Wells-Barkerville Community Forest Mapping:

Conservation Planning at the Ecoregional and Forest Scales

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Background

The Wells-Barkerville Community Forest ('the Forest'), established in 2014, is located near the communities of Wells and Barkerville in central British Columbia. This small, 4,530 ha Forest encompasses critical viewscapes for the communities, valuable recreational opportunities, and timber and ecological values. Located within the interior wet-belt of BC in the Columbia Mountains and Highlands Ecoregion, the larger landscape around the Forest supports a small, threatened herd of Southern Mountain Caribou. Regionally, connectivity is critical to maintaining populations of caribou and other wide-ranging mammal and fish species, particularly in light of the rapidly changing climate[5].

The purpose of this project was to engage with the Forest to conduct analyses at two spatial scales: identifying locations of key ecological, social, and cultural value within the Forest and immediate area of interest using a modified Forest Ecosystem Network (FEN) mapping approach[2]; and examining connectivity of the Forest in an ecoregional context to account for climate change using the Systematic Conservation Planning (SCP) framework[6].

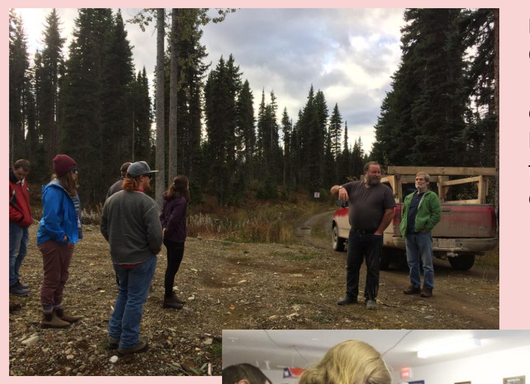
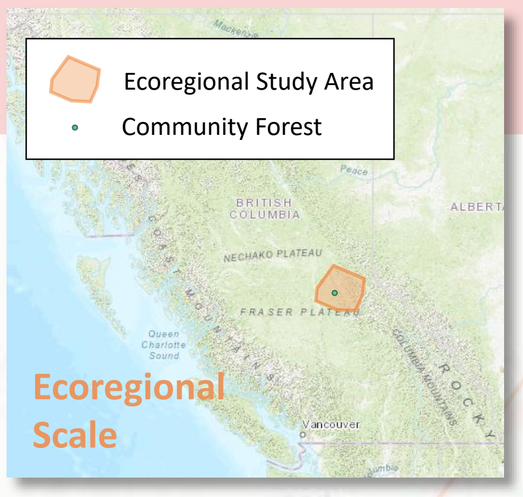
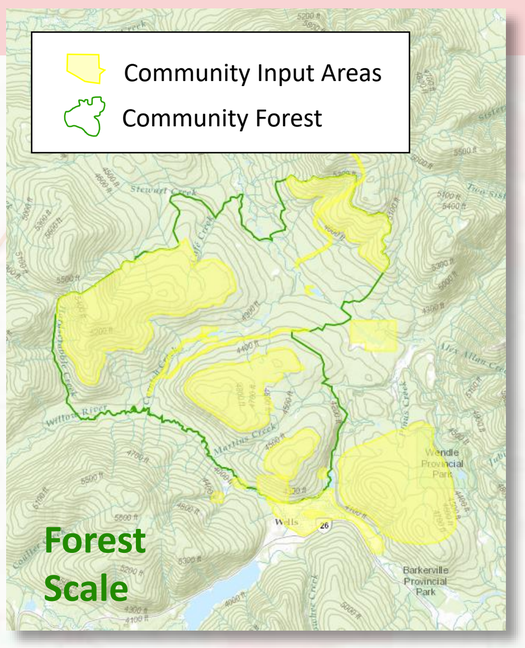


Fig. 1. Community Forest leaders explain selective logging practices to UNBC students on a visit to the Forest.

Fig. 2. Community members meet with UNBC students and faculty to discuss their values regarding the Community Forest.

Figs. 3 & 4. Left, the ecoregional study area and location of the Community Forest within the context of British Columbia. Below, the boundaries of the Community Forest just north of Wells and Barkerville, with data collected from the community regarding their ecological, social, and cultural values towards the Forest.





Sources: Wells-Barkerville Community Forest, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, AAFC, NRCan; Cartographer: Christopher Morgan

Conservation Features

A collection of measurable, spatially definable components of biodiversity serve as inputs for our conservation model[4]. These features were compiled using the SCP framework while also accounting for climate change and connectivity of lands.

