APPENDIX B: SEGMENT, CREEK & WETLAND ASSESSMENTS



SEGMENT ASSESSMENTS

Slocan Lake: Segment 1







General Segment Classification

ocheral ocginent old	Janication							
Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
521	Stream	Dock, Retaining Wall	Low	Park	High	90%	10%	Slocan River

Shore Type (%)						
Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
0	30		10	60		

Land Use								
Commercial	Forestry	Natural Area	Park	Recreation	Rural	Single Family	Industrial	Urban Park
				Х				

Substrate (%	Substrate (%)													
Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock			
				60	20	20								

Shoreline Vegetation	n Band1				
Category	Stage	Shrub Cover (%)	Tree cover (%)	Bandwidth (m)	Overhanging (%)
Landscape	Sparse	Sparse < 10	Sparse <10	50	0

renne vegetation bar	IUZ		
ategory	Stage	Veteran Trees	Wildlife Trees
indscaped	Sparse	No	No

Aquatic Vegetation(%)											
Aquatic vegetation	Submergent	Emergent	Floating								
0											

Littora	I Zone			
Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
Wide >50m	High	Yes	Yes	No







General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
302	Gravel	Dock, Retaining Wall	Low	Industrial	High	100%	0%	

Shore Type (%)						
Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
	99			2		

Land Use								
Commercial	Forestry	Natural Area	Park	Recreation	Rura	Single Family	Industrial	Urban Park
							Х	

Substrate(%)	•									
Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
					40	40	10			10	

Shoreline Ve	etation Band1			•		•	Shoreline	Vegetation Band2			•
					40	40	10			10	
IVIAII	ividu	Organic	111163	Saliu	Graveiri irie	Glavel/Cobble	Copple	CODDIE/TITIE	CODDIE/COdi Se	boulder	Derurock

Shoreline Vegetati	on Band1				Shoreline Vege	etat	ion Band2	
Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)		Category	Stage
Landscape	Sparse	Sparse <10	Sparse <10	50	0		Landscaped	Sparse
Agustic Vogotation	(9/)	Littoral Zono						

Aquatic Vegetation	n (%)			 Littora	I Zone				
Aquatic vegetation	Submergent	Emergent	Floating	Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody	l
0				Wide >50m	High	Yes	Yes	No	ı



Veteran Trees

Wildlife Trees No

General Segment Classification





Segment Length (m)	Shore Type	S	hore Type Modificatio	n Slope		Land Use	Level of	Impact	Distu	ırbed		Natural		Class	Con	nment	
589	Cliff/Bluff		Retaining Wall, Trail	Very Stee	р	Natural	Medi	um	40	1%		60%					
Shore Type (%)	•				· ·		•										
Cliff/Bluff	Gravel Be	ach	Rocky Shore	Sand	Beach	Stream	n Mouth	١	Wetland		Other	'S					
100																	
Land Use	I .		<u> </u>	<u> </u>		I											
Commercial	Forestr	y	Natural Area	Pa	rk	Recre	eation	1	Rural		Single Fan	nily	Indu	ıstrial		Urban Park	
						>	(
Substrate(%)			•	•		•						•				-	
Marl	Mud C	rganic	Fines	Sand	Grave	el/Fine Gi	ravel/Cobble	С	Cobble	Cobb	le/Fine	Cobble/Co	oarse	Boulder		Berdrock	
														20		80	
Shoreline Vegetation	on Band1		1					-	1		Shoreline	Vegetation	Band	2		1	
Category	Stage		Shrub Cover (%) Tree Co	ver (%)	Bandwi	idth (m)	Overh	nanging (%)		C	ategory		Stage		Veteran Trees	Wildlife Trees
Coniferous forest	Young forest		Sparse <10	Moderate	10-50	50		0			Conifero	us forest	١	oung '		No	No
Aquatic Vegetation	(%)					•		Littora	I Zone							L	1
Aquatic vegetation	Submergent	1	Emergent	Floating			Littoral Zon	ie (m)	Juvenile Re	earing	Stagin	9	Migra	ition	L	Large Woody	

