Assessing late succession habitat for USDA National Forests of the Coterminous United States

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Methods:

To compare modeled reference amounts of late succession habitat to current mapped amounts for the lands within the administrative boundaries of the National Forests of the coterminous US, we first performed the following in ArcGIS Pro:

1. Downloaded and loaded the ‘[Administrative Forest Boundaries’](https://data.fs.usda.gov/geodata/edw/edw_resources/shp/S_USA.AdministrativeForest.zip) (AFB) shapefile, and LANDFIRE’s [Biophysical Settings](https://landfire.gov/bps.php) (BpS, LF2020\_BPS\_220\_CONUS) and [Succession Class](https://landfire.gov/sclass.php) (SCLS, LF2022\_SClass\_230\_CONUS) datasets.
2. Converted the AFB shapefile to raster; then performed a combine of the AFB, BpS and SCLS rasters using the ‘[Combine](https://pro.arcgis.com/en/pro-app/latest/tool-reference/spatial-analyst/combine.htm)’ tool.
3. The Join Field tool was used to bring in the following attributes from the inputs:
   1. AFB: FORESTORGC, REGION, FORESTNAME
   2. BpS: BPS\_CODE, ZONE, BPS\_MODEL, BPS\_NAME, GROUPVEG, FRI\_REPLAC, FRI\_MIXED, FRI\_SURFAC, FRI\_ALLFIR, FRG\_NEW
   3. SCLS: LABEL

This data table quantified current amounts of each succession class per BpS per forest. The data table was exported as a .csv file for use in R/R-Studio.

Reference amounts of each succession class per BpS was calculated in SyncroSim (see Blankenship et al., 2012 and Swaty et al., 2012), then exported as the ‘Reference Conditions’ table, obtainable [here](https://landfire.gov/zip/LANDFIRE_CONUS_Reference_Condition_Table_August_2020.zip). An additional input was a table of SCLS descriptions which identify which classes are Early, Mid and Late Succession, and which ones are open or closed canopy. This table is delivered with the SyncroSim [LANDFIRE Package](https://apexrms.github.io/landfirevegmodels/).

Datasets were cleaned, wrangled, and visualized in R.

The output provides an estimate of whether late successional classes have decreased (e.g., due to logging) or increased (e.g., due to fire suppression) in different part of the United States.

Resources:

Blankenship, K., Swaty, R., Hall, K.R., Hagen, S., Pohl, K., Shlisky Hunt, A., Patton, J., Frid, L. and Smith, J., 2021. Vegetation dynamics models: A comprehensive set for natural resource assessment and planning in the United States. Ecosphere, 12(4), p.e03484. <https://esajournals.onlinelibrary.wiley.com/doi/pdf/10.1002/ecs2.3484>

La Puma, I.P., ed., 2023, LANDFIRE technical documentation: U.S. Geological Survey Open-File Report 2023–1045, 103 p., <https://doi.org/10.3133/ofr20231045>. https://pubs.usgs.gov/publication/ofr20231045

Swaty, R., Blankenship, K., Hall, K.R., Smith, J., Dettenmaier, M. and Hagen, S., 2021. Assessing Ecosystem Condition: Use and Customization of the Vegetation Departure Metric. Land, 11(1), p.28. <https://www.mdpi.com/2073-445X/11/1/28/pdf>