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Level B Terrain Mapping and Stream Channel Assessment

Falls Creek Study Area

Prepared for:

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Kootenay Lake Forest District
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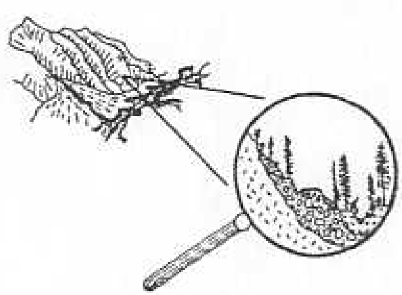

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1.0 INTRODUCTION

This report summarizes the results of a terrain and soil mapping project completed for Kalesnikoff Lumber Co. Ltd. and the B.C. Ministry of Forests Small Business Program as a portion of their ongoing planning for timber harvesting and road construction for the Falls Creek area. The study area is immediately west of Nelson on TRIM map sheets 82F043 and 82F053, including all Crown lands in the Falls Creek watershed that were not previously mapped, and some associated private lands (see Fig. 1 for location). The Crown operable area, approximately 2150 has been mapped at Terrain Survey Intensity Level (TSIL) B, while the inoperable Crown lands and private lands, approximately 400 ha, have been mapped at Level E. The total area mapped (approx. 4300 ha) includes revisions to some of the previous mapping and extends beyond the actual watershed boundaries to logical terrain breaks, ensuring full coverage of the entire watershed.

The terms of reference included provision for completing a terrain map at a scale of 1:20,000, and subsequent interpretive maps of terrain stability, landslide-induced sedimentation, surface erosion hazard, road/ditchline erosion, sediment delivery potential and sediment yield potential. The terms of reference also required stream channel stability observations for selected reaches of Falls Creek and identification of existing sediment sources. In addition there was a requirement for a brief report and a map indicating the areas of field checks.

Initial airphoto interpretation was initiated during the spring of 1998. Further airphoto interpretation and fieldwork were completed during the fall of 1998. The channel reconnaissance was carried out on 10/9, 10/16 and 11/11, 1998. Final airphoto typing and polygon descriptions were completed during the winter of 1998-1999. The major portion of the information resulting from this project is presented on the accompanying 1:20,000 maps and the databases in Appendices 2-5. The report, maps and databases should be used together, not as individual stand-alone products. Accompanying maps include:

- Terrain Classification - Slopes - Drainage
- Terrain Polygons - Field Transects – Stream Reaches
- Terrain Stability - Landslide-Induced Stream Sedimentation
- Waterborne Erosion: Surface Soil Erosion - Road and Ditchline Erosion - Sediment Delivery Potential - Sediment Yield Potential

1.1 Limitations and Reliability

This report and accompanying maps are based on airphoto interpretation, literature review, and limited field checking. The hazard assessments and mapping completed in this project are of a moderate survey intensity and intended for use in planning or prioritizing areas for more detailed assessment, not for road layout or cutblock design. The maps are intended to fulfill the requirements of Terrain Survey Intensity Levels (TSIL) B and E, as specified in the Mapping and Assessing Terrain Stability Guidebook of the Forest Practices Code of B.C. (B.C. MoF & BCE FPC 4/95). All boundaries and designations have been determined by airphoto interpretation with limited ground-truthing.

The few passable roads were examined in the field. In addition, a series of foot transects were completed to examine representative areas not accessible by road. Approximately 51% of the operable polygons include detailed field checks (i.e. approx. 2.3 field checks per 100 ha of operable area). The accompanying Terrain Polygons – Field Transects Map shows the locations of road and foot transects examined during the field program, and Appendix 4 lists polygons visited during the field work. Ridge crests dominated by bedrock features and other areas with open forest cover were given low priority, because they can be airphoto interpreted with a higher degree of accuracy than can densely forested areas. Highest priority for field sampling was given to areas likely to supply sediment to the licensed creeks and areas of uncertain classification from airphoto interpretation (e.g. the lower slopes).

At this TSIL, it is generally accepted that a map unit may include up to 15% inclusions of other types (e.g. 10-15% of a Moderate Terrain Stability Hazard map unit may be High). For this reason, neither Kutenai Nature Investigations Ltd., nor the authors can warrant or guarantee the accuracy of the hazard designations or the boundaries of the polygons indicated on the maps. It is strongly recommended that more detailed field assessments be undertaken before proceeding with road construction or other activities which may impact slope stability or surface erosion.

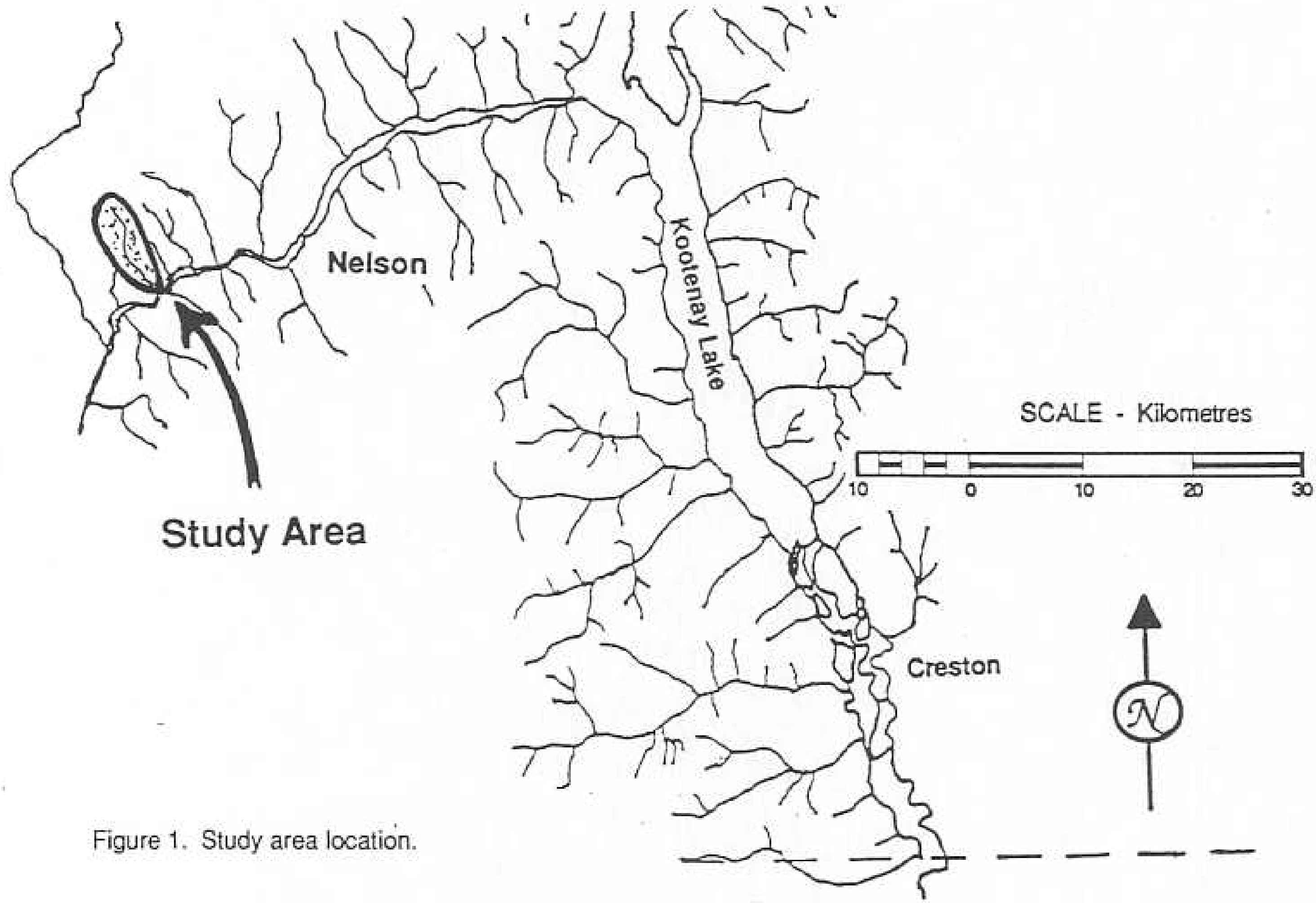

Figure 1. Study area location.

1.2 Previous Work

Soils and terrain of the area have been mapped by Jungen (1980) at a scale of 1:100,000. The bedrock geology of the area has been mapped by Little (1960, 1973). Kutenai Nature Investigations Ltd. has previously mapped terrain and soils in portions of Falls Creek and adjoining areas in the Smoky Creek/Mt. Stewart area (Utzig 1996b, polygons 200-299), and the Garrity/Smallwood Creek area (Utzig 1996a, polygons 1-199).

2.0 STUDY AREA DESCRIPTION

2.1 Bedrock Geology (adapted from Little 1960 and 1973)

Bedrock in the Falls Creek Area is divided by a large north-south trending fault. Trending northeast from the Kootenay River, the fault follows Smoky Creek, and then runs north along Falls Creek until the headwater area, where it follows a northwest trend for a short distance. West of the fault is the Valhalla Gniess Complex, a Paleocene and Eocene unit defined by biotite quartz monzonite. East of the fault is a large body of the Nelson Intrusives, mostly resistant granodiorite with minor diorite. The diorite occurs sporadically and often weathers to saprolite with sandy or silty textures (or clays with abundant seepage).

The southern portion of the map area, along the Kootenay River, is mapped as intrusives older than the Nelson Plutonics. These are described as pseudodiorite and pyroxenite. Rusty weathering argillite and siltstone of the Ymir Group is mapped as a small occurrence on a south facing slope near the eastern boundary of the study area.

Residual surficial materials are generally sandy and rubbly/blocky, with varying contents of silt, depending on the texture, mineral composition, and weathering characteristics of the underlying bedrock. Morainal materials are also predominantly sandy, and rarely silty, again depending on local bedrock sources.

2.2 Regional Pleistocene Geology

The surficial materials and topographic character of the study area are a reflection of the last major Pleistocene glaciation (termed the Pinedale in the Rocky Mountains of the United States or the Fraser at Coastal British Columbia). During this glacial interval coalescing ice sheets from the Coast and Columbia Mountains formed an ice dome over the interior plateau of central British Columbia. From this accumulation area, ice flowed south through the Kootenay and Columbia valleys, onto the Columbia plateau of Washington state (Clague 1985, 1981). All of the study area would have been over-ridden by regional ice.

The timing of the last major ice advance of interior British Columbia has been reasonably well established for the Kootenay area. A maximum radiocarbon date for its onset near Lumby is 19,100 $\pm$ 240y B.P. and near Trail 17,240 $\pm$ 330y B.P. (Clague 1981). The Kootenay valley would have been occupied with a regional ice flow some time between these dates, with accompanying advances from local source areas as well. Radiocarbon dates from Washington state indicate that deglaciation began by 13,000y B.P. Upland areas, except local source areas, became ice-free first, while the main Kootenay valley was not ice-free until approximately 10,000y B.P. (Clague 1981).

Deglaciation was accomplished initially by downwasting of an active valley ice mass, exposing ice-free uplands. This was accompanied by downwasting and retreat of local tributary glaciers from the local cirque basins of the Selkirk Mountains (e.g. Snowwater and Kokanee Creeks). Eventually this was followed by stagnation, further downwasting and retreat of the valley ice itself. The glaciofluvial and glaciolacustrine deposits on the lower slopes and benches of the West Arm of Kootenay Lake were deposited and dissected during the final stagnation and downwasting phases as meltwaters flowed along the melting ice. The weathered bedrock, colluvial and localized fluvial materials have been deposited since deglaciation (adapted from Utzig et al. 1983).

2.3 Soils and Surficial Materials

According to Jungen (1980), the soils on the mid and upper slopes of the study area are dominated by Humo-ferric Podzols and Dystric Brunisols formed primarily from colluvial and morainal materials, with associated glaciofluvials. In general the colluviums were described as higher in coarse fragments, particularly at depth. The colluviums were also more rapidly drained than the associated morainal materials, which were often compact at depth. The colluviums and morainal materials were mainly mapped as moderately coarse to very coarse textured soils (Beatrice, Bonnington, Buhl, Castlegar, Cooper, Slocan and Salmo associations), with minor areas of moderately fine to moderately coarse textured soils (Syringa association).

The lower slopes and valley bottom portions of Falls Creek, and the lower slopes along the Kootenay River were mapped as a complex of the morainal materials described above, and moderately coarse and very coarse glaciofluvial materials (Kinert association). Although the glaciofluvial materials were described as generally well drained, it was noted they often included beds of finer materials (fine sand, silt or clay) which could impede drainage and create unstable conditions on steep terrace faces.

2.4 Climate and Vegetation Zonation

Regional climate information provides an overall framework of expected temperatures, precipitation, winds and seasonal patterns, but in mountainous terrain the variation due to local conditions can be highly significant. For any given position, local valley climate varies with aspect, elevation, slope position and the influence of adjacent landscape features such as mountain masses (shading effect), glacier ice or water bodies. Sites on southerly aspects are significantly warmer than level sites of equivalent elevation or sites on northerly aspects because of increased solar radiation. Valley bottom positions are likely to be slightly warmer during the day and distinctly colder at night than equivalent elevations in a midslope position because of restricted air movement along the valley floor (i.e., cold air pooling and inversions).

The study area is located in the southern portion of the "interior wet belt." Seasonally, the climate is dominated by easterly-moving Pacific-coastal air masses, which lose the last major portion of their moisture in this area prior to crossing the Purcell Mountains. During the winter, polar air moving south through the Kootenay and Columbia valley systems inundates the area for short periods. During the summer, hot dry air occasionally moves into the area from the Columbia plateau in the United States. The general patterns of temperature and precipitation are typical for mountainous terrain, with increases in mean annual precipitation and decreases in mean annual temperature coincident with increasing elevation.

Precipitation patterns are probably a reflection of frontal cloud patterns, which are most active below about 1500 m in elevation. Precipitation increases with elevation to that level, above which it often decreases slightly. During the summer months the maximum precipitation belt will be slightly higher in response to convection storms. The annual precipitation distribution is seasonal with a maximum during mid-winter (December-January), and a minimum in mid-summer (July-August). These temperatures and precipitation patterns result in rapidly increasing snowpack with elevation. At the lower elevations the winter maximum may be reached in January, while at the higher elevations it continues to collect until April (adapted from Utzig et al. 1983).

The lower elevations of the Southern Selkirk Mountains are dominated by the Dry Warm subzone of the Interior Cedar Hemlock (ICHdw) at elevations below about 1200 m on south aspects and 1000 m on north. The mid elevations between about 1100 m and 1500 m fall within the Columbia -Shuswap Moist Warm subzone variant of the Interior Cedar Hemlock (ICHmw2). Elevation breaks for all biogeoclimatic units are approximately 100-200 m lower on north aspects than on south aspects.

Elevations above 1600 m are within the Selkirk variant of the Wet Cold Engelmann Spruce Subalpine Fir subzone (ESSFwc4). Transitional areas between the ESSFwc4 and ICHmw2, at elevations ranging from 1450 to 1650 m, fall within the Columbia variant of the Wet Cold Engelmann Spruce Subalpine Fir subzone (ESSFwc1). Areas over 1950 m in elevation fall within the Wet Cold Engelmann Spruce Subalpine Fir Parkland (ESSFwcp) and the Alpine Tundra (AT).

Specific climatic information for each of the biogeoclimatic units is available in Appendix 12 of Braumandl and Curran (1992). The Precipitation Factors for site sensitivity hazard ratings (SSWG et al

1993 and MoF & BCE FPC 1995) are 25-49 (moderate) for the ICH subzone variants and 50-100 (high) for the ESSF subzone variants within the study area.

2.5 Hydrologic Regime

Situated 16 km due west of the City of Nelson, Falls Creek is a fourth-order, S2 stream at the first community water intake (725 m elevation). Falls Creek drains a 3250 ha watershed of the southern Selkirk Mountains (Kokanee Range). Above 1060 m elevation, two major headwater tributaries drain high-elevation lakes and seepage areas. At 1060 m elevation, these tributaries converge forming a major S2 stream.

3.0 METHODS

Terrain mapping and interpretation techniques are described in the following sections. The methods and criteria employed for interpretation assessments are the culmination of a series of detailed terrain mapping projects in the Kootenay Lake area, including: Grassy Creek, Argenta and Johnsons Landing, Winlaw Creek, West Arm Demonstration Forest, Smallwood Small Business Operating Area, Woodlot 1458, Bird Creek and a series of Level D Terrain Stability Surveys (e.g. Utzig 1978, Utzig et al 1983, Utzig 1988, Utzig 1996, Utzig and Wallace 1996, Utzig 1997, Utzig 1998).

3.1 Terrain Mapping

Following a review of available information on geology, soils, biogeoclimatic units and slope classes, the project area was stratified into areas having similar terrain characteristics using standard airphoto interpretation procedures on black and white aerial photographs of a scale of approximately 1:20,000 (see Appendix 1 for lists of flight lines and airphotos).

Criteria for stratification included the elements of airphoto pattern (i.e. tone, texture, topography, drainage patterns, erosional features and micro details). Aerial photographs of a scale of approximately 1:40,000 were also examined to provide a broad overview of the topography and other landscape level features. Triangle network slope maps (TIN) generated from the digital 1:20,000 TRIM topographic base maps were used as overlays to verify slope gradients and identify slope breaks.

Terrain stratification was based on genetic materials, surface expression, qualifying descriptors, modifying processes, soil texture, soil moisture regime and slope, generally according to guidelines outlined in Terrain Classification for B.C. (Howes and Kenk 1997), RIC Standards for Terrain Mapping (RIC 1995), and FPC Mapping and Assessing Terrain Stability Guidebook (MoF & BCE FPC 1995). Any modifications to provincial standards necessary to accurately depict local conditions are identified on the map legends. Wherever possible, an attempt was made to create polygons that were uniform with regard to hazard ratings for stability and surface erosion. However, given the limitations of scale, terrain complexity and budget, sometimes complexed map units were unavoidable. Appendix 5 provides further information on terrain mapping conventions employed in this project.

During the late summer and fall of 1995 and 1998, most roads in the study area were visited in the field to verify terrain types by examining road cuts. In addition, a series of foot transects were established to conduct field inspections of terrain and soil characteristics in areas not accessible by road (see Terrain Polygon - Field Transect Map). At identified locations on the road and foot transects, qualified soil scientists and terrain specialists described terrain features, slope and soil moisture regime to provide ground-truthing for the airphoto interpretation (see Appendix 6 for field description form). In addition, areas which have undergone previous landslide events were investigated to establish the contributing factors and build a predictive model for use in establishing terrain stability interpretations.

Following the field work, initial terrain polygons were revised based on information collected in the field. Polygon boundaries, plot locations and field transects were then digitally plotted onto a TRIM map base using mono-restitution techniques. An interim version of this plot was overlaid with the TIN slope map, and minor corrections to boundaries were made to improve the match between polygon boundaries and slope breaks derived from the TRIM map data (and airphotos were updated accordingly). On-site symbols were hand transferred to the terrain database to indicate the presence of past landslide activity and other key features. After finalizing the polygon boundaries, a database was created of terrain, soil and biogeoclimatic classification information for each polygon and terrain map unit. This provided the raw data for the interpretation algorithms described in the following sections. Distribution of terrain types, slopes, moisture regimes and soil drainage are shown on the Terrain – Slopes – Drainage map and in Appendices 2 and 4.

3.2 Terrain Stability

Terrain stability classifications were determined for each polygon based on airphoto interpretation and available field data according to the criteria outlined in the Mapping and Assessing Terrain Stability Guidebook of the Forest Practices Code of B.C. (FPC 4/95). Assessment took into consideration the results of investigations of past instability in the study area and adjacent areas. To provide an objective comparison for airphoto interpretation derived stability assessments, ratings were also calculated using the algorithm described in Table 3.1 (raw data for each terrain unit is presented in Appendices 2 and 4).

General considerations when assigning hazard ratings included the following:

Past Landslide Activity: polygons which contained evidence of past landslide activity, visible on airphotos or in the field, were usually assigned class IV or V ratings.

Slope Morphology: generally, polygons with slope gradients exceeding 65% are classified as high hazard. Competent bedrock-dominated slopes may be considered stable at steeper gradients, particularly in drier climates. Ridged, benched or fluted topography generally increases stability, while gullied terrain has increased risk of slope failure for equivalent slope angles and moisture regimes.

