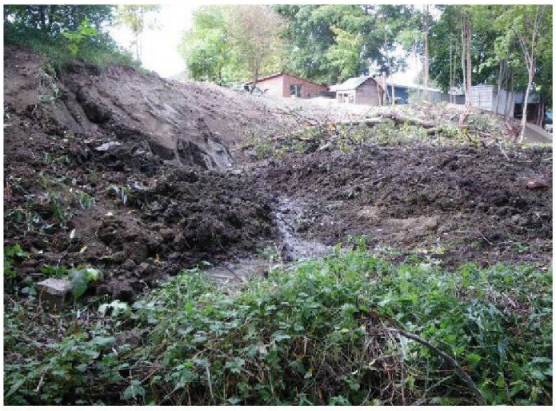
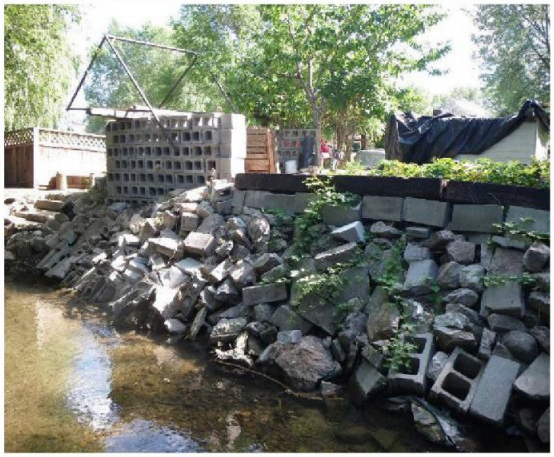
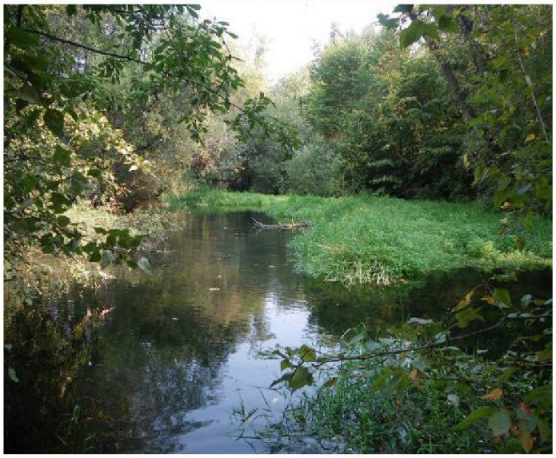
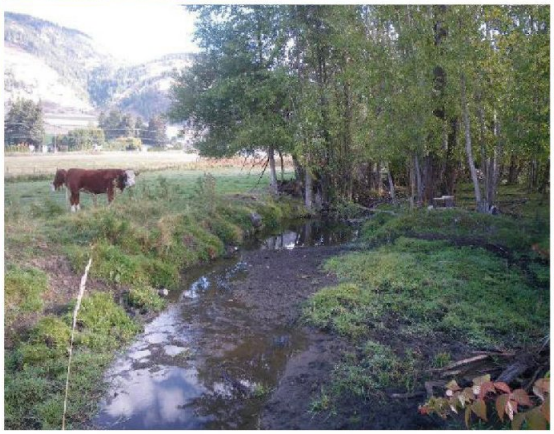
COLDSTREAM CREEK
BREWER CREEK
CRASTER CREEK

SENSITIVE HABITAT INVENTORY AND MAPPING (SHIM) – 2009 Survey Period

Inventory Summary Report

A Comprehensive Watercourse Catalogue


ECOSCAPE
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District of Coldstream
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Okanagan Basin WATER BOARD

Prepared For:
District of Coldstream

Prepared By:
Ecoscape Environmental Consultants Ltd.

File No.:09-368
December 2009

SENSITIVE HABITAT INVENTORY AND MAPPING (SHIM) - 2009

Inventory Summary Report

Prepared For:

DISTRICT OF COLDSTREAM

Prepared By:

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December, 2009

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1.0 INTRODUCTION

Ecoscape Environmental Consultants Ltd. (Ecoscape) was retained by the District of Coldstream to complete Sensitive Habitat Inventory and Mapping (SHIM) of Coldstream Creek, Brewer Creek, and Craster Creek. The following report summarizes the inventory findings, which have been provided to the District of Coldstream and the Community Mapping Network (www.shim.bc.ca) in digital GIS format.

1.1 Project Background

As resource development and human populations increase in British Columbia, pressures for all resources and services have accelerated. Rapid growth has often overwhelmed the ability of local planners to manage land and preserve sensitive habitats (Mason and Knight, 2001). This has resulted in the loss or degradation of aquatic and riparian habitats that are critical for fish and a diverse wildlife assemblage. Accordingly, there is an urgent need to develop stronger tools and better methods to conserve, protect, and reclaim these habitats.

Sensitive Habitat Inventory and Mapping (SHIM) is a standard for fish and aquatic habitat mapping in urban and rural watersheds in British Columbia. SHIM attempts to ensure the collection and mapping of reliable, high quality, current, and spatially accurate information about local freshwater habitats, watercourses, and associated riparian communities.

SHIM is designed as a land-planning, computer-generated, interactive GIS tool that identifies sensitive aquatic and terrestrial habitats. It is intended to provide community, stewardship groups, individuals, regional districts and municipalities with an effective, low-cost delivery system for information on these local habitats and associated current land uses.

SHIM has numerous applications and can:

- Provide current information not previously available to urban planners, to allow more informed planning decisions and provide inventory information for integration into Official Community Plans;
- Identify and map areas of significant impairment (e.g., erosion, channelization, habitat degradation) and potential point sources of pollution;
- Assist in the design of stormwater/runoff management plans;
- Monitor for changes in habitat resulting from known disturbance;
- Help guide management decisions and priorities with respect to habitat restoration and enhancement projects;
- Assist in determining setbacks and fish/wildlife-sensitive zones;
- Identify sensitive habitats for fish and wildlife along watercourses;

- Provide a means of highlighting areas that may have problems with channel stability or water quality that require more detailed study;
- Provide baseline mapping data for future monitoring activities; and,
- Map and identify the extent of riparian vegetation available and used by wildlife and fisheries resources.

1.2 Project Objectives

The objectives of the project were to:

- Inventory and map the extents of Coldstream, Brewer, and Craster Creeks and associated riparian habitats, and important watercourse and fisheries habitat features;
- Provide the basis for accurately mapped baseline data that can be integrated into local mapping and planning initiatives; and,
- Augment and potentially enhance local land use planning maps and/or specific site or detailed planning surveys.

The primary functions of SHIM are to:

- Identify sensitive habitats and resources within local communities;
- Integrate property boundaries, land parcels, and road networks with locations of sensitive resources to facilitate Official Community Plans and Development Permit applications;
- Work within an interactive Geographical Information System (GIS) to provide useful map products for analysis and effective communication;
- Facilitate updating and exchange of information; and,
- Establish partnerships with provincial and municipal governments, stakeholders, and the public, to protect and manage aquatic habitats and associated functions (i.e. riparian communities and linear corridors etc.).

By combining resource information from a variety of sources, the goal is that SHIM will provide a robust baseline inventory (cataloguing the stream and all natural and anthropogenic features occurring within and along it) for improving integrated resource management and planning within the District of Coldstream.

2.0 SCOPE OF WORK

The project work scope was based on a proposal submitted to the District of Coldstream (Ecoscape 2009)[1]. The fundamental objective was to complete Sensitive Habitat Inventory and Mapping (SHIM) surveys on all creeks identified in the Request for Proposal including:

- Coldstream Creek (SHIM survey length = 19.8 km)
- Brewer Creek (SHIM survey length = 3.5 km)
- Craster Creek (SHIM survey length = 3.0 km)

Field inventory methods and data processing and management were to conform to SHIM Standards and Methodology. At the completion of the project, standard SHIM deliverables are to be provided to the District of Coldstream and subsequently to the Community Mapping Network (CMN) for publication in the SHIM atlas.

3.0 METHODOLOGY

Field inventory, data processing and data deliverables conformed to the SHIM Standards (Mason and Knight, 2001), which can be reviewed in full at:

http://www.shim.bc.ca/methods/SHIM_Methods.html

3.1 Centerline Survey

Danielle Drieschner was the principal surveyor and completed all field survey elements with the assistance of Kyle Hawes, R.P.Bio., Tyra Zeman, and Adam Patterson.

The stream centerline was mapped along the center of the bankfull (not floodplain) width. The creek was stratified into a series of successive sections (segments), each possessing and being characterized by different attributes or biophysical characteristics (i.e. hydraulic class, channel characteristics, substrates composition, and riparian class, etc.). The stream segmentation and associated attributes was the fundamental unit of the centerline survey with point features providing a more quantitative measure of relative disturbance/modification and aquatic habitat quality/complexity (i.e. area abundance of deep pools, spawning substrates, large woody debris, bank erosion, etc.).

Table 1 provides a complete list of features and corresponding attributes that were recorded using the Trimble Geo Explorer (GPS) and SHIM Data Dictionary.

[1] Drieschner, D and K, Hawes. 2009. Sensitive Habitat Inventory and Mapping (SHIM) Proposal for SHIM of Coldstream Creek. January 2009. Prepared for: District of Coldstream. Prepared by: Ecoscape Environmental Consultants Ltd. 18 pp.

Table 1. Overview of watercourse and habitat attributes to be collected using the SHIM Data Dictionary (Module 3, Mason and Knight, 2001). The complete data dictionary can be found in Appendix A.

Survey Component	Main Attribute	Detailed Feature Collected
Stream Centre Line	Stream Reference Information	Name; Watershed Code; Date; Time; Survey Conditions; Surveyors
	Stream Segment Points	Start; Stop; Reach Break; Elevation; Representative Photographs
	Stream Segment Class	Stream Section; State of Section (i.e. natural/modified/channelized); Dominant Hydraulic Type
	Segment Characteristics	Section Gradient; Fish Spawning; Canopy; Access; Gravel
	Segment Substrate Attributes	Dominant Substrate Type; Compaction
	Segment Channel Attributes	Widths (wetted, bankfull), Depths (wetted, bankfull)
	Segment Instream Cover	% Total Cover; % by Feature/Cover Type (large woody debris/deep pool/over stream vegetation etc.)
	Segment Riparian Attributes	Left and Right Bank Riparian Class (vegetation association; structural stage; bank slope; material etc.)
		Segment Summary Description
	Level of Impairment	Score 0 (Severely impaired) – 6 (Natural); Rationale
	Enhancement Opportunity Rating	0 (Nil) – 4 (Very High); Rationale
Watercourse and Habitat Features	Culvert Attributes	Type-Material; Condition; Barrier; Size; Baffles
	Obstruction Attributes	Type-Material; Barrier; Size; Photo
	Stream Discharge Attributes	Point of Discharge; Type-material; Size
	Erosion Feature	Type of Erosion; severity; exposure; material
	Fish Habitat Attributes	Type of Habitat (Spawning/rearing/cover); Size; Slope; Photo
	Enhancement Areas	Type of Enhancement; Potential or existing enhancement
	Wildlife Observations	Type of Observation; Wildlife species; Photo
	Wildlife Tree Attributes	Type of Tree; Size; Location
	Near Waterbody Attributes	Type of Waterbody (spring/side channel/pond etc.); Size
	Wetland Attributes (Polygon feature)	Wetland Type-Class; Photo
	Photograph Location	Location; Direction.

3.2 Level of Impact/Condition Scoring

Ecoscape developed and appended a Level of Impact rating to the data dictionary (Appendix B). This rating system was designed with the intent of providing a more measurable parameter in evaluating the watercourse condition and monitoring and evaluating habitat changes on local watercourses and associated riparian and floodplain communities. Individual reach scores will be assigned based on the criteria outlined in Table 2.

Table 2. Level of Impact rating criteria for Coldstream Inventory and Mapping

River Bank Impact Criteria[1]	Combined Segment Score
Nil-Nil (*Nil impacts on both banks*)	6
Nil-Low	5
Nil-Mod	4
Nil-High	3
Low-Low	4
Low-Mod	3
Low-High	2
Mod-Mod	2
Mod-High	1
High-High (*Impact on both banks is high*)	0

1. Numeric Bank Impact Scores: Nil=3 Low=2 Mod=1 High=0

The raw data and rationale for respective stream segment scores can be found in Appendix A within the Stream line data. Weighted scores for respective impact ratings were obtained by dividing the cumulative length of segments receiving the same SHIM impact rating by the total SHIM stream length to obtain a fractional abundance (% of SHIM stream length).

This value was then multiplied by the respective SHIM Score (0-6) equaling the weighted score. A zero (0) to six (6) rating system was developed to evaluate respective stream segments in terms of their degree of disturbance, where a stream segment not being recently modified (natural) received a score of 6 (nil), and a stream segment being highly modified on both banks/channelized/ditched, etc. received a score of 0 (both banks high). The sum of weighted scores was then divided by the maximum attainable score (6)[2] and transformed into a percentage value to yield the stream condition score.

3.3 Top of Bank Survey

Watercourse (lake, pond, stream and wetland) location and extent are critical for providing information to help determine the degree of protection to which a watercourse should be entitled. Determining the correct location of a stream, functionally (hydrologically) connected watercourses and wetlands, and their associated top of banks (TOB) is a necessary prerequisite for delineating Fisheries Sensitive Zones (FSZ). FSZs are an essential planning component in defining the Streamside Protection and Enhancement Area for development adjacent to a stream.

The top of bank was defined using the following criteria, as recognized by the Ministry of Environment and Department of Fisheries and Oceans Canada:

i) The point closest to the boundary of the active floodplain of a stream where a break in the slope of the land occurs such that the grade beyond the break is flatter than 3:1 at any point for a minimum distance of 15 metres measured perpendicularly from the break;

ii) For a floodplain area not contained within a ravine, the edge of the active floodplain of a stream where the slope of the land beyond the edge is flatter than 3:1 at any point for a minimum distance of 15 metres measured perpendicularly from the edge; or,

iii) The first significant break in a ravine slope where the break occurs such that the grade beyond the break is flatter than 3:1 for a minimum distance of 15 metres measured perpendicularly from the break, and the break does not include a bench within the ravine that could be developed.

3.4 Data Logging and Processing

GPS settings were in accordance with Resource Inventory Committee Standards to ensure the collection of spatially accurate data. The coordinate system used was North American Datum 83, UTM Zone 11 North.

Field (GPS) data were post processed (differentially corrected) in the office using base stations situated both in Penticton (SOPAC, Dominion Radio Astrophysical Observatory), and Kettle Falls, Washington (USFS, Colville National Forest).

[2] A combined weighted score of 6 would be attained if all segments were natural with no discernable human disturbance on either the right or left bank. Note this evaluation does not factor in impacts upstream of the District of Coldstream municipal boundary limit, which could still impact on water quality and habitat values.

Data dictionary tools designed for ARC View 3.x were employed to process the data and to export the data into ESRI shapefiles. Final mapping deliverables were produced in ArcGIS 9.2.

3.5 Quality Assurance and Quality Control

The Resource Inventory Committee and SHIM Methodology (Mason and Knight, 2001) provide specific requirements for quality assurance and quality control. These standards such as GPS settings/precision, logging intervals, and data management and deliverables were followed throughout the project. Data review and quality assurance and control were provided by Kyle Hawes, R.P.Bio. – Senior resource inventory biologist.

4.0 RESULTS

The following section summarizes the morphological and biophysical character of each of the surveyed watercourses. Summary results and discussions for individual watercourses are commensurate with their overall magnitude, habitat rating, and level of impact. Refer to the attached summary pages and corresponding figures (maps) for segment attributes and representative photos. The processed data from the centreline survey (Stream_line) and feature data has been included in Appendix A. In addition, this data can be found in digital format accompanying the complete inventory catalogue, which includes all point features, attributes, and representative photos (intended for use in an ESRI GIS platform). Furthermore, the reader is encouraged to refer to the Community Mapping Network, SHIM atlas (http://cmnbc.ca/).

4.1 Coldstream Creek

Coldstream Creek (Watershed Code: 310-939400-15400) originates on the south slopes of Silver Star Mountain and is approximately 29.8 km long from its headwaters to its confluence with Kalamalka Lake. Coldstream Creek flows southward through Noble Canyon and then westward through Lavington and Coldstream.

The total surveyed stream length was approximately 19.8 linear kilometers. Coldstream Creek was broken into a total of 42 segments (reaches) along its length (Map Set 1). Anthropogenic impacts to the stream channel and riparian areas were prevalent over the entire surveyed stream length. Approximately 89% of the surveyed length of Coldstream Creek was documented to be modified to some extent by urban, rural, and agricultural activities. Segments 1 through 4 occur within relatively higher density residential areas of Coldstream, with the exception of Segment 3, which flows through park along both banks. Rural residential landuse on larger properties begins in Segment 5, transitioning to increased agricultural use adjacent the creek around Segment 9. Generally, between Segment 9 and Segment 25, Coldstream Creek is influenced by agricultural practices to some extent; with landuse adjacent the creek including livestock grazing and cash crops of predominantly corn. At Segment 25, Coldstream Creek flows through rural residential neighbourhoods with intermittent influence from agriculture (primarily livestock) varying

between properties. Between the upstream end of Segment 29 through to Segment 35, Coldstream Creek was primarily dry during the fall survey period; only intermittently wetted in residual pools.

Components of stream segment attributes are discussed in Sections 4.1.1 to 4.1.3 and watercourse and habitat features are analyzed and summarized in Section 4.1.4.

4.1.1 Stream Primary Character

Coldstream Creek has been modified to some degree over approximately 17.6 km (89%) of the surveyed stream length, with approximately 2.1 km (11%) remaining natural (Table 3). Of the 17.6 km, about 748 m were characterized as being channelized, occurring in Segments 1, 18, 19, and 21, immediately upstream of the confluence with Kalamalka Lake and through much of the creek where it crosses to the north side of Highway 6. Stream segments characterized as natural occurred in Segments 7 and 8 downstream and upstream of Coldstream Creek Road, where wide, well-vegetated riparian areas exist. The riparian band along Segment 8 contains mature cottonwoods, as well as several mature non-native deciduous trees, which provide fisheries and wildlife habitat value, although historically introduced to the area. Segments 41 and 42 at the upper extents of the study area near Noble Canyon were also characterized as being natural, with influence from livestock and rural landuse still evident.

Table 3. Coldstream Creek summary of Primary Stream Character. Values shown below are based on SHIM field inventory and analysis of ~19.8 linear km of Coldstream Creek within the District of Coldstream.

Segments	Primary Character	Length (m)	Percentage of stream length
1, 18, 19, 21	Channelized	971.0	4.9%
2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40	Modified	16635.0	84.4%
7, 8, 41, 42	Natural	2114.7	10.7%

Culverts occurred over approximately 238 m, or 1.2%, of the SHIM stream length. Culverts varied in length from 5 to 33 m, and the culvert under Highway 6 at the upstream end of Segment 16 was the only culvert which could potentially pose an obstruction to fish passage.

4.1.2 Stream Channel and Hydraulic Character

Coldstream Creek exhibits a primarily riffle/pool morphology for approximately 85% of the SHIM stream length. Approximately 8% of the 19.8 km surveyed exhibited run characteristics, while the remaining 7 segments and 7% of the SHIM length were characterized as either slough or beaver pond. Channelization of Coldstream Creek through fields between Segments 16 through 24, coupled with beaver activity, resulted in relatively deep, slow moving segments of stream. Rainbow trout were observed to be utilizing the deep water cover and woody debris throughout these segments. Within Segment 20, wetland ecosystems occur along the left bank of Coldstream Creek, with well-established aquatic vegetation and beaver activity resulting in low flood riparian sites and

red-osier dogwood – willow swamps. The hydraulic character details for the ~19.8 km of Coldstream Creek surveyed are summarized in Table 4.

The average channel gradient throughout the surveyed portion of Coldstream Creek was around 1% (Table 5). The stream gradients averaged for each of the 42 segments varied from 0 to 3%. Short lengths of the channel with steeper gradients were recorded, including the concrete flume in Segment 14, which has a grade of 7% below the dam.

Table 4. Coldstream Creek summary of hydraulic character. Values shown below are based on SHIM field inventory and analysis of ~19.8 linear km of Coldstream Creek within the District of Coldstream.

Segments	Hydraulic Character	Length (m)	Percentage of stream length
20	Beaver Pond	221.8	1%
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 23, 24, 25, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 41, 42	Riffle/Pool	16691.1	85%
22, 33, 34, 35	Run	1664.7	8%
1, 15, 19, 21, 31, 32	Slough	1142.9	6%
	Wetland	0.0	0%

Table 5. Coldstream Creek stream channel summary. Values shown below are based on SHIM field inventory and analysis of ~19.8 linear km of Coldstream Creek within the District of Coldstream.

	Gradient (%)			Stream Channel		
Segments	Average	Min	Max	Mean Bankfull Width (m)	Min (m)	Max (m)
1 to 42	1.1	0	3.0	6.0	2.6	32.0

4.1.3 Instream Habitat Cover/Complexity

Total and relative instream cover is a field estimate of the type and amount of in-channel cover available to fish. Total cover represents the total percentage of the wetted area of respective segments occupied by cover. The relative abundance (%) of cover types (e.g., deep pool, large woody debris, etc.) is an estimate of the distribution (of respective cover types) within the total cover estimate for the segment.

Approximately 46% of the SHIM stream length was noted to provide structural instream cover for fish habitat (Table 6). Only three segments were estimated to have a total percentage of the wetted area occupied by cover of less than 20%, accounting for only 1% of the surveyed stream length. Cover in Segment 13 was largely limited to boulder cover associated with bank armouring, while Segments 30 and 34 occurred in open field with unrestricted livestock access, and cover consisted of some overhanging grasses and undercut banks.

There were 22 segments, which had estimated total cover between 21% - 40%, accounting for nearly 2.9 km of stream. Six segments had estimated total cover between 41% to 50% of the wetted area - accounting for a total of 1.8 km of stream. There were 9 segments with

total cover estimated from 51% to 75%, and segments 15 and 20 had estimated total cover exceeding 75% of the wetted area of the segment. Segments 15 and 20 both had extensive deep water cover and instream vegetation associated with flooding upstream of the constructed dam in Segment 15 and beaver activity influencing hydraulic character in Segment 20.

A more quantitative assessment of notable fish habitat features can be found in Section 4.1.4.4.

Table 6. Coldstream Creek summary and distribution of instream cover/habitat complexity. Values shown below are based on SHIM field inventory and analysis of ~19.8 linear km of Coldstream Creek within the District of Coldstream

Segment Number	% Total Cover	Combined Segment Length (m)	Percentage of SHIM Stream Length	Percentage of Total cover by Cover Type [a]						
				B	DP	IV	LWD	OV	SWD	UC
	<10%									
13, 30, 34	11-20%	192.3	1%	7%	11%	14%	0%	34%	5%	29%
4, 6, 8, 9, 10, 12, 14, 16, 18, 22, 29, 31, 32, 33, 35, 36, 37, 38, 39, 40, 41, 42	21-40%	2870.3	15%	8%	21%	2%	26%	15%	21%	7%
1, 2, 17, 25, 27, 28	41-50%	1775.7	9%	10%	28%	7%	17%	11%	16%	10%
3, 5, 7, 11, 19, 21, 23, 24, 26	51-75%	3724.0	19%	3%	23%	4%	27%	15%	24%	4%
15, 20	>75%	328.0	2%	2%	65%	15%	10%	3%	5%	0%

a. Cover codes: B=boulder; DP=deep pool; IV=instream vegetation; LWD=large woody debris; OV=overstream vegetation; SWD=small woody debris; UC=undercut bank

4.1.4 Watercourse and Habitat Features

The following section summarizes feature data collected and nested within the line segments. All features are measured and recorded individually and provide a more robust and quantitative measure of watercourse impairment and habitat quality.

4.1.4.1 Modifications

Modifications to the stream channel and riparian area were documented on over 6.9 km, or 35% of the surveyed length of Coldstream Creek. Modifications had a cumulative linear measurement of over 2.2 km along the left bank, 2.3 km along the right bank, and 2.9 km instream (Table 7). Unrestricted livestock access occurs along over 2.8 km, or 14% of the SHIM stream length. Bank stabilization, retaining walls and riprap accounted for 1.9 km along the left bank and 2 km along the right bank.

Modifications such as water withdrawals, pipe crossings and fences are not effectively quantified by stream length. Fifty nine fences, five (5) pipe crossings, and five (5) water withdrawals were noted along Coldstream Creek. Pipe crossings may be higher in number, as there were some culverted sections of stream where visual confirmation of the inside of the culvert was not possible.

Table 7. Coldstream Creek summary of artificial features/modifications. Features and values shown below are based on SHIM field inventory (2009) and analysis of ~19.8 linear km of creek within the District of Coldstream.

	Left Bank			Right			Instream		
Type	Length (m)	% of total length of modifications	% of SHIM stream length	Length (m)	% of total length of modifications	% of SHIM stream length	Length (m)	% of total length of modifications	% of SHIM stream length
Bridge	181.87	2.64%	0.92%	181.87	2.64%	0.92%	3.60	0.05%	0.02%
Channelization	88.00	1.28%	0.45%	88.00	1.28%	0.45%			
Dam	0.80	0.01%	0.00%	0.80	0.01%	0.00%			
Detention Pond				10.00	0.15%	0.05%			
Dock				5.00	0.07%	0.03%			
Fences	33.33	0.48%	0.17%	6.45	0.09%	0.03%	40.51	0.59%	0.21%
Garbage/Pollution	41.00	0.59%	0.21%	2.00	0.03%	0.01%	27.20	0.39%	0.14%
Livestock Access	2.50	0.04%	0.01%	1.30	0.02%	0.01%	2805.60	40.69%	14.23%
Livestock Crossing	17.00	0.25%	0.09%	17.00	0.25%	0.09%			
Other	41.40	0.60%	0.21%	3.00	0.04%	0.02%	0.40	0.01%	0.00%
Pipe Crossing	1.45	0.02%	0.01%	1.45	0.02%	0.01%			
Retaining Wall/Bank Stabilization	1057.30	15.33%	5.36%	833.10	12.08%	4.22%	16.00	0.23%	0.08%
Rip rap	800.00	11.60%	4.06%	1127.80	16.36%	5.72%	32.50	0.47%	0.16%
Water Withdrawal	3 along left bank			2 along right bank					
	2264.65			2277.77			2925.81		

4.1.4.2 Discharges/Waterbodies

A discharge includes any substance that enters a watercourse via an artificial structure (i.e., pipe), whether it is a contribution of clean cold water from a spring, or pollution from a sewage outlet or storm drain.

A total of 40 discharges were documented along Coldstream Creek during the field inventory (Table 8). A total of 11 storm drains were recorded, with an average diameter of 430 mm and a maximum observed discharge pipe diameter of 600 mm. The field survey took place primarily in late summer and fall, and only 16 discharges were flowing at the time of the survey. In Segment 8 along the left bank (looking downstream) of Coldstream Creek, a discharge along the hillslope was recorded as septic effluent due to its strong odour. While the origin and content of this seepage was not confirmed, several seepage points were documented in the same location during the top of bank survey and further analysis is recommended. A total of six (6) discharges were described as agricultural runoff due to the associated landuse where they were documented. Tile drains totaled 15, and seven (7) discharges with ambiguous origins were classified as other.

Discharge locations noted above should be cross-referenced with water quality data that has been commissioned for the Coldstream Creek watershed to date. Synthesizing this information, along with waterbody features collected during the SHIM survey, will aid the District of Coldstream and stakeholders in identifying impacts to water quality and prioritizing action items for enhancement.

Table 8. Summary of discharges identified on Coldstream Creek. Values shown below are based on SHIM field inventory (2009) and analysis of ~19.8 linear km of Coldstream Creek within the District of Coldstream.

Type	Count	Mean Diameter (m)	Min Diameter (m)	Max diameter (m)	Number flowing during survey
Agricultural Runoff	6	0.25	0.1	0.5	1
Septic Effluent	1				1
Other	7	0.22	0.15	0.35	1
Storm Drain	11	0.43	0.15	0.6	5
Tile Drain	15	0.11	0.05	0.2	8
Total	40				16

A total of 39 waterbody features were recorded along Coldstream Creek within the study boundary (Table 9). Of the 39 waterbodies recorded, 18 were wetted or flowing into Coldstream Creek during the survey.

Table 9. Summary of waterbody features identified on Coldstream Creek. Values shown below are based on SHIM field inventory (2009) and analysis of ~19.8 linear km of Coldstream Creek within the District of Coldstream.

Type	Count	Mean Width (m)	Mean Depth (m)	Average Temperature of Flowing Waterbodies	Number flowing/wetted during survey
Natural Springs	20	0.34	0.02	11.26	12
Side Channel	3	1.70	0.22	9.2	1
Tributary	12	0.63	0.02	9.03	3
Wetland	2			6.5	2
Other	2	0.4	0.04		0
Total	39				18

4.1.4.3 Bank Stability and Erosion

Stream bank erosion was documented on over approximately 28% of the left bank and 26% of the right bank of Coldstream Creek (Table 10). Encroachment associated with residential, rural and agricultural land use, and the associated lack of riparian vegetation and structure are key factors, which have degraded the bank and channel integrity of Coldstream Creek. Bank stability has been largely addressed in residential areas with armouring (riprap) and retaining walls - constructed of various materials. In many cases, material such as concrete, tires and debris have been dumped along the bank and into the stream channel. Unrestricted livestock access to entire stream segments has also contributed to the high bank and channel instability over the 19.8 km of stream surveyed. Unrestricted livestock access and extensive associated erosion were documented in Segments 24, 30, 31, 34 and 42.

The average height of bank erosion on the left bank was 2 m, while that on the right bank averaged 1.9 m. In some locations of stream, steep, high eroding banks were noted with accumulation of clay and fines instream, resulting in embeddedness of gravel substrates that may have previously been suitable for spawning fish (e.g., kokanee and rainbow trout).

There were 42 areas of erosion noted with heights greater than 3 m. Of the 218 recorded incidents of erosion, 169 points had severity greater than 10 m^2. Erosion was observed to be relatively consistent throughout Coldstream Creek to varying degrees. The average area of exposure was around 67 m^2 for both banks. The recorded maximum exposure for a single continuous incident was 480 m^2, stretching for about 400m along the left bank of Segment 24.

Table 10. Summary of bank erosion recorded along Coldstream Creek. Features and values shown below are based on SHIM field inventory (2009) and analysis of ~19.8 linear km of creek within the District of Coldstream.

Left Bank					Right Bank				
Cumulative Length (m)	Average Height (m)	Area (m^2)	Average Area of Exposure (m^2)	Percent of SHIM stream length	Cumulative Length (m)	Average Height (m)	Area (m^2)	Average Area of Exposure (m^2)	Percent of SHIM stream length
5593.30	2.00	8589.54	67.63	28%	5044.10	1.97	7529.69	67.23	26%

4.1.4.4 Fish Habitat

Deep pools were the predominant habitat feature type observed and recorded on Coldstream Creek within the surveyed stream length (Table 11). Deep pools occurred over nearly 1270 linear metres, or 6.4% of Coldstream Creek, accounting for approximately 42% (relative area abundance) of all habitat features recorded. Large woody debris was the next most prominent habitat type, occurring over approximately 690 linear metres and accounting for 33% of habitat features.

Spawning habitat, identified by the presence of clean suitably-sized gravel for resident and adfluvial rainbow trout and adfluvial kokanee, occurred over ~560 linear metres of the SHIM stream length with an area of approximately 1277 m^2. Suitable spawning habitat accounted for over 14% of the combined measured area of habitat features. While no kokanee were observed to be spawning (survey timing preceded onset of kokanee migration) in Coldstream Creek, rainbow trout were documented frequently throughout the length of stream surveyed, beyond all noted obstructions. A resident rainbow trout population is present throughout Coldstream Creek to at least the upper limits of the study area in Segment 42.

Upstream migration of adfluvial fish species is limited to approximately 7.4 km upstream from the confluence with Kalamalka Lake, due to the presence of falls, a concrete flume and a dam located in Segment 14.

Table 11. Summary of habitat features. Values shown below are based on SHIM field inventory (2009) and analysis of ~19.8 linear km of Coldstream Creek within the District of Coldstream.

Type	Combined Length (m)	Mean Width (m)	Combined Area (m^2)	Mean wetted Depth (m)	Percent of SHIM stream length	Relative area Distribution
Boulder	3.50	2.50	8.75	0.60	0%	0%
Deep Pool	1269.60	2.91	3690.85	0.88	6%	42%
Instream Vegetation	3.50	2.80	9.80	0.60	0%	0%
Over Stream Vegetation	76.00	4.30	326.80	0.39	0%	4%
Undercut Bank	73.50	0.89	65.23	0.53	0%	1%
Small Woody Debris	156.90	3.22	505.61	0.36	1%	6%
Large Woody Debris	690.10	4.15	2862.91	0.43	3%	33%
Spawning Gravel	559.50	2.28	1277.12	0.16	3%	15%
Total	**2832.60**		**8747.08**		**14.36%**	

4.1.4.5 Obstructions / Barriers

Obstructions included all features that had the potential to prevent the normal passage of fish during all or part of the year. A summary of potential obstructions or barriers to upstream fish migration is summarized in Table 12.

