

PROJECT SUMMARY

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enhanced forest management

P I L O T P R O J E C T

This led to the
first ER Plan.

In January, 1996 the Invermere Forest District (IFD) was selected as one of only two areas in the province to host an Enhanced Forest Management Pilot Project (EFMPP). The IFD formally initiated the EFMPP in March 1996 and a detailed project plan was later endorsed by a broadly-based provincial steering committee in July, 1996. Implementation of the project plan for the pilot is now well underway.

The EFMPP is a co-operative effort between industry, the Ministries of Forests and Environment, Forest Renewal BC, labour and the academic community. The Invermere EFMPP will develop enhanced forest management strategies which will re-examine the timing, location and intensity of management practices, the application of various harvesting systems and better focus forest inventory and research activities.

Communicating the results of the various initiatives is a critical component of the EFMPP process. One method of providing extension of the results is through the publication of summary and interim reports discussing the projects and their results.

ROCKY MOUNTAIN TRENCH ECOSYSTEM RESTORATION: INTERIM REPORT

by Dave White

Stand Tending Forester, Invermere Forest District

RATIONALE

Retrospective studies show that the Rocky Mountain Trench area, locally called "the Trench", which includes a portion of the Enhanced Forest Management Pilot Project (EFMPP), has historically experienced frequent low-intensity ground fires, with fire in the valley bottoms returning at intervals ranging from 3 to 30 years. However, this fire dependent ecosystem has changed dramatically in recent years.

Due to man's intensive fire-suppression activities over the last several decades, the ecosystem of the Trench has transformed from a semi-open forest to a closed young forest dominated by poor quality Douglas-fir. The consequences of this shift are many. Several forage and grassland-dependent wildlife species are experiencing reduced ranges. Livestock producers are finding themselves at odds with proponents wishing to see an increase in ungulate populations both of which are competing for a decreasing forage supply. The potential for catastrophic wildfire is heightened. And, overall forest health in the Trench is diminishing.

The recently released Kootenay/Boundary Land Use Plan - Implementation Strategy has

established guidelines for restoring fire-maintained ecosystems in the Trench. Using these guidelines as a basis, a project (which is the focus of this interim report) was initiated within the EFMPP to assess in detail the timber supply implications of creating a more open forest through various ecosystem restoration treatments.

The project also undertook the development of a prototype "ecosystem restoration plan" on the Sheep Creek North Range Unit designed to facilitate the transition from a closed back to an open forest condition. In doing so, it was anticipated that the planning process developed could be applied to other Trench areas.

Lastly, the project also provided the opportunity to apply "real world" operational treatments designed to test the feasibility and utility of the various prescriptions arising from the prototype and future ecosystem restoration plans.

OBJECTIVES

1. Use the forest estate model "Forest Service Simulator" (FSSIM) to analyze the short and long-term timber supply implications of various ecosystem restoration treatments.



2. Develop a prototype ecosystem restoration plan for the Sheep Creek North Range Unit that applies the guidelines contained in the Kootenay/Boundary Land Use Plan - Implementation Strategy.
3. Using the process established by the prototype Sheep Creek North Ecosystem Restoration Plan, initiate a similar planning process for the three remaining range units in the EFMPP. (Ultimately, all Trench areas in the Invermere Forest District will be incorporated into the planning process allowing the District to plan and apply ecosystem restoration treatments at the strategic level).
4. Test and report on the efficacy of a variety of prescribed treatments, i.e. restoration harvesting, spacing and underburns.

METHODS

Scenarios were developed for a range of resource emphases, from exclusive timber production to exclusive forage production, and selected mixes on a continuum between the two. FSSIM was then used to test the sensitivity of the timber supply to ecosystem restoration treatments for the EFMPP study area for each scenario.

