Phase 6 Local Land Use Methodology

(ArcGIS 10.2+ methods)

GOAL: Compile and deliver up to eleven 8-bit unsigned integer land use 10m resolution binary raster datasets derived from local land use, land cover, parcel, and other datasets, or derived as hybrids of local and regional land use data.

IMPORTANT: Before starting this process, please read through these methods in their entirety as latter steps are abbreviated to minimize duplication of explanations.

1) GENERAL OVERVIEW OF METHODOLOGY

a) Perform an inventory of the local land use, land cover, zoning, and parcel data for each County assigned to you.
   i) Record your decisions and progress in CNTY_FIPS_Worklog.docx.
      (1) To create the worklog, save the template G:\ImageryServer\Local_LULC_Data\P6_Worklog_Template.docx, in your county's Working folder as CNTY_FIPS, e.g., G:\ImageryServer\Local_LULC_Data\WestVirginia\HAMP_54027\HAMP_54027_Worklog.docx
   ii) Prioritize the counties starting with those that are data poor and ending with those which are data rich.

b) For each county, create ONLY the land use classes (see Section 2) for which you have:
   i) local data; and that
   ii) represent a significant improvement/enhancement of the regional data.

c) For each land use class for which you have data:
   i) Create a 1m-resolution raster of the class;
   ii) Aggregate to 10m to create a fractional 10m land use dataset with cell values ranging from 0...100 representing the percent of each class within each pixel.

d) All of the classes in Section 2 have already been created from national/regional datasets and saved as 10m-resolution fractional rasters. Your job is to determine whether counties provided data that enable you to <u>improve</u> on the regional data. If the local data do not enable you to significantly improve the regional data, then note this in the worklog and move on to the next land use type or next county.

e) The data for every county are unique. Use your judgement as to whether the data supplied by localities is useful. In making such decisions, consider both the added value (to the regional data) and level of effort required to incorporate the local data. Spending 2-hours to add a few buildings to the Impervious-Non Road dataset is not worth it. Also consider the balance between commission and omission errors when deciding whether local data will enable you to improve on the regional data- particularly when making changes to the Developed Mask. The goal is to complete each county within 1-3 days. Some circumstances may require you to deviate from the rules below. That's fine- just document your decisions in the county worklog.

f) Regional data are to be used for each land use class that is not created from local data.

2) PHASE 6 LAND USE CLASS DEFINITIONS

Dataset names are highlighted in **RED** and should be saved in the final.gdb. All but one of these datasets should be fractional, continuous rasters with NoData values set to zero. Raster values will range from 0..100. The one exception is the Developed Mask which will have values of 1 and NoData.

a) Impervious Roads (**IR_10m**)
   i) Includes paved and unpaved roads and bridges and tree canopy over roads.
   ii) Excludes driveways and may or may not exclude road shoulders depending on how shoulders are mapped.

b) Impervious Non-Roads (**INR_10m**)
   i) Includes buildings, driveways, sidewalks, parking lots, garages, tunnels, runways, and road types that are excluded from local/regional road datasets. Also includes tree canopy over non-road forms of impervious surfaces.

c) Forest (**FOR_10m**)
   i) Contiguous patches of trees and shrubs
   ii) >=1 acre with a minimum internal radius of 36m corresponding to a 1-acre circle
   iii) Assumed to have an unmanaged and pervious understory
   iv) Excludes portions of cells that are water or wetlands.
   v) Includes areas of scrub-shrub that meet the area requirements specified in bullet "ii". Shrubs that do not fall into the Forest category will go into Open Space
   vi) Tree Canopy that does not qualify as Forest will go to one of the three TC classes below.

d) Tree Canopy Impervious Road (**TCIR_10m**)
   i) Small patches of trees that do not meet the definition of forest
   ii) Overhanging Impervious Road surfaces.
   iii) This class is being mapped for potential future use as a modifier to nutrient loads from roads.