A falls and associated dam structure and concrete flume in Segment 14 impose a barrier to upstream fish passage from below. However, fish were documented to occur upstream of this barrier. The flooded area upstream of the dam has naturalized and provides valuable fish and wildlife habitat. Removal of the dam in the interest of restoring fish passage is not perceived to be enough of a habitat gain. If passage mitigation were to be considered, alternatives are recommended such that the upstream wetland ecosystem is preserved.

The culvert that flows beneath Highway 6 between Segments 16 and 17 may also be a barrier to fish passage; therefore, the habitat gain with removal of the falls and dam may only be approximately 400 m. A concrete apron with a grade of approximately 15% occurs at the culvert outlet and the culvert is curved/jointed under the highway.

Persistent debris was the most common potential obstruction noted, with 20 incidents documented. Beaver dams and log jams were also present along Coldstream Creek. In total, there were 5 confirmed obstructions, 6 unknown and 14 potential. Woody debris accumulations throughout the stream are dynamic, changing with water levels from year to year. Therefore, some of the features recorded during the 2009 field inventory may become dislodged and dismantled through both natural and human causes.

Table 12. Coldstream Creek summary of potential obstructions/barriers to upstream fish migration. Features and values shown below are based on SHIM field inventory (2009) and analysis of ~19.7 linear km of creek within the District of Coldstream.

Type	# of obstructions occurring	Barrier	Cumulative Length (m)	Mean Wetted Width (m)	Mean Depth (m)	Mean Height (m)
Beaver Dam	2	1 potential, 1 yes	4.7	4.05	0.7	1.3
Log Jam	2	1 unknown, 1 yes	12	5	0.70	2.35
Falls	1	yes	30	5	0.03	1.80
Persistent Debris	20	13 potential, 5 unknown, 1 yes	93.00	4.79	0.28	0.94
Dam	1	yes	0.40	5.60	0.05	1.40
		Total	140.20			

4.1.5 Stream Impact Summary

Ecoscape developed and appended a Level of Impact rating to the data dictionary (Appendix B). This rating system was designed with the intent of providing a more measurable parameter in evaluating the watercourse condition and monitoring and evaluating habitat changes on local watercourses and associated riparian and floodplain communities. The raw data and rationale for respective stream segment scores can be found in Appendix A within the Stream line data. Methodology for calculating the weighted scores and fractional abundance is described above in Section 3.2.

The sum of weighted SHIM scores equaled 2.5 (out of 6), with Coldstream Creek receiving a stream grade of 42% (Table 13). Three segments received a score of 0, indicating that impacts were high along both banks. There were 11 segments receiving an impact score of 1, exhibiting moderate impacts along one bank and high on the other, accounting for 20% of the stream length. An additional 11 segments, or 28% of the stream length, received a score of 2, indicating that both banks exhibited moderate impacts or one bank was low and one high. A total of 8 segments received a score of 3 (1 bank nil, 1 bank high, or 1 bank low and 1 bank moderate) and accounted for 16% of the stream length. Six stream segments had relatively low impacts receiving a score of 4 for having both banks low, or 1 bank nil and 1 bank moderate. Only 5% of the 19.8 km had levels of impact considered to be nil on one bank and low on the other.

Table 13. Coldstream Creek summary of Level of Impact. Values shown below are based on SHIM field inventory and analysis of ~19.8 linear km of Coldstream Creek within the District of Coldstream

Segments	SHIM Impact Score	Length (m)	Percentage of stream length	Weighted Score
30, 31, 34	0	1179.2	6%	0.00
1, 13, 14, 18, 19, 21, 22, 24, 26, 32, 33	1	3949.1	20%	0.20
2, 4, 12, 20, 23, 25, 35, 37, 38, 39, 40	2	5495.6	28%	0.56
6, 11, 15, 16, 27, 29, 36, 41	3	3155.0	16%	0.48
3, 5, 7, 10, 17, 28	4	4918.1	25%	0.99
8, 9, 42	5	1078.7	5%	0.27
N/A	6		0%	0.00
			Weighted Score	**2.50**
			Stream Grade	**41.69%**

4.1.6 Preliminary Prioritization of Channel and Riparian Rehabilitation

The SHIM survey of Coldstream Creek revealed that approximately 17.6 km, or 89% of the total surveyed stream length, has been modified to some degree. Modifications ranged from channelized sections with retaining walls, encroachment to the top of bank and lack of riparian vegetation, to rural areas with unrestricted livestock access for entire segment lengths. Coldstream Creek has also been channelized through much of its length, with earth berms occurring along both banks and only a narrow band of native vegetation as the stream flows through agricultural properties. Modifications instream and along the stream banks result in impacts to the watercourse, such as non-point-source pollution, sedimentation and associated degradation to water quality and fish habitat.

Opportunities to restore instream and riparian habitats are limited in some areas due to close proximity to transportation infrastructure, such as where the railway or highway is located at or near the stream's top of bank. There are also limitations where the creek flows through private properties. Over time, possibly through the development application process within the District of Coldstream, it may be possible to remove retaining wall structures, re-grade banks and revegetate riparian areas on a property-by-property basis. Improvements in watershed stewardship and education to stream-side property owners may be beneficial, to help address riparian vegetation removal, yard waste, debris, bank protection works and overall encroachment within the riparian area.

Opportunities for re-vegetating riparian areas with native vegetation and stabilizing banks with bioengineering techniques are present throughout Coldstream Creek. There are several areas where the stream flows through fields with an absence of riparian structure. Willow live-staking along Coldstream Creek throughout these segments that may be largely comprised of grasses would help to provide shade, bank stability and fish and wildlife habitat. It is also key to establish livestock exclusion fencing along those segments, which currently exhibit unrestricted livestock access (Segments 24, 30, 31, 34, and 42 in their entirety, while shorter sections of livestock access occur in other segments). While the livestock observed in these areas may be in smaller numbers, from 2 head of cattle observed in Segment 30 to nearly a dozen horses in Segment 24, the impacts to the

stream bank and riparian areas are extensive and persistent. Fencing of the above 5 segments alone would be a step to restoring approximately 2.4 km of stream.

Throughout Coldstream Creek, it was frequently noted that fencing occurred at the top of bank, with lack of riparian vegetation beyond the top of bank and subsequent erosion, as well as an absence of a vegetated buffer to help mitigate for runoff from fields into Coldstream Creek. Fencing should be located such that it allows for a wider riparian band between adjacent landuse and Coldstream Creek. The Provincial Riparian Areas Regulation could be used as a guideline for determining riparian setbacks, which would generally be based on 3 times the channel width in determining the Zones of Sensitivity (ZOS) for large woody debris (LWD), bank stability, channel movement, shade and litter fall and insect drop (the RAR methodology is described briefly below).

Many of the disturbed and modified stream segments, riverine wetlands, and riparian associations along Coldstream Creek have a high capability to regenerate in conjunction with remedial efforts such as bank stabilization and riparian planting.

To assist in the prioritization of sites, where rehabilitative efforts would realize the greatest potential net benefits in habitat and potential water quality improvements, key areas were extracted using the SHIM data. Recognizing that erosion is the prevalent symptom of stream channel and habitat impairment (i.e., encroachment, unfettered livestock access, channelization, riparian removal etc.), Ecoscape extracted key problem areas according to erosion using the following criteria:

Severity of erosion:
1. Length of erosion > 100 m and/or
2. Height of erosion > 3 m and/or
3. Exposure Area > 40 m^2

Incidents of erosion not meeting the above criteria were excluded, highlighting the areas of greatest concern. This is illustrated in Map Set 2. Where general clusters of erosion features fulfilling the above criteria occurred within a segment a priority area was identified. In addition, individual severe erosion features, such as those occurring along both banks of an entire segment accompanied by unfettered livestock access were flagged as priority sites.

This preliminary exercise extracted a total of 22 Priority Areas (Map Set 2). Of these, 11 sites were classified as Highest Priority, six (6) sites classified as Moderate Priority, and five (5) sites classified as Lowest Priority. It should be noted that water quality parameters collected during water sampling by the Ministry of Environment have not been factored into this analysis. However, such a review may be carried out simply by over-laying such water quality data points onto the maps supplied (Map Set 2), which may corroborate the preliminary site prioritizations as shown or identify additional key areas.

4.1.7 Riparian Setbacks

The detailed assessment methodology under the Provincial Riparian Areas Regulation (RAR) utilizes a number of factors to determine riparian setbacks based on the site potential vegetation type (SPVT) and channel type, including the Zones of Sensitivity (ZOS) for:

- Large woody debris, bank and channel stability,
- Litterfall and insect drop, and
- Shade.

As an example, the zones of sensitivity for a stream reach (segment) with a SPVT of treed and a riffle-pool channel morphology would be as follows:

- Large woody debris, bank and channel stability = 3 x Channel width (min. 10m / max. 15m)
- Litterfall and insect drop = 3 x Channel width (min. 10m / max. 15m)
- Shade = 3 x Channel width (max. 30m)

From this, the Streamside Protection and Enhancement Area (SPEA) is determined by the largest calculated zone of sensitivity within respective reaches.

Ecoscape collected channel measurements frequently along Coldstream Creek to determine the averages for wetted widths and bankfull widths for segment information, and to provide an estimate of what the riparian setback may be along a given segment. This analysis is intended to suggest preliminary SPEAs (minimum setbacks) within each segment of the surveyed stream length. However, SPEA values determined are not intended to eliminate the requirement for site specific property assessments of proposed development adjacent Coldstream Creek, and subsequent detailed SPEA determination using legal surveys. Based on experience on other watercourses, the estimated SPEA using SHIM channel information (collected by Ecoscape) has resulted in SPEA estimates being generally within +/- 0.5m of that determined during site specific detailed RAR assessments. Having the approximate SPEA for various segments throughout Coldstream Creek will be a valuable tool for District of Coldstream staff when evaluating development applications.

Table 14. Preliminary riparian setback analysis of Coldstream Creek by stream segment using SHIM (2009) bankfull (channel) measurements.

Reach	Length (m)	Channel Width (m)	Zones of Sensitivity[1]			Streamside Protection Enhancement Area (SPEA)	Enhancement Opportunity Rating
			Litter and Insect Drop (3 x Chan. Width/ min. 10m max 15m)	Bank and Channel Stability (3x Chan. Width/min. 10m-max 30m)	Shade (3x Chan. Width max 30m)		
1	127	4.4	13.2	13.2	13.2	**13.2**	Low
2	806	4.8	14.4	14.4	14.4	**14.4**	Low
3	468	6.4	15	15	19.2	**19.2**	Moderate
4	269	6.3	15	15	18.9	**18.9**	Low
5	1772	6.3	15	15	18.9	**18.9**	Low
6	134	4.9	14.7	14.7	14.7	**14.7**	Moderate
7	866	6.7	15	15	20.1	**20.1**	Low
8	318	6.9	15	15	20.7	**20.7**	Low

9	137	6.1	15	15	18.3	**18.3**	Low
10	935	6	15	15	18	**18**	Low
11	833	6.2	15	15	18.6	**18.6**	High
12	548	6.6	15	15	19.8	**19.8**	High
13	154	6	15	15	18	**18**	High
14	157	5.2	15	15	15.6	**15.6**	High
15	174	18	15	30	30	**30**	Low
16	268	5	15	15	15	**15**	Low
17	556	4.2	12.6	12.6	12.6	**12.6**	Low
18	521	3.7	11.1	11.1	11.1	**11.1**	Moderate
19	101	6	15	15	18	**18**	Moderate
20	222	32	15	30	30	**30**	Moderate
21	222	6.2	15	15	18.6	**18.6**	Moderate
22	418	4.8	14.4	14.4	14.4	**14.4**	Moderate
23	468	5.2	15	15	15.6	**15.6**	Moderate
24	870	5	15	15	15	**15**	High
25	1528	5.5	15	15	16.5	**16.5**	Moderate
26	744	4.8	14.4	14.4	14.4	**14.4**	Moderate
27	334	4.4	13.2	13.2	13.2	**13.2**	Moderate
28	322	4.4	13.2	13.2	13.2	**13.2**	High
29	649	3.8	11.4	11.4	11.4	**11.4**	High
30	326	2.6	10	10	10	**10**	High
31	333	3.5	10.5	10.5	10.5	**10.5**	High
32	186	3.3	10	10	10	**10**	Moderate
33	450	3	10	10	10	**10**	High
34	521	3.4	10.2	10.2	10.2	**10.2**	High
35	276	4.2	12.6	12.6	12.6	**12.6**	High
36	400	5.4	15	15	16.2	**16.2**	Moderate
37	231	5.8	15	15	17.4	**17.4**	Moderate
38	458	3.5	10.5	10.5	10.5	**10.5**	Moderate
39	304	4	12	12	12	**12**	Low
40	385	4.4	13.2	13.2	13.2	**13.2**	Low
41	363	5.7	15	15	17.1	**17.1**	Low
42	623	4.3	12.9	12.9	12.9	**12.9**	Moderate

[1] Zones of Sensitivity have been determined based on the Channel Type for all segments being riffle pool – based on stream gradients. Site Potential Vegetation Type (SPVT) is treed.

4.2 Brewer Creek

4.2.1 Stream Primary Character

Brewer Creek (Watershed Code 310-939400-15400-44200-0550) is an approximately 8.6 km long tributary to Coldstream Creek. Brewer Creek enters Coldstream Creek approximately 14.3 km upstream from the confluence of Kalamalka Lake and Coldstream Creek. The SHIM survey focused on the length of Brewer Creek occurring within the District of Coldstream municipal boundaries, which is approximately 3.5 km. Brewer Creek was broken into 11 segments. The primary character of Segments 1 through 8 was classified as being modified, accounting for ~2.2 km, or nearly 63% of the SHIM stream length (Table 15). Segments 9, 10 and 11 at the upstream end of the study boundary were classified as natural, with limited anthropogenic disturbance and well-established riparian areas.

A total of seven (7) culverts were documented along the SHIM length of Brewer Creek, for a total of 88 m of stream culverted, or 3% of the stream length. Culverts did not appear to pose a barrier to fish passage, although no flows were observed in Brewer Creek during the field survey downstream of Dawe Road.

Table 15. Brewer Creek summary of Primary Stream Character. Values shown below are based on SHIM field inventory and analysis of ~3.5 linear km of Brewer Creek within the District of Coldstream

Segments	Primary Character	Length (m)	Percentage of stream length
1, 2, 3, 4, 5, 6, 7, 8	Modified	2195.8	63%
9, 10, 11	Natural	1297.9	37%

4.2.2 Stream Channel and Hydraulic Character

Approximately 2.9 km, or 83%, of the SHIM stream length of Brewer Creek has a riffle-pool hydraulic character (Table 16). While the stream was not flowing during the field survey, Segments 1 and 2 were classified as runs. As the stream gradient increased with Segment 10 to a step-pool morphology, this segment was classified as cascade-pool according to the data dictionary.

The average channel gradient throughout Segments 1 through 8 of Brewer Creek was around 1% (Table 17). The average stream gradient from Segments 9 through 11 was 9.3%, with a minimum average grade, through these upper segments, of 5% and a maximum of 18%. The bankfull width was relatively consistent throughout the SHIM stream length, averaging 2.4 m in Segments 1 through 8 and 3.4 m wide towards the upstream end of the survey stream length (approaching the municipal boundary).

Table 16. Brewer Creek summary of hydraulic character. Values shown below are based on SHIM field inventory and analysis of ~3.5 linear km of Brewer Creek within the District of Coldstream.

Segments	Hydraulic Character	Length (m)	Percentage of stream length
3, 4, 5, 6, 7, 8, 9, 11	Riffle/Pool	2892.4	83%
1, 2	Run	511.2	15%
10	Cascade/Pool	90.1	3%

Table 17. Brewer Creek stream channel summary. Values shown below are based on SHIM field inventory and analysis of ~3.5 linear km of Brewer Creek within the District of Coldstream.

	Gradient (%)			Stream Channel		
Segments	Average	Min	Max	Mean Bankfull Width (m)	Min (m)	Max (m)
1 through 8	1.2	1.0	2.5	2.4	1.8	3.0
9 through 11	9.3	5.0	18.0	3.4	3.2	3.6

4.2.3 Instream Habitat Cover and Complexity

Approximately 34% of the SHIM stream length was noted to provide structural instream cover for fish (Table 18). Over 600 m of stream provided total instream cover between 51 and 75%, located in the upper limits of the study area in Segment 11. Large woody debris was the prominent fish habitat feature recorded in this segment accounting for about 40% of the total cover, while small woody debris and deep pools followed with 25% and 15% respectively. Segment 10 exhibited percent total cover between 41% and 50%, while six (6) segments had total cover estimates between 21% - 40%, accounting for over 400 m of stream length. Only three (3) segments were estimated to have a total percentage of the wetted area occupied by cover of less than 20%, accounting for only 4% of the surveyed stream length.

Table 18. Brewer Creek summary and distribution of instream cover/habitat complexity. Values shown below are based on SHIM field inventory and analysis of ~3.5 linear km of Brewer Creek within the District of Coldstream.

		Combined Segment Length (m)	Percentage of SHIM Stream Length	Percentage of Total cover by Cover Type [a]						
Segment Number	% Total Cover			B	DP	IV	LWD	OV	SWD	UC
7	<10%	44.1	1%	20%	5%	0%	0%	30%	35%	10%
5, 6	11-20%	103.0	3%	19%	11%	9%	0%	46%	7%	8%
1, 2, 3, 4, 8, 9	21-40%	406.3	12%	4%	14%	7%	24%	33%	15%	2%
10	41-50%	40.5	1%	50%	15%	0%	30%	5%	0%	0%
11	51-75%	604.3	17%	5%	15%	0%	40%	10%	25%	5%

a. Cover codes: B=boulder; DP=deep pool; IV=instream vegetation; LWD=large woody debris; OV=overstream vegetation; SWD=small woody debris; UC=undercut bank

4.2.4 Watercourse and Habitat Features

The following section summarizes feature data collected and nested within the line segments. All features are measured and recorded individually and provide a more robust and quantitative measure of watercourse impairment and habitat quality.

4.2.4.1 Modifications

Modifications to the stream channel and riparian area occurred over 961 m, or 28% of the surveyed length of Brewer Creek (Table 19). Modifications had a cumulative linear measurement of approximately 712 m along the left bank and 724 m along the right bank. Retaining walls/bank stabilization and riprap accounted for 64% of the left bank modifications and over 66% of right bank modifications. There were several stream crossings, fencing and bank armouring throughout the residential areas of Brewer Creek, where the stream is largely confined as it flows through private properties. Bridge crossings numbered 28 along Brewer Creek and 12 fence crossings were documented.

Table 19. Brewer Creek Summary of artificial features/modifications. Features and values shown below are based on SHIM field inventory (2009) and analysis of ~3.5 linear km of creek within the District of Coldstream.

	Left Bank			Right			Instream		
Type	Length (m)	% of total length of modifications	% of SHIM stream length	Length (m)	% of total length of modifications	% of SHIM stream length	Length (m)	% of total length of modifications	% of SHIM stream length
Bridge	72.0	7.5%	2.1%	72.0	7.5%	2.1%	0.6	0.1%	0.0%
Dam							0.6	0.1%	0.0%
Fences	2.7	0.3%	0.1%	2.7	0.3%	0.1%	1.3	0.1%	0.0%
Garbage/Pollution	16.3	1.7%	0.5%	7.5	0.8%	0.2%	1.9	0.2%	0.1%
Livestock Access*									
Other	3.8	0.4%	0.1%	3.8	0.4%	0.1%			
Pipe Crossing	0.0	0.0%	0.0%	0.0	0.0%	0.0%			
Retaining Wall/Bank Stabilization	345.3	35.9%	9.9%	394.7	41.1%	11.3%			
Rip rap	271.8	28.3%	7.8%	243.4	25.3%	7.0%			
Trail							1.8	0.2%	0.1%
Water Withdrawal				1 along right bank					
	711.88			724.08			6.20		

*Unsure of extent of cattle use; excrement noted along bank and adjacent trail

4.2.4.2 Discharges/Waterbodies

There were only five (5) discharges identified along Brewer Creek. Three (3) were classified as storm drains and two (2) as tile drains. All tile drains had a diameter of 0.10 m, while perceived storm drains varied from 0.10 to 0.30 m. During the field survey, one storm drain was flowing in Segment 7 near Dawe Road, while the stream channel itself was dry. One pvc tile drain was flowing in Segment 8; downstream of this discharge Brewer Creek was dry, and low flows became consistent upstream of this discharge.

Two waterbody features recorded as natural springs were documented in the upper segments of Brewer Creek during the field survey. Defined channels occurred, although neither feature was flowing at time of survey.

4.2.4.3 Bank Stability and Erosion

Low bank stability was recorded for Segments 4 and 8, where encroachment to the top of bank contributed to bank instability and consistent erosion. Along the left bank, minor to intermediate severity erosion occurred on just over 18% of surveyed stream length. The right bank was comparable with just over 17% eroding (Table 20).

Bank stability was recorded as "medium" in 8 of the 11 segments occurring along Brewer Creek, often attributed to anthropogenic bank stabilization efforts. Segment 10, where the falls occur, had high bank stability associated with bedrock banks.

In contrast to Coldstream Creek, livestock access was not a contributing factor to erosion along Brewer Creek. Livestock access was documented to occur in the upper, natural segments of Brewer Creek, where sporadic presence of fecal matter was noted, although noticeable impacts on the stream banks was not documented during the fall survey.

Table 20. Summary of bank erosion recorded along Brewer Creek. Features and values shown below are based on SHIM field inventory (2009) and analysis of ~3.5 linear km of creek within the District of Coldstream.

Left Bank					Right Bank				
Length (m)	Average Height (m)	Area (m^2)	Average Area of Exposure (m^2)	Percent of SHIM stream length	Length (m)	Average Height (m)	Area (m^2)	Average Area of Exposure (m^2)	Percent of SHIM stream length
634.2	1.2	673.4	29.3	18.2%	607.8	1.1	654.1	31.2	17.4%

4.2.4.4 Fish Habitat

No incidental fish observations were made during the 2009 field survey of Brewer Creek. However, active fish sampling methods were not employed.

Fish habitat features recorded throughout Brewer Creek were limited to a combined measured length of about 230 m, of which large woody debris accounted about 77% (Table 21). Overstream vegetation and deep pools had the next highest relative distribution, at approximately 16% and 6% respectively. The sum of individual areas of measured habitat features totaled 714 m^2.

Fish habitat features were generally limited throughout residential areas of Brewer Creek, with most features recorded in upper sections where the stream character was more natural and there was good recruitment of woody debris. Large woody debris features were typically associated with scour pools and presence of small woody debris.

Segments 1 to 9 were primarily dry during the field survey. Residents along Brewer Creek explained that flows are generally limited to 5 - 6 weeks during and following spring freshet.

Table 21. Summary of habitat features. Values shown below are based on SHIM field inventory (2009) and analysis of ~3.5 linear km of Brewer Creek within the District of Coldstream.

Type	Combined Length (m)	Mean Width (m)	Combined Area (m^2)	Mean wetted Depth (m)	Percent of SHIM stream length	Relative area Distribution
Boulder	0.0	0.0	0.0	0.0	0.0%	0.0%
Deep Pool	24.3	1.8	45.1	0.3	0.7%	6.3%
Instream Vegetation	0.0	0.0	0.0	0.0	0.0%	0.0%
Over Stream Vegetation	48.0	3.1	113.6	0.1	1.4%	15.9%
Undercut Bank	0.0	0.0	0.0	0.0	0.0%	0.0%
Small Woody Debris	1.3	1.8	2.3	0.0	0.0%	0.3%
Large Woody Debris	156.5	3.4	553.0	0.2	4.5%	77.4%
Spawning Gravel	0.0	0.0	0.0	0.0	0.0%	0.0%
Total	**230.10**		**714.05**		**6.59%**	

4.2.4.5 Obstructions / Barriers

In addition to the lack of continuous stream flows, a total of 11 potential obstructions to fish passage were documented along Brewer Creek within the District of Coldstream municipal limits (Table 22). Persistent debris was the most common type of obstruction noted, with two potential obstructions occurring at approximately 460 m and 730 m upstream of the confluence with Coldstream Creek. All other obstructions occurred in Segments 10 and 11, with bedrock falls in Segment 10 posing the only definite barrier to fish passage.

Table 22. Brewer Creek summary of potential obstructions/barriers to upstream fish migration. Features and values shown below are based on SHIM field inventory (2009) and analysis of ~3.5 linear km of creek within the District of Coldstream.

Type	# of obstructions occurring	Barrier	Cumulative Length (m)	Mean Wetted Width (m)	Mean Depth (m)	Mean Height (m)
Falls	1	Yes	5.0	2.6	0.04	2.3
Persistent Debris	10	4 potential, 6 unknown	37.9	4.2	0.2	1.2
		Total	42.9			

4.2.5 Stream Impact Summary

The sum of weighted SHIM scores equaled 3.7 (out of 6), with Brewer Creek receiving a stream grade of 61% (Table 23). Segment 7 was the only segment to receive a score of 0, based on the high anthropogenic impacts occurring as the stream flows through private residential properties. The natural conditions of Segments 10 and 11 resulted in stream scores of 6, indicating that impacts were relatively nil along the approximately 1.2 km of stream length.

Table 23. Brewer Creek summary of Level of Impact. Values shown below are based on SHIM field inventory and analysis of ~3.5 linear km of Brewer Creek within the District of Coldstream.

Segments	SHIM Impact Score	Length (m)	Percentage of stream length	Weighted Score
7	0	440.8	13%	0.00
N/A	1	N/A	N/A	N/A
4, 5, 6	2	781.0	22%	0.45
1, 2	3	511.2	15%	0.44
3	4	296.3	8%	0.34
8, 9	5	275.6	8%	0.39
10, 11	6	1188.8	34%	2.04
			Weighted Score	**3.66**
			Stream Grade	**61.02%**

4.2.6 Opportunities and Constraints – Overview

With approximately 63% of Brewer Creek being modified to some extent, the condition of this watercourse would improve with increased stewardship from adjacent private landowners. Items to address include overall expansion and naturalization of the riparian area along both banks, as well as erosion mitigation, and ceasing the dumping of yard waste over the banks into the channel. On an individual property basis, retaining structures and bank stabilization should be removed, in favour of bank re-grading, bio-engineering and riparian revegetation.

Segments 9, 10 and 11 are in a relatively natural state and no enhancement measures are recommended. There is potential along Segments 1 to 3 to naturalize the stream channel, creating sinuosity where Brewer Creek has been channelized/confined, and restore and enhance wetland complexes that occur between the channelized Brewer Creek and Coldstream Creek near their confluence. While the extents of wetland features in this area were not captured within the scope of this SHIM survey of centerline and top of bank, they are visible from the available ortho-imagery and surface water connections to Coldstream Creek were picked up as waterbody features in the SHIM survey. Conservation and enhancing the biological function of these features should be a priority.

4.2.7 Riparian Setbacks

As described in Section 4.1.7 for estimated riparian setbacks along Coldstream Creek, stream channel measurements were recorded throughout the SHIM survey of Brewer Creek. Table 24 provides a riparian setback analysis based on the average bankfull widths recorded for each of the 11 stream segments and based on the RAR detailed assessment methodology for determining SPEA widths.

This analysis is intended to suggest preliminary SPEAs (minimum setbacks) within each segment of the surveyed stream length. However, SPEA values determined are not intended to eliminate the requirement for site specific property assessments of proposed

development adjacent Brewer Creek, and subsequent detailed SPEA determination using legal surveys. Given the steep ravine in the upper segments of Brewer Creek, setbacks would be based from top of ravine, rather than high water level of Brewer Creek. Furthermore, additional professional studies would be required to address slope stability in prescribing an appropriate setback.

Table 24. Preliminary riparian setback analysis of Brewer Creek by stream segment.

			Zones of Sensitivity[1]				
Reach	Length (m)	Channel Width (m)	Litter and Insect Drop (3 x Chan. Width/ min. 10m max 15m)	LWD/Bank and Channel Stability (3x Chan. Width/min. 10m-max 30m Riffle Pool, 2X channel width, min 10m, max 15 m Cascade-pool)	Shade (3x Chan. Width max 30m)	Streamside Protection Enhancement Area (SPEA)	Enhancement Opportunity Rating
1	346.5	2.3	10	10	10	**10**	Low
2	164.7	2.5	10	10	10	**10**	Moderate
3	296.3	2.7	10	10	10	**10**	Moderate
4	94.4	3.3	10	10	10	**10**	Moderate
5	495.6	1.8	10	10	10	**10**	Moderate
6	190.9	2.2	10	10	10	**10**	Moderate
7	440.8	2.5	10	10	10	**10**	Moderate
8	166.5	3	10	10	10	**10**	Low
9	109.1	3.2	10	10	10	**Ravine**	Low
10	90.1	3.6	10.8	10	10.8	**Ravine**	Nil
11	1098.7	3.5	10.5	10	10.5	**Ravine**	Nil

1. Zones of Sensitivity have been determined based on the Channel Type for most segments being riffle pool and Segment 10 being step pool and Segments 9 and 11 being cascade pool – based on RAR stream gradients. Site Potential Vegetation Type (SPVT) is treed.

4.3 Craster Creek

4.3.1 Stream Primary Character

Craster Creek (Watershed Code 310-939400-15400-44200) is an approximately 13.2 km long tributary to Coldstream Creek. Craster Creek enters Coldstream Creek approximately 15.1 km upstream from the confluence of Kalamalka Lake and Coldstream Creek. The SHIM survey focused on the length of Craster Creek occurring within the District of Coldstream municipal boundaries, which is approximately 3 km. Craster Creek was broken into 12 segments. Nearly 20% of the stream length is described as channelized, including Segments 1, 2, and 5 (Table 25). An additional 57.5%, or 1.7 km, of Craster Creek is characterized as modified, although the primary character is not channelized. The remaining 23% of SHIM stream length has a natural primary character.

Only three (3) culverts were documented along the SHIM length of Craster Creek, for a total of 80.5 m of stream culverted, or 3% of the stream length. Two of the culverts were noted to be unknown or potential barriers to fish passage as the inlet was not clearly visible and/or the culvert was angled under the road.

Table 25. Craster Creek summary of Primary Stream Character. Values shown below are based on SHIM field inventory and analysis of ~3 linear km of Craster Creek within the District of Coldstream.

Segments	Primary Character	Length (m)	Percentage of stream length
1, 2, 5	Channelized	594.4	19.7%
3, 4, 6, 7, 8, 10	Modified	1733.7	57.5%
9, 11, 12	Natural	687.35	23%

4.3.2 Stream Channel and Hydraulic Character

Approximately 2.5 km, or 84%, of the SHIM stream length of Craster Creek has a riffle-pool hydraulic character (Table 26). Segment 1 was classified as a run, representing 6% of the SHIM stream length, and the remaining 10% consisted of a riffle for approximately 295 m in Segment 5.

The average channel gradient throughout Craster Creek was around 2% (Table 27), with a minimum of 1% and a maximum of 4.5% in the upper reaches of Craster Creek within the study boundary. The mean bankfull width was 3.9 m, while the minimum average width recorded was 1.7 in Segment 5 and the maximum 6.7 m in Segment 11.

Table 26. Craster Creek summary of hydraulic character. Values shown below are based on SHIM field inventory and analysis of ~3 linear km of Craster Creek within the District of Coldstream.

Segments	Hydraulic Character	Length (m)	Percentage of stream length
5	Riffle	295.7	10%
2, 3, 4, 6, 7, 8, 9, 10, 11, 12	Riffle/Pool	2527.4	84%
1	Run	192.3	6%

Table 27. Craster Creek stream channel summary. Values shown below are based on SHIM field inventory and analysis of ~3 linear km of Craster Creek within the District of Coldstream.

	Gradient (%)			Stream Channel		
Segments	Average	Min	Max	Mean Bankfull Width (m)	Min (m)	Max (m)
1 to 12	2.0%	1.0%	4.5%	3.9	1.7	6.7

4.3.3 Instream Habitat Cover/Complexity

Approximately 32% of the SHIM stream length was noted to provide structural instream cover for fish (Table 28). Total cover within any of the 12 identified segments was not estimated in excess of 40% of the wetted area. A total of 10 segments were estimated to exhibit total cover between 21% - 40%, equating to nearly 915 m of stream length. Segment 1, located in a channelized portion of stream confined by the railway along the right bank and weedy field with unrestricted livestock access on the left bank, was estimated to have only 10% total cover. Distribution of cover type was relatively consistent in Segment 5, which was estimated to have 20% cover throughout the 219 m segment. The lower reaches of Craster Creek were dry during the field survey.

Table 28. Craster Creek summary and distribution of instream cover/habitat complexity. Values shown below are based on SHIM field inventory and analysis of ~3 linear km of Craster Creek within the District of Coldstream

Segment Number	% Total Cover	Cover within combined Segment Length (m)	Percentage of SHIM Stream Length	Percentage of Total cover by Cover Type [a]						
				B	DP	IV	LWD	OV	SWD	UC
1	≤10%	19.2	1%	0%	0%	0%	0%	75%	25%	0%
3	11-20%	43.8	1%	15%	15%	5%	20%	25%	20%	0%
2, 4, 5, 6, 7, 8, 9, 10, 11, 12	21-40%	914.8	30%	11%	13%	0%	34%	20%	15%	7%

a. Cover codes: B=boulder; DP=deep pool; IV=instream vegetation; LWD=large woody debris; OV=overstream vegetation; SWD=small woody debris; UC=undercut bank

4.3.4 Watercourse and Habitat Features

The following section summarizes feature data collected and nested within the line segments. All features are measured and recorded individually and provide a more robust and quantitative measure of watercourse impairment and habitat quality.

