PHASE 7 Land Use: CONSTRUCTION

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U.S. Department of the Interior
U.S. Geological Survey

Proposed Rollup of High-Res Land Use Classes 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**
   - 33 Solar Field Barren (- construction)
   - 34 Solar Field Herbaceous
   - 35 Solar Field Shrubland

Blue = mapped 56-class schema
White = Phase 7 schema

8. **Compacted Pervious**
   - 28 Bare Developed (- construction)
   - 30 Extractive Barren
   - 36 Suspended Succession Barren (- construction)
   - 37 Suspended Succession Herbaceous
   - 38 Suspended Succession Shrubland
   - 42 Natural Succession Barren (urban areas - construction)
   - 43 Natural Succession Herbaceous (urban areas)

9. **Construction**
   - All barren lands (except bare shore and extractive barren) that became developed in the next 3-5 years.
   - Reported Data from States

9. **Forest**
   - 40 Forest
   - 41 Tree Canopy, Other
   - 43 Natural Succession Herbaceous (rural areas)
   - 44 Natural Succession Shrubland
   - 53 Riverine Wetlands Tree Canopy
   - 54 Riverine Wetlands Forest
   - 63 Terrene Wetlands Tree Canopy
   - 64 Terrene Wetlands Forest

15. **Harvested Forest (2)**
   - 45 Harvested Forest Barren (- construction)
   - 46 Harvested Forest Herbaceous
   - 42 Natural Succession Barren (rural areas – construction)
   - Reported Data from States

10. **Wetlands, Riverine Non-forested**
   - 50 Riverine Wetlands Barren (- construction)
   - 51 Riverine Wetlands Herbaceous
   - 52 Riverine Wetlands Shrubland
   - 55 Riverine Wetlands Harvested Forest

11. **Wetlands, Terrene Non-forested**
   - 60 Terrene Wetlands Barren (- construction)
   - 61 Terrene Wetlands Herbaceous
   - 62 Terrene Wetlands Shrubland
   - 65 Terrene Wetlands Harvested Forest

12. **Cropland**
   - 80 Cropland Barren (- construction)
   - 81 Cropland Herbaceous
   - 82 Orchards and Vineyards Barren (- construction)
   - 83 Orchards and Vineyards Herbaceous
   - 84 Orchards and Vineyards Shrubland

13. **Pasture and Hay**
   - 85 Pasture and Hay Barren (- construction)
   - 86 Pasture and Hay Herbaceous

14. **Water**
   - 11 Lakes & Reservoirs
   - 12 Riverine Ponds
   - 13 Terrene Ponds
   - 14 Streams and Rivers (visible water)
   - 15 Bare Shore- adjacent to lakes

Phase 6 Construction

Option 1: Reported by states

- Permitted (E&S) disturbed area per year per county (NY, PA, WV, DC) or HUC12 (DE, VA);
- Allocated from HUC12 or county to land-river segments in proportion to mapped developed area;
- Subtracted from mapped developed area in each land-river segment

Option 2: Mapped by CBPO (Maryland only)

- 1.29 * (estimated annual change in development in each land-river segment)
- Subtracted from mapped developed area in each land-river segment

Phase 7 Construction

Option 1: Reported by states

- Permitted (E&S) disturbed area per year per county or HUC12;
- Allocated from HUC12 or county to land-river segments in proportion to mapped construction and new development;
- Subtracted from mapped construction and development in each land-river segment.

Option 2: Mapped by CBPO

- For years 2013/14 - 2021/22: high-resolution barren lands that became at least 20% developed in the following 3-5 years.
- For years 1985 – 2012 (estimated annual change in development (NLCD) in each land-river segment) * scaling factor.
- Subtracted from mapped construction and development in proportion to mapped construction and new development in each land-river segment.

Phase 7 Construction Details

Backcast Period (1985-2012)

*Construction Acres (Year X) = NLCD development change (from Year X to X+1) * scaling factor*

Develop a scaling factor that relates mapped construction in 2013/14, 2017/18, and 2021/22 high-res LULC with annual change in developed land uses from NLCD for the periods: 2013/14, 2017/2018, and 2021/22.

High-res Mapping Period (2013-2022)

Reclass all high-res patches of barren land uses (except "bare shore" and "extractive barren") that became at least 20% developed within 3-5 years as "regulated construction".

