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Cavity-nest research at the Hayward Brook study area - Fundy Model Forest

Summary report (Fall 1995)

November 20, 1995

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Introduction

This is an update report on the progression of cavity-nester study that I have been working on for the past year and a half. It briefly summarizes the work done at the Hayward Brook study area during the 1995 field season and also gives a tentative schedule for the fall of 1995 as well as for the winter of 1996. An appendix containing variables used for analysis as well as some tables and graphs can be found at the end of the document.

Overview of 1995 field season

Cavity searches

Cavity searches for 1995 were begun on 2 May and concluded on 6 July. They were briefly interrupted for two days during the first week by a late snow storm that left 5 to 10 cm of snow on the study area. This snow persisted for almost two weeks and seemed to lessen our search efficiency. Cavity searching was the only field work done during the first three weeks of May: vegetation sampling could not be initiated for lack of deciduous foliage.

Active cavities (n = 34) were located by criss-crossing the breeding bird sample plots and, to a greater extent than in 1994, the forest adjacent to these plots. Fewer nests were found than last year (n = 57) for the following reasons: 1) field personnel numbers were in smaller numbers this year than in 1994 (2 vs. 4), and 2) harvesting operations began in early June, considerably shortening the cavity search period. Breeding chronologies were conducted as in 1994 but could not be completed for some nest sites. Harvesting operations began before some birds could successfully fledge their young. Trees and snags used as cavity-nesting substrate in 1993 and in 1994 were revisited throughout the summer to determine degree of re-use. A total of 9 of these trees and snags were re-used from the preceding nesting seasons.

Global Positioning of nest sites and random sites

Coordinates of some nest sites and random sites (n = 74) were determined with the help of a GPS device in mid-December of 1994. During the 1995 cavity search period, all remaining 1993 and 1994 nest sites and random sites not sampled during the 1994 season (n = 100) were geographically located using the GPS device lent by Neil Burgess of the Canadian Wildlife Service. Coordinates of these sites were determined from 3 May to 6 May 1995. Coordinates of 1995 nest sites and of their respective random sites were defined as they were sampled. All nest site and random site coordinates have been digitized into the Fundy Model Forest GIS at Sussex. GIS analyses are currently underway with help from the ARC/VIEW program.

Habitat sampling

Sampling of habitat surrounding nest trees and random trees was begun on 22 May and concluded on 11 July 1995. Nest-sites used in 1993 and in 1994 as well as random sites that were put in place during the fall of 1994 were all relocated. Vegetation sampling that could not be performed during the 1994 field season due to insufficient time allocation were completed. All 1995 sites were also sampled during the field season. Habitat sampling was conducted as quickly as possible so that it could be completed before prescribed harvesting operations would begin in late May or early June. Luckily, poor soil drainage, frequent rain in May and fluctuating wood market demands pushed back harvesting dates to early July. This enabled us to complete all habitat sampling before most of the harvesting operations began.

Harvesting error on plot 3

While conducting small mammal trapping on July 26, it was noticed that pink flagging tape had been put in place on the southern side of plot 3. Efforts were made that day to contact Chris Celest to obtain information on the presence of this flagging tape. Repeated efforts to contact Mr. Celest failed. Upon arriving at the same location the next day, a feller-buncher could be heard harvesting on plot 3. It had already entered plot 3 and was approximately 50 m from the stream. It had followed a line almost parallel to plot lines P and Q, cutting out a corridor roughly 40 m wide (Figure 1). We contacted the cutting foreman who eventually came on site to assess the situation. The accidental harvesting on plot 3 stemmed from a mutual misunderstanding between the riparian research group and J.D. Irving Ltd.: they thought our control plot was farther upstream than it actually is. Harvesting along plot 3 was postponed until the situation could be resolved. After receiving the go ahead, field personnel abundantly reflagged the cut block limits on both sides of plot 3 so that the situation would not repeat itself.