4.3.4.1 Modifications

Modifications to the stream channel and riparian area occurred over approximately 1.4 km, or 48% of the surveyed length of Craster Creek (Table 29). Modifications had a cumulative linear measurement of approximately 267 m along the left bank, 265 m along the right bank, and 943 m instream. Instream modifications were largely attributed to livestock access, which occurred over 916 m of Craster Creek. While three of the livestock access points documented livestock enclosures with consistent stream access, 520 m are attributed to upper segments of Craster Creek where cattle excrement was documented sporadically along and within the stream channel. Unlike other stream segments, where retaining walls/ bank stabilization and riprap accounted for the majority of modifications, bank armouring only accounted for 15.7% and 15% of left and right bank modifications respectively. The downstream end of Segment 5 flows through a concrete flume under a building and is further channelized and lacking riparian structure and function throughout the remainder of the segment.

Table 29. Craster Creek Summary of artificial features/modifications. Features and values shown below are based on SHIM field inventory (2009) and analysis of ~3 linear km of creek within the District of Coldstream.

	Left Bank			Right			Instream		
Type	Length (m)	% of total length of modifications	% of SHIM stream length	Length (m)	% of total length of modifications	% of SHIM stream length	Length (m)	% of total length of modifications	% of SHIM stream length
Bridge	11.5	0.8%	0.4%	11.5	0.8%	0.4%	16.0	1.1%	0.5%
Channelization	20.0	1.4%	0.7%	20.0	1.4%	0.7%			
Dam							0.3	0.0%	0.0%
Fences	0.8	0.1%	0.0%	0.8	0.1%	0.0%	4.2	0.3%	0.1%
Garbage/Pollution	8.5	0.6%	0.3%	8.0	0.6%	0.3%	6.2	0.4%	0.2%
Livestock Access							916.5	63.5%	30.4%
Pipe Crossing	0.2	0.0%	0.0%	9.2	0.6%	0.3%			
Retaining Wall/Bank Stabilization	114.1	7.9%	3.8%	87.7	6.1%	2.9%			
Rip rap	112.1	7.8%	3.7%	128.0	8.9%	4.2%			
	267.2			265.2			943.20		

4.3.4.2 Discharges/Waterbodies

A total of two (2) discharges were identified along Craster Creek, both of which were flowing during the field survey. Both storm drains had a diameter of 0.3 m.

One approximately 23 m long side channel was recorded along Craster Creek in Segment 7.

4.3.4.3 Bank Stability and Erosion

Bank erosion was recorded along 921 m, or 30.5% of the left bank of Craster Creek (Table 30). The average height was 1.6 m, with a total area of exposure of 1446 m^2. The right bank of Craster Creek was similar, with erosion to some degree occurring along 787 m of the SHIM stream length. The average height was also 1.6 m and the total area of exposure was approximately 1129 m^2. Frequent erosion occurred through residential areas of Craster Creek, where encroachment to the top of bank and riparian vegetation removal are common. Bank stability was recorded as "medium" for 11 of the 12 segments occurring along Craster Creek. Bank stability was characterized as "low" in Segment 4, with frequent erosion and embeddedness of stream substrates noted.

Erosion occurring within Segments 11 and 12 can largely be attributed to natural stream processes and is relatively minor, with the exception of a 4.5 m high eroding bank towards the downstream end of Segment 11.

Table 30. Summary of bank erosion recorded along Craster Creek. Features and values shown below are based on SHIM field inventory (2009) and analysis of ~3 linear km of creek within the District of Coldstream.

Left Bank					Right Bank				
Length (m)	Average Height (m)	Area (m^2)	Average Area of Exposure (m^2)	Percent of SHIM stream length	Length (m)	Average Height (m)	Area (m^2)	Average Area of Exposure (m^2)	Percent of SHIM stream length
921.0	1.6	1446.0	68.9	30.5%	787.0	1.6	1129.4	49.1	26.1%

4.3.4.4 Fish Habitat

Fish habitat features recorded throughout Craster Creek were limited to approximately 190 m, with nearly 52% consisting of large woody debris (Table 31). Overstream vegetation had a relative area distribution around 31%, largely attributed to dense shrub growth throughout Segment 7. Deep pools had the next highest relative abundance, with nearly 10% total cover, and small woody debris features accounted for nearly 8% of recorded fish habitat features. The combined area for recorded habitat features totaled 521 m^2.

Large woody debris features were typically associated with scour pools, as well as the presence of small woody debris. Deep pools recorded were deep relative to the segment and stage of flows, ranging from 0.5 m to 1.5 m.

Incidental observations of rainbow trout fry occurred towards the upstream segments of Craster Creek.

Table 31. Summary of habitat features. Values shown below are based on SHIM field inventory (2009) and analysis of ~3 linear km of Craster Creek within the District of Coldstream

Type	Combined Length (m)	Mean Width (m)	Combined Area (m^2)	Mean wetted Depth (m)	Percent of SHIM stream length	Relative area Distribution
Boulder	0.0	0.0	0.0	0.0	0.0	0.0
Deep Pool	22.6	2.2	51.5	0.9	0.7%	9.9%
Instream Vegetation	0.0	0.0	0.0	0.0	0.0	0.0
Over Stream Vegetation	80.0	2.0	160.0	0.0	2.7%	30.7%
Undercut Bank	0.0	0.0	0.0	0.0	0.0	0.0
Small Woody Debris	12.0	3.5	39.9	0.1	0.4%	7.7%
Large Woody Debris	75.2	3.5	269.2	0.2	2.5%	51.7%
Spawning Gravel	0.0	0.0	0.0	0.0	0.0	0.0
Total	**189.80**		**520.60**		**6.30%**	

4.3.4.5 Obstructions / Barriers

No definitive obstructions or barriers to fish passage were documented along Craster Creek within the survey length. A total of three (3) persistent debris obstructions were recorded, consisting of small and large woody debris accumulations, for a total cumulative length of 9.1 m. The average height was 1.2 m.

Table 32. Craster Creek summary of potential obstructions/barriers to upstream fish migration. Features and values shown below are based on SHIM field inventory (2009) and analysis of ~3 linear km of creek within the District of Coldstream

Type	# of obstructions occurring	Barrier	Cumulative Length (m)	Mean Wetted Width (m)	Mean Depth (m)	Mean Height (m)
Persistent Debris	3	3 Potential	9.1	6.1	0.3	1.2

4.3.5 Stream Impact Summary

The sum of weighted SHIM scores equaled 2.95 (out of 6), with Craster Creek receiving a stream grade of 49.1% (Table 33). Segments 1 and 5 received a score of 0, based on the high anthropogenic impacts and channelization of Craster Creek. Segments 9, 11, and 12 received scores of 5 or 6, representing low to nil bank impacts along 23% of the SHIM stream length.

Table 33. Craster Creek summary of Level of Impact. Values shown below are based on SHIM field inventory and analysis of ~3 linear km of Craster Creek within the District of Coldstream.

Segments	SHIM Impact Score	Length (m)	Percentage of stream length	Weighted Score
1, 5	0	488.0	16%	0.00
2, 6	1	216.6	7%	0.07
4	2	480.9	16%	0.32
3, 7	3	561.0	19%	0.56
8, 10	4	581.6	19%	0.77
9, 11	5	423.0	14%	0.70
12	6	264.4	9%	0.53
			Weighted Score	**2.95**
			Stream Grade	**49.13%**

4.3.6 Opportunities and Constraints – Overview

With approximately 48% of Craster Creek being modified to some extent, the condition of this watercourse would benefit from increased stewardship. Riparian restoration and enhancement is somewhat limited by the railway (along right bank in Segments 1 and 2), but in general the riparian area along both banks should be expanded with planting and setback fencing. Retaining structures and bank stabilization should be removed, in favour of re-grading banks, livestaking with willows and vegetating with native riparian trees and shrubs.

Livestock exclusion fencing should be set up where relatively unrestricted livestock access is occurring in Segments 1 and 10. The extent of livestock access in Segments 11 and 12 is unknown. However, cattle excrement was noted to occur within the stream channel periodically.

Segment 5 could be daylighted where Craster Creek flows beneath an outbuilding at the downstream end of the segment. Segment 5 is also lacking in riparian structure upstream of the flumed section under the building and would benefit from live-staking and riparian plantings, with exclusion fencing moved further from the top of bank.

4.3.7 Riparian Setbacks

As described in Section 4.1.7 for estimated riparian setbacks along Coldstream Creek, stream channel measurements were recorded throughout the SHIM survey of Craster Creek. Table 34 provides a riparian setback analysis based on the average bankfull widths recorded for each of the 12 stream segments and based on the RAR detailed assessment methodology for determining SPEA widths.

This analysis is intended to suggest preliminary SPEAs (minimum setbacks) within each segment of the surveyed stream length. However, SPEA values determined are not intended to eliminate the requirement for site specific property assessments of proposed development adjacent Craster Creek, and subsequent detailed SPEA determination using legal surveys. Given the steep ravine in the upper segments (9, 11, and 12) of Craster Creek, setbacks would be based from top of ravine, rather than high water level of Craster Creek. Furthermore, additional professional studies would be required to address slope stability in prescribing an appropriate setback.

Table 34. Riparian setback analysis of Craster Creek by stream segment.

			Zones of Sensitivity[1]				
Reach	Length (m)	Channel Width (m)	Litter and Insect Drop (3 x Chan. Width/ min. 10m max 15m)	LWD/Bank and Channel Stability (3x Chan. Width/min. 10m-max 30m Riffle Pool, 2X channel width, min 10m, max 15 m Cascade-pool)	Shade (3x Chan. Width max 30m)	Streamside Protection Enhancement Area (SPEA)	Enhancement Opportunity Rating
1	192.3	2.6	10	10	10	**10**	Moderate
2	106.4	2.8	10	10	10	**10**	Low
3	218.9	2.7	10	10	10	**10**	Moderate
4	480.9	3.1	10	10	10	**10**	Moderate
5	295.7	1.7	10	10	10	**10**	Moderate
6	110.2	3	10	10	10	**10**	Low
7	342.1	4.1	12.3	12.3	12.3	**12.3**	Moderate
8	158.5	3.7	11.1	11.1	11.1	**11.1**	Low
9	158.5	3.7	11.1	11.1	11.1	**Ravine**	Low
10	423.1	7.3	15	21.9	21.9	**21.9**	Low
11	264.5	6.7	15	13.4	20.1	**Ravine**	Low
12	264.4	5.4	15	10.8	16.2	**Ravine**	Nil

1. Zones of Sensitivity have been determined based on the Channel Type for most segments being riffle pool and Segments 11 and 12 being cascade pool – based on RAR stream gradients. Site Potential Vegetation Type (SPVT) is treed.

5.0 CLOSURE

This report has summarized detailed field inventory data collected during 2009 SHIM surveys within the District of Coldstream. The collection and management of data conformed to the SHIM methodology, which is a standard for fish and aquatic habitat mapping in urban and rural watersheds in British Columbia.

The 2009 inventory has resulted in the development of an up-to-date catalogue of watercourse and habitat features occurring within respective watercourses, which has numerous applications and can be used by the community, stewardship groups, individuals, and the District, as well as senior regulatory agencies. In maintaining the integrity of this SHIM database, periodic field inspections should be carried out to update watercourse and habitat feature mapping.

The inventory that has been summarized within this report was commissioned by and prepared for the District of Coldstream. The collection, processing, and management of data have conformed to SHIM standards. No other warranty is made, either expressed or implied.

Questions or inquires pertaining to SHIM methodology, data, and this summary report should be directed to the undersigned.

Respectfully Submitted,
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APPENDIX A

Stream-line Data

STREAMNAME	SEG_NUMBER	WTRSHEDCDE	DATE_	TIME_	CREW	WEATHER	AIRTEMP	WATER_TEM	STAGE	LINE_TYPE	LINE_SRC	FISH_BEARI	FISH_SP1	FISH_SP2	COMMENTS	PHOTONUM
Coldstream Creek	1.0	310-939400-15400		10:14:07am	DD/KH/MA	Partly Cloudy	22.0	14.0	low	Trimble	shim2008	Yes			Segment 1 is influenced by Kalamalka Lake levels; staging area, cover, absence of spawning gravels	IMGP4991
Coldstream Creek	2.0	310-939400-15400		11:33:56am	DD/MA/KH	Partly Cloudy	22.0	14.0	low	Trimble	shim2008	Yes	General Fish Observn		Urban residential, associated modifications, narrow riparian band	IMGP5038
Coldstream Creek	3.0	310-939400-15400		10:41:39am	DD	Clear	23.0	14.0	low	Trimble	shim2008	Yes			Sports field left bank, dog park right bank	IMGP5072
Coldstream Creek	4.0	310-939400-15400		10:37:55am	DD	Clear	23.0	14.0	low	Trimble	shim2008	Yes	General Fish Observn		Residential area	IMGP5104
Coldstream Creek	5.0	310-939400-15400		01:30:39pm	DD	Clear	23.0	13.7	low	Trimble	shim2008	Yes	Rainbow	General Fish Observ	Rural residential	IMGP5127
Coldstream Creek	6.0	310-939400-15400		10:40:22am	DD/KH	Clear	22.0	11.7	low	Trimble	shim2008	Yes	Rainbow	General Fish Observ	Higher gradient near stream crossing; manicured lawn; limited riparian	IMGP5163
Coldstream Creek	7.0	310-939400-15400		11:14:21am	DD/KH	Clear	22.0	11.7	low	Trimble	shim2008	Yes	Rainbow	General Fish Observ	Increased density and width of riparian band upstream of park	IMGP5167
Coldstream Creek	8.0	310-939400-15400		12:16:31pm	DD	Clear	22.0	11.8	low	Trimble	shim2008	Yes			Ravine upstream of Coldstream Creek Rd, well-established riparian- non-native maple	IMGP5175
Coldstream Creek	9.0	310-939400-15400		12:55:14pm	DD	Clear	22.0	12.0	low	Trimble	shim2008	Yes	Rainbow			IMGP5213
Coldstream Creek	10.0	310-939400-15400		01:46:27pm	DD	Clear	22.0	12.0	low	Trimble	shim2008	Yes			Rural/agricultural use both banks with natural vegetation	IMGP5234
Coldstream Creek	11.0	310-939400-15400		11:26:20am	DD	Clear	22.0	11.5	low	Trimble	shim2008	Yes	Rainbow		Increased coniferous; agricultural fields/influence visible either side, seepage along rb, trib lb	IMGP5301
Coldstream Creek	12.0	310-939400-15400		12:33:59pm	DD	Clear	20.0	10.5	low	Trimble	shim2008	Yes	Rainbow		Agricultural landuse	IMGP5504
Coldstream Creek	13.0	310-939400-15400		12:33:59pm	DD	Clear	20.0	10.5	low	Trimble	shim2008	Yes	Rainbow		Open field to top of bank	IMGP5543
Coldstream Creek	14.0	310-939400-15400		12:33:59pm	DD	Clear	20.0	10.5	low	Trimble	shim2008	Yes	Rainbow		Steep, incised eroding bank up to concrete flume - obstruction to fish passage at upstream end	IMGP5558
Coldstream Creek	15.0	310-939400-15400		08:22:17am	DD	Clear	18.0	10.5	low	Trimble	shim2008	Unconfirmed			Flooded area associated with dam	IMGP5565
Coldstream Creek	16.0	310-939400-15400		09:44:52am	DD	Clear	18.0	10.5	low	Trimble	shim2008	Yes	Rainbow		Native riparian band	IMGP5574
Coldstream Creek	17.0	310-939400-15400		12:04:43pm	DD	Clear	18.0	10.5	low	Trimble	shim2008	Yes	Rainbow		Slough-like and lwd at u/s end before Ricardo Rd	IMGP5602
Coldstream Creek	18.0	310-939400-15400		07:42:02am	DD	Clear	19.0	12.8	low	Trimble	shim2008	Yes	Rainbow		Channel more channelized-corn field-rb; industrial lb	IMGP5667
Coldstream Creek	19.0	310-939400-15400		11:29:19am	DD	Clear	19.0	12.8	low	Trimble	shim2008	Yes	Rainbow		Hydraulic character changes to slough, beaver influence	IMGP5678
Coldstream Creek	20.0	310-939400-15400		11:46:44am	DD	Clear	19.0	12.8	low	Trimble	shim2008	Yes	Rainbow		Beaver activity widening channel-willow swamp and open water	IMGP5682
Coldstream Creek	21.0	310-939400-15400		12:40:02pm	DD	Clear	19.0	14.0	low	Trimble	shim2008	Yes	Rainbow		Upstream of willow swamp, narrower channel cottonwood-dist.riparian	IMGP5696
Coldstream Creek	22.0	310-939400-15400		03:02:12pm	DD	Clear	20.0	14.5	low	Trimble	shim2008	Yes	Rainbow		Agricultural influence both banks, narrow riparian band	IMGP5723
Coldstream Creek	23.0	310-939400-15400		09:42:19am	DD	Over cast	10.0	9.4	low	Trimble	shim2008	Yes	Rainbow		Cottonwood band; gravel pit operations nearby	IMGP5750
Coldstream Creek	24.0	310-939400-15400		12:26:58pm	DD	Over cast	10.0	9.4	low	Trimble	shim2008	Yes	Rainbow		Livestock enclosure includes creek/both banks, narrow riparian, grazed	IMGP5807
Coldstream Creek	25.0	310-939400-15400		10:52:35am	DD	Over cast	10.0	9.6	low	Trimble	shim2008	Yes	Rainbow		Rural residential, parallel Highway 6	IMGP5850
Coldstream Creek	26.0	310-939400-15400		12:19:10pm	DD	Clear	9.0	8.2	low	Trimble	shim2008	Yes	Rainbow		Transition from rural residential to agricultural landuse	IMGP5957
Coldstream Creek	27.0	310-939400-15400		09:00:55am	DD	Partly Cloudy	9.0	7.1	low	Trimble	shim2008	Yes	General Fish Observn	Rainbow	Rural residential/agricultural, wetlands, seepage along banks	IMGP6021
Coldstream Creek	28.0	310-939400-15400		09:00:55am	DD	Partly Cloudy	9.0	7.1	low	Trimble	shim2008	Yes	General Fish Observn	Rainbow	Wide broadleaf riparian along left bank, feild/horses along right bank	IMGP6050
Coldstream Creek	29.0	310-939400-15400		09:00:55am	DD	Partly Cloudy	9.0	7.1	low	Trimble	shim2008	Unconfirmed			Stream channel becomes stagnant/intermittent towards upstream end of segment; wetlands lb, rural r	IMGP6089
Coldstream Creek	30.0	310-939400-15400		04:28:12pm	DD	Partly Cloudy	11.0	0.0	dry	Trimble	shim2008	Unconfirmed			Field, livestock enclosure, dry with exception of deep residual pools at upstream end near culverts	IMGP6118
Coldstream Creek	31.0	310-939400-15400		09:35:04am	DD	Clear	11.5	6.9	low	Trimble	shim2008	Yes	Rainbow		Livestock enclosure, streamside grazing, lack of riparian vegetation	IMGP6128
Coldstream Creek	32.0	310-939400-15400		11:08:28am	DD	Clear	11.5	6.9	low	Trimble	shim2008	Yes	Rainbow		Livestock access to stream-more vegetated at downstream end, wetland in left bank riparian; erosion	IMGP6154
Coldstream Creek	33.0	310-939400-15400		12:21:48pm	DD	Clear	11.5	7.7	low	Trimble	shim2008	Unconfirmed			Reed canary grass, cattails, channel dry in some areas, possible livestock access, but not constant	IMGP6178
Coldstream Creek	34.0	310-939400-15400		02:30:49pm	DD	Clear	11.5	7.7	dry	Trimble	shim2008	Unconfirmed			Livestock grazing, dry channel, veg in poorer condition-more weeds	IMGP6191
Coldstream Creek	35.0	310-939400-15400		02:51:11pm	DD	Clear	11.5	9.2	low	Trimble	shim2008	Unconfirmed			Highway influence along rb	IMGP6205
Coldstream Creek	36.0	310-939400-15400		09:50:11am	DD	Over cast	10.0	7.6	low	Trimble	shim2008	Yes	Rainbow		Pasture rb-fenced horses, field lb, channelized-narrow riparian	IMGP6289
Coldstream Creek	37.0	310-939400-15400		12:31:56pm	DD	Over cast	10.0	7.6	low	Trimble	shim2008	Yes	Rainbow		No longer field lb-rural residential, less confined channel	IMGP6303
Coldstream Creek	38.0	310-939400-15400		12:19:20pm	DD	Light Rain	9.0	7.5	low	Trimble	shim2008	Yes	Rainbow		Rural residential upstream to highway crossing	IMGP6342
Coldstream Creek	39.0	310-939400-15400		02:50:43pm	DD	Partly Cloudy	10.0	7.5	low	Trimble	shim2008	Yes	Rainbow		Highway parallels left bank, rural residential right bank	IMGP6375
Coldstream Creek	40.0	310-939400-15400		04:39:36pm	DD	Partly Cloudy	10.0	7.5	low	Trimble	shim2008	Yes	Rainbow		Wider riparian, mixed forest, steeper banks	IMGP6401
Coldstream Creek	41.0	310-939400-15400		11:41:13am	DD	Light Rain	9.0	7.4	low	Trimble	shim2008	Yes	Rainbow		Creek heads away from highway influence; rural residential/natural	IMGP6418
Coldstream Creek	42.0	310-939400-15400		01:30:10pm	DD	Light Rain	9.0	7.4	low	Trimble	shim2008	Yes	Rainbow		Cedars, consistent erosion, livestock	IMGP6443

STREAMNAME	SEG_NUMBER	PRIMARY	SECONDARY	HYDRAULIC	COMT_CLASS	PERCENT_GI	CROWN_CLOS	SPAWNING_H	LIVESTOCK_	BARS	ISLANDS
Coldstream Creek	1.0	Channelized		Slough	Kalamalka Lake influence with backwatering	0.0	>90%	Unknown		None	None
Coldstream Creek	2.0	Modified		Riffle/Pool	Urban residential	1.5	71-90%	Potential		None	None
Coldstream Creek	3.0	Modified	Non-channelized	Riffle/Pool	Park left bank-playing field, skate park; dog park right bank	1.5	71-90%	Potential		None	None
Coldstream Creek	4.0	Modified		Riffle/Pool	Residential area u/s park-more channel modifications,less riparian veg	2.0	71-90%	Potential		None	None
Coldstream Creek	5.0	Modified	Non-channelized	Riffle/Pool	Large rural properties, less modifications; native riparian, but some anthropogenic influence	2.0	71-90%	Potential		Side	None
Coldstream Creek	6.0	Modified		Riffle/Pool	Park; mature trees, manicured turf, ball field; fisheries enhancements have occurred	3.0	71-90%	Potential		None	None
Coldstream Creek	7.0	Natural	Other	Riffle/Pool	Rural -anthropogenic impacts low; native riparian veg, good recruitment of lwd, swd; fish habitat	2.0	71-90%	Potential		Side	None
Coldstream Creek	8.0	Natural		Riffle/Pool	Ravine, wide riparian band, non-native maturing deciduous forest; also includes native species	1.5	>90%	Potential		Side	Split
Coldstream Creek	9.0	Modified	Non-channelized	Riffle/Pool	Agricultural field right bank out of ravine section; natural left bank	1.5	71-90%	Potential		Side	None
Coldstream Creek	10.0	Modified	Non-channelized	Riffle/Pool	Agricultural and rural properties with native riparian vegetation-riparian area varies in width	1.5	71-90%	Potential	Yes	Side	None
Coldstream Creek	11.0	Modified	Other	Riffle/Pool	Native riparian vegetation and stream character; agricultural influence; grasses, invasive weeds	1.5	71-90%	Potential	Yes	Mid-channel	None
Coldstream Creek	12.0	Modified		Riffle/Pool	Increasing agricultural impacts; invasive weeds, cattle/fencing visible, lack of riparian vegetation	1.0	71-90%	Unknown	Yes	Side	None
Coldstream Creek	13.0	Modified		Riffle/Pool	Lack of riparian vegetation	1.0	41-70%	Unknown	Yes	Side	None
Coldstream Creek	14.0	Modified		Riffle/Pool	Intensley modified to channelized, concrete waste and debris, rip rap, discharge	1.5	71-90%	Unknown		None	None
Coldstream Creek	15.0	Modified	Other	Slough	Water is backed up with dam; natural lb riparian, agriculture along rb	0.0	71-90%	Unknown		Side	None
Coldstream Creek	16.0	Modified	Non-channelized	Riffle/Pool	Dense riparian band, ov; anthropogenic impacts beyond top of bank	1.0	71-90%	Unknown		Side	None
Coldstream Creek	17.0	Modified	Other	Riffle/Pool	More slough at u/s end; native riparian with influence from adj land use-railway, residential, agric	1.5	71-90%	Unknown		Side	Occasional
Coldstream Creek	18.0	Channelized		Riffle/Pool	Narrow native riparian band, but both banks impacted; earth berm beyond lb.	1.5	71-90%	Unknown		None	None
Coldstream Creek	19.0	Channelized	Beaver Pond	Slough	Series of beaver dams and persistent debris resulting in slough-0.5 m to over 1.7 m deep	0.0	71-90%	Unknown		Side	Occasional
Coldstream Creek	20.0	Modified	Beaver Pond	Beaver Pond	Wetland extends along left bank and beaver activity has resulted in a willow swamp-like environmen	0.0	41-70%	Unknown		Side	Occasional
Coldstream Creek	21.0	Channelized		Slough	Channelized-railway/disturbed left bank, agriculture right bank	0.0	71-90%	Unknown		Side	Occasional
Coldstream Creek	22.0	Modified	Other	Run	Riffle pool character at d/s end near segment break, but run/slough hydrology for majority of seg	1.0	41-70%	Unknown		Mid-channel	Occasional
Coldstream Creek	23.0	Modified		Riffle/Pool	Low gradient riffle/pool	1.0	71-90%	Unknown		Side	None
Coldstream Creek	24.0	Modified	Other	Riffle/Pool	Low gradient riffle-pool, almost run	1.0	41-70%	Potential	Yes	None	None
Coldstream Creek	25.0	Modified	Non-channelized	Riffle/Pool	Natural riparian vegetation with rural residential impacts alternating between both banks	1.0	71-90%	Potential		Side	Occasional
Coldstream Creek	26.0	Modified		Riffle/Pool	Agricultural influence both banks; livestock access, seepage	1.0	71-90%	Unknown	Yes	Side	Occasional
Coldstream Creek	27.0	Modified		Riffle/Pool	Riparian area includes wetlands, field, agricultural and rural residential, with bands of native veg	1.0	71-90%	Unknown		Side	Occasional
Coldstream Creek	28.0	Modified		Riffle/Pool	Well-established left bank riparian, encroachment along right bank, seepage	1.0	71-90%	Unknown		Side	Occasional
Coldstream Creek	29.0	Modified		Riffle/Pool	Hydraulic character run to riffle/pool-low flows at time of assessment	1.0	71-90%	Unknown		Side	Occasional
Coldstream Creek	30.0	Modified	Intermittent	Riffle/Pool	Field, riparian lacking, livestock enclosure; dry during assessment	1.0	0	Unknown	Yes	Side	None
Coldstream Creek	31.0	Modified		Slough	Low water, deep residual pools	0.0	21-40%	Unknown	Yes	Side	
Coldstream Creek	32.0	Modified		Slough	Debris jams, erosion throughout, grazing and livestock access, several wildlife trees/mature trees	0.0	41-70%	Unknown	Yes	Side	Occasional
Coldstream Creek	33.0	Modified	Wetland	Run	Slow moving through grasses, some cattails, sedges, rushes, willows	0.0	1-20%	Unknown	Yes	Side	Occasional
Coldstream Creek	34.0	Modified	Other	Run	Creek primarily dry in this segment during assessment	0.0	0	Unknown	Yes	Mid-channel	Occasional
Coldstream Creek	35.0	Modified	Other	Run	Highway along rb, earth berm and livestock along lb-cottonwood regen, some riparian veg	0.0	41-70%	Unknown	Yes	Side	Occasional
Coldstream Creek	36.0	Modified		Riffle/Pool	Horse pasture rb (fenced); field lb; native riparian band; both banks have been bermed	2.0	71-90%	Unknown		Side	Occasional
Coldstream Creek	37.0	Modified		Riffle/Pool	Wider riparian, channel less confined	2.0	71-90%	Unknown	Yes	Side	Occasional
Coldstream Creek	38.0	Modified		Riffle/Pool	Native riparian band, anthropogenic impacts associated with rural landuse	1.5	71-90%	Unknown		Side	None
Coldstream Creek	39.0	Modified		Riffle/Pool	Left bank influenced from Highway 6; right bank rural residential	1.5	71-90%	Unknown		Side	None
Coldstream Creek	40.0	Modified		Riffle/Pool	Highway runs parallel, but wider riparian and dense native vegetation	2.0	71-90%	Unknown		Side	Occasional
Coldstream Creek	41.0	Natural		Riffle/Pool	Natural, private driveway lb, rural residential	2.0	>90%	Unknown		Side	None
Coldstream Creek	42.0	Natural		Riffle/Pool	Cedar forest, erosion both banks consistent	2.5	71-90%	Unknown	Yes	Side	Occasional