*Construction acres (Year X) = annual proportion of NLCD development change over each interim period (e.g., 2013-2017) * acres of high-res LULC development change over each interim period.*

Future Period (2022/23 – 2040)

Construction Acres = projected annual change in development (Ches. Bay Land Change Model)

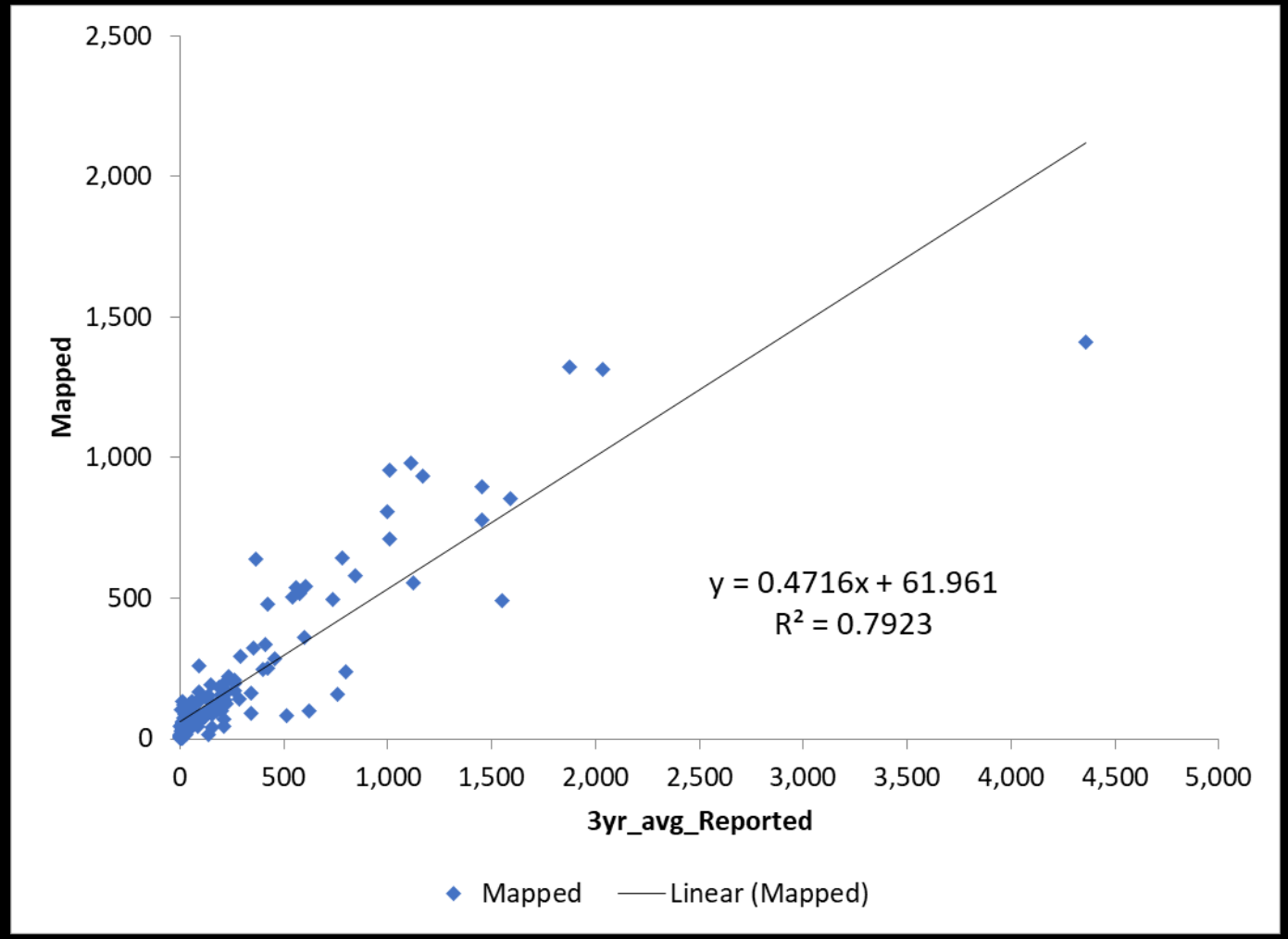
Note: a scaling factor may not be needed for this period because the CBLCM forecasts growth for both impervious and pervious portions of development.


