

DUTEAU CREEK RESTORATION PLAN

WATERSHED CODE 128-835500-54100-49500

Prepared for:

RIVERSIDE FOREST PRODUCTS LIMITED

LUMBY DIVISION

Prepared by:

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DUTEAU CREEK RESTORATION PLAN

AGENCY ENDORSEMENT

The Key Government Ministries have indicated their acceptance of this plan through their following endorsements:

Ministry of Water, Land and Air Protection

Name/title: _____

Signature: _____

Date : _____

Ministry of Forests

Name/title: _____

Signature: _____

Date: _____

INTRODUCTION

A strategic objective of Forest Renewal BC is to Enhance Environmental Values. Forest Renewal BC's Watershed Restoration Program accelerates the recovery of watersheds that have been affected by past forest harvesting activities. The activities of the Watershed Restoration Program include deactivating and rehabilitating roads, stabilizing slopes and gullies, and restoring fish and aquatic habitat.

In 2000, the mandate of Forest Renewal BC was to focus on the completion of restoration of identified high priority or "Key" watersheds. These Key watersheds are briefly defined as - those that provide domestic water supplies or have high fisheries values and/or a high likelihood of restoration success. Its strategic plan is to work with its partners to invest in completing the restoration activities in 20 per cent of the Key watersheds by 2004. The watersheds selected for completion are identified as "Target" watersheds and Duteau Creek was designated as one of the Target watersheds.

The first phase for the completion of the Target watershed is to prepare a Restoration Plan. The Restoration Plan is a work list of watershed treatments to address the most important sites as identified by the key agencies with jurisdiction in a watershed. Funding responsibility is divided, based on funding eligibility and jurisdiction. The focus of the plan is based on FRBC eligible works but the plan also identifies non-eligible work that would potentially enhance the fish habitat in the watershed.

The next phase includes prescriptions and proposed works as indicated in the Restoration Plan Section - 9. RESTORATION PRIORITIES. The FRBC program will no longer exist after March 31, 2002 and new sources of funding are uncertain at this time. Therefore this is only a Restoration Plan and not a commitment to undertake the works proposed in this plan.

The final phase is declaring "Completion" of the restoration works for the Target watershed. That watershed restoration has been "Completed" means that there remain no limiting factors to fish habitat and water quality relating to past timber harvesting activities. Completion is when quality assurance has been signed off by the qualified professional on all Major Works activities identified in the Restoration Plan, and approved in a workplan. Completion excludes ineligible FRBC activities.

The following is the Restoration Plan for the Duteau Creek Watershed.

DUTEAU CREEK RESTORATION PLAN

1. RATIONAL FOR SELECTION AS A TARGET WATERSHED

- Duteau Creek was selected as a "target watershed" as it is a community watershed and has high fisheries values as determined by the Ministry of Environment Lands and Parks (MELP) priority ranking of watersheds within the Kamloops Forest Region.
- Almost all of the assessments have been completed and most of the works relating to "watershed completion" have been dealt with as well.
- It is expected that minimal funding will be required to complete the outstanding activities and declare the watershed as restored.

2. METHODOLOGY OF RESTORATION PLAN COMPOSITION

The restoration plan for the Duteau Watershed was formed as follows:

- All relevant reports, assessments and maps pertaining to the Duteau Creek watershed were reviewed. (These Reports/Assessments are listed under: Section 5. COMPLETED WATERSHED ASSESSMENTS). The priority sites from each assessment were displayed with labels on a draft-planning map. This pooling of information displayed which locations the various reports may have had similar and/or overlapping concerns (priority sites) to be dealt with. This information also enabled the recognition that some of the sites had, through various reasons, become less of a priority in later assessments. The draft-planning map became a useful tool to present known information to parties involved in the consultation process.
- A helicopter overview flight was undertaken in the fall of 2001 to obtain a visual appreciation of the condition of the watershed and to verify the restoration priorities. As well as the writer, Brian Nuttall of MELP and John Fleming, Acting Watershed Restoration Technician of the MOF and were included in this overview flight.
- Meetings and/or telephone conversations were undertaken with the various key stakeholders and knowledgeable personnel involved in the watershed to obtain their input for the restoration plan. (The "Key Stakeholders" are listed under Section 4. KEY STAKEHOLDERS INVOLVED IN RESTORATION ACTIVITIES)

From the information gleaned from the assessments, meetings and inputs from those contacted, this Restoration Plan was drawn up, incorporating the suggestions received from the various Key Stakeholders.