STREAMNAME	SEG_NUMBER	COMT_SCHAR	SUB_I	SUB_	SUB_	SUB_I	SUB_I	SUB_	COMPACTION	COMT_SUB	WIDTH_W	WIDTH_BI	DEPTH_W	DEPTH_B
Coldstream Creek	1.0	Channelized; lake influence; mature Pacific willow provide good canopy closure	0	95	0	3	2	0	Low	Coarse material contributed where it has fallen into stream from bank armouring	3.5	4.4	0.4	0.8
Coldstream Creek	2.0	Urban res. with intermittent bank stabilization; narrow band of riparian veg. incl. cottonwood/willo	0	25	60	10	5	0	Low	Potential spawning gravel throughout segment; larger substrates in association with bank works	3.6	4.8	0.3	0.7
Coldstream Creek	3.0	Mature riparian band-wider along right bank; some armouring, but relatively natural	0	5	70	20	5	0	Low	Larger substrates associated with armouring; gravels dominant-good potential for spawning	5.0	6.4	0.3	0.6
Coldstream Creek	4.0	Some rural properties along left bank may contain livestock-fencing exists	0	5	70	15	10	0	Low	Coarse substrates assoc. with bank armouring; sand	4.4	6.3	0.3	0.6
Coldstream Creek	5.0	Some lateral gravel bars were noted within this segment; including side bars and midchannel bars	0	15	55	25	5	0	Low	More fines noted, including clay due to large eroding bank; gravel dominant, but more embedded	4.5	6.3	0.3	0.5
Coldstream Creek	6.0	Park; instream enhancements-rock armouring, weirs, possible spawning gravel addition	0	5	40	30	25	0	Low	Coarser subs associated with armouring; gravel addition with enhancement work	3.9	4.9	0.3	0.6
Coldstream Creek	7.0	Fencing along creek where cattle noted; good spawning gravels and fish habitat features throughout	0	8	50	30	10	2	Low	Gravels dominant;1short bedrock section near upstream end of segment	5.2	6.7	0.3	0.7
Coldstream Creek	8.0	Stagnant side channel-could not locate u/s end	0	20	45	30	5	0	Low	Embedded gravels-sedimentation	5.0	6.9	0.2	0.7
Coldstream Creek	9.0	Unknown livestock access; well-vegetated riparian area	0	20	45	30	5	0	Low	Embedded gravels-sedimentation; erosion points	4.9	6.1	0.2	0.7
Coldstream Creek	10.0	One livestock watering access noted-blocked from creek	0	25	40	30	5	0	Low	Boulder cover associated with armouring; eroding banks, sedimentation of gravels	4.9	6.0	0.2	0.6
Coldstream Creek	11.0	Small side bars and midchannel, more open canopy d/s end of segment	0	18	55	25	2	0	Low	Gravels prevalent, but embedded; fines with erosion and previous livestock access	5.3	6.2	0.2	0.6
Coldstream Creek	12.0	Fencing in place, but tracks within channel; previous intensive use	2	10	40	45	3	0	Low	Increased cobble, boulder associated with bank armouring	5.2	6.6	0.2	0.6
Coldstream Creek	13.0	Fencing, regulated livestock crossing, lack of vegetation	2	10	40	45	3	0	Low	Increased cobble, boulder associated with bank armouring	4.9	6.0	0.2	0.6
Coldstream Creek	14.0	Narrow, dense riparian band, steep eroding banks, concrete flume/obstruction at upstream end	0	5	15	45	35	0	Medium	Coarse substrates associated with bank armouring	4.6	5.2	0.2	0.7
Coldstream Creek	15.0	Flooded, well-vegetated with overstream vegetaion, as well as emergent aquatics	15	55	10	15	5	0	Low	Coarse substrates associated with armouring	18.0	21.0	1.0	1.8
Coldstream Creek	16.0	Dense riparian, adjacent impacts-steep eroding lb at d/s end; fence, horse paddock top of rb	0	20	45	25	10	0	Low	Coarse subs assoc. armouring; some suitable spawning gravels noted	3.4	5.0	0.2	0.7
Coldstream Creek	17.0		0	25	30	40	5	0	Low	Coarse substrates associated with armouring; erosion, embeddedness	2.4	4.2	0.3	0.6
Coldstream Creek	18.0	Narrow band of cottonwoods has contributed to blowdown along segment and assoc. disturbance	0	25	45	25	5	0	Low	Accumulation of fines associated with uprooted cottonwoods and bank instability	2.6	3.7	0.2	0.7
Coldstream Creek	19.0	Side channel enters left bank-vegetated between channels with mature cottonwood and willow	35	50	5	5	5	0	Low	Coarse substrates associated with armouring	5.0	6.0	0.9	1.4
Coldstream Creek	20.0	Wetland-flooded area to left bank	30	60	5	5	0	0	Low	Very soft substrates-deep fines	32.0	32.0	1.2	1.8
Coldstream Creek	21.0	Side channel adjacent railway-separated by earth berm-weedy area	5	85	5	5	0	0	Low	Influenced by beaver and channelized with adjacent anthropogenic impacts, soft substrates	5.1	6.2	0.8	1.3
Coldstream Creek	22.0	More cover at d/s end-lb lacking riparian vegetation	0	65	20	15	0	0	Low	Increasing fines as creek flows through field on lb; at d/s end cobble and gravel more dominant	3.6	4.8	0.3	0.7
Coldstream Creek	23.0	Road beyond left bank to gravel pit and agricultural/gravel pit to right	0	60	25	15	0	0	Low	Fines dominant	4.1	5.2	0.3	0.8
Coldstream Creek	24.0	Horses access both sides of creek throughout segment; gradient-0.5-1	0	65	30	5	0	0	Low	Small gravels, but not deep-primarily sand	3.7	5.0	0.3	0.7
Coldstream Creek	25.0	Clean gravels noted towards d/s end of segment; erosion and sediment sources identified along seg	0	25	55	15	5	0	Low	Coarser substrates generally associated with armouring/placement; increased coarse substrates u/	4.1	5.5	0.3	0.7
Coldstream Creek	26.0	Livestock access varies by property; associated erosion, riparian impacts	0	20	40	35	5	0	Low	Coarse substrates associated with armouring of banks, crossings	3.8	4.8	0.2	0.8
Coldstream Creek	27.0	Native riparian band, wetlands, seepage, erosion and intermittent disturbed/modified throughout	0	30	40	25	5	0	Low	Frequent eroding banks, fine deposition	3.1	4.4	0.2	0.7
Coldstream Creek	28.0	Horses/lack of veg along rb, erosion; seepage points, tile drains frequent; native riparian left ban	0	45	35	15	5	0	Low	Frequent eroding banks, fine deposition, coarse substrates associated with armouring	3.1	4.4	0.2	0.7
Coldstream Creek	29.0	Rural residential, horses rb, wetland, agricultural lb; native riparian band	0	45	30	20	5	0	Low	Erosion, seepage along right bank, tributaries and wetlands along lb	2.6	3.8	0.2	0.7
Coldstream Creek	30.0	Channel dry-intermittent, erosion, lacking riparian, livestock enclosure	0	35	50	15	0	0	Low	Erosion both banks, gravels, fine deposition	0.0	2.6	0.0	0.7
Coldstream Creek	31.0	Cattle and horse access with associated grazing; banks trampled with erosion	0	80	15	5	0	0	Low	Deep accumulation of fines	2.6	3.5	0.3	0.7
Coldstream Creek	32.0	Livestock, eroding banks and fine substrates, some fencing at top of bank, but instream disturbance	0	85	10	5	0	0	Low	Deep accumulation of fines throughout	2.9	3.3	0.4	0.7
Coldstream Creek	33.0	Some sign of horses, but not overgrazed as other segs-tall grasses,forbs, willow regen; adj. paddock	0	88	10	2	0	0	Low	Deep fines, erosion throughout	2.1	3.0	0.3	0.8
Coldstream Creek	34.0	Livestock grazing, erosion both banks, riparian vegetation limited to grasses and forbs	0	70	30	0	0	0	Low	Fines dominant; embedded gravels throughout	0.0	3.4	0.0	0.7
Coldstream Creek	35.0	Low flows during assessment, livestock access in channel, erosion throughout segment	0	40	50	5	5	0	Low	Fine accumulation due to erosion, gravels present, but embedded; boulders assoc. with armouring	2.0	4.2	0.1	0.7
Coldstream Creek	36.0	Livestock fenced-no access observed	0	20	70	10	0	0	Low	Erosion, associated embeddedness	3.4	5.4	0.1	0.7
Coldstream Creek	37.0	One localized livestock crossing was noted; otherwise, fencing is in place	0	10	55	35	0	0	Low	Increasing cobble from previous section	3.0	5.8	0.1	0.6
Coldstream Creek	38.0	Native riparian, frequent erosion, private stream crossings, some bank armouring	0	20	30	50	0	0	Low	Frequent bank erosion throughout segment, associated fines	2.4	3.5	0.2	0.7
Coldstream Creek	39.0	Dense band of native veg along with residential impacts, crossings, erosion, bank stabilization	0	15	30	40	15	0	Low	Boulder largely associated with bank armouring	2.6	4.0	0.2	0.7
Coldstream Creek	40.0	Wider stream channel, wider, natural riparian, although still dose to highway	0	10	35	50	5	0	Low	Erosion, fines deposition	2.9	4.4	0.1	0.7
Coldstream Creek	41.0	Dense vegetation along both banks with driveway along lb; trail and rural residential rb; erosion	0	20	35	40	5	0	Low		3.5	5.7	0.2	0.8
Coldstream Creek	42.0	Livestock access, some fencing; creek crossings and assoc. erosion; gradient increase u/s end of seg	0	20	30	35	5	5	Low	Erosion-siltation, embedded substrates, bedrock present towards upper portion of segment	2.6	4.3	0.2	0.8

STREAMNAME	SEG_NUMBER	COMT_CHAN	TOTAL_COVE	B	DP	IV	LWD	OV	SWD	UC	SPAN	COMT_COV	L_RIPCLASS	L_QUALIFIE
Coldstream Creek	1.0	Channelized	50	20	55	0	0	5	0	20	0	Pools dominant, rock falling in from bank	Broadleaf forest	Urban_Residential
Coldstream Creek	2.0	Modified with bank protection works and urban encroachment; meandering with narrow riparian ban	50	20	30	0	0	25	0	25	10		Broadleaf forest	Urban_Residential
Coldstream Creek	3.0	Less confined in this seg; increased riparian, meandering	55	5	30	0	15	30	15	5	13	Good cover; frequent pools, lwd, ov	Broadleaf forest	Recreation
Coldstream Creek	4.0	Meandering with armouring; encroachment with residential use; narrow riparian band-less native ve	25	40	30	0	5	5	15	5	2	Boulder cover associated with armouring	Broadleaf forest	Rural_Residential
Coldstream Creek	5.0	Meandering, wider riparian area in general with limited confinement	60	5	23	2	15	25	25	5	20	Natural state allows input of lwd and swd, contrib. to pool formation; B cov. with bank protection	Broadleaf forest	Rural_Residential
Coldstream Creek	6.0		30	35	30	0	0	30	5	0	0	Boulder cover at d/s end of segment associated with armouring; weirs have created pools; some ov	Broadleaf forest	Recreation
Coldstream Creek	7.0	Meandering; little anthropogenic impact; natural stream processes	65	5	20	0	30	20	20	5	18	Good cover for fish; potential for lwd, swd and increased habitat complexity with natural riparian	Broadleaf forest	Natural
Coldstream Creek	8.0	Some erosion, seeps along left bank	40	5	20	0	30	15	25	5	9	Lwd and swd recruitment; assoc. pools	Broadleaf forest	Natural
Coldstream Creek	9.0	Eroding banks where stream meanders-not channelized	35	2	20	0	35	15	23	5	4	Lwd assoc. dp and swd dominant cover; juvenile RB observed in pools; lwd/swd not posing obstruction	Broadleaf forest	Natural
Coldstream Creek	10.0	Eroding banks	40	10	20	0	45	5	15	5	25	Functional lwd jams dominant cover type, along with associated scour pools and accumulation of swd	Broadleaf forest	Agriculture
Coldstream Creek	11.0	Not confined, meandering, natural recruitment of lwd and swd	60	0	25	5	45	5	20	0	8		Mixed forest	Natural
Coldstream Creek	12.0	Meandering stream, not channelized; previous grazing/livestock access in riparian area	30	5	10	0	45	5	30	5	11	Boulder cover associated with bank armouring; woody debris dominant form of cover	Mixed forest	Agriculture
Coldstream Creek	13.0	Meandering stream, not channelized; previous grazing/livestock access in riparian area	15	60	0	15	0	15	5	5	0	Limited cover, mostly associated with bank armouring	Broadleaf forest	Agriculture
Coldstream Creek	14.0	Erosion, bank armouring, steep, high banks, obstruction at u/s end, concrete flume	30	35	15	0	15	15	5	5	2	Boulder, concrete debris, dp below falls provide cover	Broadleaf forest	Agriculture
Coldstream Creek	15.0	Variable depths-0.85m towards u/s; 1.5-2m at d/s end; variable widths	80	5	65	15	10	0	5	0	0	Deep open water environment; lwd, ov and instream vegetation, reed canary grass along banks	Broadleaf forest	Natural
Coldstream Creek	16.0		30	10	5	0	25	45	10	5	6	Boulder cov mainly associated with bank armouring	Broadleaf forest	Natural
Coldstream Creek	17.0	Variable depths-stream more channelized and deeper at u/s end of segment	45	15	20	0	40	10	10	5	10	High recruitment of lwd throughout segment-associated pools, swd; boulder cover assoc. armouring	Broadleaf forest	Disturbed
Coldstream Creek	18.0	Confined by adjacent land use and historic channelization.	35	5	5	0	25	25	30	10	28	Several span logs-recruitment of swd and lwd.	Broadleaf forest	Disturbed
Coldstream Creek	19.0	Channel wider upstream of larger debris jam, wetted width between 3.5 m and 7.5 m	75	0	65	5	15	5	10	0	10	Slough characteristic provides deep water cover throughout the segment	Broadleaf forest	Disturbed
Coldstream Creek	20.0	Variable widths; depths range from 0.4m-2m	85	0	65	15	10	5	5	0	12	Instream veg associated with wetland, willows; lwd and deep water- extensive cover	Disturbed wetland	Disturbed
Coldstream Creek	21.0	Historically channelized with narrow riparian band	60	0	55	5	25	5	10	0	8	Deep water cover throughout and associated swd and lwd	Broadleaf forest	Disturbed
Coldstream Creek	22.0	Channel bankfull width varies from 3.5 to 6.4 m	40	0	15	15	25	10	35	0	9	Open field along lb; reed canary grass, willow and sporadic span logs	Herbs/grasses	Agriculture
Coldstream Creek	23.0	Confined to some extent by road along lb and associated disturbance, agriculture right bank	60	0	5	10	40	15	25	5	9	Good recruitment of woody debris with adj. cottonwoods, reed canary grass provides instream cover	Broadleaf forest	Disturbed
Coldstream Creek	24.0	Meandering, relatively consistent width	55	0	25	5	30	5	30	5	11	Woody debris accumulation and associated pools dominant cover type; riparian vegetation lacking	Broadleaf forest	Agriculture
Coldstream Creek	25.0		50	5	30	15	20	5	25	0	9		Broadleaf forest	Rural_Residential
Coldstream Creek	26.0	Channel width variable; more confined in open grass area	55	5	10	10	30	5	35	5	5	Several rainbow trout observed throughout segment	Broadleaf forest	Agriculture
Coldstream Creek	27.0	Meandering stream, not channelized	45	5	20	5	15	10	25	20	5	Good recruitment lwd, swd	Broadleaf forest	Agriculture
Coldstream Creek	28.0		45	5	25	5	20	10	25	10	5		Broadleaf forest	Natural
Coldstream Creek	29.0	Wetted widths vary where no flows, but generally consistent	40	5	15	5	15	20	25	15	10		Broadleaf forest	Agriculture
Coldstream Creek	30.0	No flows at time of assessment	20	0	25	20	0	30	5	20	0	Deep pools at u/s end, and cover would consist of undercut banks and overhanging grasses during flov	Herbs/grasses	Agriculture
Coldstream Creek	31.0		30	0	70	0	5	0	10	15	0	Deep water cover, lacking instream complexity and riparian	Broadleaf forest	Agriculture
Coldstream Creek	32.0		35	0	45	0	25	5	20	5	3		Broadleaf forest	Agriculture
Coldstream Creek	33.0		30	0	20	15	2	30	3	30	1	Cover limited-largely undercut from erosion and overhanging grasses	Disturbed Wetland	Agriculture
Coldstream Creek	34.0	No flow during assessment, some residual pools	20	0	5	10	0	40	5	40	0	Limited cover, overhanging grasses, sedges and u/c due to erosion	Herbs/grasses	Agriculture
Coldstream Creek	35.0	Low flows to dry during assessment	30	35	25	0	5	5	25	5	3	Boulder cover associated with rock armouring	Broadleaf forest	Agriculture
Coldstream Creek	36.0		35	0	35	5	30	5	20	5	3		Broadleaf forest	Agriculture
Coldstream Creek	37.0		35	5	30	0	25	10	25	5	0		Broadleaf forest	Rural_Residential
Coldstream Creek	38.0		30	0	25	0	25	30	15	5	0	Overstream vegetation dense in some areas-cedar, dogwood	Mixed forest	Rural_Residential
Coldstream Creek	39.0		30	30	15	0	20	15	20	0	0	Boulder cover associated bank armouring	Broadleaf forest	Disturbed
Coldstream Creek	40.0	Wider channel, less confined	35	0	10	0	40	20	25	5	2	Increasing woody debris recruitment	Mixed forest	Disturbed
Coldstream Creek	41.0		35	5	10	0	30	25	25	5	5		Mixed forest	Rural_Residential
Coldstream Creek	42.0		35	10	20	0	30	15	20	5	4		Coniferous forest	Natural

STREAMNAME	SEG_NUMBER	L_STAGE	L_SHRUBS	L_SNAG	L_VETERAN_	L_BKSTBILI	L_BANK_MAT	L_COMMENT	R_RIPCLASS	R_QUALIFIE	R_STAGE	R_SHRUBS	R_SNAG	R_VETERAN_	R_BKSTBIL	R_BANK_MAT
Coldstream Creek	1.0	mature forest	5-33%	<5	No	High	Boulder	Narrow band of veg., mature Pacific willow provide canopy cover; bank- dense willow roots and rock	Broadleaf forest	Urban_Residential	mature forest	5-33%	<5	No	High	Boulder
Coldstream Creek	2.0	mature forest	5-33%	<5	No	High	Cobble	Mat cottonwood/willow, native veg, mixed with manicured turf; var. bank matl, ret. structures	Broadleaf forest	Urban_Residential	mature forest	5-33%	<5	No	High	Cobble
Coldstream Creek	3.0	mature forest	34-66%	<5	No	Medium	Till	Willow, cottonwood, red-osier dogwood, riparian band, mowed lawn-sports fields, some armouring	Broadleaf forest	Recreation	mature forest	67-100%	<5		Medium	Till
Coldstream Creek	4.0	mature forest	5-33%	<5	No	Medium	Till	Bank material-rockarmouring, soils; more agricultural than right bank	Broadleaf forest	Rural_Residential	mature forest	5-33%	<5	No	Medium	Till
Coldstream Creek	5.0	mature forest	67-100%	>=5	<5	Medium	Till	Natural riparian band with some rural/agricultural influence, incl. livestock access and field	Broadleaf forest	Rural_Residential	mature forest	67-100%	>=5	<5	Medium	Till
Coldstream Creek	6.0	mature forest	5-33%	<5	No	High	RipRap	Park; rock armouring bank; mature willow and cottonwood; limited shrubs	Broadleaf forest	Recreation	mature forest	5-33%	<5	No	High	RipRap
Coldstream Creek	7.0	mature forest	67-100%	>=5	>=5	Medium	Till	Some livestock-fenced from creek; mature cottonwood, pine, fir; good recruitment lwd, rural /natural	Broadleaf forest	Natural	mature forest	67-100%	>=5	>=5	Medium	Till
Coldstream Creek	8.0	mature forest	67-100%	>=5	<5	Medium	Fines	Natural but historically modified with presence of mature non-native trees	Broadleaf forest	Natural	mature forest	34-66%	<5	<5	Medium	Fines
Coldstream Creek	9.0	mature forest	67-100%	>=5	<5	Medium	Fines	Non-native mature maples, mature cottonwoods, willow, alder; well-developed understorey-ravine	Broadleaf forest	Rural_Residential	mature forest	34-66%	<5	<5	Medium	Fines
Coldstream Creek	10.0	mature forest	67-100%	>=5	<5	Medium	Fines	Agricultural/rural influence intermittently, bank armouring and narrower riparian band in sections	Broadleaf forest	Agriculture	mature forest	34-66%	>=5	<5	Low	Fines
Coldstream Creek	11.0	mature forest	34-66%	>=5	<5	Medium	Fines	Open coniferous; previous livestock access-tracks/scat; Douglas fir, cedar, cottonwood, wetland/trib	Mixed forest	Agriculture	young forest	5-33%	>=5	No	Low	Fines
Coldstream Creek	12.0	mature forest	5-33%	>=5	No	Low	Fines	Disturbed with past livestock use of riparian, field beyond tob	Broadleaf forest	Agriculture	mature forest	5-33%	<5	No	Low	Fines
Coldstream Creek	13.0	Young Forest	5-33%	<5	No	Medium	Fines	Limited riparian, field beyond tob	Broadleaf forest	Agriculture	Grass/Herb	5-33%	No	No	Low	Fines
Coldstream Creek	14.0	mature forest	5-33%	>=5	No	Low	Fines	Agricultural operations beyond riaprian band	Broadleaf forest	Agriculture	mature forest	5-33%	<5	No	Low	Fines
Coldstream Creek	15.0	mature forest	67-100%	>=5	No	Medium	Fines	Native, dense riparian vegetation, flooded; agricultural beyond riparian band	Broadleaf forest	Agriculture	young forest	5-33%	<5	No	Medium	Cobble
Coldstream Creek	16.0	mature forest	34-66%	>=5	<5	Low	Fines	Agricultural influence beyond top of bank; wide riparian throughout much of segment	Broadleaf forest	Agriculture	young forest	34-66%	<5	No	Medium	Fines
Coldstream Creek	17.0	mature forest	34-66%	>=5	No	Low	Fines	Wide, well-vegetated riparian with areas of encroachment to top of bank, railway influence	Broadleaf forest	Rural_Residential	mature forest	34-66%	>=5	No	Medium	Fines
Coldstream Creek	18.0	mature forest	5-33%	>=5	No	Medium	Fines	Industrial and disturbed beyond top of bank; narrow riparian band.	Broadleaf forest	Agriculture	mature forest	34-66%	>=5	No	Medium	Fines
Coldstream Creek	19.0	mature forest	5-33%	>=5	No	Medium	Fines	Industrial, disturbed beyond tob; earth berm beyond left bank	Broadleaf forest	Agriculture	mature forest	5-33%	>=5	No	Low	Till
Coldstream Creek	20.0	sapling >10m	5-33%	<5	No	Low	Fines	Industrial/railway-disturbed beyond tob; invasive weeds; wetland-grasses, willow, cattail	Broadleaf forest	Agriculture	mature forest	5-33%	>=5	No	Medium	Till
Coldstream Creek	21.0	mature forest	5-33%	>=5	No	Low	Fines	Railway and associated disturbance, invasive weeds, lack of riparian vegetation	Broadleaf forest	Agriculture	mature forest	5-33%	>=5	No	Low	Till
Coldstream Creek	22.0	Grass / Herb	5-33%	<5	No	Low	Fines	Agric. field beyond tob; trees/shrubs at d/s end, then minimal	Broadleaf forest	Agriculture	mature forest	5-33%	>=5	No	Low	Till
Coldstream Creek	23.0	mature forest	5-33%	>=5	No	Low	Fines	Good instream cover, narrow native riparian band	Broadleaf forest	Disturbed	mature forest	5-33%	>=5	No	Low	Fines
Coldstream Creek	24.0	mature forest	5-33%	<5	No	Low	Fines	Grazed, invasive weeds, grasses-limited trees and shrubs; exclusion fencing in place for cattle lb	Broadleaf forest	Agriculture	mature forest	5-33%	>=5	No	Low	Fines
Coldstream Creek	25.0	mature forest	34-66%	>=5	<5	Medium	Fines	Deciduous dominant, although Douglas fir sporadic; lb more natural than rb	Broadleaf forest	Rural_Residential	mature forest	5-33%	>=5	No	Medium	Fines
Coldstream Creek	26.0	mature forest	5-33%	>=5	No	Low	Fines	Erosion for most of segment, narrow riparian band, livestock access	Broadleaf forest	Agriculture	mature forest	5-33%	>=5	No	Low	Fines
Coldstream Creek	27.0	mature forest	67-100%	>=5	<5	Low	Fines	Riparian band varied-wetland, agriculture	Broadleaf forest	Agriculture	young forest	5-33%	>=5	No	Low	Fines
Coldstream Creek	28.0	mature forest	34-66%	>=5	<5	Low	Fines	Broadleaf forest, agriculture	Broadleaf forest	Agriculture	Grass/Herb	5-33%	<5	No	Low	Fines
Coldstream Creek	29.0	young forest	34-66%	>=5	No	Low	Fines	Narrow band of trees/shrubs with wetland along left bank	Broadleaf forest	Agriculture	young forest	5-33%	<5	No	Low	Fines
Coldstream Creek	30.0	Grass / Herb	<5%	No	No	Low	Fines	Livestock enclosure, lack of riparian vegetation and structure	Herbs/grasses	Agriculture	Grass / Herb	<5%	No	No	Low	Fines
Coldstream Creek	31.0	mature forest	<5%	>=5	<5	Low	Fines	Mature trees present, but lacking riparian vegetation overall; grazing	Broadleaf forest	Agriculture	mature forest	<5%	>=5	<5	Low	Fines
Coldstream Creek	32.0	mature forest	34-66%	>=5	<5	Low	Fines	Livestock use, consistent erosion, sediment source, wetland along portion of left bank riparian	Broadleaf forest	Agriculture	mature forest	34-66%	>=5	<5	Low	Fines
Coldstream Creek	33.0	Grass / Herb	<5%	<5	No	Low	Fines	Some mature /regen willow; grasses/forbs, cattails along left riparian area	Herbs/grasses	Agriculture	Grass / Herb	<5%	<5	No	Low	Fines
Coldstream Creek	34.0	Grass / Herb	<5%	No	No	Low	Fines	Limited mature trees in segment, willow regen; streamside grazing; wildlife habitat value	Herbs/grasses	Agriculture	Grass / Herb	<5%	No	No	Low	Fines
Coldstream Creek	35.0	young forest	5-33%	>=5	No	Low	Fines	Cottonwood regen primarily, livestock grazing, access, erosion throughout	Rock	Disturbed	Grass / Herb	5-33%	No	No	Medium	RipRap
Coldstream Creek	36.0	mature forest	34-66%	>=5	<5	Low	Fines	Narrow riparian band, field beyond top of bank	Broadleaf forest	Agriculture	mature forest	34-66%	>=5	<5	Low	Fines
Coldstream Creek	37.0	mature forest	34-66%	>=5	<5	Low	Fines	Rural residential, native riparian band	Broadleaf forest	Agriculture	mature forest	34-66%	<5	<5	Low	Fines
Coldstream Creek	38.0	mature forest	34-66%	>=5	No	Low	Till	Frequent erosion throughout segment, dense but narrow riparian band	Mixed forest	Rural_Residential	mature forest	34-66%	>=5	No	Low	Till
Coldstream Creek	39.0	mature forest	5-33%	No	No	Medium	Till	Highway lb, vegetation trimmed, ltd to grasses, weeds where parallel; some native veg, narrow band	Broadleaf forest	Rural_Residential	mature forest	34-66%	>=5	No	Low	Till
Coldstream Creek	40.0	mature forest	34-66%	>=5	<5	Low	Fines	Highway along lb, but wider band of mature vegetation	Mixed forest	Natural	mature forest	34-66%	>=5	<5	Low	Fines
Coldstream Creek	41.0	mature forest	34-66%	>=5	No	Low	Fines	Drvieway along most of segment, band of native vegetation	Mixed forest	Rural_Residential	mature forest	34-66%	>=5	<5	Low	Fines
Coldstream Creek	42.0	mature forest	34-66%	>=5	No	Low	Fines	Native vegetation, free range cattle, clearing with field area towards upstream end	Coniferous forest	Natural	mature forest	34-66%	>=5	<5	Low	Fines

STREAMNAME	SEG_NUMBER	R_COMMENT	CMMNTFLORA	CMMNTFAUNA	IMP_SCORE
Coldstream Creek	1.0	Naturalized band with mature willow, channelization, manicured landscaping adjacent riparian banc	Pacific willow, red-osier dogwood, Oregon grape, snowberry, nightshade, hort. varieties	Belted Kingfisher, Stellars Jay, Mallards, Carp	1
Coldstream Creek	2.0	Variable bank material and retaining structures, roots, rip. band with mature trees/shrubs/manicure	Cottonwood, Pac. willow, red-osier dogwood, rose sp., snowberry, oregon grape, hort. herbs/shrubs	Black-capped chickadee, little brown bat, Northern flicker, Stellars Jay, gen. fish, American robin	2
Coldstream Creek	3.0	Wider riparian band -more naturalized, gradual bank; mowed sections through dog park	Willow,cottonwood,snowberry,dogwood, douglas maple,burdock,nightshade, black hawthorn, rose, alder	Beaver, bear	4
Coldstream Creek	4.0	Residential encroachment; lack of veg and recruitment potential of lwd	Cottonwood, doug maple,non-native maple, nightshade, willow, grass, hops	Black-billed Magpie, California Quail, American Robin, European Starling	2
Coldstream Creek	5.0	Relatively wide natural riparian band throughout most of seg; recruitment of lwd, swd; field, rural	Cottonwood, willow, dogwood, aspen, douglas maple, snowberry, buttercup, reed canarygrass, hawthorn	Whitetail deer, great horned owl, western red squirrel, WIWR, RBNU, rainbow trout, NOFL	4
Coldstream Creek	6.0	Bank material primarily riprap armouring, fines; turf to top of bank, limited shrubs, mature canopy	Willow, cottonwood, turf, nightshade, dogwood, crabapple, snowberry, current	Northern Flicker, Black-capped Chickadee	3
Coldstream Creek	7.0	Steeper ravine towards Coldstream Creek Rd; native veg; min. disturbance; livestock fencing	Horsetail, chokecherry, cottonwood, willow, dogwood, ash, water birch, nightshade	Great horned owl, RBNU, BCCH, western red squirrel, pileated woodpecker, black bear	4
Coldstream Creek	8.0	Natural, modified historically; Coldstream Creek Rd beyond top of ravine-assoc. debris along bank	Maple,manitoba maple,horsetail,cottonwood,alder,black locust,dogwood, snowberry,nightshade,rose	Pileated woodpecker, black-capped chickadee, black bear	5
Coldstream Creek	9.0	Less riparian veg-field beyond top of bank; trees have been planted; erosion issues noted	Cedar, maple, cottonwood, boxelder, nightshade, snowberry, dogwood,willow, alder, burdock	Rainbow trout, deer tracks, black bear,	5
Coldstream Creek	10.0	Rural/agricultural influence; channel not confined; mat.to vet cottonwoods along seg. native riparia	Cottonwood, water birch,dogwood,alder,elm,snowberry,aster,ornamental cedar,hops,buttercup,nightshade	BEKI, white tailed deer, black bear, RNPH	4
Coldstream Creek	11.0	Open field, seepage, erosion,previous livestock access-fence setback from ck;invasive/native veg	Doug fir,aspen,cedar,skunkcabbage,cattails,cottonwd,dogwood,reed canarygrass,willow,alder,doug maple	Red-tailed hawk,pheasant,whitetailed deer,RBNU,NOFL,BEKI,BCCH	3
Coldstream Creek	12.0	Invasive weeds, grazing, general lack of consistent native riparian vegetation	Douglas fir, alder, cottonwood, cedar, non-native maple, chokecherry, horsetail, saskatoon, dogwood	American Kestrel, Black Capped Chickadee, Belted Kingfisher, Red-tailed Hawk	2
Coldstream Creek	13.0	Invasive weeds, grazing, lack of riparian vegetation, bank armouring	Anthropogenic grasses, willow, invasive weeds	Black Capped Chickadee, Red-tailed Hawk	1
Coldstream Creek	14.0	Agricultural operations beyond top of bank, erosion	Cottonwood, douglas maple, non-native veg, invasive weeds, red-osier dogwood	Potential for wildlife movement, avian species	1
Coldstream Creek	15.0	Agricultural field/residential beyond tob, modified	Willow, cottonwood, hops, rose, dogwood, hawthorn, reed canary grass	Bear, waterfowl, potential for diversity of wildlife-good opportunity for avian species	3
Coldstream Creek	16.0	Horse paddock tob-riparian band-established maples; natural character; erosion/ armouring adj. hw	Cottonwood, willow, non-native maple, dogwood, douglas maple, hops, alder,snowberry	Black capped chickadee, ring-necked pheasant, black bear tracks, avian sp.	3
Coldstream Creek	17.0	Well-vegetated, naturalized riparian with areas of encroachment	Cottonwood, willow, non-native maple, dogwood, doug maple, snowberry, rose	Belted kingfisher,black-capped chickadee, great horned owl	4
Coldstream Creek	18.0	Corn beyond top of bank; narrow native riparian band; several deciduous trees blown down.	Cottonwood, willow, dogwood, rose sp., hops, snowberry	Rainbow trout, black bear, STJA; riparian band provides nesting, foraging, perching habitat	1
Coldstream Creek	19.0	Corn field beyond top of bank; narrow native riparian band	Cottonwood, willow, dogwood, rose, hops	Beaver, black bear, redbreasted nuthatch, belted kingfisher, several avian species, rainbow trout	1
Coldstream Creek	20.0	Corn field beyond tob; narrow native riparian band	Cottonwood, willow, dogwood, rose, hops, cattail, reed canary grass, invasive weeds	Beaver, bear, RBNU,Pacific treefrog, avian species-snags for cavity nesting, garter snake, RB	2
Coldstream Creek	21.0	Corn beyond tob; native riparian band-narrow cottonwood-blowdown	Cottonwood, willow, dogwood, invasive weeds, reed canary grass	Beaver, bear, RBNU, BCCH, AMRO, STJA, avian species-snags for cavity nesting	1
Coldstream Creek	22.0	Native vegetation, narrow riparian band	Cottonwood, willow, dogwood,invasive weeds,reed canary grass, horsetail	Pacific chorus frog, Northern flicker, rainbow trout, black bear, beaver	1
Coldstream Creek	23.0	Narrow native riparian band; good wildlife and fisheries habitat value	Cottonwood, dogwood, hawthorn, rose, reed canary grass, nightshade, willow, invasive weeds	GBHE, RTHA, AMCR, RUGR, black bear, white tailed deer, rainbow trout	2
Coldstream Creek	24.0	Horses, grazing, erosion, invasive weeds, grasses, narrow band of riparian vegetation	Cottonwood, dogwood, hawthorn, rose, reed canary grass, nightshade, willow, alder, burdock, thistle	GBHE,RTHA,AMCR,BCCH, horses, black bear,	1
Coldstream Creek	25.0	Rural residential with assoc. anthropogenic impacts along segment; native riparian as well	Willow,cottonwood,rose,dogwood,hawthorn,water birch,doug. maple, non-native maple,reedcanary grass	Black bear, Western red squirrel, BCCH, RBNU, deer	2
Coldstream Creek	26.0	Erosion for much of segment, seepage,livestock access, grazing, anthropogenic impacts, narrow ri	Wllow, douglas fir,reed canary grass, brooklime,cattails,alder,douglas maple,dogwood,aspen	BEKI,BCCH,AMRO, beaver,RBNU, black bear, rainbow trout, livestock	1
Coldstream Creek	27.0	Rural residential, agriculture-field anthropogenic impacts	Aspen, willow, cottonwood, cattails, dogwood, snowberry, rose,hawthorn,nigthshade,burdock	BCCH, RTHA,WIWR,RUGR,deer,pacific chorus frog, rainbow trout,pileated woodpecker,horses,cows	3
Coldstream Creek	28.0	Rural residential, agriculture-horses, seepages, lacking riparian buffer	Aspen, willow, cottonwood, cattails, dogwood, snowberry, rose,hawthorn,nigthshade,burdock	BCCH, RTHA,WIWR,RUGR,deer,pacific chorus frog, rainbow trout,pileated woodpecker,horses,cows	4
Coldstream Creek	29.0	Rural residential, modifications, seepage, erosion	Willow, cottonwood, cattails, dogwood, snowberry, rose,hawthorn,nigthshade,burdock	BCCH, RTHA,WIWR,RUGR,deer,pacific chorus frog, rainbow trout,pileated woodpecker,horses,cows	3
Coldstream Creek	30.0	Cows-2-lack of riparian structure and habitat complexity; grasses, weeds, erosion	Agronomic grasses, forbs, invasive weeds	Livestock, small mammal tracks noted in stream channel, deer	0
Coldstream Creek	31.0	Grazing, disturbed riparian; some mature trees, but lacking riparian veg, cover, bank stabilization	Cottonwood, thistle, reed canary grass, red-osier dogwood, cattail, grasses	Cows, horses, avian species utilizing cottonwoods	0
Coldstream Creek	32.0	Farm operations, paddocks, disturbed, erosion consistent	Willow, snags, cottonwood,thistle,reed canary grass, dogwood,cattails, alder, snowberry, rose	Livestock, avian species, rainbow trout	1
Coldstream Creek	33.0	Sporadic mature willow and willow regen, but mostly grasses/forbs; previously disturbed field	Willow, bulrush, sedges, reed canary grass,grasses,invasive weed species	Ruffed grouse, beaver, horse	1
Coldstream Creek	34.0	Streamside grazing, lack of riparian structure; wildlife habitat value	Willow, invasive weeds, clover,reed canary grass, grasses, sedges, thistle	Sandpiper, beaver, horses, coyote, small mammals and avian species	0
Coldstream Creek	35.0	Highway fill slope, erosion, rock armouring, limited enhancement/riparian potential	Willow, cottonwood,red-osier dogwood, snowberry, grasses, invasvie weeds, rose,false solomon's seal	Deer, bear, yellow rumped warbler, livestock, avian species	2
Coldstream Creek	36.0	Horse pasture-fence; narrow riparian band	Dogwood, cottonwood, reed canary grass,willow,snowberry, aster,invasive weeds	Deer, bear, raven, horses, NOFL, potential for avian species and wildlife movement corridor	3
Coldstream Creek	37.0	Horse pasture, narrow riparian band	Dogwood, cottonwood, reed canary grass,willow,snowberry,invasive weeds	Deer, bear, horses, several cavity nests in cottonwoods,BCCH,NOFL, avian species and wildlife corrid	2
Coldstream Creek	38.0	Anthropogenic impacts increase parallel to highway	Alder, dogwood, cedar, cottonwood, oregon grape, douglas fir,oregon grape,douglas maple	Red breasted nuthatch, squirrel, avian species, wildlife movement corridor	2
Coldstream Creek	39.0	Rural residential yards, native veg with anthropogenic influence, bridges, bank armouring,erosion	Cottonwood, dogwood, water birch, rose, snowberry,non-native maple, douglas fir	Red-breasted nuthatch, western red squirrel, chipmunk, value for avian species and wildlife corridor	2
Coldstream Creek	40.0	Rural properties, natural, wide riparian band	Cottonwood, douglas fir, dogwood, non-native maple, oregon grape, snowberry, hawthorn	Squirrels, bear, raccoon, potential for several avian species and mammals	2
Coldstream Creek	41.0	Native vegetation throughout most of segment, anthropogenic impacts assoc. with house, trail	Cedar, Douglas fir, cottonwood, dogwood, hawthorn, snowberry, oregon grape,horsetail,paper birch	Chipmunk, deer, rainbow trout, squirrel, bear	3
Coldstream Creek	42.0	Rural, cattle access, logged previously	Cedar, cottonwood, alder, douglas maple, false solomon's seal, red-osier dogwood	Rainbow trout, deer, bear, hairy woodpecker, squirrel, chipmunk, cattle, pot. avian sp. and mammals	5