Natural Succession
Barren
Harvested Forest

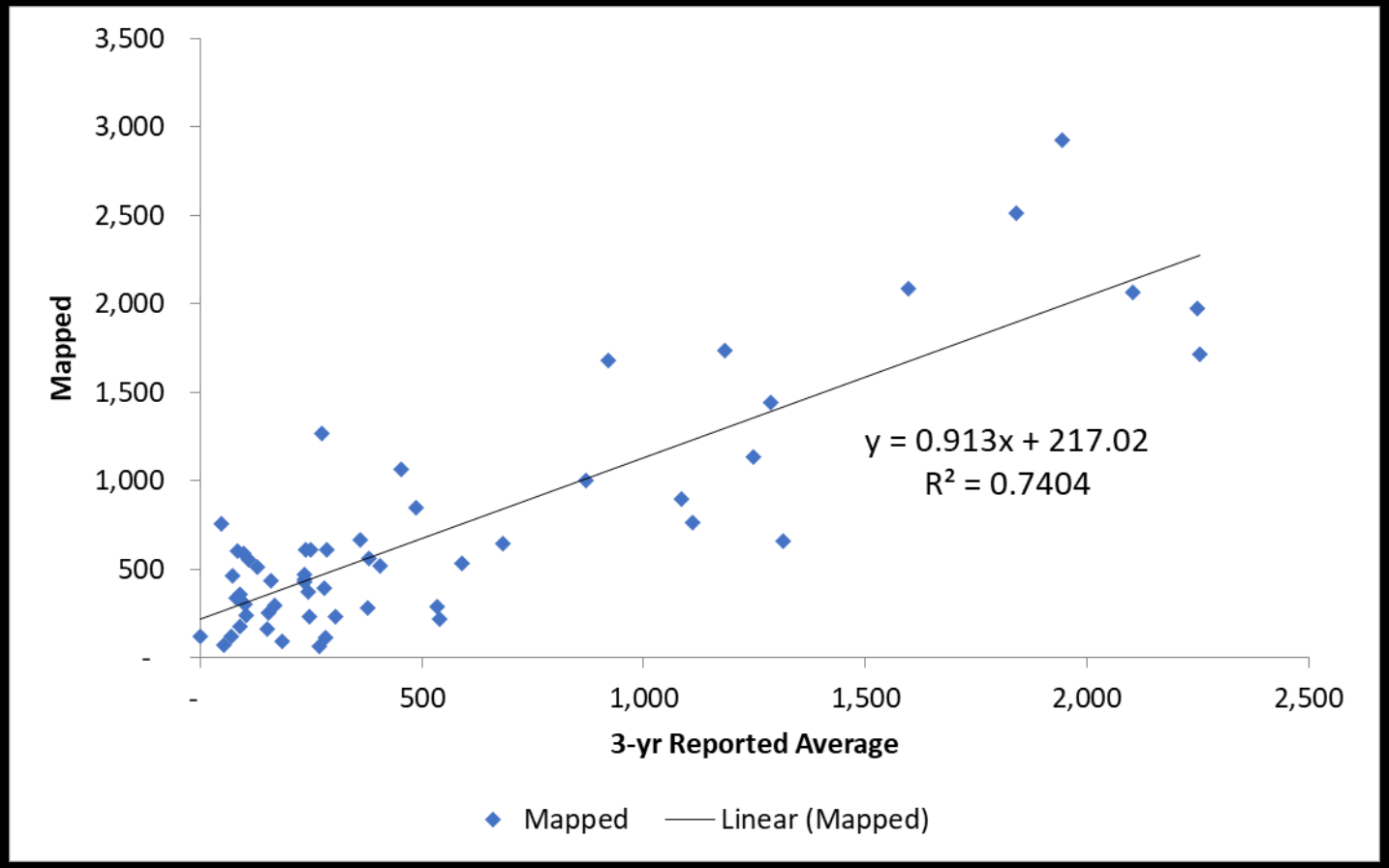
Phase 7 Construction – impacts to “Harvested Forest”

- New methodology maps 106,683 acres of “construction”, including 5,519 acres of mapped harvested forest reclassed as construction
- This represents only 0.8% of all mapped harvested forest
- FWG agreed (8/6/25) to allow construction mapping rules to take precedent over harvested forest mapping rules.

Phase 7 Construction – mapped vs reported (VA HUC10's)



