

Fires and Sustainability of Navajo Nation Forests



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Introduction

The Navajo Nation stretches 27,425 square miles over three states. The reservation is located on the Colorado Plateau which is drained by the Colorado River and its tributaries. It is the largest reservation in the United States. The area overlaps with the southern Rocky Mountains and has an arid to semi-arid climate. The Navajo Nation Department of Forestry (NDF) manages 596,728 acres of commercial forests and 4,818,815 acres of woodlands located along the Defiance Plateau and Chuska Mountains

Current Management

In previous years, the NDF managed the forest under an uneven-age forest plan, but today the NDF combines even- and uneven-age silvicultural treatments with a 120 year rotation. Since 1991, there have been no commercial harvests and the amount of timber removed has been reduced from 15.9 to million to 4 million board feet. There are various alternatives to timber harvests:

- Woodland Program
- Thinning Treatments
- Pole Marking Program
- Hazard Removal
- Prescribed Fire and Fuel treatments



Objective

I am evaluating data from the forest inventory, maps and data sets from Monitoring Trends in Burn Severity project and the Navajo Forestry Department.



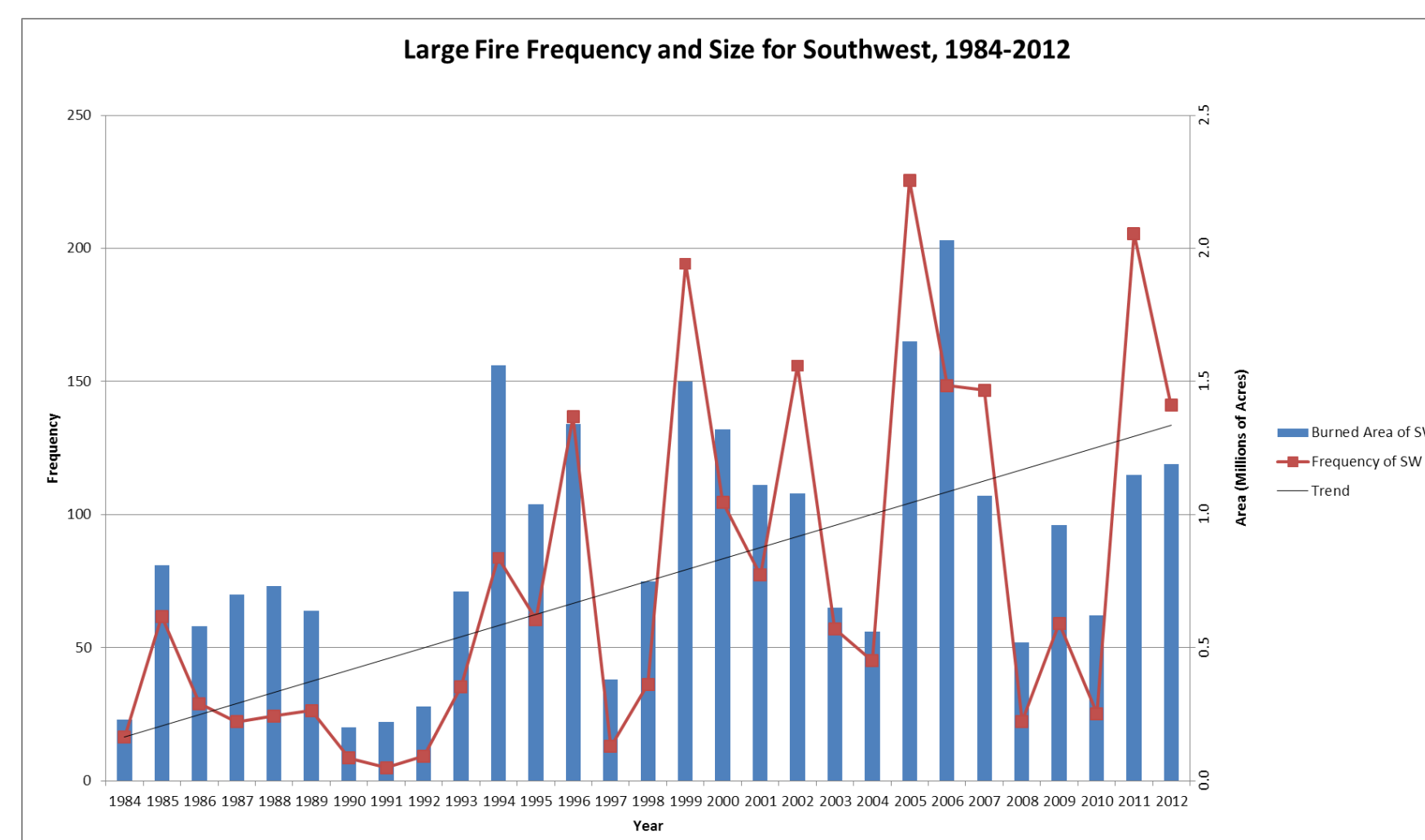
Diné Care