A prototype ecosystem restoration plan was developed for the Sheep Creek North Range Unit after conducting extensive field reconnaissance and applying the principles and guidelines established in the Kootenay/Boundary Land Use Plan Implementation Strategy. The prototype ecosystem restoration plan was presented to the major forest licensees, range tenure holders, and a cross-section of interest groups (from cattlemen to environmentalists).

As identified in the plan, prescriptions aimed at achieving ecosystem restoration objectives were prepared for harvesting and underburning treatments on the Sheep Creek North Range Unit.

The prototype planning process was extended to the remaining Trench range units within the EFMPP study area.

RESULTS

The analysis of timber supply implications in the EFMPP is now ongoing. The preliminary analysis suggests that the impact of ecosystem restoration treatments on long-term timber supply in the Trench is minimal, while the short-term timber supply is virtually unaffected.

The Sheep Creek North Ecosystem Restoration Plan is complete and the District's concept of ecosystem restoration has been presented to various audiences. All inputs/comments received have been favourable. (Note: The narrative portion of the plan is included within this document. For additional information please contact the author.)

Implementation of the Sheep Creek North Ecosystem Restoration Plan has begun. Harvesting to restore historical stand structures has been completed on 124 hectares within the Sheep Creek North Range Unit. The harvested area is next scheduled for a prescribed underburn in the fall of 1997 as per the ecosystem restoration plan. Additional stand restoration harvesting is planned for fall of 1997 to further test the efficacy of prescribed treatments that will be applied in the future ecosystem restoration plans elsewhere in the District.

The remaining three range units area in the Trench (that are also in the EFMPP study area) are now in the field reconnaissance and planning stage. Applying the principles of adaptive management the planning process is being refined as necessary based on agency and public input and preliminary results of FSSIM timber supply analysis. Planning is expected to be completed on these units during the winter of 1997/98.

MANAGEMENT IMPLICATIONS

The outcome of the FSSIM modeling of the EFMPP study area will help direct resource management emphasis in the Trench. The prototype ecosystem restoration plan and prescribed treatments carried out thus far have produced encouraging results, and ecosystem restoration of the Trench may proceed now at a much more rapid, yet strategically directed pace than previously anticipated.

WORK STILL REQUIRED

- Further forest estate modeling with FSSIM which refines the impacts of ecosystem restoration treatments is required and will be undertaken in the fall of 1997.
- Implementation of treatments prescribed in the Sheep Creek North and other ecosystem restoration plans will continue.
- A case study reporting the steps involved and final results of the initial two harvest treatments conducted on Sheep Creek North Range Unit will be completed in 1998.

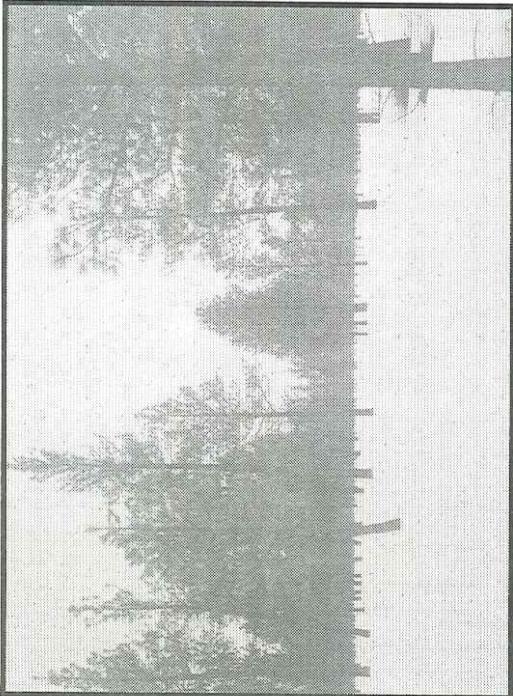


Overstocking due to fire suppression



- Opportunities exist to pursue further research into the effects of varying crown closures through spacing or harvesting treatments on overall forage production and ecological health.
- Reports on the efficacy of prescribed treatments will be completed as the treatments occur.