Small mammal trapping

Small mammal trapping began on 12 July and was concluded on 14 August 1995. Unlike the past two years, traps were only laid on some of the ten breeding bird survey plots. Plots 3, 4, 6, 9 and 10 were used for trapping while the remaining plots were not sampled. Plots 1 and 2 were not sampled because of cutting operations underway during the sample period. Plot 5 was not sampled because the buffer strip manipulation (harvesting outside the 30 m buffer zone) was already finished by the time small mammal trapping had begun. Plots 7 and 8 were not sampled due to their being dropped from part of the Buffer Strip management scheme.

Fall work

All field data gathered from habitat sampling have been entered into database form and are ready for analysis. A copy of the data set, consisting of six files (three files for cavity sites and three files for random sites), was handed over to Jacques Allard on 2 October 1995 for preliminary analyses. However, due to a very busy schedule, Mr. Allard has yet to make suggestions on how to best analyze the data. I would greatly appreciate suggestions on how to go about analyzing the important quantities of data that I now have and that are still coming in from the GIS analysis.

All nest and random site coordinates have been entered into the GIS database with the help of Walter Emrich of the Sussex planning office. These coordinates will be used to study the spatial relationships of nest and random sites to certain landscape features such as streams, logging roads and forest stands. These relationships are presently being measured with the help of ARC/VIEW. Results are slowly coming in, for I am just getting initiated to using this program. Data and results from this analysis should be complete by mid-December.

Preliminary results of this research project were presented during the ASFWB meeting held at Liscombe Lodge in Liscomb, Nova Scotia on 17 October. Other participants at the meeting seemed generally interested in the project and in what we were attempting to do with it. I am also glad to state that my presentation won first prize for the best overall student presentation. On 2 November, I received an interesting document from Julie Towers of the Nova Scotia Department of Natural Resources. She had seen my presentation but had not had a chance to speak with me at the meeting. She sent me a draft copy of a woodpecker nest tree study that was realized right here in the Maritime provinces. This project, entitled "Cavity nest tree characteristics for six maritime woodpecker species", was prepared for the St. Mary's River-Forestry-Wildlife Project Steering Committee. It deals with various characteristics of woodpecker nest trees found within the Maritime provinces. Some data was collected in the field (n = 31) while most of it (n = 731) comes from the Maritimes Nest Records Scheme (MNRS) maintained by the Canadian Wildlife Service. This paper will give me a chance to compare some of my findings with other results emanating from our region.

I have just completed the first draft on the "Study Area and Methods" section of my thesis. The following step will be to start writing the "Introduction" section and continuing work on tables and graphs. I will also be continuing my ARC/VIEW analysis. I am continuing my readings and ordering new articles for my bibliography. New articles concerning cavity-

nester habitat use are quite rare. Most of the articles that I have been ordering lately concern forest habitat and forest resource management. I am also working as laboratory demonstrator for two undergraduate courses this semester. The work load demanded by these two demonstrations is between 5 and 8 hours a week, which offers me more than enough time to work on my thesis. After Christmas, I will only be applying for one laboratory demonstration (BI-3264, Biologie des vertébrés). This will give me more time to work on my data analysis and on my thesis composition. I am also working on a french slide show of my study that I want to present to the Shediac naturalist club. This presentation will only be given after Christmas.

Some preliminary results

A total of 121 active cavities from 7 cavity-nester species were found over the three field seasons (Table 1). The Yellow-bellied Sapsucker was the most common species with a total of 67 nests. Of all tree species used as cavity trees, Trembling Aspen was by far the favoured species, accounting for 79.3% of all nesting cavities found from 1993 to 1995 (Figure 2). Yellow-bellied sapsuckers have been shown to nest frequently in Trembling Aspen in the northeastern United States (Runde and Capen 1987, Kilham 1971). Since much of the study area contains rather large trees (25 to 45 cm dbh) of this species, it is possible that is offers suitable habitat for this species of woodpecker. Further analyses of the data should enable to determine if this is the case. The importance of Trembling Aspen as nesting substrate is very apparent. Other trees were used as cavity excavating substrate, but no trends are presently visible due to lack of analysis.