STREAMNAME	SEG_NUMBER	WTRSHEDCDE	TIME_	WEATHER	AIRTEMP_	WATER_TEMP	STAGE	FISH_BEARI	COMMENTS	PHOTONUM	PRIMARY	SECONDARY	HYDRAULIC
Brewer Creek	1.0	310-939400-15400-44200-0550	10:29:53am	Snow/Sleet	2.0	3.9	low		Confluence with Coldstream Ck; cattail marsh rb, dense riparian thicket on left bank	IMGP6706	Modified	Wetland	Run
Brewer Creek	2.0	310-939400-15400-44200-0550	12:16:43pm	Snow/Sleet	2.0	3.9	dry		Left bank riparian narrows adjacent sheep	IMGP6726	Modified		Run
Brewer Creek	3.0	310-939400-15400-44200-0550	01:24:21pm	Snow/Sleet	2.0	3.9	low		Orchard along right bank, wider riparian	IMGP6772	Modified		Riffle/Pool
Brewer Creek	4.0	310-939400-15400-44200-0550	02:38:10pm	Snow/Sleet	2.0	3.9	dry		Residential both banks; encroachment to tob, dense shrubs	IMGP6780	Modified		Riffle/Pool
Brewer Creek	5.0	310-939400-15400-44200-0550	09:36:09am	Over cast	4.0	0.0	dry		Rural/urban residential transition	IMGP6800	Modified		Riffle/Pool
Brewer Creek	6.0	310-939400-15400-44200-0550	11:39:55am	Over cast	4.0	0.0	dry		Rural residential, farming/livestock left bank	IMGP6831	Modified		Riffle/Pool
Brewer Creek	7.0	310-939400-15400-44200-0550	12:52:38pm	Over cast	4.0	0.0	dry		Residential, no longer farming, multiple stream crossings	IMGP6854	Modified		Riffle/Pool
Brewer Creek	8.0	310-939400-15400-44200-0550	09:20:10am	Partly Cloudy	1.0	4.9	low		Creek dry towards Dawe Rd, flows starting at bridge	IMGP6612	Modified		Riffle/Pool
Brewer Creek	9.0	310-939400-15400-44200-0550	10:06:16am	Partly Cloudy	1.0	3.6	low		Natural, leaving residential influence	IMGP6622	Natural		Riffle/Pool
Brewer Creek	10.0	310-939400-15400-44200-0550	09:48:50am	Over cast	3.0	4.9	low	Unconfirmed	Falls at upstream end, steep gradient, natural ravine	IMGP6634	Natural		Cascade/Pool
Brewer Creek	11.0	310-939400-15400-44200-0550	11:08:34am	Over cast	3.0	4.9	low	Unconfirmed	Above falls; no incidental fish observations	IMGP6686	Natural		Riffle/Pool
Craster Creek	1.0	310-939400-15400-44200	09:24:37am	Light Rain	8.0		dry	Yes	Lower reaches dry during assessment, narrow riparian band and railway rb, agriculture lb	IMGP6472	Channelized		Run
Craster Creek	2.0	310-939400-15400-44200	09:55:37am	Light Rain	8.0		dry	Yes	Lower reaches dry, narrow riparian band/field left bank, railway right bank	IMGP6478	Channelized		Riffle/Pool
Craster Creek	3.0	310-939400-15400-44200	10:39:58am	Light Rain	8.0		dry	Yes	Stream heads away from railway, natural transitioning to residential	IMGP6483	Modified		Riffle/Pool
Craster Creek	4.0	310-939400-15400-44200	11:49:13am	Light Rain	9.0	0.0	dry	Yes	Residential, associated anthropogenic impacts	IMGP6512	Modified		Riffle/Pool
Craster Creek	5.0	310-939400-15400-44200	02:06:59pm	Light Rain	9.0		dry	Yes	Concrete flumed d/s end, stream goes under building; enters open field	IMGP6534	Channelized		Riffle
Craster Creek	6.0	310-939400-15400-44200	03:01:34pm	Light Rain	9.0		dry	Yes	Industrial along right bank, road left bank	IMGP6543	Modified		Riffle/Pool
Craster Creek	7.0	310-939400-15400-44200	10:05:18am	Over cast	8.0	0.0	low	Yes	Rural residential, field	IMGP6554	Modified	Non-channelized	Riffle/Pool
Craster Creek	8.0	310-939400-15400-44200	11:44:14am	Over cast	8.0	7.5	low	Yes	Mixed forest, rural residential	IMGP6584	Modified		Riffle/Pool
Craster Creek	9.0	310-939400-15400-44200	10:10:08am	Light Rain	10.0	7.4	low	Yes	Upper Craster Creek beyond residential; ravine, natural riparian veg, rural influence	IMGP6242	Natural		Riffle/Pool
Craster Creek	10.0	310-939400-15400-44200	11:18:15am	Light Rain	10.0	7.4	low	Yes	Agricultural/rural, banks not as steep	IMGP6244	Modified		Riffle/Pool
Craster Creek	11.0	310-939400-15400-44200	12:39:59pm	Light Rain	10.0	7.4	low	Yes	Natural both banks	IMGP6276	Natural		Riffle/Pool
Craster Creek	12.0	310-939400-15400-44200	12:45:13pm	Over cast	9.0	4.7	low	Yes	Steep ravine both banks, presence of bedrock	IMGP6593	Natural		Riffle/Pool

STREAMNAME	SEG_NUMBER	COMT_CLASS	PERCENT_GR	CROWN_CLOS	SPAWNING_H	LIVESTOCK_	BARS	ISLANDS	COMT_SCHAR	SUB_ORGANI	SUB_FINES
Brewer Creek	1.0	Stream channelized along field-earth berm; dense riparian on left, field/wetland on right	1.0	71-90%	Unknown		None	None	Mature cottonwoods, dense shrubs, cattails, more open along right bank adajcent field	0	55
Brewer Creek	2.0	Stream historically channelized along field- earth berm, wetland btwn rb and Coldstream Creek	1.0	71-90%	Unknown		None	None	Narrow riparian band, agricultural both riparian areas, cattails, channel btwn rb to Coldstream Ck	0	55
Brewer Creek	3.0	Native vegetation, agriculture/rural landuse both riparian areas	1.0	71-90%	Unknown		None	None	Narrow riparian band	0	40
Brewer Creek	4.0	Narrow riparian band, encroachment to tob	1.0	41-70%	Unknown			None	Rural residential, dense shrubs overstream, but riparian lacking	0	20
Brewer Creek	5.0	Residential, anthropogenic impacts throughout; retaining walls, minor erosion, lack of native veg	1.0	41-70%	Unknown		None	None	Residents say stream only flows for 5-7 weeks, associated with spring runoff	0	10
Brewer Creek	6.0	Rural residential, lawn, farming; short segment before re-entering neighbourhood	1.0	41-70%	Unknown		None	None	Livestock are fenced from creek, limited riparian vegetation	0	5
Brewer Creek	7.0	Rural/urban residential, narrow riparian band in places, mostly landscaped, confined	1.0	41-70%	Unknown		Side	None	Stream does not flow year round in this segment	0	5
Brewer Creek	8.0	Anthropogenic impacts	2.5	71-90%	Unknown		None	None	Rural residential impacts	0	5
Brewer Creek	9.0	Steeper banks, leaving rural residential, steeper gradient	5.0	71-90%	Unknown		Side	None		0	5
Brewer Creek	10.0	Short falls towards upstream end, step pool throughout segment	18.0	71-90%	Unknown		None	None	Steep banks, gradient 14-20%	0	0
Brewer Creek	11.0	Upstream of falls, LWD and SWD frequent, trail along left bank	5.0	71-90%	Unknown	Yes	None	None	Extent of livestock access unknown; some fecal matter noted on trail, beyond tob	0	5
Craster Creek	1.0	Earth berm lb, railway rb riparian, channelized run, hydrology may differ when stream flowing	1.0	41-70%	Unknown	Yes	None	None	Livestock access, fenced along right bank	0	5
Craster Creek	2.0	Railway rb riparian; narrow riparian band, field/rural residential lb	1.0	41-70%	Unknown		None	None	Confined by railway; erosion, bank armouring	0	5
Craster Creek	3.0	Native riparian vegetation d/s end of segment, increasing non-native and modifications towards homes	1.0	41-70%	Unknown		None	None	Rural residential, natural riparian; some non-native towards u/s end of segment	0	5
Craster Creek	4.0	Rural residential; native vegetation, but encroachment to tob, frequent erosion	1.0	71-90%	Unknown		None	None	Rural residential, consistent erosion; attempts at armouring, narrow riparian band	0	5
Craster Creek	5.0	Concrete flume under building in fenced enclosure, field	1.0	21-40%	Unknown		None	None	Stream flows under buidings in fenced enclosure; daylights through field, fenced from livestock	0	5
Craster Creek	6.0	Constricted by adjacent land use, frequent erosion, narrow riparian band	1.0	41-70%	Unknown		None	None	Some dense shrub growth, but narrow band and frequent erosion	0	10
Craster Creek	7.0	Rural residential, riparian band with field, rural yards	2.0	71-90%	Unknown	Yes	Side	None	Livestock access appears to be limited to one fenced water access point	0	5
Craster Creek	8.0	Rural residential, entering mixed forest, wider riparian	2.0	71-90%	Potential		Side	None	Mixed forest, anthropogenic impacts in riparian	0	5
Craster Creek	9.0	Natural, ravine, cedar; some rural residential beyond top of right bank	3.0	71-90%	Unknown		Side	None	Ravine, cedar forest, agriculture beyond top of bank	0	5
Craster Creek	10.0	Livestock access, rural modifications, intermittent erosion, natural character	3.0	71-90%	Unknown	Yes	Side	None	Rural impacts, grazing, native vegetation	0	10
Craster Creek	11.0	Ravine left bank; cedar, natural character	4.5	>90%	Unknown	Yes	Side	None	Natural, coniferous	0	5
Craster Creek	12.0	Steep ravine both banks, natural	4.0	71-90%	Unknown	Yes	Side	None	Cedar, steep banks, cattle fecal matter noted along stream	0	5

STREAMNAME	SEG_NUMBER	SUB_GRAVEL	SUB_COBBLE	SUB_BLDER	SUB_BEDRK	COMPACTION	COMT_SUB	WIDTH_W	WIDTH_BF	DEPTH_W	DEPTH_BF	COMT_CHAN
Brewer Creek	1.0	40	5	0	0	Low		1.6	2.3	0.1	0.5	Portions of stream dry during assessment; residual pools and wetted at d/s end of segment
Brewer Creek	2.0	40	5	0	0	Low		0.0	2.5	0.0	0.7	Channel low to dry through most of segment
Brewer Creek	3.0	50	10	0	0	Low		0.7	2.7	0.1	0.8	Stream dry through most of segment, some residual pools
Brewer Creek	4.0	45	30	5	0	Low	Increasing coarse substrates towards road crossing	0.0	3.3	0.0	0.7	Channel dry during assessment
Brewer Creek	5.0	40	45	5	0	Low	Coarse substrates generally associated with armouring	0.0	1.8	0.0	0.7	Channel dry during assessment-no wetted measurements
Brewer Creek	6.0	35	55	5	0	Medium		0.0	2.2	0.0	0.5	Stream channel dry during assessment; no wetted measurements
Brewer Creek	7.0	30	55	10	0	Medium	Coarse substrates generally associated with armouring	0.0	2.5	0.0	0.7	Channel dry during assessment, no wetted measurements
Brewer Creek	8.0	30	50	15	0	Medium	Increasing coarse substrates	0.9	3.0	0.0	0.5	Stream dry at d/s end of segment; wetted width varied 0-2.1m
Brewer Creek	9.0	30	50	15	0	Medium	Increasing coarse substrates	1.5	3.2	0.1	0.5	
Brewer Creek	10.0	5	20	50	25	High		1.7	3.6	0.2	0.8	
Brewer Creek	11.0	30	50	15	0	Medium		1.9	3.5	0.1	0.5	
Craster Creek	1.0	70	25	0	0	Low			2.6		0.5	No flows during assessment; channel uniform
Craster Creek	2.0	60	25	10	0	Low	Boulder cover associated with railway bank armouring		2.8		0.5	No flows during assessment
Craster Creek	3.0	60	25	10	0	Low	Coarse substrates associated with armouring		2.7		0.6	No flows during assessment
Craster Creek	4.0	55	35	5	0	Low	Erosion, embedded substrates		3.1		0.6	No flows during assessment
Craster Creek	5.0	35	60		0	Medium	Concrete at d/s end where stream flumed under bulidings; cobble predominant		1.7		0.5	No flows during assessment
Craster Creek	6.0	35	50	5	0	Medium			3.0		0.7	No flows during assessment
Craster Creek	7.0	30	65	0	0	Medium	Cobble predominant	2.2	4.1	0.1	0.5	Lower portion of the segment was dry; wetted width and depths account for upper segment
Craster Creek	8.0	35	55	5	0	Medium	Cobble predominant	2.0	3.7	0.2	0.6	Creek flowing consistently
Craster Creek	9.0	30	55	10	0	Medium	Small boulder, cobble, gravel, sand	2.1	3.7	0.1	0.5	
Craster Creek	10.0	25	55	10	0	Medium	Increased sand, primarily cobble	3.6	7.3	0.1	0.6	
Craster Creek	11.0	30	50	15	0	Medium	Increasing boulder towards u/s end; if do not break seg at steep ravine, incl bedrock	3.8	6.7	0.1	0.6	
Craster Creek	12.0	45	35	10	5	Medium	Bedrock presence	2.9	5.4	0.1	0.7	

STREAMNAME	SEG_NUMBER	TOTAL_COVE	B	DP	IV	LWD	OV	SWD	UC	SPANLOG_CO	COMT_COV	L_RIPCLASS	L_QUALIFIE	L_STAGE	L_SHRUBS	L_SNAG	L_VETERAN_	L_BKSTBILI	L_BANK_MAT
Brewer Creek	1.0	35	0	15	20	30	20	15	0	3	Grasses in channel	Broadleaf forest	Natural	mature forest	67-100%	>=5	<5	Medium	Fines
Brewer Creek	2.0	35	0	10	10	25	35	20	0	6	Overstream vegetation dense in areas, grasses in channel	Broadleaf forest	Agriculture	young forest	34-66%	>=5	No	Medium	Fines
Brewer Creek	3.0	40	0	20	0	30	35	15	0	10	Dense riparian shrubs	Broadleaf forest	Rural_Residential	mature forest	34-66%	>=5	No	Medium	Fines
Brewer Creek	4.0	25	15	5			65	15	0	0	Dense shrubs, overstream vegetation	Broadleaf forest	Rural_Residential	mature forest	34-66%	>=5	No	Low	Fines
Brewer Creek	5.0	15	25	15	5	0	40	10	5	0	Fish habitat limited with inconsistent flows and modifications	Broadleaf forest	Rural_Residential	young forest	5-33%	<5	No	Medium	Fines
Brewer Creek	6.0	15	5		20		60		15	1	Limited cover	Mixed forest	Agriculture	Grass / Herb	<5%	No	No	Medium	Fines
Brewer Creek	7.0	10	20	5			30	35	10	0	Limited cover, several bridges, lacking year long flows	Mixed forest	Urban_Residential	young forest	5-33%	>=5	No	Medium	Fines
Brewer Creek	8.0	25	15	5	0	0	55	10	15	1	Limited cover	Coniferous forest	Rural_Residential	mature forest	34-66%	<5	No	Low	Till
Brewer Creek	9.0	40	15	10	0	30	25	15	5	2		Coniferous forest	Natural	young forest	34-66%	<5	No	Medium	Till
Brewer Creek	10.0	45	50	15	0	30	5	0	0	6		Coniferous forest	Natural	mature forest	34-66%	>=5	No	High	Bed_Rock
Brewer Creek	11.0	55	5	15	0	40	10	25	5	30	Frequent cover; woody debris throughout segment	Coniferous forest	Natural	mature forest	34-66%	>=5	<5	Medium	Fines
Craster Creek	1.0	10	0	0	0	0	75	25	0	0	Limited cover	Herbs/grasses	Agriculture	Grass / Herb	<5%	No	No	Medium	Fines
Craster Creek	2.0	25	10	5	0	5	50	30	0	1	Cover limited, some dense shrub growth and boulder cover associated with armouring	Broadleaf forest	Rural_Residential	mature forest	34-66%	>=5	No	Medium	Fines
Craster Creek	3.0	20	15	15	5	20	25	20	0	0	Limited complexity	Broadleaf forest	Rural_Residential	mature forest	5-33%	>=5	No	Medium	Fines
Craster Creek	4.0	35	20	10	0	40	20	10	0	4	Increasing cover u/s end, lwd recruitment, boulder cover associated with armouring	Broadleaf forest	Rural_Residential	mature forest	34-66%	>=5	No	Low	Fines
Craster Creek	5.0	25	0	0	0	0	65	5	30	0	Building, overhanging grasses	Herbs/Grasses	Agriculture	Grass/Herb	<5%	No	No	Medium	Concrete
Craster Creek	6.0	35	5	10	0	35	35	15	0	6	Overstream veg, woody debris	Broadleaf forest	Disturbed	young forest	34-66%	No	No	Medium	Till
Craster Creek	7.0	40	0	20	0	30	35	15	0	8	Dense ov with shrub growth; accumulation of swd and lwd	Broadleaf forest	Rural_Residential	young forest	67-100%	<5	No	Medium	Fines
Craster Creek	8.0	30	5	15	0	35	20	10	15	3		Mixed forest	Rural_Residential	mature forest	34-66%	<5	No	Medium	Fines
Craster Creek	9.0	35	5	15	0	40	5	25	10	11		Mixed forest	Natural	mature forest	34-66%	>=5	No	Medium	Fines
Craster Creek	10.0	40	15	10	0	45	5	15	10	11		Coniferous forest	Natural	mature forest	34-66%	>=5	No	Medium	Fines
Craster Creek	11.0	40	20	10	0	35	5	20	10	24	Good lwd recruitment	Coniferous forest	Natural	mature forest	34-66%	>=5	No	Medium	Till
Craster Creek	12.0	35	10	25	0	35	5	20	5	20		Coniferous forest	Natural	mature forest	34-66%	>=5	No	Medium	Fines

STREAMNAME	SEG_NUMBER	L_COMMENT	R_RIPCLASS	R_QUALIFIE	R_STAGE	R_SHRUBS	R_SNAG	R_VETERAN_	R_BKSTBILI	R_BANK_MAT
Brewer Creek	1.0	Wide cottonwood riparian shrub thicket; more dense at d/s end	Disturbed wetland	Agriculture	young forest	5-33%	>=5	No	Medium	Fines
Brewer Creek	2.0	Narrow riparian band, field/sheep beyond tob	Broadleaf forest	Agriculture	young forest	34-66%	>=5	No	Medium	Fines
Brewer Creek	3.0	Narrow riparian band	Broadleaf forest	Agriculture	mature forest	34-66%	>=5	No	Medium	Fines
Brewer Creek	4.0	Narrow riparian band, erosion, encroachment beyond top of bank	Broadleaf forest	Rural_Residential	tall shrubs 2-10m	34-66%	No	No	Low	Fines
Brewer Creek	5.0	Bank armouring frequent, lack of riparian veg, residential yards	Broadleaf forest	Rural_Residential	young forest	5-33%	<5	No	Medium	Fines
Brewer Creek	6.0	Manicured yard, sporadic trees, farming, lacking riparian, no livestock access	Mixed forest	Rural_Residential	Grass / Herb	5-33%	No	No	Medium	Fines
Brewer Creek	7.0	Bank armouring frequent, manicured landscaping, sporadic trees, impacts associated with road, yards	Mixed forest	Urban_Residential	young forest	5-33%	No	No	Medium	Fines
Brewer Creek	8.0	Rural residential impacts, erosion, bank armouring	Coniferous forest	Rural_Residential	mature forest	34-66%	<5	No	Low	Till
Brewer Creek	9.0	Previously logged, relatively young cedar	Coniferous forest	Natural	young forest	34-66%	<5	No	Medium	Till
Brewer Creek	10.0	Some exposed soil and eroding banks, but largely bedrock, natural steep ravine	Coniferous forest	Natural	mature forest	34-66%	>=5	No	High	Bed_Rock
Brewer Creek	11.0	Residential beyond top of ravine, natural, some disturbance with trail	Coniferous forest	Natural	mature forest	34-66%	>=5	<5	Medium	Fines
Craster Creek	1.0	Earth berm along left bank; grazed, invasive weeds	Broadleaf forest	Disturbed	young forest	34-66%	No	No	Medium	Fines
Craster Creek	2.0	Riparian band widening, rural residential beyond top of bank	Broadleaf forest	Disturbed	tall shrubs 2-10m	5-33%	No	No	Medium	Fines
Craster Creek	3.0	Rural residential; open field and homes beyond narrow riparian band	Broadleaf forest	Rural_Residential	mature forest	34-66%	>=5	No	Medium	Fines
Craster Creek	4.0	Encroachment to tob in most areas, narrow riparian band, frequent erosion	Broadleaf forest	Rural_Residential	mature forest	34-66%	>=5	No	Low	Fines
Craster Creek	5.0	Concrete flume under buidings, natural substrates u/s; some trees, but riparian area largely grasses	Herbs/Grasses	Agriculture	herbs/grasses	5-33%	No	No	Medium	Concrete
Craster Creek	6.0	Road, narrow riparian band, armouring, frequent erosion	Broadleaf forest	Disturbed	young forest	34-66%	No	No	Low	Fines
Craster Creek	7.0	Dense shrub growth, field, riparian band dense, but not wide	Broadleaf forest	Rural_Residential	young forest	34-66%	<5	No	Medium	Fines
Craster Creek	8.0	Anthropogenic impacts with housing, reduced riparian, erosion; native vegetation - increasing cedars	Mixed forest	Rural_Residential	mature forest	34-66%	<5	No	Medium	Fines
Craster Creek	9.0	Ravine, native vegetation, intermittent erosion	Mixed forest	Natural	mature forest	34-66%	>=5	No	Medium	Till
Craster Creek	10.0	Natural with rural modifications, livestock enclosure, intermittent bank erosion	Coniferous forest	Agriculture	mature forest	34-66%	>=5	No	Medium	Fines
Craster Creek	11.0	Steep ravine, dominant cedar, regen, shrub layer limited	Coniferous forest	Natural	mature forest	34-66%	>=5	No	Medium	Till
Craster Creek	12.0	Steep ravine, natural, cedar regen, recruitment of lwd	Coniferous forest	Natural	mature forest	34-66%	>=5	<5	Medium	Fines

STREAMNAME	SEG_NUMBER	R_COMMENT	CMMNTFLORA	CMMNTFAUNA	IMP_SCORE
Brewer Creek	1.0	Wetland, field	Cottonwood, dogwood, cattails, grasses, snowberry, skunk cabbage	Black bear, BCCH, AMCR, ring necked pheasant, potential for diversity of wildlife	3
Brewer Creek	2.0	Narrow riparian band; wetland, apples, field beyond rb	Cottonwood, dogwood, grasses, snowberry, invasive weeds, willow	Black bear, BCCH, AMCR, pheasant; wildlife movement corridor, pot. for avian species	3
Brewer Creek	3.0	Narrow riparian band, apples, agriculture/rural landuse	Cottonwood, dogwood, grasses, snowberry, invasive weeds, willow	Black bear, NOFL, BCCH, AMCR, ring necked pheasant, potential for wildlife, avian nesting	4
Brewer Creek	4.0	Narrow riparian band, rural residential, encroachment to top of bank	Cottonwood, dogwood, grasses,snowberry, invasive weeds, willow, douglas maple, douglas fir, rose	Black bear sign (scat), potential for avian species, wildlife movement	2
Brewer Creek	5.0	Bank armouring frequent, lack of riparian	Cottonwood, ash, dogwood, turf, rose, horticultural species of shrubs, trees, oregon grape, doug fir	BCCH, RBNU, DEJU, STJA, NOFL, bear, domestic animals	2
Brewer Creek	6.0	Rural residential, manicured landscaping, some mature trees, minor erosion, bank armouring	Cottonwood, douglas fir, rose, turf, non-native maple, lombardy poplar	RTHA, BCCH, RBNU, DEJU, STJA, NOFL, domestic animals	2
Brewer Creek	7.0	Manicured landscaping, frequent bank armouring, bridges, sporadic trees-native and non-native	Cottonwood, douglas fir, rose, turf, invasive weeds, lilac, horticultural species	BCCH, RBNU, DEJU, STJA, NOFL, domestic animals	0
Brewer Creek	8.0	Consistent erosion, bank armouring, rural modifications	Cedar, dogwood, thimbleberry, douglas maple, snowberry, rose	Squirrel, Stellars Jay, bear	5
Brewer Creek	9.0	Previously logged, young cedar	Western red cedar, dogwood, thimbleberry, douglas maple, snowberry, rose, black gooseberry	Bear, deer, potential for diversity of wildlife	5
Brewer Creek	10.0	Natural steep ravine, largely bedrock banks	Western red cedar, mosses, red-osier dogwood, thimbleberry,	American dipper, black bear, potential for diversity of wildlife	6
Brewer Creek	11.0	Natural, steep bank most of segment	Cedar, devil's club, falsebox, thimbleberry, black gooseberry, birch, larch, spruce	Wren, American crow, bear, squirrel, belted kingfisher, Northern flicker, American dipper	6
Craster Creek	1.0	Narrow vegetated band between creek and railway	Willow, rose, snowberry, dogwood, cottonwood, hawthorn, grasses, invasive species	California quail, bear	0
Craster Creek	2.0	Close proximity to railway-vegetation maintained-currently no mature trees	Willow, rose, snowberry, dogwood, cottonwood, hawthorn, douglas maple, grasses, invasive species	quail, bear, potential wildlife movement corridor, avian nesting, foraging	1
Craster Creek	3.0	Rural residential, natural riparian band, more altered at u/s end-turf	Rose, snowberry, dogwood, cottonwood, grasses, aspen, paper birch, cedar, oak, maple, spruce	BCCH, AMCR, CAQU	3
Craster Creek	4.0	Rural residential, natural riparian band, encroachment to tob	Rose, snowberry, dogwood, cottonwood, grasses, douglas maple, non-native deciduous trees/shrubs	NOFL, squirrel, coyote, good band for wildlife movement but restricted with fencing	2
Craster Creek	5.0	Concrete flume as creek flows under building, daylights and flows through field, till	Lombardy poplar, ash, reed canary grass, cottonwoods	DEJU	0
Craster Creek	6.0	Tolko operations beyond tob; narrow riparian band, frequent erosion	Cottonwood, water birch, dogwood, rose, snowberry, grasses, Douglas maple	DEJU, potential for avian species, small mammals, reptiles, amphibians	1
Craster Creek	7.0	Field, road, rural residential, dense shrub, overstream vegetation	Cottonwood, dogwood, douglas maple, hawthorn, rose, snowberry	RBNU, bear, potential for avian species, wildllife movement corridor	3
Craster Creek	8.0	Rural residential with reduced riparian, associated erosion; native vegetation	Douglas fir, cedar, chokecherry, cottonwood, red-osier dogwood, thimbleberry	RBNU, bear, potential for avian species, wildllife movement corridor, BCCH	4
Craster Creek	9.0	Rural residential/agriculture beyond top of bank	Cedar, douglas fir, douglas maple, birch, devil's club, red-osier dogwood, ferns,	Bear, squirrel, rainbow trout; movement corridor, concealment cover, feeding, nesting value	5
Craster Creek	10.0	Rural modifications, livestock grazing, fenced enclosure, native vegetation	Cedar, douglas fir, douglas maple, birch, red-osier dogwood, invasive weeds, grasses	Bear, squirrel, wildlife habitat value	4
Craster Creek	11.0	Ravine, douglas fir regen, cedar	Cedar, alder, douglas fir, douglas maple, birch, red-osier dogwood	Squirrel, bear, red-breasted nuthatch, trees with cavities	5
Craster Creek	12.0	Steep ravine, cedar regen	Cedar, mosses, paper birch, black gooseberry, douglas fir	Bear, squirrel, red-breasted nuthatch, rainbow trout; fish/wildlife habitat	6

