Freshwater Atlas

Warehouse Model Specification - v1.3

Prepared for

The Crown Registry and Geographic Base Branch
of the
Integrated Land Management Bureau
Ministry of Agriculture and Lands

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Document Tracking

Version: 3

Last Updated: June 19, 2008

REVISION HISTORY

Date	Version	Author	Description of Changes
Jan 17, 2007	1	Refractions Research	Initial draft.
May 21, 2008	2	Refractions Research	Updated the status of all attributes to reflect the 1.3 delivery. Added additional appendices and attribute descriptions.
June 19, 2008	3	Refractions Research	Minor updates.

CONTENTS

FIGURES

TABLES

1 INTRODUCTION

1.1 PURPOSE

This document is intended to outline the geometry and attribute model for the Freshwater Atlas Version 1.3 data load into the SDE in a generally readable format. The SDE Oracle logical model approved by ILMB defines the official model and is the absolute definition for the Freshwater Atlas SDE model.

This document also specifies the data that will be loaded into the model with the SDE load scheduled for release July 2, 2008.

1.2 SCOPE

This document includes the following:

- Descriptions of all layers, geometries and attributes of the Freshwater Atlas, Version 1.3.

The document does not include:

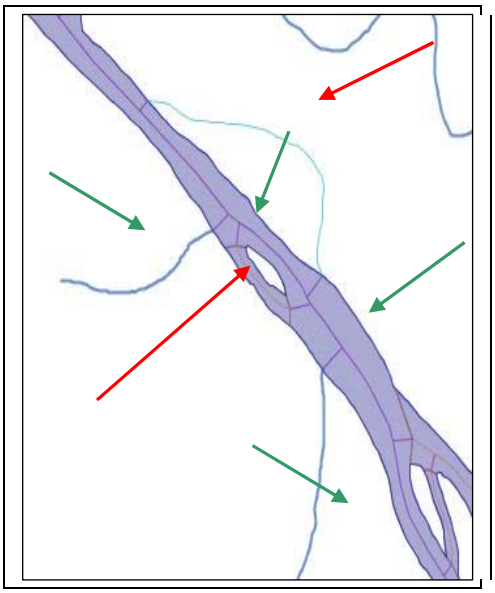
- Information on the source of the Freshwater Atlas data.
- Detailed information on how the attributes were derived or computed.
- Information on manual or automated modification made to the geometries.

1.3 ASSUMPTIONS

- The document is intended only to outline the specifications for the Version 1.3 Freshwater Atlas Data Load.

2 DEFINITIONS

Table 1: Definitions

Term	Definition
primary flow	The main channel (majority of flow) of a natural river, stream or creek. See the green arrows in Figure 1.
secondary flow	Any channel that is not the main channel of a natural river, stream or creek. In Figure 1 below the primary flows are highlighted with the green arrows and the secondary flows highlighted with the red arrows. **Figure 1: Primary/Secondary Example** 
mainstem	Connected collection of flow edges (derived using a set of rules) that make up the main channel of a river (See Section **Error! Reference source not found.**).
bl_key / route	Connected collection of flow edges (derived using a set of rules) that make up a main channel, side channel or distributary (See Section **Error! Reference source not found.**).
flow edge	Any edge that is associated with a flow (observed stream edges, constructed stream edges, inferred stream edges). Does not include edges that bound water features (river banks, lake banks and coastline).
controlling route	The controlling route through a lake or river is a route that flows through the polygon from an input to an outlet which represents the prominent flow of water. Wetland controlling arcs represent the main flow through a wetland and are much more complex than lake or river controlling routes. See Appendix A: Controlling Routes for

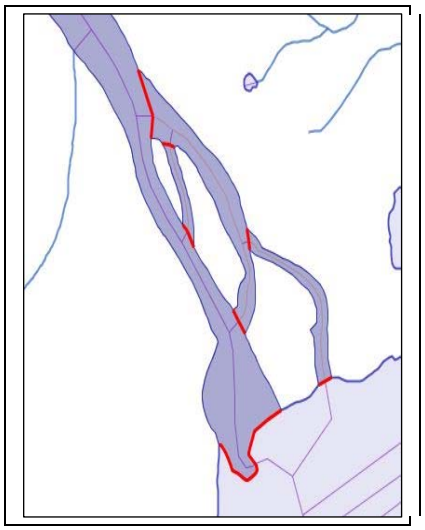
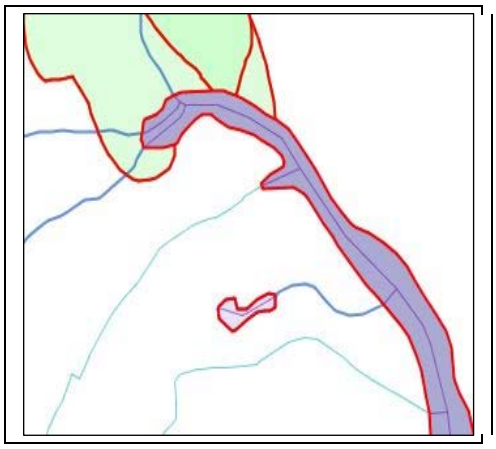
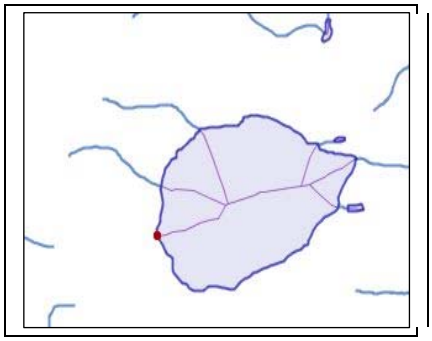
	more information.
delimiter	Any edge that delimits water from water (lake from river, river from ocean, river from river, lake from lake, etc). In Figure 2 below the delimiters are highlighted in red. **Figure 2: Delimiter Example** 
bank	Any edge that delimits water from land (lake bank, river bank, wetland bank, etc) as shown in Figure 3 (the banks are highlighted in red). **Figure 3: Bank Example** 
TRIM	Terrain Resource Information Mapping – Program to produce digital maps for the province of BC. (http://srmwww.gov.bc.ca/bmgs/baseline_atlas/)
TRIM 1	Original mapping of the province of BC (1:20k scale) completed in December 1996.
TRIM II	A program to update the original TRIM data to new specifications.
designated headwater	Designated headwaters are linework added to lakes and double line rivers to identify that routes/mainstems should not be pushed upstream of the waterbody.

	Figure 4: Designated Headwater Example  Designated headwaters are added for two reasons: • The lake represents where 'the majority of the water flows from'. None of the tributaries of the lake represent significant flow. • Naming reasons – the lake is the known to be the headwaters of the named stream flowing out of the lake.
BMGS	Base Mapping and Geomatic Services (http://srmwww.gov.bc.ca/bmgs/)

3 DATA SPECIFICATIONS

3.1 DATA EXTENTS

The data provided in Freshwater Atlas Version 1.3 includes data within British Columbia for all regions. Extra-jurisdictional data will not be provided for this version of the Freshwater Atlas. The figure below shows the extents of each of the five Freshwater Atlas regions and extra-jurisdictional data.

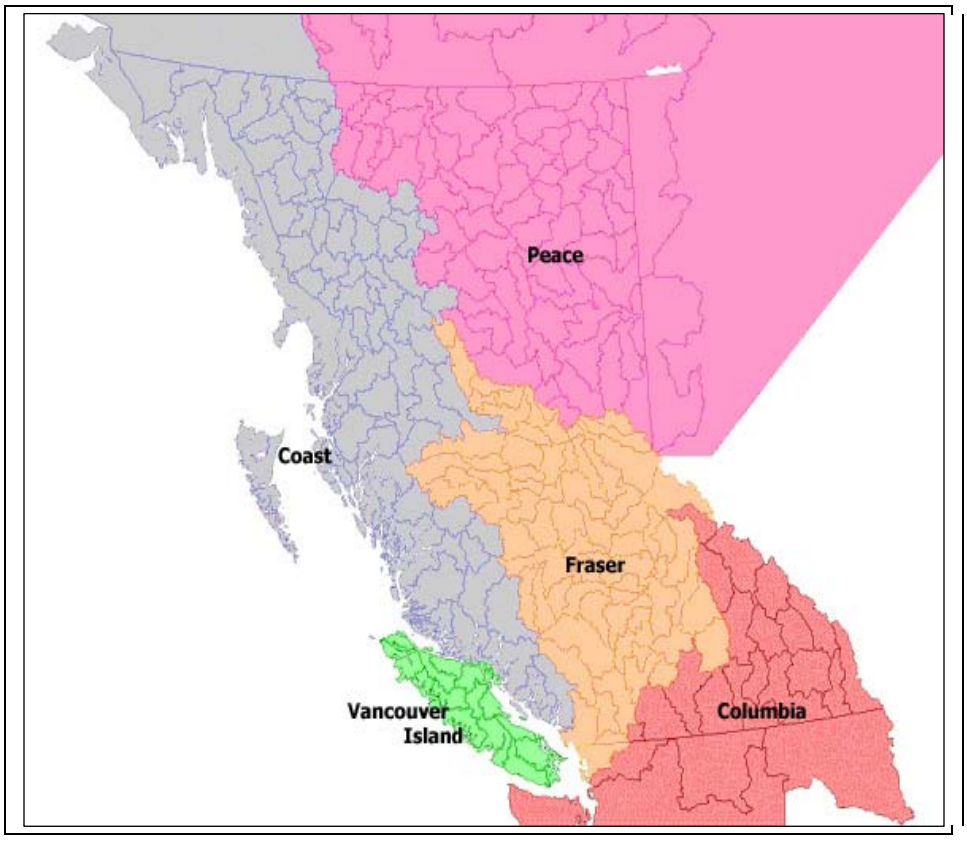


Figure 5: FRESHWATER ATLAS Regions

Freshwater Atlas contains a BC Border feature, which provides linework "defining" the BC Border (from the perspective of Freshwater Atlas). This border is **not** the official surveyed BC border. Rather, it was derived from various data sources purely in order to provide a well-defined provincial polygon which could be used to close off other Freshwater Atlas features, as a convenient approximation:

- The southern border was created using the ends of the streams along the border as mapped by TRIM. The border line is formed by connecting stream ends in sequence.

