

Phase 7 Land Use Aggregation

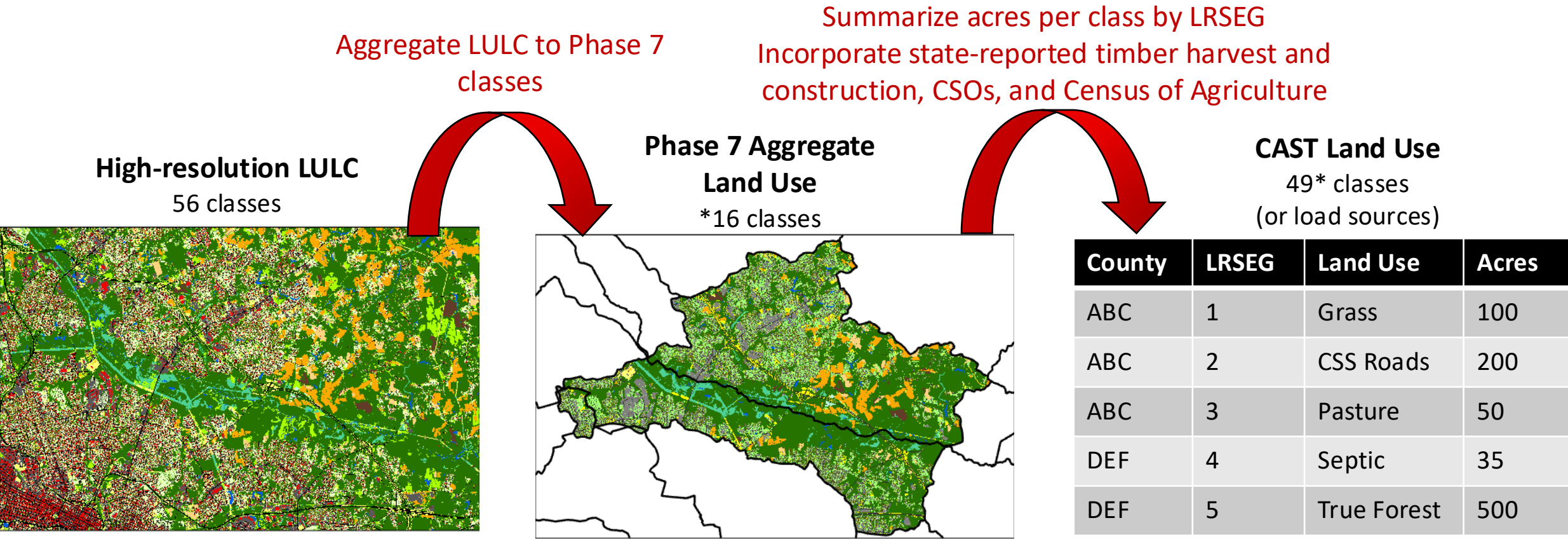
Sarah M. McDonald

USGS, Lower Mississippi Gulf Water Science Center

Land Use Workgroup

September 17, 2025

Summary: How are the Land Use Products Related?



