



Fuel Management Prescription

West Arm Provincial Park— Harrop/ Strickland Creek

Treatment Unit 1

REVISED JULY 2020

Prepared by: Erik Leslie, RPF 718 Radio Ave, Nelson, V1L 3L3 250 505 3311 ErikL@netidea.com	Prepared for: Amanda Weber-Roy Kootenay Conservation Specialist BC Parks Ministry of Environment and Climate Change Strategy
Location: Northeast corner of West Arm Provincial Park near Harrop (Strickland Creek area)	

Note: Fuel Management Prescriptions have been prepared for 6 Treatment Units in the Harrop/ Strickland Creek area. This prescription covers Treatment Unit 1.

A. Treatment Rationale and Site Summary

The West Arm Provincial Park Fire Management Plan (2017) identified the northeast corner of the Park as a critical area for the establishment of landscape level fuel breaks. The stand structure in this area—mature coniferous forest with extensive ladder and surface fuels—will support high to extreme fire behaviour under 90th percentile summer fire weather conditions. The implementation of this prescription will significantly reduce fuel hazards in this area and contribute to the development of an integrated network of fuel breaks between Harrop and the Park.

TREATMENT UNIT (TU) AREA SUMMARY					
TU	Gross Area (ha)	Permanent Access (ha)	Biodiversity or riparian reserves (ha)	Net Treatment Area (ha)	Prescription summary
1	15.1	1.9	0.5	12.7	Hand treatment: understory thinning
TOTAL	15.1	1.9	0.5	12.7	

ECOSYSTEM / SITE CHARACTERISTICS							
TU	BEC subzone	Site Series	Overstory species composition	Elevation range (m)	Slope range (%)	Aspect	Terrain/ Soils
1	ICHdw1	104 / 101 (103, 110)	Fd60 Cw30 (Lw Py Pw Hw)	560 – 620	35 - 80	North	Generally sandy loam over loamy sand

B. Management Objectives and Strategies

This prescription is designed to be consistent with the objectives in the West Arm Provincial Park Management Plan (2007) and the objectives in the Kootenay-Boundary Land Use Plan.

While this prescription has been developed primarily to address fuel hazards and wildfire risk, it is also designed to maintain or enhance key Park values including biodiversity and wildlife habitat, and to promote ecosystem resilience.

General fuel management objectives and strategies are described below.

Fuel Management Objectives

This Fuel Management Prescription is consistent with the objectives of the West Arm Provincial Park Fire Management Plan (2017).

Specifically, the objectives of this prescription are to:

- Help protect West Arm Provincial Park's natural values from high intensity wildfire;
- Improve public safety in the Harrop area as well as within West Arm Provincial Park;
- Improve the ability of the BC Wildfire Service to protect Park values and private land in the adjacent community;
- Enhance natural barriers to reduce the continuity of fuel loads;
- Demonstrate the principles and practices of FireSmart and fuel/ vegetation management to local community members and the broader public.

Biodiversity and Other Objectives

- Emulate the pattern of natural disturbances that have historically acted upon Park ecosystems;
- Accelerate succession to mature and older-growth forest structural conditions with often lower stand densities;
- Increase the availability and diversity of wildlife habitat through the restoration of more natural mixed or semi-open forest conditions;
- Minimize negative impacts to, and where possible enhance, Park values including cultural heritage, recreation and visual quality;
- Minimize negative impacts to, and where possible enhance, the many values of the treated forest, including source water protection and forest health.

Management Strategies

The objectives stated above will be achieved by implementing the following strategies:

- Reduce crown continuity with a typical target of 30 - 40% crown closure to reduce the risk of crown fire;
- Create small gaps and patch openings in the forest canopy to emulate natural disturbances;
- Protect sensitive areas, including riparian ecosystems and areas with sensitive soils;
- Retain some representative patches of unmodified mature forest, especially in mesic to moist areas;
- Retain veteran and wildlife trees throughout the treatment areas;
- Preferentially retain large mature Ponderosa pine, Douglas-fir and larch, while preferentially removing less drought- and fire-adapted tree species such as cedar, hemlock and true firs;
- Significantly reduce understorey conifer density to minimize ladder fuels;
- Reduce fine surface fuels and flammable understorey vegetation to reduce the risk and expected intensity of surface fire;
- Retain and promote regeneration and growth of deciduous tree and shrub species to reduce fire risk and improve wildlife habitat.
- Create shaded fuel break conditions to reduce expected wildfire intensities and provide a safer environment for fire fighters to anchor tactical fire suppression actions.

