**Processing procedures for developing a 30-m sage site potential map for the Great Basin**

1. Data collection and processing for the Great Basin (GB): sage cover related data, satellite observations (MODIS and Landsat), PRISM climate data, and site environmental variables (e.g., Polaris soil data, Compound Topographic Index).
2. Generate a good condition sage cover mask:

>40% sage on vegetation cover

<10% annual herbaceous

>70% rangeland cover

1993-2014 Non-fire region

1. In this study, 250-m MODIS long term (2000-2015) above median averaged growing season NDVI (GSN) was used as a proxy for sage site potential (dependent variable in the regression tree model). Site environmental variables and climate data were used as the independent variables in the regression tree model to predict GSN.
2. Generate sage training samples (at 250-m resolution) within the study area: ~10,700 sage pixels were randomly selected from the study area based on the three sage productivity categories (low/med/high GSN).
3. Upscale the 30-m (or Polaris 78-m) data to 250-m using spatial averaged methods. GSN and independent variable data were extracted from these 250-m maps for the sage training samples.
4. Apply our “Cubist optimization” approach to develop an optimal sage site potential model based on the sage training data. Josh’s Python script was used to do the model testing and the optimal model identification (see Bruce’s report for the detailed information).
5. Descriptions of the final sage site potential model:

 Average |error| 1.1

 Relative |error| 0.16

 Correlation coefficient 0.98

Attribute usage in the final sage site potential model:

Condition Model

 97% 100% Landsat 90% NDVI during August - September

 78% 66% Polaris organic matter

 35% 58% Polaris available water capacity (AWC)

 31% 44% Compound Topographic Index (CTI)

 4% 40% steep south facing (Steep S)

 1% 24% steep north facing (Steep N)

1. Generate a 250-m sage site potential map for the GB based on the final sage site potential model and MapCubist code, evaluate the 250-m sage site potential (Gu’s) map by comparing with Wylie’s sage index map. Good correlation between these two maps (R2=0.76).
2. Apply the 250-m sage site potential mode to the 30-m data to generate a 30-m sage site potential map for the GB. The 78-m Polaris data were downscaled to 30-m using ERDAS “Bilinear Interpolation” function.
3. Data used in this study:

USGS percent sage brush map; annual herbaceous map; percent bare ground map; rangeland cover map; 1993-2014 LANDFIRE burn area map; MODIS long-term averaged GSN; Landsat 90% NDVI during August – September; Polaris organic matter; Polaris AWC; USGS CTI; steep south facing; and steep north facing.

Other data (e.g., DEM, MLRA, Landfire ESP, ecoregion, precipitation, temperature, etc) were not included in the final sage site potential model.