e) Tree Canopy Impervious Non-Road (**TCINR_10m**)

i) Small patches of trees that do not meet the definition of forest
ii) Overhanging Impervious Non-Road surfaces
iii) This class is being mapped for potential future use as a modifier to nutrient loads from impervious non-roads.

f) Tree Canopy Impervious Herbaceous (**TCH_10m**)
i) Small patches of trees that do not meet the definition of forest
ii) Overhanging herbaceous surfaces (i.e., turf grass, pasture, cropland, etc.)

g) Developed Mask (**DM_10m**)
i) The Developed Mask consists of all developed land uses: residential, commercial, industrial, institutional, recreational, and other urban, or non-agricultural lands.
ii) It is used to determine if herbaceous lands are Turf Grass (or agriculture) and if barren lands are Open Space (or agriculture). Note that agriculture is not mapped explicitly but is rather represented by all unclassified lands outside of areas classed as one of these eleven P6 land use datasets.

h) Turf Grass (**TG_10m**)
i) Turf Grass represents all herbaceous lands within the Developed Mask, e.g., residential lawns, cemeteries, golf courses, and athletic fields.

i) Open Space (**OS_10m**)
i) Herbaceous, scrub-shrub, and barren land, assumed to be unfertilized, and that is maintained in its current state (i.e., prevented from succeeding to forest).
(1) Examples: beaches, extractive, vacant lots, abandoned/fallow agricultural fields, transmission line right-of-ways, junkyards, fairgrounds, gravel roads, railroads.
(2) Note that to accurately identify herbaceous, scrub-shrub, and barren lands as Open Space, one must first map Forests and Turf Grass.

j) Wetlands (**WET_10m**)
i) Local or state mapped wetlands that are not duplicative of the National Wetlands Inventory

k) Water (**WAT_10m**)
i) Streams, ponds, lakes, swimming pools, canals, ditches, wet detention basins, reservoirs, etc.

3) WORK FLOW OVERVIEW

a) There are four broad stages (i.e., setup, inventory, compare, and produce) that are generally performed to create a final set of the above listed eleven 10-meter resolution raster data sets.

b) Setup: data, folders, and MXD's for analysis.

c) Inventory: Compare existing Regional to local vector and raster data files to identify which of the eleven Regional land use classes can be improved by incorporating the local data.

d) Compare: if the local data are not obviously better than the regional data, compare them closely and decide whether or not to use the local data. You may find the local data adds information to the regional data but do not fully replace the regional data. In such cases, evaluate the effort needed to create a hybrid of the regional and local data for those classes. If the effort exceeds several hours and will only result in minor improvements, then make a clear notation in your worklog that no local data was used for this county and move on to other classes or counties.

   i) Open the G:\ImageryServer\Local_LULC_Data\Regional_LULC.mxd
   ii) Immediately save this mxd in your county's working folder as Regional_Countyname_FIPSCode.
   iii) Go to Counties.gdb in Local_LULC and add your county boundary to this mxd.
   iv) Add the Imagery Basemap: (File>Add Data> Add Basemap>Imagery) to your mxd.
   v) Zoom to your county's boundary and evaluate how well the local data might improve the Regional land cover classes in your county. The Basemap takes a long time to draw so best to not turn it on (make it visible) until you're zoomed in to <=1:50K scale.

e) Produce: Develop 1m binary or mask rasters for each of the Phase 6 land uses with sufficient local data. Aggregate these rasters to 10m resolution and develop local/regional hybrid 10m datasets if warranted.

4) FILE MANAGEMENT

a) Manage files under the existing folder structure for each county:
   i) G:\Imageryserver\Local\YourState\YourCounty\Working
      (1) Store intermediate work files, *.MXDs, Excel files, and other materials you may develop while working on this county.
   ii) G:\Imageryserver\Local\YourState\YourCounty\working.gdb
      (1) Store temporary working files used to develop the final 10m raster datasets.
   iii) G:\Imageryserver\Local\YourState\YourCounty\final.gdb
      (1) Store final 8-bit (byte), unsigned integer 10m raster land use datasets.

