# Preprocessing

1. Code/BasalArea/createSurface.R: creates a points shapefile of plot basal area to be used as input for creating a spatial surface of basal area; uses FIA data; creating basal area map is done using interpolation in ArcGIS
2. Code/CensusProcessing/censusProcessing.R: takes all FIA plots, subsets AZ, CO, NM, UT plots; combines all tree and condition records for these states as well
3. Code/CensusProcessing/createOccurrences.R: takes the processed recruitment data, and uses it to create a points shapefile of pinon occurrences
4. Code/ClimateProcessing/current.R: creates seasonal normals from PRISM data for current time
5. Code/ClimateProcessing/future.R: creates seasonal normals from WorldClim data for future time
6. Code/ClimateProcessing/historic.R: creates raster stacks from PRISM data for historic time
7. Code/ElevationProcessing/createSurface.R: creates elevation raster from SRTM
8. Code/IPM/resample\_BA\_elev.R: resamples basal area and elevation rasters to resolution of PRISM normals

# Vital rate models

## Growth

1. Code/Growth/dataPrepGrowth.R: creates data frame for input variables to create growth model
2. Code/Growth/modelSelection.R: selects growth models and creates some figures (e.g. marginal effect plots)

## Survival

1. Code/Survival/dataPrepSurvival.R: creates data frame for input variables to create survival model
2. Code/Survival/modelSelection.R: selects survival models and creates some figures (e.g. marginal effect plots)

## Recruitment

1. Code/Recruitment/dataPrepRecruitment.R: creates data frame for input variables to create recruitment model
2. Code/Recruitment/modelSelection.R: selects recruitment models and creates some figures (e.g. coefficient plot, observed versus predicted recruitment)
3. Code/Recruitment/recruitSize.R: calculates mean size and SD of size of recruits (needed for kernel)

# IPM

1. Code/IPMBinSize/IPM\_binSize.R: selects a bin size for the kernel
2. Code/IPM/IPM\_xx.R: runs the IPMs for a certain set of vital rate models and creates output rasters of lambda, growth, survival, reproduction
3. Code/IPM/diagnosticPlots.R: creates plots of lambda and vital rates as a function of input variables

# Validation

1. Code/Validation/createFig3.R: does the double-threshold validation that optimizes NRMSE and creates manuscript figure 3
2. Code/Validation/Landscape\_CurrentRange.R: creates histogram of lambda in current range versus the background values
3. Code/Validation/prepFIAPresenceAbsence.R: creates a raster of cells coding pinon presence/absence
4. Code/Validation/validateWithFIA.R: does the main validation: AUC, simple RMSE, quadrant analysis, scale analysis

# Elasticity analysis

1. Code/Elasticities/elasticities.R: code for elasticity analyses

# MaxEnt

1. Code/MaxEnt/maxent.R: code for MaxEnt model for pinon

# Forecasts

1. Code/Forecasts/…: several files to rerun IPMs under certain scenarios for future

# Predictor maps

1. Code/PredictorMaps/mapPredictors.R: creates maps of the predictors for visualization

# Other

1. Code/IPM/createS12.R: creates figure S12 for manuscript, difference of lambdas between BA-only and other model sets (climate-only and BA + climate)