Using Wildlife Trail Cameras to Monitor Wildlife Stewardship in the Terrace Community Forest

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Introduction

The Terrace Community Forest (TCF) covers approximately 22,000 hectares. Its three Operating Areas (Shames, Deep Creek and Onion Lake) are located around the city of Terrace in northwestern BC's Coastal Western Hemlock forest landscape. The Onion Lake portion of TCF's timber harvesting land base sits just to the south of Lakelse Lake (Map 1) in a landscape where, back in the 1970's, the old growth was clearcut "at a valley wide scale," with 20,000 hectares harvested from Terrace to Kitimat.

Much of this now "second growth" land base was "juvenile-spaced" (also called, "pre-commercially thinned") in the mid-1980s to late 1990s: Spacing reduces stem density with an aim to promoting future commercial harvest. Notably, much of the area was not spaced (Picture 1), and is now proving to be a huge silviculture challenge, as these dense stands grow very slowly and provide little or no commercial value for a very extended time frame. These areas are also extremely limited in their value to wildlife and have virtually no biodiversity.

Picture 1. Dense stand of hemlock, with stump in foreground indicating the old growth site condition.

In contrast with old growth, both the managed (spaced) and unmanaged second growth forest are now closed canopy stands. They lack coarse woody debris (CWD), snags and tree diversity, and the closed canopy restricts understory development. These stands no longer provide the structure to support a biodiverse ecosystem, and lack the attributes that support old-growth dependent species.

Map 1. General location of Terrace Community Forest (White Circle), ~30km south of Terrace, BC (right).

Stewardship Objectives and Challenges

As part of its long-term planning, the TCF is looking to balance multiple community interests, including managing for the needs of wildlife and other stewardship values.

For the management of wildlife that require old growth structure, there are currently very few old growth attributes to support those species. What does exist is primarily limited to remnant old stumps. Attributes such as snags, coarse woody debris, old live trees, patches of light and rich riparian habitats were all removed during the largescale clearcut harvest in the past.

How do we bring these old growth attributes back into the forest within a timely manner (i.e., forest restoration)—in both managed and unmanaged stands? How do we retain remnant elements long enough to bridge the time until restoration efforts provide habitat? And can an approach be found that allows us to fund the work needed within the context of a working commercial forest—particularly in unmanaged areas?

Strategic Approach

Managed Stands

To date, the TCF has been using a range of funding opportunities, in combination with commercial thinning, to bring in a mosaic of habitat attributes—including connectivity and habitat patches—to break up the even-aged second growth landscape (Map 2). This includes removal of weevil-damaged spruce, and commercial thinning of spaced stands from ~1200 down to 300-400 stems per hectare, approaching natural densities of old growth (Picture 2).

Map 2. An overview of several different TCF silviculture – harvest treatments.

Unmanaged Stands

Further, in 2024, restoration work was made possible for some of the most dense, unthinned stands (Picture 1): In partnership with Patrick Ferguson (RPF), and with support from SERNbc and the Forest Enhancement Society of BC (FESBC), the Community Forest was able to plan—and rapidly implement—a variety of silvicultural techniques. The objectives of the work were two-fold: 1) create, enhance and connect habitat for a suite of wildlife species, and 2) promote future timber values. Similar work also took place in 2022, in TCF's Deep Creek operating area located to the

northwest of Terrace: In that case, partnership support came from SERNbc and the BC government's Forest Employment Program, and also involved the Kitsumkalum Band. These projects not only create habitat and promote timber growth, but also provide operational and cost information and insights that allow improved planning and results for future efforts.

