United States Department of Agriculture

Forest Service

Irvine

Reply to:

Date: October 23, 1985

Subject: Species Habitat Relationships

To: Robert Radtke

Here's an early draft of the "Wildlife in Jack Pine" paper. I've intentionally left out the Appendix of wildlife species and abundances until I get some feedback on general approach. I'll also be adding a second appendix that covers species probably affected by management alternatives. Literature review will be added to the Introduction and Discussion. I'd appreciate any comments on the general approach. Clearly, the paper has more relevance to USFS Species Habitat Relationships than to KW management, but it does add some documentation of other species found in the same habitat, and those favored by burning.

Best wishes.

John

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FOREST SERVICE USDA

WILDLIFE MANAGEMENT OF THE JACK PINE FOREST TYPE IN THE LAKE STATES

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INTRODUCTION

Recent legislation (RPA, NFMA) has mandated that the USDA Forest Service management of National Forests shall not adversely affect populations of vertebrate species, especially species that are endangered, threatened, rare economically important, or desirable in other ways. However, all stands cannot be managed to benefit all species, so difficult choices must be made between prescriptions that benefit the most species or the most desirable species. Thus, there is a need to develop habitat capability evaluation procedures that helps prioritize goals and evaluate wildlife tradeoffs.

A given region in the mid-latitudes of North America commonly holds 300-400 vertebrate species. Our knowledge of the habitat requirements of vertebrates varies enormously. At one extreme we know enough about some game species to predict approximate densities in different habitats. In contrast, there has been so little research on many non-game species that even their habitat distribution is poorly understood. Clearly, the wildlife tradeoffs among management options cannot be appreciated fully until there is adequate research accomplished for all vertebrate species. For the short term, there is a need to develop models that help prioritize goals, evaluate wildlife tradeoffs and identify research needs. Because of the large number of vertebrates, it is impossible to monitor the impact of management activities on all species. Consequently, NFMA of 1976 has directed the Forest Service to monitor populations of representative indicator species. As research information on

almost all species accumulates, it may be possible to substitute direct habitat monitoring for monitoring of individual wildlife species.

We present a simple, multi-species model that divides wildlife into 4 importance classes, assigns an importance factor to each class, and further weights each species by one of four abundance categories. This permits comparisons of management alternatives by each importance class or all of them together. The weighting by importance categories and abundance class places less emphasis on species diversity per se at the stand level, and stresses the habitat values of rare or desirable species.

We chose the Jack Pine forest type in the Lake States as an example for three reasons: (1) There is a good mix of species in the different importance categories (an endangered species, a variety of rare or sensitive species and a variety of game, fur and "feature" species). (2) We have a reasonable familiarity with this forest type and there are several contrasting management options that are realistic alternatives for managers. (3) We have conducted wildlife research in the jack pine forest type for over six years, including vegetation measurements.

METHODS

We first grouped vertebrate species into four levels of importance below endangered for the purpose of ranking the overall value of various habitat conditions, and assigned each of them a logarithmic weighting factor: (1) threatened, sensitive or rare species, 8x; (2) game, furbearer or "featured" species, 4x; (3) other common vertebrates, 2x; (4) and ubiquitous/abundant species, 1x. (In actual practice, a land manager may only wish to consider one importance category or even only one species, such as an endangered species.) We also assigned each species a weighting factor for the estimated abundance

class for each stand age and management option. The four abundance classes and factors were weighted as follows: abundant = 4, common = 3, uncommon = 2 and rare = 1.

Four stand age categories were defined to correspond to four general wildlife habitat conditions. The open situation was from 0-5 years after fire or harvest. Years 6-16 represented a shrubland-savanna with interspersed trees, thickets and openings. The third period (canopy closure) was from 17-30 years. Jack pine forests were classified as mature at stand ages greater than 30 years. We estimated the abundance class of each of 145 vertebrate species in each stand age category. The relative value of each stand age category to wildlife was estimated by multiplying the importance value of each species times the abundance class and summing the product of all species WHV $= \mathcal{E}_i$; $A_i \times B_i$, where A = abundance class (1,2,3 or 4) and B = importance class (1,2,4, or 8) and $\underline{i}$ represents each species under consideration.

Four contrasting management options for regenerating jack pine were chosen as examples, two required the occurrence of fire and two did not. One of the regeneration methods uses fire in unharvested stands, as with a wildfire or non-commercial stand regeneration through prescribed fire. Trees are regenerated by serotinous seeding. Prescribed fire can also be used after commercial harvest if seed trees are left after harvest. Fill-in planting is often required for full stocking. The non-fire options include full tree harvest followed by planting, and a shelterwood option with two commercial harvests.

Most of the differences in wildlife habitat quality among jack pine stands are related to gross physiognomic characteristics associated with stand ages ranging from open fields to mature forests. However, the value of various stand