5) WORK SETUP

a) Open ArcMap and modify the Progress Map attribute table to indicate what county you are working on and what you are doing (G:\ImageryServer\Local_LULC_Data\Progress_Map.gdb\Progress_Map)
   i) Using <Control Click> select the counties assigned to you in the attribute table
   ii) Left click on the "Analyst" column name and select Field Editor from the drop down menu
   iii) In the box below "Analyst =" enter your first and last initials in double quotes.
   iv) Click OK.
   v) For all of your assigned counties use the field editor to mark your Data column as "Local" to distinguish it from counties that have Regional data only.
   vi) Use the field editor to mark the status of each county as "Not Started", "Inventory" "Processing", or "Completed". The status field will be used to make maps for managers on the status of the overall effort.
   vii) Feel free to add columns of your own if you feel they may be useful somehow in this effort.

b) Open a copy of the work log (G:\Imageryserver\ Local_LULC_Data \P6_Worklog_Template.docx) and save the file in your County's root folder as: G:\Imageryserver\Local*YourState**YourCounty*\ County_Name (First four to ten letters) *FIPSCode_Worklog.docx.*
   i) You may want to set the print layout of this file to Landscape.
   ii) You may add tables or sections, etc. to this file as you see fit to best relate your process and decisions made while manipulating this county's data.

c) Set up Global Environmental Variables for your Mapping Document (mxd)
   i) You can skip the following steps if you make a copy of the Work_Template.mxd found in the Local_LULC_Data folder and save it to your county's working folder. All environmental variables have been preset for you, except for the work and scratch work space variables. The Pathnames box is also checked to store relative pathnames to data sources. You can save the template to your county's Working directory named appropriately for your county, e.g.: G:\ImageryServer\Local_LULC_Data\New York\ONTA_36069\Working\ ONTA_36069_Inventory.mxd.
   ii) Click on the Geoprocessing menu and "Environments…" in the dropdown menu
   iii) Select Workspace at the top of the Environmental Settings window.
   iv) Using the folder icon to the right of the Current Workspace text box, Navigate to G:\Imageryserver\Local*YourState**YourCounty*\working.gbd
   v) Optionally, navigate to: G:\ImageryServer\Local_LULC_Data\YourState\YourCounty \Working\ for the "Scratch Workspace" box as well.

vi) Click on Processing Extent in the still open Environmental Settings window and set the projection, extent, and snap as follows:
   (1) Snap Raster:
      (a) Navigate to the regional land use file geodatabase and select any land use raster located in: G:\ImageryServer\Local_LULC_Data\ Phase6_LandUse_050115.gdb

vii) Click on "Output Coordinates" in the still open Environmental Settings window
   (1) All files must eventually be represented in USA_Contiguous_Albers_Equal_Area_Conic_USGS_version Projection.
      (a) You will decide when in the process to reproject local data to Albers
   (2) Set the Output Coordinate System to "As Specified Below"
   (3) Click the icon to the right of the text box below the above.
   (4) Select USA_Contiguous_Albers_Equal_Area_Conic_USGS_version from Favorites or, if not there, Click on Projected Coordinate Systems > Continental > North America > USA_Contiguous_Albers_Equal_Area_Conic_USGS_version

viii) Click on Raster Analysis in the still open Environmental Settings window
   (1) Set Cell Size to "As Specified Below"
   (2) In the text box that opens enter: 1
      (a) This value is set to 1 while working with local data.

ix) Click on Raster Storage
   (1) Uncheck the box beside Build Pyramids

x) Click OK to close the Environmental Settings" dialogue box.