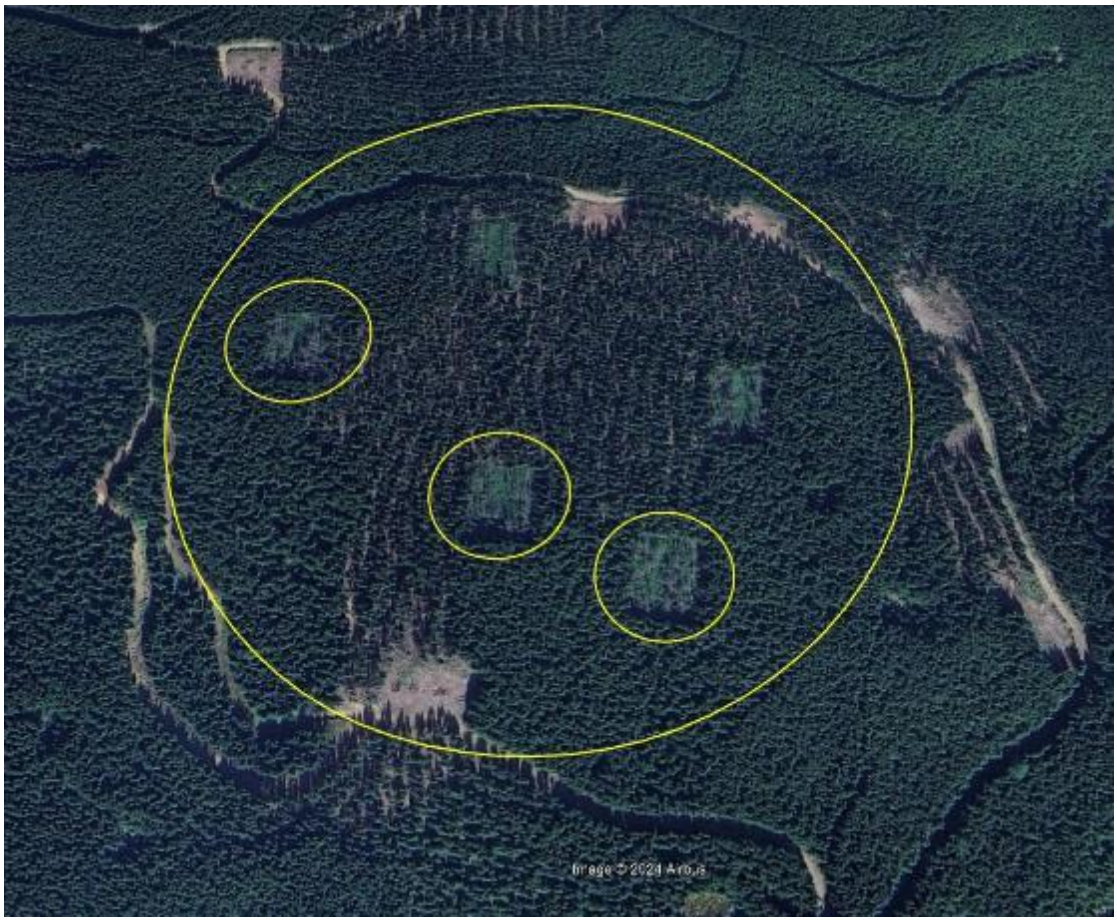
Picture 2. Commercially thinned stand: note retention of pre-existing stumps (remnant CWD), and the understorey vegetation growth in response to increased light.

Stewardship Habitat Patches

The TCF has a long history of working in partnerships and fostering research. Recently, part of the diversity of habitat attributes added in the Community Forest included the creation of a set of Stewardship Habitat Patches (SHPs)(Map 3, Pictures 3 & 4). SHPs were created in 2017 with funding from the Kitimat-Stikine Regional District as part of an offset for the loss of old-growth associated with the construction of the nearby Waste Management facility at Forceman Ridge. These SHP offset areas were placed within the oldest nearby second growth (including in the TCF landbase, near the Onion Lake ski trails). Part of the task was to create old-growth attributes in the context of working forests, and using the existing 7% wildlife tree patch (WTP) retention guidelines for cutblocks. Instead of simply leaving healthy young trees within these pseudo-WTP areas, we created old growth attributes including snags (through girdling live trees), coarse woody debris piles, and patches of light.

Understanding that most forest birds and mammals are territorial, the SHPs were arranged and distributed to support foraging home ranges, nest, and den sites for several selected wildlife

species at the ~40 hectare landscape-scale that represents “typical” forestry harvest patches (Map 3).



Map 3. Example Stewardship Habitat Patches (see small yellow circles around three of the five SHPs in this map) within ~50-year-old second growth forest—much of which can be seen to be undergoing a Commercial Thin in this example. Note the light green colour in the SHPs, indicating abundant understorey development.

Pictures 3 and 4. Fall and Summer views of the Stewardship Habitat Patches.

At completion of operational activities, students from Coast Mountain College (Picture 5) assisted in marking (with numbered tags), measuring, and cataloguing all the created structural attributes. All created attributes in the HSPs, in context with surrounding forest, will be monitored over time to determine if, how and when they successfully achieved the goal of supporting the needs of a range of old-growth species, including cavity-nesters, ungulates, furbearers, bats, grouse, forest raptors and other old-growth dependent birds and mammals.