Dine' CARE, an environmental activist group formed by Navajo members, advocated for a more ecological approach when designing the forest management plan and demanded to the NDF to draft an Environmental Impact Statement. Since 1991, Dine' CARE has had a large influence in reducing the amount of forest to the current levels.

Historical Trends of Southwest

Southwest forests have evolved with frequent low to mixed severity fires, maintain open stands and low fuel loadings.

- Ponderosa forests have low severity fire regimes with intervals typically 2-47 years. Ground fuels are light and trees are widely spaced reducing crown fires¹.
- Pinyon-Juniper Woodlands are dominated with grass or forb in the understory. These forests have varying fire regimes due to the difference in structure and composition.
- Mixed-conifer forests have a complex fire regime. They burn every 30 to 100 years, a variable frequency and severity depending on elevation ²).



Study Sites

Fire Name	Majority of Land Cover	Year	Acres burned	Regeneration
Allentown 5	Grassland/Herbaceous	1996	2,647	None recorded
HDScrabble	Woodlands	1996	2,218	None recorded
Carrizo	Evergreen forest	2002	3,698	Douglas-Fir, Gamble Oak, Quaking Aspen
Kinlichee2	Evergreen forest	2006	1,738	None recorded
Oak Ridge 3	Evergreen forest	2007	13,259	None Recorded

Methods:

Monitoring Trends in Burn Severity (MTBS)

