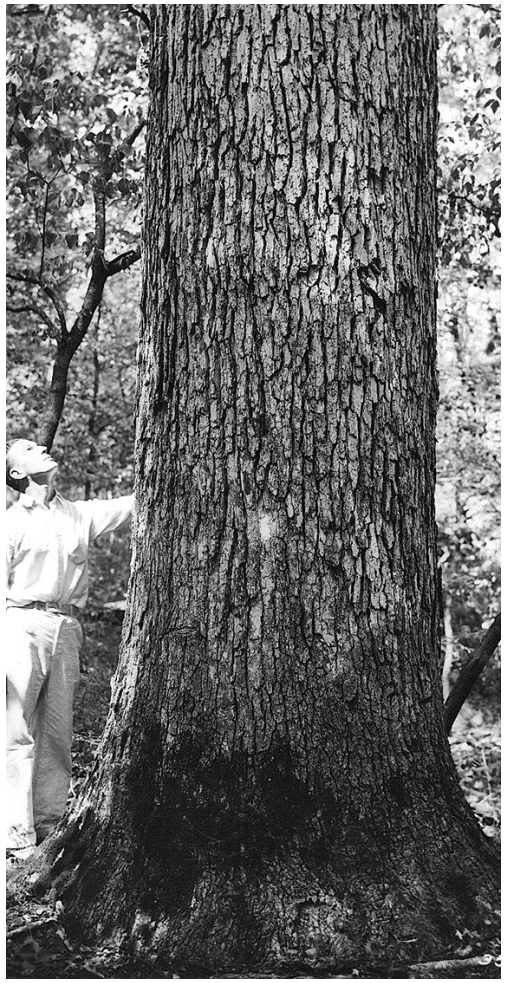
Forest Service
U.S. DEPARTMENT OF AGRICULTURE