- The eastern border through the Rockies (the Great Divide) is derived from the generated watershed boundary edges.

- The north-eastern border north of the Great Divide is the eastern edges of the 1:20K mapsheet tiles from TRIM.

- The northern border is the northern edges of the 1:20K mapsheet tiles from TRIM.

- The Alaska border is the scanned boundary from the 1:50K MYLAR mapsheets, extracted from the 1:50K Watershed Atlas.

In most areas the Freshwater Atlas generated watersheds were clipped to or closed by the segments of Freshwater Atlas BC Border. However, along the Great Divide the opposite is the case – the Freshwater Atlas BC Border was derived from the computed watershed boundaries.

3.2 DATA CONTENTS

The data delivery will include the following Freshwater Atlas features:

- Stream Network

- Waterbodies

- Obstructions

- Bays, Channels, Named Points

- Islands

- Named Points

- Watershed Polygons

- Coastline

The data delivery will not include the following features:

- Elevation data on anything other than the stream network (as per client decision)

- Glaciers (These have not changed since the 1.2 version)

- Watershed Group Polygons (These have not been regenerated for the 1.3 delivery)

3.3 DATA PRECISION

All edges will meet the following precision requirements:

- will not collapse when snapped to a 10^{-3}m grid.
- will not produce invalid, or complex geometries when snapped to a 10^{-3}m grid.

In addition the stream network will not contain any interior intersections when snapped to a 10^{-3}m grid.

The ordinates are provided as double precision values.

All integer types refer to signed 32-bit integers.

3.4 COORDINATE SYSTEM

The data will be delivered in the BC Albers projection defined as follows:

- Central meridian: 126.0 degrees
- Standard parallel 1: 50.0 degrees
- Standard parallel 2: 58.5 degrees
- Latitude of origin: 45 degrees
- Reference System: NAD83 (North American Datum 1983)

All data will be provided as 2-D (x,y) values.

3.5 DATA DIRECTIONALITY

The following directionality rules apply to all arcs:

- All flow arcs are directionalized upstream (from sink to source).
- Lake and double line river banks are directionalized in the same direction as their controlling route (upstream from sink to source).
- Coastline arcs are directionalized using the right hand rule ("right hand in the feature you are bounding"); therefore coastal islands are directionalized clockwise.
- Wetland banks are directionalized in the same direction as their controlling route.
- Delimiters are directionalized based on the controlling route.

- Provincial and international boundary arcs are undirectionalized.

4 LAYER SPECIFICATIONS

4.1 LAYERS

The SDE contains the following layers. Some of these layers will be delivered as multiple files; one file per watershed group. Other layers will be delivered as a single file for the entire province.

The column "version" indicates with which release the data was populated. A value of "N" indicates the data has not been delivered and thus is not populated in the LRDW.

4.1.1 Linear Layers

Table 2: Linear Layers

Layer Name	Shapefile Name	Type	Description	VERSION
Coastline SP	WSG_CST	Line	Contains all coastline edges including marine islands and the mainland coast. Does not contain multipart geometries.	1.3
Stream Network SP	WSG_SS	Line	Contains only flow network arcs (observed, inferred and constructed flows). Contains no banks, coast or watershed boundary arcs. Does not contain multipart geometries.	1.3
Linear Boundary SP	WSG_LB	Line	Contains all bank edges (of rivers, lakes and wetlands), delimiter edges, glacier edges and administrative boundary edges. Does not contain multipart geometries.	Glacier edges - 1.2 Other edges - 1.3

Layer Name	Shapefile Name	Type	Description	VERSION
Watershed Boundary SP	WSG_WB	Line	Contains all principal and non-principal watershed boundary lines. Does not contain multipart geometries.	1.3
Route SP	N/A	Line	Contains route geometries. Combines all flow network arcs with the same blue line key into a single multi-geometry with distance attribution.	N

4.1.2 Point Layers

Table 3: Point Layers

Layer Name	Shapefile Name	Type	Description	Version
Obstructions SP	WSG_PNT	Point	Contains water obstacles (rapids, falls, artificial waterfalls, etc). This does not contain multipart geometries.	1.3
Named Point Feature SP	cst_points	Point	Contains point features (both fresh and coastal) and associated names. This does not contain multipart geomtries.	1.3
Stream Direction SP	str_dir	Point	Directional arrowheads for use with web mapping applications only. Arrowheads are in various sizes for scale dependant display. Arrowhead orientation is based on the vertex order of the referenced	N

Layer Name	Shapefile Name	Type	Description	Version
			linear element.	

4.1.3 Polygon Layers

Table 4: Polygon Layers

Layer Name	Shapefile Name	Type	Description	Version
Lake Poly	WSG_LW	Polygon	Contains all lake polygons for the province. Does not contain multipart geometries.	1.3
River Poly	WSG_RW	Polygon	Contains all double line river polygons for the province. Does not contain multipart geometries.	1.3
Wetland Poly	WSG_WW	Polygon	Contains all wetland polygons for the province. Does not contain multipart geometries.	1.3
Manmade Waterbody Poly	WSG_MW	Polygon	Contains all manmade waterbody polygons including reservoirs and canals. Does not contain multipart geometries.	1.3
Watershed Group Poly	WSG_GP	Multi-Polygon	Contains polygons delimiting the watershed group boundary which is a collection of drainage basins. In-land groups will contain a single polygon, coastal groups may contain multiple polygons (one for each island) i.e., this is a multipart polygon feature.	1.2

Layer Name	Shapefile Name	Type	Description	Version
Watersheds Poly	WSG_PWSH	Polygon	Contains all polygons generated from fundamental watershed boundary lines. A fundamental watershed boundary line is a watershed boundary line that bounds two unit polygons with different Freshwater Atlas watershed codes or is identified as isolated.	1.3
Nth Order Watershed Poly	WSG_WSH	Polygon	Maximal watershed polygons of Nth order plus all remaining unit watershed polygons and double line river, and lake polygons necessary to create a non-overlapping province wide dataset. This layer mimics the 1:50K 3rd order watershed coverage polygon layer.	N
Island Poly	cst_islands	Polygon	Contains all island polygons. Islands may overlap as there are islands within islands.	1.3
Bay and Channel Poly	cst_polygons	Polygon	Contains bay and channel (fresh and coastal) features and associated names.	1.3
Glacier Poly	glaciers	Polygon	Contains glaciers and ice masses as polygons.	1.2
Named Watersheds Poly	wsh_named	Polygon	Contains all named river watershed polygons. There	1.2

Layer Name	Shapefile Name	Type	Description	Version
			are approximately 12,000 named streams in BC.	

4.1.4 Non-spatial Layers

Table 5: Non-spatial Layers

Layer Name	Shapefile Name	Description	Version
Edge Type Cds	edge_codes	Contains the type codes with an English description used to categorize linear features.	1.2
Waterbody Type Cds	wb_codes	Contains all waterbody type codes and an English description.	1.2
Waterbody 20k 50k	20k50k_wbs	Contains all primary and secondary matches between 1:20K and 1:50K waterbody polygons.	1.3
Stream 20k 50k	20k50k_streams	Contains all primary and secondary matches between 1:20K and 1:50K stream edges.	1.3

4.2 LINEAR LAYER DESCRIPTIONS

4.2.1 Coastline SP

ATTRIBUTE NAME	version	DESCRIPTION
LINEAR FEATURE ID	1.3	A unique numeric identifier used to link the arc to the database.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.3	Populated by SDE.
LENGTH METRE	1.3	The length in meters of the linear object
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
FEATURE SOURCE	1.3	The source of the arc; where the feature was obtained or modified.
EDGE TYPE	1.3	The numeric code used by the Freshwater Atlas to identify the various types of water network linear features.
BLUE LINE KEY	1.3	Uniquely identifies a single flow line such that a main channel and a secondary channel with the same watershed code would have different blue line keys (the Fraser River and all side channels have different blue line keys).
CWB WATERSHED CODE	1.3	A 143 character code derived using a hierarchy coding scheme. Approximately identifies where a particular stream is located within the province.
WATERSHED KEY	1.3	A key that identifies a stream system (for example the Fraser River mainstem and all its side channels the same watershed key). There is a 1:1 match between a watershed key and watershed code. The watershed key will match the blue line key for the mainstem.
WATERSHED GROUP CODE	1.3	The watershed group code the feature is contained within.
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.
LOCAL WATERSHED CODE	N	A 143 character code similar to the Freshwater Atlas watershed code that further subdivides remnant polygons to provide an approximate location along the mainstem.
DOWNSTREAM ROUTE MEASURE	1.3	The distance along the route from the mouth of the route to the feature. This distance is measured from the mouth of the containing route to the downstream end of the feature.

