlands

“Barren and herbaceous lands resulting from recently cleared forests and other tree canopy in association with a timber harvest permit (DE, MD, PA, VA, WV) or having a land use history of forest rotation since the mid 1980’s”



Harvested Forest Wetlands: 2022 Ed.

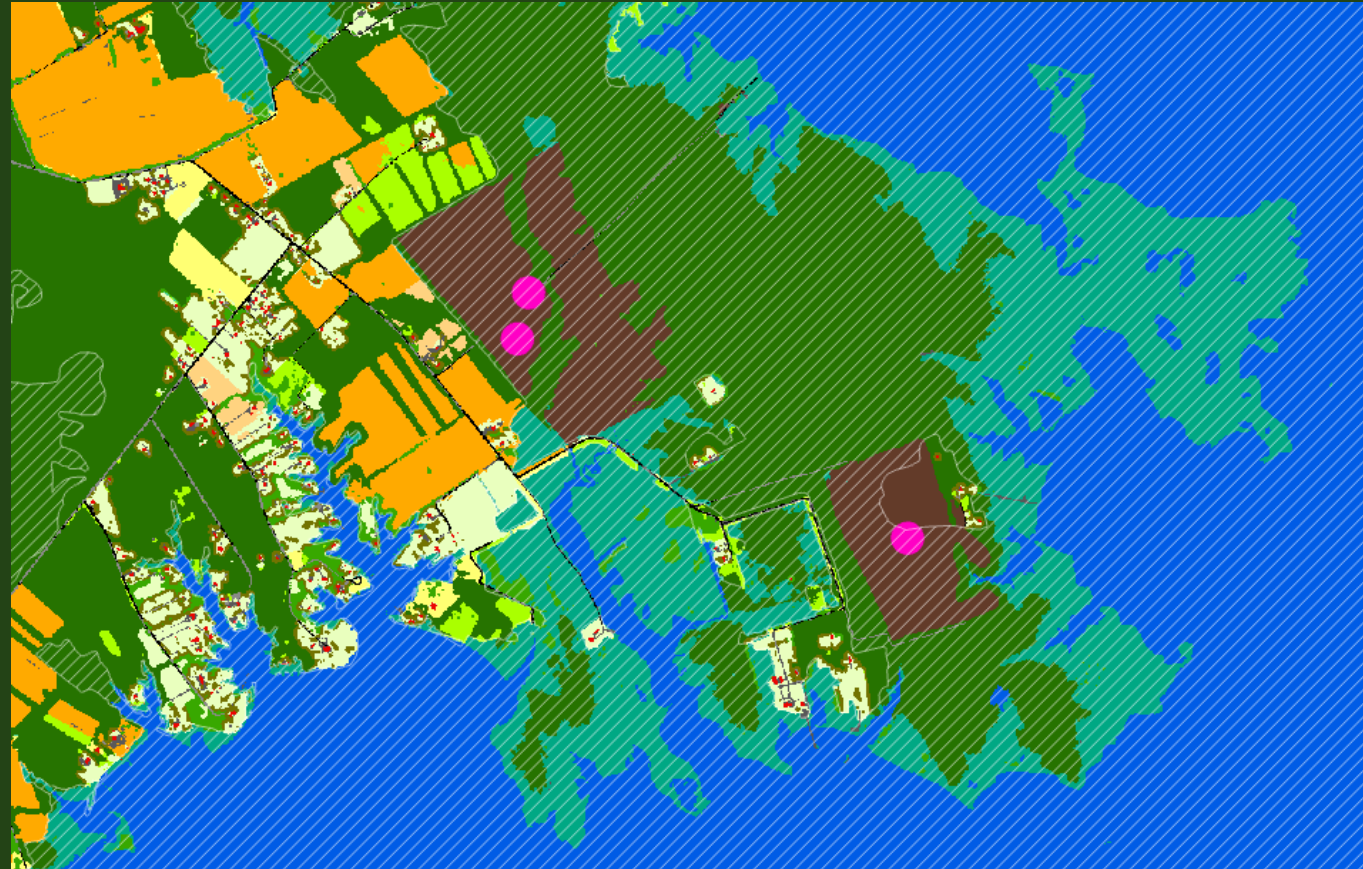
"Barren and herbaceous lands resulting from recently cleared forests and other tree canopy in association with a timber harvest permit (DE, MD, PA, VA, WV) or having a land use history of forest rotation since the mid 1980's"



Harvested Forest Wetlands: Decisions

Add 3 classes of Harvested Wetlands Forest:

- New Classes:
 - Harvested Tidal Wetland Forest
 - Harvested Riverine Wetland Forest
 - Harvested Terrene Wetland Forest
- Preserve harvesting and wetlands classes