C. Forest Composition and Structure

Photographs of typical stand conditions



Overstory summary

TU	SPECIES COMPOSITION (OVERSTORY by VOLUME)	AVERAGE LIVE BASAL AREA	CROWN CLOSURE	NOTES
1	Fd60 Cw30 (Lw Py Pw Hw)	32	~40 – 90%	Stand age approximately 100 years Fd average ~40cm dbh, ~26 – 32 meters tall Cw average ~25cm dbh, ~16 – 24 meters tall.

Understory stems per hectare summary

TU 1	Cw	Hw	Fd	Total
L1 (12.5 cm - 17.5 cm dbh)	180	40	60	280
L2 (7.5 cm - 12.5 cm dbh)	320	160	40	520
L3 (<7.5cm dbh and ≥ 1.3 m tall)	700	200	200	1100
L4 (1.0 - 1.3 m tall)	360	800	40	1200
Total	1560	1200	340	3100

D. Reserve Areas

I.D.	# ha	Ecosystem type / reserve description
1	0.3	Strickland Creek riparian zone
2	0.2	Stephanie Creek riparian zone

E. Assessments

SOIL ASSESSMENTS							
TU	Hazard Ratings			Maximum Allowable Soil Disturbance (%)	Sensitive Soils (Y/N)	Texture	Coarse Fragments
	Soil Compaction	Soil Erosion	Soil Displacement				
1	M	M – VH	M – VH	5%	Y	~SL/ LS	25 – 60%
COMMENTS		Understory hand treatment only.					

RIPARIAN ASSESSMENTS

TU	Riparian I.D. and Class.	RRZ Width (m)	RMZ Width (m)	BA or SPH Retained in RMZ	Comments
1	Strickland Creek (S6)	5	25		
1	Stephanie Creek (S6)	5	25		
1	Unnamed S6	0	30		
COMMENTS		Understory hand-treatment area only. Domestic creeks protected by reserves.			

VISUAL IMPACT ASSESSMENTS

COMMENTS	No VQO's legally established; however area will be managed to a Retention VQO. Visual quality will not be affected by understory hand treatment.
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FOREST HEALTH ASSESSMENTS

AGENT	SPECIES AFFECTED	% INCIDENCE	MORTALITY
Armillaria root rot	Fd, others	<10	Moderate
Douglas-fir bark beetle	Fd	<1	None observed
COMMENTS			

ARCHAEOLOGICAL ASSESSMENTS

DATE	CONSULTANT	COMMENTS / RECOMMENDATIONS
February 2018	Ursus Heritage Consulting	Archaeology Overview Assessment and Preliminary Field Review identified a small High archaeological potential polygon near the Park gate. Ursus recommended that if ground disturbance activities are planned for the High potential polygon area then an Archaeological Impact Assessment should be completed. Remaining area in TU1 was rated as Low archaeological potential.
COMMENTS	Understory hand treatment with no prescribed ground disturbance.	

WINDTHROW ASSESSMENTS

COMMENTS	Windthrow Site Hazard rated Low to Moderate. Biophysical Hazard rated Moderate. Treatment Risk rated Low. Windthrow Risk rated Low.
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F. Prescription: Understory removal and ladder / surface fuel reduction

Summary:

- Thin from below to reduce total conifer stocking to ~400 sph
- Reduce fine fuels (<7.5cm) to maximum of 0.5 kg/m²
- Prune ladder fuels to 2.5m
- Dispose of woody debris