4.2.2 Stream Network SP

ATTRIBUTE NAME	version	DESCRIPTION
LINEAR FEATURE ID	1.3	A unique numeric identifier used to link the arc to the database.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features. **Note**: version 1.3 has x,y,z values where z represents the refined elevation.
OBJECTID	1.3	Populated by SDE.
LENGTH METRE	1.3	The length in meters of the linear object
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
FEATURE SOURCE	1.3	The source of the arc; where the feature was obtained or modified.
EDGE TYPE	1.3	The numeric code used by the Freshwater Atlas to identify the various types of water network linear features.
BLUE LINE KEY	1.3	Uniquely identifies a single flow line such that a main channel and a secondary channel with the same watershed code would have different blue line keys (the Fraser River and all side channels have different blue line keys).
CWB WATERSHED CODE	1.3	A 143 character code derived using a hierarchy coding scheme. Approximately identifies where a particular stream is located within the province.
WATERSHED KEY	1.3	A key that identifies a stream system (for example the Fraser River mainstem and all its side channels the same watershed key). There is a 1:1 match between a watershed key and watershed code. The watershed key will match the blue line key for the mainstem.
WATERSHED GROUP CODE	1.3	The watershed group code the feature is contained within.
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.
GNIS ID	1.3	The BCGNIS (BC Geographical Names Information System) feature id.
GNIS NAME	1.3	The BCGNIS (BC Geographical Names Information System) name associated with the GNIS feature id (an English name was used where available, otherwise another language was selected).
STREAM ORDER	1.3	The calculated modified Strahler order.
STREAM MAGNITUDE	1.3	The calculated magnitude.
WATERBODY KEY	1.3	The waterbody key of the waterbody the edge is contained within.
BLUE LINE KEY 50K	1.3	The best matched blue line key from the 1:50K Watershed

ATTRIBUTE NAME	version	DESCRIPTION
		Atlas.
WATERSHED CODE 50K	1.3	The hierarchical identifier from the 1:50K Watershed Atlas associated with the blue line key 50k.
WATERSHED KEY 50K	1.3	The 50K watershed key associated with the blue line key 50K from the 1:50K Watershed Atlas.
WATERSHED GROUP CODE 50K	1.3	The 50K group code associated with the 50K blue line key from the 1:50K Watershed Atlas.
GRADIENT	N	The gradient of the stream. How the gradient is defined is to be determined.
LOCAL WATERSHED CODE	1.3	A 143 character code similar to the Freshwater Atlas watershed code that further subdivides remnant polygons to provide an approximate location along the mainstem.
DOWNSTREAM ROUTE MEASURE	1.3	The distance along the route from the mouth of the route to the feature. This distance is measured from the mouth of the containing route to the downstream end of the feature.
LEFT RIGHT TRIBUTARY	N	Describes which side of the local mainstem this tributary enters on. Valid values are: left or right

4.2.3 Linear Boundary SP

ATTRIBUTE NAME	version	DESCRIPTION
LINEAR FEATURE ID	1.3	A unique numeric identifier used to link the arc to the database.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.3	Populated by SDE.
LENGTH METRE	1.3	The length in meters of the linear object
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
FEATURE SOURCE	1.3	The source of the arc; where the feature was obtained or modified.
EDGE TYPE	1.3	The numeric code used by the Freshwater Atlas to identify the various types of water network linear features.
BLUE LINE KEY	1.3	The blue line key of the controlling arc of the bounded feature, if applicable.
CWB WATERSHED CODE	1.3	The watershed code of the controlling arc of the bounded feature, if applicable.
WATERSHED KEY	1.3	The watershed key of the controlling arc of the bounded feature, if applicable.
WATERSHED GROUP CODE	1.3	The watershed group code the feature is contained within. **Note:** For the July 31st SDE load values will be based on watershed groups delineated by the existing watershed boundary lines.

ATTRIBUTE NAME	version	DESCRIPTION
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.
WATERBODY KEY	1.3	The waterbody key of the waterbody the edge bounds.
LOCAL WATERSHED CODE	N	A 143 character code similar to the Freshwater Atlas watershed code that further subdivides remnant polygons to provide an approximate location along the mainstem.
DOWNSTREAM ROUTE MEASURE	N	The distance along the route from the mouth of the route to the feature. This distance is measured from the mouth of the containing route to the downstream end of the feature.

4.2.4 Watershed Boundary SP

ATTRIBUTE NAME	version	DESCRIPTION
WATERSHED BOUNDARY ID	1.3	A unique numeric identifier used to link the arc to the database.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECT ID	1.3	Populated by SDE.
LENGTH METRE	1.3	The length in meters of the linear object.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
FEATURE SOURCE	1.3	The source of the arc; where the feature was obtained or modified.
EDGE TYPE	1.3	The numeric code used by the Freshwater Atlas to identify the various types of water network linear features.
BLUE LINE KEY RIGHT	N	The blue line key of watershed to the right of this edge.
BLUE LINE KEY LEFT	N	The blue line key of the watershed to the left of this edge.
CWB WATERSHED CODE RIGHT	N	The watershed code of the watershed to the right of this edge.
CWB WATERSHED CODE LEFT	N	The watershed code of the watershed to the left of this edge.
LOCAL WATERSHED CODE RIGHT	N	The local watershed code of the watershed to the right of this edge.
LOCAL WATERSHED CODE LEFT	N	The local watershed code of the watershed to the left of this edge.
WATERSHED KEY RIGHT	N	The watershed key of the stream to the right of this edge.
WATERSHED KEY LEFT	N	The watershed key of the stream to the left of this edge.
WATERSHED GROUP CODE	1.3	The watershed group code the feature is contained within.
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.

4.2.5 Route SP

ATTRIBUTE NAME	version	DESCRIPTION
ROUTE ID	N	A unique identifier.
GEOMETRY	N	ArcSDE spatial column: coordinates defining the features.
OBJECTID	N	Populated by SDE.
FEATURE CODE	N	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
LENGTH METRE	N	The length of the geometry feature (in meters).
BLUE LINE KEY	N	Uniquely identifies a single flow line such that a main channel and a secondary channel with the same watershed code would have different blue line keys (the Fraser River and all side channels have different blue line keys).
CWB WATERSHED CODE	N	A 143 character code derived using a hierarchy coding scheme. Approximately identifies where a particular stream is located within the province.
WATERSHED KEY	N	A key that identifies a stream system (for example the Fraser River mainstem and all its side channels the same watershed key). There is a 1:1 match between a watershed key and watershed code. The watershed key will match the blue line key for the mainstem.

4.3 POINT LAYER DESCRIPTIONS

4.3.1 Obstruction SP

ATTRIBUTE NAME	version	DESCRIPTION
OBSTRUCTION ID	1.3	Unique key representing the point.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features
OBJECTID	1.3	Populated by SDE.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
FEATURE SOURCE	1.3	The source of the arc; where the feature was obtained or modified.
GNIS ID	1.3	The BCGNIS (BC Geographical Names Information System) feature id associated with the feature.
GNIS NAME	1.3	The BCGNIS (BC Geographical Names Information System) name associated with the GNIS feature id (an English name was used where available, otherwise another language was selected).
OBSTRUCTION TYPE	1.3	String representing the type of obstacle (Rapid, Fall, Dam etc.).

ATTRIBUTE NAME	version	DESCRIPTION
BLUE LINE KEY	1.3	The blue line key of the flow arc that the obstruction lies on.
CWB WATERSHED CODE	1.3	The watershed code of the flow arc the obstruction lies on.
WATERSHED KEY	1.3	The watershed key of the flow arc that the obstruction lies on.
LINEAR FEATURE ID	1.3	The unique identifier of the stream edge the obstruction lies on.
WATERSHED GROUP CODE	1.3	The watershed group code the feature is contained within.
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.
LOCAL WATERSHED CODE	N	The local watershed code of the flow arc the obstruction lies on.
ROUTE MEASURE	1.3	The distance along the route in meters, measured from the mouth of the route containing the obstruction to the obstruction.

4.3.2 Named Point Feature SP

ATTRIBUTE NAME	version	DESCRIPTION
NAMED POINT FEATURE ID	1.3	Unique identifier for each named feature.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.3	Populated by SDE.
NAMED FEATURE TYPE	1.3	Type of the named point. Contains one of the following: Fresh or Marine.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data. Note: This is currently empty as there is no feature code for named points at the moment.
GNIS ID	1.3	The BCGNIS (BC Geographical Names Information System) feature id associated with the feature.
GNIS NAME	1.3	The BCGNIS (BC Geographical Names Information System) name associated with the GNIS feature id (an English name was used where available, otherwise another language was selected).