“Barren and herbaceous lands resulting from recently cleared forests and other tree canopy in association with a timber harvest permit (DE, MD, PA, VA, WV) or having a land use history of forest rotation since the mid 1980’s”

Harvested Forest: NAIP Imagery

"Barren and herbaceous lands resulting from recently cleared forests and other tree canopy in association with a timber harvest permit (DE, MD, PA, VA, WV) or having a land use history of forest rotation since the mid 1980's"



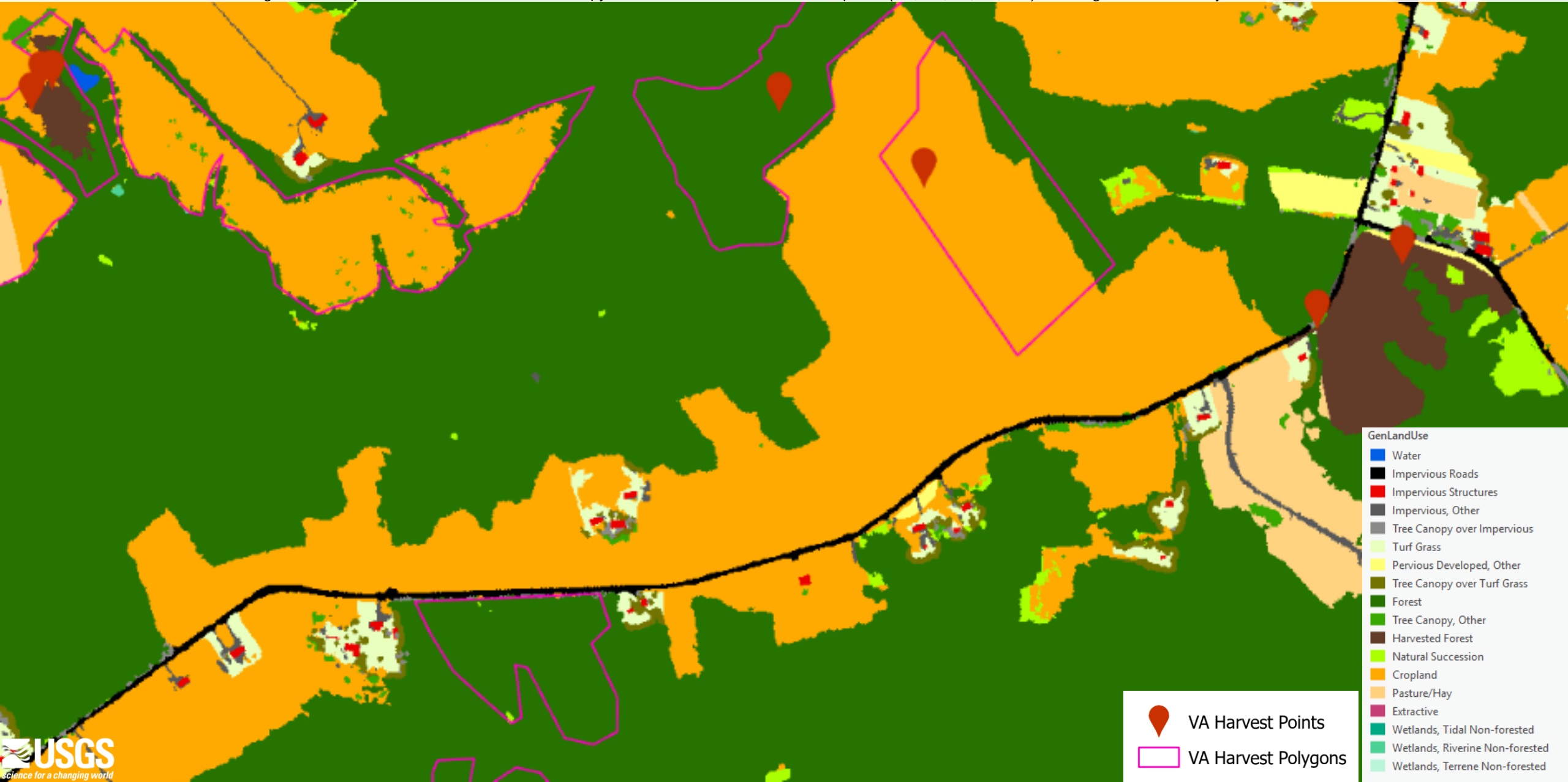
Harvested Forest: Virginia Harvest Data

"Barren and herbaceous lands resulting from recently cleared forests and other tree canopy in association with a timber harvest permit (DE, MD, PA, VA, WV) or having a land use history of forest rotation since the mid 1980's"



