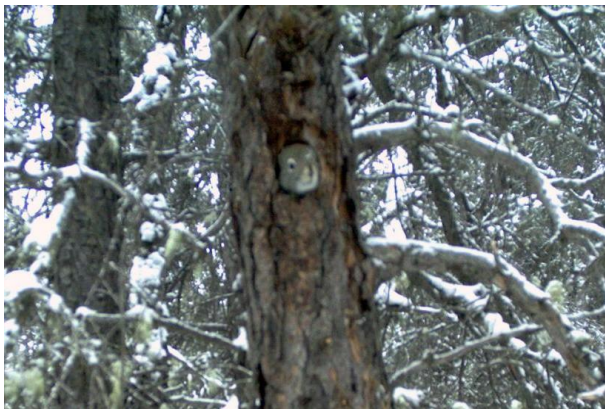


Cavity and Tree Preferences of Winter Roosting Birds and Resting Mammals in Southern Yukon

A Report to Yukon Fish and Wildlife Enhancement Trust, March 2018



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Project Summary

Many studies have investigated the tree and nest preferences of cavity-using avian and mammalian species for breeding, but relatively few studies have examined winter tree-cavity use. Furthermore, most published research on winter cavity use has focused on species and populations within southern and sub-boreal forest regions. Currently, no known research has investigated the potential cavity, tree or habitat preferences of over-wintering, northern boreal species that use tree-cavities as a strategy for coping with extreme cold. In southern Yukon, 14 resident species (10 avian and 4 mammalian) are known to depend on tree cavities for nesting and/or roosting. These species include: boreal chickadee (*Poecile hudsonica*), black-capped chickadee (*Poecile atricapilla*), mountain chickadee (*Poecile gambeli*), red-breasted nuthatch (*Sitta canadensis*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), American three-toed woodpecker (*Picoides tridactylus*), black-backed woodpecker (*Picoides arcticus*), boreal owl (*Aegolius funereus*), northern saw-whet owl (*Aegolius acadicus*), American marten (*Martes americana*), fisher (*Martes pennanti*), red squirrel (*Tamiasciurus hudsonicus*) and northern flying squirrel (*Glaucomys sabrinus*). The purpose of this research is to examine which tree and cavity characteristics are preferred for roosting and resting by over-wintering bird and mammal species in southern Yukon. This research will provide data that can be used in the conservation and management of cavity-using birds and mammals in northern boreal forest communities. Furthermore, by identifying the cavity and tree preferences of winter cavity users, this study can help guide forest use and management practices such as salvage logging of burned and beetle-killed stands, firewood cutting and FireSmart, in Canada's northern forests, and can help ensure that cavity-trees with preferred characteristics are retained on the landscape.

Four study areas have been established throughout southern Yukon, each containing three 40-hectare treatment plots that represent the forest types within each area. These study areas are located near the communities of Haines Junction, Mendenhall, and Whitehorse. Tree-cavities within each plot will be surveyed during the day and night, throughout the winter months, using the combination of a Peeper and endoscopic camera (lit cameras attached to a telescopic pole, and connected to a monitor). These camera systems will be used to identify the species and number of individuals occupying a cavity. Cavity-use surveys will be conducted during daylight hours to detect roosting/resting nocturnal species (i.e. boreal owls and northern flying squirrels) and during the night to detect diurnal species (i.e. woodpeckers, chickadees, nuthatches, red squirrels, and marten). To identify the resource preferences of over-wintering birds and mammals, cavity and tree characteristics for each site used on a given day/night will be compared to the characteristics of those not being used. Information on habitat type and structure will also be collected to determine whether broader habitat characteristics affect cavity selection.

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Figure 1. Setting up the Peeper Camera to observe cavity occupancy during a nocturnal survey.

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Figure 2. Female American three-toed woodpecker roosting in tree-cavity. Photo was taken at night using a Peeper Camera system.

Project Activities

What activities were completed?

Study area and plot locations were scouted throughout the Autumn of 2017, around the communities of Whitehorse, Carcross, Mendenhall and Haines Junction. In total, 12 study plots were established in white-spruce, mixedwood, lodgepole pine and spruce beetle-affected forests, throughout southern Yukon. Once established, each study plot was systematically and thoroughly searched for tree-cavities to ensure equal effort was spent searching, and to maximize the number of tree-cavities found. Once a cavity was located, a GPS waypoint was taken, and the tree was flagged for ease of relocation. Tree species, cavity height, cavity content (nest material, feces, etc) and broad habitat descriptions were also noted for ease of relocation and for future reference.

In December 2017, the first of four transect surveys were conducted in each plot to determine the presence of bird and mammal species, and to map their locations. This information will later be analyzed to conclude whether cavity occupancy by a species reflects their tree and cavity preferences rather than their presence or abundance in an area. The second round of transect surveys will take place in April 2018.

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Beginning in early February 2018, cavity occupancy surveys began with one round of daytime surveys, followed by two rounds of nighttime surveys. In a given day or night, all cavities within a study plot were searched for roosting/resting birds and mammals. Once an occupied cavity was located, the occupant species and number of individuals were noted and, if possible, a photo was taken of occupants in their cavities. Information on behaviour was also recorded.

How did activities contribute to objectives/work plan?