3. DESCRIPTION OF THE WATERSHED

Duteau Creek originates in the Aberdeen Plateau and flows in a northerly direction to the village of Lumby where it joins Bessette Creek. Duteau Creek is a 4th order stream with an area of 21,294 hectares and ranging in elevation from 520 metres at its confluence with Bessette Creek to over 1,800 metres in the Grizzly Hills. The total stream length is 263 km. Biogeoclimatic zones include Interior Douglas Fir (IDF) at low elevations, and Interior Cedar Hemlock (ICH), Montane Spruce (MS) and Engelmann Spruce and Sub-Alpine Fir (ESSF) at mid to upper elevations. (IWAP - Dobson Engineering - March 1999)

The watershed upstream of the North Okanagan Water Authority's (NOWA) Headgates Intake consists of a canyon section and an upland section. (Refer to the Duteau Creek Restoration Plan map in Appendix A.) In the upland section, surficial materials consist of moderate to well-drained moraine with intervening depressional terrain that is poorly drained and dominated by organic deposits. Rockfalls exist along the extensive lower escarpments composed of columnar basalt. Steep, short slopes susceptible to small slides (consisting of stratified sands and gravels) exist at the head of the canyon section. (IWAP - Dobson - March 1999) Down stream of the Headgates Intake, Duteau Creek flows through a small canyon for approximately 3 km and then breaks out on the floor of the White Valley where it meanders through farmland for approximately 6.5 km to its confluence with Bessette Creek.

The higher elevations of Duteau watershed supply one of the areas largest small lake rainbow trout fisheries. The lower section in the valley bottom provides valuable rainbow trout and salmon spawning and rearing habitat. Pygmy whitefish, redbreast shiners and mottled sculpin can also be found in the lower reaches. (Duteau Creek Fisheries Assessment - Trumbley - 1996)

Timber harvesting is a dominant use of the watershed beginning over 60 years ago with partial cutting systems in the lower elevation stands. It wasn't until the late 1970's to mid 80's that major logging occurred on the upper Aberdeen Plateau. Clear cutting has been the dominant silviculture treatment in the even-aged Lodgepole pine and Englemann spruce-subalpine fir stands in the upper elevations. Tolko Industries Ltd., Riverside Forest Products and the Ministry of Forests' Small Business Forest Enterprise Program operate in the watershed.

In the summer of 1998, the Aberdeen fire burned approximately 700 acres of standing timber and existing reforested cutblocks. The majority of the burnt standing timber was salvaged in the fall and winter of 1998.

Duteau Creek is a community watershed providing water for the North Okanagan Water Authority (NOWA). (Refer to the NOWA - Supply Assets map in Appendix B.) The Duteau Creek system is regulated through 3 reservoirs in the upper watershed and the Headgates Intake, all operated by NOWA. Earth filled dams were constructed on Haddo and Aberdeen Lakes in the early 1900's and another earth filled dam was constructed at

the Grizzly Reservoir in the 1970's. Additional water for the reservoirs comes from a diversion from the Harris Creek watershed to the east. First built in the 1930's and recently refurbished in 1992, this diversion transfers water from Paradise and Gold Creeks into Heart Creek, which flows into the Aberdeen Lake Reservoir. The Headgates intake was originally constructed in the 1920's and rebuilt in the 1960's and the total licensed diversion through this facility exceeds 25 million m³ per year. (IWAP - Dobson - 1999)

The Duteau Creek watershed is a high use recreational area. Recreational activities include camping, fishing, hunting and snowmobiling.

There are two grazing tenures and one trapping license in the watershed. There are no mineral or placer claims.

4. KEY STAKEHOLDERS INVOLVED IN RESTORATION ACTIVITIES

A number of Key Stakeholders have been involved in the various watershed restoration activities over the past seven years. The following is a list of the Key Stakeholders along with a brief description of their involvement.

The North Okanagan Water Authority (NOWA)

NOWA supplies water to the City of Vernon and Coldstream Municipality and the Duteau Creek Watershed is one of their major sources of water. NOWA has been the lead proponent in several assessments and rehabilitative projects undertaken in the watershed.

Riverside Forest Products Limited (RFP) - Lumby Division

RFP is the major timber-harvesting licensee in the watershed. Through their FRBC allotment, RFP has been the lead proponent and the major source of funding for most of the assessments and restoration projects undertaken in the watershed.

