MID-BULKLEY
WATERSHED RESTORATION PROJECT

Level I Assessment
Roads, Hillslopes & Gullies

Prepared for:

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MID-BULKLEY WATERSHED RESTORATION PROJECT REPORT

Level I Assessment: Roads, Hillslopes & Gullies

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Introduction:

[1]The Mid-Bulkley Watershed study area covers approximately 90,000 hectares within the Sub-Boreal Spruce Zone. Some of the characteristic vegetation of this zone include hybrid spruce, huckleberry and highbush cranberry. The elevation ranges from 570 to 2,200 meters, with the majority of land being at the 800 to the 1,500 meter level.

Over 38 lakes and numerous wetlands make the area a valuable resource for fish and game. [2]Most of the study area is of Terrain Stability Class II with some exceptions entering Class III. The communities of Houston, Perow and part of Topley and two major rivers, the Morice and Bulkley are found here. Most of the privately owned land is located along the bands of the Bulkley River with more private land extending south from Houston along Buck Creek.

Grazing leases, woodlots, mineral claims and a large mine are some of the industries currently active in addition to the on-going logging by Northwood Pulp and Timber Ltd., Houston Forest Products Co. And the Small Business Forest Enterprise Program.

The oldest logged block is from 1918, with a few from the 1930's. The majority of logging has occurred within the last 30 years.

Scope

The objective of this Level I Road, Hillslope and Gully Assessment is to restore or rehabilitate existing environmental damage and reduce the risk of future damage caused by past timber harvesting and road building practices in the Mid-Bulkley Watershed. This report is initial survey of the impacted areas within the watershed and denotes the nature of the impact. The results are preliminary as dated aerial photos were used (1986-1994) and the field assessment was limited.

The results of the subsequent Level II detailed assessment of impacted areas may verify or refute some of the results of this report.

Methodology

Generally, the watershed boundary was determined by height of land and the Morice Forest District Boundary. Several times the Access Unit Boundary was extended beyond this to include entire cutblocks and roads.

All permanent streams were assumed to be potentially fish-bearing as information regarding this aspect was incomplete. Roads permitting lake access without having any potential to cause adverse impacts on water quality or future drainage problems. Were not recommended for deactivation[3].

1:20,000 Forest Cover mapsheets (last dates of revision form 1989 to 1995) were used in conjunction with the Integrated Silviculture Information System and Major Licensee Silviculture Information System supplied by the Ministry of Forests in Houston. Most of the study area was aerial photographed in 1994 with a small northern area done in 1993. These color photographs were used. When these were unavailable, black and white 1991 were used. When these latter photos were unavailable, black and white 1986 to 1988 photographs were examined. The aerial photographs from 1991, 1993 and 1994 were taken at approximately 3,300 feet. The 1986 to 1988 photos were taken at approximately 11,000 feet, thus not providing the detailed viewing of roads and cut blocks needed. In such case ground checks were recommended.

All blocks and roads (photo availability permitting) were examined for surface erosion, drainage problems, and slope instability. All observed stream crossings and those shown on maps were highlighted as were areas of visible blowdown.

A two hour helicopter overview was undertaken in mid-October 1996 in the initial stage of this project with the intent to further observe impacted areas and to gain an overall assessment of the terrain. Unfortunately, fog limited viewing to the Swiss Fire-Buck Flats area. No other field checks were made.

[4]Each identified impact was assessed using the Risk Assessment criteria discussed in Appendix E, Risk Assessment Procedure. Work priority was determined using the factors and suggested guidelines stated in the Resource Rehabilitation Handbook[5]. A complete list of resource manuals is found in the accompanying Appendix B.

Eligibility guidelines outlined in the 1996/1997 Handbook for Land-Based Programs[6] were followed in determination of eligibility of cut blocks and roads. Ineligible cut blocks and roads having identified impacts were also assessed for risk and assigned a work priority but were kept separate in the final presentation of the study results.

The entire study area was divided into Access Units. An Access Unit consists of a road or road network allowing for the most rational access to neighboring cutblocks. Each Access Unit was assigned a name representing its's area of coverage to facilitate its' location by the field crew.

Permanent deactivation[7] of eligible roads was targeted. Five Year Forest Development Plan Maps from Northwood Pulp and Timber Ltd., Houston Forest Products Co. and the Small Business Forest Enterprise Program were used to determine which roads were eligible for semi-permanent deactivation[8].