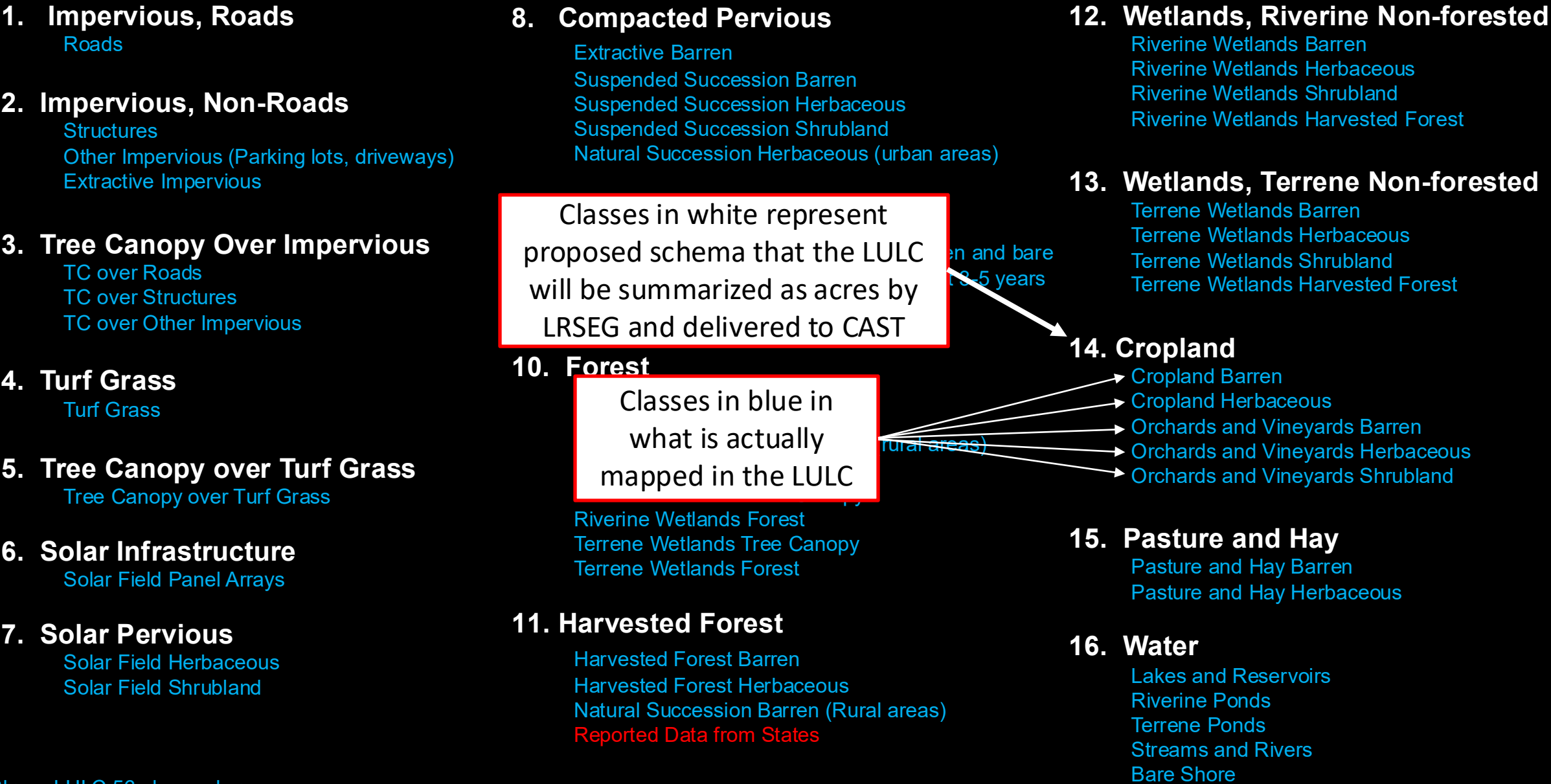
Mapped data with high spatial (1-meter) and categorical (56-class) resolutions that can be aggregated to different schemas and summarized by any overlay geography to meet the needs of a variety of projects

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.

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

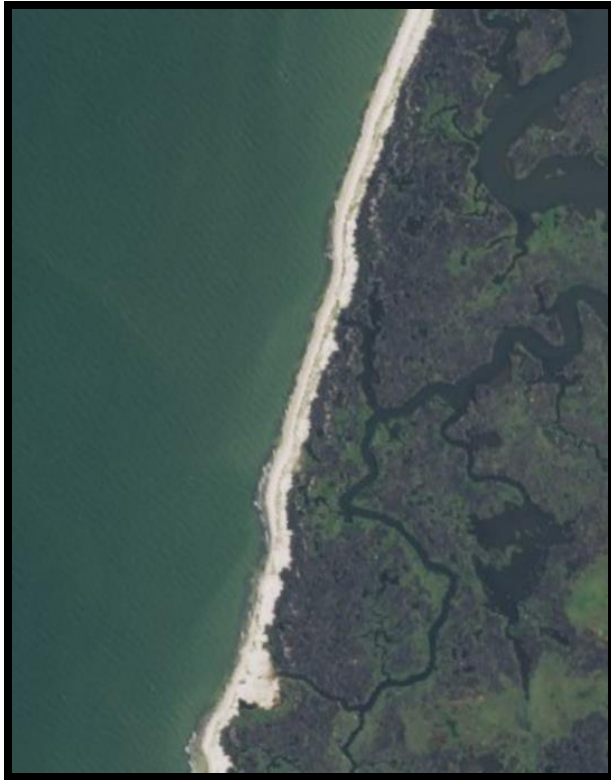
Proposed Aggregation of High-Res LULC for Phase 7