Aspect: at equivalent elevations south aspects are generally drier than north-facing slopes because of higher evapotranspiration and reduced groundwater seepage. Consequently, for similar materials on similar slope gradients, the hazard is higher on north aspects. Reduced tree cover and rooting strength on south aspects can sometimes compensate for the gains from reduced moisture content.

Surficial Materials: finer textured and shallow materials are generally less stable than coarser textured materials. Areas with wetter moisture regimes due to climate, slope position and/or perched water tables are also less stable.

Bedrock Lithology/Structure: where appropriate, the following bedrock features contributing to instability were considered: bedrock lithology (e.g. weak bedrock types such as some phyllites, schists and granodiorite-diorites); unfavourable bedrock structure (bedding, schistocity or jointing parallel to the slope).

Climate/Soil Moisture Regime: wetter climates and wetter moisture regimes will have a higher frequency of saturated soil conditions, and therefore generally a higher risk of instability.

Table 3.2 describes the various terrain stability hazard classes. Distribution of terrain stability is shown on the Terrain Stability – Landslide-Induced Sedimentation map and in Appendix 3. The Terrain Stability map provides single interpretive classes for each polygon, as required under the FPC, while Appendix 3 provides more complete composite interpretive classes.

3.3 Landslide-Induced Stream Sedimentation

Landslide-induced stream sedimentation hazards were determined for each polygon based on airphoto interpretation and available field data. The criteria considered are described in Table 3.3. This interpretation takes into account conditions within the polygon in question, and any other polygons between this polygon and the nearest downslope hydrologic feature. As presented at this time, the

Table 3.1. Key for determination of Terrain Stability Hazard (adapted from B.C. FPC 1995 and Utzig 1996).

SITE FACTORS	Low Risk				←================================→				High Risk	Comments
CLIMATE	PP,IDF 1	MS,ICHdw, ICHxw 2	ESSFdc1,ESSFdk, ICHmk1,ICHmw1,2,3 3	ESSFwc1-2 4	ESSFwc4, ESSFwm,ICHwk1 5	ESSFvc, ICHvk1 6				groupings of BEC subzone/variants, ideally based on: frequency and intensity of rainstorms and level of runoff generated by snowmelt
MOISTURE REGIME	VX-SM 0	SM/M 5	M/SM 9	SHG-HG 18	SHD 22					an indicator of the relative frequency of saturation and the potential to generate surface runoff during high intensity events or snowmelt
SLOPE GRADIENT (%)	≤25 -15	26-30 0	31-39 4	40-49 8	50-59 16	60-64 22	65-69 26	70-79 48	≥80 64	steeper slope angles provide increased risk of landslides due to the increased effectiveness of gravity
GULLIED TERRAIN	"V" in Terrain Label or Soil Description indicating gullies >2 m deep with a spacing of ≤50m	Slopes <30% 4	Slopes 30-45% 6	Slopes >45% 10						accounts for the increased likelihood of landslides in gullied terrain
DEPTH TO RESTRICTING (cm)	<30 or >100 0	31 – 100 5								accounts for the role of an impermeable boundary impeding soil drainage and contributing to saturation; accounts for the presence of potential sliding plane
SUB-SURFACE TEXTURE	LS,S,R 0	SL,fSL 5	Si,SiL,L 10	C,SiC,SiCL,CL,SC,SCL 15						factor accounts for differing shear strengths of various soil textures; most limiting at 60-90 cm depth; R = bedrock
EVIDENCE OF SLOPE PROCESSES	Terrain Process Labels None 0	Terrain Process Labels Fc,Rb 20	Terrain Process Labels R,Rf,Rs,Rd,Rt,F 110							indicators of active or recently active slope processes related to landslides and landslide risk
RATING TOTALS	I <10	II 11 - 23	III 25 - 38	IV 39 - 97	V > 97					

Table 3.2. Terrain stability classification (adapted from Mapping and Assessing Terrain Stability Guidebook FPC 4/95).

Terrain Stability Hazard Class	Interpretation	Possible % of polygons with one or more landslides following development*
I	no significant stability problems exist field inspection by a terrain specialist usually not required	<1%
II	low likelihood of landslides following timber harvesting or road construction minor slumping may occur along road cuts, especially during first or second year following construction field inspection by a terrain specialist usually not required	1-5%
III	moderate likelihood that stability problems can develop timber harvesting should not significantly reduce terrain stability; low likelihood of landslides following timber harvesting; minor slumping may occur along road cuts, especially during first or second year following construction; low to moderate likelihood of landslides following road construction field inspection by a terrain specialist usually not required	6-20%
IV	expected to contain areas with a moderate likelihood of landslide initiation following timber harvesting expected to contain areas with a moderate to high likelihood of landslide initiation following road construction; sidecasting and/or wet season construction will significantly increase the potential for road-related slides; hoe construction, back-casting, end-hauling, adequate drainage control and other appropriate engineering measures may significantly reduce the potential for road-related slides a field inspection by a qualified terrain specialist, to assess the stability of the affected area, should occur prior to road or trail construction, or any development that may result in significant soil disturbance or drainage diversion within or upslope of the polygon	21-60%
V	expected to contain areas with a moderate to high likelihood of landslide initiation following timber harvesting; usually contains, or is of similar characteristics to, areas with evidence of past or present instability expected to contain areas with a high to very high likelihood of landslide initiation following road construction; sidecasting and/or wet season construction will significantly increase the potential for road-related slides; hoe construction, back-casting, end-hauling, adequate drainage control and other appropriate engineering measures may significantly reduce the potential a field inspection by a qualified terrain specialist, to assess the stability of the affected area, should occur prior to any development within the polygon, or development that may result in drainage diversion within or upslope of the polygon	61-100%

* the percentages assume basic sidecast road construction practices and landslides > 0.05 ha.

Table 3.3. Landslide-induced stream sedimentation classification (adapted from Mapping and Assessing Terrain Stability Guidebook FPC 4/95 and Utzig et al 1983).

Hazard Class	Criteria
1	hillslopes within or below the polygon have gradients ≤30% for a continuous slope distance of >150 m or >200 m if immediately adjacent to a stream edge; no gullies with gradients ≥25% originating in the polygon no airphoto or field evidence of landslides originating from this polygon entering the stream low likelihood that a landslide originating from this polygon will deposit debris in a stream; post-event surface erosion of the landslide scar and deposition zone will result in minimal stream sedimentation
2	hillslopes within or below the polygon have gradients 30 to 45% for a continuous slope distance of >150 m or >200 m if immediately adjacent to a stream edge; or hillslopes within or below the polygon have gradients ≤30% for a continuous slope distance of 30 to 150 m gully channels within and below the polygon remain confined, have gradients <25% and end on slopes <25% and >50 m from the stream edge; or gully channels within and below the polygon remain confined, have lower reach gradients >25% and end on slopes <25% and >200 m from the stream edge minimal airphoto or field evidence of landslides originating from this polygon entering the stream moderate likelihood that a landslide originating from this polygon will deposit debris in a stream; post-event surface erosion of the landslide scar and deposition zone will result in some additional stream sedimentation
3	where there are hillslopes within or below the polygon with gradients 30 to 45%, they have a continuous slope distance of ≤150 m; where there are hillslopes within or below the polygon with gradients ≤30%, they have a continuous slope distance <30 m gully channels within and below the polygon remain confined, have gradients <25% and end 10 to 50 m from the stream edge; or gully channels within and below the polygon remain confined, have lower reach gradients >25% and end on slopes <25% 20 to 200 m from the stream edge clear evidence is visible on airphotos or in the field that landslides originating from this polygon have or potentially may enter the stream high likelihood that a landslide originating from this polygon will deposit debris in a stream; post-event surface erosion of the landslide scar and deposition zone will result in additional stream sedimentation
4	little or no occurrence of hillslopes within or below the polygon having gradients <45%, and those that occur have continuous slope distances of <30 m gully channels within and below the polygon remain confined, have gradients <25% and end within 10 m of the stream edge; or gully channels within and below the polygon remain confined, have lower reach gradients >25% and end within 20 m of the stream edge clear evidence is visible on airphotos or in the field that landslides originating from this polygon have entered the stream very high likelihood that a landslide originating from this polygon will deposit debris in a stream; post-event surface erosion of the landslide scar and deposition zone will result in additional stream sedimentation

Landslide-Induced Stream Sedimentation interpretation takes into account mainstem and significant tributary creeks as shown on the 1:20,000 forest cover and TRIM map bases. During any future watershed assessment procedures, this interpretation should be reviewed in light of other hydrologic features that may be identified as significant during that process. Distribution of landslide-induced stream sedimentation classes is shown on the Terrain Stability – Landslide-Induced Sedimentation map and in Appendix 3.

3.4 Surface Erosion

Surface erosion hazards were determined for each terrain polygon based on the following factors:

- biogeoclimatic subzone/variant
- moisture regime
- slope gradient
- depth to restricting layer
- surface soil texture (0-15 cm)
- surface soil coarse fragment content (0-15 cm)
- subsoil texture (60-90 cm)

A description of each of the Surface Erosion Hazard Classes is presented in Table 3.4. The weighting assigned to each of the factors is shown in Table 3.6, and the values assigned to map polygons for each factor used to determine surface erosion hazard are provided in Appendices 2 and 4. The surface erosion hazard ratings for each polygon are presented on the Waterborne Erosion map and in Appendix 3. The Waterborne Erosion map provides single interpretive classes for each polygon, as required under the FPC, while Appendix 3 provides more complete composite interpretive classes.

Table 3.4. Surface Erosion Hazard Classification (adapted from B.C. FPC 1995 and Utzig et al 1983).

Class	Description
L	low hazard for surface erosion; minor erosion of fines from ditch lines and disturbed soils no special management requirements; avoid channeling water
M	moderate hazard for surface erosion; expect problems with channeled water in road ditches or across disturbed areas revegetate disturbed areas; drainage management is critical
H	high hazard for surface erosion; expect major problems with channeled water in road ditches or across disturbed areas minimize soil disturbance; immediately revegetate disturbed areas; drainage management is critical
VH	very high hazard for surface erosion; expect severe problems with channeled water in road ditches or across disturbed areas; gully erosion may occur with channeled water avoid soil disturbance; immediately revegetate disturbed areas; drainage management is critical

3.5 Road and Ditchline Erosion

Erosion hazards associated with road surfaces, cutbanks and ditchlines were determined for each terrain polygon based on the following factors:

- biogeoclimatic subzone/variant
- moisture regime
- slope gradient
- subsoil texture (60-90 cm)
- subsoil coarse fragment content (60-90 cm)

A description of each of the road and ditchline erosion classes is presented in Table 3.5. The weighting assigned to each of the determination factors is shown in Table 3.7, and the values assigned to map polygons for each factor used to determine surface erosion hazard are provided in Appendices 2 and 4. The road and ditchline erosion hazard ratings for each polygon are presented on the Waterborne Erosion map and in Appendix 3.

Table 3.5. Road and Ditchline Erosion Hazard Classification (adapted from B.C. FPC 1995, Utzig 1983, Jordan 1997, Thompson 1997).

Class	Description
L	low hazard for waterborne erosion from road surface, cutbanks and ditchlines; minor erosion of fines from ditch lines and disturbed soils no special management requirements; avoid channeling water
M	moderate hazard for waterborne erosion from road surface, cutbanks and ditchlines; expect problems with channeled water in road ditches or across disturbed areas revegetate disturbed areas; drainage management is critical
H	high hazard for waterborne erosion from road surface, cutbanks and ditchlines; expect major problems with channeled water in road ditches or across disturbed areas minimize soil disturbance; immediately revegetate disturbed areas; install sediment traps where appropriate; drainage management is critical
VH	very high hazard for waterborne erosion from road surface, cutbanks and ditchlines; expect severe problems with channeled water in road ditches or across disturbed areas; gully erosion may occur with channeled water avoid soil disturbance; immediately revegetate disturbed areas; install sediment traps where appropriate; drainage management is critical

Table 3.6. Key for determination of surface erosion potential (adapted from B.C. FPC 1995 and Utzig 1996).

SITE FACTORS	LOW --------- MODERATE --------- HIGH --------- VERY HIGH						Comments
CLIMATE	PP,IDF 1	MS,ICHdw, ICHxw 2	ESSFdc1,ESSFdk, ICHmk1,ICHmw1-3 3	ESSFwc1-2 4	ESSFwc4, ESSFwm,ICHwk1 5	ESSFvc, ICHvk1 6	groupings of BEC subzone/variants, ideally based on: frequency and intensity of rainstorms and level of runoff generated by snowmelt
MOISTURE REGIME	X-SX 1	SM 2		M 3		SHG-SHD 6	an indicator of the relative frequency of saturation and the potential to generate surface runoff during high intensity events or snowmelt
SLOPE GRADIENT (%)	0-10 1	11-20 3	21-30 5	31-45 7	46-59 10	≥60 14	steeper slope angles provide increased erosive potential for surface runoff; erosion can occur at quite low slope angles
DEPTH TO RESTRICTING (cm)	>90 1	61-90 2		30-60 3	<30 4		partially accounts for the role of soil water storage capacity in determining the likelihood for generating runoff
SURFACE TEXTURE (0-15 cm)	SC,C,SiC 1	SiCL,CL,SCL 2		L 4	SL 6	Si,SiL,fSL,LS,S 9	factor accounts for differing erodibility of various soil textures
(%) SURFACE COARSE FRAGMENTS	>60 -4	31-60 0		16-30 3	<16 5		an indicator of the likelihood of surface armouring to inhibit deep rilling and gullying
SUBSOIL TEXTURE (30-90 cm)	S,LS,SL,fSL 1	L,SiL,Si 2		CL,SCL,SiCL 3	C,SC,SiC 4		factor to account for slowly permeable subsoils and their contribution to generating runoff (bedrock = 0; rationale – slow permeability offset by limitation to rilling/gullying)
TOTALS	<------- Low ------- <21	------ Moderate ----- 21 - 25		------------ High ------------ 26 - 33	---------- Very High -------> > 33		

Table 3.7. Key for determination of road and ditchline erosion potential (adapted from B.C. FPC 1995, Utzig 1983).

SITE FACTORS	LOW -------- MODERATE -------- HIGH -------- VERY HIGH						Comments
CLIMATE	PP,IDF 1	MS,ICHdw, ICHxw 2	ESSFdc1,ESSFdk, ICHmk1,ICHmw1-3 3	ESSFwc1-2 4	ESSFwc4,ESSF-p ESSFwm,ICHwk1 5	ESSFvc, ICHvk1 6	groupings of BEC subzone/variants, ideally based on: frequency and intensity of rainstorms and level of runoff generated by snowmelt
MOISTURE REGIME	VX-SX 1	SM 2		M 3		SHG-SHD 6	an indicator of the relative frequency of saturation and the potential to generate surface runoff during high intensity events or snowmelt
SLOPE GRADIENT (%)	0-10 1	11-20 3	21-30 5	31-45 7	46-59 10	≥60 14	steeper slope angles usually result in deeper roadcuts and more exposed soil; sediment delivery below culvert cross-drains increases with slope angle
SUBSOIL TEXTURE (30-90 cm)	SC,C,SiC,R 1	SiCL,CL,SCL 2		L 4	SL 6	Si,SiL,fSL,LS,S 9	factor accounts for differing erodibility of various soil textures; most limiting of 30-90 cm
(%) SUBSOIL COARSE FRAGMENTS	>75 or bedrock <90 cm -6	60-74 or bedrock 90-120 cm -1	45-59 4	30-44 8	15-29 11	<15 14	an indicator of the likelihood of surface armoring to inhibit deep rilling and gullying; mean of % coarse fragments from 30-90 cm
TOTALS	<------ Low ------ <21	----- Moderate ----- 21 - 25		---------- High ---------- 26 - 30		--------- Very High ------> > 30	**Where road grade is known to exceed 8%, increase the rating by one class.**

3.6 Sediment Delivery

The classes for sediment delivery **potential** provide a relative rating for sediment delivery for the polygon as a whole, without taking into account distance to a particular stream or hydrologic feature. Sediment delivery potential class was determined for each terrain type based on the following factors:

- slope configuration - continuity of slope and likelihood of sediment-laden waters moving from potential sediment sources in the polygon to a stream channel
- slope gradient - increasing hydraulic gradient and sediment carrying capacity; decreasing likelihood of sediment settling out in depressions
- moisture regime - increasing moisture availability and increased frequency of water volumes sufficient to transport sediment (especially in ditchlines intercepting seepage)

Sediment delivery **hazard** ratings are then derived from the potential classes, by adding the factor of distance to the nearest hydrologic feature located downslope.

A description of each sediment delivery potential class and hazard rating is provided in Table 3.8. The key employed for assigning sediment delivery potential classes and hazards is shown in Table 3.9. The values assigned to map polygons for each factor used to determine sediment delivery are provided in Appendices 2 and 4. The sediment delivery potential and hazard ratings for each polygon are presented on the Waterborne Erosion map and in Appendix 3.

For more detailed planning purposes, the sediment delivery potentials can be converted to specific hazards with the addition of further information on the specific locations significant hydrologic features. The GIS process defined in the IWAP manual (FPC 1995) can be used to map 50, 100 and 200 m wide strips in relation to the significant hydrologic features (creeks, ponds, lakes, etc.). These strips can then be over-laid with the mapped sediment delivery potential classes to derive specific locations of the sediment delivery hazard classes. This has not been completed at this stage, because the relevant streams have not yet been defined. For similar reasons, the rating classes provided in this report do not take into account polygons downslope with lower potential class ratings, which may reduce the sediment delivery rating for a group of polygons upslope (e.g. a wide flat terrace below a steep slope). A more detailed map of sediment delivery hazard and sediment yield should be prepared as a part of the IWAP (see next section for a discussion of sediment yield).

The actual sediment delivery hazard rating for any location in a polygon can be determined in the field based on measurements to the nearest stream. Distances should be the most direct overland flow route, not necessarily the shortest route (i.e. not across major topographic breaks). Field assessments also allow map polygons to be split into finer units (e.g. gullies and intervening face units).

3.7 Waterborne Erosion Sediment Yield

The classes for waterborne erosion sediment yield **potential** provide a relative rating for sediment yield for the polygon as a whole, without taking into account distance to a particular stream or hydrologic feature. Sediment yield potential classes were determined for each terrain polygon based on

Table 3.8. Sediment Delivery Potential and Hazard Classification (adapted from B.C. FPC 1995 and Utzig et al 1983).

Potential Class/ Hazard Rating	Description*
1	terrain units with a very low potential for sediment delivery except where <50 m from a stream, where the potential is moderate
2	terrain units with a very low potential for sediment delivery except where <50 m from a stream, where the potential is high, and 50 to 100 m from a stream where the potential is low
3	terrain units with a high potential for sediment delivery <50 m from a stream, moderate potential from 50 to 100 m from a stream, and low potential >100 m from a stream
4	terrain units with a very high potential for sediment delivery <50 m from a stream, high potential from 50 to 100 m from a stream, moderate potential 101 to 200 m, and low potential >200 m from a stream
5	terrain units with a very high potential for sediment delivery <50 m from a stream, high potential from 50 to 200 m from a stream, and moderate potential >200 m from a stream
VL	very low sediment delivery hazard; this unit separated from any stream by >50 m on benched/ broken terrain, >100 m on gentle to moderately sloping smooth slopes and >200 m on gentle gullied slopes development on this unit is unlikely to provide an avenue for sediment input into a stream
L	low sediment delivery hazard; terrain unit separated from any stream by >50 m on moderately sloping benched/broken terrain, >100 m on steep benched and gentle to moderately sloping smooth slopes, and >100 m on gentle to moderately sloping gullied slopes roads, skid trails or ditch lines crossing this unit are unlikely to provide a direct avenue for sediment input into a stream
M	moderate sediment delivery hazard; terrain unit may be < 50 m from a stream on gentle benched/broken terrain, separated from any stream by >50 m on steep benched/broken slopes, moderate smooth slopes and on gentle gullied slopes benched/broken terrain, >100 m on steep smooth and moderate-steep gullied slopes roads, skid trails or ditch lines crossing this unit may provide a direct avenue for sediment input into a stream, but the normal drainage control measures should minimize sediment movement
H	high sediment delivery hazard; terrain unit may be < 50 m from a stream on moderately to steeply sloping benched/broken terrain, gentle to moderately sloping smooth slopes, or gentle gullied terrain; or separated by > 50 m on steep smooth slopes or moderate to steep gullied slopes roads, skid trails or ditch lines crossing this unit are likely to provide a direct avenue for sediment input into a stream; soil disturbance should be minimized, special measures may be required to control sediment
VH	very high sediment delivery hazard; terrain unit is < 50 m from a stream on steeply sloping smooth slopes or moderately to steeply sloping gullied slopes roads, skid trails or ditch lines crossing this unit will provide a direct avenue for sediment input into a stream; soil disturbance should be avoided, special measures will be required to control sediment

* all distances are overland flow distances

Table 3.9. Key for determination of Sediment Delivery Potential Classes and Hazard Ratings.