4.3.3 Stream Direction SP

ATTRIBUTE NAME	version	DESCRIPTION
STREAM DIRECTION ID	N	This table is not included in the delivery. It is generated by ILMB staff.
GEOMETRY	N	
FEATURE CODE	N	
OBJECTID	N	
SYMBOL SIZE	N	
SYMBOL_ANGLE	N	

4.4 POLYGON LAYER DESCRIPTIONS

4.4.1 Lake Poly

ATTRIBUTE NAME	version	DESCRIPTION
WATERBODY POLY ID	1.3	The unique key for the waterbody polygon spatial layer.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.3	Populated by SDE.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
WATERBODY KEY	1.3	A unique identifier associated with waterbodies in order to group polygons that make up a single waterbody.
WATERBODY TYPE	1.3	The type of waterbody.
AREA HA	1.3	Area of polygon (hectares).
GNIS ID 1	1.3	A BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable. In a grouped system the feature id of the BCGNIS group is provided here and any subsequent names provided in gnis_id2 and gnis_id3.
GNIS NAME 1	1.3	The name of the first BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
GNIS ID 2	1.3	A second BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable.
GNIS NAME 2	1.3	The name of the second BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
GNIS ID 3	1.3	A third BCGNIS (BC Geographical Names Information

ATTRIBUTE NAME	version	DESCRIPTION
		System) feature id attached to a waterbody or island, if applicable.
GNIS NAME 3	1.3	The name of the third BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
CWB WATERSHED CODE	1.3	The watershed code of the controlling route through the waterbody.
WATERSHED GROUP CODE	1.3	The watershed group code the feature is contained within.
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.
BLUE LINE KEY	1.3	The blue line key of the controlling route through the waterbody.
WATERSHED KEY	1.3	The watershed key of the controlling route through the waterbody.
LOCAL WATERSHED CODE	N	The local watershed code associated with the waterbody.
WATERBODY KEY 50K	1.3	The 'best' matched waterbody from the 1:50K Watershed Atlas. In cases where there are multiple matches to features in the 1:50K watershed atlas the match with the greatest overlapping area was used.
WATERSHED GROUP CODE 50K	1.3	The group code from the 1:50K Watershed Atlas associated with the waterbody key 50k.
WATERBODY KEY GROUP CODE 50K	1.3	The waterbody key 50K with the group code 50K concatenated.
WATERSHED CODE 50K	1.3	The 1:50K Watershed Atlas watershed code associated with the waterbody key 50K.

4.4.2 River Poly

ATTRIBUTE NAME	version	DESCRIPTION
WATERBODY POLY ID	1.3	The unique key for the waterbody polygon spatial layer.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.3	Populated by SDE.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
WATERBODY KEY	1.3	A unique identifier associated with waterbodies in order to group polygons that make up a single waterbody.
WATERBODY TYPE	1.3	The type of waterbody.
AREA HA	1.3	Area of polygon (hectares).
GNIS ID 1	N	A BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable. In a grouped system the feature id of the BCGNIS group is

ATTRIBUTE NAME	version	DESCRIPTION
		provided here and any subsequent names provided in gnis_id2 and gnis_id3. For Version 1.2 River names are attached to the linear features and have not been transferred to the polygons.
GNIS NAME 1	N	The name of the first BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected). For Version 1.2 River names are attached to the linear features and have not been transferred to the polygons.
GNIS ID 2	N	A second BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable. For Version 1.2 River names are attached to the linear features and have not been transferred to the polygons.
GNIS NAME 2	N	The name of the second BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected). For Version 1.2 River names are attached to the linear features and have not been transferred to the polygons.
GNIS ID 3	N	A third BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable. For Version 1.2 River names are attached to the linear features and have not been transferred to the polygons.
GNIS NAME 3	N	The name of the third BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected). For Version 1.2 River names are attached to the linear features and have not been transferred to the polygons.
WATERSHED GROUP CODE	1.3	The watershed group code the feature is contained within.
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.
CWB WATERSHED CODE	1.3	The watershed code of the controlling route through the waterbody.
BLUE LINE KEY	1.3	The blue line key of the controlling route through the waterbody.
WATERSHED KEY	1.3	The watershed key of the controlling route through the waterbody.
WATERBODY KEY 50K	1.3	The 'best' matched waterbody from the 1:50K Watershed Atlas. In cases where there are multiple matches to features in the 1:50K watershed atlas the match with the greatest overlapping area was used.
WATERSHED GROUP CODE 50K	1.3	The group code from the 1:50K Watershed Atlas associated with the waterbody key 50k.
WATERBODY KEY GROUP CODE 50K	1.3	The waterbody key 50K with the group code 50K concatenated.

ATTRIBUTE NAME	version	DESCRIPTION
WATERSHED CODE 50K	1.3	The 1:50K Watershed Atlas watershed code associated with the waterbody key 50K.
LOCAL WATERSHED CODE	N	The local watershed code associated with the waterbody.

4.4.3 Wetland Poly

ATTRIBUTE NAME	version	DESCRIPTION
WATERBODY POLY ID	1.3	The unique key for the waterbody polygon spatial layer.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.3	Populated by SDE.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
WATERBODY KEY	1.3	A unique identifier associated with waterbodies in order to group polygons that make up a single waterbody.
WATERBODY TYPE	1.3	The type of waterbody.
AREA HA	1.3	Area of polygon (hectares).
GNIS ID 1	1.3	A BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable. In a grouped system the feature id of the BCGNIS group is provided here and any subsequent names provided in gnis_id2 and gnis_id3.
GNIS NAME 1	1.3	The name of the first BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
GNIS ID 2	1.3	A second BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable.
GNIS NAME 2	1.3	The name of the second BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
GNIS ID 3	1.3	A third BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable.
GNIS NAME 3	1.3	The name of the third BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
WATERSHED GROUP CODE	1.3	The watershed group code the feature is contained within. **Note:** For the Version 1.3 load values will be based on watershed groups delineated by the existing watershed boundary lines. **Note:** As of Version 1.3 certain wetlands may not respect

ATTRIBUTE NAME	version	DESCRIPTION
		boundaries due to wetland integration. Various adjacent wetlands were merged which may now be crossing boundaries.
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.
CWB WATERSHED CODE	1.3	The watershed code of the controlling route through the waterbody.
BLUE LINE KEY	1.3	The blue line key of the controlling route through the waterbody.
WATERSHED KEY	1.3	The watershed key of the controlling route through the waterbody.
WATERBODY KEY 50K	1.3	The 'best' matched waterbody from the 1:50K Watershed Atlas. In cases where there are multiple matches to features in the 1:50K watershed atlas the match with the greatest overlapping area was used.
WATERSHED GROUP CODE 50K	1.3	The group code from the 1:50K Watershed Atlas associated with the waterbody key 50k.
WATERBODY KEY GROUP CODE 50K	1.3	The waterbody key 50K with the group code 50K concatenated.
WATERSHED CODE 50K	1.3	The 1:50K Watershed Atlas watershed code associated with the waterbody key 50K.
LOCAL WATERSHED CODE	N	The local watershed code associated with the waterbody.

4.4.4 Manmade Waterbody Poly

ATTRIBUTE NAME	version	DESCRIPTION
WATERBODY POLY ID	1.3	The unique key for the waterbody polygon spatial layer.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.3	Populated by SDE.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
WATERBODY KEY	1.3	A unique identifier associated with waterbodies in order to group polygons that make up a single waterbody.
WATERBODY TYPE	1.3	The type of waterbody.
AREA HA	1.3	Area of polygon (hectares).
GNIS ID 1	1.3	A BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable. In a grouped system the feature id of the BCGNIS group is provided here and any subsequent names provided in gnis_id2 and gnis_id3.
GNIS NAME 1	1.3	The name of the first BCGNIS (BC Geographical Names Information System) feature id (an English name was used

ATTRIBUTE NAME	version	DESCRIPTION
		where available, otherwise another language was selected).
GNIS ID 2	1.3	A second BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable.
GNIS NAME 2	1.3	The name of the second BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
GNIS ID 3	1.3	A third BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable.
GNIS NAME 3	1.3	The name of the third BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
WATERSHED GROUP CODE	1.3	The watershed group code the feature is contained within. **Note:** For Version 1.3 SDE load values will be based on watershed groups delineated by the existing watershed boundary lines.
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.
CWB WATERSHED CODE	1.3	The watershed code of the controlling route through the waterbody.
BLUE LINE KEY	1.3	The blue line key of the controlling route through the waterbody.
WATERSHED KEY	1.3	The watershed key of the controlling route through the waterbody.
WATERBODY KEY 50K	1.3	The 'best' matched waterbody from the 1:50K Watershed Atlas. In cases where there are multiple matches to features in the 1:50K watershed atlas the match with the greatest overlapping area was used.
WATERSHED GROUP CODE 50K	1.3	The group code from the 1:50K Watershed Atlas associated with the waterbody key 50k.
WATERBODY KEY GROUP CODE 50K	1.3	The waterbody key 50K with the group code 50K concatenated.
WATERSHED CODE 50K	1.3	The 1:50K Watershed Atlas watershed code associated with the waterbody key 50K.
LOCAL WATERSHED CODE	N	The local watershed code associated with the waterbody.

4.4.5 Glacier Poly

ATTRIBUTE NAME	version	DESCRIPTION
WATERBODY POLY ID	1.2	The unique key for the waterbody polygon spatial layer.