NA

Low



Yes

Yes

Yes





Disturbed

Natural

Yes



Class Comment

No

General Segment Classification

Segment Length (m) Shore Type Shore Type Modification

Cliff/Bluff Gravel Beach Rocky Shore Sand Beach Stream Mouth Wetland Others 100	749	Cliff/Bluff		None	Very	Steep	Natur	al	Non	ie	0%			100%					
Land Use Commercial Forestry Natural Area Park Recreation Rural Single Family Industrial Urban Park Substrate(%) Marl Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock Shoreline Vegetation Band1 Category Stage Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 0 Littoral Zone Littoral Zone	Shore Type (%)	•			· ·						•								
Commercial Forestry Natural Area Park Recreation Rural Single Family Industrial Urban Park Substrate(%) Marl Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock 5 95 Shoreline Vegetation Band1 Category Stage Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 0 Littoral Zone	Cliff/Bluff	Gravel Be	ach	Rocky Shore		Sand Bea	ch	Stream	n Mouth	V	Vetland		Others	S					
Commercial Forestry Natural Area Park Recreation Rural Single Family Industrial Urban Park X	100																		
Substrate(%) Marl Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock Shoreline Vegetation Band1 Category Stage Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 0 Category Stage Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 0 Category Stage Veteran Trees Wildlift Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 0 Category Stage Veteran Trees Wildlift Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 0 Category Stage Veteran Trees Wildlift Coniferous forest Mature forest Mature forest Moderate 10-50 Abundant >50 50 0 0 Category Stage Veteran Trees Wildlift Coniferous forest Mature forest Mature forest Mature No Yes	and Use			1			ı		ı			1		-					
Substrate(%) Marl Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock 5 95 Shoreline Vegetation Band2 Category Stage Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 0 Coniferous forest Mature States Moderate 10-50 Abundant >50 50 0 0 Coniferous forest Mature States Moderate 10-50 Abundant >50 50 0 0 Coniferous forest Mature States Moderate 10-50 Abundant >50 50 0 0 Coniferous forest Mature States Moderate	Commercial	Forestr	'	Natural Area		Park		Recrea	ation	F	Rural		Single Fam	ily	Ind	ustrial		Urban Park	
Marl Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock 5 95 Shoreline Vegetation Band1 Category Stage Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 0 Littoral Zone Gravel/Cobble Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock 5 95 Shoreline Vegetation Band2 Category Stage Veteran Trees Wildlif Coniferous forest Mature No Yes Aquatic Vegetation(%)				х															
Shoreline Vegetation Band1 Category Stage Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 Coniferous forest Mature No Yes Aquatic Vegetation (%) Littoral Zone	Substrate(%)	•		•	•		•		•		•			•					
Shoreline Vegetation Band1 Category Stage Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 Coniferous forest Mature No Yes Aquatic Vegetation(%) Shoreline Vegetation Band2 Category Stage Veteran Trees Wildliff Coniferous forest Mature No Yes Littoral Zone	Marl	Mud C	rganic	Fines	Sand	(Gravel/Fine	Gra	avel/Cobble	C	obble	Cobbl	le/Fine	Cobble/Co	arse	Boulder		Berdrock	
Category Stage Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Category Stage Veteran Trees Wildliff Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 Coniferous forest Mature Aquatic Vegetation(%) Littoral Zone																5		95	
Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 Coniferous forest Mature No Yes Aquatic Vegetation(%) Littoral Zone	Shoreline Vegeta	tion Band1		•	•								Shoreline	e Vegetatio	n Ban	d2			
Aquatic Vegetation(%) Littoral Zone	Category	Stage		Shrub Cover (%)) Tree	Cover (%	6) B	andwidth	n (m)	Overha	nging (%)		Category	'		Stage		Veteran Trees	Wildlife
	Coniferous forest	Mature forest		Moderate 10-50	Abun	ndant >50) 50	0		0		1	Conifero	us forest		Mature	Ì	No	Yes
Aquatic vegetation Submergent Emergent Floating Littoral Zone (m) Juvenile Rearing Staging Migration Large Woody	Aquatic Vegetatio	on(%)		1						Littoral	Zone						L		ı
	Aquatic vegetation	Submergent	E	mergent	Floating				Littoral Zone	e (m)	Juvenile Rear	ing	Staging		Migr	ation	La	arge Woody	

