Biomass supply estimates for the Confederated Salish and Kootenai Tribes based on harvest planning and management goals

Blake R. Hough[1], Cody Sifford[1], Laurel James[1], Tom Richards[3], Jim Durglo[2], Daniel T. Schwartz[1]

[1] University of Washington, [2] CSKT Forestry Department, [3] Northwest Management, Inc.

Introduction

Assessment of biomass supply chains often takes place on the regional scale, applying regional average conversion factors to estimate available biomass. On the other hand, ecologically-based forest management takes place on the landscape scale and requires more detailed knowledge of the distribution and composition of forest resources. We are working with the Confederated Salish and Kootenai Tribes (CSKT) to assess the availability and costs of collecting slash from planned forest management activities. Our estimates are based on detailed landscape-level information of the forest composition and actual harvest strategies of the tribe.

Objectives

- Determine available slash volume in each harvest area based on harvest prescriptions for the actual accessible landscape within that area.
- Analyze the costs for collecting and transporting slash to a central facility in Pablo, MT based on available volume, loading and chipping costs, and distance from each harvest area to Pablo.

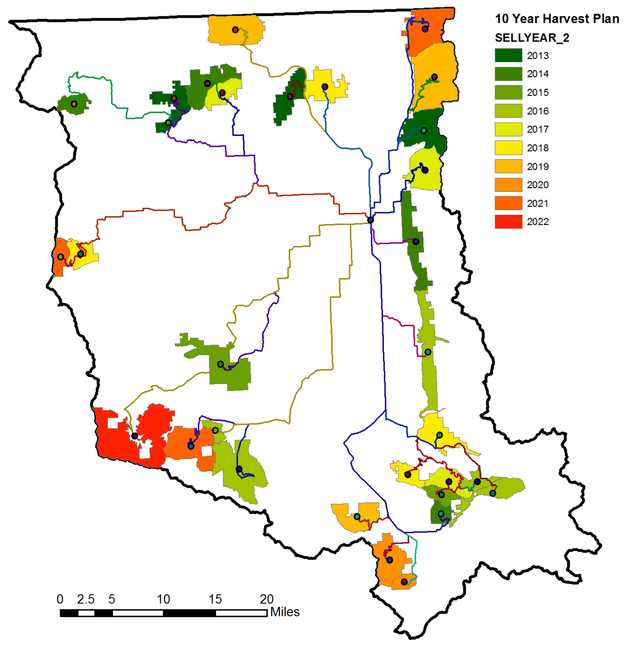

Figure 1: Forest management areas on the CSKT Reservation for the next 10 years. Roads connecting the centroid of each harvest area to a potential biomass processing site in Pablo are shown.

Methods

- FVS (Forest Vegetation Simulator) was used to simulate forest growth and projected harvests based on detailed measurements from 296 CFI plots and silvicultural prescriptions from Tribal foresters (Figure 2)

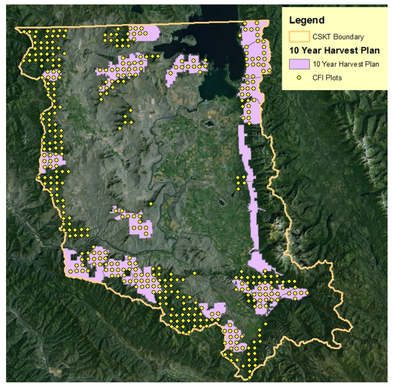

Figure 2: 296 CFI plots cover the forested areas of the Reservation. About 75 FIA plots would cover the same area.

- A GIS road layer provided by CSKT defines six classes of road based on quality and speed.
- Class 3 roads and below are accessible by chip vans and could be used to remove slash.
- Harvest buffers extend an average of 400 feet from roads and determine where slash will be available (Figure 3).
- CSKT divides their forests into 13 structural classes, called *seral clusters*, describing tree size, stand density, species composition, and layering. Five *fire regimes* are also defined based on the fire frequency, intensity, and pattern during the pre-European era (Figure 4).
- Incorporating the FVS data into the geospatial data shown in Figures 1 and 4 allowed us to use regional correlations for the volume of slash per delivered board foot to estimate the amount of slash available at any harvest location.

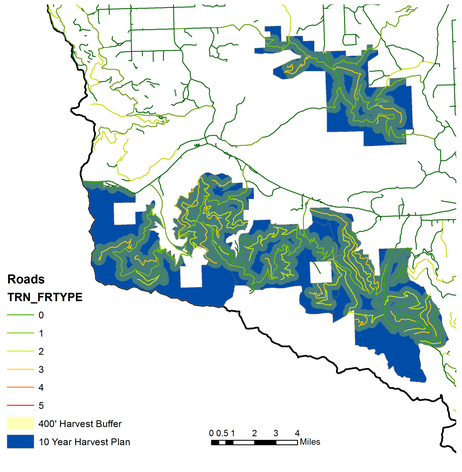

Figure 3: 400' harvest buffer applied around chip van-accessible roads within harvest areas. This defines the harvestable area where slash will be available to extract.

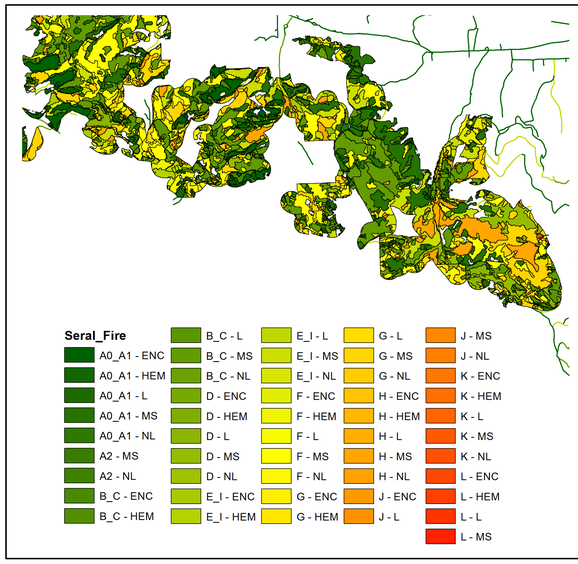

Figure 4: Seral cluster/ fire regime designations describe all forested land. Each has a different management strategy (resulting in different slash volumes), and mapping these within the harvest zone gives the acreage and location of each seral/fire designation, allowing slash yield to be determined at specific locations.

Results

Total timber harvest, recovered slash volumes, and delivered cost to Pablo

Year	Harvested Area (Acres)	Harvest (MMBF)	Recovered Slash (yd³)	Recovered Slash (BDT)	Avg. Delivered Cost ($/BDT)
2013	11,049	18.1	31,966	12,946	16
2014	7,554	18.1	32,243	13,059	24
2015	10,431	18.1	31,992	12,957	21
2016	9,459	18.1	32,170	13,029	20
2017	8,822	18.1	32,283	13,075	17
2018	7,836	18.1	32,343	13,099	19
2019	9,482	18.1	32,266	13,068	20
2020	7,826	16.8	30,228	12,242	22
2021	9,541	18.1	32,364	13,108	20
2022	9,318	18.1	36,119	14,628	24

Given current harvest plans and practices:

- ~13,000 BDT of slash are available per year from CSKT forests
- The average delivered cost to Pablo of wood chips from slash is $20/BDT

Acknowlegements

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