Activity	Treatment Specifications
Understory removal	<p>Thin from below (i.e. remove smallest trees first) up to a diameter at breast height of 17.5cm until the target density of 400 sph total stems has been achieved. This equates to approximately 5 meter spacing. Douglas-fir, western larch, Ponderosa pine and western white pine should be prioritized for retention.</p> <p>Western yew and all deciduous tree species should be retained as “ghost trees”, i.e. should not contribute to target densities.</p> <p>Up to 10 clumps per hectare of conifer regeneration, each less than 5 m in diameter, may be left at the supervisor’s discretion, provided these clumps do not represent significant ladder fuels. This represents up to 2% of the treatment area.</p> <p>Retain all trees with flagging identifying plot locations. Minimize scarring and marking on retained trees. Stumps must be less than 10cm tall from the ground surface, and cut at an angle less than 10 degrees.</p>
Wildlife/ Danger Trees	Retention of high-value wildlife trees should be maximized provided that no more than 10% of each Treatment Unit is designated as a no-work zone.
Coarse Fuels (>7.5cm diameter)	Coarse woody debris (CWD) is an important habitat element. Where available, retain a minimum of 50 pieces/ ha (equates to 15 meter spacing) > 25 cm diameter at top and > 3 meter in length distributed randomly throughout the area. Prefer retention of larger and decaying pieces. Retained CWD should be left unbucked whenever possible but bucked if necessary so that it lays flat to the ground along the majority of its length. Avoid scorching large CWD (>25cm) during any pile burning operations.
Fine Fuels (<7.5cm diameter)	<p>Woody debris <7.5 cm must not exceed 0.5 kg/m² (5 tonnes/ha).</p> <p>Fine woody debris in excess of those targets must be removed.</p>
Pruning	<p>Retained conifers of all sizes should be pruned, with the exception of western yew. Prune to a minimum height of 2.5 meters, or 1/3 of total height, whichever is less.</p> <p>Pruning cuts should aim to be flush with the tree stem without cutting into the branch collar, and branch stubs must be less than 1cm long. Dead branches > 5 cm in diameter may be left unpruned at the contract supervisor’s discretion.</p>
Debris Disposal - Burning	<p>Where burning is used to dispose of woody debris within treatment units, the following requirements apply:</p> <ul style="list-style-type: none"> • All burning is to be conducted in compliance with the BC Wildfire Act and Wildfire Regulation and any applicable Bylaws. Burning practices must comply with the Environmental Management Act Open Burning Smoke Control Regulations except for practices explicitly managed under a smoke management plan. • Burning must be executed in such a way that minimizes impacts to the site. Burn piles must not be located within 3 meters of any trail, 3 meters of animal burrows, 3 meters of snags, and must not result in significant scorching of any retained trees or CWD.

	<ul style="list-style-type: none"> • Burn piles must be constructed to facilitate effective ignition and complete combustion. Piles must be built to burn efficiently with minimal smoke production. No piles will contain bole sections >3 meters in length. • Burn piles must be within treatment area, and adhere to a maximum size of 3m x 3m x 2 m tall. To reduce the number of piles, burning should occur concurrently with treatment operations using the hot-feed technique. Up to 5 piles/ha may be left unburned as “critter piles” at completion of the project, at the discretion of the contract supervisor. Critter piles are measured over each hectare, not as an average over the entire treatment area. • The contractor is responsible for obtaining all necessary burning permits from relevant agencies before burning.
Debris Disposal - Chipping	If chipping is used, chips should be distributed evenly on-site, targeting an average of 3 – 5 cm depth over the dispersal area and a maximum depth of 10 cm in any given spot. Chipped material that will result in depths greater than those outlined above must be hauled off-site.

H. Operational Specifications

Field Marking Conventions:

Treatment unit boundary – orange ribbon with black lettering: ‘Treatment Unit Boundary’

Reserve boundary-- orange ribbon with black lettering: ‘Reserve Zone’

Sub-treatment unit boundary – orange and black striped ribbon

Falling corners – Triple ‘Treatment Unit Boundary’ ribbon

Sample plot – yellow and white ribbon stating plot number, unit, surveyor, and date

Safety

Danger trees must be assessed by a certified Wildlife/ Danger Tree Assessor. No-Work Zones around retained unsafe wildlife trees must be clearly marked in the field.

Localized steep slopes (>60%) are present. No-Work Zones may be required on some steep slope areas. Steep slopes should not be worked during very wet, icy, or snow-covered conditions. Prior to work on steep slopes, worker safety must be assessed by the crew foreman, considering terrain, soil stability, vegetation, soil moisture, snow depth and weather factors.