I have drawn up three tables comparing results of tree dbh (Table 2), cavity tree height (Table 3) as well as cavity height (Table 4) from research done East from Arizona to Vermont. These three tables were drawn to give an idea how results from the Hayward Brook study area compare to those of other studies.

Conclusion

There is much analysis to be done before other discussions may be undertaken. Analyses of data will be continued this fall and winter as will be thesis work. I am looking forward to being able to begin the main analyses and to get this project rolling full steam. I would also appreciate more frequent meetings (formal and informal) with steering committee members during the following months. The guidance and encouragement would be greatly appreciated. Enclosed is a tentative schedule for the work to be done over the next few months.

Tentative work schedule (order of events reflects priority)

November 1995

- Begin primary analyses from recommendations given by J. Allard
- Continue GIS analysis with ARC/VIEW

December 1995

- Continue primary analyses from recommendations given by J. Allard
- Finish GIS analysis with ARC/VIEW
- Begin writing of "Introduction" section of thesis
- Rewrite "Study Area and Methods" following recommendations of steering committee members

January

- Continue primary analyses from recommendations given by J. Allard and analysis of GIS data
- Finish writing "Introduction" section of thesis and submit copies to steering committee members as first draft
- Graphical representations of results as graphs and tables

Table 1- Number of nests for each of the seven cavity-nester species found to be nesting in the Hayward Brook study area from 1993 to 1995.

Species	1993	1994	1995	Total
Black-capped Chickadee *Parus articapillus*	0	2	2	4
Downy Woodpecker *Picoides pubescens*	0	6	0	6
Hairy Woodpecker *Picoides villosus*	4	5	3	12
Northern Flicker *Colaptes auratus*	0	4	2	6
Pileated Woodpecker *Dryocopus pileatus*	0	3	1	4
Red-breasted Nuthatch *Sitta canadensis*	6	9	7	22
Yellow-bellied Sapsucker *Sphyrapicus varius*	20	28	19	67
Total	30	57	34	121

Table 2- Comparison of mean diameter at breast height (dbh in cm) of nest trees for the seven cavity-nesting bird species studied at the Hayward Brook study area from 1993 to 1995.

Species	Mean	SE	Range	n	Source
Black-capped Chickadee	16.8	1.55	14.0 - 21.0	4	Doucette (199?)
	15.8	1.2	?	44	Runde and Capen (1987)
Downy woodpecker	45.0	5.95	31.0 - 65.0	6	Doucette (199?)
	27.6	?	15.0 - 43.0	7	Towers et al. (1992)
	35.7	2.51	?	3	Li and Martin (1991)
	40.9	4.5	?	29	Gutzwiller and Anderson (1987)
	30.7	5.3	?	7	Runde and Capen (1987)
	31.8	?	15.0 - 66.0	15	Conner et al. (1975)
	26.2	?	21.1 - 30.2	11	Lawrrence (1967)
Hairy Woodpecker	32.6	2.96	22.0 - 57.0	12	Doucette (199?)
	32.8	?	12.0 - 91.4	26	Towers et al. (1992)
	37.1	11.14	?	8	Li and Martin (1991)
	27.1	1.3	?	21	Runde and Capen (1987)
	40.6	?	20.3 - 63.5	10	Conner at al. (1975)
	28.2	?	25.4 - 34.8	11	Lawrence (1967)
Northern Flicker	36.8	5.25	26.0 - 60.0	6	Doucette (199?)
	33.0	?	15.2 - 77.0	29	Towers et al. (1992)
	44.9	8.45	?	37	Li and Martin (1991)
	46.3	4.1	?	28	Gutzwiller and Anderson (1987)
	36.8	?	30.0 - 46.0	6	Conner et al. (1975)
	27.4	?	21.6 - 33.5	25	Lawrence (1967)
Pileated Woodpecker	40.2	2.98	36.0 - 49.0	4	Doucette (199?)
	44.5	?	25.4 - 61.0	10	Towers et al. (1992)
	54.6	?	33.0 - 91.0	14	Conner et al. (1975)