Slope Configuration	Slope (%)	Moisture Regime	Sediment Delivery Potential Class	Sediment Delivery Hazard Ratings — Distance to Hydrologic Feature (m)			
				<50	50-100	101-200	> 200
Benched or Broken	0 - 30	VX-M	1	M	VL	VL	VL
	0 - 30	SHG-SHD	3	H	M	L	L
	31 - 60	VX-M	2	H	L	VL	VL
	31 - 60	SHG-SHD	4	VH	H	M	L
	> 60	VX-M	3	H	M	L	L
	> 60	SHG-SHD	4	VH	H	M	L
Smooth Continuous	10 - 30	VX-M	2	H	L	VL	VL
	10 - 30	SHG-SHD	4	VH	H	M	L
	31 - 60	VX-M	3	H	M	L	L
	31 - 60	SHG-SHD	4	VH	H	M	L
	> 60	VX-M	4	VH	H	M	L
	> 60	SHG-SHD	5	VH	H	H	M
Gullied	10 - 30	VX-M	3	H	M	L	L
	10 - 30	SHG-SHD	5	VH	H	H	M
	31 - 60	VX-M	4	VH	H	M	L
	31 - 60	SHG-SHD	5	VH	H	H	M
	> 60	all	5	VH	H	H	M

Notes:

Slope Configuration: assigned to each map polygon; determined with regard to potential for sediment-laden surface waters reaching the nearest hydrologic feature

- **Benched or broken:** benched, terraced, ridged, hummocky or rolling terrain which includes topographic high points or benches with slope gradients <20% and >20 m wide; and all terrain slopes ≤ 10%
- **Smooth Continuous:** sloping terrain with no slope breaks or benches with slopes < 10% and >20 m wide (slopes of ≤ 10% are considered benched/broken)
- **Gullied:** presence of gullies which lead directly into a specified hydrologic feature, gullies with depths > 2m and channel gradients > 10% (slopes of ≤ 10% are considered benched/broken)

Slope: representative slope of map unit (generally equivalent to median slope, determined qualitatively)

Moisture Regime: representative moisture regime for the map unit (determined qualitatively)

Table 3.10. Sediment Yield Potential and Hazard Classification (adapted from Utzig et al 1983).

Potential Class/ Hazard Rating	Description*
1	terrain units with a very low potential for sediment yield except where <50 m from a stream, where the potential is moderate
2	terrain units with a very low potential for sediment yield except where <50 m from a stream, where the potential is high, and 50 to 100 m from a stream where the potential is low
3	terrain units with a high potential for sediment yield <50 m from a stream, moderate potential from 50 to 100 m from a stream, and low potential >100 m from a stream
4	terrain units with a very high potential for sediment yield <50 m from a stream, high potential from 50 to 100 m from a stream, moderate potential 100 to 200 m, and low potential >200 m from a stream
5	terrain units with a very high potential for sediment yield <50 m from a stream, high potential from 50 to 200 m from a stream, and moderate potential >200 m from a stream
VL	very low sediment yield hazard; this unit separated from any stream by >50 m on benched/ broken terrain, >100 m on gentle to moderately sloping smooth slopes and >200 m on gentle gullied slopes development on this unit is unlikely to provide an avenue for sediment input into a stream
L	low sediment yield hazard; terrain unit separated from any stream by >50 m on moderately sloping benched/broken terrain, >100 m on steep benched and gentle to moderately sloping smooth slopes, and >100 m on gentle to moderately sloping gullied slopes roads, skid trails or ditch lines crossing this unit are unlikely to provide a direct avenue for sediment input into a stream
M	moderate sediment yield hazard; terrain unit may be < 50 m from a stream on gentle benched/broken terrain, separated from any stream by >50 m on steep benched/broken slopes, moderate smooth slopes and on gentle gullied slopes benched/broken terrain, >100 m on steep smooth and moderate-steep gullied slopes roads, skid trails or ditch lines crossing this unit may provide a direct avenue for sediment input into a stream, but the normal drainage control measures should minimize sediment movement
H	high sediment yield hazard; terrain unit may be < 50 m from a stream on moderately to steeply sloping benched/broken terrain, gentle to moderately sloping smooth slopes, or gentle gullied terrain; or separated by > 50 m on steep smooth slopes or moderate to steep gullied slopes roads, skid trails or ditch lines crossing this unit are likely to provide a direct avenue for sediment input into a stream; soil disturbance should be minimized, special measures may be required to control sediment
VH	very high sediment yield hazard; terrain unit is < 50 m from a stream on steeply sloping smooth slopes or moderately to steeply sloping gullied slopes roads, skid trails or ditch lines crossing this unit will provide a direct avenue for sediment input into a stream; soil disturbance should be avoided, special measures will be required to control sediment

* all distances are overland flow distances

a combined evaluation of the following factors:

- surface soil erosion hazard (see above)
- road and ditchline erosion hazard (see above)
- sediment delivery potential (based on slope configuration, slope gradient and moisture regime – see above)

Sediment yield **hazard** ratings are then derived from the potential classes, by adding the factor of distance to the nearest hydrologic feature located downslope. Increasing distance to a hydrologic feature is assumed to increase the likelihood that sediment-laden surface water may infiltrate or pool, allowing the sediment to be deposited before reaching a stream.

A description of each sediment yield potential class and hazard rating is provided in Table 3.10. The key employed for assigning sediment yield potential classes and hazards is shown in Table 3.11. The values assigned to map polygons for each factor used to determine sediment yield are provided in Appendix 3. The sediment yield potential and hazard ratings for each polygon are presented on the Waterborne Erosion map and in Appendix 3.

Refer to the section on sediment delivery for a discussion of GIS planning and field procedures for refining the sediment delivery and yield potentials into detailed hazard ratings.

Table 3.11. Key for determination of Waterborne Erosion Sediment Yield Potential Classes and Hazard Ratings.

Surface Erosion Hazard	Road and Ditchline Erosion Hazard	Sediment Delivery Potential	Sediment Yield Potential Class	Sediment Yield Hazard Ratings			
				Distance to Hydrologic Feature (m)			
				0-50	50-100	101-200	> 200
M,L	M,L	1,2	**1**	M	VL	VL	VL
All other combinations			**2**	H	L	VL	VL
M	H,VH	3	**3**	H	M	L	L
H,VH	M	3					
L	H,VH	4,5					
H,VH	L	4,5					
M	M	4,5					
H,VH	H,VH	3	**4**	VH	H	M	L
M	H,VH	4,5					
H,VH	M	4,5					
H,VH	H,VH	4,5	**5**	VH	H	H	M

3.8 Other Downslope Consequences

In addition to stream sedimentation, development downslope can also be affected by landslides, surface erosion and debris floods. In Appendix 3, polygons with potential impacts to downslope residential development and highways are also identified. This is only meant to redflag areas which may require further investigation. The list of polygons indicated may not be complete, and provides no indication of the potential level of risk present. The list may not include some residential development that has occurred since 1997, the date of aerial photography used in this study.

3.9 Reconnaissance Stream Channel Assessments

A hybrid approach to reconnaissance channel assessment was developed by supplementing BC's Channel Assessment Procedure (CAP - Anon. 1995) with additional observations and interpretations. The approach involves three steps: identifying reach breaks, conducting field observations, and carrying out interpretations.

Preliminary reach breaks were established in the office using TRIM maps and airphotos to define homogeneous sections of stream channel. Final stream reaches were recognized in the field by their physical characteristics – including gradient, channel form, riparian vegetation, bed materials, bank materials, confinement, and hillslope-to-channel coupling. In addition, confluences and changes in sediment supply were also utilized as reach breaks.

Field observations included an assessment of channel disturbance according to the indicators and approach provided in the CAP, and additional observations in the form of detailed channel descriptions for selected reaches. All observations were carried out by foot traverse due to poor access to Falls Creek. A significant majority of the channel was traversed – enough that each reach could be characterized as to its level of disturbance. The frequency of disturbance indicators and the detailed descriptions were used to identify the extent of disturbance existing in each reach.

Interpretations followed the CAP, supplemented by other quantitative measurements of channel bed, banks, and riparian areas. Definitions of these other parameters are provided in Appendix 6. These data were interpreted to provide additional objective measures of channel condition. Table 3.12 describes four non-dimensional indices employed to provide further insight into channel stability.

Table 3.12. Indicators and indices for rating stream channel instability.

Indicator	Description	Index
storage capacity	ratio of bankfull width to bankfull depth	w_b/d_b
transport capacity	ratio of surface to subsurface mean bed grain-size	$d_{50,sfc}/d_{50,subsfc}$
bed stability	ratio of bed grain-size to bankfull depth	$d_{90,sfc}/d_b$
confinement	ratio of gully width (at 1 m) to bankfull channel width	w_{1m}/w_b

4.0 STUDY RESULTS

4.1 Terrain Features

The distribution of terrain types, slopes and drainage classes can be found on the Terrain Classification Map. Appendix 2 provides a list of terrain types, slopes and moisture regimes for each of the map polygons. Appendix 3 summarizes the various hazard ratings for each polygon. Appendix 4 provides information on Biogeoclimatic Classification, selected soil properties and an indication of the level of field checking for each polygon. Terrain map polygons 1-199 are updated from previous mapping in the Garrity/Smallwood Creek area (Utzig 1996a), map polygons 200-299 are updated from previous mapping in the Smoky Creek/Mt. Stewart area (Utzig 1996b), and polygons >300 are new polygons from this mapping project.

The following sections briefly summarize the terrain types and their distribution. Appendix 5 provides general comments regarding terrain mapping conventions used in this project.

4.1.1 Upper Falls Creek Ridge Crests

The upper elevation ridge crests are dominated by gently to moderately sloping well to rapidly drained gravelly sandy morainal veneers, sandy rubbly saprolite veneers and ridged to rolling bedrock outcrops. The saprolites are generally silty to fine sandy at the surface, reflecting eolian inputs (including minor volcanic ash), grading to sandy rubbly at depth (sandy loams). The morainal materials are similar with silty surface horizons and gravelly sandy lower horizons (sandy loam), with moderate to high coarse fragment content. Bedrock outcrops are locally common. Isolated occurrences of gravelly sandy and sandy glaciofluvial deposits were observed in most of the passes crossing the upper ridge. There are local occurrences of steep bedrock cliffs and associate sandy rubbly colluvium and open rubbly to blocky talus slopes.

There are a number of upper elevation gently sloping basins that include a series of small lakes and wetlands (e.g. Rockslide and Johnianne Lakes). These areas usually include occurrences of deeper gravelly sandy and sometimes silty moderately well to imperfectly drained morainal materials, as well as well drained gravelly, sandy and silty glaciofluvial materials, sometimes occurring as small terraces. Some depressions have accumulated veneers or blankets of poorly drained humic organic materials over silty glaciolacustrine.

4.1.2 Headwater Tributaries

The main eastern headwater tributary is dominated by steep rock outcrops and associated sandy rubbly and blocky colluvial slopes on the northern and eastern sides, while the western slopes are a mix of gravelly silty and sandy morainal materials, and sandy rubbly colluviums. The lower slopes are dominantly gravelly silty to loamy morainal materials, minor glaciofluvial terraces and steep sandy rubbly colluvium, mainly just below the main Falls Creek waterfall. The finer textured morainal materials are mainly well drained, but there are significant area with moderately well to imperfectly drained soils on lower terraces and some steep terrace faces. A number of landslides have occurred in these areas, usually associated with road-related causes (cutslopes, fill slopes and drainage diversions).

4.1.3 Western Slopes

The ridge forming the northwestern boundary of the Falls Creek watershed is continuous with the upper elevations of the western flanks of the Smoky Creek watershed. These slopes are dominated by moderately sloping bedrock outcrops and associated morainal, glaciofluvial, colluvial and saprolite veneers. All of these genetic materials are generally gravelly or rubbly sandy loams with a silty to fine sandy surface capping. The morainal and glaciofluvial materials tend to occur in swales, while the saprolites and colluviums are on more exposed slopes and sometimes lack the eolian capping.

Mid elevations on the western side of Smoky Creek are a combination of gravelly sandy loam washed morainal blankets and intermixed gravelly sandy and sandy gravelly glaciofluvial blankets and terraces. There are occasional bedrock outcrops, sometimes as ridges or benches. The bedrock areas have associated veneers of morainal, glaciofluvial, saprolites and occasionally veneer-blankets of colluviums.

Gullies, swales and benches that contain ephemeral streams, also include local areas of silty, fine sandy and gravelly sandy fluvial and glaciofluvial deposits. The areas subject to seasonal moisture are subhygric, but generally unmappable at this scale.

The saddle between the Smoky and Falls Creek watersheds is dominated by sandy, silty and gravelly sandy glaciofluvial terraces, dissected terraces and blankets.

4.1.4 Eastern Slopes

The gentle ridge crest between Smallwood/Garrity Creeks and Falls creek is dominated by bedrock and associated shallow soils, including veneers of saprolite, morainal and eolian materials. Shallow channeled and depressional areas often contain locally derived fine sand and silty fluvial and glaciofluvial materials. Closed depressions are often subhygric and wetter, with organic soils in some cases. The sideslope in upper Falls Creek is a mix of gravelly sandy loam and silt loam morainal blanket veneer and rubbly sandy loam blanket veneers, with rolling to ridged bedrock outcrops.

4.1.5 Lower Slopes and Valley Bottom

The lower slopes of Falls Creek are a complex of steep dissected glaciofluvial terraces, moderately steep to steep morainal slopes, and steep colluviums. The glaciofluvial materials are generally gravelly sandy and sandy, but there are significant occurrences of silty glaciolacustrines interbedded in some locations. The morainal materials vary from sandy loam to silt loam and can sometimes include significant amounts of clay. There are sporadic occurrences of sandy gravelly glaciofluvial terraces and fluvial fans along the valley bottom. Some of these have been recently channelized by major stream diversions resulting from bridge failures on the old road system.

4.1.6 Mt. Stewart, Beasly/Bonnington Face and Kootenay River Valley

The crest Mt. Stewart, on the southern boundary of the Falls Creek watershed, is a gently undulating complex of bedrock outcrops, sandy rubbly saprolites and gravelly sandy loam morainal materials. The morainal materials are predominantly in swales and minor depressions, and usually have a significant capping of silty reworked eolian and/or glaciofluvial material. The gentle slopes just below the crest of Mt. Stewart are a mix of similar morainal blanket-veneers, saprolites and occasional rubbly sandy colluviums on steeper sections. The steeper pitches on private land between 800 and 1000 m are predominantly sandy rubbly colluviums, with patches of washed morainal and glaciofluvial. The lower gently sloping and benched areas are dominantly gravelly sandy glaciofluvial intermixed with minor washed morainal and saprolites associated with bedrock ridges.

Slopes facing the Kootenay River near the mouth of Falls Creek are a complex of glaciofluvial blankets-veneers and dissected terraces, steep bedrock faces, colluvial slopes, saprolites, and patches of morainal materials. The steeper bedrock outcrops and colluviums and generally restricted to the lower Falls canyon. A bedrock ridge and associated saprolites occur at an elevation of approximately 650 – 700 m north and south of the mouth of Falls Creek. Gravelly sandy glaciofluvial blankets and terraces, and gravelly sandy morainal blanket/veneer remnants are interspersed with the bedrock ridges.

4.2 Terrain Stability/Waterborne Erosion Hazards

In general, the majority of the stability problems in the Falls Creek drainage are concentrated along the steep lower slopes, directly above the incised stream channel. Debris slides and debris flows were the most common form of mass wasting encountered, with only incidental direct evidence of debris torrent or debris flood activity. Soil creep was rare, as was rock fall, evidenced by the paucity of active talus slopes.

Almost all the recent debris slides encountered resulted from poor road-building practices on moderately steep to very steep slopes. Debris slides associated with sidecasting and/or drainage diversion on 60-

75% slopes in gravelly silty and sandy morainal materials are the most common. Smaller cutbank slumping often has contributed by blocking ditchlines or adding more material to already overloaded fillslopes. Tension cracks and continuing drainage diversion along the road indicate the potential for further slides in this area.

Surface erosion potential is generally moderate to high due to the frequent occurrence of silty to fine sandy surface horizons. In these areas, minimizing soil disturbance, avoiding drainage diversions and prompt revegetation will be critical.

4.3 Falls Creek Stream Channel

Ten reaches were identified on Falls Creek between Kootenay River and the basin headwaters. The distribution of stream channel reaches and field transects can be found on the Terrain Polygons - Field Transects – Stream Reaches map and further detailed site descriptions are summarized in Appendix 5. The characteristics of each reach are provided in Table 4.1 along with their disturbance ratings. Figure 4.1 provides this information in longitudinal profile. Table 4.2 provides details on the presence/absence of disturbance indicators as recorded in the field. Figures 4.2 – 4.7 illustrate the condition of selected reaches of the stream channel. The sections below highlight the significant characteristics of each reach.

The results show that 87% of the surveyed mainstem reaches are moderately or severely aggraded. Stable and degraded reaches were essentially absent. The stream is expected to have step-pool and cascade-pool morphology, although functioning wood was almost entirely absent from the channel (SP_b-w and CP_b-w).

Table 4.1. Summary of reach characteristics and disturbance levels.

R	Length (slope distance m)	Reach Elevation		Gradient % (min,max)	Width m (min,max)	Disturbance Rating % of reach			Descriptions Available (site #)
		lower	upper			A1	A2	A3	
1	1700	540	725	not surveyed					
2	2550	725	880	5 (4,8)	14 (7,40)		10	90	
3	1600	880	975	6 (3,7)	14 (7,25)		15	85	9
4	800	975	1020	6.5 (5,8)	10 (7.5,18)		65	35	8
5	300	1020	1040	7 (5,10)	7.5 (6,9.5)		90	10	6
6	350	1040	1060	3.5	n/a	10	60	30	
7	1450	1060	1200	8(5,11)	n/a		30	70	3
8	200	1200	1240	11	n/a	80	20		
9	500	1240	1280	9 (8,10)	3.5 (1.8,7)	55	35	10	2
10	~700	1280	1355+	11(10,14)	2.6 (2,3.4)	90	10		1
11*	800	1060	1140	9 (6,18)	7 (4.5,10)	20	60	20	4,5

+ the upper end of reach 10 was not field verified; * a major headwater tributary to Falls Creek

Figure 4.1: Longitudinal Profile of Falls Creek

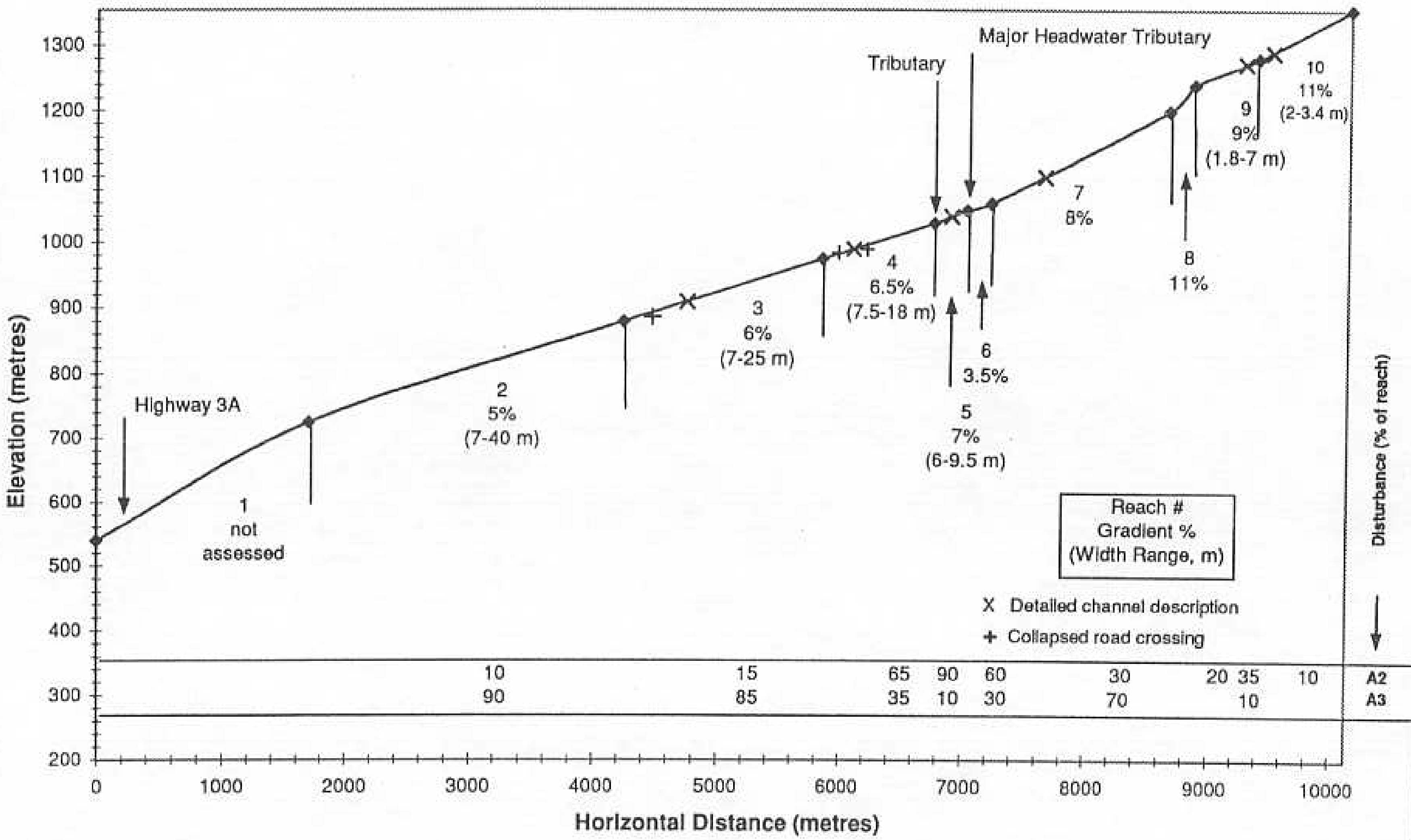

Table 4.2. Field indicators of disturbance by reach.