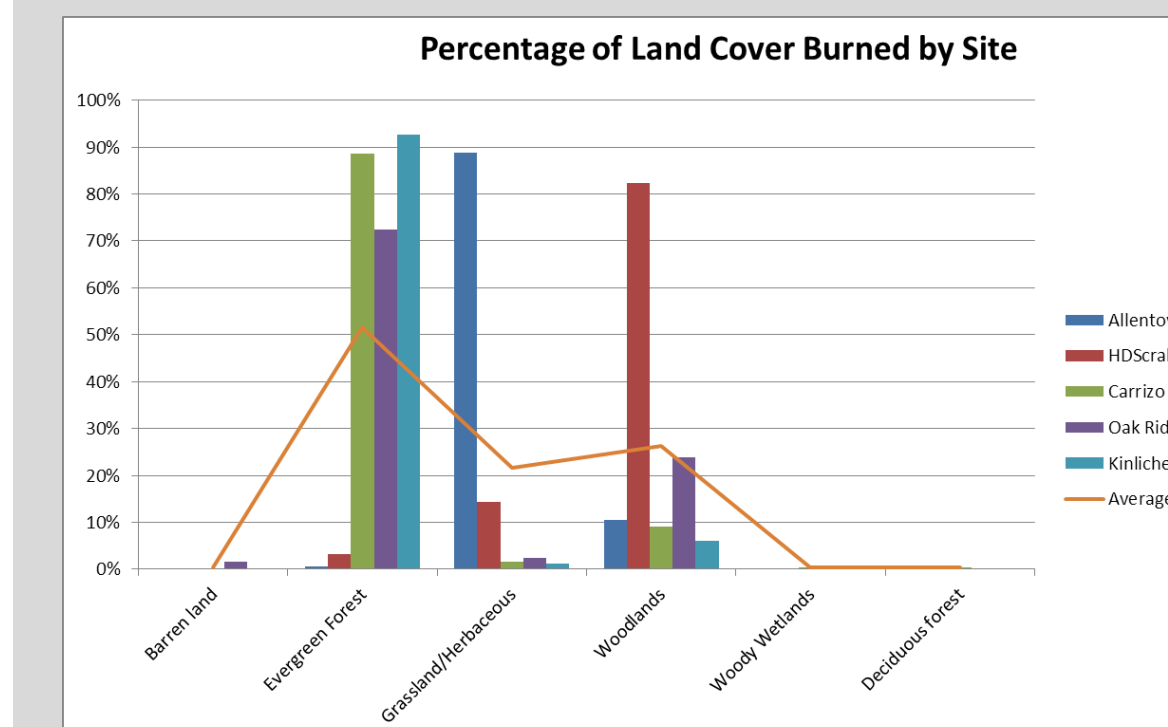
- MTBS maps burn severity and perimeters of fires across the United States, starting from 1984.
- Historical trends of southwest
- Fires assessed within the Navajo Nation.

Field sampling was conducted using transects and sample plots in 5 wildfire sites.

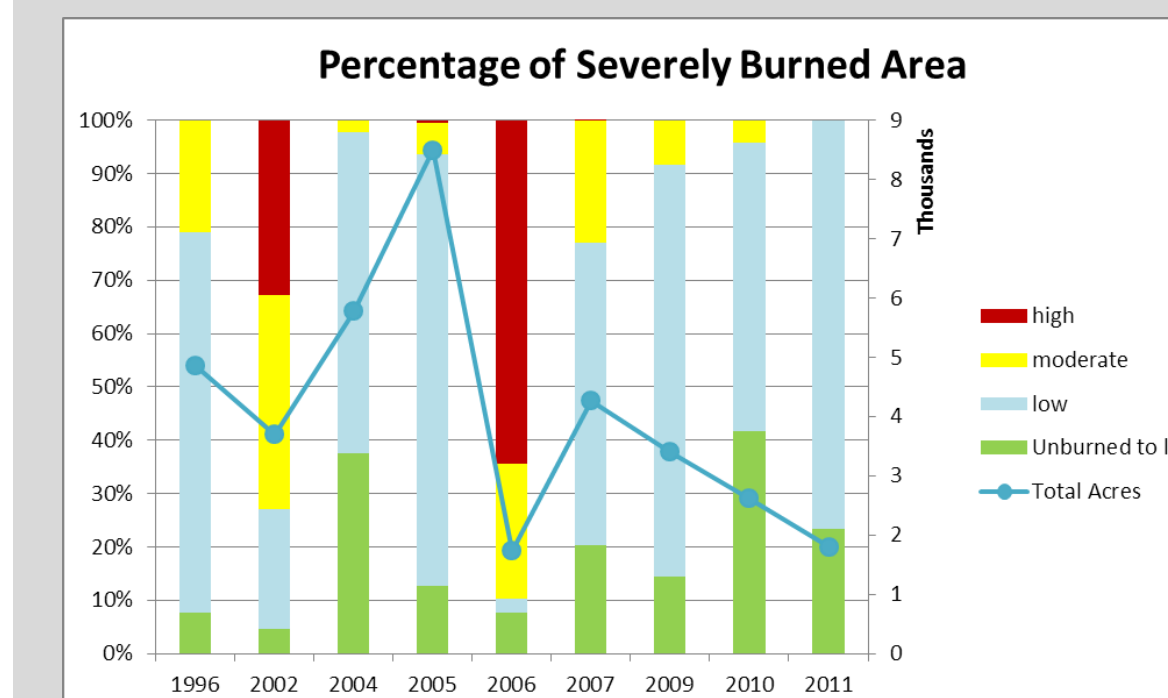
- Transect 50 m in length
- Three 50-m² circular plots placed along each transect.
- Measured regeneration, mortality, bare ground cover, slope, species composition.