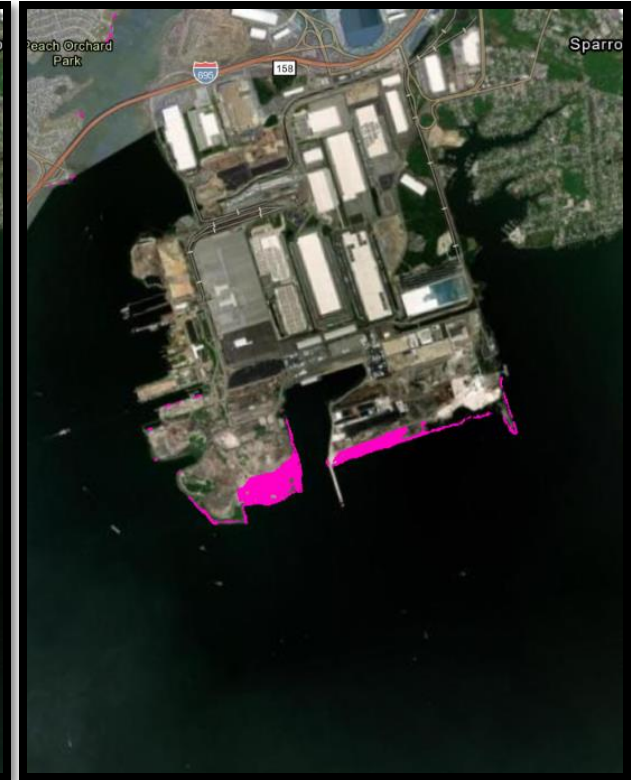
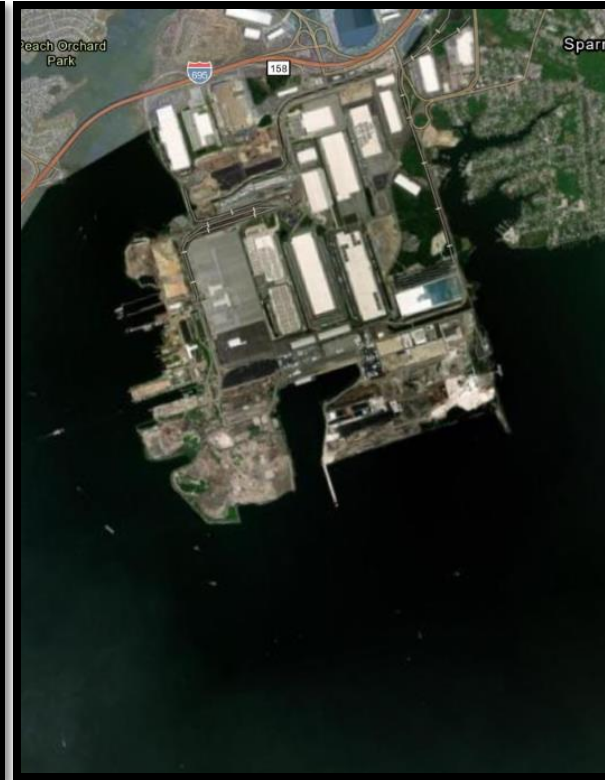
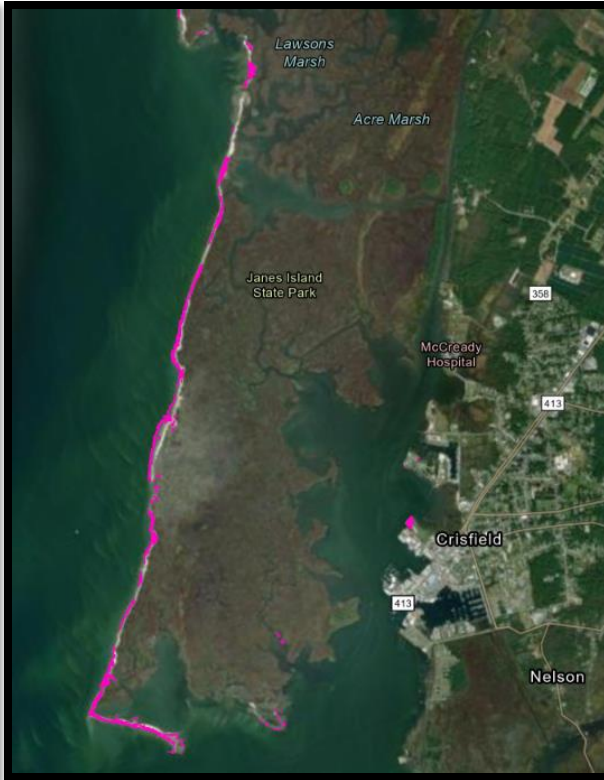
Blue = LULC 56-class schema
White = Phase 7 Rollup schema