R #	Length (slope distance m)	S1	S2	S3	S4	S5	C1	C2	C3	C4	C5	B1	B2	B3	D1	D2	D3
2	0-2450	✔		✔	✔		✔	✔	✔	✔	✔	✔	✔			✔	✔
2	2450-2550																
3	0-400				✔			✔			✔					✔	
3	400-1300	✔		✔	✔		✔	✔	✔	✔	✔	✔	✔	✔		✔	✔
3	1300-1600				✔			✔	✔	✔	✔					✔	
4	0-500			✔	✔			✔	✔	✔			✔			✔	✔
4	500-650			✔	✔			✔	✔	✔			✔			✔	
4	650-800			✔	✔		✔	✔	✔	✔			✔			✔	✔
5	M6				✔			✔	✔		✔		+			✔	
6	0-350				✔		✔	✔	✔	✔	✔	✔				✔	✔
7	0-700)	✔		✔	✔		✔	✔	✔	✔	✔	✔				✔	
8	0-200			✔				✔					✔				
9	0-500			✔	✔								✔			✔	✔
10	0-1500			✔				✔					✔		✔	✔	
11	0-280				✔				✔	✔	+	✔	+			✔	
11	280-400			✔				+	+	✔	✔		✔	✔		✔	✔
11	400-500(M4)				+			+			+	✔				✔	

✔ active indicator; + recovering indicator; locations within a reach begin at bottom of reach

Disturbance Indicator Definitions

S1	homogeneous bed texture	C1	extensive cascades
S2	sediment fingers	C2	minimal pool area
S3	sediment wedges	C3	elevated mid-channel bars
S4	extensive bars	C4	multiple channels or braids
S5	extensively scoured zones	C5	disturbed stone lines
B1	abandoned channels	D1	small woody debris
B2	eroding banks	D2	LWD function
B3	avulsions	D3	LWD jams

Reach Descriptions

Reach 10

This reach was observed to be in the best condition of all the reaches. The disturbance observed was characterized by frequent bars, dysfunctional wood, and disturbed riparian vegetation (site M1). Stone lines were evident with pools occupying about 25% of site M1. There were significant signs of bed stability and little bank erosion. It is likely that M1 indicates the lower end of current channel recovery.

Reach 9

At site M2, a 50-year-old debris jam has caused channel width to increase, resulting in extensive braiding at the base of M2. Almost the entire bed is mobile with a near absence of clinging vegetation. The remainder of the reach below M2 was observed to be in a similar condition: old debris jams with sediment wedges, a similar width, about 25% of the bed with pools, and some stone lines still evident.

Reach 8

This reach is short, showing some good pool development and containing a bedrock-controlled section. The reach ends in a 30-metre waterfall. The pool at the bottom of the waterfall was observed to be infilled with coarse sediment.

Reach 7

Condition was poor in this lengthy reach with the channel dewatered in places. Continuous bars were observed in the channel margins with pools occupying only 10-20% of the reach. Extensive bank erosion was present. There was an almost complete absence of functional wood in the reach. The slopes above the western side of Reach 7 have contributed significant sediment inputs in the past, as a result of road-related debris slides and debris flows. Some of the slides are still semi-active at present.

Reach 11 (Headwater Tributary)

Sites 4 and 5 describe a reach which deteriorates downstream due to collapsed road crossings. The upper part of the reach appears to be in reasonable condition with some significant signs of recovery. Condition declines downstream with greater bed mobility and a much larger width-to-depth ratio. In places, the channel is entirely full. In one location below M4, a forested channel island is being undermined by the creek. Near the base of the reach, a relict avulsion channel is present, one which presumably occurred due to the collapse of a road crossing (it follow the old roadbed for part of its length). Further down a large sediment wedge is contained behind a second collapsed crossing. Avulsions and consequent downcutting continue in this area.

Reach 6

Condition here improved marginally over that of reach 7, presumably due to the increase in stream power afforded by the inflow of the major tributary and another significant tributary near its lower end. The major avulsion channel from the headwater tributary also enters in this reach.

Reach 5

An absence of functional wood, a channel approaching capacity, high bed mobility, and extensive riparian disturbance characterize this reach. Some stone lines and limited pools (10-15% of the bed) were observed. Well-anchored boulders provide important bed control. A steep tributary (gradient 21%) which discharges in this reach was assessed and found to be in better condition, presumably due to the reduced impact from roads and riparian disturbance.

Reach 4

Severe channel widening is evident in this reach with old bars recently colonized by pioneer vegetation. Almost the entire bed is mobile and affected by deposition. Two collapsed road crossings are present in this reach (see Figure 4.1). Debris jams and sediment wedges were commonly observed.

Figure 4.2. Dewatered channel (125 l/s), reach 7.

Figure 4.3. Sediment wedge and debris jam, reach 7.

Figure 4.4. Sediment wedge, reach 4.

Figure 4.5. Collapsed crossing and sediment wedge, reach 11.

Figure 4.6. Avulsion channel from reach 11.

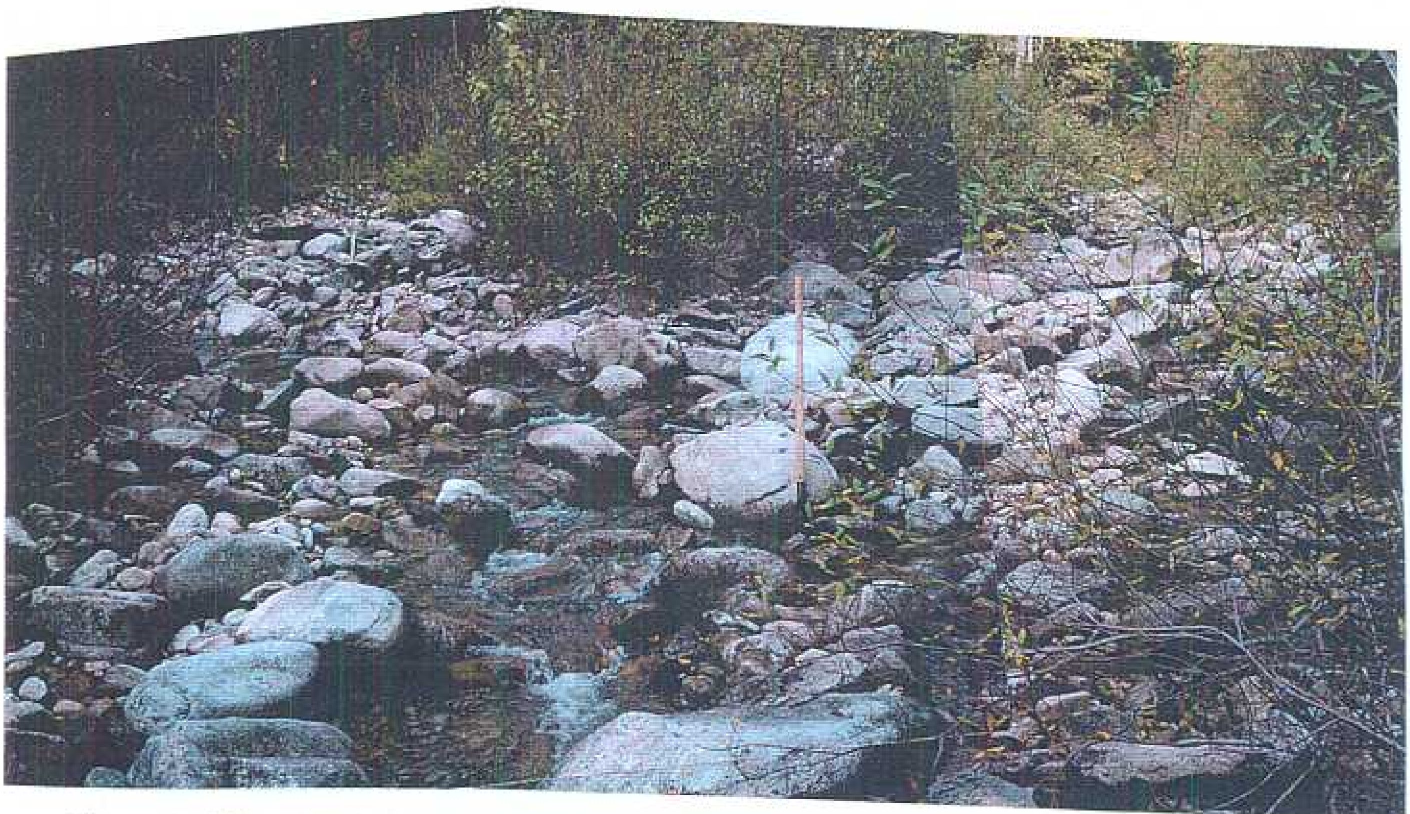

Figure 4.7. Major channel island being recolonised, reach 5.

Reach 3

Extensive bars (many elevated), multiple channels, minimal pool area, and dysfunctional wood characterize this reach. In addition, there are sections where the channel has widened substantially (maximum: 25 m) in response to aggradation. Debris jams and sediment wedges continue to be common. It should be noted that M9 was not representative of the entire reach.

Reach 2

This reach is similar to reach 3 but in slightly worse condition. Maximum channel width was observed to be 40 m. Sediment wedges in this reach become extremely large and explain the infilling experienced at the first community intake (located at the base of this reach). Individual sediment wedges were observed commonly to contain hundreds of cubic metres of material. Toward the bottom of the reach, cobble bars became more extensive and avulsions more common. Note that the top 100 m of the reach was a bedrock canyon. Toward the base of the reach, bedrock was observed in the channel bed with the notable addition of some pool formation, suggesting the possibility of channel recovery.

Reach 1

This reach was not surveyed because it is below the first community intake.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 Terrain Assessment

As recommended by the B.C. Forest Practices Code, all areas recognized as Terrain Stability Class IV and V should receive more detailed on-site inspection by a qualified soil scientist or geoscientist prior to road construction, forest harvesting or any other activity which may affect slope stability. Given that most road development is likely to occur in the upper elevations, above the mapped Class IV terrain, unstable or potentially unstable areas downslope of roads, culverts, drainage interception or any drainage diversions should be carefully examined prior to road construction, especially given the values further downslope. Rockfall hazards should be carefully assessed when working on steeper slopes.

Areas identified by this study as active sediment sources and/or high or very high waterborne erosion sediment yield hazards should receive more detailed site inspection by a qualified soil scientist prior to engaging in any activity which may result in soil disturbance or drainage diversion. Surficial materials derived from high mafic content bedrock are especially vulnerable to waterborne erosion due to their sandy/silty textures and lack of coarse fragments.

5.2 Stream Channel Assessment

Logging and road building during the 1960s have caused extensive damage to the mainstem and riparian areas of Falls Creek. Collapsed road crossings have caused avulsions and created major new channels on old roadbeds. In addition, road-related landslides have been deposited directly into the creek. Reaches 8 through 10 are in better condition than the lower reaches, because they were not as affected by the road-related disturbance and have recovered somewhat from the riparian logging. In reach 7, evidence of landslides are common. Reaches 5 and 4 have been destabilized by collapsed road crossings both on the mainstem and on the major headwater tributary (reach 11 in Table 1). Channel condition worsens steadily downstream with long sections rated as A3. Prominent in the channel are frequent debris jams retaining massive sediment wedges of up to 500 m^3. A large majority of the bed is active annually (up to 90%) and elevated bars occur throughout reaches 2 through 7. Avulsions are common in reaches 3 and 4. Long-term wood recruitment has been impaired by the widespread removal of riparian vegetation. At present large wood is rarely present and almost never functioning.

There are limited signs of recovery. Pools exist, especially in the upper reaches; however, they are limited in extent, presumably due to annual infilling during the freshet. The large boulders are typically stable and provide important anchoring to the bed.

5.3 Rehabilitation Considerations

Given the remaining terrain hazards and the extensive damage to the mainstem stream channel, it is recommended to defer further development in this drainage, at least until additional assessments are carried out. If development is proposed, it should be carefully assessed to ensure it will not aggravate existing hazards downslope, have no connection to the stream channel network, and have no potential to increase peak flows.

Options for further work include:

1. Pursue no further assessments or rehabilitation work.

Without rehabilitation work, the channel (and riparian areas) will likely take decades to recover. Additional road-related landslides will likely occur. Problems related to sediment accumulation will continue for decades at the water intakes and highway culvert locations. Further harvesting or road construction that results in increased peak flows or sediment delivery will likely retard the recovery process.

2. Complete an IWAP.

Prior to any further harvesting, a watershed assessment should be completed, including an evaluation of the potential interactions between further forest harvesting, road building and stream channel recovery. This should be completed in conjunction with Level 1 road and stream rehabilitation assessments, as described in #3.

3. Complete reconnaissance road and stream rehabilitation assessments (Level 1).

Assess all road systems and the complete channel network within the old logging area. The objective would be to determine the full extent and types of opportunities for road and channel rehabilitation, and the potential risks for further landslides, erosion and stream channel impacts. Based on this assessment, determine the cost/benefit ratios and priorities for various rehabilitation measures. The deteriorated state of the main road system, poor access and degree of revegetation will likely be significant considerations in determining options.

4. Address high-hazard/low cost hillslope and channel issues.

Depending of the results of #2 and #3, there may be opportunities for limited rehabilitation work in the short-term. Some of the residual landslide hazards due to the existing road network and drainage diversions can likely be addressed with small machine/hand-tool prescriptions. By preventing further sediment input into the channel, this action would help to accelerate channel recovery. Areas requiring major pullback of fills would remain untreated, but new disturbance would be limited.

There are likely intervention opportunities in the stream channel to speed up channel recovery using only small equipment. These sites could be identified in #3, and detailed prescriptions developed at that time, or immediately following the Level 1 assessment.

5. Develop detailed prescriptions for road and channel rehabilitation.

The road problems are numerous and widely distributed. Only a portion of the total roads and trails were walked in conjunction with this study. Detailed prescriptions should only be contemplated on a priority basis following completion of the reconnaissance assessment (#3).

The problems in the channel are numerous and of a large scale. Detailed prescriptions could include removal of sediment wedges and debris jams and large equipment would likely be required. To avoid reconstructing parts of the road, access may be possible on the creek bed, subject to MELP approval. It would likely be most efficient to combine the road and channel work. It may be useful to develop a long-term access strategy as part of the rehabilitation planning.

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APPENDIX 1: Listing of TRIM map sheets, flight lines and airphotos

Falls Creek Study Area: TRIM Map Sheets 82F 043, 053

Study Area Line	Flight Line	Photo Numbers
1	97047	50-53
2	97091	220-223
3	97091	120-124
4	97091	52-55

APPENDIX 2 Falls Creek Study Area Terrain Data Summary

POLY	MAP UNIT 1							MAP UNIT 2							MAP UNIT 3						
#	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture
1	6	szrDvx		15	0	40	SX	3	Rmr		25	0	45	X-VX	1	dsMvw		15	0	25	SM-SX
2	10	hOvb	szFp	1	0	5	SHG-HG														
3	5	Rsk		75	45	125	X	5	srCvxb		65	35	85	SX-X							
4	7	szrDvbx		20	0	40	SX-X	3	Rm		25	0	45	X							
5	10	hOvb	szFp	1	0	5	SHG-HG														
6	6	srDvxb		45	30	55	SX	4	dsMvb		40	25	55	SM-M							
7	8	srCvbx		60	45	75	SM-M	2	dsMvb		50	40	60	SM							
8	7	gsFGvx	sgFGbtj	25	10	35	M//SHG	2	sgFj		15	0	20	SHG	1	sgFGtks		55	40	75	SM-SX
9	7	gsMbv		45	30	55	SM-M	3	srCvb		45	40	60	SX							
10	6	szDvb		35	15	55	SX-SM	3	Rkr		45	35	65	X-VX	1	gsMvxb		30	25	40	SM-M
11	7	szFv	sgMbt-W	20	5	30	SHG-M	3	gsFGbt		15	5	45	M-SHG							
12	7	gsMbv		40	30	55	M-SM	3	srCvb		45	40	60	SX-SX							
13	9	srCvbx		50	35	60	SX-SM	1	Rks		55	45	85	X							
14	6	zsrCv		60	50	75	SX	2	zsrCvb-V		75	55	95	SM-SX	2	zgsMvx		50	45	60	SM
15	8	srCbv		65	35	85	SX	2	Rsk		70	40	95	X-VX							
16	8	srCvb		55	45	85	SX-SM	2	gsMvb		50	40	60	SM							
17	6	srDv		35	25	50	SX	4	sdMvb		30	25	45	SM-SX							
18	6	gzsMbv		30	20	45	SM-M	4	zsrDvb		35	30	55	SX							
19	7	srCbv		40	30	60	SX	2	Rk		50	30	75	X	1	gzsMvb		35	30	50	SM-M
20	7	xszDvxb		30	0	55	SX	2	Rmrk		35	0	75	X	1	szFvbx	sdMv	5	0	20	M//SHG
21	10	szrDv		5	0	20	SM														
22	7	szrDv		20	0	30	SX	3	Rm		20	0	30	X							
23	6	hOv	zFp	5	0	10	SHG	4	zrDv		10	0	20	SX-SM							
24	8	zFGv		5	0	10	SHG	2	zrDv		10	0	20	SX-SM							
25	9	srCvb		50	40	60	SX	1	Rk		55	40	65	X							
26	6	gsMbv-W		35	25	50	SM-M	4	rsCvb		45	35	60	SX							
27	6	gszMbv		35	25	45	SM	4	szrDvx		35	25	45	SX-X							
28	5	gsMbv		20	0	30	M-SM	5	zsrDv		25	10	35	SX-SM							
29	7	srDvb		35	20	50	SM-SX	2	gsMb		35	20	40	SM	1	Rm		35	20	40	X
30	7	srCvb		40	25	55	SX-SM	2	Rmk		45	35	55	X	1	gsMvb		40	30	45	SM-M
42	6	zEv		10	0	25	SX//SHG	2	Rm		10	0	25	X	2	dsMv		10	0	20	SX-SM
68	5	dsMbv	Rmr	20	10	45	SM//SHG	5	srDvbx	Rmr	40	10	55	SX//X							
72	9	srDvbx		35	30	50	SX-SM	1	Rak		40	30	55	X							
73	5	srDvbx		25	0	45	SX-SM	3	dsMv		15	0	30	SM//SHG	2	Rm		35	0	55	X-VX
164	8	srCv		50	40	70	SX	2	Rks		60	50	75	X							
166	6	srCv		45	35	70	SX	4	Rskr		55	40	85	X-VX							