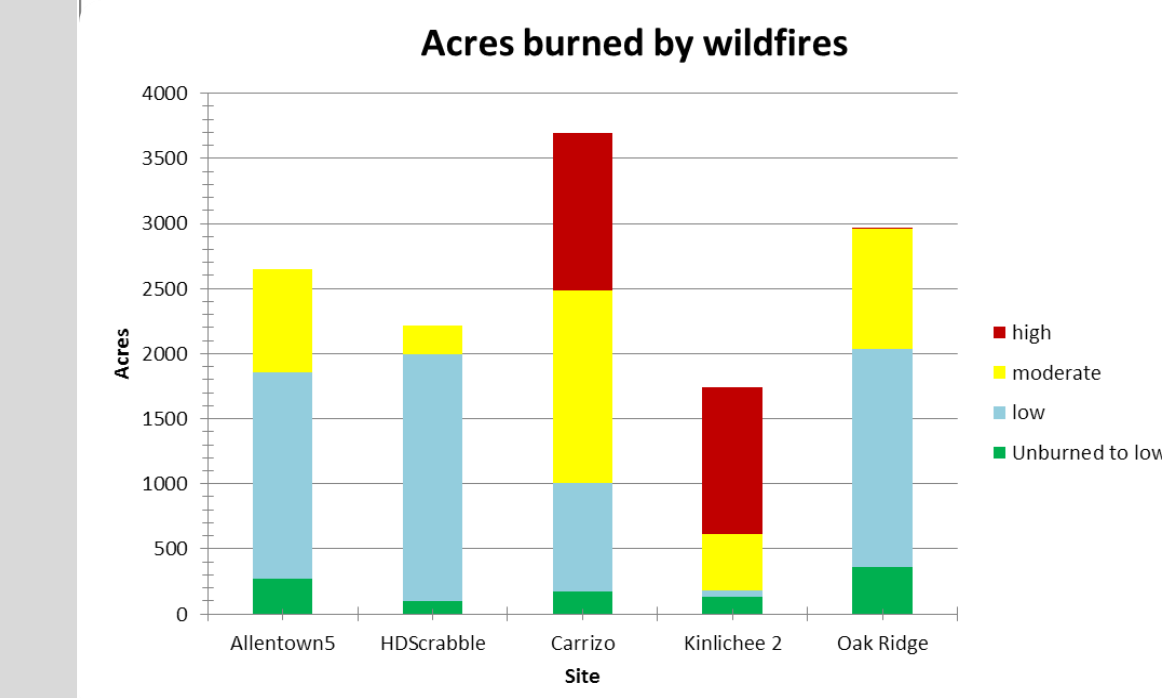
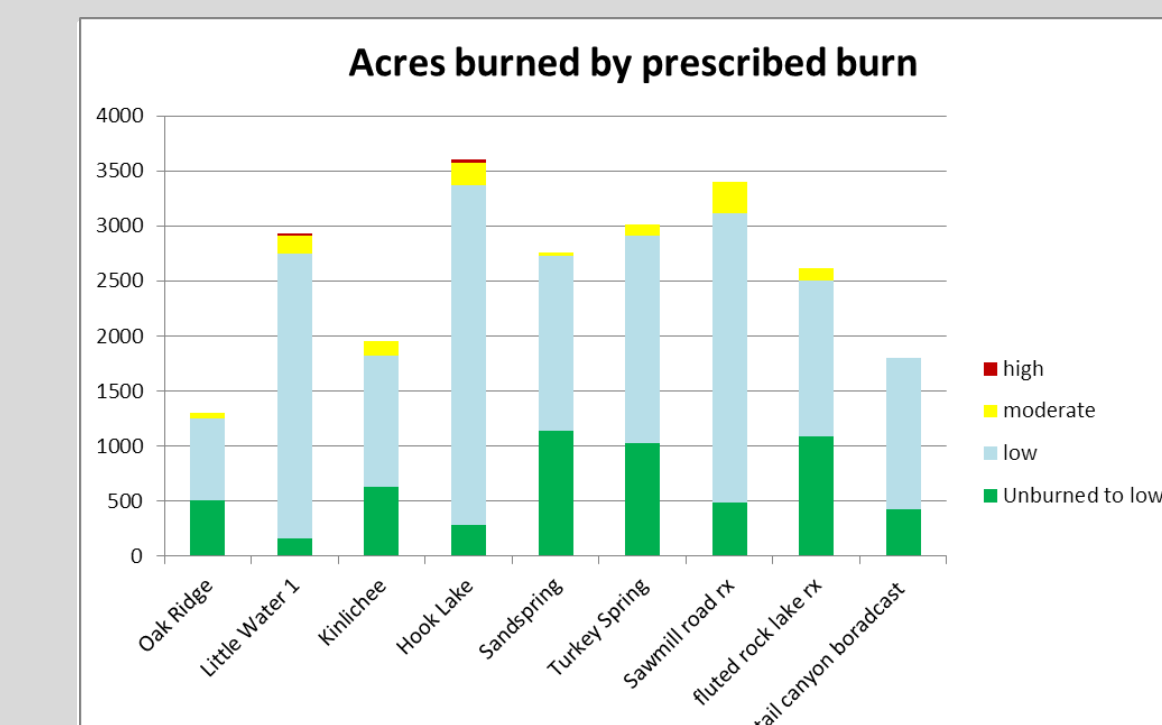
Results



