

Knoot

A systems approach to understanding factors that inhibit oak regeneration

Tricia G. Knoot(1), Lisa A. Schulte(1), John Tyndall(1), and Brian Palik(2)

(1) Iowa State University, Department of Natural Resource Ecology and Management

(2) Northern Research Station, USDA Forest Service

Recent forest surveys suggest the widespread conversion of oak-dominated forests to later-successional forest types in the Midwestern U.S., with potential detrimental effects to oak-associated flora and fauna. While forest ecologists have furthered our ecological and silvicultural understanding of oak regeneration, the importance of social factors on oak regeneration success and the relationships among the combined driving forces of oak forest loss have received little attention. To more fully understand the oak issue, we sought to develop a holistic conceptual model of oak regeneration in the Driftless Area of the Midwest through a process of bounding the problem, identifying key biophysical and social components, assessing dependencies and feedbacks, and exploring within- and cross-scale interactions. Using a qualitative research framework, we conducted in-depth interviews with 32 natural resource professionals from various sectors of the natural resource community. As regional natural resource professionals often negotiate the ecological and social context related to forest management on private lands, they can offer unique insights into the complex system dynamics of forest change in the Midwest. Our preliminary analyses suggest that social factors are primarily driving oak forest conversion; the professionals pointed to an overall unwillingness by private landowners to adopt and implement oak regeneration practices, namely intensive harvesting practices. Various ecological (e.g., deer herbivory and the spread of invasive shrubs) and social forces (e.g., forest parcelization and exurban sprawl), and relationships and feedbacks among these variables, were cited as further inhibiting decision-making by private landowners regarding oak regeneration. Our results will help guide the development of strategies that promote successful oak regeneration decisions by private landowners, with attention towards addressing the interrelated ecological, economic, and social factors which hinder landowner adoption and implementation of oak regeneration objectives.

Contact Information:

Tricia G. Knoot, Ph.D. Candidate, EPA STAR Fellow

Department of Natural Resource Ecology and Management

Iowa State University

339 Science II

Ames, IA 50011-3221

515-294-2957

tknoot@iastate.edu

Lisa A. Schulte, Ph.D., Assistant Professor
Department of Natural Resource Ecology and Management
Iowa State University
339 Science II
Ames, IA 50011-3221
515-294-7339
lschulte@iastate.edu

John Tyndall, Ph.D., Postdoctoral Fellow
Department of Natural Resource Ecology and Management
Iowa State University
339 Science II
Ames, IA 50011-3221
515-294-4912
jtyndall@iastate.edu

Brian Palik, Ph.D., Project Leader and Research Ecologist
Northern Research Station, USDA Forest Service
1831 Hwy 169 East
Grand Rapids, MN 06514
218-326-7116
bpalik@fs.fed.us