APPENDIX 2 Falls Creek Study Area Terrain Data Summary

POLY	MAP UNIT 1							MAP UNIT 2							MAP UNIT 3						
#	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture
185	8	srCvb		65	50	75	SX-X	2	Rsk		70	55	80	X-VX							
245	5	zsrDv		20	0	40	SX	3	sgFGvb		20	0	30	SM-SX	2	Rm		35	20	60	X
247	5	zsrDvx		35	15	45	SX-SM	4	Rma		45	20	55	X	1	gsMvxb-W		30	20	45	SM-SX
248	6	zsrDvb		30	15	45	SX-SM	4	gsMbv-W		25	10	35	M-SHG							
249	5	gsMbv-W		30	20	40	SM-M	5	srDbv		35	25	50	SX-SM							
250	8	gsMb-W		30	25	40	SM-M	2	srDbv		35	25	50	SX-SM							
252	10	sgFGv	gsMb-W	25	20	50	SM														
253	8	gsFGtbv		30	10	40	SM-M	2	srDv		20	10	55	SX							
254	5	gsFGvxb		40	30	50	SX-SM	5	srCvxb		40	30	55	SX							
255	10	gsFbt		30	20	40	SM-M														
256	10	zsFGtp		10	0	20	M														
257	6	zLGtp		10	0	15	SHG-M	4	zsFtp		10	0	25	M-SHG							
259	10	szLGtp		10	0	20	SHG-M														
271	8	gsMb-W		35	20	45	SM-M	2	gfMb		35	20	45	M							
272	10	zsdMvb		10	0	15	M														
274	5	szrDvb		15	0	30	SX-SM	4	gzsMbv		15	0	20	M	1	Rm		15	0	30	X
275	7	gzMbv		25	15	35	M-SM	3	zrDvb		25	15	35	SX-SM							
276	10	gzMbv		15	0	30	M														
277	7	srCbv		40	35	50	SX-SM	2	gsMvb-W		35	25	40	SM-M	1	Rak		45	30	60	X
278	10	hObv	zFp	1	0	5	HG-SHD														
301	6	sgFGtsv-V		65	55	95	SX-X	2	srCv		75	55	115	SX-X	2	Rs		95	75	145	X-VX
302	6	sxDvx		30	5	45	SX	3	gzsMvb		25	10	40	SM-M	1	sgFGtbv		30	5	45	SM
303	7	zgsMbvx		20	10	40	SM	2	sgFGvbx	srDv	20	5	40	SM//SHG	1	srDvb		20	10	40	SX
304	6	gzsMb		40	35	50	M//SHG	4	gsFGvb		40	30	50	SM							
305	8	gzsMb		35	25	45	M-SM	2	zsrCv		45	40	55	SM-SX							
306	7	gzsMbv-VW		60	45	75	M	3	gsFGvb-V		60	45	75	SM							
307	7	gszMb		60	50	65	M	3	gsFGvb		55	45	65	SM							
308	7	sgFGtj		20	10	55	SM/SHG	3	gszMtb		30	15	75	M/SHG							
309	5	srCvb		70	55	75	SX-SM	4	srCvx	gsMbv-W	60	40	70	SM-M	1	Rks		70	60	85	X
310	6	gsMvb		50	40	60	SM-M	4	srCv		50	40	60	SM-SX							
311	10	gsMbt-W		40	20	55	M-SM														
312	7	gsFGst-V		70	55	80	SM-SX	2	gzsMbt-VW		65	45	75	SM-M	1	gzMbt-V		65	15	75	SHG/M
313	8	gsFGtj		25	10	40	SM	2	zsrDvb		25	10	40	SM							
314	7	srDvb		20	10	40	SM-SX	3	gsFGvb		15	10	40	SM-SX							
315	8	srCvb		45	30	55	SX	2	gsFGvb		35	20	50	SX-SM							
316	5	gzMbt		45	25	55	M//SHG	3	zLGt		20	10	45	M-SHG	2	sgFtfa		30	15	50	SM/SHG

APPENDIX 2 Falls Creek Study Area Terrain Data Summary

POLY	MAP UNIT 1							MAP UNIT 2							MAP UNIT 3						
#	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture
317	10	gsFGtja		25	10	35	SM-M														
318	10	gsFGbvt		40	30	55	SM														
319	6	srCvb		45	35	60	SX	2	Rka		50	35	65	X-VX	2	gsFGvb		35	25	50	SM
320	7	srCvb-V		60	50	75	SX//M	2	sgFGbvk-V		55	45	70	SM-SX	1	Rks		65	50	75	X-VX
321	4	srDvb		35	20	50	SX	4	gsFGbv		30	15	45	SM-SX	2	Rhk		40	20	50	X-VX
322	10	srCbv		60	45	70	SM-M														
323	6	srDvb		30	20	45	SX	4	gsFGvb		25	15	40	SM-SX							
324	6	srDvb		25	0	35	SX	3	Rhu		25	0	35	X-VX	1	dsMvxb-W		20	5	30	SM-SX
325	6	srCvxb		55	45	70	SX-X	3	Rks		60	45	95	VX-X	1	gsMvxb-W		40	35	55	SM-SX
326	7	srCvb		50	40	60	SX-SM	3	gsMvb-W		45	35	55	SM							
327	6	srCvxb		50	40	65	SX-X	3	Rks		55	45	75	VX-X	1	gsMvxb-W		40	35	55	SM
328	7	srDvx		25	10	35	SX	3	gsFGvx		20	5	30	SM-SX							
329	6	srDvb		35	20	50	SX-X	4	gsFGvbt		30	15	40	SM-SX							
330	6	sgFGts-V		65	55	90	SM-SX	2	gszMbkv-V		60	50	70	M	2	srCvb-V		70	55	80	SX
331	6	sgFtj-LU		10	5	15	SHG/SM	3	sgFGtb		15	10	40	SX-SM	1	sgFaf		35	20	40	SX//SHG
332	6	sgFGvt		30	15	45	SX-SM	4	srDv		30	20	50	SX							
333	6	srCv		60	50	70	SX	3	Rkr		55	35	75	X-VX	1	gsFGvb		35	15	40	SX-SM
334	7	srCvb		75	55	85	SX//M	2	sgFGkvs-V		65	55	85	SX//SHG	1	Rsk-V		85	65	105	X
335	10	gFGf		25	20	35	SX														
336	10	gsFGtj		10	5	20	SM-SX														
337	7	srCv		40	30	60	SX	2	gsFGvtb		30	20	40	SX-SM	1	Rkr		50	35	75	X-VX
338	6	srDvx		35	25	50	SX	4	gsFGvbt		30	20	45	SX-SM							
339	6	srDvx		25	5	45	SX	2	Rra		30	5	45	X-VX	2	gsFGvxb		20	5	30	SX-SM
340	5	srCvx		40	25	55	SX	4	Rhk		50	35	65	X-VX	1	dsMvx-W		30	20	45	SX-SM
341	5	srDvx		35	15	45	SX	3	dsMvb		30	10	40	SX-SM	2	Rhr		35	15	45	X-VX
342	10	srCvb		40	30	60	SX														
343	7	srDvb		10	0	20	SX-SM	3	hOvb	srDv	2	0	5	SHD-SHG							
344	5	srCvxb		50	35	60	SX	3	Rka		55	40	65	X-VX	2	dsMvbx-W		30	20	45	SM-SX
345	5	gsFGbv		35	30	45	SM-SX	5	srCvx		45	30	50	SX-X							
346	6	gsFGbv-V		60	40	70	SM-SX	4	srCvb-V		65	40	75	SX							
347	5	gsFGbv		35	25	45	SM	4	gsMbv		40	25	45	SM-M	1	srCv-V		55	45	75	SX
348	7	srCvx		65	55	75	SX-X	3	Rks		85	65	95	X-VX							
349	8	gsFGbv		35	30	45	SM	2	srDv		40	30	50	SX							
350	7	gsMbv-W		45	35	55	SM-SX	3	srCvx		45	35	55	SX-X							
351	6	gsFGatb		30	20	40	SM	4	gsMb-W		35	25	40	SM-M							
352	7	gsMbv-W		35	25	40	SM-M	3	gsFGbt		30	20	40	SM							

APPENDIX 2 Falls Creek Study Area Terrain Data Summary

POLY	MAP UNIT 1							MAP UNIT 2							MAP UNIT 3						
#	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture
353	7	srCvx		65	55	85	SX	3	Rks		75	50	125	X-VX							
354	7	gsFGtbv-V		70	45	80	SM-SX	2	gsMbt-V		60	40	75	SM-M	1	srCv		65	45	75	SX
355	8	sgFjaf-LU		15	10	25	SHG-SM	2	sgFGbt		20	10	40	SX-SM							
356	6	srCvbx-V		65	55	95	SX	2	Rs-V		75	60	125	X-VX	2	gsFGsv-V		65	55	75	SX
357	8	gsFGbv-V		60	50	70	SM-SX	2	srCvb-V		65	50	75	SX							
358	6	srCvb		45	30	75	SX	3	Rksa		55	30	95	X-VX	1	gsFGvb		40	30	55	SM-SX
359	6	srCvb		70	45	85	SX	4	gsFGbv-V		60	40	70	SM-SX							
360	6	srCvbx		60	45	95	SX	4	Rsk		70	50	105	X-VX							
361	6	srDvx		20	10	40	SX	4	gsMvb-W		15	5	30	SM-SX							
362	7	gsMbv-WV		55	40	60	SM-M	3	srCvb-V		60	45	75	SX							
363	7	srCvxb		50	30	75	SX	3	Rkrs		55	35	85	X-VX							
364	7	Rsk		95	75	145	X-VX	3	srCvxb		65	50	85	SX-X							
365	7	srDvx		35	15	50	SX-X	2	gsFGvbx		25	15	50	SX-SM	1	Rha		35	20	55	X-VX
366	10	srDvbx		30	25	50	SX-M														
367	7	srDvxb		25	10	50	SX-SM	3	Rmh		30	10	60	X-VX							
368	4	zsrDv		25	5	45	SX	3	zdsMvb		20	5	35	SX-SM	3	Rmr		35	15	55	X-VX
369	6	srCvb		60	40	75	SX	2	zdsMvb		50	30	55	SX-SM	2	Rsk		85	60	145	X-VX
370	6	dzsMvb		20	10	35	SM//SHG	4	zsrDv		25	10	45	SX//SHG							
371	5	gsMbv-WV		60	50	70	SM-SX	5	srCvb		60	50	70	SX							
372	6	srDvb-		35	10	55	SX	2	Rhak		45	25	65	X-VX	2	zdsMvx		25	10	35	SM-SX
373	6	dsMvb-W		20	10	30	SM-SX	4	srDvx		25	10	40	SX							
374	7	sxCvbk		75	55	95	SX-X	2	Rsk		85	65	145	X-VX	1	gsFGtbv		55	30	75	SX-SM
375	7	zsrDvx		25	5	45	SX	3	zdsMvb		15	5	25	SM/SHG							
376	6	zsrDvx		25	15	45	SX	3	Rhu		35	15	45	X-VX	1	zdsMvx		15	5	25	SM
377	8	srCvb		45	35	60	SX-X	2	Rks		55	40	85	X-VX							
378	7	zsrDvx	Rhu	35	15	40	SX-X	3	zdsMw-W	Rhu	20	10	35	SM							
379	8	srCvb		50	35	85	SX	1	Rks		95	75	125	X-VX	1	xCk		65	55	75	X
380	5	dzsMbv-W		10	0	15	SHG/SM	3	srzDv		15	5	25	SX-SM	2	gsFGbtv		25	5	45	SM-SX
381	10	srCvxb		55	40	75	SX-X														
382	8	srCvb		50	40	65	SX-X	2	dsMvb		40	35	55	SM-SX							
383	8	srDvx		20	10	35	SX	2	Ruh		25	15	35	X-VX							
384	7	srDvx		20	15	35	SX-X	2	dsMw-W		15	5	30	SM-SX	1	Ruh		30	10	40	X-VX
385	9	srCvxb		55	35	70	SX-X	1	Rk		60	40	75	X-VX							
386	7	srDvx		35	25	50	SX-X	3	gsMvb		30	15	40	SM-SX							
387	6	zsrDvb		30	15	50	SX-SM	4	gzsMbv-W		25	5	35	SM-M							
388	9	srCvb		75	55	95	SX	1	Rs		85	70	105	X-VX							

APPENDIX 2 Falls Creek Study Area Terrain Data Summary

POLY	MAP UNIT 1							MAP UNIT 2							MAP UNIT 3						
#	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture	%	Terrain	L Strata	S-md	S-min	S-max	Moisture
389	7	gsMbv-W		20	10	35	M-SHG	3	srDv		25	15	45	SX-SM							
390	5	zgsMbv-RdW		70	60	85	M//SHG	3	srCvb		75	60	85	SX-SM	2	sgFGbv-Rs		65	55	75	SX-SM
391	7	gsMbt		20	15	45	M/SHG	3	gsFGbt		20	15	45	SM							
392	6	srCv		55	50	70	SX	4	gsMvb		50	45	60	SM							
393	8	gsFGtbv		35	25	50	SM	2	srDv		35	25	50	SX							
394	5	srCv		60	50	85	SX	4	gsFGvsb		65	50	80	SX-SM	1	Rsk		75	60	95	X-VX
395	7	gsFGvb		20	10	30	SM-SX	3	srDv		25	10	35	SX							
396	7	zsxCvb		65	45	75	SX-X	2	gsMvb-W		50	40	60	SM	1	Rks		70	55	80	X
397	7	gsFGtbs		65	20	75	SM-SX	2	szrCvxb		70	55	125	SX	1	sFGv	gzsMbvt	60	50	70	SM//SHG
398	8	gsFGbtv		35	30	50	SM-SX	2	zsrDv		35	30	45	SX							
399	8	rsCvbx		70	55	95	SX	2	Rsk		95	65	145	X-VX							
400	5	gsFGbv-V		65	55	85	SM-SX	4	srCbv		75	55	85	SX	1	Rs-V		85	65	120	X
401	10	gsFGta		35	30	45	SM														
402	6	gzsMbt		40	30	55	M-SHG	4	sgFGbt-V	gfMb-VFx	60	45	75	SM//SHG							
403	10	sgFGtb		25	10	40	SM														
404	10	gsFGbv		40	30	50	SM														
405	10	gsFGb		30	20	40	SM														
406	8	gsFGbt		25	20	35	SM	2	gsFGbt-V		40	20	50	SM							
407	6	sxDvx		30	5	45	SX	3	gzsMvb		25	10	40	SM-M	1	sgFGtbv		30	5	45	SM
408	8	gsFGat		40	30	50	SM	2	srCvx		40	35	50	SX							
409	8	sgFGtj		20	10	30	SM	2	gsMbja-W		20	10	30	M//SHG							

APPENDIX 3 Falls Creek Interpretations for Watershed Management

Poly #	Terrain Stab.	LS-Ind. Sedim.	Dwnslp. Conseq.	Surf. Eros.	Rd/Ditch Eros.	SD Pot.	Sediment Delivery Hazard*				SY Pot.	Sediment Yield Hazard*			
							<50m	51-100m	101-200m	>200m		<50m	51-100m	101-200m	>200m
1	I	1		M7L3	L9M1	1	M	VL	VL	VL	1	M	VL	VL	VL
2	I	1		H	VH	3	H	M	L	L	4	VH	H	M	L
3	IV	4		M5H5	L	4	VH	H	M	L	3	H	M	L	L
4	I	1		M7L3	L	1	M	VL	VL	VL	1	M	VL	VL	VL
5	I	1		H	VH	3	H	M	L	L	4	VH	H	M	L
6	II6III4	4		M6H4	L6H4	3	H	M	L	L	3	H	M	L	L
7	IV8III2	4		M8H2	L8H2	3	H	M	L	L	3	H	M	L	L
8	I9III1	1		H7M3	H7L3	2	H	L	VL	VL	2	H	L	VL	VL
9	II	3		M7L3	M7L3	3	H	M	L	L	3	H	M	L	L
10	II	2		M7L3	L9M1	3	H	M	L	L	2	H	L	VL	VL
11	II7I3	2		H7M3	M7H3	4	VH	H	M	L	4	VH	H	M	L
12	III7II3	2		H7L3	M7L3	3	H	M	L	L	3	H	M	L	L
13	III	2		M9L1	L	3	H	M	L	L	2	H	L	VL	VL
14	IV8III2	2		H	M	5	VH	H	H	M	3	H	M	L	L
15	IV	4		H8M2	L	4	VH	H	M	L	3	H	M	L	L
16	III	4		M	L8H2	3	H	M	L	L	3	H	M	L	L
17	II	2		M	L	3	H	M	L	L	2	H	L	VL	VL
18	II	3		M	M6L4	3	H	M	L	L	1	M	VL	VL	VL
19	III9II1	3		L	L9M1	3	H	M	L	L	2	H	L	VL	VL
20	II7I3	1		M8L2	L9M1	1	M	VL	VL	VL	1	M	VL	VL	VL
21	I	1		M	L	1	M	VL	VL	VL	1	M	VL	VL	VL
22	I	1		L	L	2	H	L	VL	VL	1	M	VL	VL	VL
23	I	1		H6L4	H6L4	3	H	M	L	L	4	VH	H	M	L
24	II8I2	1		H8L2	H8L2	4	VH	H	M	L	5	VH	H	H	M
25	III9II1	1		M9L1	L	3	H	M	L	L	2	H	L	VL	VL
26	II	1		M6L4	M6L4	3	H	M	L	L	3	H	M	L	L
27	II	2		M	M6L4	3	H	M	L	L	3	H	M	L	L
28	I	1		M	M5L5	1	M	VL	VL	VL	1	M	VL	VL	VL
29	II9I1	1	Yes	M7H3	L8M2	3	H	M	L	L	3	H	M	L	L
30	II9III1	1	Yes	M7H3	L9M1	3	H	M	L	L	2	H	L	VL	VL
42	I	1		M6L4	L	1	M	VL	VL	VL	1	M	VL	VL	VL
68	I5II5	1		M	M5L5	2	H	L	VL	VL	1	M	VL	VL	VL
72	II	1		M9L1	L	3	H	M	L	L	2	H	L	VL	VL
73	I	3		H5M5	L	1	M	VL	VL	VL	2	H	L	VL	VL
164	III	3		H8M2	L	3	H	M	L	L	2	H	L	VL	VL
166	II	1		M	L	3	H	M	L	L	2	H	L	VL	VL