ATTRIBUTE NAME	version	DESCRIPTION
GEOMETRY	1.2	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.2	Populated by SDE.
FEATURE CODE	1.2	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
WATERBODY KEY	N	A unique identifier associated with waterbodies in order to group polygons that make up a single waterbody.
WATERBODY TYPE	1.2	The type of waterbody.
AREA HA	1.2	Area of polygon (hectares).
GNIS ID 1	N	A BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable. In a grouped system the feature id of the BCGNIS group is provided here and any subsequent names provided in gnis_id2 and gnis_id3.
GNIS NAME 1	N	The name of the first BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
GNIS ID 2	N	A second BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable.
GNIS NAME 2	N	The name of the second BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
GNIS ID 3	N	A third BCGNIS (BC Geographical Names Information System) feature id attached to a waterbody or island, if applicable.
GNIS NAME 3	N	The name of the third BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
WATERSHED GROUP CODE	1.2	The watershed group code the feature is contained within. **Note:** For the July 31st SDE load values will be based on watershed groups delineated by the existing watershed boundary lines.
WATERSHED GROUP ID	1.2	A unique numeric key representing the watershed group code.
CWB WATERSHED CODE	N	The watershed code of the controlling route through the waterbody.
BLUE LINE KEY	N	The blue line key of the controlling route through the waterbody.
WATERSHED KEY	N	The watershed key of the controlling route through the waterbody.
WATERBODY KEY 50K	N	The 'best' matched waterbody from the 1:50K Watershed Atlas. In cases where there are multiple matches to features in the 1:50K watershed atlas the match with the greatest overlapping area was used.

ATTRIBUTE NAME	version	DESCRIPTION
WATERSHED GROUP CODE 50K	N	The group code from the 1:50K Watershed Atlas associated with the waterbody key 50k.
WATERBODY KEY GROUP CODE 50K	N	The waterbody key 50K with the group code 50K concatenated.
WATERSHED CODE 50K	N	The 1:50K Watershed Atlas watershed code associated with the waterbody key 50K.
LOCAL WATERSHED CODE	N	The local watershed code associated with the waterbody.

4.4.6 Watershed Group Poly

ATTRIBUTE NAME	version	DESCRIPTION
WATERSHED GROUP ID	1.2	A unique numeric key representing the watershed group code.
WATERSHED GROUP CODE	1.2	The four character watershed group code, e.g. ADMS (Adams River), ALBN (Alberni Inlet).
WATERSHED GROUP NAME	1.2	The name of the watershed group.
GEOMETRY	1.2	ArcSDE spatial column: coordinates defining the features. **Note:** For the July 31st SDE load values will be based on watershed groups delineated by the existing watershed boundary lines.
OBJECTID	1.2	Populated by SDE.
FEATURE CODE	1.2	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
AREA HA	1.2	The area of the polygon in hectares.

4.4.7 Watershed Feature

ATTRIBUTE NAME	version	DESCRIPTION
WATERSHED FEATURE ID	1.3	A unique identifier for each watershed in the layer.
GEOMETRY	1.3	**Note:** For Version 1.3 the polygons in this field will be derived from fundamental watershed boundary lines, delimiters, coastline and administrative boundaries. A fundamental watershed boundary line is a watershed boundary line that bounds two unit polygons with different Freshwater Atlas watershed codes or is identified as isolated.
OBJECTID	1.3	Populated by SDE.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of

ATTRIBUTE NAME	version	DESCRIPTION
		feature represented by the spatial data.
AREA HA	1.3	Area of the watershed, in hectares.
WATERSHED ORDER	1.3	The maximum order of the watershed key associated with the watershed polygon.
WATERSHED MAGNITUDE	1.3	The maximum magnitude of the watershed key associated with the watershed polygon.
LOCAL WATERSHED ORDER	1.3	The order associated with the local watershed code.
LOCAL WATERSHED MAGNITUDE	1.3	The magnitude associated with the local watershed code.
GNIS ID 1	N	The first BCGNIS (BC Geographical Names Information System) feature id associated with the watershed key of the watershed.
GNIS NAME 1	N	The first BCGNIS (BC Geographical Names Information System) name associated with the watershed key of the watershed.
GNIS ID 2	N	The second BCGNIS (BC Geographical Names Information System) feature id associated with the watershed key of the watershed.
GNIS NAME 2	N	The second BCGNIS (BC Geographical Names Information System) name associated with the watershed key of the watershed.
GNIS ID 3	N	The third BCGNIS (BC Geographical Names Information System) feature id associated with the watershed key of the watershed.
GNIS NAME 3	N	The third BCGNIS (BC Geographical Names Information System) name associated with the watershed key of the watershed.
WATERBODY ID	N	If the watershed is made up of a lake or river, this field will contain the waterbody id associated with that waterbody, otherwise it will be null.
WATERBODY KEY	1.3	If the fundamental watershed overlaps one or more significant lakes or rivers, this field contains the waterbody key associated with the waterbody that has the largest intersecting area with the watershed. Otherwise it is -l.
CWB WATERSHED CODE	1.3	The 143 character watershed code associated with the watershed polygon.
LOCAL WATERSHED CODE	1.3	A 143 character code similar to the Freshwater Atlas watershed code that further subdivides remnant polygons to provide an approximate location along the mainstem.
WATERSHED KEY	1.3	The watershed key associated with the watershed polygon (and watershed code). (If the watershed_code is like '999-999999-…', indicating an isolated watershed, then -1 is used as the watershed key).
WATERSHED GROUP CODE	1.3	The watershed group code associated with the polygon.

ATTRIBUTE NAME	version	DESCRIPTION
WATERSHED GROUP ID	1.3	A unique numeric key representing the watershed group code.
RIVER AREA	N	Area of double line rivers within the watershed, in hectares.
LAKE AREA	N	Area of lakes within the watershed, in hectares.
WETLAND AREA	N	Area of wetland within the watershed, in hectares.
MANMADE AREA	N	Area of manmade features within the watershed, in hectares.
GLACIER AREA	N	Area of glacier within the watershed, in hectares.
AVERAGE ELEVATION	N	The average elevation of the watershed.
AVERAGE SLOPE	N	The average slope of the watershed.
ASPECT NORTH	N	The percentage of the watershed that has an aspect within 45 degrees of north, ie. an aspect between 315 and 45 degrees.
ASPECT SOUTH	N	The percentage of the watershed that has an aspect within 45 degrees of south, ie. an aspect between 135 and 225 degrees.
ASPECT EAST	N	The percentage of the watershed that has an aspect within 45 degrees of east, ie. an aspect between 45 and 135 degrees.
ASPECT WEST	N	The percentage of the watershed that has an aspect within 45 degrees of west, ie. an aspect between 225 and 315 degrees.
ASPECT FLAT	N	The percentage of the watershed with no discernable aspect, ie. the flat land.

4.4.8 Nth Order Watershed Poly

ATTRIBUTE NAME	version	DESCRIPTION
WATERSHED ID	N	A unique identifier for each watershed in the layer.
GEOMETRY	N	**Note:** For the July31st SDE load the polygons in this field will be derived from principal watershed boundary lines, delimiters, coastline and administrative boundaries. A principal watershed boundary lines is a watershed boundary lines that bounds two unit polygons with different Freshwater Atlas watershed codes or is identified as isolated.
OBJECTID	N	Populated by SDE.
FEATURE CODE	N	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
AREA HA	N	Area of the watershed, in hectares.
WATERSHED ORDER	N	The maximum order of the watershed key associated with the watershed polygon.

ATTRIBUTE NAME	version	DESCRIPTION
WATERSHED MAGNITUDE	N	The maximum magnitude of the watershed key associated with the watershed polygon.
LOCAL WATERSHED ORDER	N	The order associated with the local watershed code.
LOCAL WATERSHED MAGNITUDE	N	The magnitude associated with the local watershed code.
GNIS ID 1	N	The first BCGNIS (BC Geographical Names Information System) feature id associated with the watershed key of the watershed.
GNIS NAME 1	N	The first BCGNIS (BC Geographical Names Information System) name associated with the watershed key of the watershed.
GNIS ID 2	N	The second BCGNIS (BC Geographical Names Information System) feature id associated with the watershed key of the watershed.
GNIS NAME 2	N	The second BCGNIS (BC Geographical Names Information System) name associated with the watershed key of the watershed.
GNIS ID 3	N	The third BCGNIS (BC Geographical Names Information System) feature id associated with the watershed key of the watershed.
GNIS NAME 3	N	The third BCGNIS (BC Geographical Names Information System) name associated with the watershed key of the watershed.
WATERBODY ID	N	If the watershed is made up of a lake or river, this field will contain the waterbody id associated with that waterbody, otherwise it will be null.
WATERBODY KEY	N	If the watershed is made up of a lake or river, this field will contain the waterbody key associated with that waterbody, otherwise it will be null.
CWB WATERSHED CODE	N	The 143 character watershed code associated with the watershed polygon.
LOCAL WATERSHED CODE	N	A 143 character code similar to the Freshwater Atlas watershed code that further subdivides remnant polygons to provide an approximate location along the mainstem.
WATERSHED KEY	N	The watershed key associated with the watershed polygon (and watershed code).
WATERSHED GROUP CODE	N	The watershed group code associated with the polygon.
WATERSHED GROUP ID	N	A unique numeric key representing the watershed group code.