Picture 5. College students working in HSPs in 2017.

Retaining & Substituting Stand Elements

In all these works, operators are making efforts to retain and, when possible, enhance existing CWD, by avoiding damage to large old stumps and decaying logs, and sometimes building them up with additional materials to help them continue providing habitat for as long as possible, while new elements are recruited over time.

While snags are being created, and wildlife trees are being recruited, their development takes time. In some cases, special elements such as tree cavities and strong lateral branching can take a very long time to occur naturally in a second-growth stand, often not developing before stands become commercially viable and are cut a second time. Where large-scale destruction of habitat has occurred, “substitute” stand elements may be the only means to allow the existence of species that need these elements.

TCF is also, therefore using other restoration tools including the use of cedar maternity-style bat boxes—made locally by Dani Riis—to provide habitat for bat nursery sites (typically many species use old growth cavities) (Picture 6).

Picture 6. Maternity-style bat box.

Within the second growth forests, for many years, branches are too thin to support the larger stick nests/platforms used by raptors, corvids and owls. In response to this need, in areas of commercial thinning, we have therefore trialed a technique used in Europe, creating artificial nest platforms within the second growth forest. To create these potential nest sites, we placed a mesh platform covered with wood debris just beneath the canopy (Picture 7).

Picture 7. Artificial nest platform

Through these combined approaches, TCF is looking to retain and create a range of habitat types and structural attributes that will support a diversity of old-growth species, in the knowledge that this, in turn, will support a healthy, functioning ecosystem—both for wildlife and for the health and enjoyment of our community.

Monitoring with Wildlife Trail Cameras

Several tools are available to look at the effectiveness of habitat attribute creation in supporting target wildlife species (here, species requiring old growth attributes). An efficacy assessment of the SHPs will be funded by the Regional District of Kitimat-Stikine by 2028, determining structural functioning and wildlife use in the patches (roughly ten years post-creation). In the meantime, we have taken the opportunity to use wildlife trail cameras to determine which species are using both the commercially thinned areas and the SHPs with old-growth attributes (Picture 8). Cameras were

place adjacent to areas where wildlife structure has been created and along existing game trails between the months of May and October in 2023 and 2024.

Picture 8. Wildlife Trail Camera (Reconyx Hyper Fire 2)

Results

Using this technique at several sites over the last two years, we have observed many species of wildlife using the Terrace Community Forest, particularly when these cameras were placed adjacent to structure that naturally occurs or has been specifically created for the wildlife (this includes wildlife connectivity corridors for moose and bears; Pictures 9 & 10).

Picture 9. Cow moose and two calves.

Picture 10. Black bear.

Species that were photographed using the SHPs included hares (Picture 11), squirrels, bull moose (Picture 12), grizzly (Picture 13) and black bears, marten (Picture 14), and fisher.

Picture 11. Snowshoe Hare

Picture 12. Bull moose

Picture 13. Grizzly bear.

Picture 14. Marten (yellow circle)

Not all photographs are, of course, expected: a moving branch triggered the motion sensor and allowed us to capture this picture (Picture 15) of a bat flying past a camera that was placed near the HSPs.

Picture 15. Bat

Other species observed on an old logging road in the TCF incuded a coyote (Picture 16) and a wolf (Picture 17), as well as moose, black and grizzly bears.

Picture 16. Coyote

Picture 17. Wolf. This wolf noticed the camera and turned back to look at it.

Future Work

Stewardship habitat creation and support of wildlife and biodiversity are key components of the long -term, ongoing mission of Terrace Community Forest, and work will continue to monitor the success of the initiatives described in this report, including the potential for new educational opportunities for research and monitoring. As the observations to date have shown, habitat attributes created in recent years (e.g., the SHPs created in 2017) are starting to be used by wildlife, and more comprehensive assessments of wildlife use and habitat suitability are expected within the next several years—including a comparison of wildlife use (species and relative abundance) between the second growth with the SHPs incorporated, and "comparable" old growth. Please stay tuned for updates! See the Terrace Community Forest website: https://terracecommunityforest.com/

Bull Moose at the Moose Café off the Moose Highway - Onion Lake Ski Trails, Terrace.