APPENDIX 3 Falls Creek Interpretations for Watershed Management

Poly #	Terrain Stab.	LS-Ind. Sedim.	Dwnslp. Conseq.	Surf. Eros.	Rd/Ditch Eros.	SD Pot.	Sediment Delivery Hazard*				SY Pot.	Sediment Yield Hazard*			
							<50m	51-100m	101-200m	>200m		<50m	51-100m	101-200m	>200m
185	IV	2		H8M2	M8L2	4	VH	H	M	L	4	VH	H	M	L
245	I	1		L7M3	L	1	M	VL	VL	VL	1	M	VL	VL	VL
247	II	1		M5L5	L	3	H	M	L	L	2	H	L	VL	VL
248	II6I4	1		M6L4	L6M4	2	H	L	VL	VL	1	M	VL	VL	VL
249	II	1		M	L	3	H	M	L	L	2	H	L	VL	VL
250	II	1		M	M8L2	3	H	M	L	L	1	M	VL	VL	VL
252	I	1		L	M	2	H	L	VL	VL	1	M	VL	VL	VL
253	II8I2	1		M	M8L2	2	H	L	VL	VL	1	M	VL	VL	VL
254	II	2		M5L5	H5L5	3	H	M	L	L	3	H	M	L	L
255	II	1		M	M	2	H	L	VL	VL	1	M	VL	VL	VL
256	I	1		L	M	1	M	VL	VL	VL	1	M	VL	VL	VL
257	II6I4	2		H6M4	H	3	H	M	L	L	4	VH	H	M	L
259	II	1		M	VH	3	H	M	L	L	3	H	M	L	L
271	II8III2	3		M8H2	M	3	H	M	L	L	3	H	M	L	L
272	I	1		L	L	1	M	VL	VL	VL	1	M	VL	VL	VL
274	I	1		L6M4	L	1	M	VL	VL	VL	1	M	VL	VL	VL
275	I	1	Yes	L	L	2	H	L	VL	VL	1	M	VL	VL	VL
276	I	1		M	M	1	M	VL	VL	VL	1	M	VL	VL	VL
277	II	2		L8M2	L8M2	3	H	M	L	L	3	H	M	L	L
278	I	3		H	VH	3	H	M	L	L	4	VH	H	M	L
301	IV	4	Yes	M8H2	M6L4	5	VH	H	H	M	4	VH	H	M	L
302	II6I4	2	Yes	L7M3	L6M4	2	H	L	VL	VL	1	M	VL	VL	VL
303	I	1	Yes	L	M9L1	2	H	L	VL	VL	1	M	VL	VL	VL
304	III6II4	2	Yes	H6M4	H6M4	3	H	M	L	L	4	VH	H	M	L
305	II	1	Yes	M	M8L2	3	H	M	L	L	3	H	M	L	L
306	IV7III3	3	Yes	VH7H3	VH	4	VH	H	M	L	5	VH	H	H	M
307	IV7II3	3	Yes	VH7M3	VH	3	H	M	L	L	4	VH	H	M	L
308	I7III3	2		L7H3	L7H3	2	H	L	VL	VL	1	M	VL	VL	VL
309	IV6III4	3		M6H4	L6VH4	4	VH	H	M	L	3	H	M	L	L
310	III	2		H	H6L4	3	H	M	L	L	4	VH	H	M	L
311	III	2		H	M	3	H	M	L	L	3	H	M	L	L
312	IV	3		H9VH1	VH	5	VH	H	H	M	5	VH	H	H	M
313	I	1		L8M2	H8L2	2	H	L	VL	VL	2	H	L	VL	VL
314	I	1		L	L7M3	2	H	L	VL	VL	1	M	VL	VL	VL
315	II	2		L8M2	L8H2	3	H	M	L	L	3	H	M	L	L
316	III5II5	3		H8L2	H5VH5	3	H	M	L	L	4	VH	H	M	L

APPENDIX 3 Falls Creek Interpretations for Watershed Management

Poly #	Terrain Stab.	LS-Ind. Sedim.	Dwnslp. Conseq.	Surf. Eros.	Rd/Ditch Eros.	SD Pot.	Sediment Delivery Hazard* <50m	51-100m	101-200m	>200m	SY Pot.	Sediment Yield Hazard* <50m	51-100m	101-200m	>200m
317	I	1		M	H	2	H	L	VL	VL	2	H	L	VL	VL
318	II	2		M	H	3	H	M	L	L	3	H	M	L	L
319	II	2		L6M4	L8H2	3	H	M	L	L	3	H	M	L	L
320	IV7III3	3		H8M2	L8M2	4	VH	H	M	L	3	H	M	L	L
321	II6I4	2		M6L4	L6H4	3	H	M	L	L	2	H	L	VL	VL
322	III	3		H	M	3	H	M	L	L	3	H	M	L	L
323	II6I4	1		M	L6M4	1	M	VL	VL	VL	1	M	VL	VL	VL
324	I	1		M7L3	L9M1	1	M	VL	VL	VL	1	M	VL	VL	VL
325	III9II1	2		M	L9M1	3	H	M	L	L	2	H	L	VL	VL
326	III7II3	2		M	L7H3	3	H	M	L	L	3	H	M	L	L
327	III6II4	2		M7L3	L9M1	3	H	M	L	L	2	H	L	VL	VL
328	I	1		M7L3	L7M3	2	H	L	VL	VL	1	M	VL	VL	VL
329	II6I4	2		M6L4	L6H4	3	H	M	L	L	2	H	L	VL	VL
330	IV	3		M6VH4	M6VH4	5	VH	H	H	M	5	VH	H	H	M
331	I	1		L	L	3	H	M	L	L	2	H	L	VL	VL
332	I	1		L	M6L4	1	M	VL	VL	VL	1	M	VL	VL	VL
333	III6II4	2		H6L4	L9H1	3	H	M	L	L	2	H	L	VL	VL
334	IV	3		H9M1	M7H3	4	VH	H	M	L	5	VH	H	H	M
335	I	1		L	L	2	H	L	VL	VL	1	M	VL	VL	VL
336	I	1		L	M	1	M	VL	VL	VL	1	M	VL	VL	VL
337	II8I2	1		L	L8M2	3	H	M	L	L	2	H	L	VL	VL
338	II6I4	1		L6M4	L6H4	3	H	M	L	L	2	H	L	VL	VL
339	I	1		L	L8M2	1	M	VL	VL	VL	1	M	VL	VL	VL
340	II	1		M9H1	L9M1	3	H	M	L	L	2	H	L	VL	VL
341	II8I2	1		M8L2	L7M3	2	H	L	VL	VL	1	M	VL	VL	VL
342	II	1		M	L	3	H	M	L	L	2	H	L	VL	VL
343	I	1		L7H3	L7VH3	2	H	L	VL	VL	2	H	L	VL	VL
344	III5II5	2		M8H2	M7L3	3	H	M	L	L	3	H	M	L	L
345	I5II5	1		M	M5L5	3	H	M	L	L	3	H	M	L	L
346	IV	3		H	H6M4	5	VH	H	H	M	5	VH	H	H	M
347	I5III5	2		M	H9L1	3	H	M	L	L	3	H	M	L	L
348	IV	3		H7M3	L	4	VH	H	M	L	3	H	M	L	L
349	II	2		M8L2	H8L2	3	H	M	L	L	3	H	M	L	L
350	II	2		M7L3	M7L3	3	H	M	L	L	3	H	M	L	L
351	I6II4	2		M	H	3	H	M	L	L	3	H	M	L	L
352	II7I3	2		M	H	3	H	M	L	L	3	H	M	L	L

APPENDIX 3 Falls Creek Interpretations for Watershed Management

Poly #	Terrain Stab.	LS-Ind. Sedim.	Dwnslp. Conseq.	Surf. Eros.	Rd/Ditch Eros.	SD Pot.	Sediment Delivery Hazard* <50m	51-100m	101-200m	>200m	SY Pot.	Sediment Yield Hazard* <50m	51-100m	101-200m	>200m
353	IV	2		H7M3	L	4	VH	H	M	L	3	H	M	L	L
354	IV	3		H	VH9L1	5	VH	H	H	M	5	VH	H	H	M
355	I	1		L	L	3	H	M	L	L	2	H	L	VL	VL
356	IV	3		H8M2	M8VH2	5	VH	H	H	M	5	VH	H	H	M
357	III8IV2	3		H	VH8M2	5	VH	H	H	M	5	VH	H	H	M
358	II7III3	2		L9M1	L9M1	3	H	M	L	L	2	H	L	VL	VL
359	IV	4		H	M6H4	4	VH	H	M	L	5	VH	H	H	M
360	III6IV4	4		H6M4	L	4	VH	H	M	L	2	H	L	VL	VL
361	I	1		L6M4	L6M4	2	H	L	VL	VL	1	M	VL	VL	VL
362	IV	3		H	H7M3	4	VH	H	M	L	5	VH	H	H	M
363	III7II3	3		M	L	3	H	M	L	L	2	H	L	VL	VL
364	IV	3		M7H3	L7M3	4	VH	H	M	L	3	H	M	L	L
365	II7I3	2		M9L1	L8M2	3	H	M	L	L	2	H	L	VL	VL
366	II	2		L	L	2	H	L	VL	VL	1	M	VL	VL	VL
367	I	1		L	L	2	H	L	VL	VL	1	M	VL	VL	VL
368	I	1		M7L3	L	3	H	M	L	L	1	M	VL	VL	VL
369	III8IV2	2		H	L8H2	3	H	M	L	L	3	H	M	L	L
370	I	1		M6H4	M6L4	2	H	L	VL	VL	1	M	VL	VL	VL
371	IV5III5	3		H	VH5L5	4	VH	H	M	L	5	VH	H	H	M
372	II8I2	1		M6H4	L8M2	3	H	M	L	L	2	H	L	VL	VL
373	I	2		L	M6L4	2	H	L	VL	VL	1	M	VL	VL	VL
374	IV9III1	3		H7M3	L9VH1	4	VH	H	M	L	3	H	M	L	L
375	I	1		M7H3	L7M3	2	H	L	VL	VL	1	M	VL	VL	VL
376	I	1		M7L3	L9M1	3	H	M	L	L	1	M	VL	VL	VL
377	II	2		M	L	3	H	M	L	L	2	H	L	VL	VL
378	II7I3	1		M	L7M3	3	H	M	L	L	2	H	L	VL	VL
379	III9IV1	2		M8H2	M8L2	3	H	M	L	L	3	H	M	L	L
380	I	1		M8L2	M7L3	3	H	M	L	L	2	H	L	VL	VL
381	III	1		M	L	3	H	M	L	L	2	H	L	VL	VL
382	III8II2	1		M8H2	M8H2	3	H	M	L	L	3	H	M	L	L
383	I	1		L	L	2	H	L	VL	VL	1	M	VL	VL	VL
384	I	1		M9L1	L8M2	1	M	VL	VL	VL	1	M	VL	VL	VL
385	III	3		M	L	3	H	M	L	L	2	H	L	VL	VL
386	II	1		M	L7M3	3	H	M	L	L	2	H	L	VL	VL
387	II6I4	1		M	L6M4	2	H	L	VL	VL	1	M	VL	VL	VL
388	IV	3		H9M1	L	4	VH	H	M	L	3	H	M	L	L

APPENDIX 3   Falls Creek Interpretations for Watershed Management

Poly #	Terrain Stab.	LS-Ind. Sedim.	Dwnslp. Conseq.	Surf. Eros.	Rd/Ditch Eros.	SD Pot.	Sediment Delivery Hazard*				SY Pot.	Sediment Yield Hazard*			
							<50m	51-100m	101-200m	>200m		<50m	51-100m	101-200m	>200m
389	I	2		M7L3	M7L3	2	H	L	VL	VL	1	M	VL	VL	VL
390	V5IV5	4		H8M2	VH7M3	4	VH	H	M	L	5	VH	H	H	M
391	I	2		M7L3	M	2	H	L	VL	VL	1	M	VL	VL	VL
392	III	2		M6H4	L6H4	3	H	M	L	L	3	H	M	L	L
393	I8II2	2		M	M8L2	3	H	M	L	L	3	H	M	L	L
394	IV	3		H9M1	M5VH5	4	VH	H	M	L	5	VH	H	H	M
395	I	1		L	L	2	H	L	VL	VL	1	M	VL	VL	VL
396	IV8III2	2		H9M1	M7H3	4	VH	H	M	L	4	VH	H	M	L
397	III7IV3	4		H9VH1	VH8M2	4	VH	H	M	L	5	VH	H	H	M
398	I8II2	1		M	M8L2	3	H	M	L	L	3	H	M	L	L
399	IV	2		H8M2	H8L2	4	VH	H	M	L	5	VH	H	H	M
400	IV	3		M	VH5H5	5	VH	H	H	M	4	VH	H	M	L
401	I	1	Yes	M	H	3	H	M	L	L	3	H	M	L	L
402	IV6V4	4	Yes	H	H6VH4	4	VH	H	M	L	5	VH	H	H	M
403	I	1	Yes	L	L	2	H	L	VL	VL	1	M	VL	VL	VL
404	II	1	Yes	M	H	3	H	M	L	L	3	H	M	L	L
405	I	1	Yes	L	H	2	H	L	VL	VL	2	H	L	VL	VL
406	I8II2	1	Yes	L	H8M2	3	H	M	L	L	2	H	L	VL	VL
407	II6I4	2	Yes	L7M3	L6M4	2	H	L	VL	VL	1	M	VL	VL	VL
408	II	1	Yes	M8L2	H8L2	3	H	M	L	L	3	H	M	L	L
409	I	1	Yes	L8M2	L8M2	2	H	L	VL	VL	1	M	VL	VL	VL

*Distances refer to slope distance from a hydrologic feature (e.g. stream or lake)

APPENDIX 4 Falls Creek Polygon Data for Interpretation Determination

Poly #	Unit #	BEC Unit	Soil Drain	Slope Config.	Depth to Restrict (cm)	0-15 cm Text	0-15 cm CF (%)	30-90 cm Text	30-90 cm CF (%)	Field Checks*
1	1	ESSFwc4	r	b	35	SiL	35	SL	65	
1	2	ESSFwc4	r	b	10	SL	65	R	R	
1	3	ESSFwc4	w-r	b	65	SiL	30	SL	40	
2	1	ESSFwc4	i-p	b	95	SiL	5	SiL	5	
3	1	ESSFwc1	r	s	10	SL	65	R	R	
3	2	ESSFwc1	r	s	36	SiL	45	SL	75	
4	1	ESSFwc1	r	b	45	SiL	35	SL	65	D
4	2	ESSFwc1	r	b	10	SL	65	R	R	
5	1	ESSFwc1	i-p	b	95	SiL	5	SiL	5	
6	1	ICHmw2	r	s	75	fSL	35	SL	60	D
6	2	ICHmw2	w	s	85	SiL	30	SL	40	SS32
7	1	ICHmw2	w	s	85	SL	65	SL	90	G6
7	2	ICHmw2	w	s	85	SL	30	SL	40	D
8	1	ICHmw2	w//i	b	299	fSL	30	SL	40	G5
8	2	ICHmw2	i	b	299	SL	30	LS	60	
8	3	ICHmw2	w-r	s	299	SL	40	SL	60	D
9	1	ICHmw2	w	s	120	SL	30	SL	45	G4
9	2	ICHmw2	r	s	90	SL	35	SL	65	
10	1	ESSFwc1	r-w	s	80	SiL	40	SL	60	D
10	2	ESSFwc1	r	s	10	SL	65	R	R	
10	3	ESSFwc1	w	s	80	SiL	35	SL	40	D
11	1	ICHmw2	i-w	s	120	SiL	15	SL	35	Y
11	2	ICHmw2	w-i	s	199	SL	30	LS	40	
12	1	ICHmw2	w	s	95	SiL	30	SL	45	SS33
12	2	ICHmw2	r	s	95	SL	45	SL	75	
13	1	ICHmw2	r-w	s	85	SL	45	SL	75	Y
13	2	ICHmw2	r	s	10	SL	65	R	R	
14	1	ICHmw2	r	s	85	SL	40	SL	70	
14	2	ICHmw2	w-r	v	95	SL	35	SL	65	
14	3	ICHmw2	w	s	95	SiL	35	SL	45	
15	1	ICHmw2	r	s	75	SL	40	SL	80	
15	2	ICHmw2	r	s	10	SL	65	R	R	
16	1	ICHmw2	r-w	s	85	SL	35	SL	65	
16	2	ICHmw2	w	s	90	SL	35	SL	40	
17	1	ICHmw2	r	s	65	SiL	35	SL	75	
17	2	ICHmw2	w-r	s	85	SiL	35	SL	45	
18	1	ICHdw	w	s	95	SiL	30	SL	40	
18	2	ICHdw	r	s	90	SiL	35	SL	65	
19	1	ICHdw	r	s	115	SL	40	SL	65	
19	2	ICHdw	r	s	10	SL	65	R	R	
19	3	ICHdw	w	s	85	SL	35	SL	40	
20	1	ICHmw2	r	b	75	SiL	35	SL	65	
20	2	ICHmw2	r	b	10	SL	65	R	R	
20	3	ICHmw2	w//i	b	120	fSL	10	SL	35	
21	1	ICHmw2	w	b	85	SiL	10	SL	50	SG2
22	1	ICHmw2	r	s	75	SiL	35	SL	65	D
22	2	ICHmw2	r	s	10	SL	65	R	R	
23	1	ICHmw2	i	b	50	SiL	5	SiL	15	D

APPENDIX 4 Falls Creek Polygon Data for Interpretation Determination

Poly #	Unit #	BEC Unit	Soil Drain	Slope Config.	Depth to Restrict (cm)	0-15 cm Text	0-15 cm CF (%)	30-90 cm Text	30-90 cm CF (%)	Field Checks*
23	2	ICHmw2	r-w	b	75	SiL	30	SL	55	
24	1	ICHmw2	i	s	10	SiL	5	fSL	20	D
24	2	ICHmw2	r-w	s	65	SiL	30	SL	55	
25	1	ICHdw	r	s	85	SL	35	SL	65	D
25	2	ICHdw	r	s	10	SL	65	R	R	
26	1	ICHdw	w	s	150	fSL	35	SL	40	D
26	2	ICHdw	r	s	85	SL	35	SL	65	
27	1	ICHdw	w	s	120	SiL	35	fSL	45	G14
27	2	ICHdw	r	s	75	fSL	35	SL	60	D
28	1	ICHdw	w	b	120	SiL	20	SL	30	D
28	2	ICHdw	r-w	b	85	fSL	30	SL	55	D
29	1	ICHdw	w-r	s	85	fSL	25	SL	55	D
29	2	ICHdw	w	s	90	fSL	25	SL	35	
29	3	ICHdw	r	s	10	SL	65	R	R	
30	1	ICHdw	r-w	s	85	fSL	25	SL	55	D
30	2	ICHdw	r	s	10	SL	65	R	R	
30	3	ICHdw	w	s	90	fSL	25	SL	35	
42	1	ICHmw2	r//i	b	55	SiL	20	R	R	SG1
42	2	ICHmw2	r	b	10	SL	65	R	R	D
42	3	ICHmw2	r-w	b	65	SiL	25	SL	35	D
68	1	ICHmw2	w//i	b	115	SiL	15	SL	35	D
68	2	ICHmw2	r	b	75	SiL	35	SL	65	
72	1	ICHmw2	r-w	s	85	SiL	35	SL	65	D
72	2	ICHmw2	r	s	10	SL	65	R	R	
73	1	ESSFwc1	r-w	b	55	SiL	25	SL	60	D
73	2	ESSFwc1	w//i	b	85	SiL	25	SL	50	SS31
73	3	ESSFwc1	r	b	10	SL	65	R	R	D
164	1	ESSFwc1	r	s	55	SiL	45	SL	75	Y
164	2	ESSFwc1	r	s	10	SL	65	R	R	
166	1	ESSFwc1	r	s	75	SiL	35	SL	65	
166	2	ESSFwc1	r	s	10	SL	65	R	R	
185	1	ESSFwc1	r	s	55	SiL	35	SL	65	
185	2	ESSFwc1	r	s	10	SL	65	R	R	
245	1	ICHmw2	r	b	65	fSL	35	LS	75	D
245	2	ICHmw2	w-r	b	85	fSL	30	LS	60	KG3
245	3	ICHmw2	r	b	10	SL	65	R	R	D
247	1	ICHmw2	r-w	s	65	fSL	40	SL	65	KG4
247	2	ICHmw2	r	s	10	SL	65	R	R	D
247	3	ICHmw2	w-r	s	75	SL	35	SL	45	D
248	1	ICHmw2	r-w	s	85	fSL	35	SL	65	
248	2	ICHmw2	w-i	s	95	SL	35	SL	45	
249	1	ICHmw2	w	s	120	fSL	35	SL	45	
249	2	ICHmw2	r-w	s	85	fSL	35	SL	65	
250	1	ICHdw/mw2	w	s	120	fSL	30	SL	40	
250	2	ICHdw/mw2	r-w	s	95	fSL	35	SL	65	
252	1	ICHdw	w	s	150	SL	35	SL	40	D
253	1	ICHdw	w	s	199	SiL	25	SL	40	
253	2	ICHdw	r	s	75	fSL	30	SL	60	