Decision: Approval of an update to the June 2025 LUWG decisional item to read “the group approved moving all bare shore (tidal and non-tidal) that is not classified as construction to the Phase 7 water class.”

- Total bare shore area in the watershed is minimal: 1,374 acres.
- Left: Example of bare shore (pink) along the Bay that would be counted as water if approved.
- Right: Example of bare shore (pink) along the Bay that is actually construction, that would be counted as construction and not water.



Beach along Janes Island State Park



Construction misclassified as Bare Shore in Baltimore County, Maryland

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 Barren (urban)

Natural Succession Herbaceous (urban areas)

9. Construction

All Barren Lands (except extractive barren and bare shore) that became developed in the next 3-5 years

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

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 and Reservoirs

Riverine Ponds

Terrene Ponds

Streams and Rivers

Bare Shore

Blue = LULC 56-class schema

White = Phase 7 Rollup schema

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads Roads	8. Compacted Pervious Extractive Barren	12. Wetlands, Riverine Non-forested Riverine Wetlands Barren Riverine Wetlands Herbaceous Riverine Wetlands Shrubland Riverine Wetlands Harvested Forest
2. Impervious, Structures Structures Other Impervious Extractive Barren	<div>Decision: Approval of an update to the June 2025 LUWG decisional item to read “the group approved moving all bare shore (tidal and non-tidal) that is not classified as construction to the Phase 7 water class” Why update? 1. Barren land along the bay shoreline is mostly sandy beaches, hardened shorelines (rip-rap), and in some cases, construction 2. For consistency with how we handle barren land adjacent to lakes, reservoirs, streams and rivers, we recommend aggregating bare shore along the Bay shoreline to water unless it is construction 3. If not approved, these lands would be treated as Compacted Pervious in Phase 7</div>	13. Wetlands, Terrene Non-forested Terrene Wetlands Barren Terrene Wetlands Herbaceous Terrene Wetlands Shrubland Terrene Wetlands Harvested Forest
3. Tree Canopy TC over 10% TC over 20% TC over 30%		14. Cropland Cropland Barren Cropland Herbaceous Orchards and Vineyards Barren Orchards and Vineyards Herbaceous Orchards and Vineyards Shrubland
4. Turf Grass Turf Grass		15. Pasture and Hay Pasture and Hay Barren Pasture and Hay Herbaceous
5. Tree Canopy Tree Canopy		16. Water Lakes and Reservoirs Riverine Ponds Terrene Ponds Streams and Rivers Bare Shore
6. Solar Fields Solar Fields Solar Field Shrubland		
7. Solar Fields Solar Fields Solar Field Shrubland	Harvested Forest Herbaceous 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

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 Barren (urban)

Natural Succession Herbaceous (urban areas)
9. Construction

All Barren Lands (except extractive barren and bare shore) that became developed in the next 3-5 years

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

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 and Reservoirs

Riverine Ponds

Terrene Ponds

Streams and Rivers

Bare Shore

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)