Work Procedures within Identified Riparian Management Areas

For streams identified on the attached map, the Riparian Reserve Zone (RRZ) extends from 0 to 5m from the stream edge. The Riparian Management Zone (RMZ) extends from 5 to 30 meters from the stream edge. Treatment will not occur within mapped RRZs.

The following specifications apply in the RMZ:

- Use of vegetable-based bar and chain oils;
- No refuelling of any equipment;
- Retention of all deciduous vegetation and any coniferous vegetation >17.5cm in diameter at breast height;
- No burn piles or chipping debris within 10m of the stream;
- No construction of bladed or excavated trails except as identified on the attached map;
- No machines may be used within 10m of all streams except for designated crossings.

Measures to Prevent the Spread of Invasive Plants

Minimize the spread of invasive plants by taking these measures:

- All machinery must be thoroughly pressure washed prior to transport to the treatment unit;
- Apply native grass seed or rake nearby native and uncontaminated forest floor materials over exposed mineral soil, including any pile burning areas.

Fire Prevention and Suppression

All operations much follow to the BC Wildfire Act and Wildfire Regulation and any direction provided by the contract supervisor.

I. FRPA Values, Higher Level Plans, Consultation and Referrals

VALUES – FOREST AND RANGE PRACTICES ACT and HIGHER LEVEL PLANS			
LAND USE OBJECTIVES (Higher Level Plans and objectives set by Government under the Land Act)			
Do the proposed activities conflict with land use objectives (higher level plans or objectives under the <i>Land Act</i>)?		No	
COMMUNITY WATERSHED - GAR section 8, FPPR section 8.2, 61, 62 and 84			
Does the proposed treatment area include areas that are within a community watershed?		No	
DOMESTIC WATER LICENCES (inside or outside of community watershed) - FPPR section 59			
Does the proposed treatment area contain water sources that are diverted for human consumption by a licensed waterworks?	Yes		Strickland Creek and Stephanie Creek are domestic watersheds. Both creeks are protected by reserves.
LICENCED WATER WORKS (inside or outside of a community watershed) - FPPR section 60			
Does the proposed treatment include areas that are within 100 m of a licensed waterworks?	Yes		Hand treatment near the Morrison waterworks will have no impact on POD and associated water infrastructure.
OLD GROWTH MANAGEMENT AREAS (OGMA's)			
Does the proposed treatment area include areas in a mapped OGMA?		No	
OBJECTIVES SET BY GOVERNMENT FOR WILDLIFE - FPPR section 7			

Does the proposed treatment area include areas to which objectives for wildlife under FPPR section 7 apply?		No	
FISHERIES SENSITIVE WATERSHED - GAR section 14, FPPR section 8.1			
Are any activities proposed within a fisheries sensitive watershed?		No	
UNGULATE WINTER RANGE - GAR section 12, FRPA sections 180 and 181, FPPR section 69			
Does the proposed treatment area include areas within a designated Ungulate Winter Range?		No	
WILDLIFE HABITAT AREA - GAR section 10, FRPA sections 180 and 181, FPPR section 69			
Does the proposed treatment area include any identified wildlife habitat areas (WHA)?		No	
SPECIES AT RISK			
Are there any known species at risk within the proposed area?		No	
WILDLIFE HABITAT FEATURES - FPPR section 70(2)			
Does the proposed treatment area include any identified wildlife habitat features?		No	
RECREATION FEATURES - FRPA section 56 and 149, FPPR section 70			
Does the proposed treatment area contain interpretive sites, recreation trails, recreation sites, recreation facilities that are considered to be of significant recreation value and are designated a resource feature?	Yes		Lasca Road is used to access the Lasca Creek trailhead. Treatment will not have any negative impacts on recreation features.
VISUAL QUALITY OBJECTIVES - GAR section 7, FRPA sections 180 and 181, FPPR section 9.2			
Is the proposed treatment within a scenic area?	Yes		No VQO's legally established; however area will be managed to a Retention VQO. Retention VQO will be met.
ARCHAEOLOGICAL RESOURCES/CULTURAL HERITAGE RESOURCES - FPPR section 10			
Are there any known			AOA and PFR (Ursus 2018) identified a small High