Translating Ecology into Management

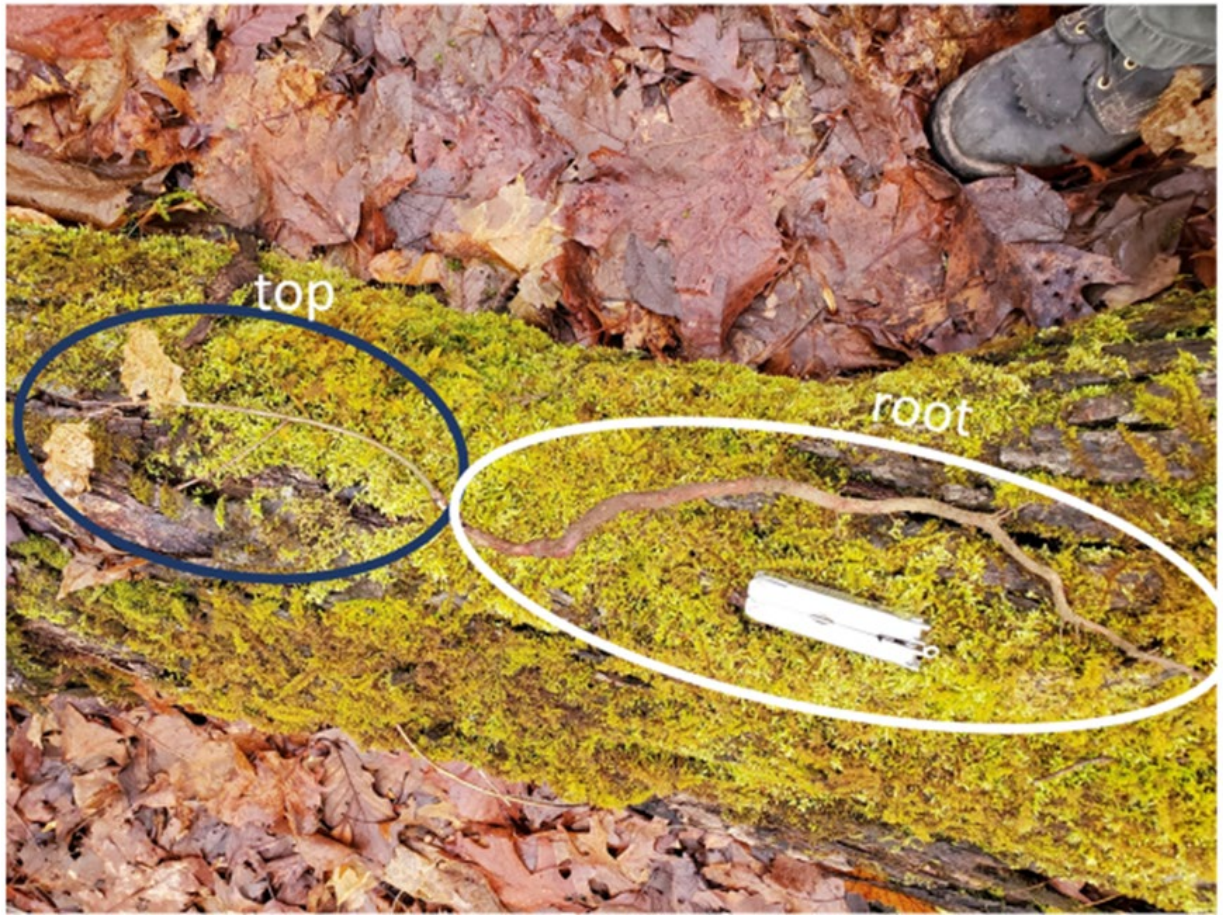


Ohio Hills Adaptive Silviculture for Climate Change Workshop
May 23-25, 2022

Melissa Thomas-Van Gundy
Research Forester
USDA Forest Service, Northern Research Station
Parsons, WV

