



Project Impacts

NSRC-FUNDED RESEARCH FINAL REPORT

Sustainable Management of Northern Forests for Timber, Carbon, and Biodiversity

PROJECT AWARD YEAR AND TITLE:

2006

The Influence of Forest Attributes on Indicators of Biodiversity: Establishing Guidelines for Sustainable Forest Management

PRINCIPAL INVESTIGATORS:

Therese Donovan

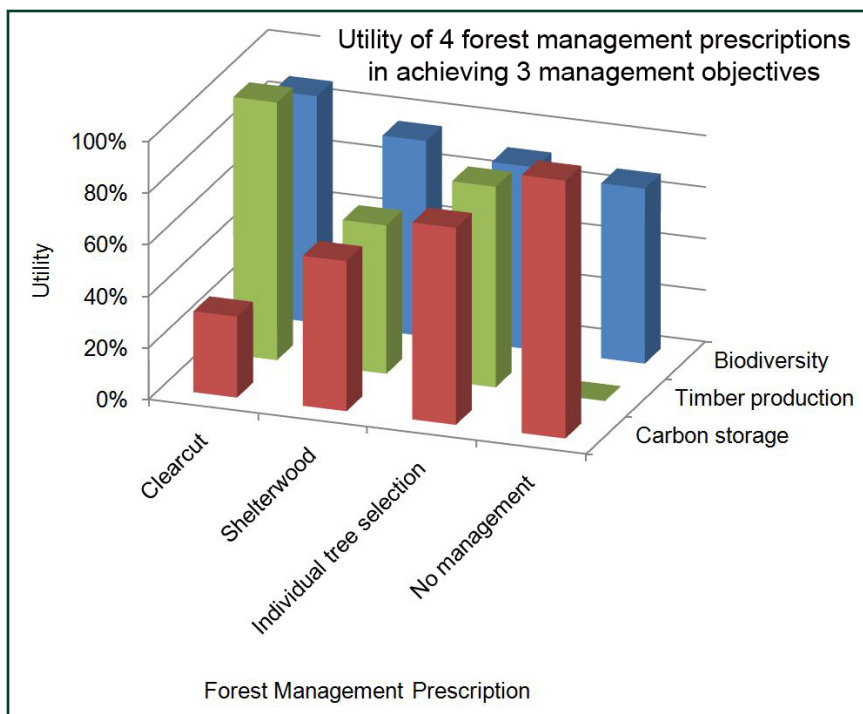
VT Cooperative Fish & Wildlife Research Unit
tdonovan@uvm.edu

Scott Schwenk

VT Cooperative Fish & Wildlife Research Unit
scott.schwenk@uvm.edu

William Keeton

University of Vermont
william.keeton@uvm.edu



Today's northern forests are managed for multiple purposes, including timber production, biodiversity conservation, and carbon sequestration. Challenges arise in managing for multiple ecosystem services because of conflicting endpoints. A practice that maximizes one objective, such as timber production, is unlikely to simultaneously maximize all other ecosystem services. Additional challenges arise in quantifying and comparing values of different services. How can board feet harvested, carbon stored, and biodiversity level be compared to allow an informed management decision?

NSRC researchers applied Multi-Criteria Decision Analysis to simultaneously consider three objectives in managing Vermont forests: storing carbon, producing timber and wood products, and sustaining bird biodiversity. Researchers used a computer model, the Forest Vegetation Simulator, to simulate four forest management prescriptions (no harvest, clearcut, shelterwood, and single-tree selection) on 42 northern hardwood sites over 100 years. For each simulation, they estimated carbon storage, timber production, and biodiversity implications for 51 terrestrial bird species.

Results indicated that multiple objectives for forest services could be accommodated, but trade-offs occurred. When a greater preference for carbon storage was applied, management prescriptions involving less intense harvesting were favored. Conversely, greater preference for timber production favored management with a high intensity of harvesting. However, differences among the four management prescriptions in terms of bird biodiversity were comparatively small because reductions in occurrence in some bird species were counterbalanced by increases in other species. A diversity of silvicultural approaches is likely to be preferable to any single approach in meeting multiple objectives for forest ecosystem services.