APPENDIX B

SHIM Data Dictionary

```
SHIM2008
SHIM 2002 ddf revised by Ecoscape

STREAM                  Line Feature, Label 1 = StreamName, Label 2 = Line_Src
                        Stream centre line dynamic line segments
   STREAM_REFERENCE     Separator
   StreamName           Text, Maximum Length = 50
                        Required, Required
   LocalName            Text, Maximum Length = 50
                        Normal, Normal
   Organization         Text, Maximum Length = 100
                        Required, Required
   WtrshedCde           Numeric, Decimal Places = 0, watershed code
                        Minimum = 0, Maximum = 50, Default Value = 0
                        Normal, Normal
   TributaryCde         Text, Maximum Length = 35, Tributary Code
                        Normal, Normal
   ILP                  Text, Maximum Length = 35, Interim Locator Point (Tributary Code)
                        Normal, Normal
   Date                 Date, Auto generate Create, Year-Month-Day Format
                        Required, Required
   Time                 Time, Auto generate Create, 24 Hour Format
                        Normal, Normal
   Crew                 Text, Maximum Length = 50
                        Required, Required
   Weather              Menu, Normal, Normal
      Light Rain [L]
      Heavy Rain [H]
      Snow/Sleet [N]
      Over cast [OV]
      Clear [S]
      Partly Cloudy [PC]
      Other [O]
   AirTemp              Numeric, Decimal Places = 1, degrees centigrade
                        Minimum = -25, Maximum = 45, Default Value = 0
                        Normal, Normal
   Water_Temp           Numeric, Decimal Places = 1, degrees celsius
                        Minimum = -2, Maximum = 29, Default Value = 0
                        Normal, Normal
   Stage                Menu, Normal, Normal
      dry
      low
      moderate
      high
      flood
      other
   Line_Type            Menu, Normal, Normal
      Trimble   Default
      Garmin
      Photointerp
      Chain_Compass
      Other
   Line_Src             Menu, Normal, Normal
      shim2008   Default
      shim2006
      shim4
      shim3
      shim2
      shim1
      trim
      DFO
      other
   Fish_Bearing         Menu, Normal, Normal
      Yes
      No
      Unconfirmed
   Fish_SP1             Menu, Normal, Normal, Code for fish species
      General Fish Observn [FSH]
      Bull trout [BT]
      Coho [CO]
      Chinook [CH]
      Chum [CM]
      Cutthroat Trout [CT]
      Westslope Cutthroat  [WCT]
      Dolly Varden [DV]
      Anadromous Dolly Var [ADV]
```

```
   Pink [PK]
   Rainbow [RB]
   Stickleback [SB]
   Salmonid [SA]
   Sculpin [CC]
   Sockeye [SK]
   Steelhead [ST]
   Sucker [SU]
   Trout [TR]
   Whitefish [WF]
   Other [O]
Sp1_Src             Menu, Normal, Normal
   FISS
   FDIS
   DFO
   MWALP
   MOTH
   Other
Fish_SP2            Menu, Normal, Normal, Code for fish species
   General Fish Observn [FSH]
   Bull trout [BT]
   Coho [CO]
   Chinook [CH]
   Chum [CM]
   Cutthroat Trout [CT]
   Westslope Cutthroat  [WCT]
   Dolly Varden [DV]
   Anadromous Dolly Var [ADV]
   Pink [PK]
   Rainbow [RB]
   Stickleback [SB]
   Salmonid [SA]
   Sculpin [CC]
   Sockeye [SK]
   Steelhead [ST]
   Sucker [SU]
   Trout [TR]
   Whitefish [WF]
   Other [O]
Sp2_Src             Menu, Normal, Normal
   FISS
   FDIS
   DFO
   MWALP
   MOTH
   Other
Fish_SP3            Menu, Normal, Normal, Code for fish species
   General Fish Observn [FSH]
   Bull trout [BT]
   Coho [CO]
   Chinook [CH]
   Chum [CM]
   Cutthroat Trout [CT]
   Westslope Cutthroat  [WCT]
   Dolly Varden [DV]
   Anadromous Dolly Var [ADV]
   Pink [PK]
   Rainbow [RB]
   Stickleback [SB]
   Salmonid [SA]
   Sculpin [CC]
   Sockeye [SK]
   Steelhead [ST]
   Sucker [SU]
   Trout [TR]
   Whitefish [WF]
   Other [O]
Sp3_Src             Menu, Normal, Normal
   FISS
   FDIS
   DFO
   MWALP
   MOTH
   Other
Comments            Text, Maximum Length = 100
                    Normal, Normal
```

PhotoNum — Text, Maximum Length = 25, Roll and print number of photograph
Normal, Normal

Photo_File — File Name, Normal, Normal

---------- — Separator

SEGMENT_CLASS — Separator

Seg_Number — Numeric, Decimal Places = 1, Unique Identification number for segment
Minimum = 0, Maximum = 99999, Default Value = 0
Required, Required

Primary — Menu, Required, Required, State of stream section
- Channelized [CH]
- Culvert [CV]
- Ditch [FRT]
- Modified [Md]
- Natural [N]
- Other [O]

Secondary — Menu, Normal, Normal, State of stream section
- Beaver Pond [BP]
- Ephemeral [EP]
- Flumed [F]
- Intermittent [IN]
- Side channel [SC]
- Wetland [HMW]
- Braided [BC]
- Non-channelized [NC]
- Other [O]

Hydraulic — Menu, Normal, Normal, Dominant hydraulic type
- Beaver Pond [BP]
- Cascade [C]
- Cascade/Pool [CP]
- Falls [F]
- Pool [P]
- Run [RN]
- Riffle [RF]
- Riffle/Pool [RP]
- Slough [S]
- Standing [S]
- Wetland [HMW]
- Other [O]

Comt_Class — Text, Maximum Length = 100, Comments for Segment
Normal, Normal

---------- — Separator

SEGMENT_CHARACTER — Separator

Percent_Gradient — Numeric, Decimal Places = 1, Gradient to last point for chain survey
Minimum = 0, Maximum = 100, Default Value = 0
Normal, Normal

Crown_Closure — Menu, Normal, Normal
- 0 [0]
- 1-20% [1]
- 21-40% [2]
- 41-70% [3]
- 71-90% [4]
- >90% [5]

Spawning_Habitat — Menu, Normal, Normal, Good spawning habitat
- Anadromous
- Resident
- Unknown Default
- Potential

Livestock_access — Menu, Normal, Normal, Stream segmnet accessible to live-stock
- Yes

Bars — Menu, Normal, Normal
- None Default
- Side
- Diagonal
- Mid-channel
- Spanning
- Braided

Islands — Menu, Normal, Normal
- None Default
- Occasional
- Frequent - Irregular
- Frequent - Regular
- Split
- Anastomosing

Comt_SChar — Text, Maximum Length = 100, Comments for Segment
Normal, Normal

---------- — Separator

```
SUBSTRATE           Separator
Sub_Organic         Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Sub_Fines           Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Sub_Gravel          Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Sub_Cobble          Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Sub_Blder           Numeric, Decimal Places = 0, substrate boulder
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Sub_BedRk           Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Compaction          Menu, Normal, Normal, Level of substrate compaction
   Low [L]
   Medium [M]
   High [H]
Comt_Sub            Text, Maximum Length = 100, Comment for Substrates
                    Normal, Normal
____________________      Separator
CHANNEL             Separator
Width_W             Numeric, Decimal Places = 2, wetted width
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Width_BF            Numeric, Decimal Places = 2, Bank full width
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Width_LFP           Numeric, Decimal Places = 2, left flood plain width
                    Minimum = 0, Maximum = 1000, Default Value = 0
                    Normal, Normal
Width_RFP           Numeric, Decimal Places = 2, right flood plain width
                    Minimum = 0, Maximum = 1000, Default Value = 0
                    Normal, Normal
Depth_W             Numeric, Decimal Places = 2, Wetted depth
                    Minimum = 0, Maximum = 10, Default Value = 0
                    Normal, Normal
Depth_BF            Numeric, Decimal Places = 2, Bankfull depth
                    Minimum = 0, Maximum = 10, Default Value = 0
                    Normal, Normal
Depth_FP            Numeric, Decimal Places = 2, Flood plain depth
                    Minimum = 0, Maximum = 10, Default Value = 0
                    Normal, Normal
Comt_Chan           Text, Maximum Length = 100, Comment for Channel
                    Normal, Normal
____________________      Separator
INSTREAM_COVER      Separator
Total_Cover         Numeric, Decimal Places = 0, Percentage of Segment With Cover
                    Minimum = 0, Maximum = 1000, Default Value = 0
                    Required, Required
B                   Numeric, Decimal Places = 0, percent boulder
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
DP                  Numeric, Decimal Places = 0, percent deep pools
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
IV                  Numeric, Decimal Places = 0, percent instream vegetation
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
LWD                 Numeric, Decimal Places = 0, percent
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
OV                  Numeric, Decimal Places = 0, percent overstream vegetation
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
SWD                 Numeric, Decimal Places = 0, small woody debris
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
UC                  Numeric, Decimal Places = 0, percent undercut bank
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
```

```
LWD_Count           Numeric, Decimal Places = 0, Number of LWD in Segment
                    Minimum = 0, Maximum = 999, Default Value = 0
                    Normal, Normal
Spanlog_Count       Numeric, Decimal Places = 0, Number of LWD in Segment
                    Minimum = 0, Maximum = 999, Default Value = 0
                    Normal, Normal
DP_Count            Numeric, Decimal Places = 0, Number of Deep Pools in Segment
                    Minimum = 0, Maximum = 999, Default Value = 0
                    Normal, Normal
Comt_Cov            Text, Maximum Length = 100, Comment for Channel
                    Normal, Normal
____________________      Separator
LEFT_BANK_RIPARIAN        Separator
L_RipClass          Menu, Required, Required, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
L_Qualifier         Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural_Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
L_BandWidth         Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
L_BankSlope         Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
L_Stage             Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
L_Shrubs            Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
L_Snag              Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
L_Veteran           Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
L_BkStbility        Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
L_Bank_Material     Menu, Normal, Normal
   Concrete [C]
   Gabions [GB]
   Pilings [P]
   Stonework [S]
```

```
   RipRap [RR]
   Retain Wall/Bank Stb [EHB]
   Sandbags [SB]
   Wood [W]
   Bark_Mulch [BM]
   Asphalt [AS]
   Dyke [DY]
   Till [T]
   Fines [F]
   Gravel [G]
   Cobble [CB]
   Boulder [B]
   Bed_Rock [BR]
   Other [O]
L_Top_Bank          Menu, Normal, Normal, Estimated top of bank
   Yes
   No
L_Comment           Text, Maximum Length = 100, Comment Left bank riparian
                    Normal, Normal
____________________       Separator
RIGHT_BANK_RIPARIAN        Separator
R_RipClass          Menu, Required, Required, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
R_Qualifier         Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural_Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
R_BandWidth         Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
R_BankSlope         Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
R_Stage             Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
R_Shrubs            Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
R_Snag              Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
R_Veteran           Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
R_BkStbility        Menu, Normal, Normal, Bank Stability
```

```
      High [H]
      Medium [M]
      Low [L]
   R_Bank_Material     Menu, Normal, Normal
      Concrete [C]
      Gabions [GB]
      Pilings [P]
      Stonework [S]
      RipRap [RR]
      Retain Wall/Bank Stb [EHB]
      Sandbags [SB]
      Wood [W]
      Bark_Mulch [BM]
      Asphalt [AS]
      Dyke [DY]
      Till [T]
      Fines [F]
      Gravel [G]
      Cobble [CB]
      Boulder [B]
      Bed_Rock [BR]
      Other [O]
   R_Top_Bank          Menu, Normal, Normal, Estimated top of bank
      Yes
      No
   R_Comment           Text, Maximum Length = 100, Comment Right Bank Riparian
                       Normal, Normal
   ____________________      Separator
   FLORA_FAUNA         Separator
   CmmntFlora          Text, Maximum Length = 100, Flora Comment
                       Normal, Normal
   CmmntFauna          Text, Maximum Length = 100, Fauna Comment
                       Normal, Normal
   ____________________      Separator
   LEVEL_OF_IMPACT     Separator
   Impact_rating       Menu, Required, Required
      Nil [6]
      1_bank_low [5]
      1_bank_mod [4]
      1_bank_high [3]
      Both_banks_low [2]
      Both_banks_mod [1]
      Both_banks_high [0]
   LOI_Comment         Text, Maximum Length = 100, Comment_lev_impact
                       Normal, Normal
   ____________________      Separator
   ENHANCE_OPP_RATING  Separator
   Opportunity_Rating  Menu, Required, Required, Enhancement and Restoration
      Nil [0]
      Low [1]
      Moderate [2]
      High [3]
      Very_high [4]
   Comment             Text, Maximum Length = 100
                       Normal, Normal

POINT                  Point Feature, Label 1 = Type_Point, Label 2 = Point_number
                       Nested Point type
   Type_Point          Menu, Required, Required, Point Type Code
      Location Point [L]
      Start Point [S]
      End Point [E]
      Reference Point [RP]
      Bench Mark [BM]
      Monument [MT]
      Map Tie Point [MTP]
      Reach Break [R]
      Riparian Band [RB]
      Segment Break [SB]
      Elevation [Alt]
      Left Top of Bank [LTOB]
      Right Top of Bank [RTOB]
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Distance            Numeric, Decimal Places = 2, Distance to last point for chain survey
```

```
                     Minimum = 0, Maximum = 1000, Default Value = 0
                     Normal, Normal
   Bearing           Numeric, Decimal Places = 0, Compass bearing to last point
                     Minimum = 0, Maximum = 360, Default Value = 0
                     Normal, Normal
   Gradient          Numeric, Decimal Places = 0, Gradient to last point for chain survey
                     Minimum = 0, Maximum = 90, Default Value = 0
                     Normal, Normal
   Elevation         Numeric, Decimal Places = 0, Altimeter elevation in meters
                     Minimum = 0, Maximum = 2000, Default Value = 0
                     Normal, Normal
   Comments          Text, Maximum Length = 100
                     Normal, Normal
   PhotoNum          Text, Maximum Length = 10, Roll and print number of photograph
                     Normal, Normal
   Photo_File        File Name, Normal, Normal

CROSS-SECTION        Point Feature, Label 1 = Point_number
   CROSS_SECTION_POINT       Separator
   Point_number      Numeric, Decimal Places = 1, unique point identification number
                     Minimum = 0, Maximum = 99999, Default Value = 0
                     Required, Required
   Velocity          Numeric, Decimal Places = 1, average velocity feet per second
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Normal, Normal
   Flow              Numeric, Decimal Places = 1, cubic feet per second
                     Minimum = 0, Maximum = 10000, Default Value = 0
                     Normal, Normal
   Flow_method       Menu, Normal, Normal
      Float [F]
      Hydraulic Head [H]
      Flow meter [M]
      Other [O]
   Comments          Text, Maximum Length = 100, general comments
                     Normal, Normal
   PhotoNum          Text, Maximum Length = 10, Roll and print number
                     Normal, Normal
   Photo_File        File Name, Normal, Normal
   ____________________      Separator
   SUBSTRATE         Separator
   Sub_Organic       Numeric, Decimal Places = 0
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Normal, Normal
   Sub_Fines         Numeric, Decimal Places = 0
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Normal, Normal
   Sub_Gravel        Numeric, Decimal Places = 0
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Normal, Normal
   Sub_Cobble        Numeric, Decimal Places = 0
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Normal, Normal
   Sub_Blder         Numeric, Decimal Places = 0, substrate boulder
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Normal, Normal
   Sub_BedRk         Numeric, Decimal Places = 0
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Normal, Normal
   Compaction        Menu, Normal, Normal, Level of substrate compaction
      Low [L]
      Medium [M]
      High [H]
   CommntSub         Text, Maximum Length = 100
                     Normal, Normal
   ____________________      Separator
   CHANNEL           Separator
   Width_W           Numeric, Decimal Places = 2, wetted width
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Required, Required
   Width_BF          Numeric, Decimal Places = 2, Bank full width
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Required, Required
   Width_LFP         Numeric, Decimal Places = 2, left flood plain width
                     Minimum = 0, Maximum = 1000, Default Value = 0
                     Normal, Normal
   Width_RFP         Numeric, Decimal Places = 2, right flood plain width
```

```
                    Minimum = 0, Maximum = 1000, Default Value = 0
                    Normal, Normal
Depth_W             Numeric, Decimal Places = 2, Wetted depth
                    Minimum = 0, Maximum = 10, Default Value = 0
                    Required, Required
Depth_BF            Numeric, Decimal Places = 2, Bankfull depth
                    Minimum = 0, Maximum = 10, Default Value = 0
                    Required, Required
Depth_FP            Numeric, Decimal Places = 2, Flood plain depth
                    Minimum = 0, Maximum = 10, Default Value = 0
                    Normal, Normal
Comt_Chan           Text, Maximum Length = 100, Comment for Channel
                    Normal, Normal
____________________      Separator
DETAILED_CHANNEL    Separator, Detailed channel cross-section
SCL_Depth           Numeric, Decimal Places = 2
                    Minimum = -10, Maximum = 10, Default Value = 0
                    Normal, Normal
CL1_Width           Numeric, Decimal Places = 2, Width at CL1
                    Minimum = 0, Maximum = 20, Default Value = 0
                    Normal, Normal
CL1_Depth           Numeric, Decimal Places = 2, Depth at CL1
                    Minimum = -10, Maximum = 10, Default Value = 0
                    Normal, Normal
CL2_Width           Numeric, Decimal Places = 2, Width at CL2
                    Minimum = 0, Maximum = 20, Default Value = 0
                    Normal, Normal
CL2_Depth           Numeric, Decimal Places = 2, Depth at CL2
                    Minimum = -10, Maximum = 10, Default Value = 0
                    Normal, Normal
CL3_Width           Numeric, Decimal Places = 2, Width at CL3
                    Minimum = 0, Maximum = 20, Default Value = 0
                    Normal, Normal
CL3_Depth           Numeric, Decimal Places = 2, Depth at CL3
                    Minimum = -10, Maximum = 10, Default Value = 0
                    Normal, Normal
WETL_Width          Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
CR1_Width           Numeric, Decimal Places = 2, Width at CR1
                    Minimum = 0, Maximum = 20, Default Value = 0
                    Normal, Normal
CR1_Depth           Numeric, Decimal Places = 2, Depth at CR1
                    Minimum = -10, Maximum = 10, Default Value = 0
                    Normal, Normal
CR2_Width           Numeric, Decimal Places = 2, Width at CR2
                    Minimum = 0, Maximum = 20, Default Value = 0
                    Normal, Normal
CR2_Depth           Numeric, Decimal Places = 2, Depth at CR2
                    Minimum = -10, Maximum = 10, Default Value = 0
                    Normal, Normal
CR3_Width           Numeric, Decimal Places = 2, Width at CR3
                    Minimum = 0, Maximum = 20, Default Value = 0
                    Normal, Normal
CR3_Depth           Numeric, Decimal Places = 2, Depth at CR3
                    Minimum = -10, Maximum = 10, Default Value = 0
                    Normal, Normal
WETR_Width          Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
BF_Width            Numeric, Decimal Places = 2, Bank full width
                    Minimum = 0, Maximum = 30, Default Value = 0
                    Normal, Normal
BF_Elevation        Numeric, Decimal Places = 2, Bank full Elevation
                    Minimum = -10, Maximum = 10, Default Value = 0
                    Normal, Normal
LFP_Width           Numeric, Decimal Places = 2, left flood plain width
                    Minimum = 0, Maximum = 200, Default Value = 0
                    Normal, Normal
RFP_Width           Numeric, Decimal Places = 2, right flood plain width
                    Minimum = 0, Maximum = 200, Default Value = 0
                    Normal, Normal
FP_Elevation        Numeric, Decimal Places = 2, Flood plain elevation
                    Minimum = 0, Maximum = 25, Default Value = 0
                    Normal, Normal
Comt_EChan          Text, Maximum Length = 100, Extra Channel comments
```

```
                    Normal, Normal
_____________________       Separator
EXTRA_LEFT_BAND     Separator
LX_BandWidth        Numeric, Decimal Places = 2, left extra band width
                    Minimum = 0, Maximum = 10, Default Value = 0
                    Normal, Normal
LX_Slope            Numeric, Decimal Places = 0, degrees
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
LX_Top_Bank         Menu, Normal, Normal, Estimated top of bank
   Yes
   No
LX1_BandWidth       Numeric, Decimal Places = 2, left extra band width
                    Minimum = 0, Maximum = 10, Default Value = 0
                    Normal, Normal
LX1_Slope           Numeric, Decimal Places = 0, degrees
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
LX1_Top_Bank        Menu, Normal, Normal, Estimated top of bank
   Yes
   No
LX_Comment          Text, Maximum Length = 100, Comment left extra band
                    Normal, Normal
_____________________       Separator
LEFT_RIPARIAN_BAND1       Separator
L_Bearing           Numeric, Decimal Places = 0, Compass bearing from last point
                    Minimum = 0, Maximum = 360, Default Value = 0
                    Normal, Normal
L_RipClass          Menu, Required, Required, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
L_Qualifier         Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
L_BandWidth         Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
L_BankSlope         Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
L_Top_Bank          Menu, Normal, Normal, Estimated top of bank
   Yes
   No
L_Stage             Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
L_Shrubs            Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
```

```
   67-100% [H]
L_Snag              Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
L_Veteran           Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
L_BkStbility        Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
L_Bank_Material     Menu, Normal, Normal
   Concrete [C]
   Gabions [GB]
   Pilings [P]
   Stonework [S]
   RipRap [RR]
   Retain Wall/Bank Stb [EHB]
   Sandbags [SB]
   Wood [W]
   Bark_Mulch [BM]
   Asphalt [AS]
   Dyke [DY]
   Till [T]
   Fines [F]
   Gravel [G]
   Cobble [CB]
   Boulder [B]
   Bed_Rock [BR]
   Other [O]
L_Comment           Text, Maximum Length = 100, Comments Left bank riparian
                    Normal, Normal
_____________________       Separator
LEFT_RIPARIAN_BAND2         Separator
L2_RipClass         Menu, Normal, Normal, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
L2_Qualifier        Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
L2_BandWidth        Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
L2_BankSlope        Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
L2_Top_Bank         Menu, Normal, Normal, Estimated top of bank
   Yes
   No
L2_Stage            Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
```

```
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
L2_Shrubs           Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
L2_Snag             Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
L2_Veteran          Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
L2_BkStbility       Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
L2_Comment          Text, Maximum Length = 100, Comments Left bank riparian
                    Normal, Normal
____________________      Separator
LEFT_RIPARIAN_BAND3       Separator
L3_RipClass         Menu, Normal, Normal, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
L3_Qualifier        Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
L3_BandWidth        Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
L3_BankSlope        Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
L3_Top_Bank         Menu, Normal, Normal, Estimated top of bank
   Yes
   No
L3_Stage            Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
L3_Shrubs           Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
L3_Snag             Menu, Normal, Normal, Presence of Snags
   No
```

```
   <5
   >=5
L3_Veteran          Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
L3_BkStbility       Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
L3_Comment          Text, Maximum Length = 100, Comments Left bank riparian
                    Normal, Normal
____________________       Separator
LEFT_RIPARIAN_BAND4        Separator
L4_RipClass         Menu, Normal, Normal, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
L4_Qualifier        Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
L4_BandWidth        Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
L4_BankSlope        Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
L4_Top_Bank         Menu, Normal, Normal, Estimated top of bank
   Yes
   No
L4_Stage            Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
L4_Shrubs           Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
L4_Snag             Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
L4_Veteran          Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
L4_BkStbility       Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
L4_Comment          Text, Maximum Length = 100, Comments Left bank riparian
```

```
                    Normal, Normal
_____________________       Separator
EXTRA_RIGHT_BAND    Separator
RX_BandWidth        Numeric, Decimal Places = 2, right extra band width
                    Minimum = 0, Maximum = 20, Default Value = 0
                    Normal, Normal
RX_Slope            Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
RX_Top_Bank         Menu, Normal, Normal, Estimated top of bank
   Yes
   No
RX1_BandWidth       Numeric, Decimal Places = 2, right extra band width
                    Minimum = 0, Maximum = 20, Default Value = 0
                    Normal, Normal
RX1_Slope           Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
RX1_Top_Bank        Menu, Normal, Normal, Estimated top of bank
   Yes
   No
RX_Comment          Text, Maximum Length = 100, Comment right extra band
                    Normal, Normal
_____________________       Separator
RIGHT_RIPARIAN_BAND1        Separator
R_Bearing           Numeric, Decimal Places = 0, Compass bearing from last point
                    Minimum = 0, Maximum = 360, Default Value = 0
                    Normal, Normal
R_RipClass          Menu, Required, Required, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
R_Qualifier         Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
R_BandWidth         Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
R_BankSlope         Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
R_Top_Bank          Menu, Normal, Normal, Estimated top of bank
   Yes
   No
R_Stage             Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
R_Shrubs            Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
```

```
   67-100% [H]
R_Snag              Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
R_Veteran           Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
R_BkStbility        Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
R_Bank_Material     Menu, Normal, Normal
   Concrete [C]
   Gabions [GB]
   Pilings [P]
   Stonework [S]
   RipRap [RR]
   Retain Wall/Bank Stb [EHB]
   Sandbags [SB]
   Wood [W]
   Bark_Mulch [BM]
   Asphalt [AS]
   Dyke [DY]
   Till [T]
   Fines [F]
   Gravel [G]
   Cobble [CB]
   Boulder [B]
   Bed_Rock [BR]
   Other [O]
R_Comment           Text, Maximum Length = 100, Comment Right bank riparian
                    Normal, Normal
_____________________       Separator
RIGHT_RIPARIAN_BAND2        Separator
R2_RipClass         Menu, Normal, Normal, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
R2_Qualifier        Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
R2_BandWidth        Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
R2_BankSlope        Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
R2_Top_Bank         Menu, Normal, Normal, Estimated top of bank
   Yes
   No
R2_Stage            Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
```

```
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
R2_Shrubs           Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
R2_Snag             Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
R2_Veteran          Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
R2_BkStbility       Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
R2_Comment          Text, Maximum Length = 100, Comment Right bank riparian
                    Normal, Normal
____________________      Separator
RIGHT_RIPARIAN_BAND3      Separator
R3_RipClass         Menu, Normal, Normal, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
R3_Qualifier        Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
R3_BandWidth        Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
R3_BankSlope        Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
R3_Top_Bank         Menu, Normal, Normal, Estimated top of bank
   Yes
   No
R3_Stage            Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
R3_Shrubs           Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
R3_Snag             Menu, Normal, Normal, Presence of Snags
   No
```

```
   <5
   >=5
R3_Veteran          Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
R3_BkStbility       Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
R3_Comment          Text, Maximum Length = 100, Comment Right bank riparian
                    Normal, Normal
____________________       Separator
RIGHT_RIPARIAN_BAND4       Separator
R4_RipClass         Menu, Normal, Normal, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Shrubs [VSH]
R4_Qualifier        Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Rural Residential [ru]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
R4_BandWidth        Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 0
                    Normal, Normal
R4_BankSlope        Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 100, Default Value = 0
                    Normal, Normal
R4_Top_Bank         Menu, Normal, Normal, Estimated top of bank
   Yes
   No
R4_Stage            Menu, Normal, Normal, Structural Stage
   Sparse Bryoid [1]
   Grass / Herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
R4_Shrubs           Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
R4_Snag             Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
R4_Veteran          Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
R4_BkStbility       Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
R4_Comment          Text, Maximum Length = 100, Comment Right bank riparian
```

```
                     Normal, Normal
   _____________________      Separator
   FLORA_FAUNA       Separator
   CmmntFlora        Text, Maximum Length = 100, Flora Comment
                     Normal, Normal
   CmmntFauna        Text, Maximum Length = 100, Fauna Comment
                     Normal, Normal

Culvert              Point Feature, Label 1 = Point_number, Label 2 = Type_Culvert
   Point_number      Numeric, Decimal Places = 1, unique point identification number
                     Minimum = 0, Maximum = 99999, Default Value = 0
                     Required, Required
   Type_Culvert      Menu, Normal, Normal, Type of culvert
      Box Culvert [BC]
      Gated Inlet [GI]
      Gated Outlet [GO]
      Gated Multiple Inlet [GMI]
      Gated Multiple Out [GMO]
      Inlet [I]
      Inlet Stacked [IS]
      Multiple Inlet [MI]
      Multiple Outlet [MO]
      Outlet [O]
      Outlet Stacked [OS]
   Owner             Menu, Normal, Normal
      Municipal [MU]
      Private [PR]
   Condition         Menu, Normal, Normal, condition of culvert
      Good [G]
      Partially Collapsed [P]
      Collapsed/Plugged [C]
   Barrier           Menu, Required, Required, Obstructs fish passage
      Yes [Y]
      No [N]
      Potential [P]
      unknown   Default
   Material          Menu, Required, Required, Culvert material
      Concrete [C]
      Steel [S]
      Wood [W]
      Iron [I]
      Metal_Concrete [MC]
      PVC [P]
      Asphalt coded [AD]
      Corrugated Steel [CS]
      Other [O]
   Substrate         Menu, Normal, Normal, substrate within culvert
      Boulders [B]
      Cobbles [C]
      Fines [F]
      Gravels [G]
      Mixed [M]
      Same as Culvert [S]
   Form              Menu, Normal, Normal, Shape of culvert
      Circular [C]
      Rectangular [R]
      Arch [A]
      Vertical Ellipse [V]
      Horizontal Ellipse [H]
      Other [O]
   Length            Numeric, Decimal Places = 2, Feature length
                     Minimum = 0, Maximum = 1000, Default Value = 0
                     Normal, Normal
   Width             Numeric, Decimal Places = 2, Width of Feature
                     Minimum = 0, Maximum = 1000, Default Value = 0
                     Normal, Normal
   Height            Numeric, Decimal Places = 2, Height of culvert above streambed
                     Minimum = 0, Maximum = 1000, Default Value = 0
                     Normal, Normal
   Depth             Numeric, Decimal Places = 2, Depth of plunge pool
                     Minimum = 0, Maximum = 1000, Default Value = 0
                     Normal, Normal
   Diameter          Numeric, Decimal Places = 2, Diameter of culvert
                     Minimum = 0, Maximum = 1000, Default Value = 0
                     Normal, Normal
   ScreenSize        Numeric, Decimal Places = 2
```

```
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
  StormOutlets      Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 999, Default Value = 0
                    Normal, Normal
  Headwall          Menu, Normal, Normal, Does a headwall exist
     Concrete [C]
     Concrete Block [CB]
     Gabion [G]
     Sand bag [SB]
     Wood [W]
     Till [T]
     Rip_rap [RR]
     Stonework [ST]
  Apron             Menu, Normal, Normal, Does an apron exist
     Yes [Y]
     No [N]   Default
  Baffles           Menu, Normal, Normal, Do baffles exist
     Yes [Y]
     No [N]   Default
  Comments          Text, Maximum Length = 100
                    Normal, Normal
  PhotoNum          Text, Maximum Length = 10, Roll and print number of photograph
                    Normal, Normal
  Photo_File        File Name, Normal, Normal

Obstruction         Point Feature, Label 1 = Point_number, Label 2 = Type_Obstruction
  Point_number      Numeric, Decimal Places = 1, unique point identification number
                    Minimum = 0, Maximum = 99999, Default Value = 0
                    Required, Required
  Type_Obstruction  Menu, Normal, Normal, Code for feature
     Beaver Dam [BD]
     Canyon [CN]
     Cascade [C]
     Dam [D]
     Falls [F]
     Fences [FE]
     Hydro Dam [HD]
     Log Jam [X]
     Persistent Debris [PD]
     Pump [PU]
     Rock [R]
     Velocity Barrier [VB]
     Other [OT]
  Bank              Menu, Normal, Normal
     Both [B]
     Instream [I]
     Left [L]
     Right [R]
  Barrier           Menu, Required, Required, Obstructs fish passage
     Yes [Y]
     Potential [P]
     unknown   Default
  Length            Numeric, Decimal Places = 2, Feature length
                    Minimum = 0, Maximum = 1000, Default Value = 0
                    Normal, Normal
  Width             Numeric, Decimal Places = 2, Width of Feature
                    Minimum = 0, Maximum = 1000, Default Value = 0
                    Normal, Normal
  Depth             Numeric, Decimal Places = 2, Depth of feature
                    Minimum = 0, Maximum = 1000, Default Value = 0
                    Normal, Normal
  Diameter          Numeric, Decimal Places = 2, Diameter of feature
                    Minimum = 0, Maximum = 1000, Default Value = 0
                    Normal, Normal
  Height            Numeric, Decimal Places = 2, Height of feature
                    Minimum = 0, Maximum = 1000, Default Value = 0
                    Normal, Normal
  Slope             Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 90, Default Value = 0
                    Normal, Normal
  ScreenSize        Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
  PhotoNum          Text, Maximum Length = 10, Roll and print number of photograph
                    Normal, Normal
```

```
   Photo_File          File Name, Normal, Normal
   Comments            Text, Maximum Length = 100
                       Normal, Normal

Modification           Point Feature, Label 1 = Point_number, Label 2 = Type_Modification
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Type_Modification   Menu, Normal, Normal, Code for feature
      Bridge [BR]
      Catchbasin [CB]
      Channelization [HOC]
      Dam [HOD]
      Detention Pond [DP]
      Dock [DK]
      Dredging [HBDD]
      Fences [HOF]
      FloodGate [FG]
      Garbage/Pollution [WP]
      Gravel Pit [GP]
      Livestock Crossing [LC]
      Livestock Access [LA]
      Logging [LG]
      PipeCrossing [PL]
      Pump Station [PS]
      Retain Wall/Bank Stb [EHB]
      Rip_Rap [RR]
      Road [R]
      Trail [TR]
      Water Withdrawal [FUP]
      Other [O]
   Bank                Menu, Normal, Normal
      Both [B]
      Instream [I]
      Left [L]
      Right [R]
   Type_Material       Menu, Normal, Normal
      Concrete [C]
      Gabions [GB]
      Pilings [P]
      Stonework [S]
      Sandbags [SB]
      Wood [W]
      Gravel [G]
      Bark_Mulch [BM]
      Asphalt [AS]
      Dyke [DY]
      Other [O]
   Length              Numeric, Decimal Places = 2, Feature length
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Width               Numeric, Decimal Places = 2, Width of Feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Height              Numeric, Decimal Places = 2, Height of feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   PhotoNum            Text, Maximum Length = 10, Roll and print number of photograph
                       Normal, Normal
   Photo_File          File Name, Normal, Normal
   Comments            Text, Maximum Length = 100
                       Normal, Normal

Discharge              Point Feature, Label 1 = Point_number, Label 2 = Type_Discharge
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Type_Discharge      Menu, Normal, Normal, Code for feature
      Agricultural Runoff [WPA]
      HouseEffluent [WE]
      Landfill Leachates [WPML]
      Pollutant [WP]
      Pulp Mill/Effluent [WPP]
      Storm Drain [WPD]
      Septic Effluent [WPMP]
      Tile Drain [WPI]
```

```
      Trench [WPE]
      Other [O]
   Bank                Menu, Normal, Normal
      Both [B]
      Instream [I]
      Left [L]
      Right [R]
   Material            Menu, Required, Required, Culvert material
      Concrete [C]
      Steel [S]
      Wood [W]
      Iron [I]
      PVC [P]
      Asphalt coded [AD]
      Corrugated Steel [CS]
      Other [O]
   Headwall            Menu, Normal, Normal, Does a headwall exist
      Concrete [C]
      Concrete Block [CB]
      Gabion [G]
      Sand bag [SB]
      Wood [W]
      Till [T]
      Rip_rap [RR]
      Stonework [ST]
   Length              Numeric, Decimal Places = 2, Feature length
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Width               Numeric, Decimal Places = 2, Width of Feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Diameter            Numeric, Decimal Places = 2, Diameter of feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Height              Numeric, Decimal Places = 2, Height of feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Temperature         Numeric, Decimal Places = 2, Water temperature
                       Minimum = 0, Maximum = 100, Default Value = 0
                       Normal, Normal
   PhotoNum            Text, Maximum Length = 10, Roll and print number of photograph
                       Normal, Normal
   Photo_File          File Name, Normal, Normal
   Comments            Text, Maximum Length = 100
                       Normal, Normal

Erosion                Point Feature, Label 1 = Point_number, Label 2 = Source_Erosion
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Source_Erosion      Menu, Normal, Normal, Code for feature
      Bank Erosion [HCEB]
      Culvert [CV]
      Headwall [H]
      Lack of Riparian Veg [WDL]
      Livestock Access [WDC]
      Streamside Grazing [WDG]
      Landslide
      Debris flow/torrent
      Sloughing
      Other [O]
   Bank                Menu, Normal, Normal
      Both [B]
      Instream [I]
      Left [L]
      Right [R]
   Severity            Menu, Required, Required
      <5m sq [L]
      5-10m sq [M]
      >10m sq [S]
   Exposure            Menu, Normal, Normal
      Clay [C]
      Silt [Si]
      Till [T]
      Bedrock [B]
      Roots [R]
```

```
      Soil [S]
      Other [O]
   Length              Numeric, Decimal Places = 2, Feature length
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Width               Numeric, Decimal Places = 2, Width of Feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Height              Numeric, Decimal Places = 2, Height of feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Slope Degrees       Numeric, Decimal Places = 0
                       Minimum = 0, Maximum = 90, Default Value = 0
                       Normal, Normal
   PhotoNum            Text, Maximum Length = 10, Roll and print number of photograph
                       Normal, Normal
   Photo_File          File Name, Normal, Normal
   Comments            Text, Maximum Length = 100
                       Normal, Normal

Fish_Habitat           Point Feature, Label 1 = Point_number, Label 2 = Type_Habitat
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Type_Habitat        Menu, Normal, Normal, Code for feature
      Boulder [B]
      Deep Pool [DP]
      Instream Vegetation [IV]
      Large Woody Debris [LWD]
      Over Stream Vegetn. [OV]
      Small Woody Debris [SWD]
      Spawning Habitat [HS]
      Undercut Bank [UC]
      Other [O]
   Bank                Menu, Normal, Normal
      Both [B]
      Instream [I]
      Left [L]
      Right [R]
   Length              Numeric, Decimal Places = 2, Feature length
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Width               Numeric, Decimal Places = 2, Width of Feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Depth               Numeric, Decimal Places = 2, Depth of feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   PhotoNum            Text, Maximum Length = 10, Roll and print number of photograph
                       Normal, Normal
   Photo_File          File Name, Normal, Normal
   Comments            Text, Maximum Length = 100
                       Normal, Normal

Fish_Sample            Point Feature, Label 1 = Point_number, Label 2 = TrapNo
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   TrapNo              Numeric, Decimal Places = 0, Minnow Trap number
                       Minimum = 0, Maximum = 100, Default Value = 1
                       Normal, Normal
   DateIn              Date, Year-Month-Day Format, Date Trap was set
                       Normal, Normal
   DateOut             Date, Year-Month-Day Format, Date Trap removed
                       Normal, Normal
   Method              Menu, Normal, Normal, Method of detection
      Visual [V]
      Trap [T]
      Other [O]
   Species             Menu, Normal, Normal, Code for fish species
      General Fish Observn [FSH]
      Bull trout [BT]
      Coho [CO]
      Chinook [CH]
      Chum [CM]
      Cutthroat Trout [CT]
```

```
   Westslope Cutthroat  [WCT]
   Dolly Varden [DV]
   Anadromous Dolly Var [ADV]
   Pink [PK]
   Rainbow [RB]
   Stickleback [SB]
   Salmonid [SA]
   Sculpin [CC]
   Sockeye [SK]
   Steelhead [ST]
   Sucker [SU]
   Trout [TR]
   Whitefish [WF]
   Other [O]
Count_total         Numeric, Decimal Places = 0, Number of fish sampled
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Redd                Menu, Normal, Normal, Presence of redd
   Yes [Y]
   No [N]
PhotoNum            Text, Maximum Length = 10, Roll and print number of photograph
                    Normal, Normal
Photo_File          File Name, Normal, Normal
Comments            Text, Maximum Length = 100
                    Normal, Normal
____________________      Separator
SPECIES 1           Separator
Sp_1                Menu, Normal, Normal, Code for fish species
   General Fish Observn [FSH]
   Bull trout [BT]
   Coho [CO]
   Chinook [CH]
   Chum [CM]
   Cutthroat Trout [CT]
   Westslope Cutthroat  [WCT]
   Dolly Varden [DV]
   Anadromous Dolly Var [ADV]
   Pink [PK]
   Rainbow [RB]
   Stickleback [SB]
   Salmonid [SA]
   Sculpin [CC]
   Sockeye [SK]
   Steelhead [ST]
   Sucker [SU]
   Trout [TR]
   Whitefish [WF]
   Other [O]
Count_1             Numeric, Decimal Places = 0, Number of fish sampled
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Age_1               Menu, Normal, Normal, Life history stage of fish
   Juvenile [J]
   Immature [I]
   Mature [M]
   Spawning [SPW]
   Spent [S]
   Varied [V]
   Mort [Mt]
ForkLth_1           Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
____________________      Separator
SPECIES 2           Separator
Sp_2                Menu, Normal, Normal, Code for fish species
   General Fish Observn [FSH]
   Bull trout [BT]
   Coho [CO]
   Chinook [CH]
   Chum [CM]
   Cutthroat Trout [CT]
   Westslope Cutthroat  [WCT]
   Dolly Varden [DV]
   Anadromous Dolly Var [ADV]
   Pink [PK]
   Rainbow [RB]
```

```
   Stickleback [SB]
   Salmonid [SA]
   Sculpin [CC]
   Sockeye [SK]
   Steelhead [ST]
   Sucker [SU]
   Trout [TR]
   Whitefish [WF]
   Other [O]
Count_2             Numeric, Decimal Places = 0, Number of fish sampled
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Age_2               Menu, Normal, Normal, Life history stage of fish
   Juvenile [J]
   Immature [I]
   Mature [M]
   Spawning [SPW]
   Spent [S]
   Varied [V]
   Mort [Mt]
ForkLth_2           Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
____________________      Separator
SPECIES 3           Separator
Sp_3                Menu, Normal, Normal, Code for fish species
   General Fish Observn [FSH]
   Bull trout [BT]
   Coho [CO]
   Chinook [CH]
   Chum [CM]
   Cutthroat Trout [CT]
   Westslope Cutthroat  [WCT]
   Dolly Varden [DV]
   Anadromous Dolly Var [ADV]
   Pink [PK]
   Rainbow [RB]
   Stickleback [SB]
   Salmonid [SA]
   Sculpin [CC]
   Sockeye [SK]
   Steelhead [ST]
   Sucker [SU]
   Trout [TR]
   Whitefish [WF]
   Other [O]
Count_3             Numeric, Decimal Places = 0, Number of fish sampled
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Age_3               Menu, Normal, Normal, Life history stage of fish
   Juvenile [J]
   Immature [I]
   Mature [M]
   Spawning [SPW]
   Spent [S]
   Varied [V]
   Mort [Mt]
ForkLth_3           Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
____________________      Separator
SPECIES 4           Separator
Sp_4                Menu, Normal, Normal, Code for fish species
   General Fish Observn [FSH]
   Bull trout [BT]
   Coho [CO]
   Chinook [CH]
   Chum [CM]
   Cutthroat Trout [CT]
   Westslope Cutthroat  [WCT]
   Dolly Varden [DV]
   Anadromous Dolly Var [ADV]
   Pink [PK]
   Rainbow [RB]
   Stickleback [SB]
   Salmonid [SA]
```

```
   Sculpin [CC]
   Sockeye [SK]
   Steelhead [ST]
   Sucker [SU]
   Trout [TR]
   Whitefish [WF]
   Other [O]
Count_4             Numeric, Decimal Places = 0, Number of fish sampled
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Age_4               Menu, Normal, Normal, Life history stage of fish
   Juvenile [J]
   Immature [I]
   Mature [M]
   Spawning [SPW]
   Spent [S]
   Varied [V]
   Mort [Mt]
ForkLth_4           Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
____________________       Separator
SPECIES 5           Separator
Sp_5                Menu, Normal, Normal, Code for fish species
   General Fish Observn [FSH]
   Bull trout [BT]
   Coho [CO]
   Chinook [CH]
   Chum [CM]
   Cutthroat Trout [CT]
   Westslope Cutthroat  [WCT]
   Dolly Varden [DV]
   Anadromous Dolly Var [ADV]
   Pink [PK]
   Rainbow [RB]
   Stickleback [SB]
   Salmonid [SA]
   Sculpin [CC]
   Sockeye [SK]
   Steelhead [ST]
   Sucker [SU]
   Trout [TR]
   Whitefish [WF]
   Other [O]
Count_5             Numeric, Decimal Places = 0, Number of fish sampled
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
Age_5               Menu, Normal, Normal, Life history stage of fish
   Juvenile [J]
   Immature [I]
   Mature [M]
   Spawning [SPW]
   Spent [S]
   Varied [V]
   Mort [Mt]
ForkLth_5           Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 100, Default Value = 0
                    Normal, Normal
____________________       Separator
SPECIES 6           Separator
Sp_6                Menu, Normal, Normal, Code for fish species
   General Fish Observn [FSH]
   Bull trout [BT]
   Coho [CO]
   Chinook [CH]
   Chum [CM]
   Cutthroat Trout [CT]
   Westslope Cutthroat  [WCT]
   Dolly Varden [DV]
   Anadromous Dolly Var [ADV]
   Pink [PK]
   Rainbow [RB]
   Stickleback [SB]
   Salmonid [SA]
   Sculpin [CC]
   Sockeye [SK]
```

```
      Steelhead [ST]
      Sucker [SU]
      Trout [TR]
      Whitefish [WF]
      Other [O]
   Count_6             Numeric, Decimal Places = 0, Number of fish sampled
                       Minimum = 0, Maximum = 100, Default Value = 0
                       Normal, Normal
   Age_6               Menu, Normal, Normal, Life history stage of fish
      Juvenile [J]
      Immature [I]
      Mature [M]
      Spawning [SPW]
      Spent [S]
      Varied [V]
      Mort [Mt]
   ForkLth_6           Numeric, Decimal Places = 1
                       Minimum = 0, Maximum = 100, Default Value = 0
                       Normal, Normal

Enhancement            Point Feature, Label 1 = Point_number, Label 2 = Type_Enhance
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Type_Enhance        Menu, Normal, Normal, Code for feature
      Fishways [EOF]
      Hatchery [ECAH]
      Incubation Box [ECNX]
      LWD Placement [EHRL]
      Log/Rock Wiers [EHRI]
      Riparian Plantings [EHBP]
      Riparian Zone Fence [EHBF]
      Rock/Boulder Placeme [EHRR]
      Side Channel/Pools [EHRS]
      Spawning Gravel [EHSP]
      Veg Bank Stabilize [EHBV]
      Other [O]
   Bank                Menu, Normal, Normal
      Both [B]
      Instream [I]
      Left [L]
      Right [R]
   Status              Menu, Normal, Normal, Potential or existing enhancement
      Existing [E]
      Potential [P]
   Length              Numeric, Decimal Places = 2, Feature length
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Width               Numeric, Decimal Places = 2, Width of Feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Height              Numeric, Decimal Places = 2, Height of feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Diameter            Numeric, Decimal Places = 2, Diameter of feature
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Comments            Text, Maximum Length = 100
                       Normal, Normal
   PhotoNum            Text, Maximum Length = 10, Roll and print number of photograph
                       Normal, Normal
   Photo_File          File Name, Normal, Normal

Wildlife               Point Feature, Label 1 = Point_number, Label 2 = Type_Evidence
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Type_Evidence       Menu, Normal, Normal
      Calls [Cl]
      Egg masses [EM]
      Nest [Nt]
      Sighted [St]
      Scat/Droppings [Sd]
      Tracks [Tk]
      Other [O]
   Class_Wildlife      Menu, Normal, Normal
```

```
      Amphibian
      Large Mammal
      Songbird
      Raptor
      Reptile
      Small Mammal
      Waterbirds
      Waterfowl
   Bank                Menu, Normal, Normal
      Both [B]
      Instream [I]
      Left [L]
      Right [R]
   Species_Wildlife    Text, Maximum Length = 45
                       Normal, Normal
   CmmntFauna          Text, Maximum Length = 100, Fauna Comment
                       Normal, Normal
   PhotoNum            Text, Maximum Length = 10, Roll and print number
                       Normal, Normal
   Photo_File          File Name, Normal, Normal

Tree_Wildlife          Point Feature, Label 1 = Point_number, Label 2 = Type_Tree
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Type_Tree           Menu, Normal, Normal
      Coniferous
      Deciduous
      Unknown
   Veteran_tree        Menu, Normal, Normal, Point location of a veteran tree
      Yes
   DBH                 Numeric, Decimal Places = 2, Diameter Breast Height
                       Minimum = 0, Maximum = 20, Default Value = 0
                       Normal, Normal
   Mast_tree           Menu, Normal, Normal
      Yes
   Bank                Menu, Normal, Normal
      Both [B]
      Instream [I]
      Left [L]
      Right [R]
   Nesting             Menu, Normal, Normal
      Potential
      Large
      Small
   State               Menu, Normal, Normal, state of wildlife tree
      Living
      Dead
      unknown
   Woodpkr_use         Menu, Normal, Normal
      Yes
   Denning             Menu, Normal, Normal
      Yes
   Perches             Menu, Normal, Normal
      Yes
   Cavities            Menu, Normal, Normal
      1
      2
      3
      4+
   CmmntFlora          Text, Maximum Length = 100, Flora Comment
                       Normal, Normal
   PhotoNum            Text, Maximum Length = 10, Roll and print number
                       Normal, Normal
   Photo_File          File Name, Normal, Normal

Waterbody              Point Feature, Label 1 = Point_number, Label 2 = Type_Waterbody
                       location of an adjacent waterbody
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Type_Waterbody      Menu, Normal, Normal, Code for feature
      Discontinued [HMD]
      Ditch [FRT]
      Natural Springs [HMS]
      Side Channel [SC]
```

```
      Tributary [HMT]
      Wetland [HMW]
      Beaver Pond [BP]
      Other  [HM]
   Bank                Menu, Normal, Normal
      Both [B]
      Instream [I]
      Left [L]
      Right [R]
   Length              Numeric, Decimal Places = 2, Waterbody length
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Width               Numeric, Decimal Places = 2, Bankfull Width
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Depth               Numeric, Decimal Places = 2, Bankfull Depth
                       Minimum = 0, Maximum = 1000, Default Value = 0
                       Normal, Normal
   Temperature         Numeric, Decimal Places = 2, Water temperature
                       Minimum = 0, Maximum = 100, Default Value = 0
                       Normal, Normal
   PhotoNum            Text, Maximum Length = 10, Roll and print number of photograph
                       Normal, Normal
   Photo_File          File Name, Normal, Normal
   Comments            Text, Maximum Length = 100
                       Normal, Normal

Water_Sample           Point Feature, Label 1 = Point_number, Label 2 = TDS
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   TDS                 Numeric, Decimal Places = 1, Total Dissolved Solids
                       Minimum = 0, Maximum = 250, Default Value = 0
                       Normal, Normal
   pH                  Numeric, Decimal Places = 1
                       Minimum = 0, Maximum = 15, Default Value = 0
                       Normal, Normal
   Temp                Numeric, Decimal Places = 1, Degrees Centigrade
                       Minimum = 0, Maximum = 100, Default Value = 0
                       Normal, Normal
   DO                  Numeric, Decimal Places = 1, Dissolved Oxygen
                       Minimum = 0, Maximum = 25, Default Value = 9
                       Normal, Normal
   Turbidity           Menu, Normal, Normal
      Clear [C]   Default
      Lightly Turbid [L]
      Moderately Turbid [M]
      Turbid [T]
      Other
   Comments            Text, Maximum Length = 100
                       Normal, Normal
   Photo_File          File Name, Normal, Normal

Photo_Location         Point Feature, Label 1 = Point_number, Label 2 = Photo_Roll_&_Frame
   Point_number        Numeric, Decimal Places = 1, unique point identification number
                       Minimum = 0, Maximum = 99999, Default Value = 0
                       Required, Required
   Photo_Roll_&_Frame  Text, Maximum Length = 75
                       Normal, Normal
   Photo_File          File Name, Normal, Normal
   Photo_Direction     Menu, Normal, Normal
      Upstream [U]
      Downstream [D]
      Accross_stream [X]
      Up [UP]
      Down [BD]
   Photo_Bearing       Numeric, Decimal Places = 0
                       Minimum = 0, Maximum = 360, Default Value = 0
                       Normal, Normal
   Photo_Comments      Text, Maximum Length = 100
                       Normal, Normal

Point_generic          Point Feature, Label 1 = Comment
   Comment             Text, Maximum Length = 100
                       Normal, Normal
```