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Table 2- (continued)

Species	Mean	SE	Range	n	Source
Red-breasted Nuthatch	21.4	0.99	16.0 - 31.0	22	Doucette (199?)
	48.4	21.78	?	14	Li and Martin (1991)
Yellow-bellied Sapsucker	35.9	1.07	23.0 - 61.0	67	Doucette (199?)
	31.3	?	16.5 - 76.2	41	Towers et al. (1992)
	33.6	2.4	?	38	Runde and capen (1987)
	29.7	?	21.6 - 42.7	42	Lawrence (1967)

Table 3- Comparison of mean tree height (m) of nest trees for the seven cavity-nesting bird species studied at the Hayward Brook study area from 1993 to 1995.

Species	Mean	SE	Range	n	Source
Black-capped Chickadee	3.35	0.98	1.6 - 6.0	4	Doucette (199?)
	3.8	0.7	?	44	Runde and Capen (1987)
	2.2	2.1	?	25	Stauffer and Best (1982)
Downy Woodpecker	16.83	1.51	13.5 - 22.0	6	Doucette (199?)
	6.76	?	1.7 - 18.5	8	Towers et al. (1992)
	19.7	2.4	?	7	Runde and Capen (1987)
	10.2	5.6	?	30	Stauffer and Best (1982)
	8.3	?	1.5 - 19.8	15	Conner et al. (1975)
	9.0	?	3.7 - 13.8	11	Lawrence (1967)
Hairy Woodpecker	19.29	1.13	12.0 - 27.0	12	Doucette (199?)
	9.31	?	2.2 - 17.5	15	Towers et al. (1992)
	17.5	1.2	?	21	Runde and Capen (1987)
	12.9	?	3.9 - 26.4	10	Conner et al. (1975)
	10.7	?	4.6 - 13.8	11	Lawrence (1967)
Northern Flicker	11.83	1.78	6.0 - 17.0	6	Doucette (199?)
	7.04	?	0.6 - 18.0	35	Towers et al. (1992)
	12.4	?	9.1 - 15.8	6	Conner et al. (1975)
	8.1	3.2	?	31	Stauffer and Best (1982)
	7.0	?	2.5 - 13.8	25	Lawrence (1967)
Pileated Woodpecker	22.38	3.14	13.0 - 26.0	4	Doucette (199?)
	11.10	?	9.2 - 13.8	4	Towers et al. (1992)
	20.3	?	10.7 - 36.6	14	Conner et al. (1975)
Red-breasted Nuthatch	9.60	0.52	5.5 - 15.5	22	Doucette (199?)
Yellow-bellied Sapsucker	21.52	0.51	10.5 - 29.0	67	Doucette (199?)
	12.30	?	5.5 - 18.5	21	Towers et al. (1992)
	19.4	0.8	?	38	Runde and Capen (1987)
	9.0	?	3.1 - 13.8	42	Lawrence (1967)

Table 4- Comparison of mean nesting-cavity height (m) for the seven cavity-nesting bird species studied at the Hayward Brook study area from 1993 to 1995.