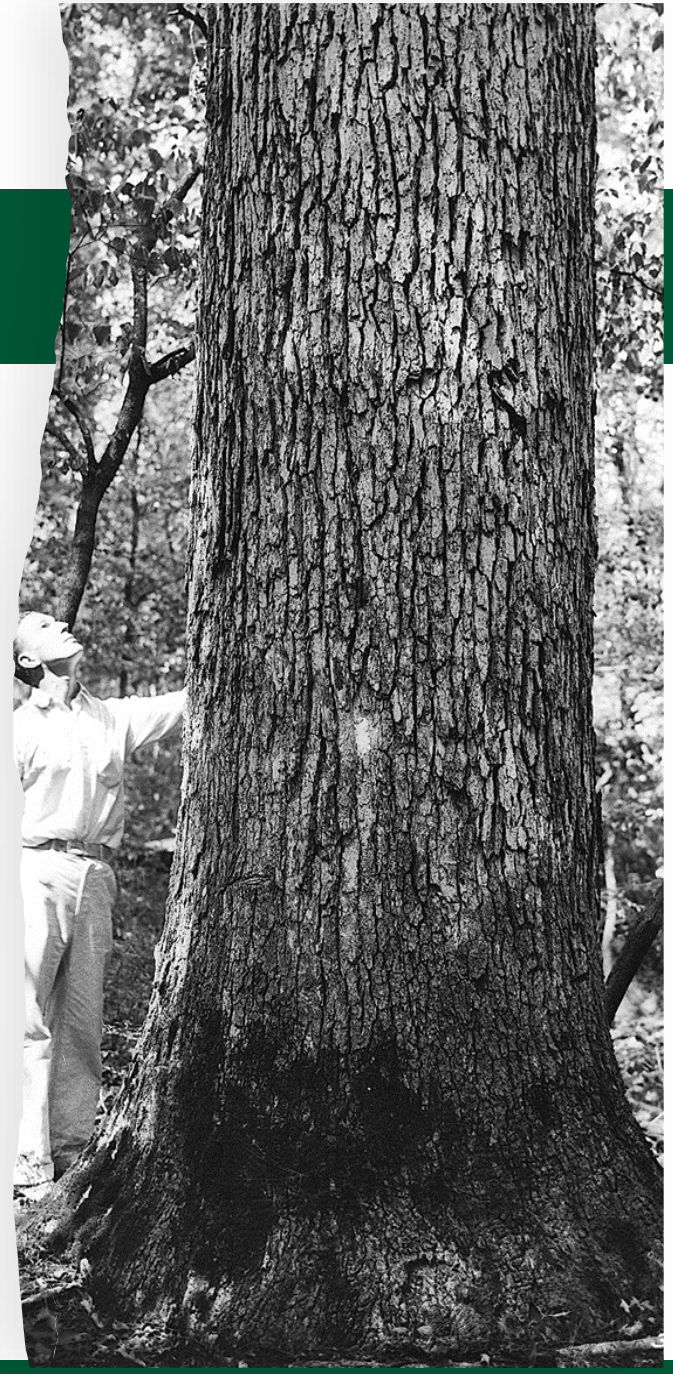
INTRODUCING - The Seedling-Sprout

- Response to topkill
  - browse
  - fire
  - drought
  - low light
- Emphasis on root growth at the expense of shoot growth
- General trait of intermediate shade tolerance


top
root


532

Regeneration is a process NOT an event



Two Laws of Oak Regeneration

- adequate numbers of advanced reproduction

- timely release of those stems

Loftis, D.L. 2004. Upland oak regeneration and management. In: Spetich, M.A., ed. 2004. Upland oak ecology symposium: history, current conditions, and sustainability.
Gen. Tech. Rep. SRS–73. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 311 p.