Wide >50m

Level of Impact

Land Use



Yes







General Segment Classification

1521 Rock None Steep Natural Low 1% 99%	Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
	1521	Rock	None	Steep	Natural	Low	1%	99%	

Shore Type (%)

Cliff/Bluff Gravel Beach Rocky Shore Sand Beach Stream Mouth Wetland Others

100 Snow Stream Mouth Wetland Others

Land Use

Commercial Forestry Natural Area Park Recreation Rural Single Family Industrial Urban Park

x

Substrate(%)

Marl Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock

Shoreline Vegetation Band1 20 Shoreline Vegetation Band2 Shoreline Vegetation Band2

Bandwidth (m) Overhanging (%) Stage Veteran Trees Wildlife Trees Shrub Cover (%) Tree Cover (%) Category Category Coniferous forest Young forest Moderate 10-50 Abundant >50 Coniferous forest Mature <20 Yes

Aquatic Vegetation(%) Littoral Zone Aquatic vegetation Floating Juvenile Rearing Migration Large Woody Submergent Emergent Littoral Zone (m) Staging No No No Narrow Low







General Segment Classification

Segment Length (m)	Shore Type	Sho	ore Type Modification	on Slope	Lar	nd Use	Level of	Impact	Distur	bed	1	Vatural		Class	Comme	ent
5905	Cliff/Bluff		None	Very Stee	o Na	atural	Non	ie	0%	ó		100%				
Shore Type (%)	•			•			l.									'
Cliff/Bluff	Gravel Bea	ch	Rocky Shore	Sand	Beach	Stream	Mouth	W	etland		Others					
99						,	1									
Land Use																
Commercial	Forestry		Natural Area	Pa	rk	Recrea	ation	Ru	ıral	Sir	ngle Fami	ly	Indust	trial	Ur	rban Park
			х													
Substrate(%)				•								-				
Marl	Mud Orç	janic	Fines	Sand	Gravel/Fi	ne Gra	avel/Cobble	Col	oble	Cobble/	'Fine	Cobble/Coar	se	Boulder		Berdrock
														5	ç	95
Shoreline Vegetati	on Band1						S	horeline	Vegetation	Band2	2		'			
Category	Stage		Shrub Cover (%)	Tree Cove	r (%)	Bandwidth	ı (m)	Overhan	ging (%)		Category		St	tage		Veteran Trees
Coniferous forest	Young forest		Moderate 10-50	Abundant	>50	50		0			Coniferou	is forest	M	ature		No
Aquatic Vegetation	ı (%)		ı					Littoral 2	Zone							
Aquatic vegetation	Submergent	Fr	mergent	Floating		Γ	Littoral Zon	e (m)	Juvenile Re	aring	Staging		Migrati	on	Laro	re Woody

Narrow









	Comment	Class Co	latural	N	rbed	pact Distu	Level of Ir	nd Use	Laı	n Slope	ore Type Modification	ype Sho	Shore Typ	Segment Length (m)
1			60%		%	40	Mediu	e Family	Singl	Low	Dock, Groyne	(Rock	406
_			l.	-1		l l	l.							Shore Type (%)
				Others		Wetland	n Mouth	Stream	Beach	Sand	Rocky Shore	el Beach	Gravel	Cliff/Bluff
											50	50	50	
_								ļ.						Land Use
	Urban Park	ustrial	ly Ind	ingle Famil	S	Rural	ation	Recre	rk	Par	Natural Area	estry	Fores	Commercial
1				х										
_		•	•				•		1	•				Substrate(%)
]	Berdrock	Boulder	Cobble/Coarse	/Fine	Cobble	Cobble	avel/Cobble	ine G	Gravel/F	Sand	Fines	Organic	Лud	Marl M
1	10	45				15		10	10		10			
_		d2	Vegetation Band	horeline	S								n Band1	Shoreline Vegetation
Wildlife Tre	Veteran Trees	Stage		Category		Overhanging (%)	n (m)	Bandwidt	er (%)	Tree Cover	Shrub Cover (%)		Stage	Category
No	No	Sparse	s forest	Coniferou		0		50	10-50	Moderate 1	Moderate 10-50	rest	Mature fore	Coniferous forest
			L.			ittoral Zone	U	1		L .	1		(%)	Aquatic Vegetation (
7	Large Woody	ation	Migr	Staging	earing	(m) Juvenile Re	Littoral Zone			Floating	mergent	t E	Submergent	

