Integrated Stewardship Strategy for the Invermere TSA

Final Report

Version 1.0

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Project 419-38

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1 Introduction

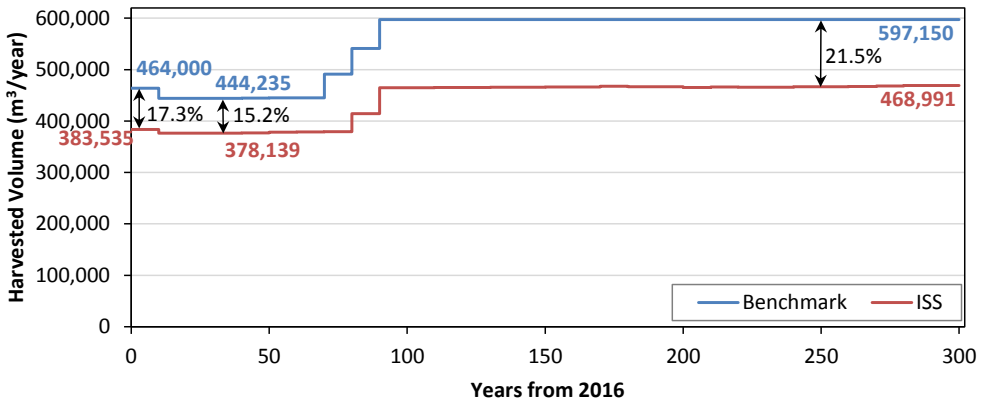
The British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development initiated an Integrated Stewardship Strategy (ISS) – sustainable forest management analysis – for the Invermere Timber Supply Area (TSA). This document succinctly summarizes results, key observations, and recommendations developed through this ISS iteration – including spatial and temporal protections and opportunities to mitigate identified issues. Detailed information can be found in the five documents prepared for this ISS iteration, which include: Situation Analysis, Scenario Development, Data Package, Analysis Report, Tactical Plan, and Implementation Monitoring Plan (*https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/silviculture/silviculture-strategy-areas*).

2 Key Observations

ISS Objectives	Facilitate a respectful and collaborative planning process that supports the delivery of defined stewardship outcomes - which in turn improves business certainty for licensees operating within Invermere TSA.
Land Base	The Invermere TSA is situated in south-eastern British Columbia covering an area of 1.32 million ha, from which 603,828 ha is Forest Management Land Base (FMLB - 45.9%) and 173,350 ha is the effective Timber Harvesting Land Base (THLB – 13.2%). These area estimates are based on the best known land base assumptions implemented throughout the ISS process. A benchmarking analysis to the latest Timber Supply Review analysis decreased the effective THLB by 104 ha (0.1%); mostly due to assumptions for ownership. Then, by properly accounting for non-forest and non-productive, aspatial netdowns (slopes 40-70%, unstable terrain, and problem forest types), and Forest Stewardship Council requirements (rules for riparian and no harvest areas) the THLB was reduced by 12.2% compared to the benchmark. Finally, by exclusion of the candidate reserves and proposed WHAs, the working forest was reduced to the values shown above.
History of AAC	The Invermere TSA was established in 1981 with an Annual Allowable Cut (AAC) of 670,000 m³/year. Since then, the AAC was adjusted upwards or downwards to address salvaging of fire or insects impacted stands as well as harvesting of small-diameter lodgepole pine stands.

Year	AAC (m³/yr)	Notes
1981	670,000	
1985	1,800,000	2-year increase to address salvage of timber burnt in 1985 wildfires
1986	696,190	Land transfer from the former Cranbrook Forest District to the Invermere Forest District
1989	736,140	Increased from 1986 level by 40,000 m³/yr to address logging of small-diameter lodgepole pine stands.
1990	697,264	Transfer of land to TFL 14 and establishment of Height of the Rockies Provincial Park
1994	657,264	Expiration of small-diameter lodgepole pine allowance
1996	591,500	
2001	581,570	