Species	Mean	SE	Range	n	Source
Black-capped Chickadee	3.12	0.95	1.4 - 2.4	4	Doucette (199?)
	2.5	0.3	?	44	Runde and Capen (1987)
	2.2	2.1	?	25	Stauffer and Best (1987)
Downy Woodpecker	11.00	2.43	3.0 - 18.5	6	Doucette (199?)
	5.30	?	1.2 - 15.4	43	Towers et al. (1992)
	13.55	4.77	?	3	Li and Martin (1991)
	6.9	0.7	?	29	Gutzwiller and Anderson (1987)
	9.3	1.2	?	7	Runde and Capen (1987)
	6.1	3.1	?	30	Stauffer and Best (1987)
	4.7	?	1.0 - 11.6	15	Conner et al. (1975)
Hairy Woodpecker	10.49	0.60	7.5 - 15.5	12	Doucette (199?)
	6.51	?	1.5 - 15.4	101	Towers et al. (1992)
	15.2	6.44	?	8	Li and Martin (1991)
	8.3	0.8	?	21	Runde and Capen (1987)
	8.8	?	2.4 - 19.8	10	Conner et al. (1975)
Northern Flicker	7.92	1.27	5.5 - 13.5	6	Doucette (199?)
	4.25	?	0.5 - 15.4	170	Towers et al. (1992)
	16.3	5.03	?	37	Li and Martin (1991)
	7.3	0.6	?	28	Gutzwiller and Anderson (1987)
	8.1	3.2	?	31	Stauffer and Best (1982)
	8.5	?	6.1 - 11.9	6	Conner et al. (1975)
Pileated Woodpecker	9.72	1.60	8.0 - 14.5	4	Doucette (199?)
	7.38	?	3.1 - 18.5	22	Towers et al. (1992)
	13.6	?	9.1 - 19.2	14	Conner et al. (1975)
Red-breasted Nuthatch	8.03	0.47	5.0 - 12.0	22	Doucette (199?)
	12.2	4.35	?	14	Li and Martin (1991)

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Table 4- (continued)

Species	Mean	SE	Range	n	Source
Yellow-bellied Sapsucker	9.69	0.34	3.2 - 16.0	67	Doucette (199?)
	7.30	?	1.8 - 16.9	81	Towers et al. (1992)
	8.6	0.5	?	38	Runde and Capen (1987)