4.4.9 Named Watershed Poly

ATTRIBUTE NAME	version	DESCRIPTION
NAMED WATERSHED ID	1.2	A unique identifier for each watershed in the layer.
GEOMETRY	1.2	**Note:** There is some risk involved for the July31 SDE load. Some large named watersheds (Fraser River) may be too large to generate or be useful.
OBJECTID	1.2	Populated by SDE.
FEATURE CODE	1.2	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
AREA HA	1.2	Area of the watershed, in hectares.
BLUE LINE KEY	1.2	The blue line key associated with the named stream.
GNIS ID	1.2	The BCGNIS (BC Geographical Names Information System) feature id associated with the watershed.
GNIS NAME	1.2	The BCGNIS (BC Geographical Names Information System) name associated with the GNIS feature id (an English name was used where available, otherwise another language was selected).
STREAM ORDER	1.2	The maximum order associated with the watershed key of the named stream.
STREAM MAGNITUDE	1.2	The maximum magnitude associated with the watershed key of the named stream.
WATERSHED KEY	1.2	The watershed key associated with the named stream.
CWB WATERSHED CODE	1.2	The watershed code associated with the named stream.

4.4.10 Island Poly

ATTRIBUTE NAME	version	DESCRIPTION
ISLAND ID	1.3	ISLAND ID is a unique identifier for each feature.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.3	Populated by SDE.
AREA HA	1.3	Area of the island, in hectares.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
ISLAND TYPE	1.3	ISLAND TYPE contains one of "Fresh, Marine or Marine/Fresh"
GNIS ID 1	1.3	The BCGNIS (BC Geographical Names Information System) feature id.
GNIS NAME 1	1.3	The name of the first BCGNIS (BC Geographical Names Information System) feature id (an English name was used

ATTRIBUTE NAME	version	DESCRIPTION
		where available, otherwise another language was selected).
GNIS ID 2	1.3	A second BCGNIS (BC Geographical Names Information System) feature id
GNIS NAME 2	1.3	The name of the second BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
GNIS ID 3	1.3	A third BCGNIS (BC Geographical Names Information System) feature id attached
GNIS NAME 3	1.3	The name of the third BCGNIS (BC Geographical Names Information System) feature id (an English name was used where available, otherwise another language was selected).
CWB WATERSHED CODE	1.3	To be populated with the watershed code of the island for coastal islands; and the most downstream watershed code of bounding features for interior islands. Vancouver Island is the exception with the resolution to be determined.
LOCAL WATERSHED CODE	N	

4.4.11 Bay and Channel Poly

ATTRIBUTE NAME	version	DESCRIPTION
BAY AND CHANNEL ID	1.3	Unique identifier for each feature.
GEOMETRY	1.3	ArcSDE spatial column: coordinates defining the features.
OBJECTID	1.3	Populated by SDE.
AREA HA	1.3	Area of the bay or channel, in hectares.
FEATURE CODE	1.3	The MOEP standard numeric code to identify the type of feature represented by the spatial data.
BAY CHANNEL TYPE	1.3	BAY CHANNEL TYPE contains one of the following: Fresh Bay, Fresh Channel, Marine Bay, or Marine Channel.
GNIS ID	1.3	The BCGNIS (BC Geographical Names Information System) feature id associated with the named bay or channel.
GNIS NAME	1.3	The BCGNIS (BC Geographical Names Information System) name associated with the GNIS feature id (an English name was used where available, otherwise another language was selected).

4.5 NON-SPATIAL LAYER DESCRIPTIONS

4.5.1 Edge Type Cds

ATTRIBUTE NAME	version	DESCRIPTION
EDGE TYPE	1.2	The numeric code used by the Freshwater Atlas to identify the various types of water network linear features.
EDGE DESCRIPTION	1.2	A plain English description of the type code.

4.5.2 Waterbody Type Cds

ATTRIBUTE NAME	version	DESCRIPTION
WATERBODY TYPE	1.2	The type of waterbody. Possible values include: L, R, W, X, G.
WATERBODY DESCRIPTION	1.2	Contains a plain English description of the waterbody type.

4.5.3 Waterbody 20k 50k

ATTRIBUTE NAME	version	DESCRIPTION
WATERBODIES_20K_50K_ID	1.3	A unique identifier populated by the database.
WATERBODY ID 20K	1.3	The 20k waterbody id matched to the 50k feature.
WATERBODY KEY 20K	1.3	The 20k waterbody key matched to a 50k key feature.
WATERSHED GROUP CODE 20K	1.3	The watershed group of the 20k waterbody feature.
WATERSHED GROUP ID 20K	1.3	A unique numeric key representing the 20k watershed group code.
WATERBODY TYPE 20K	1.3	The type of 20k waterbody feature.
WATERBODY KEY 50K	1.3	The 50k waterbody key of the matched waterbody.
WATERSHED GROUP CODE 50K	1.3	The 50k watershed group code of the matched waterbody.
WATERBODY TYPE 50K	1.3	The type of the matched 50k waterbody.
MATCH TYPE	1.3	A string identifying the type of match. One of 'Primary', indicating the best match, or 'X-Ref', indicating cross reference or secondary match.
CWB WATERSHED CODE 20K	1.3	The controlling route of the matched 20k waterbody.
WATERSHED CODE 50K	1.3	The controlling route of the matched 50k waterbody.
LOCAL WATERSHED CODE 20K	N	The local watershed code associated with the 20k waterbody.

4.5.4 Stream 20k 50k

ATTRIBUTE NAME	version	DESCRIPTION
STREAMS_20K_50K_ID	1.3	A unique identifier populated by the database.
LINEAR FEATURE ID 20K	1.3	The edge id used to link to a unique line in the 1:20K stream network.
BLUE LINE KEY 20K	1.3	The blue line key associated with the 20k edge.
WATERSHED KEY 20K	1.3	The watershed key associated with the 20k edge.
CWB WATERSHED CODE 20K	1.3	The watershed code associated with the 20k edge.
WATERSHED GROUP CODE 20K	1.3	The watershed group code associated with the 20k edge.
WATERSHED GROUP ID 20K	1.3	A unique numeric key representing the 20k watershed group code.
BLUE LINE KEY 50K	1.3	The best matched 50k blue line key.
WATERSHED KEY 50K	1.3	The watershed key for the best matched 50k blue line key.
WATERSHED CODE 50K	1.3	The 50k watershed code of the best matched 50k blue line key.
WATERSHED GROUP CODE 50K	1.3	The watershed group code of the best matched 50k blue line key.
MATCH TYPE	1.3	A string identifying the type of match. One of 'Primary', indicating the best match, or 'X-Ref', indicating cross reference or secondary match.

5 APPENDIX A - FEATURE CODES

The following table describes the valid values for the feature code attributes.

Table 6: Feature Code Attribute Table

Feature Code	Description
AP09200000	Dump
AP90300100	Mine – Tailing Pond
EA26700110	Settling Basin – Sewage
FA02650000	Boundary (International)
GA03950000	Canal
GA08800110	Ditch
GA24850000	River/Stream – Definite
GA24850140	River/Stream – Indefinite
GA24850150	River/Stream – Intermittent
GB11350110	Flooded Land – Inundated
GB15300000	Lake – Definite
GB15300130	Lake – Indefinite
GB15300140	Lake – Intermittent
GB24300000	Reservoir – Definite
GB90100000	Reservoir – Indefinite
GB90100110	Reservoir – Intermittent
GC17100000	Marsh
GC30050000	Swamp
GE14850000	Island – Definite
GG05800000	Coastline – Definite
WA11410000	Flow Connectors – Inferred
WA17100000	Frequently Flooded Land
WA21100111	Construction Line – Coastline
WA23111110	Construction Line – Lakeshore
WA24111110	Construction Line – Main Flow
WA24111111	Construction Line – Lake Arm
WA24111120	Construction Line – Main Connector
WA24111130	Construction Line – Secondary Flow
WA24111140	Construction Line – Segment Delimiter
WA24111150	Construction Line – Secondary
WA24111160	Construction Line – River Delimiter
WA24111170	Construction Line – Flow Inferred
WA24111180	Construction Line – Subsurface Flow
WA24111190	Construction Line – Flow Connector
WA24200110	Double-Line Blueline – Right Bank

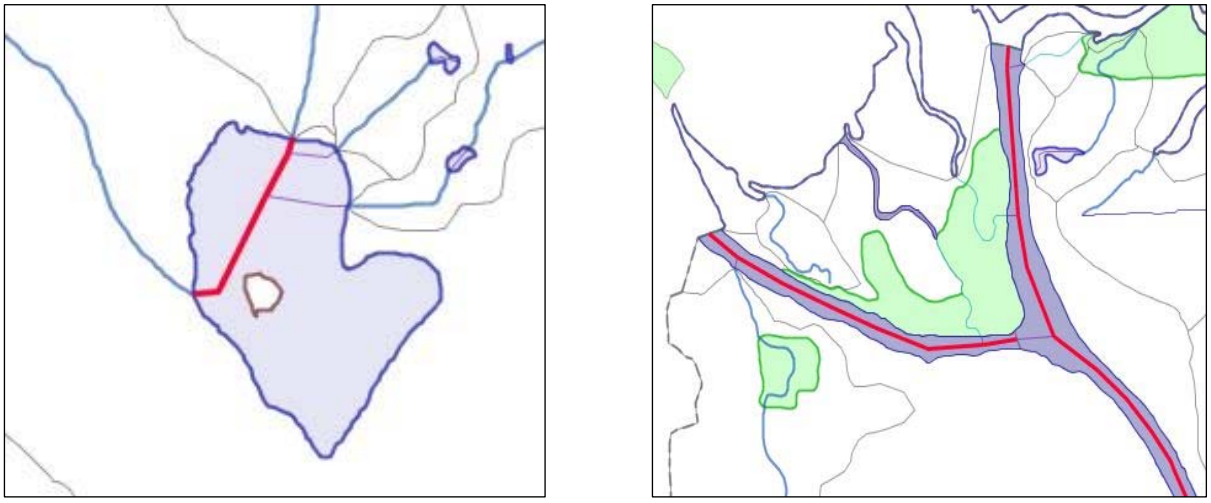
WA24200120	Double-Line Blueline – Right
WA24200130	Double-Line Blueline – Left Bank
WA24200140	Double-Line Blueline – Left
WA24220110	Island in River – Right Bank
WA24220120	Island in River – Right Bank Shared with Wetland
WA24220130	Island in River – Left Bank
WA24220140	Island in River – Left Bank Shared with Wetland
WA25100110	Watershed Boundary – Major
WA25100120	Watershed Boundary – Minor
WA25100140	Watershed Boundary – (att) operator modified or added HOL
GA08450110	Dam – Beaver
GA23500110	Rapids
GA90002110	Falls
GA98450000	Dam
HB27550000	Sinkhole
GA10450200	Artificial Waterfall
GA10450300	Flattened Waterfall

6 APPENDIX B – CONTROLLING ROUTES

A controlling route is a route that flows through a river or lake polygon from an input to an outlet which represents the prominent flow of water.