Summary of Phase 7 Aggregation Decisions

Recommendation	Phase 6 Class	Workgroup Lead	Approval Date
“The USWG recommends that the Solar Impervious relative land use loading rate be set equal to the relative loading rate of the Buildings and Other land use category. The USWG recommends that the Solar Pervious relative land use loading rate be set equal to the relative loading rate of the Turfgrass land use category. ...”	Mixed Open and Impervious, Non-Roads	Urban Stormwater	December 2024
“All patches of barren land uses (except bare shore and extractive barren) that became at least 20% developed within 3-5 years represent ‘Regulated Construction’ ...”	Mixed Open	Watershed Technical	August 2025
“The FWG agreed that the natural succession classes should roll up to Forest for Phase 7 of the watershed model in the rural context...”	Mixed Open	Forestry	December 2024
“Natural Succession Barren rolls up to Construction in urban contexts and Harvested Forest in rural contexts. Natural Succession Herbaceous rolls up to Compacted Pervious (previously Mixed Open) in urban contexts and to Forest in rural contexts.”	Mixed Open	Forestry	February 2025
“The FWG approved the proposed construction mapping rules for Phase 7 which would change areas previously labeled as "harvested forest" that were later developed to be mapped as "construction". This change will only affect 0.8% of mapped “harvested forest” and will override the existing timber harvest mapping rules.”	Mixed Open	Forestry	August 2025
Rename Mixed Open to Compacted Pervious	Mixed Open	Land Use	December 2024
“...all bare shore (tidal and non-tidal) that is not classified as construction to the Phase 7 water class...”	Mixed Open	Land Use	September 2025

Proposed Aggregation of High-Res LULC for Phase 7

1. Impervious, Roads
Roads

2. Impervious, Non-Roads
Structures
Other Impervious
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 Barren (urban)
Natural Succession Herbaceous (urban areas)

9. Construction
All Barren Lands (except extractive barren and bare shore) that became developed in the next 3-5 years
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
Harvested Forest Barren
Harvested Forest Herbaceous
Natural Succession Barren (Rural areas)
Reported Data from States

12. Wetlands, Riverine Non-forested
What's the Recommendation?
All mapped barren land uses (except bare shore and extractive barren) mapped as development 3-5 years later are construction.

13.
What was it in Phase 6?
Mixed Open

14.
Who's leading?
Watershed Technical Workgroup (WTWG)

15.
What's the recommendation status?
Approved at the August 2025 meeting.

16.
Lakes and Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers
Bare Shore

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 at their December 2024.

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

12. Wetlands, Riverine Non-forested
Riverine Wetlands Barren
s Herbaceous
s Shrubland
s Harvested Forest
- Terrene Non-forested
Barren
Herbaceous
Shrubland
Harvested Forest
- ous
eyards Barren
eyards Herbaceous
eyards Shrubland
- Hay
Barren
Herbaceous
16. Water
Lakes and Reservoirs
Riverine Ponds
Terrene Ponds
Streams and Rivers
Bare Shore

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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

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 Barren (urban)

Natural Succession Herbaceous (urban areas)

9. Construction

All Barren Lands (except extractive barren and bare shore) that became developed in the next 3-5 years

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

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, keeping NATS Herbaceous (urban areas) in Compacted Pervious (previously called Mixed Open), and allowing NATS barren to be considered for construction.

What was it in Phase 6?

Mixed Open

Who's leading?

Forestry Workgroup (FWG)

What's the recommendation status?

Decisions approved by FWG at December 2024 meeting, February 2025 meeting, and August 2025

Date Shored

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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

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 at December 2024 meeting.

44 Natural Succession Shrubland
53 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
Bare Shore

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Orange = Phase 7 Rollup schema (proposed change)

Decision: the group approves the aggregation of the High-Resolution LULC data to 16 Phase 7 mapped land use classes

1. Impervious, Roads

Roads

2. Impervious, Non-Roads

Structures

Other Impervious

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 Barren (urban)

Natural Succession Herbaceous (urban areas)

9. Construction

All Barren Lands (except extractive barren and bare shore) that became developed in the next 3-5 years

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

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 and Reservoirs

Riverine Ponds

Terrene Ponds

Streams and Rivers

Bare Shore

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