FCAT/REM Preprocessing Steps

This document is meant to serve as a training document and reference material for the preprocessing steps required for an REM project to be run in FCAT from the BlueJay VM.

First time working on an REM project:

1. Contact SIG IT support team to get VPN access and a user profile set up on the BlueJay VM (IP 10.1.30.113).
2. Map the shared drive '\\10.1.30.142\srv\share' to the BlueJay VM following these instructions.
3. Preprocessing requires some handling of GIS data. If ESRI ArcPro is your preferred software for handling GIS data and you do not have an ESRI license and ArcPro set up on your personal machine, contact the SIG IT support team to get that set up.
4. Download the TreeMap2016 dataset from the REM Active Projects Google Drive.
5. Download the 'Fire Probability Map' from the Climate Forward Data Repository website.
6. Copy (from the shared drive) or git pull (from the rem-tools github repo) the rem-tools folder to your local machine.
7. Download and install R and Rstudio to your personal machine. Instructions for how to do this are in the rem-tools folder, "HowToDownload_R_RStudio.pdf".

Every time working on an REM project:

1. Download the project treatment shapefile. These will typically be found in the corresponding project folder in the REM Active Projects Google Drive.
2. In your preferred platform for handling GIS data (these sub steps can be done in whatever order makes the most sense for your project):
    a. Ensure the project treatment shapefile has no overlapping polygons or broken geometries.
    b. Ensure the project treatment shapefile is projected and uses measurement units of meters. Recommended: project the shapefile into Transverse Mercator (UTMs).
    c. Add and fill the 3 attributes required by FCAT.
        i. tx_type: data type = text. This is the same as the name of the treatment kcp file you will make in step 4. Should generally follow this format: <brief description of treatment>_<harvest project code>. For example: general_tx_FA020. These names should not include any characters or spaces other than underscores.
        ii. tx_code: data type = double. This can be any integer but should be unique to the tx_type.
        iii. kcp_exists: data type = double. This is a binary attribute. 1 = the treatment kcp exists and 0 = the treatment kcp does not exist. For an REM project this should always be 1.
    d. Dissolve the project treatment shapefile by the 3 FCAT attributes from step 2c.
    e. Once steps 2a-2d are complete, upload the updated project treatment shapefile to the shared drive you mapped to the BlueJay VM, in '\share\rem-inputs'.
3. Still in your preferred platform for handling GIS data:

a. Find the average annual burn probability.
    i. Buffer the treatment shapefile by 15km.
    ii. Find the average annual burn probability within the 15km buffer.
b. Find the acreage of the project AOI and compute number of ignition simulations needed.
    i. Create a minimum bounding envelope around the 15km buffer.
    ii. Calculate the acres of the resulting rectangle.
    iii. Divide the acres by 50.
    iv. Whichever number is larger between 10,000 and acres/50 is the number of ignition simulations needed for your project.

4. Create the treatment and regeneration kcp files needed for your project.
    a. If you are running a prefeasibility REM project and are using the general treatment kcp:
        i. Open the R script "treemap_data_for_FVS_kcps.R" found in the rem-tools folder. Set the file paths to match your local file paths for the various files read in. Run the R script. You will use 2 outputs from this script:
            1. The lists of softwood and hardwood species output into the R console after the lines 'noquote(top_49_xx$code)'. These lists are needed for the treatment kcp file.
            2. The 6 species in the object called 'top_6_regen_species' found in the R environment. These species are used in the regeneration kcp file.
        ii. Make a copy of the 'general_tx_2024.kcp' file from the rem-tools folder into your project folder and rename the kcp to match what you put in the tx_type attribute of your shapefile. Update the softwood and hardwood species groups in this kcp file. Be sure to keep 'OS' in your softwoods group and 'OH' in your hardwoods group.
        iii. Make a copy of the 'regen_main.kcp' file from the rem-tools folder into your project folder and rename the kcp to be specific to your project (something like 'regen_PC488'). Delete all lines in the regen kcp that pertain to species that are not in the top 6 regen species you got from the R script. If you got a species from the R script that is not in the regen_main.kcp file, let Kayla know and she will update the regen_main.kcp to include the new species.
        iv. Upload the updated regen and treatment kcp files to the shared drive in 'share\rem\CONUS\kcps'
    b. If you are working on a project with specific treatment(s) you will need to create your own kcp file(s) from scratch and/or by borrowing various pieces from existing kcp files. This document does not cover that process.
5. Once steps 1-4 are complete you are ready to proceed to running FCAT. In the rem-tools folder see the files 'how_to_ps1_for_FCAT_v2.pdf', 'EXAMPLE_FCAT_commands.ps1', and 'Signs that each FCAT step has completed running.pdf' for guidance.