- Planning for the three remaining range units in the EFMP study area will be completed during the winter of 1997/98.
- Field reconnaissance and planning will be extended to the remainder of the Trench within the Invermere Forest District in 1997 and 1998. The intent will be to complete the entire Trench and develop a "strategic-level" ecosystem restoration plan to guide and schedule future treatments. This strategic plan will be multi-agency based (led by the District) and will be taken through a public consultation process.



Desired stand conditions

(NOTE: Following is an excerpt from the narrative portion of the Sheep Creek North Ecosystem Restoration Plan. More specific information with regard to the appendices, related maps and tables should be sought directly from the author.)

SHEEP CREEK NORTH RANGE UNIT ECOSYSTEM RESTORATION PLAN

A. INTRODUCTION

This ecosystem restoration plan is designed to set out a long-term strategy to address forest ingrowth on the Sheep Creek North Range Unit in a manner that optimizes the production of timber, forage and wildlife habitats. Treatment strategies are designed to respect private lands and existing resource tenure holders such as Christmas tree and range permittees. A primary objective of this plan is to return a significant amount of the

landbase in this range unit to a fire-maintained ecosystem. This strategy identifies treatments and approximate scheduling for inclusion into Invermere Forest District prescribed burn, silviculture and harvesting plans.

B. METHODOLOGY

In the absence of reliable targets for desired stand conditions, guiding principles have been developed to formulate treatment strategies. All areas have been field checked to ensure the feasibility of treatment recommendations. An analysis of impacts of treatment options have been undertaken to demonstrate tradeoffs for some treatments. Treatment units have been mapped and described. (Note: Treatment scheduling and crown closures are summarized in the appendix of the full plan.)

C. GUIDING PRINCIPLES

1. KOOTENAY/BOUNDARY LAND USE PLAN -

IMPLEMENTATION STRATEGY

The objectives of the Kootenay/Boundary Land Use Plan (KBLUP) - Implementation Strategy are important guiding principles for this plan.

The KBLUP sets target contributions for resource objectives to be met within the Invermere Forest District. (Note: The target contributions table is in the appendix of the full plan). The percentages of ecosystem components from the plan are targets for the entire fire-maintained portion of the Rocky Mountain Trench (natural disturbance type 4 (NDT4)) and, as such, are not necessarily applicable to each individual range unit. The principles used in developing this plan include but are not limited by the targets set by the KBLUP.

2. CROWN CLOSURE

The existing crown closure over the entire range unit has been identified as the maximum crown closure that will exist over time.

In the absence of reliable crown closure targets, the existing level has been chosen as a target. Treatments have been scheduled to maintain approximately the same crown closure in perpetuity by spatially moving burning and harvesting treatments across the landscape over time. The selection of crown closure at the existing level balances all resources and prohibits further ingrowth, however, the selection of this level also implies that it is satisfactory for resource users and ecosystem health.

3. FIRE ECOLOGY

There is a need to retain the remaining fire-maintained ecosystems that are not encumbered by incompatible land uses. Most of this range unit experienced a fire periodicity of 5 to 30 years based on studies done in similar areas. Fire created an open stand structure that provided for much greater forage production than currently exists. Fire also promoted an ecosystem adapted to repeated fires and a wildlife component that evolved to expect it. The reintroduction of fire ensures



these ecosystems are represented across the landscape as well as reducing the probability of catastrophic fires. There is a need for maintaining the few remaining fire-maintained areas which are scarce in the Invermere Forest District due to incompatible land uses which preclude burning i.e. Christmas tree production. This principle is consistent with the Forest Practice Code "Biodiversity" guidebook and recommendations it contains for the NDT4 ecosystems present in the Sheep Creek North Range Unit.

4. FIBRE UTILIZATION

A guiding principle in choosing treatment strategies is to ensure full utilization of on-site wood fibre when prescribing treatments to attain the objective of ecosystem restoration.