The image on the right of Figure 6 shows the controlling arc of the lake highlighted in red. The image on the left shows the controlling routes of the two double-line river waterbodies highlighted in red.

Figure 6: Lake and River Controlling Route



The controlling route through a wetland is much more complex than lake and river controlling routes. In the data deliveries there remain some wetlands without a controlling route. These wetlands will have a value in the "code_issue" attribute of the polygon (label point) layer.

For this purpose, a wetland is defined as the merging of all wetland polygons with the same wb_key. The rules for wetland controlling routes are as follows (see Figure 7 for an example):

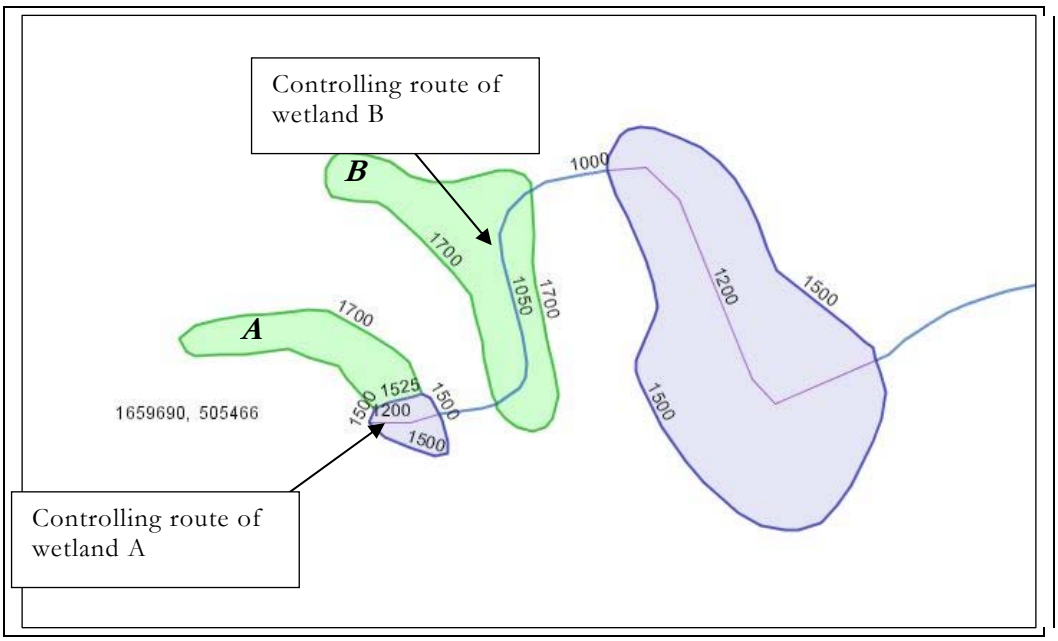
- If there is a 1050 or 1150 in the wetland, the route associated with these edges is the controlling route.
- If the wetland borders a double line river (shared 1835, 1875, 1925, 1975), the controlling route of the double line river is also the controlling route of the wetland. In the case where a wetland borders multiple double-line rivers, the double-line river with the longest shared shoreline is selected.
- If there is a 1200, 1300, 1400 or 2000 in the wetland, the route associated with these edges is the controlling route.

- If the wetland borders a lake (1525) the controlling route of the lake is also the controlling route of the wetland. In the case where a wetland borders multiple lakes, the lake with the longest shared shoreline is selected.

- If the wetland borders a manmade waterbody (2100), the controlling route of the manmade waterbody is also the controlling route of the wetland. In the case where a wetland borders multiple manmade waterbodies, the lake with the longest shared shoreline is selected.

- If none of the above is satisfied, the wetland will not have a controlling route.

Figure 7: Wetland Controlling Routes



7 APPENDIX C – BLUE LINE KEY, WATERSHED KEY, AND FRESHWATER ATLAS WATERSHED CODE

7.1 HOW THE ATTRIBUTES ARE CALCULATED

The blue line key and watershed key are defined as follows:

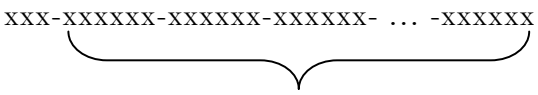
1. The blue line key is a unique key for identifying a single flow channel. As such, in a braided system the main channel will have a different blue line key from the secondary channels.

2. The watershed key is used to identify entire rivers (the Fraser River, its distributaries and side channels); therefore, the main channel and secondary channels of a braided system will have the same watershed key.

These attributes are also associated with coastline edges (codes 100 and 150) - see "How the Attributes are Attached to Arcs – Coastline Arcs" below.

The Freshwater Atlas watershed code is defined as follows:

1. The Freshwater Atlas watershed code is a 143 digit hierarchical key applied to flow arcs in the same way as the watershed key. In a braided system, the main channel and secondary channels have the same Freshwater Atlas watershed code. The format of this key is:



For more information on how this key is computed, refer to the Hierarchical Key documentation.

7.2 HOW THE ATTRIBUTES ARE ATTACHED TO ARCS

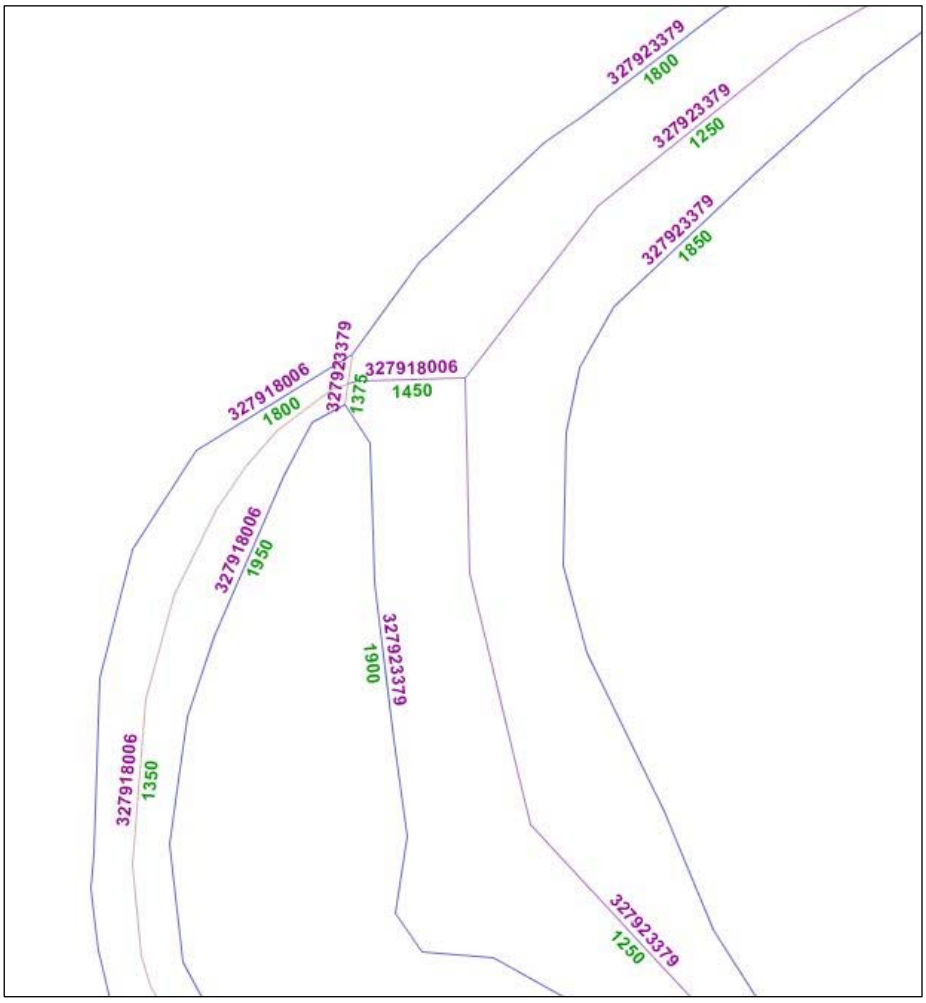
For all flow arcs, the blue line key, watershed key, and Freshwater Atlas watershed code attributes are defined as described above.

