Ecosystem type change

RESOURCE BRIEF

IMPORTANCE

Ecosystem types are broad surrogates for the biodiversity and ecosystem processes which they contain. Human activities and land use are altering the area and spatial patterns of ecosystem types. As such, large losses of specific ecosystem types at the hands of human activity should warrant conservation concern. Ecosystem types which are observed to suffer the greatest proportional losses are candidates for focused attention, management and restoration.

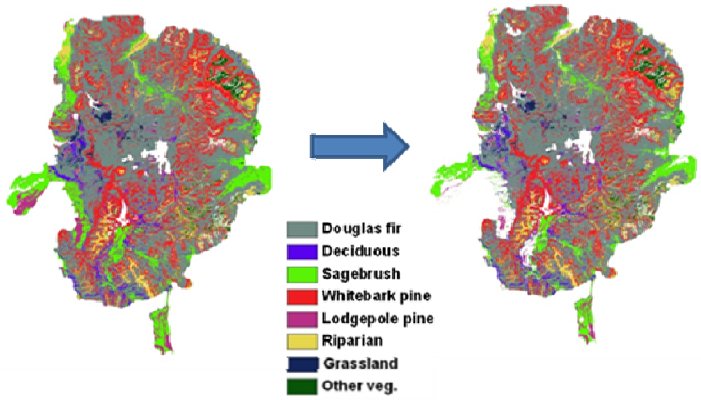

Figure 1. LANDFIRE ecosystem type change

Ideally parks would have information on ecosystem type location and extent dating from before park establishment in order to construct a complete picture of landscape change through time. However, historical datasets rarely exist to accommodate this task. As such, modeling exercises, along with projects that track recent change provide an important picture of broad scale change within and around parks.

The USFS's LANDFIRE program provides a modeled data product which depicts ecosystem types and their location prior to European settlement based on biophysical conditions and historical disturbance regimes. The following analysis uses this layer as a reference condition and overlays present day human land use to examine where and how much each ecosystem type has been lost to human activities. It further generates measures of fragmentation to develop the impacts of human activities on the species and function of ecosystem types.

Results

Total losses to human activities have been minimal whereas proportional losses on private lands have been moderate. Mean patch size has decreased by at least 40% in half of the ecosystem types observed. Sagebrush communities have experienced the largest proportional losses at 19% of total, 33% of private lands and a 75% decrease in mean patch size. Deciduous communities have lost 7% of total, 36% of private lands and mean patch size has decreased by 30%. Grasslands represent the last ecosystem type at possible risk losing 6% of total, 47% of private lands and a decrease in mean patch size of 44%. Douglas fir, whitebark pine and an ecosystem type capturing all 'other' vegetation communities did not suffer substantial losses in this analysis. Data on lodgepole pine and riparian ecosystem types were insufficient to interpret results.

Conclusions

The YELL/GRTE PACE area has not suffered large losses of total ecosystem type area. However, ecosystem types which occur in the most common settings for human development such as lower elevation valleys and foothills have suffered losses in area which warrant attention. Sagebrush, deciduous and grassland communities support a disproportionately large biodiversity relative to the small areas that they cover. With losses approaching 50% on private lands they may be at risk of losing species and ecosystem function in portions of the YELL/GRTE PACE.