Tolko Industries Limited (Tolko) - Lavington Planer Division

Tolko has a timber-harvesting license in the southwest corner of the watershed. It has also participated in various assessments and works in the area through their FRBC allotment.

Department of Fisheries and Oceans (DFO)

DFO has initiated, provided assistance and funding for some of the fish enhancement projects undertaken in the lower section of the watershed.

Ministry of Environment, Lands and Parks (MELP)

MELP has initiated, provided assistance and funding for various assessments, remedial works and fish enhancement projects throughout the watershed.

The Ministry of Forests (MOF)

The MOF's Small Business Forest Enterprise Program (SBFEP) manages several timber sales in the area as well as some salvage operations. The MOF Range Department

oversees two grazing licenses in the watershed and the MOF Recreation Department is involved in recreational activities. These departments, along with the district MOF-FRBC department, have been involved in various restoration projects throughout the watershed.

The Whitevalley Community Resource Centre (WCRC)

WCRC is a community based non-profit organization that has been operating in the Lumby area since the mid 1980's. It has been involved in partnering various FRBC projects in the Lumby area including many of those projects in the Duteau Creek Watershed.

5. COMPLETED WATERSHED ASSESSMENTS

The following assessments have been completed and include the Duteau Creek Watershed

Duteau Creek Fisheries Assessment	Trumbley	February 1996
DUTEAU CREEK WATERSHED		
Results of the Watershed Restoration Project	Dobson	March 1996
Project included:		
<ul style="list-style-type: none"> • Level I Interior Watershed Assessment Procedure (IWAP) • Gully Assessment Procedure • Channel Assessment Procedure • Riparian Vegetation Assessment • Level I Road Assessment • Water Quality Monitoring 		
Proposal		
- RESTORATION OF DUTEAU WETLAND	NOWA	December 1996
Access Management Strategy for the DUTEAU CREEK WATERSHED	Dobson	September 1997
Duteau Creek Rehabilitation Prescriptions (Completed for MELP)	Hesketh	1997
Harris / Duteau Terrain Stability Mapping	Roeds	February 1998
Upper Duteau Rehabilitation Project	NOWA / WCRC	September 1998
Interior Watershed Assessment (IWAP) for the DUTEAU CREEK WATERSHED	Dobson	March 1999

6. OTHER ASSESSMENTS (in various stages of completion)

Fish and Fish Habitat Inventory (Incomplete) Only phase I - III Pre-Field Project Planning Report completed. The completion of the FFHI is included in Section - <u>9. RESTORATION PRIORITIES</u>	Trumbley	2001
Terrain Mapping Upgrade TSIL Level "C" (Incomplete) The completion of the TSIL is included in Section - <u>9.</u>	EBA Eng.	2001
The Results of Bacterial Source Tracking within the Duteau, Vernon and East Canoe Creek Watersheds Vernon, British Columbia - 2001 (DRAFT)	BWP Consulting	March 2002

7. ACTIVITIES UNDERTAKEN IN THE WATERSHED TO DATE

Included are the Stakeholders associated with the projects and the year of implementation.

Lawson Creek Rehabilitation Project -	MELP, DFO, RFP, WCRC	1997
Landslide Bioengineering Project - 0.5 km Downstream of Haddo FSR Crossing - RFP		1998
Upper Duteau Rehabilitation Project - NOWA, RFP, WCRC, MOF Range (Involved cattle control structures, blocking off access, lake access rehabilitation.)		1998
Repaired Wood Culvert - Site 37 at 2.5 km on Hope Road (Wes Barton) Some riparian and cattle control measures may be required. Refer to Section - <u>9. RESTORATION PRIORITIES</u>		1998

"Duteau Creek Rehabilitation Prescriptions" - remedial works completed.
The following was verified by Lee Hesketh, Nov 26, 2002:
Of the 20 sites originally recommended for works.
-11 sites were completed.
-5 sites were re-classified as low priority - not done.
-1 site was a fish enhancement proposal between Grizzly and Haddo - not identified as a problem in the IWAP. NOWA concerned about altering channel - presently stable.
Dropped as a priority.
-3 sites may require work and are addressed under Section - 9. RESTORATION PRIORITIES.