For lakes, rivers and wetland banks the arcs are encoded with the blue line key, watershed key, and Freshwater Atlas watershed code of the controlling route of the waterbody. In cases of shared banks the order of precedence is lake, river and wetland.

For provincial boundary arcs that bound waterbodies, the arcs are encoded with the blue line key, watershed key, and Freshwater Atlas watershed code of the controlling route of this bounded waterbody.

Figure 8 shows an example of how blue line keys are associated with the banks of a double line river. The controlling route for the main flow is identified by the 1250's. All the banks associated with this main flow waterbody have the same blue line key as the controlling route (327918006). The controlling route for the side channel is identified by the 1350's. The banks associated with this side channel waterbody have a blue line key associated with the 1350 route (327918006). The watershed keys are similar but because the side channel has the same watershed key as the mainflow, all the bank and flow edges in this picture will have the same watershed key. The Freshwater Atlas watershed code are also transferred in a similar manner.

Figure 8: Attribute Blue Line Key Example



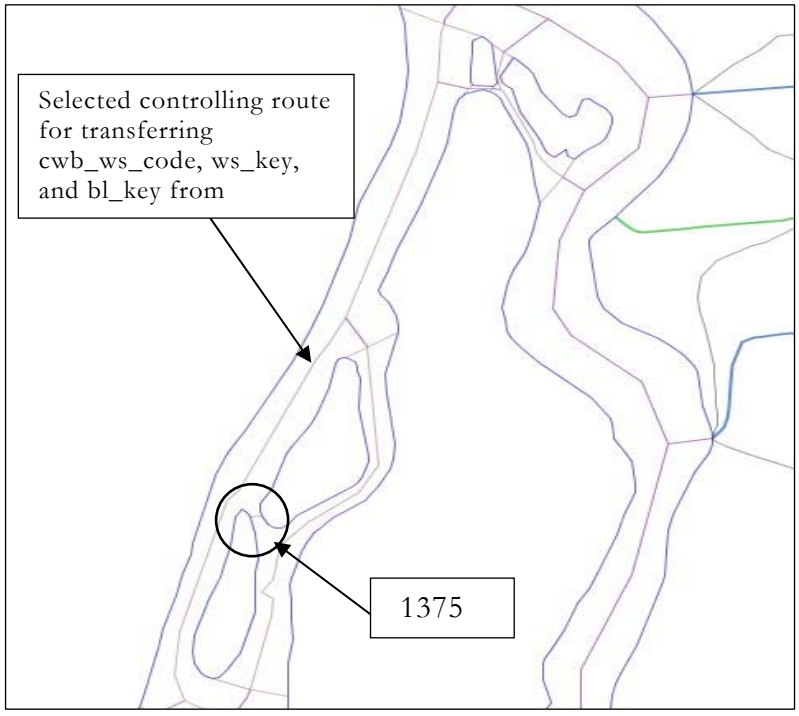
7.3 HOW THE ATTRIBUTES ARE ATTACHED TO ARCS - DELIMITERS

Delimiters have special rules for associated blue line keys, watershed keys and Freshwater Atlas watershed codes. River delimiters (1375) that are split by 1450's take on the value of the flow that the 1375 is 'parallel' to. This will be the controlling route the 1450 is flowing out of or flowing into. The 1375 delimiting the main flow from the side channel takes on the values from the controlling route of the main flow.

In the case where a 1375 is not split by flow arcs (as shown in Figure 9), the controlling route of the two waterbodies that it separates is compared. If one is primary and the other secondary then the value of the primary controlling route is used; otherwise the waterbody that is "closest to a primary flow" is used. "Closest to a primary flow" is computed by:

1. finding the middle of the delimiter;
2. projecting outwards to the two controlling routes using the shortest path possible;
3. following routes upstream computing the upstream length until a primary route is found; and
4. selecting the controlling route with the shortest upstream length to a primary route.

Figure 9: Delimiters and bl_key, ws_key, cwb_ws_code



The highlighted 1375 is not intersected by any flow. The middle of this edge is computed and projected (using shortest path) onto the controlling route of the waterbodies on either side. The length to the primary flow from each of these points is then computed and the controlling route with the shortest path found. In this case the west-most waterbody controlling route is selected.

7.4 HOW THE ATTRIBUTES ARE ATTACHED TO ARCS – COASTLINE ARCS

A watershed key, blue line key and Freshwater Atlas watershed code will be attached to coastline arcs as well in accordance with the way hierarchical keys are computed.

All coastal islands with the exception of Vancouver Island will have a unique blue line key, and Freshwater Atlas watershed code. Vancouver Island will have two blue line keys and two Freshwater Atlas watershed codes; one for the eastern side of the island and one for the western side of the island. The watershed key for all coastal islands will be the same as the blue line key.

The mainland coastline will have four blue line keys and Freshwater Atlas watershed codes: one for the Washington coastline, one for the Alaskan coastline, one for the southern BC coastline and one for the northern BC coastline. The watershed key for the mainland coastline will be the same as the blue line key.

For example, the Freshwater Atlas watershed code for the southern portion of the BC Mainland will be:

- 900 – 000000 – 000000 – 000000 - … - 000000

The Freshwater Atlas watershed code for SaltSpring Island will be:

- 925 – 303570 – 000000 – 000000 - … - 000000

8 APPENDIX D – RELATED DOCUMENTS

8.1 FEATURE NAMING

The features in the Freshwater Atlas were named by matching the the Freshwater Atlasfeatures with the BCGNIS (British Columbia Geographical Names Information System) and TRIM Toponymy datasets.

The following documents outline the processing completed to name the the Freshwater Atlas Features.

- Process Summary for the TRIM Toponymy ⇔ BCGnis Linking Process (2003-08-Toponymy-Process.doc)
- Water Body Toponym Matching (WaterBodyToponymMatching.doc)
- Stream Toponym Matching (StreamToponymMatching.doc)
- Named Stream Snaking Technical Documentation (SnakingNamedStreams.doc)
- Bay Name Matcher (Bay Name Matcher Technical Documentation.doc)
- Point Name Matcher (Point Name Matcher Technical Documentation.doc)
- Island Name Matcher (Island Name Matcher Technical Documentation.doc)
- Obstacle Processing Technical Documentation (Trim Obstacle Processing for CWB.doc)

8.2 ROUTES

Assigning routes to the Freshwater Atlas datasets is a complex automated and manual process. The automated processing is described in the following documents:

- Mainstemming Technical Documentation (Mainstems.doc)
- Route Generation Technical Documentation (CWB Routing Documentation.doc)
- Route Building (routing.doc)

8.3 FRESHWATER WATERSHED CODE (HIERARCHICAL KEYS)

Freshwater Atlas Watershed Codes (hierarchical keys) are associated with every route and can be used to perform approximate upstream/downstream queries without traversing the stream network. The format of these keys has changed from the old TRIM Watershed Atlas hierarchical keys. The new hierarchical keys are a 143 character string formatted as shown in Table 7:

Table 7: Format of Hierarchical Keys

xxx	-	xxxxxx	-	xxxxxx	-	xxxxxx	-	xxxxxx	-	xxxxxx	…	xxxxxx
h1	-	h2	-	h3	-	h4	-	h5	-	h6	…	h21

Further information can be found in the following document:

- Hierarchical Key Technical Documentation (HKeys.doc)

8.4 ORDER & MAGNITUDE

Information on the computation of modified strahlar order and magnitude on the stream network can be found in the following document:

- Order and Magnitude Technical Documentation (OrderMagnitude.doc)

8.5 20K – 50K CONFLATION

In order to preserve a large legacy database containing various habitat and inventory information, the 1:50 000 Watershed Atlas (WSA) was conflated with the 1:20 000 BC data. Further information on this processes can be found here:

- Water Body Conflation (WaterBodyConflationTechnicalDocumentation.doc)
- Waterbody – Waterbody Matching Post Processor (PostProcessor.doc)
- Matching 1:20k Streams With 1:50k Streams (jcs_matching2.doc)

8.6 WATERSHED BOUNDARY GENERATION & FUNDAMENTAL WATERSHEDS

Further information on the generation of watershed boundary lines and fundamental watersheds can be found in these documents:

- Watershed Boundary Generation Process Flow (CWB.1.2.WatershedBoundaryProcess.rev2.doc)

- Watershed Boundary Drainage ID Requirements (CWB.1.2.WatershedDrainageIDRequirements.rev4.doc)

- WaterBug Watershed Boundary Generator Technical Design (CWB.1.2.WaterBugDesign.rev1.doc)

- CWBHOL Data Store Design (CWB-HOL.DataStoreDesign.rev2.doc)

- Isolated Watershed Identification Technical Documentation (IsolatedWatershedTechnicalDocumentation.doc)

- Fundamental Watersheds (Freshwater Atlasv1.3-FW.TechnicalSpecification.v0.3.doc)

8.7 STREAM ELEVATION

Further information on the computation of refined elevation on the stream network can be found in this document:

- Stream Elevation (SE) Generation Technical Specification (Freshwater Atlasv1.3-SE.TechnicalSpecification.v07.doc)

- Stream Elevation (SE) Technical Issues (Freshwater Atlasv1.3-SE.TechnicalIssues.v0.8.doc)