d) Perform data inventory for your County
   i) Open your CNTY_FIPS_Final.mxd and add your county boundary polygon from: G:\ImageryServer\Local_LULC_Data\Counties.gdb and save the mxd as CNTY_FIPS_Inventory.mxd, CNTY_FIPS_Regional.mxd, and or CNTY_FIPS_Work.mxd
      (1) <u>Do not use local county boundaries</u> even if they exist. Only use the county boundaries from Counties.gdb specified above.
   ii) Search for local data and add it to your map document.
      (1) Local data in each county root directory are in the RawData folder
      (2) Check for a folder called "Statewide" or similar folder in your county's state parent folder.
      (3) Check for data in subfolders of G:\Imageryserver\Local\TreeCanopy.
   iii) It is a good approach to add all deliverable Regional classes from the Phase6_LandUse_050115.gdb to an MXD created for this purpose. This may create high memory requirements so this MXD should not be used for later processing. Add your county boundary from the Counties.gdb, zoom to it, add basemap imagery to the bottom of the Table of Contents (TOC) and get a sense for how well or poorly the regional data handles each data type. Local data should be judged thereafter as to how well it improves, or replaces these regional data. In some cases local data may initially appear to be comprehensive, but actually add very little to the existing

regionally mapped classes. In such cases, make a note in the worklog that such local datasets do not improve upon the Regional data and move on to the next local dataset for evaluation.

6) ONE-METER LAND USE CLASSES FROM LOCAL DATA

Each of the eleven land use classes should be developed at 1-meter resolution and saved in the working.gdb using the names highlighted in (**Red**). Interim file naming conventions are provided as suggestions and to add clarity to the instructions. In the next section, the 1m datasets highlighted in **Red** will be aggregated separately to 10-meter resolution. How overlap between different data sources should be handled is discussed toward the end of this section. Perform the steps below using local data that may exist for any of the Phase 6 land use classes. Note that if you rename a raster using the catalog manager you will have to subsequently right click on the new file name and calculate statistics for the newly named file, otherwise the newly named file may not display properly.

a) Impervious Roads (**IR_1m**)
  i) Create a 1m Raster layer, IR_1m, using local vector and raster data representing roads.
    (1) If only polylines are available, use the Regional IR dataset.
    (2) Otherwise, project all relevant local raster and vector files to USA_Contiguous_Albers_Equal_Area_Conic_USGS_version.
  ii) Merge all projected local IR vector datasets into one.
    (1) General > Merge
    (2) Delete all entries seen in the Field Map Parameter
    (3) Output = IR_merge
  iii) Create new Short Attribute Table Field called "Value"
    (1) If necessary, delete existing fields called Value or use another unique field name.
    (2) Use Field Editor to set all rows of Value to 1
  iv) Rasterize the IR_merged.shp to 1m minding the extent and snapping rules.
    (1) Value field = Value (or Equivalent)
    (2) Output = working.gdb\IR_1m_v (the v represents origin as a vector file)
    (3) Cell Assignment = Cell_Center
    (4) Priority Field = Value
    (5) CellSize = 1
    (6) Check that Raster Analysis Environmental Variable Cell Size = 1
  v) Merge/mosaic all IR_1m_v with any local raster representations of roads (also converted to 1m).
    (1) Save result as a single 1-meter IR raster in working.gdb, e.g., …working.gdb\IR_1m

b) Impervious Non-Roads (**INR_1m**)
  i) Create a 1m Raster layer, INR_1m, using local vector and raster data representing

impervious non-roads.

(1) If only polylines are available, use the Regional INR dataset.

(2) Otherwise, project all raster and vector INR files to USA_Contiguous_Albers_Equal_Area_Conic_USGS_version.

ii) Merge all projected local INR vector datasets into one.

(1) General > Merge

(2) Delete all entries seen in the Field Map Parameter

(3) Output = INR_merge

(4) Create new Short Attribute Table Field called Value

(a) If necessary, delete existing fields called Value or use another unique field name.