Presentation

The results of this study are presented in Table 1 Road Inventory and Recommended Access Strategies, Table 2 Landslide Inventory and Rehabiliation Approaches and Table 4 Risk Assessment and Work Priorities. Table 5 Requirements, Time Schedule and Cost Estimate for Detailed Assessments/Prescriptions provides a summary of the results for each access unit. The access units have been prioritized in Table 5 with the first listing being the access unit with the highest work priority.

Impact areas, eligible and ineligible roads, eligible cutblocks and impacted ineligible cut blocks are identified on the following Forest Cover maps: 93L018, 19, 20, 27, 28, 29, 36, 37, 38, 39, 46, 47, 48, 49, 56, 57, 58, 59, 68 and 69. Mapsheets 93L045, 55 and 60 have no identified impact areas, cut blocks or roads. No terrain stability maps were available for the area.

Results

The findings are recorded in Tables 1, 2 and 4. Table 3, Gully Inventory & Assessment Recomendations, was not used as no gullies meeting the criteria set forth in the Gully Assessment Procedure Guidebook 1995[9] were observed. Table 5 contains the cost estimates for technical and professional days and summarizes each access unit.

All identified areas of impact were recorded onto the Forest Cover map sheets and color coded for identification and to denote risk rating. It is stressed that this is a preliminary assessment only. The Level II Field Assessment / Prescription will provide a more accurate impact assessment.

Surface erosion and diverted drainage were the most common impacts found within the watershed. The central interior extending southward to Goosly Lake (93L018, 19, 27, 28, 37, 38, 46, 48, 57) was found to be the most impacted area within the watershed. Two landslides were noted-one on the bank of Emerson Creek, (93L046) which was initiated by a fireguard. The other is situated near Peacock Creek, (93L037) which was initiated by a road. Heavy sedimentation of Buck Creek as it entered Goosly Lake (93L019) was observed in a 1994 photo. The sedimentation appeared to be initiated by a logging road.

Approximately 213 eligible cut blocks and over 440 kilometers of eligible road are located within the study area.

Recommendations:

- all stream crossings should be checked as well as all portions of road that parallel a stream, for erosion and stream sedimentation.
- all previously deactivated roads should be ground checked and monitored as the work may not be sufficient to accommodate drainage or may not comply with the latest standards by the Forest Practices Code.
- terrain stability assessment is recommended before any future logging occurs along Emerson Creek due to past incidence of a landslide in that area.
- further assess area of blowdown identified in block 10 of the R-2958 Access Unit for volume and recoverability
- all ineligible cut blocks and roads having identified impacts should be assessed in Level II at the same time as the eligible cut blocks and roads.
- all areas designated as moderate or high risk should be assessed first.
- a complete set of the most up to date aerial photographs should be part of a package submitted to the contractor. This would cut out travel time and photo competition.

Appendix A

Reference

1 Special Report Series 6 Ecosystems of British Columbia, February 1991, Compiled and Edited by Del Meidinger and Jim Pojar, (pages 210-212).

2 Forest Practice Code of British Columbia, Mapping and Assessing Terrain Stability Guidebook, April 1995, (pages 10, 11, 26, 27).

3 Resource Toad Rehabilitation Handbook: Planning and Implementation Guidelines, (Interim Methods) by G.D. Moore, Watershed Technical Circular No. 3, July 1994, (pages 24-26).

4 Appendix E, British Columbia, B.C. Ministry of Forests (1993) "Risk Assessment Procedure" Engineering Manual - Chapter 8, Victoria, British Columbia: Engineering Section, Timber Harvesting Branch (pages 13-17).

5 Resource Rehabilitation Handbook, (pages 23, 24)

6 Land-Based Programs Handbook, 1996/97, (pages 14-15).

7 Resource Road Rehabilitation Handbook: Planning and Implementation Guidelines (Interim Methods) by G.D. Moore, Watershed Technical Circular, No 3, July 1994, (pages 24-26)

8 Resource Road Rehabilitation Handbook: Planning and Implementation Guidelines (Interim Methods) by G.D. Moore, Watershed Technical Circular, No.3, July 1994 (pages 96-97)

9 Forest Practices Code of British Columbia, Gully Assessment Procedure Guidebook, April 1995, Co-Published by B.C. Environment, (page2).