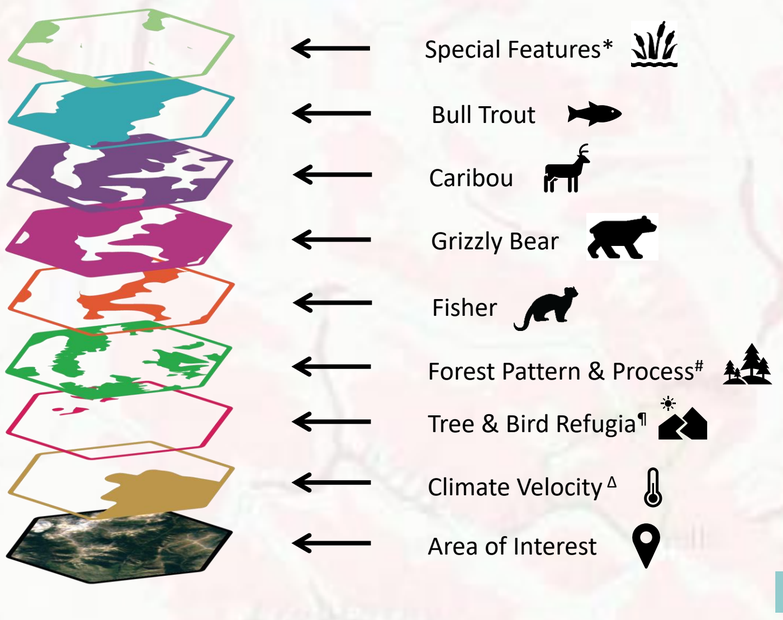


Fig. 5. A sampling of the conservation features used in the analysis. Stacked on top of one another, they form a 'Conservation Sandwich'.

* Ecosystem components that are sensitive, spatially-limited, or of high biodiversity value (e.g. wetlands, karst topography, mineral licks);
\# Combines vegetation types, forest age, wildfire occurrence, and climatological patterns;
¶ Climate-resilient environments for trees and songbirds;
Δ Forward velocity assesses how far species will have to travel to find similar habitats; Backward velocity helps locate refugia (sanctuary areas) for species and ecosystems.

Web Mapping Application

Objectives & Methods

Objective 1. Identify locations of key ecological, social, and cultural value within the Forest and immediate area of interest:

i. Identify key biodiversity components to act as surrogates for planning;
ii. Acquire and assemble spatial data in ArcMap on key biodiversity values;
iii. Work with Forest Board and residents to map community values from local knowledge on important sites.

Objective 2. Examine connectivity within the Forest and in an ecoregional context with a climate change lens:

2a. Forest Ecosystem Network (FEN) Planning plus Recreation (FERN)

iv. Use a modified FEN planning approach[2] to identify areas of ecological and cultural importance within the Forest, including:
- Areas subject to timber harvesting constraints
- Visual Quality Objectives
- Buffered water features (lakes, wetlands, fish-bearing streams)
- Oldest tree stand classes (> 141 years, >251 years)
- Community input on important recreational, cultural, and ecological areas

2b. Ecoregional Connectivity and Systematic Conservation Planning (SCP)

v. Acquire climate adaptation data[3] to identify conservation targets that promote climate change resiliency[5];
vi. Quantify landscape permeability[7] and potential for species' movement (connectivity);
vii. Use the ArcGIS-compatible prioritization software Marxan to identify biodiverse and climate resilient lands, with the connectivity layer serving as an overlay to prioritize certain lands for conservation[5].

Objective 3. Help build planning capacity within the Community Forest:

viii. Develop a Community Forest dataset in a non-technical mapping platform (ArcGIS Online);
ix. Provide a workshop/training for Forest staff, directors and other interested community members in how to access, add to, and perform limited analysis to this information;
x. Prepare a display/poster of Forest FERN/SCP mapping and share at a community gathering;
xi. Develop a mechanism for ongoing contribution of community data/values to Forest planning.

Management Implications

The products of this research and analysis were a report and a set of maps identifying the locations of key ecological, social, and cultural value within the Forest. With high value conservation lands identified, planning and management of the Forest will be made easier and more defensible with the FERN and SCP frameworks in place. This will help to ensure a healthy forest and community as residents focus on diversifying their future amidst volatility in the local timber and mineral markets. Building local planning capacity will also help facilitate long-term sustainability of the Forest, including community bids to expand the Forest in the future.

References

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Acknowledgements

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