The Role of Site

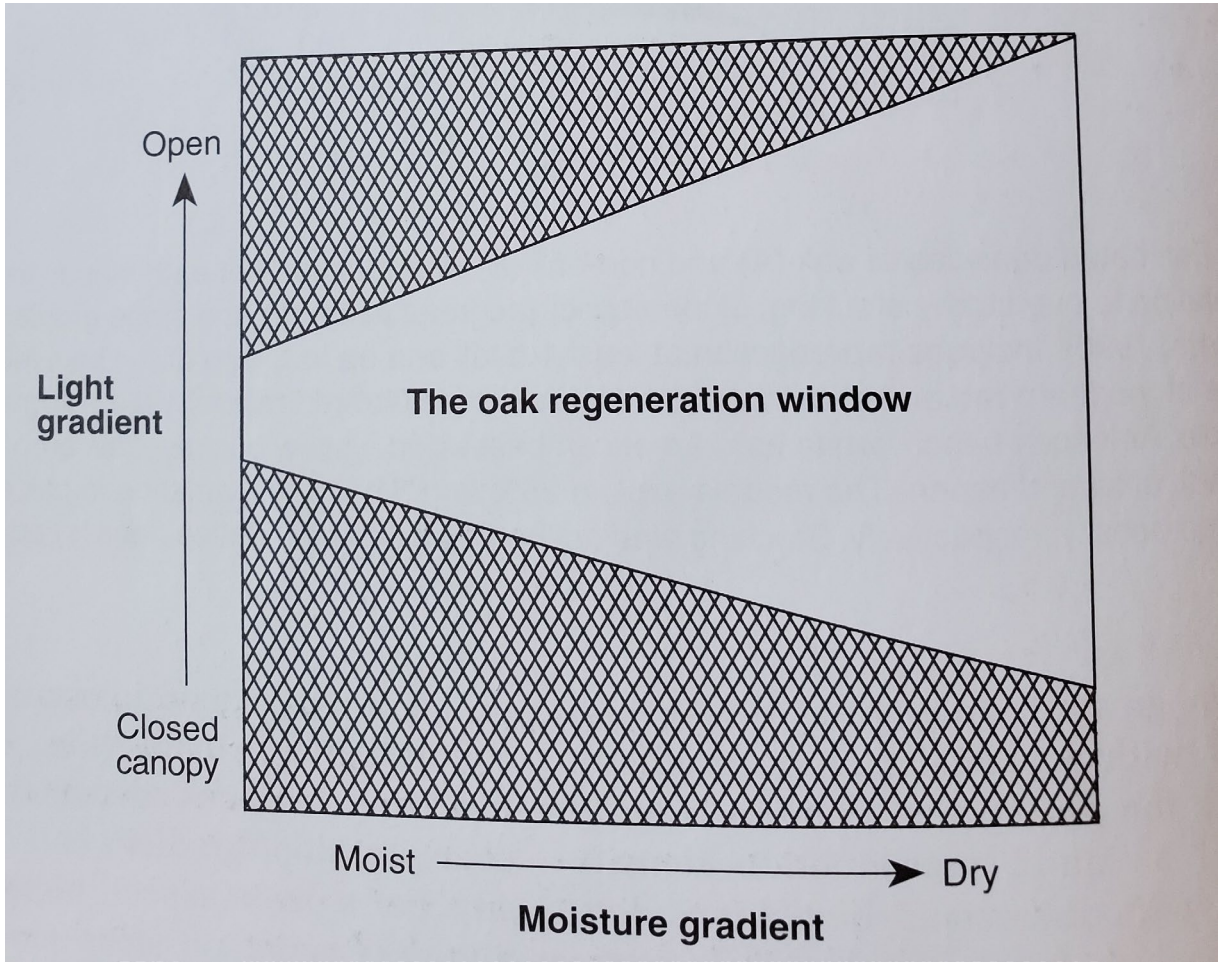


Fig. 3.7. from Johnson, et al. 2009. The Ecology and Silviculture of Oaks.

Advanced reproduction