Curtis Bridge Repair - RFP,MOF (Wes Barton)	1999
Review of High Risk Sites in Road Condition Assessments - RFP (The sites were reviewed and re-assessed by Wes Barton / Bob Reid in the FRBC report for Activity 704827 - dated July 16, 1999.) 2 sites (1 & 37) are addressed in Section - <u>9. RESTORATION PRIORITIES</u> The rest of the sites were either completed or the risk has been downgraded.	1999
Bridge Replacement - 26 km Wollaston Main - Tolko, MOF (Wood culvert replaced by 9 m concrete bridge.)	2000
Remedial Work to Stock Bridge - MOF Range (2 km upstream of Headgates Intake.)	2000
Roads 533.1 and 533.1.2 Road Deactivation and Slide Remediation - RFP Additional works are recommended in Section - <u>9. RESTORATION PRIORITIES.</u>	2000
Reichel Pump House off Channel Project - DFO	2001
Duteau Creek Bank Stabilization Project near NOWA Headgates - RFP	2001
Throttle Hill Upgrade - RFP Additional works recommended in Section - <u>9. RESTORATION PRIORITIES</u>	2001

8. WATERSHED LEVEL OBJECTIVES

The watershed level objectives are:

- To reduce the existing and potential sediment delivery from identified problem road sections and associated hillslopes in the upper area of Duteau Creek. *The problem sections are shown as IWAP SITES 1 and 2 on the Restoration Plan Map and are identified in Section - 9. RESTORATION PRIORITIES. To further reduce potential sediment delivery - measures to reduce damage at cattle watering sites are recommended at Stn 03 - reach 74 and at Stn 32 - reach 60 (Duteau Creek Rehabilitation Prescriptions). These sites are also shown on the map and identified in Section - 9.1 Other Restoration Priorities.*
- To implement measures to restore riparian vegetation at the identified impacted riparian sites. *A site has been identified on the Hope Road system in both the IWAP (polygon # 482) and in the Duteau Creek Rehabilitation Prescriptions (Stn 33 - reach 65) as requiring riparian planting. This site has been included in Section - 9. RESTORATION PRIORITIES and is shown as Riparian Site 33 on the Restoration Plan Map.*

- Maintain the existing rearing, holding, and spawning habitats for the variety of fish species that frequent the watershed. The completion of the Fish and Fish Habitat Inventory will help catalogue the existing fish presence and habitats in the watershed. The reduction of sediment will likely result in better water quality as well as maintain and possibly enhance the existing fish habitat.

9. RESTORATION PRIORITIES

This section lists the restoration priorities as gathered from the various assessments and reports and as well as input from the stakeholders. As mentioned in the Introduction, the FRBC program is being terminated on March 31, 2002 and future funding is uncertain. Therefore this plan may not be implemented. Cost estimates are included but due to the uncertainty of funding, a time schedule showing project implementation and completion has not been drawn up.

The restoration priorities are separated into two sections: Restoration priorities related to forest harvesting activities and other non-forest harvesting related restoration priorities.

9.1 Restoration Priorities Related to Forest Harvesting Activities (The location of the sites are shown on the Restoration Plan Map)

Site	Location / Description	Remarks	Cost Estimate
Duteau Creek	Complete the FFHI for the Watershed	Phases I - III, preplanning, completed.	\$ 18,000
Duteau Creek	TSIL Level "C" - complete stage 3 and report.	Stage 2, review, completed	\$ 15,000
IWAP Site # 1 Also identified as Site # 1 in the Level I Road Assessments.	Throttle Hill - Complete rock ballasting and surfacing on both bridge approaches and install a sump on the NW side of the bridge to further reduce sediment input into Duteau Creek.	An iron cross ditch structure, similar to the one installed on the east side of the bridge may also be considered for the western side of the bridge to reduce sediment input. A prescription will be required.	\$ 10,000
IWAP Site # 2	Roads 533.1 & 533.1.2. SE of Grizzly Swamp. Implement Road Deactivation Prescriptions prepared by Dobson Engineering in 2001.	The associated slide should be examined during the next freshet following the works to ensure there is minimal water impacting the failure. Proposed prescription completed. May require future revegetative measures.	\$ 3,000 \$ 2,000 (reveg.)

Duteau Creek Rehabilitation Prescriptions - Stn 33 - reach 65. Also identified as polygon # 482 in the Riparian Assessment in the IWAP.	Spur road off of and east of Hope Road. Lack of riparian vegetation and logging debris in creek.	Plant willows and cottonwood in areas lacking cover. Remove logging debris from channel. (Handwork). Proposed prescription complete - will require reviewing.	\$ 4,000
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9.2 Other Restoration Priorities

(The location of the sites / concerns are located on the Restoration Plan Map)

The following priorities are taken from the IWAP and the comments are from the minutes of the Final Round Table Meeting and / or comments regarding completed projects. The outstanding issues are not directly associated with timber harvesting and therefore are not part of the obligations to determine that the restoration of the watershed is "Complete".