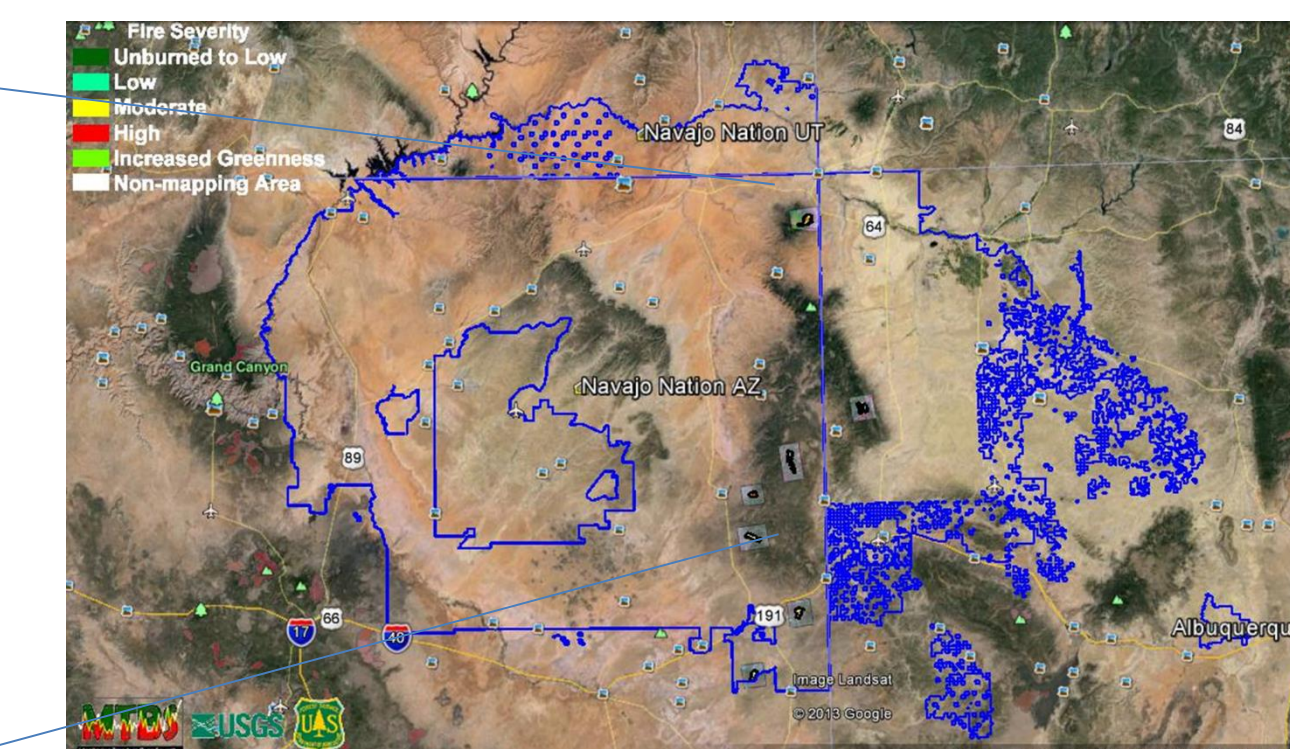
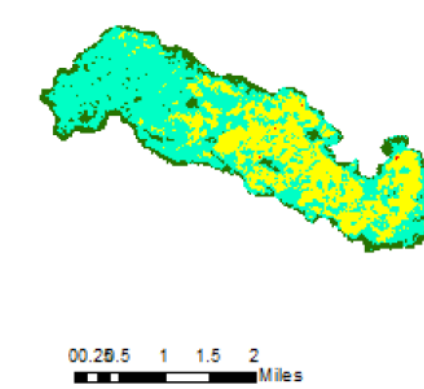
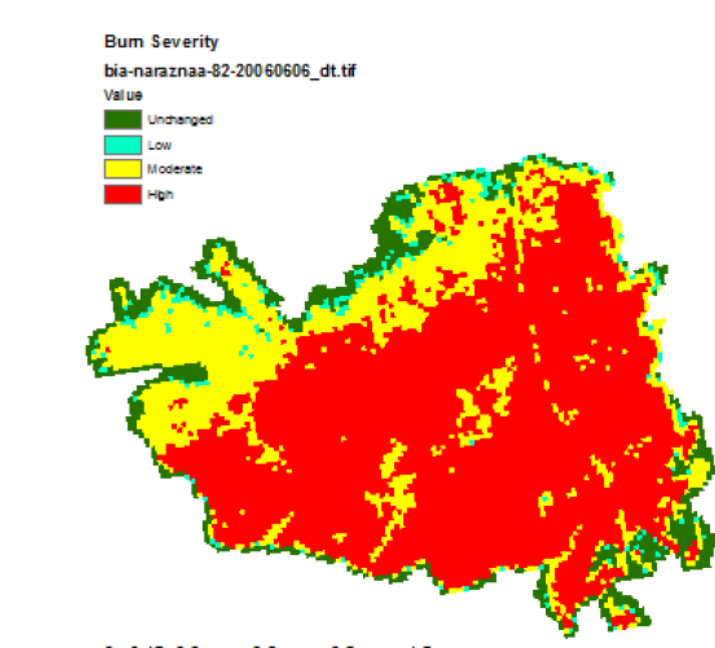
Forest Composition directed toward an increase in Gamble Oak in mid-elevation and Quaking Aspen in higher elevation. Due to lack of harvesting, forests have greatly increased in density. Little change in regeneration in areas at low elevations.



Analysis showed a trend toward increasing fire size. However, no clear trend toward increasing fire severity. Navajo Nation data will largely follow trend of large fire frequency of the southwest.



Further analysis and data of smaller fires and compositional change is required to observe overall changes of current management on forests.



References

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