Do you have lots of healthy, tall stems ready for release?

No

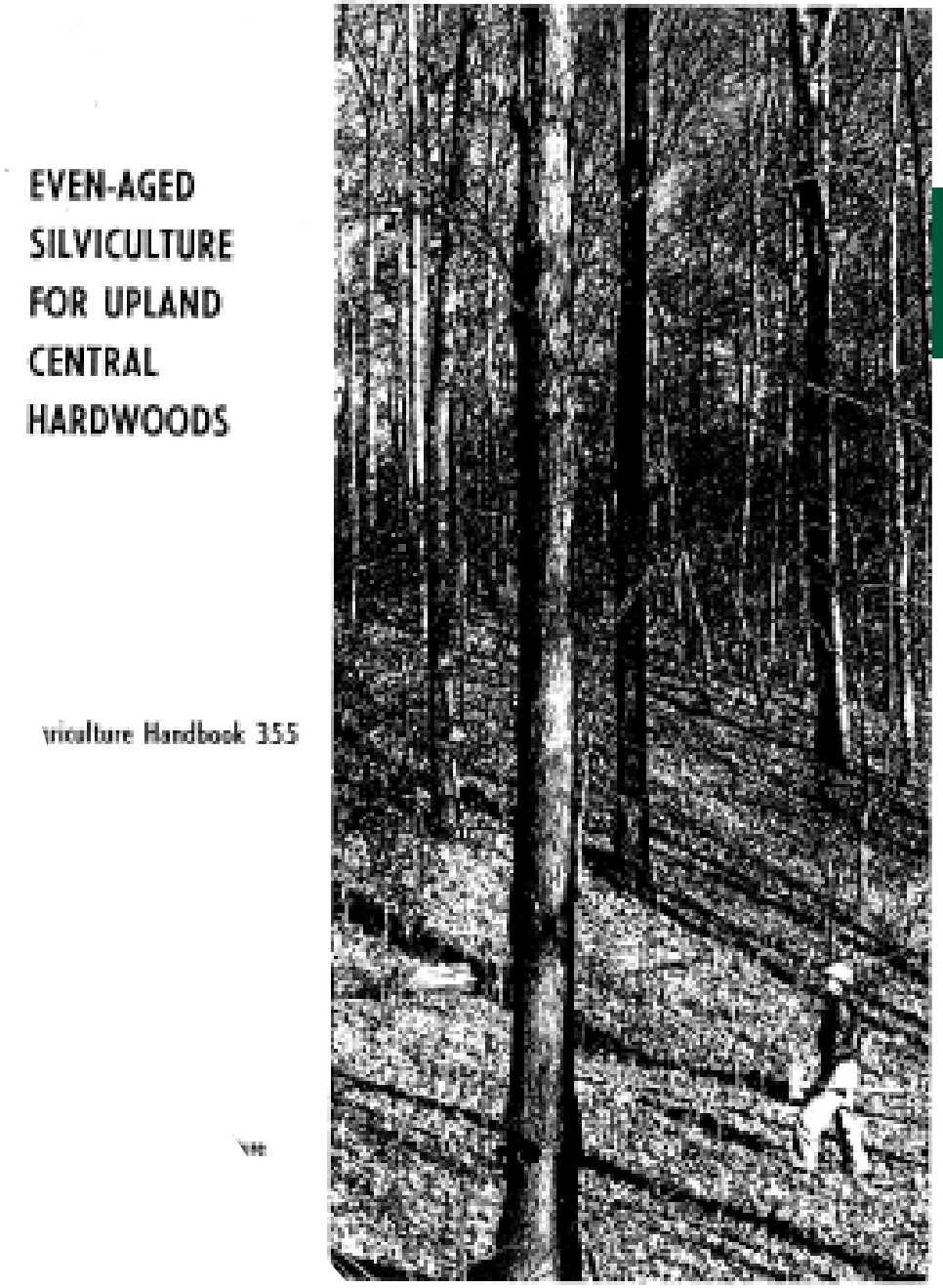
- Reduce mid-story shade
  - Herbicide or fire
  - Thin overstory