- (A) Remove the cattle bridge from lower reach D and upgrade or deactivate the trail adjacent to the channel to reduce erosion and sedimentation.
 - Action - MOF Range.
 - The issue of the cattle bridge was addressed in August of 2000. Refer to copy of letter from MOF Range in Appendix C.
 - The Duteau Creek Bank Restoration Project of 2001 addressed the concerns relating to the trail adjacent the channel upstream of the NOWA Headgates Intake.

- (B) Continue proactive cattle management in conjunction with range permit holders and the MOF Range and Recreation Branches, particularly between Haddo Lake and the canyon and area around the upper reservoirs.
 - Action - MOF Range.

- (C) Consider spawning substrate input to the Duteau Creek mainstem channel downstream of the Headgates Intake.
 - Action - DFO.

- (D) Complete the planned MELP/NOWA and SBFEP review of stream channels potentially affected by the Aberdeen fire, and rehabilitate disturbed stream channels and riparian areas where required.
 - Action - MELP
 - Have not been able to track down a report. However, the administrator of the MOF -SBFEP indicated that there was work done on a road-related failure adjacent Heart Creek in the fire salvage area.
 - During a meeting held with NOWA to discuss the proposed restoration plan on November 15, 2001, no concerns regarding the Heart Creek channels in the Aberdeen fire area were expressed.

- (E) Assess observed bank shearing and channel sedimentation concerns in the Crescent, Flyfish and Curtis drainages and Aberdeen Residual area through the range use plan process.
- Action - MOF Range
 - A field review of the areas of concern was undertaken in 1999 and included representatives of NOWA and the MOF. A copy of the report is included in Appendix C.
 - Evaluations and actions regarding range use and water quality is an ongoing process.

The following two sites were identified in the Duteau Creek Rehabilitation Prescriptions prepared by Lee Hesketh for MELP in 1997.

- 03 This site identified that minor damage by cattle was occurring at a culvert crossing located at approximately 25 km on the Grizzly Main.
- Prescriptions recommend a proper watering access by placing rock material in the base of the channel and placing old logs to control cattle movement up and down the channel.
- 32 This site identified that a cattle watering site at a bridge crossing located at approximately 2.5 km on the Hope Road allows cattle to access the riparian area up and down from the crossing.
- Prescriptions recommend placing old logs to limit cattle access to the riparian area.

Although not specified in the IWAP recommendations, NOWA has expressed the concerns over un-regulated camping in the area. The proposed reduction in the MOF Recreation staffing levels throughout the province will no doubt intensify NOWA's concerns.

10. ACCESS MANAGEMENT

The access management planning was conducted in accordance with the accepted the Forest Practices Code guidelines.

The Access Management Plan Map is the basis for the Restoration Plan Map included in Appendix A.

11. IMPLEMENTATION PLAN

11.1 Work site priorities:

Due to the uncertainty of restoration funding, no work plan schedules have been prepared for the restoration priorities proposed in Section 9.1

11.2 Proposed Effectiveness Evaluation Plan:

If the works for the proposed restoration priorities contained in Section 9.1 are implemented, routine monitoring of the proposed restoration projects will be carried out according to the recommendations contained in the site prescriptions.

11.3 Budget Summary:

Most of the necessary assessments for the Duteau Creek Watershed have been completed. The majority of the priorities resulting from the various assessments have already been dealt with. This has resulted in the composition of a relatively reasonable budget to complete the remaining restoration activities proposed in this Restoration Plan.

The total estimated budget for this Restoration Plan as it relates to eligible works relating to timber harvesting activities is as follows:

Assessments: Completion of FFHI	-	\$ 33,000
<u>Works including prescriptions:</u>	-	<u>\$ 19,000</u>
TOTAL	-	\$ 52,000

**APPENDIX A - MAP
(THREE SECTIONS)**

**ACCESS MANAGEMENT PLAN (AMP) MAP
(DUTEAU CREEK RESTORATION PLAN
IS SHOWN ON THE AMP MAP)**

APPENDIX B - MAP

NORTH OKANAGAN WATER AUTHORITY (NOWA)

SUPPLY ASSETS

WATERSHEDS

APPENDIX C

REFERENCE LETTERS

&

REPORTS