NCC Luxor Linkage Forest Restoration Project F21

FWCP Project No. COL-F21-W-3293

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Executive Summary

The purpose of the agreement "NCC Land Stewardship Activities F21" (FWCP Project No. COL-F21-W-3293) is to provide resources to enable the Nature Conservancy of Canada (NCC) to continue restoring habitat on conservation properties in the East Kootenay region of the Columbia Basin. This project addresses several priority actions from the Fish and Wildlife Compensation Program (FWCP) "Columbia Region Upland and Dryland Action Plan" (FWCP 2019). The specific actions addressed are:

1. (COLUPD.ECO.HB.12.01) Restoration of upland habitats-P1 – Contribute to restoration planning and treatments in grasslands, deciduous forests and open forest ecosystems on conservation lands, First Nation lands, and crown lands through Ecosystem Restoration Committees; and

2. (COLUPD.SOI.HB.30.01) Ungulate habitat enhancements-P1 – Support the implementation of ungulate enhancement opportunities in summer, transitional (spring/fall corridors and migration routes), and winter habitats.

The "Luxor Linkage Forest Restoration Project" took place between September 2020 and January 2021. Funding in the amount of $32,000 was designated to conduct ecosystem restoration activities, specifically restoration of open forest and grassland communities on NCC's Luxor Linkage conservation property in areas where forest ingrowth and encroachment have occurred. The property is located within NCC's Canadian Rocky Mountain Program Area and is near the communities of Spur Valley and Edgewater, BC.

Funding provided by FWCP has allowed NCC to undertake grassland/open forest restoration activities that seek to address the urgent need to improve critical habitat for wildlife and species-at-risk, improve the resiliency of these ecosystems in the context of a changing climate, and reduce the risk of high intensity wildfire to local communities.

Nature Conservancy of Canada

NCC is a leading national, non-profit, private land conservation organization. We protect and care for ecologically significant lands and waters and the species that they sustain. Our science-based conservation planning process drives our work. We partner with individuals, governments, Indigenous communities, foundations, corporations, and others to achieve durable conservation solutions. We secure properties through donation, purchase, conservation agreements and the relinquishment of other legal interests, and manage them for the long term. Since 1962, NCC and our partners have helped conserve more than 14 million hectares (35 million acres) from coast to coast to coast.

Within the Columbia Basin, NCC provides protection for over 190,000 acres of land, including landscapes such as: at-risk grasslands, unusual geological formations, montane regions, and precious valley bottom habitat. NCC's properties in the Basin conserve vital habitat for several species at risk (e.g. American Badger, Grizzly Gear, Mountain Caribou, Bull Trout, and Rocky Mountain Bighorn Sheep).

Table of Contents

List of Figures

Luxor Linkage Forest Restoration Project

Introduction

In the East Kootenay region of British Columbia, approximately 250,000 hectares of dry forest historically experienced frequent, low-intensity fires (Gayton 2013). Modern suppression of fire has favoured the development of forests with dense growth of conifers in the understory, causing dramatic declines in grasslands and open forest ecosystems. Forest ingrowth in areas that were historically open forests and grasslands not only increases the risk of high-intensity wildfire to local communities, but it also decreases the amount of high-quality habitat available for wildlife. By strategically thinning ingrown forests and restoring open forest conditions, the Nature Conservancy of Canada (NCC) works to not only improve critical habitat for species-at-risk and reduce the risk of high-intensity wildfire, but also to improve the resiliency of these ecosystems in the context of climate change.

The long-term restoration strategy for the Luxor Linkage conservation property is guided by the "Luxor Linkage Property Vegetation Management Plan (2018-2048)", which was developed by a Registered Professional Forester (Allen 2017). This project addresses several priority actions from the Fish and Wildlife Compensation Program (FWCP) "Columbia Region Upland and Dryland Action Plan" (FWCP 2019). The specific actions addressed are:

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Goals & Objectives

The goal of this project was to restore approximately 10-20 ha of Rocky Mountain Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) forest to dry open structure on the Luxor Linkage conservation property. Restoration of open forest structure and core grassland communities in areas where forest ingrowth and encroachment have occurred improves critical habitat for species such as Mule Deer (*Odocoileus hemionus*), Elk (*Cervus elaphus*), Bighorn Sheep (*Ovis canadensis*), and Common Nighthawk (*Chordeiles minor*), reduces the risk of high-intensity wildfire to local communities, and enhances the resiliency of imperiled Rocky Mountain Douglas-fir ecosystems in the context of climate change. This project complements ~30 ha of open forest habitat that NCC has restored in previous years elsewhere on the property.