Yes

- Release them
- Even-aged methods
  - Clearcut
  - Shelterwood
  - Two aged

The Classics

- Even-aged practices in response to degradation caused by “selection”
- Classic area control for timber supply
- Orderly, high quality, and of preferred species
- Advanced reproduction of oak “nearly always present in large number” in mature stands except where grazing allowed and on high SI
- No reproduction intent with intermediate cuts (crop tree idea)
- However - did those bad selection harvests produce the advanced reproduction?



Roach and Gingrich 1968

Admitting we have a problem

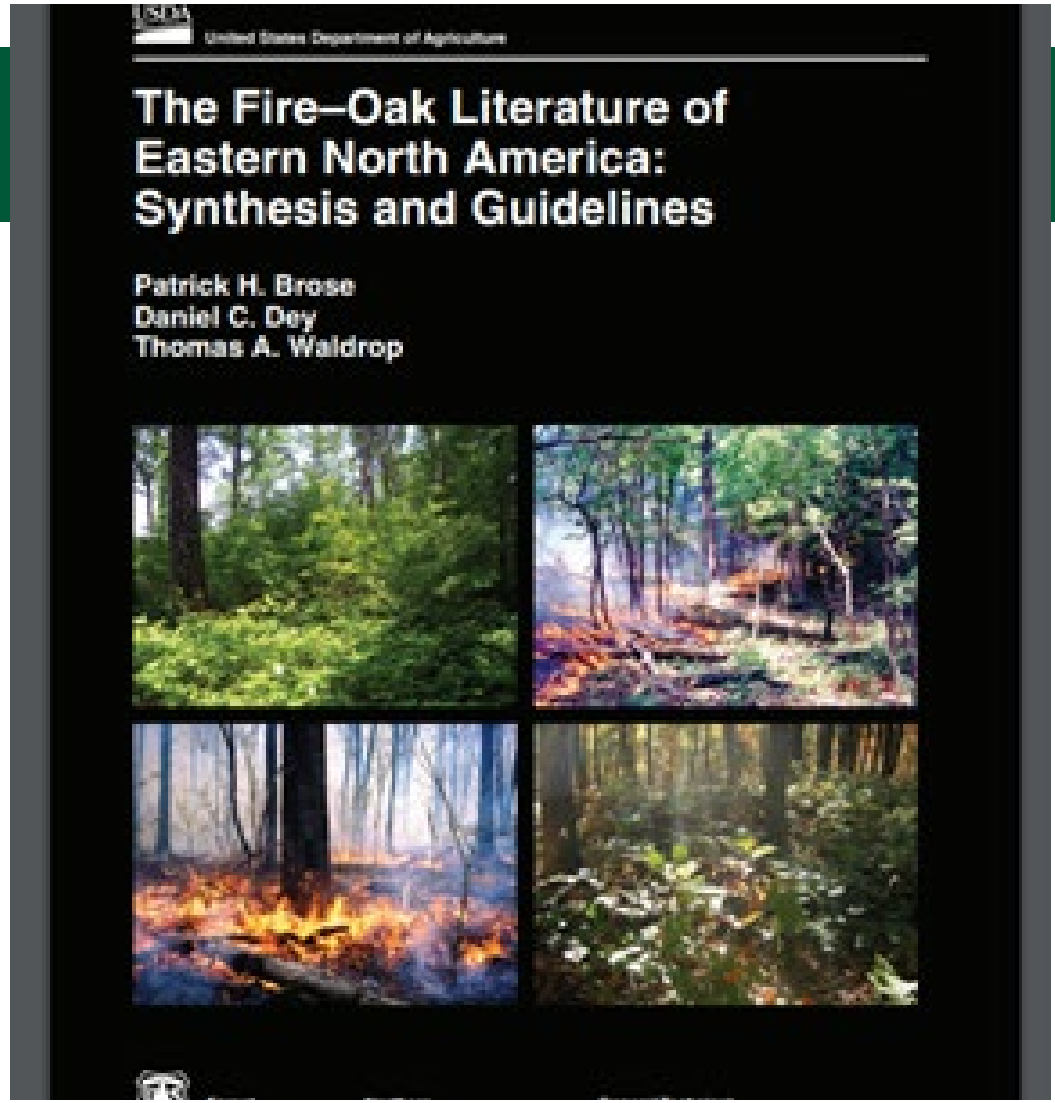
Bottleneck between seedlings and saplings and mature overstory

Loftis, D.L.; McGee, C.E.; [Editors] 1993. Oak Regeneration: Serious Problems Practical Recommendations (Symposium Proceedings). Gen. Tech. Rep. SE-84. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. 319 p.

- acorn predation,
- acorn crop failures
- climatic change,
- damage to seedlings by insects and deer,
- excessive competition resulting from decreased fire frequency

New Guidelines

Brose, P.H.; Dey, D.C.; Waldrop, T.A. 2014. The fire-oak literature of eastern North America: synthesis and guidelines. Gen. Tech. Rep. NRS-135. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 98 p.