	2005	598,570	Increased by 17,000 m³/yr to include FMER and small-scale salvage.
	2016	595,186	After accounting for area-based AACs issued since 2005
	2017	496,720	From June 29, 2017 to June 29, 2022
	2022	424,800	From June 30, 2022
Related Plans and Strategies	o Kootenay Boundary Higher Level Plan Order o Kootenay-Boundary Land Use Plan (KBLUP) o Southern Rocky Mountain Management Plan o Provincial Timber Management Goals and Objectives o Federal Recovery Strategy for Northern Caribou o Sustainable Forest Management Plan (Forest Licensees) o Silviculture Strategies Types 1, 2 and 4 o BC Mountain Pine Beetle Model o Future Forest Products and Fibre Use Strategy o Multiple Resource Value Assessment o Provincial Stewardship/ Timber Harvesting Land Base Stabilization o Forest Health Strategy o Ecosystem Restoration o Whitebark Pine o Fire and Fuel Management o Non-Spatial Biodiversity Management Objectives		
TSR Benchmark Differences from TSR	A TSR Benchmark scenario was developed to replicate, as accurate as possible, the latest TSR analysis completed in 2016. Major differences between the TSR Benchmark and ISS Base Case scenarios included elements of the land base definition (e.g., non-forest and non-productive, depletions, FSC, partial netdowns), non-timber objectives (e.g., UWR, landscape-level biodiversity, ECA), growth and yield models (e.g., newer TIPSY version (4.4)), non-THLB disturbance, and NRL estimates. Smaller THLB was exacerbated by a reduced growing stock; not proportional over all age classes; most changes resulted in fewer older stands. This significantly impacted volumes from existing natural stands that support the short-term harvest rate. The TSR4 even-flow was determined to be 447,158 m³/yr. Compared to the TSR4, the TSR Benchmark Scenario even-flow was 2.3% lower.		
ISS Base Case Differences from TSR Benchmark	The THLB for the TSR Benchmark Scenario was 0.1% higher than TSR4. The THLB for the ISS Base Case was 12.2% less than the TSR Benchmark Scenario, but the NHLB was significantly larger (22.5%). Compared to the TSR Benchmark Scenario harvest flow, the ISS Base Case was 17.3% lower in the first decade, 15.2% lower over the mid-term, and 21.5% lower over the long-term.		



Timber Objectives	Timber objectives include maintaining current harvest profiles for harvest system and haul time for the next 40 years and controlling harvest opening sizes in each decade (maximum 0%<1ha and maximum 5% 1-5ha). These objectives had minor to moderate impacts on the harvest rate. In the ISS Base Case, harvest volume by species groups (FdLw, HwBl, PyCw, SxPl) was tracked and reported only.
Non-Timber Objectives	The non-timber objectives include stand- and landscape-level biodiversity, minimum seral requirements for UWR, very-early seral patch size distribution, and maximum disturbance allowed within each LU (i.e., green-up), within each community and domestic watershed (i.e., ECA), within each visually sensitive polygon (i.e., VQO), and within each LU/UWR habitat type. The most constraining non-timber objectives were the VQO, ECA, and very-early seral patch size distribution (implemented only in the Combined Scenario). In the case of the very-early seral patch size distribution objectives, the weights were gently applied such that the negative impacts on harvest rates were minimized.
Wildlife Habitat	Spatial delineation of approved, proposed, and draft habitat areas adjusted the landbase description. Compared to the latest Timber Supply Review, additional proposed WHAs were included, a gross area of 2,275 ha (1,896 ha net). The wildlife habitat tactic explored effects of future forest harvest on wildlife habitat. The model was configured to replicate the 2016 reports prepared for the latest TSR. Patchworks produced wildlife habitat rating charts for each of the 14 habitat types. In most cases, these results were similar to those developed in the latest TSR. In other cases, it appeared that the errors were introduced in the process used in the latest TSR. An assessment of critical Caribou habitat under the federal recovery strategy (CH 638) indicated that disturbance within the High or Low Elevation range is currently below the maximum allowed of 35%. Disturbance remained fairly steady at approximately 35% over the first 20 years of the 300-year planning horizon and decreased after 50 years as the 500m buffers of the temporary roads were only accounted if they were used for hauling over the previous 40 years.
Silviculture Tactics	Subject to a combined budget of $300,000 per year, three silviculture tactics were implemented over the first 20-60 years of the planning horizon. Enhanced basic silviculture - Treatments were set-up for all existing natural and managed stands (except Cedar-Hemlock and Other uncommon species leading

stands) outside FMER and SI managed ≥18 m. Stands with known health problems (root rot and rust) were also considered. The enhanced basic silviculture cost was applied at $385/ha. On average, the eligible THLB area eligible for the first 20 years was 16,000 ha/decade.