(5) Use Field Editor to set all rows of Value to 1

iii) Rasterize the INR_merged.shp to 1 meter minding extent and snapping rules.

(1) Value field = Value (or Equivalent)

(2) Output = working.gdb\INR_1m_v (the v represents origin as a vector file)

(3) Cell Assignment = Cell_Center

(4) Priority Field = Value

(5) CellSize = 1

(6) Check that Raster Analysis Environmental Variable Cell Size = 1

iv) Merge all INR_1m_v with any local raster representations of roads (also saved to 1m).

(1) Save result as a 1-meter INR raster in working.gdb\INR_1m.

c) Forest (**FOR_1m**)

i) Create a 1-meter forest/scrub-shrub mask

(1) Merge all local vector tree, forest and scrub-shrub data into one vector file: Working.gdb\Tree_Shrub_v

(2) If needed, project the vector files and all raster tree, forest, and scrub-shrub equivalent data to Albers

(3) Convert Tree_Shrub_v to raster using a common attribute field that you create with value set to 1.

(4) Resample any local tree or forest raster data to 1 meter if needed.

(5) Merge all 1-meter tree, forest, and scrub-shrub rasters into a single raster: working.gdb\for_shrub

(a) Note: do NOT set null cells to zero prior to Region group below.

ii) Identify forests

(1) Use the Spatial Analyst > Generalization > SHRINK tool to shrink the for_shrub raster by 36m (Input: for_shrub; Output: for_shrink; Number of cells: 36; Zone value: 1). Save as for_shrink.

(2) Using for_shrub as a mask, expand for_shrink using cost distance. Cost Distance (Input: for_shrink; Cost Raster: for_shrub; Output: for_cost; Maximum distance: 50) This will recreate the original patches of forest/scrub-shrub for all patches with an internal radius greater than 36m. Note that 50m is needed as the maximum distance because 36m prevents the forest from expanding to its previous extent, before the shrink.

    (3) Reclassify for_cost so that the values are 1, null. Save as for_reclass.
        (a) Note: Check to see if the reclassed raster remains a 32-bit float raster after the reclass process. If so, convert it to an 8-bit unsigned integer using Copy Raster so that Region Group will accept this data as input. Convert to 8-bit and save as for_reclass8
    (4) Region Group for_reclass8 (8, within, no link). Save as RG_for.
    (5) Use SetNull to set all patches with cell count less than 4047 cells (1 acre) to null, else = 1. Save as FOR_1m.

d) Tree Canopy Impervious Roads (**TCIR_1m**): All trees that are not forest are by definition tree canopy. Note: <u>Do not subtract TCIR or TCINR from the original IR and INR datasets. That procedure is now obsolete. TCIR and TCINR are being developed for future use as potential modifiers of understory loading rates.</u>
    i) Create a tree canopy mask.
        (1) Merge all local vector tree and forest data into one vector file: Working.gdb\Tree_Canopy_v
        (2) Convert Tree_Canopy_v to raster using a common attribute field that you create with value set to 1. If needed, project the vector files and all raster tree and forest data to USA_Contiguous_Albers_Equal_Area_Conic_USGS_version.
        (3) Resample any local tree or forest raster data to 1 meter if needed.
        (4) Merge all 1-meter tree and forest rasters into a single raster: working.gdb\tree_canopy
    ii) Remove FOR_1m from tree_canopy raster using the Minus tool. Save as TC_1m. Note that this dataset excludes all scrub-shrub land.
    iii) If TC_1m overlays the IR_1m dataset, create a dataset of the overlapping areas and save as TCIR_1m.

e) Tree Canopy Impervious Non-Roads (**TCINR_1m**)
    i) If the local tree canopy data overlays the INR_1m dataset, create a dataset of the overlapping areas and save as TCINR_1m. Use Extract by Mask (input = TC_1m, Mask = INR_1m). Note: if you have local TC_1m but no local IR or INR, Create a hybrid TC_INR and TC_IR 10m rasters using the regional data (See Section 8).