Restoration treatments were planned for five units falling within low elevation, low snowfall areas similar to nearby Crown land designated as Ungulate Winter Range as described by the Ungulate Winter Range Order U-4-008, with treatments designed for Open Range and Open Forest management purposes (Allen 2017). Treatment objectives involve using hand-falling methods to create a mosaic of

open forest structures for a post-treatment stocking rate of 76-400 stems per hectare (sph) variably dispersed on the landscape.

Some coniferous thickets were retained as designated wildlife tree patches, which will provide thicket habitat adjacent to thinned open forest to benefit species such as Flammulated Owl (*Psiloscops flammeolus*). These wildlife tree patches also promote the retention of high-quality wildlife trees (i.e. standing snags) as well as patches of deciduous trees that contribute to high quality cavity nesting structure, such as Quaking Aspen (*Populus tremuloides*).

Study Area

All activities took place on the Luxor Linkage conservation property (390 ha), which is owned and managed by the NCC (Figure 1). The property is located in the Rocky Mountain Trench and lies between the communities of Edgewater and Spur Valley, BC within the Kootenay Dry-Mild Interior Douglas-fir biogeoclimatic subzone (IDFdm2).

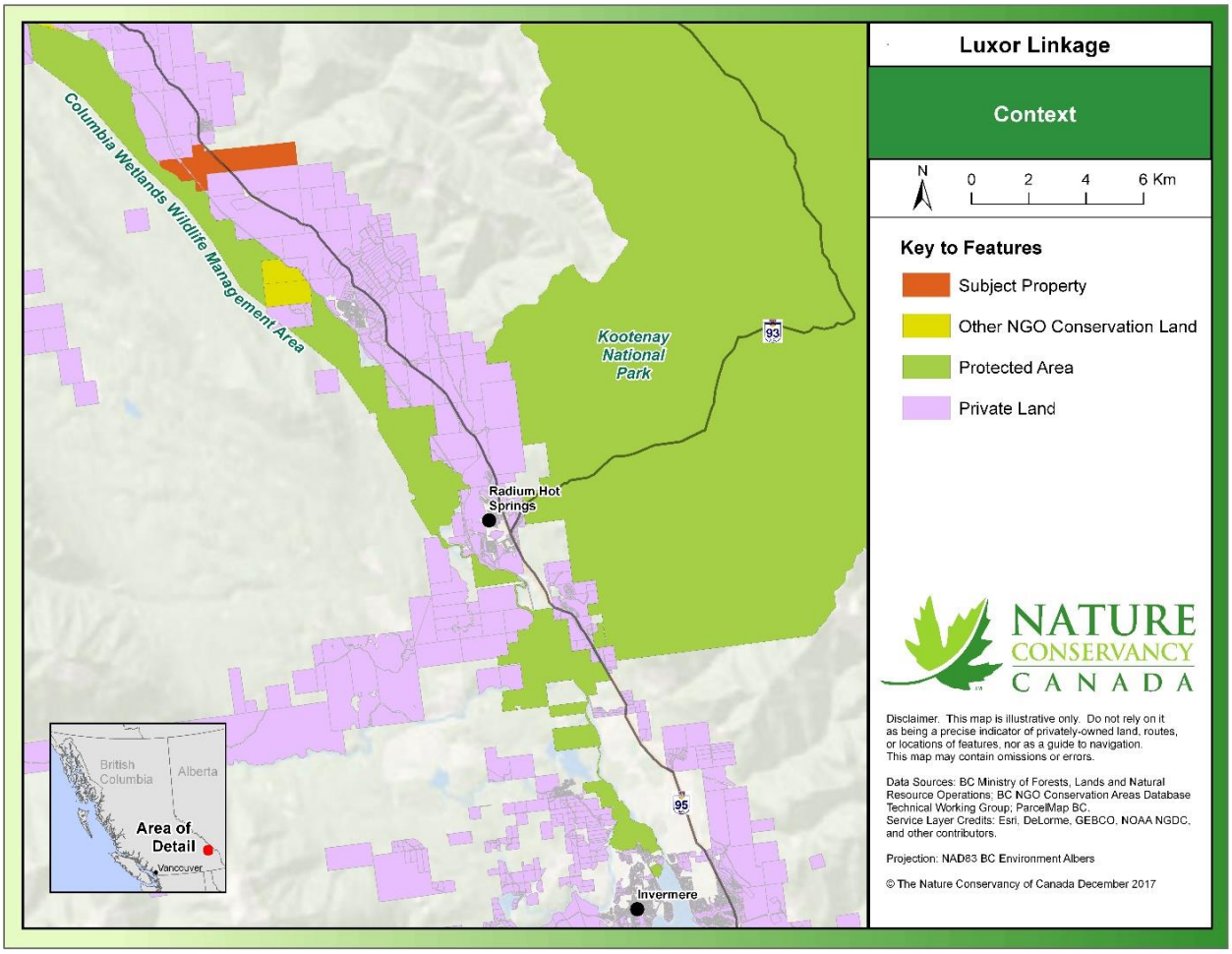

Figure 1. Location of the Luxor Linkage conservation property (highlighted in orange).

