

Prescribed Fire and its Effects on Oak Regeneration

Oak and mixed-oak forests are ecologically diverse and economically important. Today, land managers guidelines for burning in oak forests are variable and the benefits of periodic fire for regeneration is not thoroughly understood. The fire-oak hypothesis highlights the assertion that prescribed fire can contribute to the regeneration of oak and mixed-oak forests. Patrick H. Brose, Daniel C. Dey, Ross J. Phillips and Thomas A. Waldrop examined the depth and rationale of this assertion by conducting a meta-analysis on fire – oak literature in the article, “A Meta-Analysis of the Fire-Oak Hypothesis: Does Prescribed Burning Promote Oak Reproduction in Eastern North America?”.

Study Site and Methods:

- Meta-analysis of data gathered from 50 articles/ reports from 32 prescribed fire projects conducted in 15 states conducted in oak and mixed-oak forests.
- Predictions of meta-analysis:
 - Fire will have a mean decrease in midstory stem density
 - Oak will have higher post-fire sprout rates than mesic species
 - Oak reproduction compared to mesic reproduction will increase post-fire
 - Oak reproduction height post-fire will be comparable to that of mesic species
 - Density of new oak seedlings will increase postfire
- Dissected each result by examining the studies who’s outcomes contributed to a specific prediction

Key Findings:

- Post burn oaks overall resprouted 32% higher than that of mesophytic species; 52% higher than mesophytic species during the growing season; no difference between species in the dormant season.
- Mid story stems had a 54% reduction.
- Fire did not advance or decrease the oak seedling regeneration pool and greater knowledge on the studies inventory techniques are needed.
- Post fire oak height growth was comparable to mesophytic species.
- Greater density of oak established occurred in burned areas than unburned areas.
- Fire can contribute to the regeneration of oak and mixed-oak forest but more research is needed

Conclusions:

Fire can contribute to the regeneration of oak and mixed-oak forests, however more research is needed with streamlined inventory measures to fully understand the short and long term impacts as well as impacts on other ecosystem components. More research is needed to understand how potential contributing factors such as fire intensity, dormant season burns, growing season burns, carbon storage, shelterwood vs uncut stands, and fire frequency contribute to oak regeneration. Examining these factors will facilitate a better understanding of the proper guidelines for using prescribed fire for oak regeneration.

Links to paper:

[“A meta-analysis of the fire-oak hypothesis: Does prescribed burning promote oak reproduction in eastern North America”.](#)

https://www.appalachianfire.org/_files/ugd/ac1491_5ed2d35163ba4888bb389db0583bc9c2.pdf

Related research:

<https://www.appalachianfire.org/oak>

Link to brief:

https://www.appalachianfire.org/_files/ugd/696505_4cefe29e12fc4c30a12c46c42ef7b4d4.pdf