Appendix B

Additional information sources used in compilation of this report are the following:

Forest Practices Code of British Columbia, *Interior Watershed Assessment Procedure Guidebook*, (I.W.A.P.) Level 1, Analysis September 1995, B.C. Environment

Forest Practices Code of British Columbia, *Mapping and Assessing Terrain Stability Guidebook*, April 1995, B.C. Environment

Forest Practices Code of British Columbia, *Forest Road Engineering Guidebook*, September 1995, B.C. Environment

Forest Practices Code of British Columbia, *Interior Watershed Procedure Guidebook*, (I.W.A.P.) Level I Analysis, September 1995, B.C. Environment

Forest Engineering Technology RRET 4410, *Forest Road Deactivating Course Manual*, January 1993

Forest Practices Code of British Columbia, *Hazard Assessment Keys for Evaluating Site Sensitivity to Soil Degrading Processes Guidebook*, June 1995, B.C. Environment

Forest Practices Code of British Columbia Soil, *Conservation Guidebook*, April 1995, B.C. Environment

Forest Practices Code of British Columbia, *Fish Stream Identification Guidebook*, July 1995, B.C. Environment

Appendix C

The following is a list of maps used to obtain information for the study area:

* 1:20,000 TRIM maps
- 1:20,000 and 1:50,000 Five Year Forest Development Plan maps from Northwood Pulp and Timber Ltd.
- 1:20,000 and 1:50,000 Five Year Forest Development Plan maps from Houston Forest Products Company.
- 1:20,000 and 1:50,000 Five Year Forest Development Plan maps from Small Business Forest Enterprise Program
- 1:250,000 Morice Forest District Woodlot Licence Program map, year unknown
- 1:60,000 Transportation and Highways, Lakes District Highways Office map sheets A and B 1995
- Reference for Roads and Gravel Pits in the Morice Forest District, year unknown

see copy 1 for colour map key

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MAP KEY

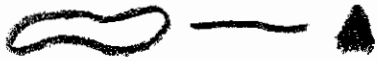
Road Section Label	N30 or X-12
Road Posing Risk within a Block	CB1K12
Landslide Label	YB1KS21
Low Risk Stream Crossing	
Moderate Risk Stream Crossing	
High Risk Stream Crossing	
Eligible Cutblock	
Small Business Forest Enterprise cutblock requiring work	
Low Risk Area	
Moderate Risk Area	
High Risk Area	
Low Risk Road 250m on either side of stream	
Moderate Risk Road 250m on either side of stream	
High Risk road 250m on either side of stream	
Blowdown	
Eligible Road	
Ineligible Road	
No Vegetation	
Watershed Boundary	
Access Unit Boundary	
Starting Point of Access Unit	
End Point of Access Unit	

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TABLE KEY

Tables 1, 2 & 4

FG	-	fireguard
SC	-	stream crossing
P	-	private/public
U	-	urban
C	-	cultivated land access
R	-	recreational use
NA	-	not applicable
UNK	-	unknown
SA	-	silvicultural activities
TH	-	timber harvesting
I, IND	-	industrial
P	-	permanent deactivation
(DA)	-	appears deactivated
sed.	-	sedimentation
pot.	-	potential
perm.	-	permanent
SB	-	stream buffer
LOD	-	large organic debris
gc	-	ground check
N	-	north
S	-	south
WL	-	woodlot
WF	-	wildfire
Pro.	-	proposed
E	-	eligible
I	-	ineligible

Table 5

Crew Days: estimated at 8 km per day for a 2-person crew.

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Disk File Reference

NOTE: file names are listed without extension

Disc AA

FILE NAME	PAGE#,ACCESS UNIT-TABLE
mb1Em	pg#1, Emerson-table 1
mb1Eq	pg#1, Equity Mine-table 1
mb1Gr	pg#1, Granisle Hwy-table 1
mb1Hi	pg#1, Hidden Lake-table 1
mb2Ho	pg#2, Houston-table 1
mb1MB	pg#1, Michelle Bay-table 1
mb1Mo	pg#1, Morice River-table 1
mb2Em	pg#2, Emerson-table 1
mb2Eq	pg#2, Equity Mine-table 1
mb2Gr	pg#2, Granisle Hwy-table 1
mb2Hi	pg#2, Hidden Lake-table 1
mb2Mi	pg#2, Michelle Bay-table 1
mb3Em	pg#3, Emerson-table 1
mb3Gr	pg#3, Granisle Hwy-table 1
mb3Hi	pg#3, Hidden Lake-table 1
mb3Mi	pg#3, Michelle Bay-table 1
mb4Em	pg#4, Emerson-table 1
mb4Gr	pg#4, Granisle Hwy-table 1
mb4Hi	pg#4, Hidden Lake-table 1
mb1Ho	Pg#1, Houston-table 1