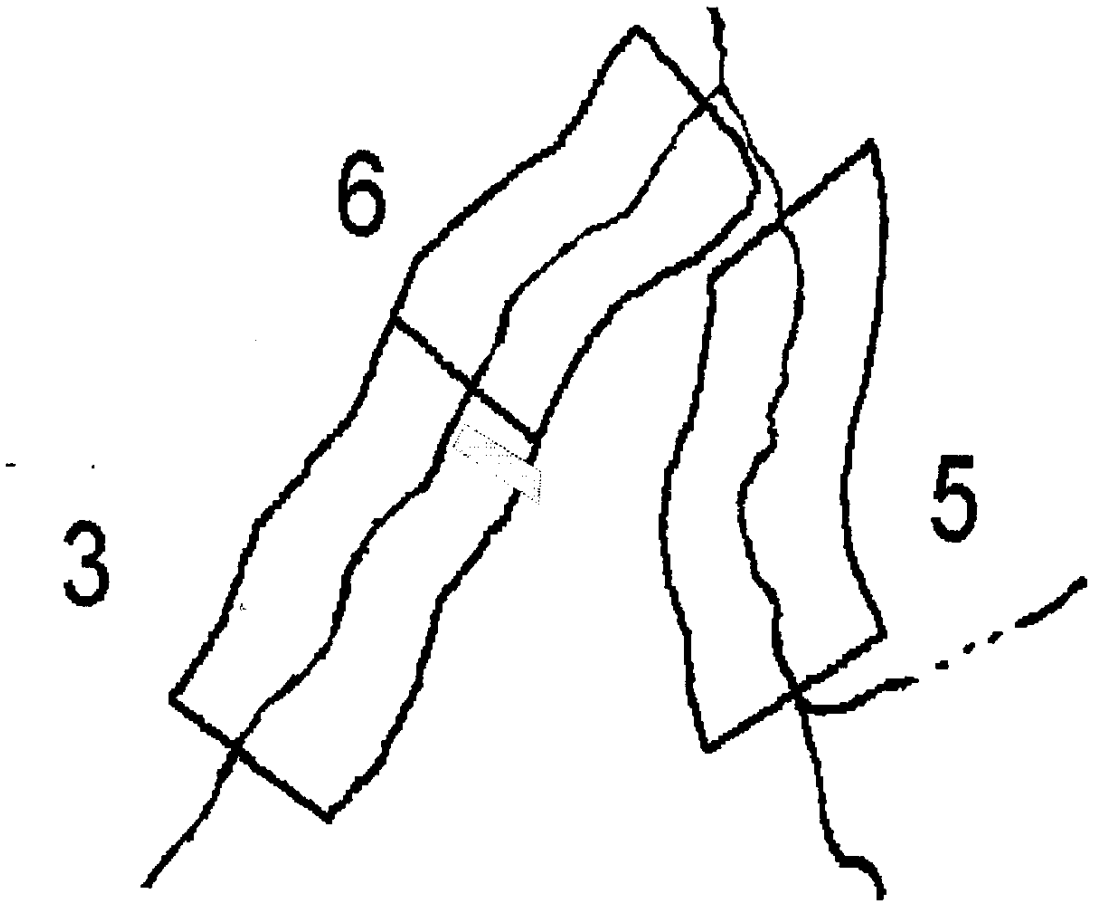

Figure 1- Map of breeding bird census plots 3, 5 and 6. The shaded area indicates approximately the location of the encroachment onto plot 3. This plot is a control that should have not undergone any harvesting interventions. The area of forest removed is approximately 40 m wide by 100 m long (0.4 ha) or 2% of plot 3.

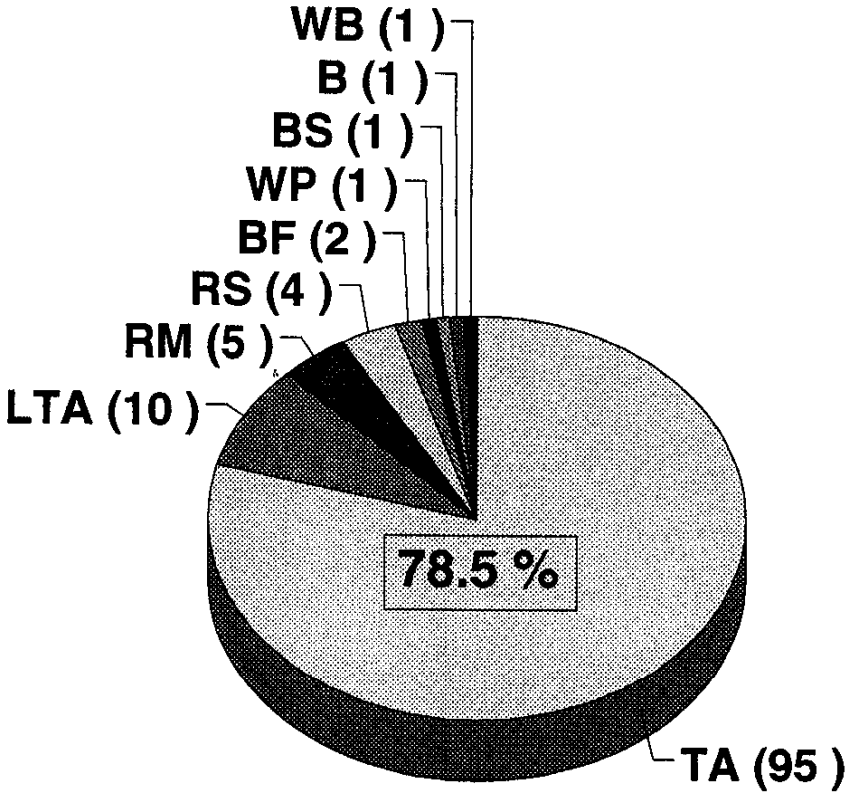

Figure 2- Tree species used as nest trees by cavity-nesting birds found at the Hayward Brook study area.