Methods

A Registered Professional Forester was hired in fall of 2020 to complete reconnaissance on the ecological units on Luxor Linkage that were slated for forest restoration treatments. The units towards the east end of the property were prioritized for this project to specifically target improvements of Elk and Mule Deer winter range (Figure 2). A thorough walk-through was completed for each unit to determine treatment priorities, and prescriptions were prepared for five ecological units (units 15, 16, 19, 20a and 24). Pre-treatments of non-native invasive plants were coordinated by the East Kootenay Invasive Species Council and were completed prior to the commencement of restoration work. Permanent monitoring plots were established across the units to monitor pre- and post-restoration tree stocking densities and to track understory growth during future monitoring sessions.

A local forestry contractor was hired to carry out hand slashing treatments on the five selected units between December 2020 and February 2021. Chainsaws were used to selectively remove trees that were less than 15 cm in diameter at breast height (dbh), with target species including Rocky Mountain Douglas-fir and Lodgepole Pine (*Pinus contorta*). Trees were cut with a maximum stump height of 0.1 m with all live limbs removed, and all deciduous species were retained. Additionally, the lower branches on some of the larger retained trees were pruned to improve sightlines for ungulates. Resultant slash was scattered on site where volumes were low and piled for later burning in areas where slash densities exceeded 1 tonne/ha. Overall, the goal was to reduce stocking rates to approximately 76-400 layer 1 Douglas-fir/Ponderosa Pine-leading sph, and to reduce the coniferous crown closure to a high-end open forest status (35 – 40% closure).

