



Current and Future Management of Burned Forests to Protect Cavity-Using Birds and Other Boreal Wildlife

Report to Yukon Fish And Wildlife Enhancement Trust

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PROJECT ACTIVITIES

What activities did you complete during your project?

Our 'birds & burns' research continued for a third year in 2023, with field work at 5 sites, including 2 new sites burned in 2022. We conducted standardized searches for new active nest cavities and checked all previously identified nest cavities for reuse. In 2023 we found 107 new active nest cavities of woodpeckers: 31 American Three-Toed Woodpecker, 60 Black-backed Woodpecker, 5 Hairy Woodpeckers, and 11 Northern Flickers. We also found 8 new nest cavities used by secondary cavity-nesting species: Boreal Chickadee, Mountain Bluebird, and Tree Swallows. Nineteen of 81 nest cavities found in previous years of the study were reused in 2023: 12 reused by woodpeckers and 7 by secondary nesters, including Boreal Chickadee, Mountain Bluebird, and Tree Swallows.

In addition to searching for new active nest cavities and tracking reuse in old cavities, we deployed 41 Automated Recording Units (ARUs) in 4 burns. In total, we have captured more than 10,000 hours of audio recordings. Also, as in previous years, we completed a bird species checklist at the end of each field day in 2023. Over the 3 years of the study, we have documented 88 avian species across the 5 study sites. In 2023 we continued to collect data on each new cavity tree (n=115) and collected information on burn severity, for a total of 585 field plots over 3 years.

How did your activities contribute to you goals and objectives?

The goals of this project are to: 1) Develop guidelines for what, where, and how much of standing deadwood needs to be retained within harvest blocks to avoid impacts of salvage harvesting on cavity-nesters; and 2) Model and map areas with disturbance refugia potential as part of a broader effort to model all types of climate-change refugia and map networks of sites and linkages with high climate-change resilience across Yukon's boreal landscapes.

The objectives of this project support achieving the goals of this project:

1. Describe the structure and composition of the cavity-nesting community in recently burned forests, including identifying keystone excavators, and changes in community composition over time.
2. Describe nest and foraging tree selection and determine the influence of pre-fire forest condition and patterns of fire severity on the cavity-nesting community.

3. Determine the environmental drivers of fire severity, including unburned patches of forest (i.e. disturbance refugia).

In 2023, our cavity nest searching and cavity reuse field activities doubled (again !) our existing database for burned forests to a total 214 active cavity nests for 8 species, contributing significantly to our development of a cavity nest web for recently burned forests in Yukon (Objective 1). A cavity nest web outlines the structure and composition of the cavity-nesting community and allows us to identify keystone excavators. Keystone excavators are those woodpeckers whose cavities are disproportionately important to other cavity-nesting species, particularly species that are unable to excavate their own cavity. Across the 3 years of data collection, we have collected significant data towards Objective 2, which will be used to develop guidelines to protect important cavity trees in recent burns (Goal 1).

With our 3-year dataset, we are beginning to see patterns in the characteristics of trees used for nesting, which will support achieving Objective 2 and ultimately the development of guidelines to protect important cavity trees in recent burns (Goal 1). For example, the majority of active woodpecker nests are in dead white or black spruce of ~25 cm diameter at breast height and in areas of high burn severity.

Our 3-year dataset of 585 burn severity plots is being collected to field-validate a remotely-sensed index of burn severity and subsequently produce high-resolution maps of patches of unburned forest (Objective 3) that may function as climate-change refugia for spruce forest species (Goal 2). We conducted targeted sampling in 2023, improving our ability to validate and refine remotely-sensed fire severity models, however preliminary analysis indicates that we still require increased sampling to examine regional differences in burn severity mapping due to differences in forest structure and site conditions, e.g. between the central Yukon and southeast Yukon burns.

Note any variances to your goals, objectives or work plan and explain why they occurred.

There were no significant variances to our goals and objectives in 2023 except that we were unable to visit the Clear Creek site until late June due to high water levels and regional flooding, and so did not deploy ARUs at that site.

Explain how the results of your work contributed to the protection, enhancement or restoration of fish, wildlife or their habitat.

As noted previously, this project will aid in developing guidelines for forest management – what, where, and how much deadwood to harvest in recent burns – to avoid impacts to potential nest sites for post-fire specialists, keystone cavity excavators, and the entire cavity-using community.

Our fire severity mapping and modelling of unburned forest patches will inform mapping, monitoring, and stewardship of potential climate-change refugia for species that depend on spruce forest, which is critical to support adaptation of Yukon's wildlife to changing conditions and associated loss of suitable habitat. In addition, our fire severity mapping will also contribute to a new project, of which WCS Canada is a partner, examining post-fire forest successional trajectories and recovery of caribou lichen in

central Yukon.

If you were to do the project again what would you do differently?

Our field activities proceeded as planned and the project is on track to meet the goals and objectives. As in previous years, we have presented our research to relevant First Nations through a written proposal, and have invited staff and youth to join our technicians in the field for opportunities for knowledge exchange. In the coming year we will also identify opportunities to share information about the project in the communities as the logistics of joining our team in the field for just a day or two has generally been prohibitive given the remote location of the study sites.

COMMUNICATIONS

What did you do to ensure your results were shared with the appropriate groups, people or governments?

We have just completed a report of 2023 field activities that will be distributed to the relevant First Nations and other partners in the coming month.