f) Tree Canopy (**TCH_1m**)
    i) The remainder of the TC_1m dataset should be classed as TCH_1m. If no overlap with IR_1m or INR_1m exists, rename the TC_1m raster as TCH_1m.

g) Developed Mask (**DM_1m**)
    i) Create a Developed Mask by merging all developed land use polygons into a single vector dataset and save as Developed_v. Developed land uses include residential, commercial, industrial, recreational, institutional, and other urban lands.
    ii) If no such land use data exist, a Developed Mask can be created using a combination of zoning and parcel data or even just using unattributed parcel data by querying

parcels less than X acres in size. The size threshold, X, may vary among rural and urban counties. The point is to minimize both commission and omission errors. For example, if you overlay parcels less than 10 acres over the regional Developed Mask and note the inclusion of significantly more area and through inspection of underlying aerial imagery you interpret that probably the majority (> 75%) of parcels under 10 acres are not agricultural, then a 10-acre threshold might be appropriate. Remember that even most agricultural parcels have a house, driveway, and outbuildings but only small ones (e.g., <=10 acres) should be in the Developed Mask to minimize commission errors. Additional commission errors can be minimized by USGS post processing using proprietary FSA agricultural data sets.

iii) Convert the merged vector developed classes to 1m raster (USA_Contiguous_Albers_Equal_Area_Conic_USGS_version) and save as DM_1m.

h) Turf Grass (**TG_1m**)
   i) If high-resolution local land cover data exist, reclassify all herbaceous cover within the Developed Mask as turf grass. Save as TG_1m.
   ii) If no high-resolution land cover data exist, then after one classifies all other land use classes, the remainder could be evaluated over aerial imagery and determined whether to class it as turf grass. Note: this will only work if you have data for at least one other land use class. In many cases, the only data a county has provided is poorly attributed parcel data and all one can is to just create the Developed Mask.

i) Open Space (**OS_1m**)
   i) Create an 1m Open Space raster dataset using local vector and raster data representing: beaches, extractive, vacant lots, abandoned/fallow agricultural fields, transmission line right-of-ways, junkyards, fairgrounds, gravel roads, railroads, scrub-shrub not classed as Forest, and barren lands within the Developed Mask. Note that to accurately identify scrub-shrub, and barren lands as Open Space, one must first map Forest and Turf Grass.
   ii) Merge all relevant vector files and convert to 1m raster (Albers Equal Area).
   iii) Mosaic rasterized polygons with any relevant 1m raster datasets. Save as OS_1m.

j) Wetlands (**WET_1m**)
   i) If local wetland data represent an improvement over the NWI (regional WET layer) then rasterize the wetland polygons to 1m and save as WET_1m.

k) Water (**WAT_1m**)
   i) If local water data represent an improvement over the regional WAT layer (derived from NWI, NHD-H, and NWI ponds) then rasterize the water polygons to 1m, mosaic with any relevant local raster water datasets and save as WAT_1m.