Wide >50m

Low



No

No







General Segment C													_				
Segment Length (m)	Shore Type	Sho	ore Type Modification	Slope	Lan	id Use	Level of I	mpact	Distur	oed	Na	atural		Class	Comment		
10785	Cliff/Bluff		Dock	Very Steep	Na	ntural	Non	е	0%		1	00%		Enterp	rise Creek		
Shore Type (%)	- L								1								
Cliff/Bluff	Gravel Bead	h	Rocky Shore	Sand B	each	Stream	n Mouth	١	Vetland		Others						
95							2										
Land Use										_							
Commercial	Forestry		Natural Area	Park		Recre	ation	F	Rural	S	ngle Family	'	Industi	rial	Urban	Park	
			Х														
Substrate(%)	•			· ·	1							ı		1			
Marl N	Mud Org	anic	Fines	Sand	Gravel/Fi	ne Gr	avel/Cobble	С	obble	Cobble	/Fine	Cobble/Coa	arse	Boulder	Be	rdrock	
														50	50		
Shoreline Vegetation	n Band1		I I					-	ı	Sh	oreline Ve	getation B	and2				
Category	Stage		Shrub Cover (%)	Tree Cover	(%)	Bandwidth	n (m)	Overha	nging (%)		Category		Sta	age	Vete	ran Trees	Wildlife Tree
Coniferous forest	Mature forest		Moderate 10-50	Abundant >	·50	50		0		7	Coniferous	forest	Ma	iture	No		Yes
Aquatic Vegetation	(%)			L				Littoral	Zone								
	Submergent	En	mergent F	loating			Littoral Zon	e (m)	Juvenile Rea	ring	Staging		Migratio	on	Large W	oody	
0		_				ŀ	Wide >50m		Moderate		Yes		Yes		No		









Large Woody Yes

General	Segmen	t Cla	issification
^		_	O T

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
3050	Rock	None	Low	Natural	Low	1%	99%	

Shore Type (%)						
Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
50	49			1		

Land Use								
Commercial	Forestry	Natural Area	Park	Recreation	Rural	Single Family	Industrial	Urban Park
		×						

Substrate(%) Organic Cobble Cobble/Coarse Mud Fines Sand Gravel/Fine Gravel/Cobble Cobble/Fine Boulder Marl Berdrock 20 25 45

Shoreline Vegetation Band1 Shoreline Vegetation Band2 Tree Cover (%) Bandwidth (m) Shrub Cover (%) Overhanging (%) Category Veteran Trees Wildlife Trees Category Stage Moderate 10-50 No Coniferous forest Mature forest Abundant >50 Coniferous forest Mature No

Aquatic Vegetation (%)

