May 6, 2020

Methodological Considerations for Mapping 2017 High-resolution Land Use

Timeline: April 2020 – February 2021

1. Cropland and Pasture (Challenge level= high; Priority= high)

   Issues: cropland is underestimated and pasture overestimated throughout the Bay watershed; total agricultural acres overestimated in rural areas where extractive activities and agricultural abandonment are prevalent and underestimated in some suburban counties due to overestimate of turf grass.

   Proposed Fix: develop a predictive model for cropland and pasture based on slope, soil fertility, patch size and shape, Cropland Data Layer, and Common Land Units

2. Orchards/vineyards (Challenge level= moderate; Priority= moderate)

   Issues: orchards/vineyards are inconsistently classed as either mixed open, cropland, or pasture.

   Proposed Fix: intersect ancillary point data identifying orchards and vineyards with parcels and herbaceous and shrub-scrub patches and manually QAQC the results.

3. Forest (Challenge level= moderate; Priority= high)

   Issues: small fragments of trees (< 1 acre) classed as mixed-open; patch width not accounted for when distinguishing forests; forests not identified within NWI wetlands; moving majority focal window (e.g., 3x3, 5x5, etc.) approach will produce change artifacts if applied over multiple years.

   Proposed Fixes: use context-sensitive fixed buffer widths to differentiate contiguous forests from fragmented forests; create separate contiguous and fragmented forest wetland classes.

4. Turf Grass (Challenge level= moderate; Priority= high)

   Issues: turf grass is slightly overestimated due to assessment of road rights-of-way, use of unbounded moving focal windows, and inclusion of turf in fractional land uses, and over-generalized local land use data, misinterpretation of local data, or lack of local data.

   Proposed Fix: replace moving focal windows with distance accumulation algorithms and parcel boundaries to constrain spread; reconsider width and/or classification of road rights-of-ways; acquire more local data; conduct more rigorous quality control over local data interpretation.

5. Right-of-ways (Challenge level= low; Priority= moderate)

   Issues: width of road right-of-ways may be overestimated; transmission line right-of-ways inconsistently mapped; pipeline and other right-of-ways not considered

   Proposed Fix: revisit right-of-ways width estimates and incorporate more and better ancillary data on utility and energy right-of-ways.

6. Natural Succession and Timber Harvests (Challenge level= high; Priority= high)
   Issues: natural succession and timber harvests are not explicitly mapped and therefore classed as either "mixed open" or "fractional" land uses preventing accurate assessments of net changes in forest cover and preventing the modeling of successional processes into the future.

   Proposed Fix: explicitly map natural succession and timber harvests using a combination of annual land cover change data (1985 – 2015) with parcels and patches of herbaceous vegetation.

7. Bare construction (Challenge level= high; Priority= low)
   Issues: land under construction is not explicitly mapped and therefore classed as either mixed open or cropland.

   Proposed Fix: identify "probable" lands undergoing construction based on patch area and proximity to urban and/or developing areas; consider developing a predictive model.

8. Solar fields (Challenge level= moderate; Priority= low)
   Issues: solar fields are not explicitly mapped and therefore classed as non-road impervious cover but may not function hydrologically like impervious cover.

   Proposed Fix: intersect ancillary point data representing solar fields with patches of impervious cover and manually QAQC the results.

9. Extractive (Challenge level= moderate; Priority= high)
   Issues: extractive lands are not explicitly mapped and therefore classed as either mixed open, cropland, pasture, impervious cover, or turf grass.

   Proposed Fix: intersect ancillary point and polygon data with patches of herbaceous and barren vegetation and reclass as extractive, and manually QAQC the results.

10. Tidal Wetlands (Challenge level= moderate; Priority= moderate)
    Issues: mapped tidal wetlands are not all contiguous tidal open water.

    Proposed Fix: recreate a tidal overlay zone based on elevation using the latest LiDAR-derived DEMs and enforce spatial contiguity with tidal open water.

11. Floodplain Wetlands (Challenge level= high; Priority= high)
    Issues: floodplains mapped purely based on frequently flooded soils and FEMA floodplains omit wetlands along headwater areas (they are classed as "other" wetlands) which might undervalue the role of these wetlands in regards to water quality and aquatic habitat.

Proposed Fix: expand floodplain mapping upstream to headwater streams where appropriate using the USGS FACET tool applied to the most recent LiDAR imagery.

12. Streams (Challenge level= low; Priority= high)

    Issues: streams only present in the 10-meter resolution land use data products and are based on a 10-meter DEM combined with their width predicted by a single statistical relationship based on drainage area; only large rivers are represented in the mapped 1-meter resolution land use data.

    Proposed Fix: overlay tree canopy and impervious land cover on the new 1-meter resolution 2-D hydrography data over the land cover and reclass the stream cells as daylighted, shaded, or culverted; associate 1:24K NHD attributes on buried streams to high-res stream segments.

13. Bare shore (Challenge level= low; Priority= low)

    Issue: bare shore areas are not explicitly mapped and classed most commonly as mixed open.

    Proposed Fix: expand open water areas into adjacent barren lands to identify bare shore areas.