archaeological sites or cultural heritage resources that are important to First Nations within the proposed area?		archaeological potential polygon near the Park gate. Remaining area was rated as Low archaeological potential. No archaeological sites were identified. Ursus recommended that if ground disturbance activities are planned for the High potential polygon area then an Archaeological Impact Assessment should be completed. No ground disturbance is prescribed in hand treatment. First Nation consultation to be completed prior to project implementation.
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CONSULTATION and REFERRALS			
FIRST NATIONS			
FIRST NATION	CONCERNS IDENTIFIED AND MEASURES TO ADDRESS		
First Nations consultation complete?	No	First Nations must be consulted prior to implementation.	
EXISTING CROWN TENURE HOLDERS			
Tenure Holder	Concerns		Measures proposed to address licensee's concerns
Subsurface tenures			N/A
Guide Outfitter			N/A
Trapline			N/A
Range			N/A
PRIVATE PROPERTY			
Does private property border the proposed treatment area?	Yes		CPR right of way is adjacent.
MINISTRY OF TRANSPORTATION			
Does treatment area overlap a Ministry of Transportation and Infrastructure Right of Way?		No	No right of way identified for Lasca Creek Road inside of Park boundary.
UTILITIES			
Are utilities located in or adjacent to the proposed treatment area? i.e. power lines, gas lines, etc.		No	
ACCESS CONTROL			
Are there any foreseen issues with access and access control during and post treatment?	Yes		There is a locked gate at the Park entrance. Trevison and Morrison lakefront properties are accessed from Lasca Creek Road west of the gate. Property owners/ residents must be consulted prior to project

			implementation to ensure that treatment operations are compatible with private land access requirements.
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J. Post-treatment and Silviculture

EXPECTED VEGETATION RESPONSE
Patchy growth of deciduous shrubs and herbs is likely in response to somewhat more open growing space and more diffuse light near ground level. Moderate ingrowth of conifer regeneration is also likely to occur over time.
ADDITIONAL TREATMENTS, ASSESSMENTS, OR MAINTENANCE
Treatment area should be re-assessed approximately 10 years post-treatment. Follow-up understory treatments may be required in approximately 15 to 20 years.
SILVICULTURE OBLIGATIONS
Do silvicultural obligations apply to the treatment area? No
PLANTING
Is planting a treatment identified in this prescription or required as a legislative obligation? No

K. Outstanding works

Boundary and Riparian Management Zone Flagging

Treatment Unit boundary above road has been flagged in the field. TU2-B boundary below road has not been flagged. Treatment boundary is prescribed as 10 meters below the outer edge of the road running surface.

Riparian management zones have not been flagged in the field. RRZ width on Strickland and Stephanie Creeks is 5m.


Additional reserves to be identified

During treatment implementation additional small retention areas / no work zones (~0.1 to 0.5 ha) may be identified based primarily on identification of high quality wildlife trees and/or presence of wildlife habitat features. Target for additional reserves / no work zones is 5 – 10% of the prescription area.

Breeding bird survey

If this prescription is implemented during breeding bird season, a breeding bird survey must be conducted prior to treatment by a qualified professional.