For example, a dense ponderosa pine (Py) and Douglas-fir (Fdii) stand with significant stocking in immature layers would be allowed to grow to a merchantable state and harvested before the reintroduction of fire. There are no planned spacing treatments of trees that are not of a merchantable size, therefore there will be no spacing slash left as unutilized fibre. Only after a stand has grown to a merchantable size will the crown closure be reduced to allow for underburning. Recent harvesting in this range unit has involved utilization of small diameter trees and the salvage of dead wood for pulp. Any prescribed treatments to achieve crown closure reduction will ensure fibre utilization has been considered.

In some instances precommercial thinning may be employed for young trees (<20 years) to ensure crown closures never increase and exclude desired plants completely.

5. FIBRE LOSSES

Timber production losses as measured in volume will be offset somewhat in terms of improved timber quality as measured by tree diameter.

A typical stand may support 3000 stems per hectare. If grown to rotation this stand would yield 155 m³/ha with an MAI of 1.11 m³/yr. If thinned to 330 stems per hectare, a density compatible with underburning, the stand would yield 98 m³/ha but rotation would be delayed by 20 years. The thinned stand would yield 0.61 m³/yr or 0.5 m³/yr less than the unthinned stand. The loss in gross production is offset by stem quality. The thinned stand would provide trees with double the diameter versus the unthinned (30 cm vs. 17 cm diameter at breast height). The aesthetic and ecological benefits of having large diameter trees also offset the loss in gross timber production. A Managed Stand Yield Summary developed using the WinTIPSY growth model was used to derive the above estimates. (Note: The assumptions used in the runs are found in the appendix of the full plan.)

6. LANDSCAPE LEVEL SCHEDULING

By applying a rotational prescription across the landscape, timber, ecological health through burning and forage

production can all be managed by shifting the resource emphasis over time.

A three phase rotational prescription will be applied to the potential timber producing areas. In the first phase, the regime is to harvest an ingrown stand near full crown closure to between 20 and 70% basal area. The second phase is 30 years of periodic under burning. The third phase is to stop burning for 30 years to allow regenerated stems to grow up to a height where they can withstand low intensity burns and a partial harvest of the mature stems. If applied successfully, this would allow crown closure to remain at or below the existing level to check forest ingrowth. The sequence of treatments will be scheduled and reported in the Integrated Silviculture Information System (ISIS) maintained by the District.

A brief analysis of the wood fibre implications with assumptions is located in the Appendix of the full plan. By assuming the 30 years of underburning is equivalent to an additional 30 years of regeneration delay the MAI drops from 0.61 to 0.52 or an 8% drop in timber production due to underburning as compared with the thinned base case. This implies a 12% sacrifice in timber production if a fire-maintained forest is promoted for 30 years of each rotation. This regime, however, represents a 50% drop in timber production over a regime that maximizes fibre growth on the site by promoting higher tree density and excludes fire.

7. PLANNING CONSTRAINTS

Treatment prescriptions must be consistent with higher level plans and the Forest Practices Code of British Columbia Act.

The planning area is partially designated as a Special Resource Management Zone (SRMZ) under the Kootenay/Boundary Land Use Plan. The treatments prescribed are primarily consistent with this designation although harvesting older stems (>250 years of age) may be significantly constrained. Further field visits with Ministry of Environment staff are scheduled to ensure specifics pertaining to individual prescriptions are consistent with the SRMZ management objectives.

8. PLANT COMMUNITIES

Crown closure will not be permitted to develop to an extent where desired plant communities will be threatened or eliminated.

Even where burning is not prescribed for extended periods, crown closure may be controlled by precommercial thinning and commercial thinning to ensure the plants are present and in such a state that they may respond favourably to fire or harvesting treatments. In many cases high crown closure has already eliminated desirable plants from parts of the range unit. It is anticipated thinning may be required to ensure rapid diameter growth of young crop trees to promote fire resistance as early as possible for underburns.