APPENDIX 4 Falls Creek Polygon Data for Interpretation Determination

Poly #	Unit #	BEC Unit	Soil Drain	Slope Config.	Depth to Restrict (cm)	0-15 cm Text	0-15 cm CF (%)	30-90 cm Text	30-90 cm CF (%)	Field Checks*
254	1	ICHdw	r-w	s	95	SL	25	LS	40	
254	2	ICHdw	r	s	85	SL	35	SL	75	
255	1	ICHdw	w	s	150	fSL	30	SL	40	
256	1	ICHdw	w	b	150	fSL	20	SL	25	D
257	1	ICHdw	m-w	b	75	SiL	10	SiL	15	D
257	2	ICHdw	w-m	b	90	SiL	10	fSL	10	D
259	1	ICHdw	m-w	b	120	SiL	5	fSL	10	
271	1	ICHdw	w	s	110	SiL	30	SL	35	D
271	2	ICHdw	w	s	95	SiL	25	L	30	D
272	1	ICHdw	w	b	75	SiL	50	SL	55	D
274	1	ICHdw	r-w	b	85	SiL	60	SL	75	KG2
274	2	ICHdw	w	b	80	SiL	30	SL	50	
274	3	ICHdw	r	b	10	SL	65	R	R	
275	1	ICHdw	w	s	120	SiL	35	SL	45	D
275	2	ICHdw	r-w	s	85	SiL	35	SL	65	
276	1	ICHdw	w	b	110	SiL	25	fSL	45	KG1
277	1	ICHdw	r-w	s	85	SL	35	SL	75	
277	2	ICHdw	w	s	120	SiL	35	SL	45	
277	3	ICHdw	r	s	10	SL	65	R	R	
278	1	ICHdw	i-vp	b	50	SiL	1	SiL	5	D
301	1	ICHdw	r	v	199	SL	45	LS	60	D
301	2	ICHdw	r	v	75	SL	45	SL	75	D
301	3	ICHdw	r	v	10	SL	65	R	R	D
302	1	ICHdw	r	s	95	SL	35	SL	75	D
302	2	ICHdw	w	s	90	SiL	25	SL	30	D
302	3	ICHdw	w	b	199	SL	20	LS	55	D
303	1	ICHdw	w	s	90	SL	25	SL	35	D
303	2	ICHdw	w//m	s	150	SL	30	LS	40	D
303	3	ICHdw	r	s	85	SL	35	SL	75	D
304	1	ICHdw	w//m	s	90	fSL	25	SL	30	D
304	2	ICHdw	w	s	120	SL	30	SL	30	D
305	1	ICHdw	w	s	299	SiL	25	SL	45	G31
305	2	ICHdw	w-r	s	75	fSL	50	SL	85	D
306	1	ICHdw	w	v	90	SiL	25	SL	30	
306	2	ICHdw	w	v	175	SL	30	LS	40	D
307	1	ICHdw	w	s	90	SiL	25	SL	30	G36
307	2	ICHdw	w	s	175	SL	30	LS	40	D
308	1	ICHdw	w/m	s	399	SL	40	LS	60	D
308	2	ICHdw	w/m	s	90	SiL	25	SiL	35	D
309	1	ICHdw	r-w	s	95	SL	45	SL	75	D
309	2	ICHdw	w	s	120	SL	55	SL	35	D
309	3	ICHdw	r	s	10	SL	65	R	R	
310	1	ICHdw	w	s	50	SiL	35	SL	35	G33
310	2	ICHdw	w-r	s	50	SiL	45	SL	75	D
311	1	ICHdw	w	s	80	fSL	30	SL	35	D
312	1	ICHdw	w-r	v	299	SL	20	LS	40	D
312	2	ICHdw	w	v	75	fSL	30	SL	35	G35
312	3	ICHdw	m/w	v	60	SiL	15	SiL	20	G30

APPENDIX 4 Falls Creek Polygon Data for Interpretation Determination

Poly #	Unit #	BEC Unit	Soil Drain	Slope Config.	Depth to Restrict (cm)	0-15 cm Text	0-15 cm CF (%)	30-90 cm Text	30-90 cm CF (%)	Field Checks*
313	1	ICHdw	w	s	399	SL	20	LS	40	G34
313	2	ICHdw	w	s	85	fSL	35	SL	65	D
314	1	ICHdw	w-r	s	85	fSL	35	SL	75	D
314	2	ICHdw	w-r	s	95	SL	20	LS	40	
315	1	ICHdw	r	s	95	SL	35	SL	65	
315	2	ICHdw	r-w	s	95	SL	30	LS	40	
316	1	ICHdw	w//m	s	75	SiL	25	SiL	30	G37
316	2	ICHdw	w-m	s	60	SiL	0	SiL	1	G17
316	3	ICHdw	w/m	s	299	SL	45	LS	65	D
317	1	ICHdw	w	s	199	SL	10	LS	35	D
318	1	ICHdw	w	s	199	SL	30	LS	40	
319	1	ICHdw/mw2	r	s	85	SL	35	SL	65	
319	2	ICHdw/mw2	r	s	10	SL	55	R	R	
319	3	ICHdw/mw2	w	s	85	SL	30	LS	40	
320	1	ICHdw/mw2	r//w	v	85	SL	45	SL	75	
320	2	ICHdw/mw2	w-r	v	125	SL	30	LS	60	
320	3	ICHdw/mw2	r	v	10	SL	55	R	R	
321	1	ICHmw2	r	s	90	fSL	35	SL	75	
321	2	ICHmw2	w-r	s	115	SL	30	LS	40	
321	3	ICHmw2	r	s	10	SL	55	R	R	
322	1	ICHmw2	w	s	120	fSL	35	SL	65	
323	1	ESSFwc1	r	b	95	fSL	40	SL	75	
323	2	ESSFwc1	w-r	b	95	SL	30	SL	40	
324	1	ESSFwc1	r	b	75	fSL	35	SL	75	
324	2	ESSFwc1	r	b	10	SL	65	R	R	
324	3	ESSFwc1	w-r	b	90	fSL	25	SL	35	
325	1	ICHmw2	r	s	75	SL	35	SL	75	D
325	2	ICHmw2	r	s	10	SL	65	R	R	D
325	3	ICHmw2	w-r	s	85	SL	30	SL	35	
326	1	ICHmw2	r-w	s	95	SL	35	SL	65	
326	2	ICHmw2	w	s	85	SL	30	SL	35	
327	1	ICHdw/mw2	r	s	75	SL	35	SL	65	
327	2	ICHdw/mw2	r	s	10	SL	65	R	R	
327	3	ICHdw/mw2	w	s	85	SL	30	SL	35	
328	1	ICHdw/mw2	r	s	85	fSL	30	SL	65	
328	2	ICHdw/mw2	w-r	s	90	SL	30	LS	40	
329	1	ICHdw	r	s	85	SL	30	SL	65	
329	2	ICHdw	w-r	s	299	SL	20	LS	25	G29
330	1	ICHdw	w-r	v	150	SL	40	LS	60	D
330	2	ICHdw	w	v	80	SiL	25	SiL	35	G19,G27
330	3	ICHdw	r	v	85	SL	30	LS	75	G28
331	1	ICHdw	m/w	b	299	SL	40	LS	70	D
331	2	ICHdw	r-w	b	299	SL	50	LS	70	G26
331	3	ICHdw	r//m	b	299	SL	40	LS	60	G18
332	1	ICHdw	r-w	b	85	SL	35	LS	55	G25
332	2	ICHdw	r	b	75	SL	40	LS	80	D
333	1	ICHdw	r	s	75	SL	45	SL	75	D
333	2	ICHdw	r	s	10	SL	65	R	R	D

APPENDIX 4 Falls Creek Polygon Data for Interpretation Determination

Poly #	Unit #	BEC Unit	Soil Drain	Slope Config.	Depth to Restrict (cm)	0-15 cm Text	0-15 cm CF (%)	30-90 cm Text	30-90 cm CF (%)	Field Checks*
333	3	ICHdw	r-w	s	95	SL	30	LS	40	
334	1	ICHmw2	r//w	s	95	SL	40	SL	65	
334	2	ICHmw2	r//i	s	195	SL	45	LS	70	
334	3	ICHmw2	r	s	10	SL	65	R	R	
335	1	ICHdw	r	s	399	SL	55	LS	85	G24
336	1	ICHdw	w-r	b	399	SL	20	LS	35	G22
337	1	ICHdw	r	s	85	SL	35	SL	65	
337	2	ICHdw	r-w	s	90	SL	30	LS	40	
337	3	ICHdw	r	s	10	SL	65	R	R	
338	1	ICHmw2	r	s	75	SL	35	SL	75	
338	2	ICHmw2	r-w	s	90	SL	30	LS	40	
339	1	ICHmw2	r	b	75	SL	35	SL	75	
339	2	ICHmw2	r	b	10	SL	65	R	R	
339	3	ICHmw2	r-w	b	85	SL	30	LS	40	
340	1	ESSFwc4	r	s	75	SL	35	SL	75	
340	2	ESSFwc4	r	s	10	SL	75	R	R	
340	3	ESSFwc4	r-w	s	85	fSL	30	SL	35	
341	1	ESSFwc4	r	b	85	fSL	35	SL	75	
341	2	ESSFwc4	r-w	b	95	SiL	30	SL	45	
341	3	ESSFwc4	r	b	10	SL	65	R	R	
342	1	ESSFwc4	r	s	90	SL	35	SL	65	
343	1	ESSFwc4	r-w	b	80	fSL	35	SL	65	D
343	2	ESSFwc4	vp-i	b	70	SiL	1	SiL	1	D
344	1	ESSFwc4	r	s	90	SL	35	SL	65	D
344	2	ESSFwc4	r	s	10	SL	65	R	R	D
344	3	ESSFwc4	w-r	s	85	fSL	30	SL	35	
345	1	ESSFwc1	w-r	s	199	SL	30	LS	45	G38
345	2	ESSFwc1	r	s	85	SL	35	SL	70	D
346	1	ICHmw2/ESSFwc1	w-r	v	199	SL	30	SL	45	
346	2	ICHmw2/ESSFwc1	r	v	95	SL	35	SL	65	
347	1	ICHmw2/ESSFwc1	w	s	150	SL	30	LS	40	
347	2	ICHmw2/ESSFwc1	w	s	90	SL	25	SL	35	
347	3	ICHmw2/ESSFwc1	r	s	95	SL	35	SL	65	
348	1	ICHmw2	r	s	70	SL	45	SL	85	
348	2	ICHmw2	r	s	10	SL	65	R	R	
349	1	ICHmw2	w	s	199	SL	30	SL	40	
349	2	ICHmw2	r	s	85	SL	35	SL	65	
350	1	ICHmw2	w-r	s	90	SL	25	SL	35	
350	2	ICHmw2	r	s	85	SL	35	SL	75	
351	1	ICHmw2	w	s	299	SL	30	LS	40	
351	2	ICHmw2	w	s	90	SL	25	SL	35	
352	1	ICHmw2	w	s	90	SL	25	SL	35	
352	2	ICHmw2	w	s	299	SL	30	LS	40	
353	1	ICHmw2	r	s	75	SL	35	SL	75	
353	2	ICHmw2	r	s	10	SL	65	R	R	
354	1	ICHmw2	w-r	v	199	SL	15	SL	30	G21
354	2	ICHmw2	w	v	90	SL	25	SL	30	
354	3	ICHmw2	r	v	75	SL	35	SL	75	D

APPENDIX 4 Falls Creek Polygon Data for Interpretation Determination

Poly #	Unit #	BEC Unit	Soil Drain	Slope Config.	Depth to Restrict (cm)	0-15 cm Text	0-15 cm CF (%)	30-90 cm Text	30-90 cm CF (%)	Field Checks*
355	1	ICHmw2	i-w	b	299	SL	45	LS	75	
355	2	ICHmw2	r-w	b	299	SL	35	LS	60	
356	1	ICHmw2	r	v	95	SL	35	SL	65	
356	2	ICHmw2	r	v	10	SL	65	R	R	
356	3	ICHmw2	r	v	90	SL	30	LS	40	
357	1	ESSFwc1	w-r	v	150	SL	30	LS	50	G39
357	2	ESSFwc1	r	v	95	SL	35	SL	65	
358	1	ICHmw2/ESSFwc1	r	s	85	SL	35	SL	65	
358	2	ICHmw2/ESSFwc1	r	s	10	SL	65	R	R	
358	3	ICHmw2/ESSFwc1	w-r	s	90	SL	30	SL	45	
359	1	ICHmw2/ESSFwc1	r	s	85	SL	35	SL	65	
359	2	ICHmw2/ESSFwc1	w-r	v	150	SL	30	SL	45	
360	1	ICHmw2	r	s	85	SL	40	SL	75	
360	2	ICHmw2	r	s	10	SL	65	R	R	
361	1	ICHmw2	r	s	75	SL	35	SL	75	
361	2	ICHmw2	w-r	s	85	fSL	25	SL	35	
362	1	ESSFwc1/ICHmw2	w	v	120	SL	30	SL	35	
362	2	ESSFwc1/ICHmw2	r	s	95	SL	35	SL	65	
363	1	ESSFwc1	r	s	85	SL	35	SL	70	
363	2	ESSFwc1	r	s	10	SL	65	R	R	
364	1	ESSFwc1/ICHmw2	r	s	10	SL	65	R	R	
364	2	ESSFwc1/ICHmw2	r	s	70	SL	35	SL	70	
365	1	ESSFwc1	r	s	75	SL	35	SL	75	
365	2	ESSFwc1	r-w	s	90	SL	30	SL	40	
365	3	ESSFwc1	r	s	10	SL	65	R	R	
366	1	ESSFwc1	r-w	s	90	SL	35	SL	75	
367	1	ESSFwc4	r-w	s	80	SL	35	SL	70	D
367	2	ESSFwc4	r	s	10	SL	65	R	R	D
368	1	ESSFwc4	r	s	85	SiL	45	SL	75	D
368	2	ESSFwc4	r-w	s	90	SiL	30	SL	45	D
368	3	ESSFwc4	r	s	10	SL	65	R	R	D
369	1	ESSFwc4	r	s	90	SL	35	SL	75	D
369	2	ESSFwc4	r-w	s	90	SL	30	SL	45	
369	3	ESSFwc4	r	s	10	SL	65	R	R	D
370	1	ESSFwc4	w//i	s	80	SiL	35	fSL	45	G41
370	2	ESSFwc4	r//i	s	75	fSL	30	SL	75	G40
371	1	ESSFwc4	w-r	v	90	SL	25	SL	35	
371	2	ESSFwc4	r	v	90	SL	35	SL	75	
372	1	ESSFwc4	r	s	90	SiL	35	SL	70	G3
372	2	ESSFwc4	r	s	10	SL	65	R	R	D
372	3	ESSFwc4	w-r	s	85	SiL	30	SL	35	D
373	1	ESSFwc1	w-r	s	90	SL	25	SL	35	
373	2	ESSFwc1	r	s	75	SL	35	SL	75	
374	1	ICHmw2/ESSFwc1	r	s	85	SL	45	SL	75	G20
374	2	ICHmw2/ESSFwc1	r	s	10	SL	65	R	R	
374	3	ICHmw2/ESSFwc1	r-w	s	120	SL	30	LS	40	
375	1	ESSFwc4	r	s	75	SiL	35	SL	70	
375	2	ESSFwc4	w/i	b	85	SiL	30	SL	35	

APPENDIX 4 Falls Creek Polygon Data for Interpretation Determination

Poly #	Unit #	BEC Unit	Soil Drain	Slope Config.	Depth to Restrict (cm)	0-15 cm		30-90 cm		Field Checks*
						Text	CF (%)	Text	CF (%)	
376	1	ESSFwc4	r	s	75	SiL	35	SL	70	
376	2	ESSFwc4	r	s	10	SL	65	R	R	
376	3	ESSFwc4	w	s	85	SiL	30	SL	35	
377	1	ESSFwc4	r	s	95	SL	35	SL	65	
377	2	ESSFwc4	r	s	10	SL	65	R	R	
378	1	ESSFwc1	r	s	75	fSL	35	SL	75	
378	2	ESSFwc1	w	s	90	SiL	25	SL	35	
379	1	ESSFwc4	r	s	90	SL	35	SL	70	
379	2	ESSFwc4	r	s	10	SL	65	R	R	
379	3	ESSFwc4	r	s	299	LS	95	SL	85	D
380	1	ESSFwc4	i/w	b	120	fSL	25	SL	35	G2
380	2	ESSFwc4	r-w	b	85	fSL	45	SL	65	D
380	3	ESSFwc4	w-r	s	299	SL	35	SL	45	G1
381	1	ESSFwc4	r	s	90	SL	35	SL	75	
382	1	ESSFwc4	r	s	95	SL	35	SL	65	
382	2	ESSFwc4	w-r	s	90	fSL	30	SL	35	
383	1	ESSFwc1	r	s	75	fSL	35	SL	75	
383	2	ESSFwc1	r	s	10	SL	65	R	R	
384	1	ESSFwc4	r	b	75	SL	25	SL	55	D
384	2	ESSFwc4	w-r	b	90	fSL	25	SL	30	D
384	3	ESSFwc4	r	b	10	SL	65	R	R	
385	1	ESSFwc1	r	s	85	SL	35	SL	65	
385	2	ESSFwc1	r	s	10	SL	65	R	R	
386	1	ICHmw2	r	s	85	fSL	35	SL	65	
386	2	ICHmw2	w-r	s	90	SiL	30	SL	35	
387	1	ICHmw2	r-w	s	90	SiL	35	SL	65	
387	2	ICHmw2	w	s	85	SiL	25	SL	30	
388	1	ICHmw2	r	s	95	SL	45	SL	75	D
388	2	ICHmw2	r	s	10	SL	65	R	R	D
389	1	ICHmw2	w-i	s	90	SL	30	SL	35	
389	2	ICHmw2	r-w	s	85	SL	40	SL	65	
390	1	ICHmw2/dw	w//i	s	85	SL	30	SL	40	G7,G8
390	2	ICHmw2/dw	r-w	s	90	SL	35	SL	70	D
390	3	ICHmw2/dw	r-w	s	299	SL	55	LS	55	G23
391	1	ICHmw2	w/i	s	85	SL	30	SL	35	
391	2	ICHmw2	w	s	199	SL	35	LS	45	
392	1	ICHmw2/dw	r	s	85	SL	35	SL	75	
392	2	ICHmw2/dw	w	s	90	fSL	15	SL	30	C2
393	1	ICHdw	w	s	199	SL	30	LS	50	C4,C7
393	2	ICHdw	r	s	85	fSL	35	SL	70	
394	1	ICHdw	r	s	85	SL	25	SL	65	C3
394	2	ICHdw	r-w	s	85	SL	20	LS	20	C6
394	3	ICHdw	r	s	10	SL	65	R	R	D
395	1	ICHmw2	w-r	s	90	SL	40	LS	50	D
395	2	ICHmw2	r	s	85	SL	35	SL	75	
396	1	ICHdw	r	s	95	fSL	35	SL	70	G15
396	2	ICHdw	w	s	90	SiL	20	SL	30	C1
396	3	ICHdw	r	s	10	SL	65	R	R	C5

APPENDIX 4 Falls Creek Polygon Data for Interpretation Determination

Poly #	Unit #	BEC Unit	Soil Drain	Slope Config.	Depth to Restrict (cm)	0-15 cm Text	0-15 cm CF (%)	30-90 cm Text	30-90 cm CF (%)	Field Checks*
397	1	ICHdw	w-r	s	299	SL	30	LS	45	C9,G9,10,16
397	2	ICHdw	r	s	85	fSL	35	SL	65	D
397	3	ICHdw	w//m	s	75	fSL	25	SL	30	G11
398	1	ICHdw	w-r	s	199	SL	20	LS	50	C8
398	2	ICHdw	r	s	85	fSL	35	SL	75	
399	1	ICHdw	r	s	90	SL	25	SL	55	D
399	2	ICHdw	r	s	10	SL	65	R	R	D
400	1	ICHdw	w-r	v	199	SL	35	LS	35	G12
400	2	ICHdw	r	v	95	SL	35	LS	55	D
400	3	ICHdw	r	v	10	SL	65	R	R	D
401	1	ICHdw	w	s	299	SL	25	LS	35	G13
402	1	ICHdw	w-m	s	90	SiL	30	SiL	35	D
402	2	ICHdw	w//m	v	199	SL	40	LS	55	D
403	1	ICHdw	w	s	299	SL	40	LS	60	D
404	1	ICHdw	w	s	299	SL	25	LS	35	
405	1	ICHdw	w	s	399	SL	25	LS	35	
406	1	ICHdw	w	s	399	SL	25	LS	35	D
406	2	ICHdw	w	v	399	SL	35	LS	45	D
407	1	ICHdw	r	s	95	SL	35	SL	75	D
407	2	ICHdw	w	s	90	SiL	25	SL	30	D
407	3	ICHdw	w	b	199	SL	20	LS	55	D
408	1	ICHdw	w	s	299	SL	25	LS	40	D
408	2	ICHdw	r	s	85	SL	35	SL	65	
409	1	ICHdw	w	s	399	SL	25	LS	55	

