Forest characteristics required by the Northern Saw-whet Owl compared with the more rare Boreal Owl.

Final Report for the
Department of Natural Resources

by

Randy F. Lauff, M.Sc.

Objectives:

To determine the habitat use and breeding range of the Boreal Owl (*Aegolius funereus*), and to contrast these with those of its close relative, the Northern Saw-whet Owl (*A. acadicus*).

Methods:

Nest boxes were first erected in 1999; a total of 93 boxes have been erected (Fig. 1), though not all are available anymore (due to theft and deterioration).

The boxes were not randomly placed – they were, with minor exception, placed in forests. Forests were always old enough to have trees large enough to naturally support nests, however, that was the only sought-after character. Forests of many types were used, from those dominated by Eastern Larch (*Larix laricina*), to those dominated by American Beech (*Fagus grandifolia*). The minor exception of boxes not placed in forests was that three boxes were placed on isolated trees, e.g. in a barrens or an area of Spruce Budworm defoliation.

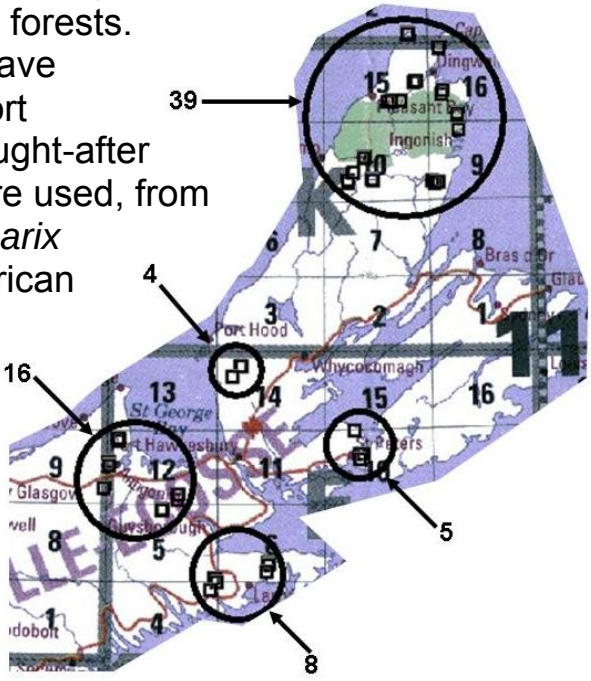


Fig. 1. Distribution of nest boxes for this study.

Habitats were quantified at nest box sites that hosted nests of the

two owl species, as well as at unused nest box sites; an unexpected number of American Kestrels (*Falco sparverius*) also used my boxes, and the data for them are also included.

The T-square method was used to determine the distribution of trees (diameter at breast height [dbh] > 5.0 cm). Twenty trees were haphazardly chosen for this, with twenty other nearest neighbours also used. This technique generates the statistic **t'**, where t' ≤1.96 signifies an aggregated forest structure; a t' falling between -1.96 and +1.96 signifies a random forest structure, and a t' ≥1.96 implies a regular structure.

Some nest boxes were used more than once by the same species over the course of the study; the data for each site however, was used only once in deriving the statistics for this study. The data for sites that had more than one species use a particular box were used in calculating the statistics for both species.

Additionally, all forty trees were identified to species; each dbh was also measured.

Table 1. The number of sites measured for this study.

site	number
unused sites	32
N Saw-whet Owl	11
Boreal Owl	4
American Kestrel	4

Results and Discussion:

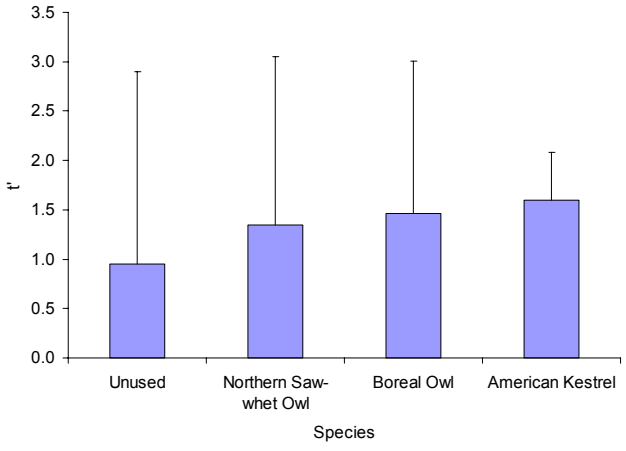
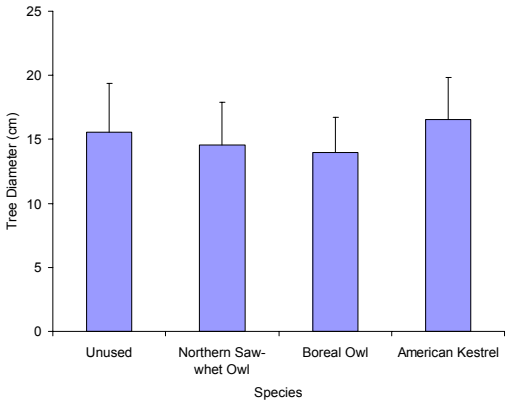


Fig. 2. Forest structure (tree distribution) at unused sites, as well as sites with occupied boxes. A t' ≤1.96 signifies an aggregated forest structure; a t' falling between -1.96 and +1.96 signifies a random forest structure, and a t' ≥1.96 implies a regular structure.