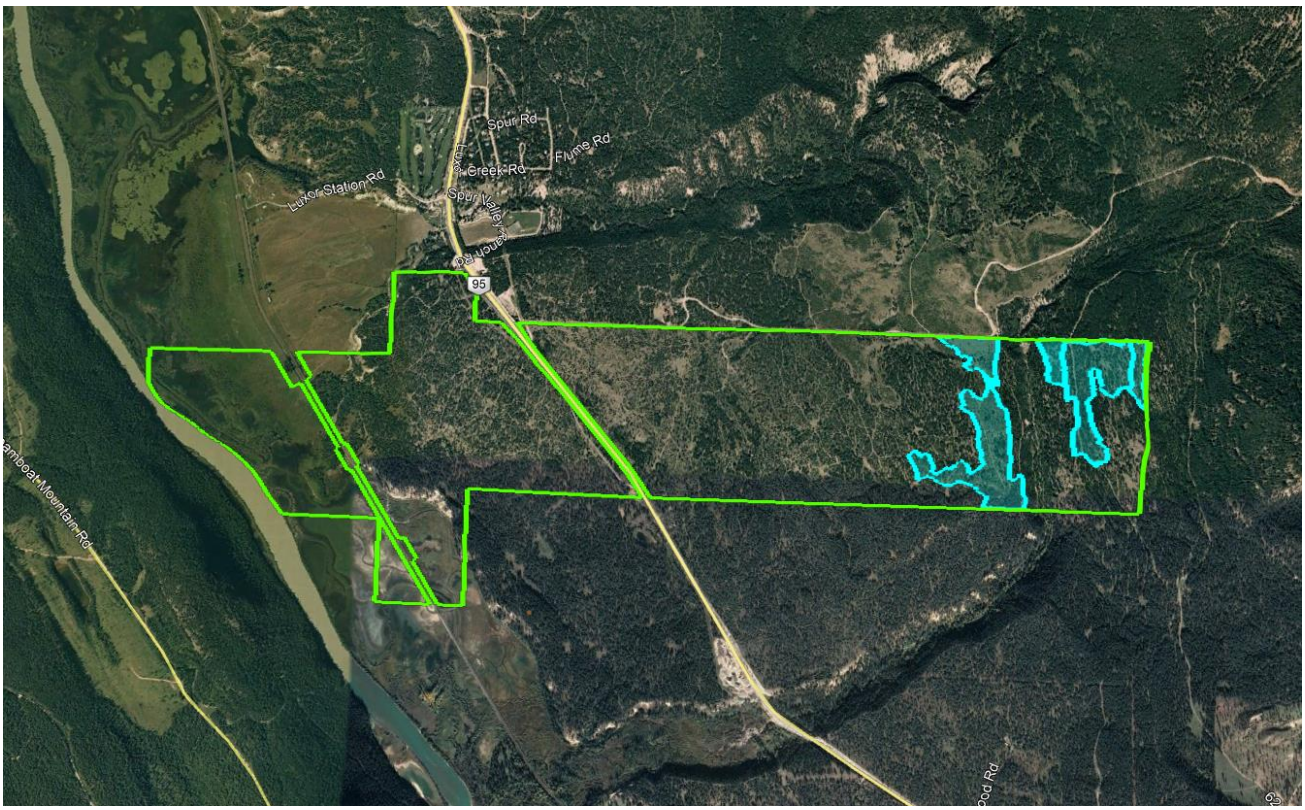

Figure 2. Location of 2020/21 forest restoration treatment areas on Luxor Linkage (highlighted in blue).

Results & Outcomes

A total of 28.3 ha of grassland/open forest habitat were successfully treated according to restoration prescriptions and the Vegetation Management Plan. On average, the total stocking rate of the treatment area was reduced to ~200 sph from initial stocking rates that ranged between 1067 – 2740 sph across treatment units, with variability in tree density maintained on the landscape for wildlife. Additionally, planned reduction in crown closure to a high-end open forest status (35 – 40% closure) was achieved. See Figure 3 for examples of before and after photos of restoration treatments.

Restoration work carried out on Luxor Linkage in the 2020-21 winter season contributes to the ~30 ha of similar treatments carried out on the property by NCC since 2017. Treating overgrown, young forests in this manner is relatively inexpensive, and ensures that a minimal amount of slash is left on-site which would pose a fire hazard. This type of forest thinning work is not only beneficial for wildlife that rely on open forest ecosystems, but also sets the stage for safer and more effective prescribed fire in the future.

a. Pre-treatment conifer in-growth in treatment unit 16 on Luxor Linkage.

b. Completed slashing in a portion of treatment unit 15 on Luxor Linkage.

c. Completed slashing in unit 15 on Luxor Linkage showing example of cut stump height and scattered slash.

d. Completed slashing in unit 20a on Luxor Linkage showing slash material variably piled and/or scattered according to the prescription.

Figure 3. Photos of pre- and post-restoration on various treatment units on Luxor Linkage.

Discussion

This project focused on vegetation management units with high levels of forest ingrowth that were susceptible to an increased risk of high-intensity wildfire. Wildlife habitat on these units also had limited viability. During the 2020-21 winter season, NCC successfully completed a restoration prescription and hand slashing treatments on five units totalling 28.3 ha. This project addresses the urgent need to enhance critical habitat for species at risk such as American Badger, to improve grazing and overwintering habitat for ungulates such as Mule Deer, and to reduce the risk of high-intensity wildfire to local communities. By strategically thinning forests to open forest conditions, NCC can not only improve critical species at risk habitat but can also improve the resiliency of these ecosystems in a world with a changing climate.

Recommendations

Several recommendations can be derived from work completed in 2020-21:

1. The scope of the challenge to restore a fire-maintained ecosystem from which fire has been excluded requires consideration of larger landscape-scale projects that may include prescribed burning or controlled wildfire. NCC should continue managing vegetation units on Luxor Linkage using forest thinning techniques with the intention of using prescribed fire to manage these habitats more efficiently in the future.

2. Given the size of the property, it is important that NCC should continue to identify additional high priority areas for forest restoration treatments that coincide with current fire breaks and potential future firefighting needs. NCC should refer to the Vegetation Management Plan for the property and update it as necessary when planning future restoration treatments.

3. NCC staff should visit monitoring plots annually in the treated units to determine effectiveness of restoration efforts and complete the burning of several piles of leftover slash material in the fall of 2021.

4. NCC staff should continue maintaining positive relationships with neighbouring landowners to encourage wildlife-friendly restoration planning on adjacent properties, and to work together in partnership where opportunities arise.

Acknowledgements

The Nature Conservancy of Canada would like to acknowledge the financial support of the Fish and Wildlife Compensation Program on behalf of its program partners BC Hydro, the Province of BC, Fisheries and Oceans Canada, First Nations and public stakeholders.

References

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