7) TEN-METER AGGREGATION OF ONE-METER LAND USE DATASETS

a) If all of the 1m-resolution land use datasets you created are mutually exclusive of one another, i.e., they have no spatial overlap, then aggregating each separately will result in no combination of cells exceeding 100 (e.g., a cell with 50% IR and 70% TG). Note that TCIR and TCINR are overlapping classes by definition. <u>If there is no overlap among classes</u> (except for TCIR and TCINR), then aggregate each class separately from 1m-resolution to 10m-resolution. The resulting 10m fractional raster datasets will have cell values ranging from 1...100 or 0...100. NOTE: The AGGREGATE tool can only increase the cell size using an integer cell factor. If the local data cell size is not an integer value in meters (e.g., 0.91m), you will have to follow the AGGREGATE step with RESAMPLE (bilinear) and a Map Algebra step, e.g., Int((Float("IMP_10m2") / 121)*100) to reset the range to 0..100. You may have to also COPY the resulting raster to ensure it is formatted as an 8-bit unsigned integer raster.
   - i) You will want to create a new MXD map document for this process and reset its Raster Analysis Environmental value for “Cell Size” to 10
   - ii) Create 10m aggregations for each of the 1m resolution land use dataset.
      - (1) Set output extent and snapping to project specifications.
      - (2) Set the Raster Analysis Cell Size Environmental Variable to 10
      - (3) Run the tool AGGREGATE
         - (a) cell factor 10
         - (b) SUM
         - (c) Check Ignore No Data
         - (d) Check expand extent if needed
         - (e) Save all results as IR_temp, INR_temp, etc.
      - (4) Convert all aggregated land use rasters from masks to binary datasets (values of 0, 1) Use ISNULL and CON to set all NoData values to zero while preserving the original data values.
      - (5) For the Developed_10m dataset only, ensure that it has final values of 1, NoData. This dataset will be used by USGS to recreate turf grass and open space land use rasters once high-resolution land cover data are available for the entire watershed.

8) CREATING HYBRID LOCAL/REGIONAL TEN-METER LAND USE DATASETS

Developing hybrid local/regional land use datasets is needed when the local data complement but do not fully replace the regional data. For example, developed areas may be evident in parcel data that are absent from the regional Developed Mask but the local data may also omit some developed areas that are present in the regional Developed Mask. In such cases, creating a hybrid of both datasets may be the optimal solution. You will save the output as if it were all derived from local data, e.g., IR_10m, DM_10m, because it will be used to fully replace the regional data by the USGS at a later date.

a) Clip the regional land use datasets that are to be used in the hybrid process to the county boundary.

b) To ensure no data is lost in the subsequent COMBINE process, reclassify the clipped and local aggregated 10m datasets so that all NoData values are set to zero. This can be done using a combination of ISNULL and CON.

c) COMBINE overlapping 10m resolution datasets. Read the help on this tool if you are unfamiliar with it.
   i) In the COMBINE output raster attribute table, create a new short-integer field, “Total” and set equal to the sum of the individual raster values. No values of “Total” should exceed 100 (representing 100% of the pixel area).
   ii) For each raster that you want to adjust, create a new short integer field in the COMBINE output raster attribute table, e.g., TG_new, TCH_new, etc.
   iii) If any values of “Total” do exceed 100, use your knowledge about the accuracy and resolution of the local land use datasets to determine which layers to adjust. For example, if you have a very accurate WAT_10m dataset but have a FOR_10m dataset derived from coarse land use data, you might want to reduce the cell values of FOR_10m to accommodate the full value of WAT_10m. In this simple case, you would COMBINE FOR_10m & WAT_10m, create a total field, and a FOR_new field, select all records with “Total” > 100, and set FOR_new = Total – WAT_10m. Then switch selection and set FOR_new = FOR_10m.
   iv) Use RECLASSIFY > LOOKUP to create a new land use rasters, e.g., a new FOR_10m, using values for all of the new land use fields you created, e.g., FOR_new. Save this final version of FOR_10m to the final.gdb.
   v) You may have to combine up to 8 layers (all other than TCIR and TCINR). If you have <u>equal confidence</u> in the accuracy of all classes, then prioritize as follows:
      (1) IR (top priority- adjust last)
      (2) INR
      (3) WET
      (4) WAT
      (5) FOR
      (6) TCH
      (7) TG
      (8) OS (lowest priority- first to adjust)

9) OVERLAP BETWEEN FINAL LOCAL AND REGIONAL LAND USE DATA

Because few counties have provided sufficient data to create all eleven of the P6 land use datasets and because the source data used to derive the local P6 land use datasets have different origins, native resolution, and minimum mapping units compared to the source data used to create the regional P6 land use datasets, there will be many cases of overlap where the final aggregated cells values of exceed 100. <u>This is not your concern and this is a distinctly different issue than the need to create hybrid local/regional datasets</u>. These exceedances will be reconciled by USGS after all local land use data in the watershed have been translated into the Phase 6 land uses. A logic and process similar to that described in Section 8 will be used to reconcile the local and regional data.