All aforementioned field activities followed the general work plan laid out in the project proposal. The information gained from this research will eventually be used to answer questions related to the tree and cavity preferences of birds and mammals, and to inform forest use and management. However, as this is only the first year of a two-year project, and as it was a short field season, little data has been collected and nothing can be concluded from the results at this time.

Where there any variances to objectives/work plan?

Though there has been little variance to the overall goal of the research (i.e. the protection, enhancement and restoration of wildlife and their habitat) and to the work plan, in general, the following changes were made to the study design and sampling methods:

- a) This project is no longer focused on how FireSmart may affect winter cavity use, specifically, but is focused, more broadly, on forest use and management in general. That being said, information acquired from surveys within the beetle-kill forest sites may be used to understand the effects of salvage-logging practices on cavity use, and cavities within FireSmart forests may still be surveyed for comparison of cavity use among unmanaged forests.
- b) The use of remote, motion-sensor/infrared cameras is no longer the primary sampling method for this study as they do not reliably detect cavity use by birds. Rather, daily and nightly occupancy surveys are being conducted using Peeper and endoscopic Camera systems. However, remote cameras will still be used as a secondary method of monitoring cavities that are known to have been occupied.
- c) Additional study areas and plots were established throughout southern Yukon to increase sample size, for comparison of tree-cavity use among sites and habitat types, and to understand the potential effects of the salvage-logging of beetle-killed forests on winter cavity use by birds and mammals.

Contribution to the protection, enhancement and restoration of fish and wildlife and their habitat

This research meets the Yukon Fish and Wildlife Enhancement Trust's criteria as the information learned can be used to help to protect and enhance wildlife habitat. For example, cavity, tree and habitat characteristics that are preferred or required by birds and

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mammals may be preserved in managed forests, or conditions that improve winter habitat suitability can be created, thus, enhancing wildlife habitat. This research may also contribute to the achievement of many of the objectives laid out in Chapter 16 of the Umbrella Final Agreement, such as:

- 16.1.1.1 - ensuring conservation in the management of wildlife resources and their habitat,
- 16.1.1.2 - preserving and enhancing the renewable resources economy (for example, preserving or enhancing wildlife populations, thus, increasing trapping and hunting opportunities),
- 16.1.1.6 - integrating the management of renewable resources (for example, wildlife and forest management), and
- 16.1.1.8 - developing responsibilities for resource management at the community level (for example, developing guidelines for and/or informing local woodcutting, salvage logging, and FireSmart activities).

This project may also have indirect impacts on other wildlife if the information learned is used to inform forest use and management. For example, the availability of suitable cavity trees is critical to maintaining communities of cavity users that, in turn, support many predator species such as hawks, owls, lynx, red fox, etc. The information gained from this study may have long-term benefits for entire wildlife communities if used to protect or enhance resources and habitat for future generations.

Communications

How will my results be shared with the appropriate communities and governments?

The following governments/organizations have granted me permissions to conduct this research through the issuance of permits, licenses and certificates, and will be given a report on my progress and preliminary results by March 31st, 2018:

- Canadian Wildlife Service (Migratory Birds Scientific Permit)
- Environment Yukon, Parks (Research and Educational Activities Park Permit)
- Environment Yukon, Tourism and Culture (Scientists and Explorers License)
- Environment Yukon, Conservation Officers Services (Wildlife Research Permit)
- University of Alberta, Animal Care and Use Committee (Animal Use Certificate).

Throughout my research, I intend to share my progress and findings at social events and community meetings, and by speaking with local firewood cutters that are encountered in the

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field. I will also make myself available (through email, phone, or in-person communication) to answer any questions and address any concerns about my research or the implications of my results. Furthermore, the Yukon communities of Mendenhall, Haines Junction, and Whitehorse may be consulted through community meetings if it is believed that the lives and livelihoods of the community members are being affected by my research. Affected First Nation communities will also be consulted with, through email, phone, in-person communications or community meeting, if it is believed that the lives and livelihoods of the community members will be affected by my research. By consulting with members of the aboriginal and non-aboriginal communities, I hope to address any concerns they may have, allow these concerns to guide my research practices, and ensure that the results of my research will not negatively impact the lives and livelihoods of community members. Furthermore, by sharing the knowledge gained from my research with the communities, I hope that I can help ensure that practices such as wood-cutting can continue with minimal effect on the ecological communities that depend on tree-cavities for coping with cold, northern winters.

How have I recognized the Enhancement Trust and its mandate?

On future reports, presentations, posters and publications, the Yukon Fish and Wildlife Enhancement Trust will be recognized as a generous and vital supporter of my research, through written and verbal acknowledgements and through the placement of their logo on all documents related to this project. Furthermore, the contribution of my work to the protection, enhancement and restoration of wildlife and their habitat will be stated and emphasized on all documents and when presenting my work.

What materials, strategies and techniques were used to promote the project and its objectives?

This research has been promoted through academic presentations, seminars and discussions with peers through venues such as the 2018 Biodiversity Forum. Furthermore, I will be presenting a poster at the 2018 International Ornithological Congress, in Vancouver, and will promote my project and objectives, as well as the Yukon Fish and Wildlife Enhancement Trust and its contribution to the protection, enhancement and restoration of fish and wildlife habitat. A copy of this poster will be submitted to the Trust once completed.