L. Administration and approval

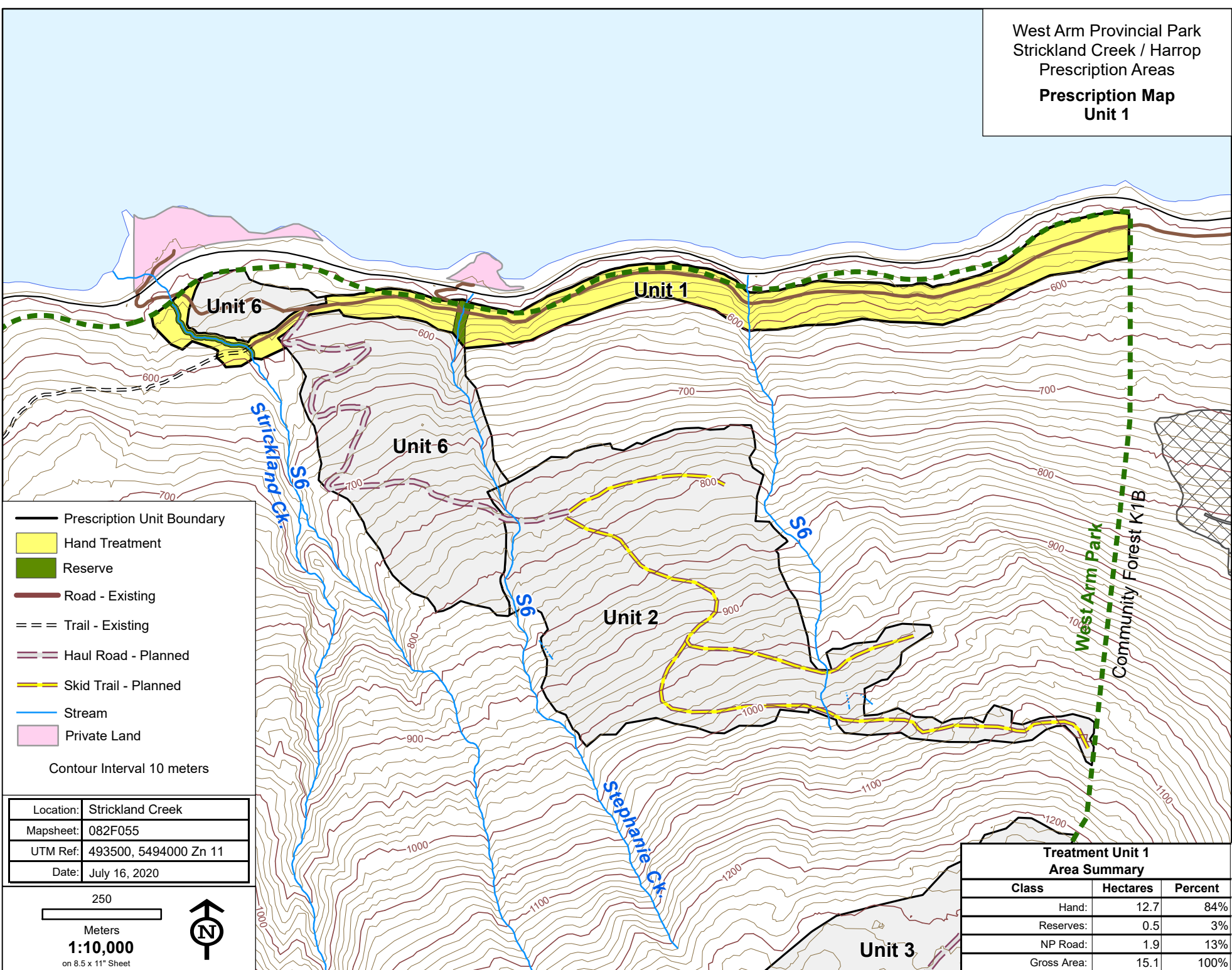
RPF PRINTED NAME		Registered Professional Forester Signature and Seal
Erik Leslie	RPF 4724	
DATE SIGNED		
July 17, 2020		
I certify that I have reviewed this document and I have determined that this work has been done to standards acceptable of a Registered Professional Forester.		

Prescription Approval	
BC Parks Project Lead	
Name	Date
Ministry of Environment Regional Director	
Name	Date

APPENDICES

Treatment Unit Prescription map (July 16, 2020)

West Arm Provincial Park
 Strickland Creek / Harrop
 Prescription Areas
**Prescription Map
 Unit 1**



- Prescription Unit Boundary
 - Hand Treatment
 - Reserve
 - Road - Existing
 - Trail - Existing
 - Haul Road - Planned
 - Skid Trail - Planned
 - Stream
 - Private Land
- Contour Interval 10 meters

Location:	Strickland Creek
Mapsheet:	082F055
UTM Ref:	493500, 5494000 Zn 11
Date:	July 16, 2020

250
 Meters
1:10,000
 on 8.5 x 11" Sheet

Treatment Unit 1 Area Summary		
Class	Hectares	Percent
Hand:	12.7	84%
Reserves:	0.5	3%
NP Road:	1.9	13%
Gross Area:	15.1	100%