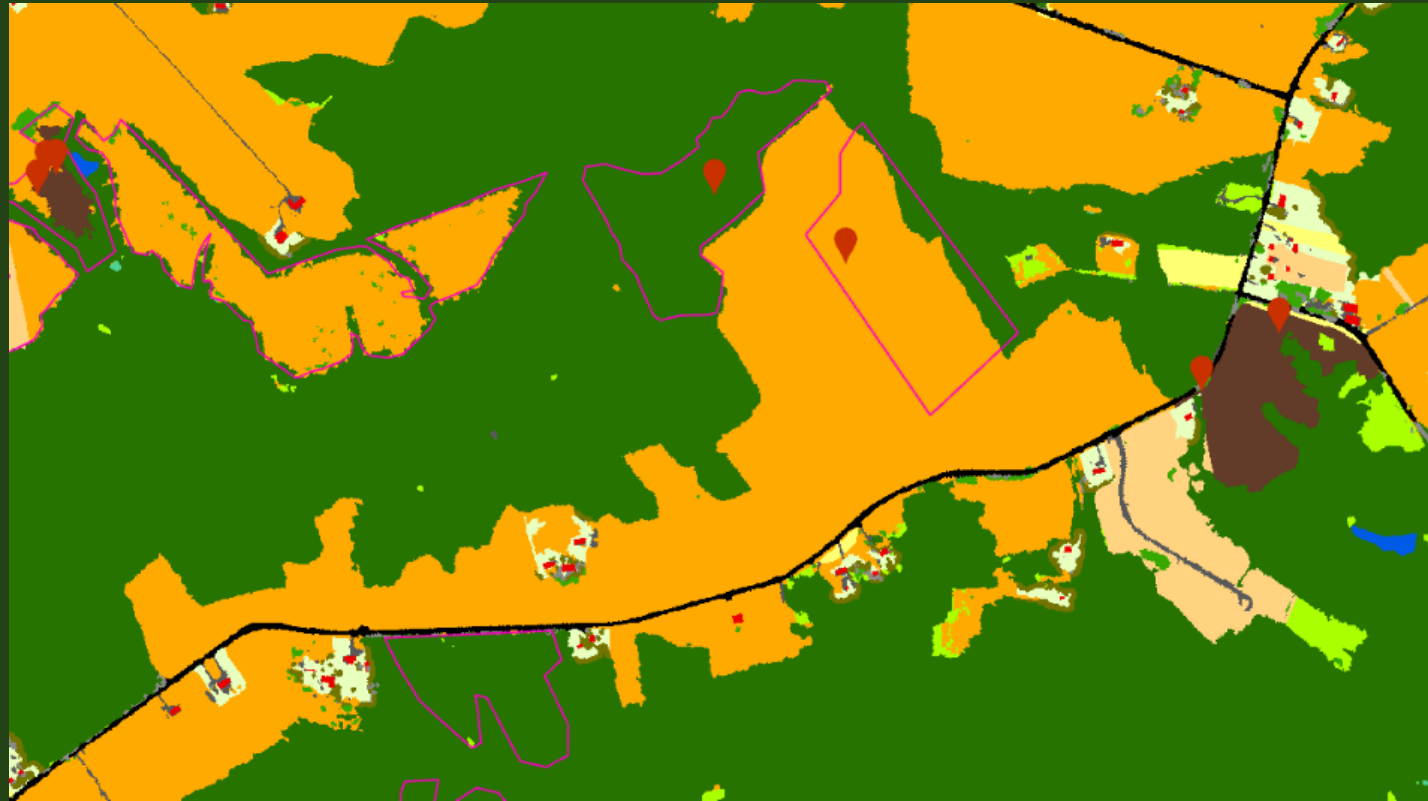
Harvested Forest: 2022 Ed.

"Barren and herbaceous lands resulting from recently cleared forests and other tree canopy in association with a timber harvest permit (DE, MD, PA, VA, WV) or having a land use history of forest rotation since the mid 1980's"



Harvested Forest: Improvement

- Prioritize state harvest data over agriculture data
- Use polygon data instead of points
- Experimenting with new metrics to distinguish harvesting from agriculture, etc.
 - NDVI
 - image texture
 - image brightness



“Barren and herbaceous lands resulting from recently cleared forests and other tree canopy in association with a timber harvest permit (DE, MD, PA, VA, WV) or having a land use history of forest rotation since the mid 1980’s”

Contact

Sarah McDonald (she/her/hers)

Geographer

U.S. Geological Survey

smcdonald@chESApeakebay.net

smcdonald@usgs.gov



Chesapeake Bay Program

Science. Restoration. Partnership.