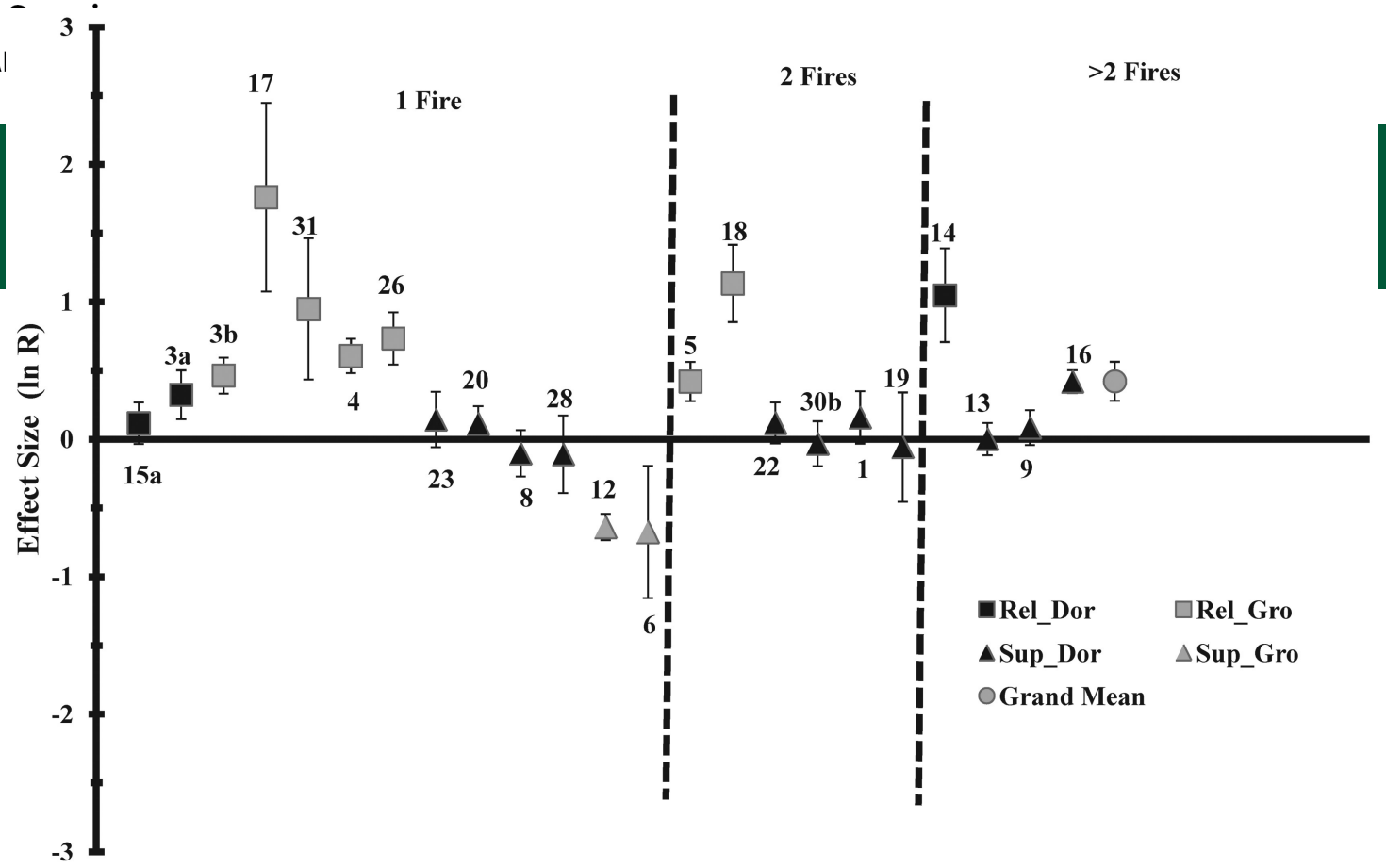


Figure 2. The relative sprouting of released (Rel) and suppressed (Sup) oak reproduction in comparison to mesophytic hardwood reproduction following dormant-season (Dor) and growing-season (Gro) prescribed fires conducted throughout the eastern United States. Log response ratios significantly greater than zero indicate that the oak reproduction sprouted postfire at a higher rate than the mesophytic reproduction. Log response ratios significantly less than zero indicate the opposite, and log response ratios not different from zero indicate that the survival rates of the two species groups were equivalent.

Brose, P.H.; Dey, D.C.; Phillips, R..J.; Waldrop, T.A. 2013. A meta-analysis of the fire-oak hypothesis: Does prescribed burning promote oak reproduction in eastern North America. Forest Science. 59(3): 322-334.