WETLAND_POINT Point Feature
- Class Menu, Normal, Normal
  - Shallow water
  - Marsh
  - Swamp
  - Fen
  - Bog
  - Flood_High_Bench
  - Flood_Mid_Bench
  - Flood_Low_Bench
  - Shrub Carr
  - Saline Meadow
- Form Menu, Normal, Normal
  - Discharge Swamp
  - Flat Swamp
  - Mineral-Rise Swamp
  - Riparian Swamp
  - Slope Swamp
  - Basin Marsh
  - Hummock Marsh
  - Lacustrine Marsh
  - Riparian Marsh
  - Slope Marsh
  - Spring Marsh
  - Basin Water
  - Lacustrine Water
  - Riparian Water
- Subform Menu, Normal, Normal
  - Floodplain
  - Delta
  - Isolated
  - Linked
  - Bay
  - Lagoon
  - Shore
  - Stream
  - Discharge
  - Spring
  - Seepage
  - Slope
  - Basin Swamp
  - Unconfined Swamp
  - Swale Swamp
  - Floodplain Swamp
  - Channel Swamp
  - Lacustrine Swamp
  - Riverine Swamp
  - Beach Ridge Swamp
  - Island Swamp
  - Levee Swamp
  - Mound Swamp
  - Floodplain Water
  - Shore Water
  - Stream Water
- Type Menu, Normal, Normal
  - Floating_aquatic
  - Submerged_aquatic
  - Forb
  - Grass
  - Low_rush
  - Reed
  - Sedge
  - Tall_rush
  - Lichen
  - Moss
  - Non_vegetated
  - Low_Shrub_<2-m
  - Mixed_shrub
  - Tall_shrub_>2-m
  - Tree_Conifer
  - Tree_Mixed
  - Tree_Broadleaf
- Site_Assocn Menu, Normal, Normal
  - Wm01
  - Wm02
  - Wm03

```
      Wm04
      Wm05
      Wm06
      Wm07
      Wm51
      Ws01
      Ws02
      Ws03
      Ws04
      Ws05
      Ws06
      Ws07
      Ws09
      Ws10
      Ws50
      Ws51
      Wa
      Fl01
      Fl02
      Fl03
      Fl04
      Fl05
      Fl06
      Fl07
      Fm01
      Fm02
      Gs01
      Gs02
      Gs03
      Gs04
      RCG
      Gs00
      Wm00
      Ws00
   No_Veg_Forms        Numeric, Decimal Places = 0
                       Minimum = 0, Maximum = 16, Default Value = 1
                       Normal, Normal
   Veg_Forms           Text, Maximum Length = 100
                       Normal, Normal
   Dom_Veg             Text, Maximum Length = 100, Two Dominant species per form
                       Normal, Normal
   REF_PHOTO           Text, Maximum Length = 100, Roll and print number of photograph
                       Normal, Normal
   Photo_File          File Name, Normal, Normal
   Comment_Unit        Text, Maximum Length = 100, Comments for Unit
                       Normal, Normal

WETLND_POLY            Area Feature, Label 1 = WetlndName, Label 2 = Poly_Src
                       Wetland Unit Boundary
   WETLAND_REFERENCE   Separator
   WetlndName          Text, Maximum Length = 100
                       Required, Required
   LocalName           Text, Maximum Length = 100
                       Normal, Normal
   NumericCode         Text, Maximum Length = 50
                       Required, Required
   Organization        Text, Maximum Length = 100
                       Normal, Normal
   WtrshedCde          Numeric, Decimal Places = 0, watershed code
                       Minimum = 0, Maximum = 100, Default Value = 0
                       Normal, Normal
   TributaryCde        Text, Maximum Length = 35, Tributary Code
                       Normal, Normal
   ILP                 Text, Maximum Length = 35, Interim Locator Point (Tributary Code)
                       Normal, Normal
   Date                Date, Auto generate Create, Year-Month-Day Format
                       Required, Required
   Time                Time, Auto generate Create, 24 Hour Format
                       Normal, Normal
   Crew                Text, Maximum Length = 100
                       Required, Required
   Weather             Menu, Normal, Normal
      Light Rain [L]
      Heavy Rain [H]
      Snow/Sleet [N]
      Over cast [OV]
```

```
   Clear [S]
   Partly Cloudy [PC]
   Other [O]
AirTemp             Numeric, Decimal Places = 1, degrees centigrade
                    Minimum = -25, Maximum = 45, Default Value = 0
                    Normal, Normal
Hydr_Stage          Menu, Normal, Normal
   dry
   low
   moderate
   high
   flood
   other
Fish_Frequent       Menu, Normal, Normal
   Yes
   No
   Unconfirmed
Poly_Type           Menu, Normal, Normal
   Trimble   Default
   Garmin
   Photointerp
   Chain_Compass
   Other
Poly_Src            Menu, Normal, Normal
   WIM_Ecoscape_2007
   shim2006
   shim4
   shim3
   shim2
   shim1
   trim
   DFO
   other
Comments            Text, Maximum Length = 100
                    Normal, Normal
____________________      Separator
REF_PHOTO           Text, Maximum Length = 100, Roll and print number of photograph
                    Normal, Normal
Photo_File          File Name, Normal, Normal
____________________      Separator
BIODIVERSITY        Separator
Primary Character   Menu, Required, Required, State of stream section
   Natural [N]
   Modified [Md]
   Constructed [CON]
   Storm_Pond [SP]
   Ditch [FRT]
   Other [O]
No_Types            Numeric, Decimal Places = 0, No of Wetland Types in Unit
                    Minimum = 1, Maximum = 25, Default Value = 1
                    Normal, Normal
No_Comms            Numeric, Decimal Places = 0, No of Communities in Unit
                    Minimum = 1, Maximum = 25, Default Value = 1
                    Normal, Normal
No_Veg_Forms        Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
OW_Type             Menu, Normal, Normal
   1 (<5%) [1]
   2 (5-25%_central) [2]
   3 (5-25%_patch) [3]
   4 (26-75%_central) [4]
   5 (26-75%_embaymnts) [5]
   6 (76-95%_central) [6]
   7 (76-95%_patch) [7]
   8 (>95%OW) [8]
Interspertion       Numeric, Decimal Places = 0, ecotone edge
                    Minimum = 0, Maximum = 1000, Default Value = 999
                    Normal, Normal
Complex             Menu, Normal, Normal, Mutiple Wetland Units
   Yes [1]
   No [0]
Comt_Biodiv         Text, Maximum Length = 100
                    Normal, Normal
____________________      Separator
HYDROGEO_GROUP      Separator
```

```
Hydrogeo_Group      Menu, Normal, Normal, Hydrogeomorphic Group
   Estuarine [ES]
   Riverine [Ri]
   Lacustrine [LA]
   Palus_Isolated_Basin [IsoBas]
   Palus_Linked_Basin [LinBas]
   Palus_Discharge_basi [Dischr]
   Palus_Slope_Spring [Slo]
____________________       Separator
WETLAND_EDATO_GRID  Separator
Hydrodyna           Menu, Normal, Normal, Dominant hydraulic type
   Stagnant [ST]
   Sluggish [SL]
   Mobile [MO]
   Dynamic [DY]
   Very Dynamic [DV]
   Other [O]
Soil_Moisture       Menu, Normal, Normal
   Moist [MO]
   Very Moist [MV]
   Wet [W]
   Very Wet [WV]
Soil_Nutr_Reg       Menu, Normal, Normal
   Very Acid [VA]
   Mod Acid [MA]
   Slight Acid [SA]
   Neutral [N]
   Alkaline [AK]
Hydrophyt_Comp      Menu, Normal, Normal, Percent Hydophyte Cover
   0 [0]
   1-20% [1]
   21-40% [2]
   41-70% [3]
   71-90% [4]
   >90% [5]
____________________       Separator
WATER_CHEM          Separator
Water_Temp          Numeric, Decimal Places = 1, degrees celsius
                    Minimum = -2, Maximum = 99, Default Value = 99
                    Normal, Normal
TDS                 Numeric, Decimal Places = 1, Total Dissolved Solids (mg/L)
                    Minimum = 0, Maximum = 9999, Default Value = 9999
                    Normal, Normal
pH                  Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 99, Default Value = 99
                    Normal, Normal
DO                  Numeric, Decimal Places = 1, Dissolved Oxygen (mg/L)
                    Minimum = 0, Maximum = 99, Default Value = 99
                    Normal, Normal
EC                  Numeric, Decimal Places = 1, Conductivity
                    Minimum = 0, Maximum = 9999, Default Value = 9999
                    Normal, Normal
Clarity             Menu, Normal, Normal
   Very Turbid [TV]
   Clear [C]
   Very Clear [CV]
   Turbid [T]
   Other [O]
Colour              Menu, Normal, Normal
   Yellow_DeepBrown [YB]
   Green_Brown [GB]
   Blue_Green [BG]
   Green_Brown_Turbid [GBT]
   Colourless [CS]
Comt_Chem           Text, Maximum Length = 100
                    Normal, Normal
____________________       Separator
SOILS               Separator
Soil_Order          Menu, Normal, Normal, Wetland_Soil_Class
   Gleysol [Gl]
   HumicGley [Hu]
   Regogley [Regl]
   Fibrisol [Fi]
   Mesisol [Me]
   Humisol [HuSol]
   Folisol [Fo]
```

```
   Regosol [Re]
   Brunisol [Br]
   Solonetzic [So]
   Chernozemic [Ch]
Texture             Menu, Normal, Normal, Soil Texture
   Coarse Sand [CS]
   Sand [SA]
   Fine Sand [FS]
   Very Fine Sand [VFS]
   Loamy Sand [LS]
   Loamy Coarse Sand [LCS]
   Loamy Fine Sand [LFS]
   Loamy Very Fine Sand [LVFS]
   Coarse Sandy Loam [CSL]
   Sany Loam [SL]
   Fine Sandy Loam [FSL]
   Very Fine Sandy Loam [VFSL]
   Loam [Lo]
   Sandy Clay Loam [SCL]
   Clay Loam [CL]
   Silt [Si]
   Silt Loam [SiL]
   Silty Clay Loam [SiCL]
   Silty Clay [SiC]
   Sandy Clay [SaC]
   Clay [Cl]
Dep_to_Gley         Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Dep_to_Mottles      Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Dep_to_Water        Numeric, Decimal Places = 2, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Orga_Class          Menu, Normal, Normal, Level of decomposition
   Fibric(VP1-4) [Fi]
   Mesic(VP5-6) [Me]
   Humic(VP7-10) [H]
   Mineral [Mi]
Dep_Organic         Menu, Normal, Normal, Level of substrate compaction
   <60cm
   60-160cm
   >160cm
Comt_Sub            Text, Maximum Length = 100, Comment for Substrates
                    Normal, Normal
____________________      Separator
SOIL_PROFILE        Separator
Of_Thicknss         Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Om_Thicknss         Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Oh_Thicknss         Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Oco_Thicknss        Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
A_Thicknss          Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
E_Thicknss          Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
B_Thicknss          Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Dep_to_C            Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Dep_to_Bedrock      Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Photo_Soil_Core     Text, Maximum Length = 100, Roll and print number of photograph
```

```
                    Normal, Normal
Comt_Profile        Text, Maximum Length = 100, Comment for Substrates
                    Normal, Normal
____________________      Separator
WETLND_CLS_1        Separator
Class1              Menu, Normal, Normal
   Shallow water
   Marsh
   Swamp
   Fen
   Bog
   Flood_High_Bench
   Flood_Mid_Bench
   Flood_Low_Bench
   Shrub Carr
   Saline Meadow
Form1               Menu, Normal, Normal
   Discharge Swamp
   Flat Swamp
   Mineral-Rise Swamp
   Riparian Swamp
   Slope Swamp
   Basin Marsh
   Hummock Marsh
   Lacustrine Marsh
   Riparian Marsh
   Slope Marsh
   Spring Marsh
   Basin Water
   Lacustrine Water
   Riparian Water
Subfrm1             Menu, Normal, Normal
   Floodplain
   Delta
   Isolated
   Linked
   Bay
   Lagoon
   Shore
   Stream
   Discharge
   Spring
   Seepage
   Slope
   Basin Swamp
   Unconfined Swamp
   Swale Swamp
   Floodplain Swamp
   Channel Swamp
   Lacustrine Swamp
   Riverine Swamp
   Beach Ridge Swamp
   Island Swamp
   Levee Swamp
   Mound Swamp
   Floodplain Water
   Shore Water
   Stream Water
Type1               Menu, Normal, Normal
   Floating_aquatic
   Submerged_aquatic
   Forb
   Grass
   Low_rush
   Reed
   Sedge
   Tall_rush
   Lichen
   Moss
   Non_vegetated
   Low_Shrub_<2-m
   Mixed_shrub
   Tall_shrub_>2-m
   Tree_Conifer
   Tree_Mixed
   Tree_Broadleaf
```

Assocn1 Menu, Normal, Normal
Wm01
Wm02
Wm03
Wm04
Wm05
Wm06
Wm07
Wm51
Ws01
Ws02
Ws03
Ws04
Ws05
Ws06
Ws07
Ws09
Ws10
Ws50
Ws51
Wa
Fl01
Fl02
Fl03
Fl04
Fl05
Fl06
Fl07
Fm01
Fm02
Gs01
Gs02
Gs03
Gs04
RCG
Gs00
Wm00
Ws00
No_Frms1 Numeric, Decimal Places = 0
Minimum = 0, Maximum = 16, Default Value = 1
Normal, Normal
Veg_Frms1 Text, Maximum Length = 100
Normal, Normal
Dom_Veg1 Text, Maximum Length = 100, Two Dominant species per form
Normal, Normal
Comt_Unit1 Text, Maximum Length = 100, Comments for Unit
Normal, Normal
_____ Separator
WETLND_CLS_2 Separator
Class2 Menu, Normal, Normal
Shallow water
Marsh
Swamp
Fen
Bog
Flood_High_Bench
Flood_Mid_Bench
Flood_Low_Bench
Shrub Carr
Saline Meadow
Form2 Menu, Normal, Normal
Discharge Swamp
Flat Swamp
Mineral-Rise Swamp
Riparian Swamp
Slope Swamp
Basin Marsh
Hummock Marsh
Lacustrine Marsh
Riparian Marsh
Slope Marsh
Spring Marsh
Basin Water
Lacustrine Water
Riparian Water
Subfrm2 Menu, Normal, Normal

Floodplain
Delta
Isolated
Linked
Bay
Lagoon
Shore
Stream
Discharge
Spring
Seepage
Slope
Basin Swamp
Unconfined Swamp
Swale Swamp
Floodplain Swamp
Channel Swamp
Lacustrine Swamp
Riverine Swamp
Beach Ridge Swamp
Island Swamp
Levee Swamp
Mound Swamp
Floodplain Water
Shore Water
Stream Water

Type2 Menu, Normal, Normal
Floating_aquatic
Submerged_aquatic
Forb
Grass
Low_rush
Reed
Sedge
Tall_rush
Lichen
Moss
Non_vegetated
Low_Shrub_<2-m
Mixed_shrub
Tall_shrub_>2-m
Tree_Conifer
Tree_Mixed
Tree_Broadleaf