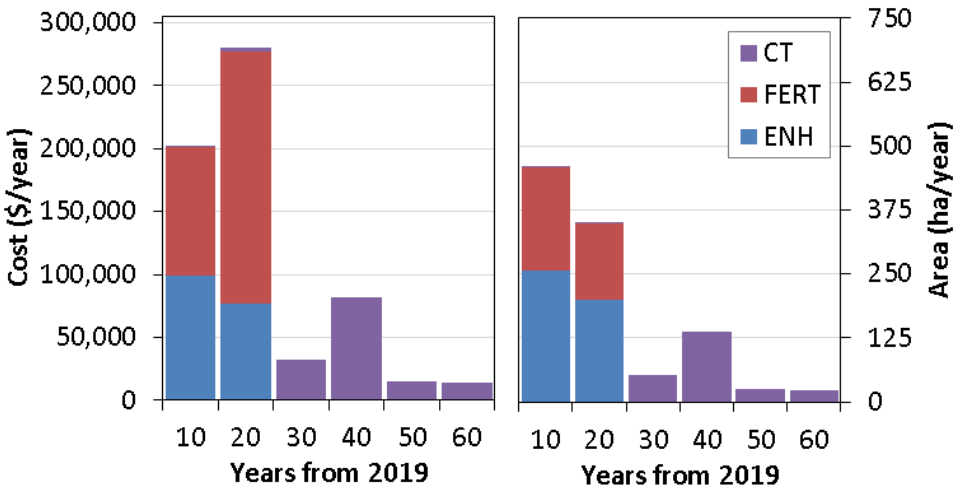
Fertilization - Up to 2 applications (7-year apart) for young existing natural and managed stands (7 to 14 yrs younger than MHA) outside of FMER, site index >15 m, on slopes ≤40%, Fd + Lw + Sx + Pl ≥80% or Sx-leading ≥70%, within MS, ICH, and ESSF BEC zones, and below 1,650 m elevation. Following last application, stands were locked from harvesting for another 7 years. The cost was applied at $450/ha/application. On average, the eligible THLB area eligible for the first 20 years was 5,600 ha/decade.

Commercial Thinning – treatments were set for all Fd, Lw, and Sx existing managed stands, site index ≥18 m, on slopes ≤40%, within 1.5 hrs haul time (one-way) that reached an age MHA-20 yrs during the first 60 years of the planning horizon. Once thinned, the stand was locked from harvesting for the following 20 years. In addition to the age requirement, the stand had to have at least 100 m^3/ha at time of thinning. The treatment reduced the yield by 40% and was available to the model for 10 years from the time of eligibility. The net cost was applied at $600/ha ($1,200/ha total cost with 50% revenue). On average, the eligible THLB area eligible for the first 60 years was 3,000 ha/decade.

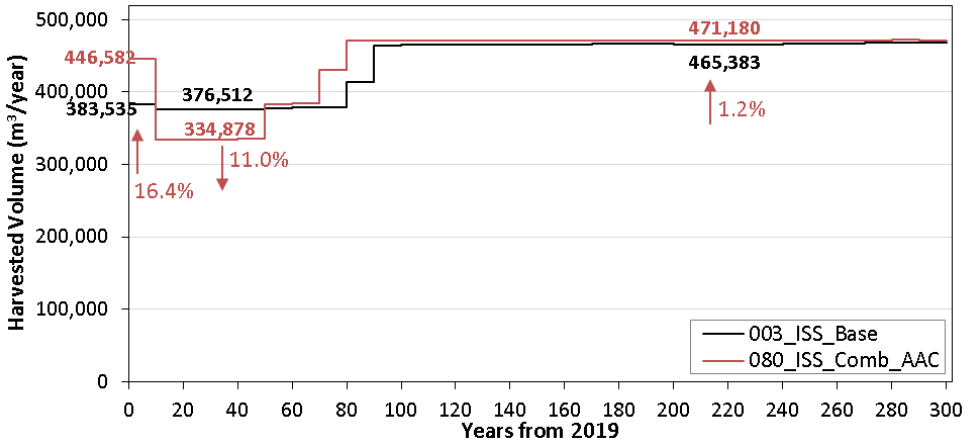
Generally, the silviculture tactics demonstrated the anticipated benefits when planning them:

- FERT provided incremental volume over the mid-term.
- CT provided incremental volume later in the mid-term over periods when available harvest volume was lowest, but at some cost later on when the remaining stands were harvested at lower volume.
- ENH provided incremental volume early in the long-term, which replaced merchantable stands that could then be harvested earlier (late mid-term).

While not fully utilized, the $300,000 per year budget was spent mostly on enhanced basic and fertilization silviculture tactics. Note that important areas were commercially thinned in decades 3-6 which is the most constraining mid-term period.