Table 1 details the number of nest box sites which were measured over the course of this study. It should be noted that just because a site has not yet been used, this should not be taken to imply that it will never be used. The sample size for Boreal Owls (and American Kestrels) is quite small, and therefore has low statistical power; this should be borne in mind when interpreting the data.

The forest structure at most nest sites for the owls and the falcon, as well as unused sites, was random (Fig. 2). There was a large amount of variation, implying that the birds were not focussing on a pattern of tree placement when selecting their nest sites.



Mean tree diameters at nest sites were all approximately 15 cm, and not significantly different from each other nor from unoccupied sites (Fig. 3). Similarly, tree spacing averaged about 170 cm over all sites, and there was no significant differences between them (Fig. 4). It should be noted however, that Kestrels are *tending* to pick sites with greater mean spacing, though the sample size is too small at this point to show this with confidence; this of course fits the known biology of Kestrels. The two owls are of similar size (the Boreal is only slightly larger), and therefore one would expect them to choose forests with similar *minimum* tree spacing and diameter. There simply are not enough sites with large trees and broader spacing (i.e. old growth forests) at my study sites to test the upper limit at this point.

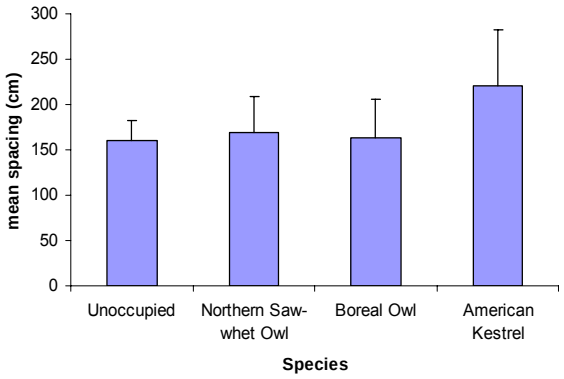


Fig. 4. Mean tree spacing at the nest sites and unused sites.

The major difference between the nesting sites of the two owls is in species richness and composition of the dominant trees. Boreal Owls consistently choose nest boxes in sites with low richness; 95% of trees at these sites are made up of Balsam Fir and White Birch (Fig. 5). In contrast, Saw-whets use sites where nine species are needed to make up 95% of the trees (Fig. 6). Although one also finds Balsam Fir at Saw-whet nest sites, the rate is half that found at Boreal Owl nest sites. Additionally, the split between conifer and deciduous trees is about equal at Saw-whet sites, whereas three-quarters of trees at Boreal Owl nest sites are conifers.

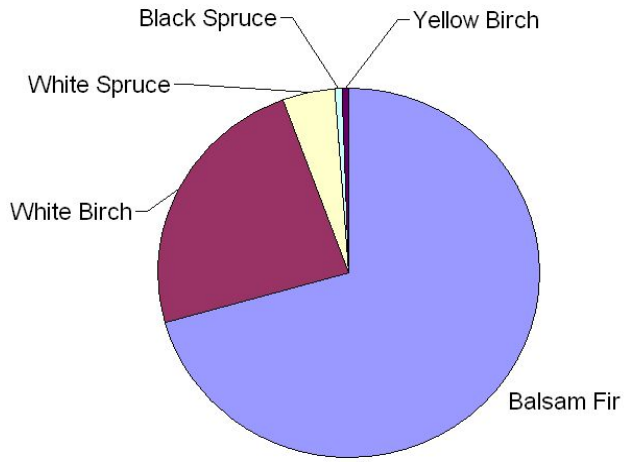
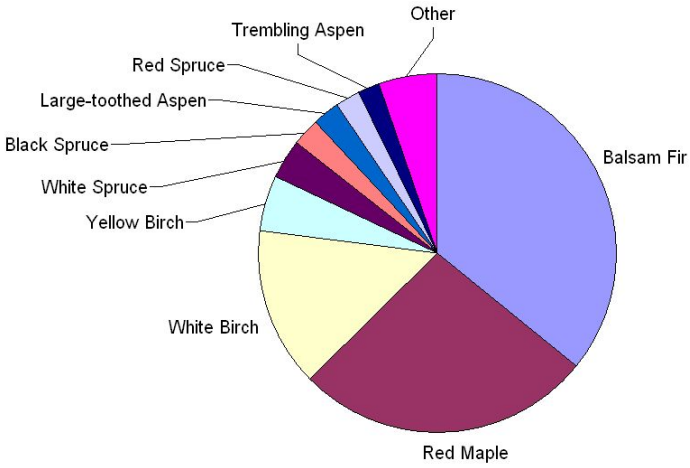


Fig. 5. The composition of trees at Boreal Owl nest sites.



Conclusions

Working with a rare species presents problems in getting sufficient numbers for rigorous statistical analysis. I anticipate working on this project for many more years, and with this in mind, hope to produce a solid, publishable account of habitat differences for these two owls.