Assocn2 Menu, Normal, Normal
Wm01
Wm02
Wm03
Wm04
Wm05
Wm06
Wm07
Wm51
Ws01
Ws02
Ws03
Ws04
Ws05
Ws06
Ws07
Ws09
Ws10
Ws50
Ws51
Wa
Fl01
Fl02
Fl03
Fl04
Fl05
Fl06
Fl07
Fm01
Fm02
Gs01
Gs02

```
   Gs03
   Gs04
   RCG
   Gs00
   Wm00
   Ws00
No_Frms2            Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
Veg_Frms2           Text, Maximum Length = 100
                    Normal, Normal
Dom_Veg2            Text, Maximum Length = 100, Two Dominant species per form
                    Normal, Normal
Comt_Unit2          Text, Maximum Length = 100, Comments for Unit
                    Normal, Normal
_____________________       Separator
WETLND_CLS_3        Separator
Class3              Menu, Normal, Normal
   Shallow water
   Marsh
   Swamp
   Fen
   Bog
   Flood_High_Bench
   Flood_Mid_Bench
   Flood_Low_Bench
   Shrub Carr
   Saline Meadow
Form3               Menu, Normal, Normal
   Discharge Swamp
   Flat Swamp
   Mineral-Rise Swamp
   Riparian Swamp
   Slope Swamp
   Basin Marsh
   Hummock Marsh
   Lacustrine Marsh
   Riparian Marsh
   Slope Marsh
   Spring Marsh
   Basin Water
   Lacustrine Water
   Riparian Water
Subfrm3             Menu, Normal, Normal
   Floodplain
   Delta
   Isolated
   Linked
   Bay
   Lagoon
   Shore
   Stream
   Discharge
   Spring
   Seepage
   Slope
   Basin Swamp
   Unconfined Swamp
   Swale Swamp
   Floodplain Swamp
   Channel Swamp
   Lacustrine Swamp
   Riverine Swamp
   Beach Ridge Swamp
   Island Swamp
   Levee Swamp
   Mound Swamp
   Floodplain Water
   Shore Water
   Stream Water
Type3               Menu, Normal, Normal
   Floating_aquatic
   Submerged_aquatic
   Forb
   Grass
   Low_rush
```

```
   Reed
   Sedge
   Tall_rush
   Lichen
   Moss
   Non_vegetated
   Low_Shrub_<2-m
   Mixed_shrub
   Tall_shrub_>2-m
   Tree_Conifer
   Tree_Mixed
   Tree_Broadleaf
Assocn3             Menu, Normal, Normal
   Wm01
   Wm02
   Wm03
   Wm04
   Wm05
   Wm06
   Wm07
   Wm51
   Ws01
   Ws02
   Ws03
   Ws04
   Ws05
   Ws06
   Ws07
   Ws09
   Ws10
   Ws50
   Ws51
   Wa
   Fl01
   Fl02
   Fl03
   Fl04
   Fl05
   Fl06
   Fl07
   Fm01
   Fm02
   Gs01
   Gs02
   Gs03
   Gs04
   RCG
   Gs00
   Wm00
   Ws00
No_Frms3            Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
Veg_Frms3           Text, Maximum Length = 100
                    Normal, Normal
Dom_Veg3            Text, Maximum Length = 100, Two Dominant species per form
                    Normal, Normal
Comt_Unit3          Text, Maximum Length = 100, Comments for Unit
                    Normal, Normal
____________________       Separator
WETLND_CLS_4        Separator
Class4              Menu, Normal, Normal
   Shallow water
   Marsh
   Swamp
   Fen
   Bog
   Flood_High_Bench
   Flood_Mid_Bench
   Flood_Low_Bench
   Shrub Carr
   Saline Meadow
Form4               Menu, Normal, Normal
   Discharge Swamp
   Flat Swamp
   Mineral-Rise Swamp
```

Riparian Swamp
Slope Swamp
Basin Marsh
Hummock Marsh
Lacustrine Marsh
Riparian Marsh
Slope Marsh
Spring Marsh
Basin Water
Lacustrine Water
Riparian Water

Subfrm4 Menu, Normal, Normal
Floodplain
Delta
Isolated
Linked
Bay
Lagoon
Shore
Stream
Discharge
Spring
Seepage
Slope
Basin Swamp
Unconfined Swamp
Swale Swamp
Floodplain Swamp
Channel Swamp
Lacustrine Swamp
Riverine Swamp
Beach Ridge Swamp
Island Swamp
Levee Swamp
Mound Swamp
Floodplain Water
Shore Water
Stream Water

Type4 Menu, Normal, Normal
Floating_aquatic
Submerged_aquatic
Forb
Grass
Low_rush
Reed
Sedge
Tall_rush
Lichen
Moss
Non_vegetated
Low_Shrub_<2-m
Mixed_shrub
Tall_shrub_>2-m
Tree_Conifer
Tree_Mixed
Tree_Broadleaf

Assocn4 Menu, Normal, Normal
Wm01
Wm02
Wm03
Wm04
Wm05
Wm06
Wm07
Wm51
Ws01
Ws02
Ws03
Ws04
Ws05
Ws06
Ws07
Ws09
Ws10
Ws50
Ws51

```
   Wa
   Fl01
   Fl02
   Fl03
   Fl04
   Fl05
   Fl06
   Fl07
   Fm01
   Fm02
   Gs01
   Gs02
   Gs03
   Gs04
   RCG
   Gs00
   Wm00
   Ws00
No_Frms4            Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
Veg_Frms4           Text, Maximum Length = 100
                    Normal, Normal
Dom_Veg4            Text, Maximum Length = 100, Two Dominant species per form
                    Normal, Normal
Comt_Unit4          Text, Maximum Length = 100, Comments for Unit
                    Normal, Normal
____________________      Separator
WETLND_CLS_5        Separator
Class5              Menu, Normal, Normal
   Shallow water
   Marsh
   Swamp
   Fen
   Bog
   Flood_High_Bench
   Flood_Mid_Bench
   Flood_Low_Bench
   Shrub Carr
   Saline Meadow
Form5               Menu, Normal, Normal
   Discharge Swamp
   Flat Swamp
   Mineral-Rise Swamp
   Riparian Swamp
   Slope Swamp
   Basin Marsh
   Hummock Marsh
   Lacustrine Marsh
   Riparian Marsh
   Slope Marsh
   Spring Marsh
   Basin Water
   Lacustrine Water
   Riparian Water
Subfrm5             Menu, Normal, Normal
   Floodplain
   Delta
   Isolated
   Linked
   Bay
   Lagoon
   Shore
   Stream
   Discharge
   Spring
   Seepage
   Slope
   Basin Swamp
   Unconfined Swamp
   Swale Swamp
   Floodplain Swamp
   Channel Swamp
   Lacustrine Swamp
   Riverine Swamp
   Beach Ridge Swamp
```

```
   Island Swamp
   Levee Swamp
   Mound Swamp
   Floodplain Water
   Shore Water
   Stream Water
Type5               Menu, Normal, Normal
   Floating_aquatic
   Submerged_aquatic
   Forb
   Grass
   Low_rush
   Reed
   Sedge
   Tall_rush
   Lichen
   Moss
   Non_vegetated
   Low_Shrub_<2-m
   Mixed_shrub
   Tall_shrub_>2-m
   Tree_Conifer
   Tree_Mixed
   Tree_Broadleaf
Assocn5             Menu, Normal, Normal
   Wm01
   Wm02
   Wm03
   Wm04
   Wm05
   Wm06
   Wm07
   Wm51
   Ws01
   Ws02
   Ws03
   Ws04
   Ws05
   Ws06
   Ws07
   Ws09
   Ws10
   Ws50
   Ws51
   Wa
   Fl01
   Fl02
   Fl03
   Fl04
   Fl05
   Fl06
   Fl07
   Fm01
   Fm02
   Gs01
   Gs02
   Gs03
   Gs04
   RCG
   Gs00
   Wm00
   Ws00
No_Frms5            Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
Veg_Frms5           Text, Maximum Length = 100
                    Normal, Normal
Dom_Veg5            Text, Maximum Length = 100, Two Dominant species per form
                    Normal, Normal
Comt_Unit5          Text, Maximum Length = 100, Comments for Unit
                    Normal, Normal
____________________      Separator
SURROUND_HABITAT    Separator
RipClass            Menu, Required, Required, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
```

```
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Tall Shrubs [VTSH]
   Low shrub [VTLS]
Qualifier           Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
   Recreation [r]
   Disturbed [d]
   Unknown [u]
BandWidth           Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 9999
                    Normal, Normal
BankSlope           Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 999, Default Value = 999
                    Normal, Normal
Stage               Menu, Normal, Normal, Structural Stage
   grass/herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
Shrubs              Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
Snag                Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
Veteran             Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
BkStbility          Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
Bank_Material       Menu, Normal, Normal
   Concrete [C]
   Gabions [GB]
   Pilings [P]
   Stonework [S]
   RipRap [RR]
   Retain Wall/Bank Stb [EHB]
   Sandbags [SB]
   Wood [W]
   Bark_Mulch [BM]
   Asphalt [AS]
   Dyke [DY]
   Fines [F]
   Gravel [G]
   Cobble [CB]
   Boulder [B]
   Bed_Rock [BR]
   Other [O]
Top_Bank            Menu, Normal, Normal, Estimated top of bank
   Yes
   No
Comment             Text, Maximum Length = 100, Comment Left bank riparian
```

```
                     Normal, Normal
   _____________________      Separator
   FLORA_FAUNA       Separator
   CmmntFlora        Text, Maximum Length = 100, Flora Comment
                     Normal, Normal
   CmmntFauna        Text, Maximum Length = 100, Fauna Comment
                     Normal, Normal
   _____________________      Separator
   FUNCTI_COND       Separator
   Functional_Rating Menu, Required, Required
      Proper_Funct_Cond [0]
      Funct_At_Risk [1]
      Non_Funct_Cond [2]
   Comt_Func_Rating  Text, Maximum Length = 100
                     Normal, Normal
   _____________________      Separator
   LEVEL_OF_IMPACT   Separator
   Impact_rating     Menu, Required, Required
      Nil [0]
      Very_low [1]
      Low [2]
      Moderate [3]
      High [4]
      Extreme [5]
   LOI_Comment       Text, Maximum Length = 100, Comment_lev_impact
                     Normal, Normal

WETLND_LINE          Line Feature, Label 1 = WetlndName, Label 2 = Poly_Src
                     Wetland Unit Boundary
   WETLAND_REFERENCE Separator
   WetlndName        Text, Maximum Length = 100
                     Required, Required
   LocalName         Text, Maximum Length = 100
                     Normal, Normal
   NumericCode       Text, Maximum Length = 50
                     Required, Required
   Organization      Text, Maximum Length = 100
                     Normal, Normal
   WtrshedCde        Numeric, Decimal Places = 0, watershed code
                     Minimum = 0, Maximum = 100, Default Value = 0
                     Normal, Normal
   TributaryCde      Text, Maximum Length = 35, Tributary Code
                     Normal, Normal
   ILP               Text, Maximum Length = 35, Interim Locator Point (Tributary Code)
                     Normal, Normal
   Date              Date, Auto generate Create, Year-Month-Day Format
                     Required, Required
   Time              Time, Auto generate Create, 24 Hour Format
                     Normal, Normal
   Crew              Text, Maximum Length = 100
                     Required, Required
   Weather           Menu, Normal, Normal
      Light Rain [L]
      Heavy Rain [H]
      Snow/Sleet [N]
      Over cast [OV]
      Clear [S]
      Partly Cloudy [PC]
      Other [O]
   AirTemp           Numeric, Decimal Places = 1, degrees centigrade
                     Minimum = -25, Maximum = 45, Default Value = 0
                     Normal, Normal
   Hydr_Stage        Menu, Normal, Normal
      dry
      low
      moderate
      high
      flood
      other
   Fish_Frequent     Menu, Normal, Normal
      Yes
      No
      Unconfirmed
   Poly_Type         Menu, Normal, Normal
      Trimble   Default
      Garmin
```

```
   Photointerp
   Chain_Compass
   Other
Poly_Src            Menu, Normal, Normal
   WIM_Ecoscape_2007
   shim2006
   shim4
   shim3
   shim2
   shim1
   trim
   DFO
   other
Comments            Text, Maximum Length = 100
                    Normal, Normal
____________________      Separator
REF_PHOTO           Text, Maximum Length = 100, Roll and print number of photograph
                    Normal, Normal
Photo_File          File Name, Normal, Normal
____________________      Separator
BIODIVERSITY        Separator
Primary Character   Menu, Required, Required, State of stream section
   Natural [N]
   Modified [Md]
   Constructed [CON]
   Storm_Pond [SP]
   Ditch [FRT]
   Other [O]
No_Types            Numeric, Decimal Places = 0, No of Wetland Types in Unit
                    Minimum = 1, Maximum = 25, Default Value = 1
                    Normal, Normal
No_Comms            Numeric, Decimal Places = 0, No of Communities in Unit
                    Minimum = 1, Maximum = 25, Default Value = 1
                    Normal, Normal
No_Veg_Forms        Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
OW_Type             Menu, Normal, Normal
   1 (<5%) [1]
   2 (5-25%_central) [2]
   3 (5-25%_patch) [3]
   4 (26-75%_central) [4]
   5 (26-75%_embaymnts) [5]
   6 (76-95%_central) [6]
   7 (76-95%_patch) [7]
   8 (>95%OW) [8]
Interspertion       Numeric, Decimal Places = 0, ecotone edge
                    Minimum = 0, Maximum = 1000, Default Value = 999
                    Normal, Normal
Complex             Menu, Normal, Normal, Mutiple Wetland Units
   Yes [1]
   No [0]
Comt_Biodiv         Text, Maximum Length = 100
                    Normal, Normal
____________________      Separator
HYDROGEO_GROUP      Separator
Hydrogeo_Group      Menu, Normal, Normal, Hydrogeomorphic Group
   Estuarine [ES]
   Riverine [Ri]
   Lacustrine [LA]
   Palus_Isolated_Basin [IsoBas]
   Palus_Linked_Basin [LinBas]
   Palus_Discharge_basi [Dischr]
   Palus_Slope_Spring [Slo]
____________________      Separator
WETLAND_EDATO_GRID  Separator
Hydrodyna           Menu, Normal, Normal, Dominant hydraulic type
   Stagnant [ST]
   Sluggish [SL]
   Mobile [MO]
   Dynamic [DY]
   Very Dynamic [DV]
   Other [O]
Soil_Moisture       Menu, Normal, Normal
   Moist [MO]
   Very Moist [MV]
```

```
   Wet [W]
   Very Wet [WV]
Soil_Nutr_Reg       Menu, Normal, Normal
   Very Acid [VA]
   Mod Acid [MA]
   Slight Acid [SA]
   Neutral [N]
   Alkaline [AK]
Hydrophyt_Comp      Menu, Normal, Normal, Percent Hydophyte Cover
   0 [0]
   1-20% [1]
   21-40% [2]
   41-70% [3]
   71-90% [4]
   >90% [5]
____________________      Separator
WATER_CHEM          Separator
Water_Temp          Numeric, Decimal Places = 1, degrees celsius
                    Minimum = -2, Maximum = 99, Default Value = 99
                    Normal, Normal
TDS                 Numeric, Decimal Places = 1, Total Dissolved Solids (mg/L)
                    Minimum = 0, Maximum = 9999, Default Value = 9999
                    Normal, Normal
pH                  Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 99, Default Value = 99
                    Normal, Normal
DO                  Numeric, Decimal Places = 1, Dissolved Oxygen (mg/L)
                    Minimum = 0, Maximum = 99, Default Value = 99
                    Normal, Normal
EC                  Numeric, Decimal Places = 1, Conductivity
                    Minimum = 0, Maximum = 9999, Default Value = 9999
                    Normal, Normal
Clarity             Menu, Normal, Normal
   Very Turbid [TV]
   Clear [C]
   Very Clear [CV]
   Turbid [T]
   Other [O]
Colour              Menu, Normal, Normal
   Yellow_DeepBrown [YB]
   Green_Brown [GB]
   Blue_Green [BG]
   Green_Brown_Turbid [GBT]
   Colourless [CS]
Comt_Chem           Text, Maximum Length = 100
                    Normal, Normal
____________________      Separator
SOILS               Separator
Soil_Order          Menu, Normal, Normal, Wetland_Soil_Class
   Gleysol [Gl]
   HumicGley [Hu]
   Regogley [Regl]
   Fibrisol [Fi]
   Mesisol [Me]
   Humisol [HuSol]
   Folisol [Fo]
   Regosol [Re]
   Brunisol [Br]
   Solonetzic [So]
   Chernozemic [Ch]
Texture             Menu, Normal, Normal, Soil Texture
   Coarse Sand [CS]
   Sand [SA]
   Fine Sand [FS]
   Very Fine Sand [VFS]
   Loamy Sand [LS]
   Loamy Coarse Sand [LCS]
   Loamy Fine Sand [LFS]
   Loamy Very Fine Sand [LVFS]
   Coarse Sandy Loam [CSL]
   Sany Loam [SL]
   Fine Sandy Loam [FSL]
   Very Fine Sandy Loam [VFSL]
   Loam [Lo]
   Sandy Clay Loam [SCL]
   Clay Loam [CL]
```

```
   Silt [Si]
   Silt Loam [SiL]
   Silty Clay Loam [SiCL]
   Silty Clay [SiC]
   Sandy Clay [SaC]
   Clay [Cl]
Dep_to_Gley         Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Dep_to_Mottles      Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Dep_to_Water        Numeric, Decimal Places = 2, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Orga_Class          Menu, Normal, Normal, Level of decomposition
   Fibric(VP1-4) [Fi]
   Mesic(VP5-6) [Me]
   Humic(VP7-10) [H]
   Mineral [Mi]
Dep_Organic         Menu, Normal, Normal, Level of substrate compaction
   <60cm
   60-160cm
   >160cm
Comt_Sub            Text, Maximum Length = 100, Comment for Substrates
                    Normal, Normal
____________________      Separator
SOIL_PROFILE        Separator
Of_Thicknss         Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Om_Thicknss         Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Oh_Thicknss         Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Oco_Thicknss        Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
A_Thicknss          Numeric, Decimal Places = 1, Unit (cm)
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
E_Thicknss          Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
B_Thicknss          Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Dep_to_C            Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Dep_to_Bedrock      Numeric, Decimal Places = 1
                    Minimum = 0, Maximum = 999, Default Value = 999
                    Normal, Normal
Photo_Soil_Core     Text, Maximum Length = 100, Roll and print number of photograph
                    Normal, Normal
Comt_Profile        Text, Maximum Length = 100, Comment for Substrates
                    Normal, Normal
____________________      Separator
WETLND_CLS_1        Separator
Class1              Menu, Normal, Normal
   Shallow water
   Marsh
   Swamp
   Fen
   Bog
   Flood_High_Bench
   Flood_Mid_Bench
   Flood_Low_Bench
   Shrub Carr
   Saline Meadow
Form1               Menu, Normal, Normal
   Discharge Swamp
   Flat Swamp
   Mineral-Rise Swamp
```

Riparian Swamp
Slope Swamp
Basin Marsh
Hummock Marsh
Lacustrine Marsh
Riparian Marsh
Slope Marsh
Spring Marsh
Basin Water
Lacustrine Water
Riparian Water

Subfrm1 Menu, Normal, Normal
Floodplain
Delta
Isolated
Linked
Bay
Lagoon
Shore
Stream
Discharge
Spring
Seepage
Slope
Basin Swamp
Unconfined Swamp
Swale Swamp
Floodplain Swamp
Channel Swamp
Lacustrine Swamp
Riverine Swamp
Beach Ridge Swamp
Island Swamp
Levee Swamp
Mound Swamp
Floodplain Water
Shore Water
Stream Water

Type1 Menu, Normal, Normal
Floating_aquatic
Submerged_aquatic
Forb
Grass
Low_rush
Reed
Sedge
Tall_rush
Lichen
Moss
Non_vegetated
Low_Shrub_<2-m
Mixed_shrub
Tall_shrub_>2-m
Tree_Conifer
Tree_Mixed
Tree_Broadleaf

Assocn1 Menu, Normal, Normal
Wm01
Wm02
Wm03
Wm04
Wm05
Wm06
Wm07
Wm51
Ws01
Ws02
Ws03
Ws04
Ws05
Ws06
Ws07
Ws09
Ws10
Ws50
Ws51

```
   Wa
   Fl01
   Fl02
   Fl03
   Fl04
   Fl05
   Fl06
   Fl07
   Fm01
   Fm02
   Gs01
   Gs02
   Gs03
   Gs04
   RCG
   Gs00
   Wm00
   Ws00
No_Frms1            Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
Veg_Frms1           Text, Maximum Length = 100
                    Normal, Normal
Dom_Veg1            Text, Maximum Length = 100, Two Dominant species per form
                    Normal, Normal
Comt_Unit1          Text, Maximum Length = 100, Comments for Unit
                    Normal, Normal
____________________      Separator
WETLND_CLS_2        Separator
Class2              Menu, Normal, Normal
   Shallow water
   Marsh
   Swamp
   Fen
   Bog
   Flood_High_Bench
   Flood_Mid_Bench
   Flood_Low_Bench
   Shrub Carr
   Saline Meadow
Form2               Menu, Normal, Normal
   Discharge Swamp
   Flat Swamp
   Mineral-Rise Swamp
   Riparian Swamp
   Slope Swamp
   Basin Marsh
   Hummock Marsh
   Lacustrine Marsh
   Riparian Marsh
   Slope Marsh
   Spring Marsh
   Basin Water
   Lacustrine Water
   Riparian Water
Subfrm2             Menu, Normal, Normal
   Floodplain
   Delta
   Isolated
   Linked
   Bay
   Lagoon
   Shore
   Stream
   Discharge
   Spring
   Seepage
   Slope
   Basin Swamp
   Unconfined Swamp
   Swale Swamp
   Floodplain Swamp
   Channel Swamp
   Lacustrine Swamp
   Riverine Swamp
   Beach Ridge Swamp
```

```
   Island Swamp
   Levee Swamp
   Mound Swamp
   Floodplain Water
   Shore Water
   Stream Water
Type2               Menu, Normal, Normal
   Floating_aquatic
   Submerged_aquatic
   Forb
   Grass
   Low_rush
   Reed
   Sedge
   Tall_rush
   Lichen
   Moss
   Non_vegetated
   Low_Shrub_<2-m
   Mixed_shrub
   Tall_shrub_>2-m
   Tree_Conifer
   Tree_Mixed
   Tree_Broadleaf
Assocn2             Menu, Normal, Normal
   Wm01
   Wm02
   Wm03
   Wm04
   Wm05
   Wm06
   Wm07
   Wm51
   Ws01
   Ws02
   Ws03
   Ws04
   Ws05
   Ws06
   Ws07
   Ws09
   Ws10
   Ws50
   Ws51
   Wa
   Fl01
   Fl02
   Fl03
   Fl04
   Fl05
   Fl06
   Fl07
   Fm01
   Fm02
   Gs01
   Gs02
   Gs03
   Gs04
   RCG
   Gs00
   Wm00
   Ws00
No_Frms2            Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
Veg_Frms2           Text, Maximum Length = 100
                    Normal, Normal
Dom_Veg2            Text, Maximum Length = 100, Two Dominant species per form
                    Normal, Normal
Comt_Unit2          Text, Maximum Length = 100, Comments for Unit
                    Normal, Normal
____________________      Separator
WETLND_CLS_3        Separator
Class3              Menu, Normal, Normal
   Shallow water
   Marsh
```

```
   Swamp
   Fen
   Bog
   Flood_High_Bench
   Flood_Mid_Bench
   Flood_Low_Bench
   Shrub Carr
   Saline Meadow
Form3              Menu, Normal, Normal
   Discharge Swamp
   Flat Swamp
   Mineral-Rise Swamp
   Riparian Swamp
   Slope Swamp
   Basin Marsh
   Hummock Marsh
   Lacustrine Marsh
   Riparian Marsh
   Slope Marsh
   Spring Marsh
   Basin Water
   Lacustrine Water
   Riparian Water
Subfrm3            Menu, Normal, Normal
   Floodplain
   Delta
   Isolated
   Linked
   Bay
   Lagoon
   Shore
   Stream
   Discharge
   Spring
   Seepage
   Slope
   Basin Swamp
   Unconfined Swamp
   Swale Swamp
   Floodplain Swamp
   Channel Swamp
   Lacustrine Swamp
   Riverine Swamp
   Beach Ridge Swamp
   Island Swamp
   Levee Swamp
   Mound Swamp
   Floodplain Water
   Shore Water
   Stream Water
Type3              Menu, Normal, Normal
   Floating_aquatic
   Submerged_aquatic
   Forb
   Grass
   Low_rush
   Reed
   Sedge
   Tall_rush
   Lichen
   Moss
   Non_vegetated
   Low_Shrub_<2-m
   Mixed_shrub
   Tall_shrub_>2-m
   Tree_Conifer
   Tree_Mixed
   Tree_Broadleaf
Assocn3            Menu, Normal, Normal
   Wm01
   Wm02
   Wm03
   Wm04
   Wm05
   Wm06
   Wm07
```

```
   Wm51
   Ws01
   Ws02
   Ws03
   Ws04
   Ws05
   Ws06
   Ws07
   Ws09
   Ws10
   Ws50
   Ws51
   Wa
   Fl01
   Fl02
   Fl03
   Fl04
   Fl05
   Fl06
   Fl07
   Fm01
   Fm02
   Gs01
   Gs02
   Gs03
   Gs04
   RCG
   Gs00
   Wm00
   Ws00
No_Frms3            Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
Veg_Frms3           Text, Maximum Length = 100
                    Normal, Normal
Dom_Veg3            Text, Maximum Length = 100, Two Dominant species per form
                    Normal, Normal
Comt_Unit3          Text, Maximum Length = 100, Comments for Unit
                    Normal, Normal
____________________       Separator
WETLND_CLS_4        Separator
Class4              Menu, Normal, Normal
   Shallow water
   Marsh
   Swamp
   Fen
   Bog
   Flood_High_Bench
   Flood_Mid_Bench
   Flood_Low_Bench
   Shrub Carr
   Saline Meadow
Form4               Menu, Normal, Normal
   Discharge Swamp
   Flat Swamp
   Mineral-Rise Swamp
   Riparian Swamp
   Slope Swamp
   Basin Marsh
   Hummock Marsh
   Lacustrine Marsh
   Riparian Marsh
   Slope Marsh
   Spring Marsh
   Basin Water
   Lacustrine Water
   Riparian Water
Subfrm4             Menu, Normal, Normal
   Floodplain
   Delta
   Isolated
   Linked
   Bay
   Lagoon
   Shore
   Stream
```

Discharge
Spring
Seepage
Slope
Basin Swamp
Unconfined Swamp
Swale Swamp
Floodplain Swamp
Channel Swamp
Lacustrine Swamp
Riverine Swamp
Beach Ridge Swamp
Island Swamp
Levee Swamp
Mound Swamp
Floodplain Water
Shore Water
Stream Water

Type4 Menu, Normal, Normal
Floating_aquatic
Submerged_aquatic
Forb
Grass
Low_rush
Reed
Sedge
Tall_rush
Lichen
Moss
Non_vegetated
Low_Shrub_<2-m
Mixed_shrub
Tall_shrub_>2-m
Tree_Conifer
Tree_Mixed
Tree_Broadleaf

Assocn4 Menu, Normal, Normal
Wm01
Wm02
Wm03
Wm04
Wm05
Wm06
Wm07
Wm51
Ws01
Ws02
Ws03
Ws04
Ws05
Ws06
Ws07
Ws09
Ws10
Ws50
Ws51
Wa
Fl01
Fl02
Fl03
Fl04
Fl05
Fl06
Fl07
Fm01
Fm02
Gs01
Gs02
Gs03
Gs04
RCG
Gs00
Wm00
Ws00

No_Frms4 Numeric, Decimal Places = 0
Minimum = 0, Maximum = 16, Default Value = 1

```
                    Normal, Normal
Veg_Frms4           Text, Maximum Length = 100
                    Normal, Normal
Dom_Veg4            Text, Maximum Length = 100, Two Dominant species per form
                    Normal, Normal
Comt_Unit4          Text, Maximum Length = 100, Comments for Unit
                    Normal, Normal
____________________      Separator
WETLND_CLS_5        Separator
Class5              Menu, Normal, Normal
   Shallow water
   Marsh
   Swamp
   Fen
   Bog
   Flood_High_Bench
   Flood_Mid_Bench
   Flood_Low_Bench
   Shrub Carr
   Saline Meadow
Form5               Menu, Normal, Normal
   Discharge Swamp
   Flat Swamp
   Mineral-Rise Swamp
   Riparian Swamp
   Slope Swamp
   Basin Marsh
   Hummock Marsh
   Lacustrine Marsh
   Riparian Marsh
   Slope Marsh
   Spring Marsh
   Basin Water
   Lacustrine Water
   Riparian Water
Subfrm5             Menu, Normal, Normal
   Floodplain
   Delta
   Isolated
   Linked
   Bay
   Lagoon
   Shore
   Stream
   Discharge
   Spring
   Seepage
   Slope
   Basin Swamp
   Unconfined Swamp
   Swale Swamp
   Floodplain Swamp
   Channel Swamp
   Lacustrine Swamp
   Riverine Swamp
   Beach Ridge Swamp
   Island Swamp
   Levee Swamp
   Mound Swamp
   Floodplain Water
   Shore Water
   Stream Water
Type5               Menu, Normal, Normal
   Floating_aquatic
   Submerged_aquatic
   Forb
   Grass
   Low_rush
   Reed
   Sedge
   Tall_rush
   Lichen
   Moss
   Non_vegetated
   Low_Shrub_<2-m
   Mixed_shrub
```

```
   Tall_shrub_>2-m
   Tree_Conifer
   Tree_Mixed
   Tree_Broadleaf
Assocn5             Menu, Normal, Normal
   Wm01
   Wm02
   Wm03
   Wm04
   Wm05
   Wm06
   Wm07
   Wm51
   Ws01
   Ws02
   Ws03
   Ws04
   Ws05
   Ws06
   Ws07
   Ws09
   Ws10
   Ws50
   Ws51
   Wa
   Fl01
   Fl02
   Fl03
   Fl04
   Fl05
   Fl06
   Fl07
   Fm01
   Fm02
   Gs01
   Gs02
   Gs03
   Gs04
   RCG
   Gs00
   Wm00
   Ws00
No_Frms5            Numeric, Decimal Places = 0
                    Minimum = 0, Maximum = 16, Default Value = 1
                    Normal, Normal
Veg_Frms5           Text, Maximum Length = 100
                    Normal, Normal
Dom_Veg5            Text, Maximum Length = 100, Two Dominant species per form
                    Normal, Normal
Comt_Unit5          Text, Maximum Length = 100, Comments for Unit
                    Normal, Normal
____________________      Separator
SURROUND_HABITAT    Separator
RipClass            Menu, Required, Required, Riparian Class
   Row Crops [NAG]
   Broadleaf forest [VBF]
   Bryophytes [VCR]
   Coniferous forest [VNF]
   Planted Tree Farm [NTF]
   Disturbed wetland [DWN]
   Dug out pond  [DOP]
   Exposed soil [NEL]
   Flood plain [VFP]
   Herbs/grasses [VHB]
   High Impervious  [NHR]
   Medium Impervious [NMR]
   Low Impervious [NLR]
   Mixed forest [VMF]
   Natural wetland [WN]
   Rock [NNB]
   Tall Shrubs [VTSH]
   Low shrub [VTLS]
Qualifier           Menu, Normal, Normal, Riparian Class Qualifier
   Agriculture [ag]
   Natural [n]
   Urban_Residential [ur]
```

```
   Recreation [r]
   Disturbed [d]
   Unknown [u]
BandWidth           Numeric, Decimal Places = 2
                    Minimum = 0, Maximum = 9999, Default Value = 9999
                    Normal, Normal
BankSlope           Numeric, Decimal Places = 0
                    Minimum = -100, Maximum = 999, Default Value = 999
                    Normal, Normal
Stage               Menu, Normal, Normal, Structural Stage
   grass/herb [2]
   low shrubs <2m [3a]
   tall shrubs 2-10m [3b]
   sapling >10m [4]
   young forest [5]
   mature forest [6]
   old forest [7]
Shrubs              Menu, Normal, Normal, Density of shrubs
   <5% [VL]
   5-33% [L]
   34-66% [M]
   67-100% [H]
Snag                Menu, Normal, Normal, Presence of Snags
   No
   <5
   >=5
Veteran             Menu, Normal, Normal, Veteran trees
   No
   <5
   >=5
BkStbility          Menu, Normal, Normal, Bank Stability
   High [H]
   Medium [M]
   Low [L]
Bank_Material       Menu, Normal, Normal
   Concrete [C]
   Gabions [GB]
   Pilings [P]
   Stonework [S]
   RipRap [RR]
   Retain Wall/Bank Stb [EHB]
   Sandbags [SB]
   Wood [W]
   Bark_Mulch [BM]
   Asphalt [AS]
   Dyke [DY]
   Fines [F]
   Gravel [G]
   Cobble [CB]
   Boulder [B]
   Bed_Rock [BR]
   Other [O]
Top_Bank            Menu, Normal, Normal, Estimated top of bank
   Yes
   No
Comment             Text, Maximum Length = 100, Comment Left bank riparian
                    Normal, Normal
____________________      Separator
FLORA_FAUNA         Separator
CmmntFlora          Text, Maximum Length = 100, Flora Comment
                    Normal, Normal
CmmntFauna          Text, Maximum Length = 100, Fauna Comment
                    Normal, Normal
____________________      Separator
FUNCTI_COND         Separator
Functional_Rating   Menu, Required, Required
   Proper_Funct_Cond [0]
   Funct_At_Risk [1]
   Non_Funct_Cond [2]
Comt_Func_Rating    Text, Maximum Length = 100
                    Normal, Normal
____________________      Separator
LEVEL_OF_IMPACT     Separator
Impact_rating       Menu, Required, Required
   Nil [0]
   Very_low [1]
```

```
      Low [2]
      Moderate [3]
      High [4]
      Extreme [5]
   LOI_Comment          Text, Maximum Length = 100, Comment_lev_impact
                        Normal, Normal

Line_generic            Line Feature, Label 1 = Comment
   Comment              Text, Maximum Length = 100
                        Normal, Normal
```