

Attachment C

Proposed Changes to the Phase 5.3 Land Use Dataset

Differences between Phase 5.2 and 5.3 urban land use

The major discrepancy between the Phase 5.2 and Phase 5.3 extents of developed land is within the pervious developed land class. For example, in Maryland the Phase 5.2 land-use has twice as much pervious developed land as evident in the Phase 5.3 land use dataset. This discrepancy is largely explainable by the CBPO Land Data Team's strict adherence to the information in USGS' new Chesapeake Bay Land Cover Data series (land cover data for 1984, 1992, 2001, and 2006) for Phase 5.3 compared to our reliance on the RESAC 2001 land cover augmented with ancillary information on populated residential road networks in Phase 5.2. There is a slight underestimate of impervious surfaces in Phase 5.3 vs. 5.2 even though the 2001 RESAC impervious surface data were used in both analyses. One reason for this is because the overall extent of the developed classes in Phase 5.2 was larger than the extent of the CBLCD developed classes so more pixels in the 2001 RESAC impervious surface dataset were captured within Phase 5.2 developed areas. Another reason is that the improved accuracy of the CBLCD series combined with our methods for incorporating State-reported extractive lands in the Phase 5.3 dataset eliminated several large "impervious surface" areas from false inclusion in the Phase 5.3 developed classes whereas these areas were considered developed in Phase 5.2. Such areas are actually quarries or surface mines and are classified as "extractive" in Phase 5.3.

The rate of change in impervious surface, which directly determines the estimated annual extent of "bare-construction" land use, also changed significantly between Phase 5.2 and Phase 5.3. This change is similarly due to reliance on the CBLCD series for Phase 5.3 to represent change over the 20-year calibration period vs. our inference of pervious and impervious developed land change over 20-years in Phase 5.2 based on changes in total housing units.

These differences between the Phase 5.2 and 5.3 developed land uses have resulted in insufficient bare-construction lands for placement of erosion and sediment control BMP's and gross underestimation of the extent of low-intensity developed land uses which by default, are lumped into the forest/wooded land use in Phase 5.3 (as occurred with all "remainder" areas in Phases 5.0, 5.1, and 5.2).

Proposed changes to Phase 5.3 land use

1. Improve accounting of the full extent of impervious and pervious developed lands- particularly in exurban and rural areas.
2. Improve estimates of the rate of change in impervious surfaces over the 20-year calibration period.
3. Improve separation of non-wooded areas from the forest/wooded land use.

4. Consider developing state-specific impervious surface coefficients for generalized developed land cover classes.
5. Refine the relationship between permitted and disturbed extractive extents.
6. Incorporate these changes into the future land change forecasts.

Proposed hybrid (Phase 5.2 and 5.3) methodology

Within each watershed modeling unit:

1. Estimate extent of impervious surfaces associated with all roads that are not accounted for in the 2006 CBLCD.
2. Estimate impervious surfaces associated with multi-unit and single-detached housing in 1990 and 2000 not accounted for in the 1992 and 2001 CBLCDs.
3. Estimate the additional extent of low-intensity developed lands associated with populated residential road networks, institutions, and open land (non-wooded, non-developed, and non-agricultural).
4. Estimate change in impervious surface over the 20-year calibration period based on changes in the CBLCD combined with changes in single-detached (and possibly multi-unit) housing.
5. Infer changes in the road network where possible and account for them in the estimates of impervious surface change over time.

Probable effect of these changes on the Phase 5.3 land use dataset

1. The extent of impervious surfaces in all years will increase through the inclusion of impervious surfaces associated with roads and houses not detectable with Landsat satellite imagery. This change would increase the nutrient and sediment loads delivered to the Bay that are attributed to developed and non-forested lands in suburban, exurban, and rural areas.
2. The extent of pervious developed lands in all years will increase through the inclusion of pervious lands associated with populated residential road networks, institutional grounds, and open lands. This change would increase the nutrient and sediment loads delivered to the Bay that are attributed to developed and non-forested lands in suburban, exurban, and rural areas.
3. Agricultural lands will not be affected
4. The extent of forest/wooded lands will decrease in all years and may mimic more closely the observed trends in forests noted by the USFS (downward trend since 1984).
5. The rate of impervious surface change will increase over the current rate in Phase 5.3 but may not be as high as the rate of change in Phase 5.2. The rate will increase because it will now be partially related to the rate of housing change (and housing has increased at higher rates than developed land cover). The rate may not be as high as in Phase 5.2 because the rate will not be exclusively related to changes in housing. Estimates of the extent of developed lands based on changes in housing

- units from the present back through 1984 will not be allowed to fall below the detected extent of developed lands in the CBLCD series.
6. The extent of these changes will mostly impact the loads from suburban, exurban, and rural areas. Particularly in areas where a large percentage of new developed land is added, the contribution of nutrient and sediment loads from all other sources upstream of a calibration site will likely decrease, especially the wooded / open category. These changes will likely affect how target loads are distributed among the major basins within each jurisdiction. However, the degree to which these changes will impact the allocation of loads is uncertain and may be minor at the large major-basin scale. The changes would also affect the acres available for applying BMPs.

Estimated time required to make the proposed land use changes

Analysis and Review: 4 weeks

- Including a brief independent review of the methodology by a group of land use experts

Model Recalibration: 4 weeks

- Model recalibration required

Total: 2 months