When to use fire in oak regeneration process

Understory Re-initiation

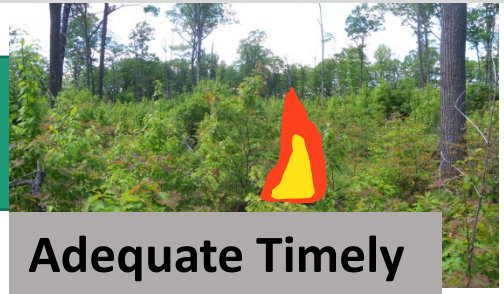
Site Prep Burning

Acorn crop
Establish Seedlings

Stand Initiation

Grow Seedlings to Competitive Size

Release Burning



Adequate Timely Release

Crown Closure

Stem Exclusion

SILVAH decision charts

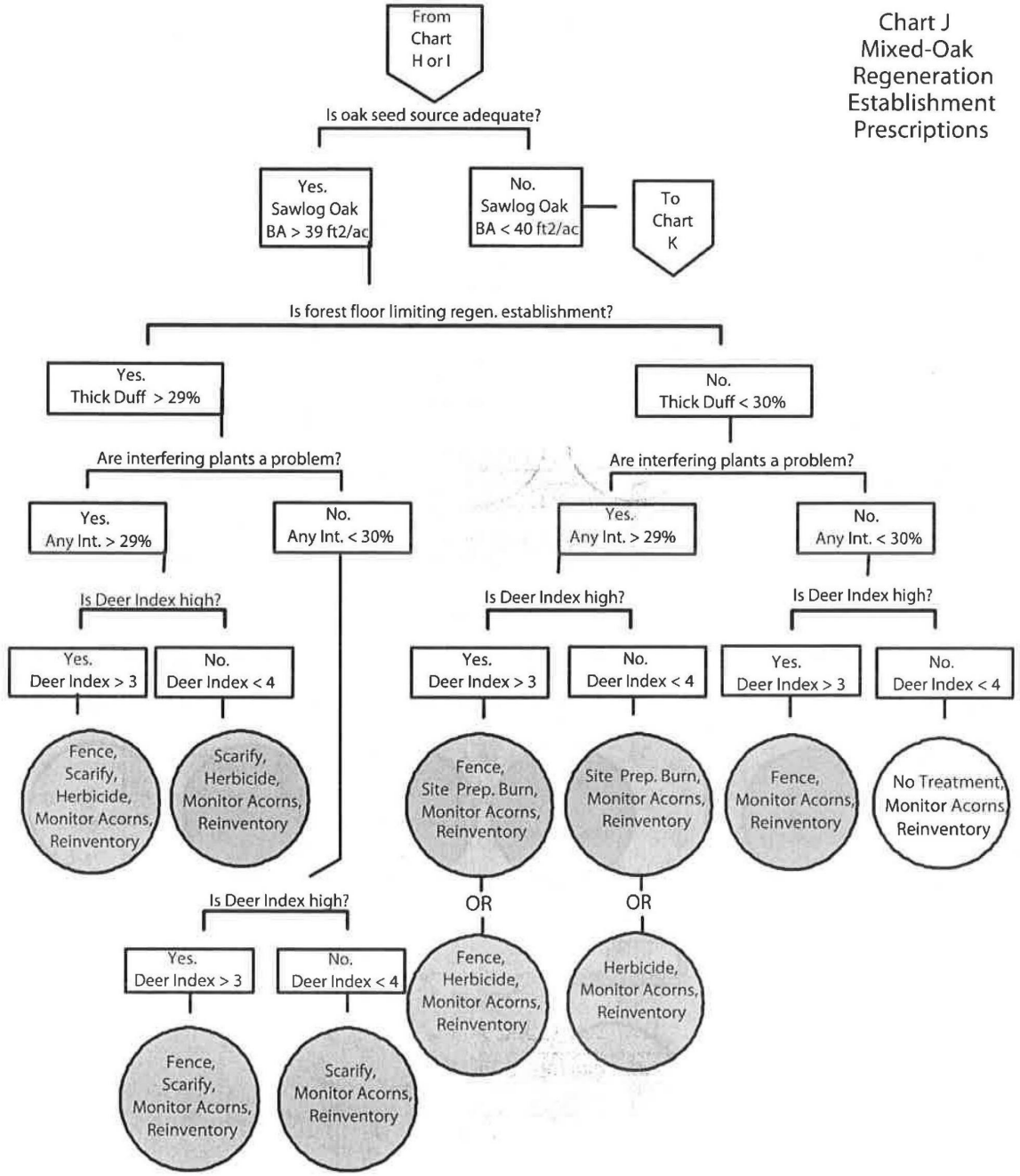


Chart G Mixed-Oak Regeneration Enhancement Prescriptions