Describe how you recognized the Enhancement Trust and/or its mandate.

All funders and partners are acknowledged in the field report that will be distributed. In addition, the YFWET is recognized in reports to other funders and in presentations.

Identify any communication materials, strategies or techniques that you used to promote your project and its objectives.

Notes and pictures from the 2023 field season were shared in internal and external WCS Canada newsletters. This is a multi-year project and we plan to increase communications and outreach activities as the project progresses, e.g. with presentation at the Yukon Biodiversity Forum in 2025.

Include photos of the project in action or the finished product.

See Photos at end of report.

Figure 1. The Crooked Creek burn, looking down towards an area of high woodpecker density. Credit Michael Quinn, WCS Canada



Figure 2. A map of the 2022 Money Creek burn with the search tracks for 3 field technicians conducting searches for new active ('first use') nest cavities in 2023, and checking for reuse of the 2022 active nest cavities. This 1-year old burned forest is primarily used by 2 burn specialists: American Three-toed Woodpecker (ATTW) and Black-backed Woodpecker (BBWO). Also nesting in the burn were Boreal Chickadees (BOCH) and Tree Swallows (TRES).

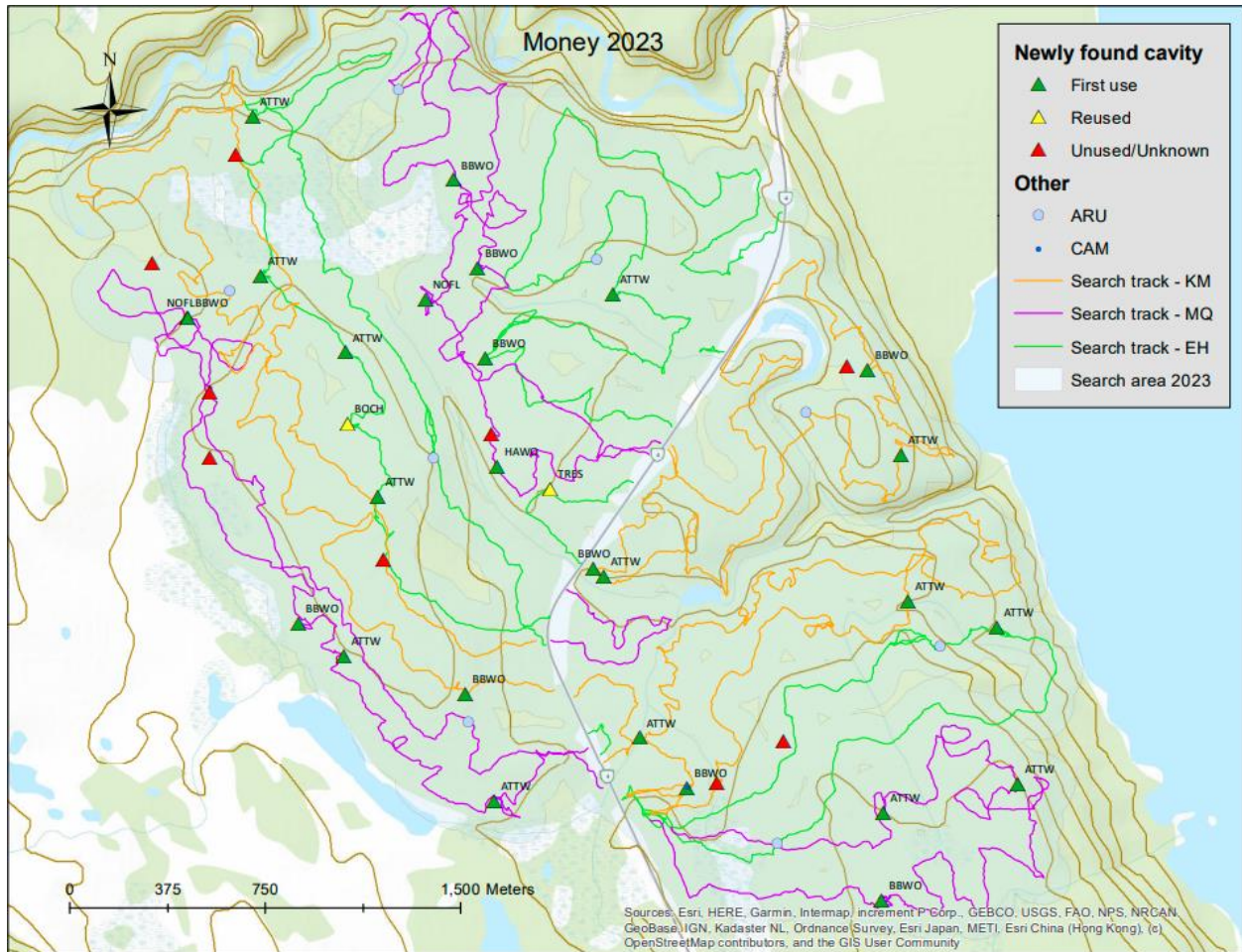


Figure 3. Black-backed and American Three-toed Woodpeckers are the dominant woodpecker, and cavity excavator, in recently burned forests in central and southeast Yukon. Here, a male Three-toed-Woodpecker brings food (beetle grubs??) to nestlings in its nest cavity.



Figure 4. A remote camera captured a Mountain Bluebird in June 2023 nesting in a cavity excavated and used by Black-backed Woodpeckers in the Tuchitua burn in 2022.