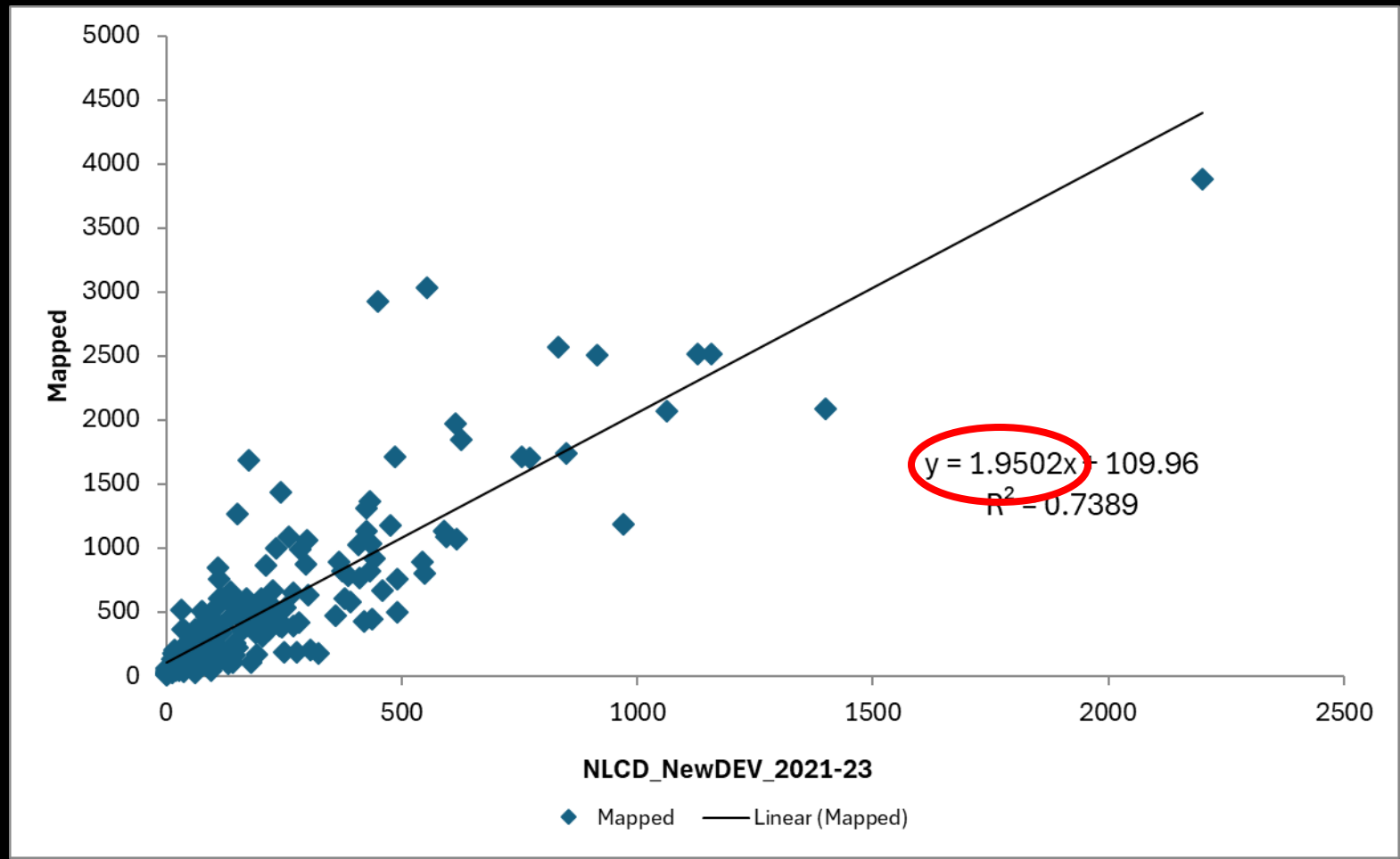
Phase 7 Construction – mapped vs reported (PA, NY, WV* counties)



* excluding Jefferson and Berkeley Counties, WV

Phase 7 Construction – scaling NLCD to High-res

Generally, mapped high-res construction is ~2x greater than the annual (2022) and 3-year average (2021-23) amount of new development detected in NLCD.



Phase 7 Construction – Berkeley County, WV

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Phase 7 Construction – Berkeley County, WV - 2024

Phase 7 Construction – Berkeley County, WV - 2020

2022 NAIP Imagery captures a moment in time and does not reflective of intra-annual dynamics.

Mapped vs Reported Construction Acres

Characteristics	Mapped Construction	Reported Construction
Measurement:	Direct	Indirect- estimated via permit
Temporal resolution:	Instantaneous snapshots varying by flight path, e.g., July 10, 2022	Averaged over multiple years
Spatial resolution:	1-meter raster dataset	Point data
Categorical resolution:	11 relevant barren classes	Variety of activities listed in permits

Mapped vs Reported Construction Issues

Mapped Construction

Likely to underestimate construction because:

1) LULC data represent a snapshopt in time; and
2) Clearing, excavation, and grading are ephemeral activities that may be phased through the duration of the project.

May be temporally imprecise before 2012 and after 2022 due to reliance on Landsat-derived land use data for historic estimates and modeled urban growth for current and future estimates since 2022.

Reported Construction

Likely to overestimate construction annually because not all permitted activities are built or built out to specified acres within a given year.

Temporally imprecise for open permits over multiple years.

Inconsistent across state lines.

WTWG Decisions

1. **Mapping construction:** *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". Scaled NLCD annual change in development will be used to map historic construction and the CBLCM will be used to estimate future construction.*

2. **Reconciling mapped and reported construction:** *Construction acres reported at the county scale will be allocated to LRSEGs by the relative amount of a county's mapped construction and new development within each LRSEG.*

   If reported construction exceeds mapped construction in an LRSEG, remaining reported construction acres will be subtracted from the developed sector (proportionally by developed class).

   If reported construction is less than mapped construction, remaining mapped construction will be reclassed as "compacted pervious" (loading like "mixed open" in Phase 6).