APPENDIX 5: Detailed Channel Description Data

Site No.	Reach No.	Length m	Elev m	Flow l/s	Gradient (%) rep	min	max	Width (m) rep	min	max	Depth (cm) rep	min	max	Ratio w/d	Bed Composition (% of total) LB	SB	LC	SC	CG	FG	S	M	W	BR	Mobile (%)	Brght (%)	Cling	Ang 1	Ang 2
1	10	50	1295	3	11	10	14	2.6	2	3.4	13	10	20	20	3	20	30	15	15	10	2	0	0	5	34	25	c->a	sa	sr
2	9	50	1275	8	9	8	10	3.5	1.8	7	7	4	20	50	5	15	35	25	10	8	2	0	0	0	97	75	n->s	sa	sr
3	7	50	1110	25	8	5	11	3.8	3	5	20	15	25	19	5	25	23	20	15	10	2	0	0	0	82	75	n->s	sa	sr
4	11	100	1095	70	12	10	18	5.5	4.5	10	50	35	70	11	10	40	20	15	10	4	1	0	0	0	70	30	s	sr	sa
5	11	40	1055	60	8	6	10	8.5	7	10	15	5	25	57	5	20	33	20	15	5	2	0	0	0	85	80	n->s	sr	sa/r
6	5	100	1030	120	7	5	10	7.5	6	9.5	18	10	25	42	10	30	25	15	13	5	2	0	0	0	75	60	n	r	sr
7		50	1028	0	21	19	22	3.6	2.8	4.8	24	15	35	15	3	32	40	15	6	3	1	0	0	0	45	35	s	sr	r
8	4	100	1005	130	7	6	8	10	8.5	18	35	25	50	29	5	30	25	20	15	4	1	0	0	0	90	80	n	r	sr
9	3	40	882	200	5	4	6	7.5	7	9	50	40	70	15	20	40	20	10	6	3	1	0	0	0	40	40	n	r	sr
10		30	995	0.1	20	18	25	1.8	1.5	2.8	40	30	75	5	1	10	28	40	5	3	7	2	2	2	17	75	s	a	sr

Site No.	Reach No.	Sco %	Dep %	Pack	Sfc (cm) d50	d90	SubSfc d50	100yr Sfc d90	Sfc/Sub d50 ratio	Ratio d/D	Ratio 100/1	No. Steps Full	Part	Step Composition LW	SW	Rt	St	Step Height Rep	Min	Max	Step Stab.	Pool Length,m rep	min	max	W1m (m) rep	min	max	Ratio w_{1m}/w_b
1	10	0	20	m	8	16	3	50	2.7	3.8	3.1	8	4		10	10	80	40	25	75	s	1	0.5	2.5	8	6	11	3.1
2	9	0	65	m->l	10	25	3	60	3.3	8.6	2.4	3	2				100	45	30	75	m	1.2	0.8	1.6	20	10	25	5.7
3	7	0	60	l	10	35	3	80	3.3	4.0	2.3	3	7				100	45	30	60		0.6	0.3	1	15	12	18	3.9
4	11	0	15	l/t	12	35	8	70	1.5	1.4	2.0	1	14				100	75	50	130	s->m	0.8	0.4	2.5	10	6	12	1.8
5	11	0	80	l(t)	15	35															m				18	10	25	2.1
6	5	0	70	l/t	14	30		60		3.3	2.0	3	14				100		25	110	m->s	1	0.5	3	20	12	30	2.7
7		0	25	m	8	20	3	60	2.7	2.5	3.0	0	15				100	80	70	90	s->m	1	0.8	1.6	12	9	15	3.3
8	4	0	95	l&t	10	40	4	65	2.5	1.9	1.6	2	11	10			90	60	40	110	s->m	0.7	0.5	1.2	28	22	40	2.8
9	3	0	40	l&t																					9	7	11	1.2
10				l																					6	4	8	3.3

e	Reach No.	Coupling (%) C	PC	Un	Seep %	Obnk %	Stone Size	Stone %	Bank Cutting (%) Nil	<.5	.5-1	>1	Cut Ends	Small Wood An	Un	Dec	Medium Wood An	Un	Dec	Large Wood An	Un	Dec	Wood CDM	Wood Stand	Wood Span
	10	75	25		15	10	>10	90	95	5			c	1	2	d	0	1	r(d)	0	3	R	c	20	0
	9	15	10	75	5	10	>10	80	70	15	10	5	n->s	0	1	d	0	1	r	4	1	R	c	5	1
	7	50		50	50	0	>10	90	50	25	20	5	c	0	0		0	0		1	0	R	c	11	0
	11			100	20	0	>10	95	60	25	15		a -> c	0	0		0	1	r	1	4	R	c	15	0
	11			100																					
	5	20	10	70	20	15	>10	90	60	25	15		a	0	0		0	2	r	1	3	R	c -> m	21	0
		20		80	5	0	>10	95	70	10	20		a	7	0	u	0	0		1	0	R	c	13	0
	4			100	15	10	>10	90					a	0	0		0	0		2	6	R	c -> m	15	0
	3			100			>10	90					a	0	0		0	0		0	0	0	c		0
)		100					>25	35	40	60			n										c	>25	4

APPENDIX 6: Definitions of Channel Description Variables

Gradient: Gradient of the reach as measured between its end points; a min or a max is recorded only where a departure exists for at least 10 m

Width and Depth (w_b and d_b): Both determined at bankfull height; bankfull height is based on a combination of changes in vegetation, bank morphology, and surface texture

Bed Composition (by %): Bolded numbers indicate full-fraction mobility; italicized numbers indicate partial-fraction mobility. Mobile sizes are summed to determine the % of the bed that is mobile. The percentage of the bed composed of each of the following:

LB - large boulders (> 100 cm on the b axis)	S - sand
SB - small boulders (25 -100)	M - muck - includes silt, clay & fine organic matter
LC - large cobbles (15 - 25)	FF - forest floor
SC - small cobbles (7.5 -15)	W - wood
CG -coarse gravels (2.5 - 7.5)	BR - bedrock
FG - fine gravels (0.25 - 2.5)	Sub - subsurface flow

Mobile (%): percentage of the clastic bed which moves annually

Brightness (%): percentage of the clastic bed which appears bright: newly exposed, lacking vegetation & organic stains

Clinging Vegetation: The abundance of the clastic bed that is covered with moss or algae:

none (n) - Clinging plants are rarely found anywhere in the reach.

sparse (s) - Plants are found but their occurrence is spotty. They are almost totally absent from rocks in the swifter portions of the reach and may also be absent in some of the slow and still water areas.

common (c) - Plants are quite common in the slower portions of the reach but thin out or are absent in the swift portions of the stream.

abundant (a) - Clinging plants are abundant throughout the reach from bank to bank. A continuous mat of vegetation is not required but moss and/or algae are readily seen in all directions across the stream.

Angularity 1, 2: Four classes of angularity observed in the reach:

angular (a) - flattened faces with sharp edges and corners; plane surfaces roughened

subangular (sa) - slightly rounded points of intersection of subrectangular faces; surfaces smooth and flat

subrounded (sr) - well rounded in two dimensions

rounded (r) - well-rounded in three dimensions; surfaces smooth

Deposition and Scour: The percentage of the area of the entire bed that is affected by each of scour & deposition (includes pools and bars on the channel margins)

Packing: The degree of imbrication/consolidation of the bed (of both the wood and the clasts):

none (n) - Rocks in loose array, moved easily by less then high flow conditions and move underfoot while walking across the bottom

loose (l) - Moderately loose without any pattern of overlapping. Most elements might be moved by average high flow conditions.

mixed (m) - Moderately tight packing of particles with fast water parts of the cross-section protected by overlapping rocks; these may be dislodged by higher than average flow conditions, however.

tight (t) - An array of sizes are tightly packed and wedged with much overlapping which makes it difficult to dislodge by kicking.

Bed-Particle Mobility

annual surface d_{50} & d_{90}: The part of the clastic bed that appears bright is assumed to move in the mean annual flood ("Annual"). The d_{50} and d_{90} of this material is recorded as seen on the surface. The d_{50} is the b axis of the 50th percentile of the size distribution of this material by weight. (The d_{90} is larger, corresponding to the 90th percentile of the same distribution.)

subsurface d_{50}: The d_{50} of the bed material below the surface.

100-year surface d_{90}: The d_{90} of the material mobile during the 100-year flood.

Number of Steps: Full – step spans entire channel; Part – step spans channel partially

Step Composition: The extent to which each of large wood (> 25 cm, "LW"), small wood (< 25 cm, "SW") roots ("Rt"), stone ("St") forms the steps.

Step Height: The height of the steps as measured from the bed to the top of the step (rep, min, max).

Step Stability

Stable (s) – most steps require 100-year flood to be broken

Unstable (u) – most steps broken during annual flood

Mixed stability (m) – mixture of stable and unstable steps

Pool Length: The longitudinal length of pools (rep, min, and max).

Confinement (w_{1m}): Width of the gully at a vertical position one metre above the channel bed (rep, min, and max)

Coupling: Coupling refers to sediment production/delivery within the reach width.

Coupled (C): Sediment produced on the sidewalls is expected to reach the creek.

Uncoupled (U): Sediment is not expected to reach the creek.

Partially Coupled (P): It is uncertain whether sediment will reach the creek.

Seepage: The percentage of the reach excluding the active channel which is subhygric or wetter based on wet-site plant indicators.

Overbank: Percentage of the full length of the reach containing evidence of overbank flows

Bank Stone Content: Percentage of the soil composing the banks containing particle sizes greater than 10 or 25 cm.

Bank Cutting: % of total bank length with evidence of bank erosion in each class according to bank height:

Nil - no cutting is evident

< 0.5 - cutting affects less than half of d_b

0.5 - 1.0 - cutting affects between a half and a full d_b

> 1 - cutting affects a height more than d_b

Cut Ends The number of cut ends observed in the riparian area: none, sparse, common, abundant.

Wood Inventory: Within-channel wood is recorded with 3 diameter size classes, distinguishing between those which are anchored (AN) and unanchored (UN). Anchored means that the wood is securely attached to at least one bank or in the bed. The dominant level of decay is recorded according to:

Undecayed (U): Needles, twigs, or bark present (< 5 years).

Decayed (D): Bark absent but wood is generally hard when kicked (5-20 years).

Rotten (R): Bark is absent and wood is soft when pressed (> 20 years).

Both the type and amount of potential wood recruitment to the channel is recorded:

Type: Coniferous (C); Deciduous (D); Mixed (M)

Stand: The number of standing trees with dbh > 25 cm within the reach.

Span: The number of channel-spanning trees (dbh > 25 cm) which do not currently reach any part of the active channel.

APPENDIX 7: Notes on Terrain Mapping

Surficial Materials (Genetic Materials)

Many soils in the study area (and throughout the Kootenays) have silty or fine sandy cappings. These tend to be deeper in receiving positions (up to 1m), shallower on steeper shedding positions and absent in more active colluvial areas. The fine sandy to silty material is Eolian in origin, including some volcanic ash, and has been redistributed by slopewash processes (Utzig 1978). These materials are often more prevalent in alpine areas. Although they are extensive, because these materials are intermixed with other materials and shallow, they have not been specifically recognized on the terrain map.

Due to the intense weathering of some of the plutonic rock types to a uniform coarse sand and fine gravel, whether as coarse fragments or in situ bedrock, in some locations it is difficult to distinguish between morainal (M), glaciofluvial (F^G), colluvial (C) and grus/saprolite (D), especially when a number of these types were intermixed. Because the management interpretations would be similar regardless of the exact origin, and to simplify map labels, often only the dominant surficial material type was noted, although two or more may be present.

There were a number of localities, often lower slopes, where morainal (M) materials have been reworked by glacial meltwaters creating discontinuous, overlying, loose, moderately sorted, shallow (0.5-2 m) surficial deposits of coarser texture. Although these could be mapped as glaciofluvial veneers, they were generally mapped as washed morainal materials (e.g. Mbt-W). Morainal -washed units often have significant inclusions of glaciofluvial deposits, and even small terraces.

Boundaries between valley bottom - toe slope map units of glaciofluvial or morainal materials and upslope map units of colluvium will often contain a transitional band of colluvial veneer grading to colluvial blanket over the morainal or glaciofluvial deposits. In general these types were too small to be mapped at this scale, however they are present in almost all these situations. In shallow sloping areas where morainal or glaciofluvial materials are mapped in complexes with saprolites, there are also commonly occurrences of morainal and glaciofluvial veneers overlying saprolites. These are also generally not indicated as separate map units.

As employed in this mapping project, both colluvium (C) and grus/saprolite (D) are products of bedrock weathering. The distinction is that colluvium is actively moving under the force of gravity, while grus/saprolite is not. A slope angle of 40% has been selected to differentiate areas of colluvium from grus/saprolite. To simplify map labels, in areas of complex slopes the dominant material type may be the only one indicated.

There is a very limited amount of fluvial (F) material mapped in the study area, mainly restricted to narrow flood plains along major streams. Almost every stream and gully has minor fluvial deposits, however they are generally too small to be depicted at this scale of mapping. The assumption can be made that any map unit containing a stream will have inclusions of sandy to gravelly (sg or gs) or sometimes silty (z) fluvial materials proportional to the length of stream in the map unit. These generally have moisture regimes of subhygric to hygric. Where glaciofluvial materials are mapped adjacent to streams, the lower terraces adjacent to the steams, may in fact be fluvial rather than glaciofluvial. Significant portions of the streambeds are often fluvial veneers over bedrock or bedrock itself, although the surrounding terrain is of sufficient depth to be mapped as blankets or terraces. These areas of bedrock are generally treated as inclusions and not indicated on the maps (detailed stream reach mapping would be required to define these areas).

High elevation cirque basins generally contain a complex of bedrock, colluvial, morainal, glaciofluvial and grus/saprolite materials. This project has included very limited field inspections of these areas. Based on limited field work in similar areas, the general model used to type these areas was to map colluvium on slopes in excess of 40%, grus/saprolite on convex gentle slopes with significant bedrock outcrops, and washed morainal in concave lower slope positions. Gently sloping to flat areas adjacent to streams were mapped as sandy to gravelly sandy glaciofluvial. Receiving positions with open meadow vegetation and subhygric to subhydric moisture regimes were mapped as organic veneer (Ov) over morainal or grus/saprolite. The silty component of the grus/saprolite map units is mainly redistributed eolian material. The percentages of the various map units mapped in these areas may not be very reliable.

The steep fans located at the base of steep gullies have generally formed from a combination of fluvial deposition, debris flood/debris torrent and snow avalanche activity. They are generally steeper than the slopes associated with fluvial fans and gentler than that associated with colluvial cones. These have been designated colluvial-fluvial (CF) materials.

Surface Expression

Map units adjacent to streams, especially those mapped as terraced (e.g. $F^{G}bt$) often include discontinuous steep (50-90%) terrace faces along the streams. These terrace faces are often too small to map at this scale and may be treated as inclusions or, if sufficiently large, be indicated by an on-site symbol.

Combinations of blankets (b) and veneers (v) are generally used to indicate areas where the depth of surficial materials over bedrock varies from less than 1 m to over 1 m. The surface expression listed first is dominant in terms of areal extent (i.e. 51-90%). Any polygons including veneer will likely include some bedrock outcrops (assume 10% minimum), whether bedrock is indicated as a map unit or not (except where another underlying stratigraphic unit is indicated). Pure blanket units can also have occasional bedrock outcrops, but they will be rare. The use of mantle indicates an irregular substrate and no clear indication of dominant depth. Thin veneer indicates depths less than 20 cm.

Modifying Processes

Many gullies in the study area have been eroded into moderately sloping to steep bedrock slopes (i.e. Rsk-V) which are overlain by a mantle of colluvium (Cbv or Cvb). Rather than indicate underlying stratigraphic units for each of these map units, these have been designated as gullied colluvium (Cbv-V) to simplify the labels, although in many cases the gullies are wholly or partly in the underlying bedrock.

As described above under surficial materials, the washed (W) process modifier has been used to indicate morainal materials (Mbv-W) with a veneer or rarely a shallow blanket of glaciofluvial material due to reworking by glacial meltwater. For the purposes of this study the process status is assumed to be inactive.

Areas of frequent snow avalanching, with return periods of ten years or less, are indicated by the normal designation "A". These areas are non-forested, non-vegetated or dominated by shrubs, herbs and/or deformed scattered trees. These areas have no potential for timber management.

There are some areas that have experienced snow avalanching for a limited period of time, following forest fires. Natural reforestation of the starting zones in recent years appears to have restricted avalanching to specific gullies, allowing reforestation of the lower slopes and runout zones previously affected. These areas have been designated "Aa", to indicate there is an ongoing risk of avalanche activity if the forest is removed in the starting zones. There is potential for timber management on the lower slopes in these areas, but with some risk attached. Forest removal in areas with similar aspect, slope and topographic configuration to the starting zone portions of these areas will likely result in increased snow avalanching as well.

Stratigraphic Units

In the interest of simplifying map labels, stratigraphic units have been used sparingly. Unless otherwise indicated veneers (v) and blankets (b) are overlying bedrock. It can be assumed that the bedrock is a unidirectional (planar) surface of the slope indicated for the veneer or blanket. If the map polygon is a complex, including bedrock, then the blanket or veneer is overlying bedrock with a similar surface expression to that indicated for the bedrock map unit, unless otherwise indicated.

Texture of Surficial Materials

As described in the B.C. Terrain Classification Manual (Howes and Kenk 1997), surficial material texture can vary both laterally and vertically within a terrain unit. The textures indicated attempt to depict the modal or typical texture for that map unit, recognizing that substantial variation can exist. Textures associated with colluvial and grus/saprolite materials generally are coarser at depth. Glaciofluvial textures are often highly variable due to the unstable deglaciation environment in which they are formed. They can often include textures ranging from washed boulders to lenses of silty glaciolacustrine within one map unit. Textures that constitute less than 20% of the map unit are generally not shown.

Many soils in the study area have surface layers that contain significant amounts of silt and fine sand derived from reworked eolian deposits including some volcanic ash. In general this layer is less than 50 cm deep and has not been included in the terrain designation. Where felt to be significant, it is indicated by including "silty" (z) in the texture portion of the terrain label. More detailed information on soil textures is presented in Appendix 4.

The common clastic texture term "fine" (f) has been used to indicate materials that have a mixture of sand, silt and clay (i.e. generally loams or sandy loams with significant clay content).

Slopes

The representative slope is generally the median slope; however, in map units with a discontinuous distribution of slopes, it is a slope which is considered representative of the conditions in the polygon. The minimum and maximum slopes are intended to cover approximately 80-90% of the slope conditions within the map unit. There are likely rare conditions of limited extent within each map unit that exceed the ranges indicated.

APPENDIX 8: Field Description Forms

Terrain Description Card

Kokanee Forests Consulting
Kutenai Nature Investigations

Project	Surveyor	DATE	Y	M	D	Plot No.

Location	Pit TC RC Exp	Photo No.

Aspect	Slope	S L B U	Elev.	Airphoto

Slope Description
Site: Convex Concave Straight
Unit: Smooth Benched/Broken Gullied
Meso: Crest Upper Mid Lower Toe Dep Level

Terrain Symbol

Moist Regime
VX X SX SM M SHG HG SHD

Soil Drainage R W MW I P VP	Coarse Frag. Lith.	TS & LIS

Bedrock Type	Strike/Dip - B F	Depth to (cm)	Fract.	// Y N	SE & SDP

Profile Description

Horiz.	Depth (cm)	Texture Sand	Silt	Clay	Coarse Fragments G	C	S	Tot	Shp		

Seep Depth	Imp. Depth		

Comments (stability indicators, mottles, gullying, $CaCO_3$, vegetation)

Poly #	P Unit 1 %			P Unit 2 %			P Unit 3 %		
Terrain									
Slope %	Rep.	Min.	Max.	Rep.	Min.	Max.	Rep.	Min.	Max.

Slope Configuration			Depth to Impermeable			Soil Drain./Moist. Reg.			BEC/Site Series		
1	2	3	1	2	3	1	2	3	1	2	3

Plot #