Disc BB

FILE NAME	PAGE#,ACCESS UNIT-TABLE
mb1Bf	pg#1, Buck Flats-table 1
mb1Ed	pg#1, Edward Dockrill-table 1
mb1Jr	pg#1, Johnny Robert-table 1
mb2Sr	pg#1, Sunset Rondeau-table 1
mb2Bf	pg#2, Buck Flats-table 1
mb2Ed	pg#2, Edward Dockrill-table 1
mb2Jr	pg#2, Johnny Robert-table 1
mb3Bf	pg#3, Buck Flats-table 1
mb3Ed	pg#3, Edward Dockrill-table 1
mb3Eq	pg#3, Equity Mine-table 1
mb3Jr	pg#3, Johnny Robert-table 1
mb4Bf	pg#4, Buck Flats-table 1
mb4Ed	pg#4, Edward Dockrill
mb4Eq	pg#4, Equity Mine-table 1
mb4Jr	pg#4, Johnny Robert-table 1
mb5Bf	pg#5, Buck Flats-table 1
mb5Eq	pg#5, Equity Mine-table 1
mb6Bf	pg#6, Buck Flats-table 1
mb6Eq	pg#6, Equity Mine-table 1
mb7Eq	pg#7, Equity Mine-table 1
mb8Eq	pg#8, Equity Mine-table 1

Disk CC

FILE NAME	PAGE#,ACCESS UNIT-TABLE
mb1EL	pg#1, Elwin Lake-table 1
mb1Gl	pg#1, Goosly Lake-table 1
mb1R2	pg#1, R2958-table 1
mb2El	pg#2, Elwin Lake-table 1
mb2Gl	pg#2, Goosly Lake-table 1
mb2R2	pg#2, R2958-table 1
mb2SR	pg#2, Sunset Rondeau-table 1
mb3EL	pg#3, Elwin Lake-table 1
mb3GL	pg#3, Goosly Lake-table 1
mb3R2	pg#3, R2958-table 1
mb3SR	pg#3, Sunset Rondeau-table 1
mb4EL	pg#4, Elwin Lake-table 1
mb4GL	pg#4, Goosly Lake-table 1
mb4R2	pg#4, R2958-table 1
mb4SR	pg#4, Sunset Rondeau-table 1
mb5EL	pg#5, Elwin Lake-table 1
mb5GL	pg#5, Goosly Lake-table 1
mb5R2	pg#5, R2958-table 1
mb5SR	pg#5, Sunset Rondeau-table 1
mb6GL	pg#6, Goosly Lake-table 1

Disk DD

FILE NAME	PAGE#,ACCESS UNIT-TABLE
mb1EL	pg#1, Elwin Lake-table 4
mb1Em	pg#1, Emerson-table 2
mb1Em	pg#1, Emerson-table 4
mb1GL	pg#1, Goosly Lake-table 4
mb1He	pg#1, Heading-table 1
mb1HL	pg#1, Hidden Lake-table 4
mb1MB	pg#1, Michelle Bay-table 4
mb1MR	pg#1, Morice River-table 4
mb1R2	pg#1, R2958-table 4
mb1MR	pg#1, Morice River-table 2
mb1SR	pg#1, Sunset Rondeau-table 4
mb2EL	pg#2, Elwin Lake-table 4
mb2GL	pg#2, Goosly Lake-table 4
mb2He	pg#2, Heading-table 1
mb2SR	pg#2, Sunset Rondeau-table 4
mb3EL	pg#3, Elwin Lake-table 4
mb3GL	pg#3, Goosley Lake-table 4
mb3He	pg#3, Heading-table 1
mb4He	pg#4, Heading-table 1
mb5He	pg#5, Heading-table 1
mb6He	pg#6, Heading-table 1
mb7He	pg#7, Heading-table 1

Disk EE

FILE NAME	PAGE#.ACCESS UNIT-TABLE
mb1BF	pg#1, Buck Flats-table 4
mb1ED	pg#1, Edward Dockrill-table 4
mb1EM	pg#1, Equity Mine-table 4
mb1Gr	pg#1, Granisle Hwy-table 4
mb1He	pg#1, Heading-table 4
mb1Ho	pg#1, Houston-table 4
mb1Jr	pg#1, Johnny Robert-table 4
mb1mb	pg#1, Mid-Bulkley-table 5
mb2BF	pg#2, Buck Flats-table 4
mb2ED	pg#2, Edward Dockrill-table 4
mb2EM	pg#2, Equity Mine-table 4
mb2He	pg#2, Heading-table 4
mb2mb	pg#2, Mid-Bulkley-table 5
mb3BF	pg#3, Buck Flats-table 4
mb3ED	pg#3, Edward Dockrill-table 4
mb3EM	pg#3, Equity Mine-table 4
mb3HE	pg#3, Heading-table 4
mb4HE	pg#4, Heading-table 4