Candidate Reserves	The current OGMA/MMAs fell short in achieving the landscape-level biodiversity targets. A sensitivity analysis of the ISS Base Case indicated that in order to meet the landscape-level biodiversity targets in addition to considering OGMA/MMAs, the harvest rate reduced by 2.9-3.8% in the short- and mid-term and no impact in the long-term. Overall, the landscape-level biodiversity objectives are currently below the minimum target levels for old seral by 10,399 ha (11%) in 54 of the 202 reporting units. Similarly, objectives are currently below the minimum target levels for mature-plus-old seral by 2,259 ha (7%) in 6 of the 24 reporting units. Candidate Reserves developed through the reserve scenario aimed to identify where and how we should reserve forested stands to address landscape-level biodiversity (old seral and mature+old seral) and where possible, non-timber values, while minimizing impacts to the working forest. Candidate reserves were identified based on 5 objectives: old and mature-plus-old seral (including full targets for old seral in LUs with low BEO), stand-level score, THLB, interior old forest, and reserve size distribution. These Candidate Reserves resulted in a net loss in THLB of 4,912 ha or 2.8%. There was a 63% overlap between areas identified as Candidate Reserves and existing Old Growth Management Area and Mature Management Areas.
Combined Scenario	Combined Scenario incorporated elements from previous scenarios (Base Case, Silviculture, and Reserves) and aimed to guide the development and monitoring of tactical plans over the first 20 years of the planning horizon. Fire and harvesting depletions were updated to 2019 and current AAC was set as the harvest rate for the first decade; then a non-declining harvest flow determination policy was adopted. Compared to the ISS Base Case (MINDY), the Combined Scenario harvest profile was 16.4% more in the first decade (i.e., current AAC), 11.0% less over mid-term, and 1.2% more over the long-term. While the current AAC could not be maintained over an extended mid-term, the mid-term drop could be avoided by turning off very early patch size distribution objectives.



Tactical Plan	The Tactical Plan developed through this iteration integrates three separate plans: reserve, harvest, and silviculture. Ultimately, it provides operational direction and bridges strategic, forest-level analyses, and operational planning processes.
Implementation Monitoring Plan	While forest licensees are not legally required to follow the tactics developed in this ISS, these tactics provide important guidance for key activities that will be monitored relative to harvesting and other performance indicators. Monitoring will focus on the implementation of these tactics over the 20-year term of the Tactical Plan. Ultimately, implementation monitoring is intended inform future ISS iterations and other forest-level analyses.

3 Recommendations

Minimum Harvest Age	o Refine the minimum harvest criteria for managed stands by including a criterion based on mean annual increment. While this new criterion may constrain harvest levels, it should improve harvest profiles (e.g., age and products).
Disturbance in the NHLB	o Refine the approach for disturbing the NHLB to mimic areas and spatial patterns disturbed naturally.
OGMA+MMA	o Apply these spatial reserves for a limited time only (e.g., 40-60 years) and then allow the model to explore alternative ways to meet landscape-level biodiversity objectives, while maintaining or enhancing reserve.
FSC Criteria	o Continue to assess impacts and trade-offs associated with implementing FSC standards.
Early Seral Patches	o Continue to assess impacts and trade-offs associated with implementing early seral patches. This might include merging reporting units across the TSA, application of target weights within an acceptable impact to harvest levels.
Harvest opening size	o Assess impacts and trade-offs associated with creating operationally feasible harvest opening sizes. This could be done to ensure that harvested blocks are more operationally feasible.

Harvest Profiles	o Implement maximum targets on Haul Time and Harvest System targets based on preferred classes and current profiles across the THLB, over the first 20 years.
Non-timber objectives	o Continue to explore modelling approaches to address highly constraining non-timber objectives (e.g., VQOs and ECAs).
Commercial Thinning	o Continue to explore criteria for implementing CT, such as increasing age timing windows and setting up future stands that will become available over the first 60 years.
Partial harvest in Constrained Areas	o Continue to explore tactics that can improve structural characteristics and reduce the risk of wildfire – including within constrained areas (e.g., UWRs, Visuals, ECAs, OGMA/MMAs, Wildland Urban Interfaces, etc.)
Silviculture Treatments	o Consider evaluating treatments based on net present value rather than cost alone. For example, the net cost for CT and ENH tactics were $600/ha and $385/ha, respectively, while the Net Present Value for the same tactics would be +$221/ha and -$231/ha. This new account would likely influence the model to select different tactics at different times.
Wildlife Habitat	o Complete validation for the wildlife habitat modelling and explore appropriate recommendations. o Develop appropriate thresholds to maintain over time (e.g., maintain current level of habitat classes 1 to 3). o Continue to work towards developing spatial criteria to apply in the model (e.g., area and shape required for specific habitat types).
Caribou Habitat	o Revisit the caribou habitat analysis once the new linework from the joint provincial and federal caribou recovery strategy is available.
Reserve Tactics	o Assess Candidate Reserves at tactical- and eventually, operational-levels; involving stakeholders to verify values are addressed appropriately for each LU. o Develop age dependent scoring curves for each stand and include them into the Combine Scenario. Here, as opposed to static locked reserves for the entire planning horizon, the model will assess on the fly the "reserve value" of each stand and set aside candidate reserves as needed. These reserves will be dynamically changing overtime, in line with OGMA/MMAs policy.
Outstanding Tactics	o Continue work on scenarios and tactics identified but not examined in this iteration. This includes additional wildlife tactics (spatial criteria for specific habitat types and revised caribou strategy), Forest Health (fire and climate change), Carbon (carbon stocks), and Range (forage production). o Examine changes in results from incorporating a vegetation inventory with LiDAR-derived attributes.