10) DELIVERY

a) Open a copy of G:\ImageryServer\Local_LULC_Data\CNTY_FIPS_Final_Template.mxd and save it into your County's root directory as CNTY_FIPS_final.mxd

b) Load each of the final 8-bit, unsigned, 10m-resolution land use rasters that you created, and only the final rasters, into this MXD.
   i) Open Map Documents Properties and check the "store relative pathnames" box, so that it can be easily copied to the GIS Server, also change the Default Database in the same location to your final.gdb for your county.
   ii) All class names should be standardized, e.g., IR_10m, INR_10m, etc.
   iii) Do not include any basemap imagery.
   iv) Do not include any county polygons.
   v) All data should be in the same projection, which should match the projection of the data frame (Albers Equal Area- NAD '83, meters, USGS).

c) Don't worry about the symbology for each raster as that will be addressed when the data are served to the web.

d) Use the check list at the bottom of the worklog_template to ensure that all delivery requirements are met including the following:
   i) Ensure all notes and unique decision rules are recorded in the work log: G:\Imageryserver\Local*YourState**YourCounty*\P6_Worklog_*FIPSCode*
   ii) Be sure the following conditions have been met:
      (1) No tables included in MXD
      (2) Pyramids built for all final raster layers (check the Properties > Source for the raster to see if they exist. If not go: Data Management > Rasters > Raster Properties).
      (3) Statistics calculated for all raster layers (check the Properties > Source for the raster to see if they exist. If not go: Data Management > Rasters > Raster Properties).
      (4) Visibility of all raster layers turned off
      (5) Visibility of polygon boundary layer turned on
      (6) The latest naming convention for the raster layers is used, e.g., IR_10m, INR_10m, etc.

e) Notify Andy Fitch by email (afitch@chesapeakebay.net) that the county is complete and ready for serving on the web.

11) DELIVERY CHECKLIST FOR FINAL.GDB RASTER, FINAL.MXD PROJECT, AND WORKLOG

Check Appropriate Column per Item: ✓

Delivery Check List											
Final.gdb Rasters	IR	INR	Wat	Wet	FOR	TCH	TCIR	TCINR	OS	TG	DM
VALUES of all local land use rasters combined do not exceed 100 for any given cell.											
SAVED only final 10m land use rasters saved in county's final.gdb, e.g.: G:\ImageryServer\Local_LULC_Data\State\CNTY_FIPS\ final.gdb\											
NAMED according to standard 11 land use class names, e.g., IR_10m.											
RESOLUTION: cell size = 10m											
TYPE AND DEPTH: 8-bit, Unsigned Integers											
PROJECTED: USA_Contiguous_Albers_Equal_Area_Conic_USGS_version											
BUILT Pyramids											
CREATED Statistics											
Final.mxd Project											
LOADED all Final.gdb rasters into a final clean MXD, CountyName_FIPSCode_Final.mxd, located in the root of your county folder, e.g.: G:\ImageryServer\LULC_Local_Data\State\CNTY_FIPS\ CNTY_FIPS_final.mxd											
TURNED visibility of all layers off											
CHECKED "Use Relative Path Names"											
CONTAINS no tables											
REMOVED all Basemap Imagery (if added previously)											
ENSURED CNTY_FIPS_final.mxd is only MXD in the county root directory.											
Worklog.docx											
RECORDED notes and unique decision rules in the worklog stored in: G:\Imageryserver\Local\YourState\YourCounty\P6_W orklog_FIPSCode											