Aquatic vegetation Submergent Emergent Floating

20 100 Wide >50m High Yes No







General Segment Classification

Segment Leng	gth (m)	Shore Type	Sh	ore Type Modificatio	n	Slope	Lan	d Use	Level of I	mpact	Distur	bed		Natural		Class (Comment		
1699		Gravel	R	etaining Wall, Dock,	N	Moderate	Single	Family	High	n	100	%		0%		Silvert	on Creek		
Shore Type ((%)	1		^							· L		1						
Cliff/Bluf		Gravel Beac	h	Rocky Shore		Sand Bea	ach	Strean	n Mouth	1	Wetland		Other	S					
		85							15										
Land Use		I		· L	1									-					
Commerci	ial	Forestry		Natural Area		Park		Recre	ation		Rural		Single Fan	nily	Indus	strial	Urban	Park	
													Х						
Substrate(%	5)			l															
Marl	M	lud Org	anic	Fines	Sar	nd	Gravel/Fin	ie Gr	avel/Cobble	C	obble	Cobb	le/Fine	Cobble/Co	oarse	Boulder	Be	erdrock	
						10	0	50		30						10			
Shoreline Ve	getatio	n Band1		1		ı				-			Shoreline	Vegetation	n Band2	!			
Category		Stage		Shrub Cover (%)	T	ree Cover (9	%)	Bandwidth	h (m)	Overha	anging (%)		Category	y	S	tage	Vete	ran Trees	Wildlife Trees
Coniferous for	est	Young forest		Moderate 10-50	S	parse <10		50		0			Mixed fo	rest	S	parse	No		No
Aquatic Vege	etation(%)		1						Littora	I Zone								
Aquatic vegeta	ation	Submergent	E	mergent	Floating	J			Littoral Zone	e (m)	Juvenile Re	aring	Staging)	Migrat	ion	Large W	oody	
40		100						Ì	Wide >50m		High		Yest		Yes		No		







General Segment Classification Segment Length (m) Shore Type Modification Slope Land Use Disturbed Natural Class Comment Shore Type Level of Impact 3161 Gravel Dock, Groyne Low Natural Medium 10% 90% Shore Type (%)
Cliff/Bluff Gravel Beach Rocky Shore Sand Beach Stream Mouth Wetland Others 99 Land Use Natural Area Park Single Family Commercial Forestry Recreation Rural Industrial Urban Park Substrate(%) Cobble Marl Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock 15 15 25 Shoreline Vegetation Band1 **Shoreline Vegetation Band2** Bandwidth (m) Stage Shrub Cover (%) Tree Cover (%) Overhanging (%) Veteran Trees Wildlife Trees Category Stage Category Coniferous forest Young forest Moderate 10-50 Abundant >50 Coniferous forest Mature No No Littoral Zone Aquatic Vegetation(%) Aquatic vegetation Submergent Emergent Floating Littoral Zone (m) Juvenile Rearing Staging Migration Large Woody

Wide >50m

Moderate



Yes

No

No





General Segment Classification

Ochici di O	eginent oic	1331116ation							
Segment L	ength (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
25	19	Rock	Retaining Wall, Dock,	Low	Single Family	High	70%	30%	Carpenter Creek

Shore Type (%)						
Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
	50		40	10		

-	Lanu Use								
	Commercial	Forestry	Natural Area	Park	Recreation	Rural	Single Family	Industrial	Urban Park
							Х		

Substrate(%)										
Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
					20	20	30			30	

					20	20	30			30	
Shoreline Vege	etation Band1							Shoreline	Vegetation Ban	d2	
Category	Stage		Shrub Cover (%)	Tree Cov	er (%)	Bandwidth (m)	Overhanging (%)	Category	1	Stage	
Coniferous fores	t Mature f	orest	Moderate 10-50	Moderate	10-50	50	0	Conifero	us forest	Sparse	Ì

Aquatic Vegetation	n(%)		•	Littora	al Zone		•
Aquatic vegetation	Submergent	Emergent	Floating	Littoral Zone (m)	Juvenile Rearing	Staging	Migration
5	70	30		Wide >50m	High	Yes	Yes



Veteran Trees

Large Woody

Wildlife Trees

No





General Segment Classification

Segment Length (n) Shor	е Туре	Shore	Type Modification	n Slop	ое	Land Use	Level of	Impact	Dist	urbed	Natura	'	Class Co	mment
4522	R	ock	Ret	aining Wall, Trail	Lov	W	Natural	Lo	N	1	1%	99%			
Shore Type (%)	u u					· ·							· ·		
Cliff/Bluff	Gr	avel Beacl	h	Rocky Shore	S	and Beach	1 5	Stream Mouth	٧	Vetland		Others			
10		35		54				1							
Land Use	1				W.						· ·				
Commercial		Forestry		Natural Area		Park		Recreation	F	Rural	Sing	gle Family	Indu	ıstrial	Urban Park
				х											
Substrate(%)	•				•						•		•		
Marl	Mud	Orga	anic	Fines	Sand	Gr	avel/Fine	Gravel/Cobble	Co	obble	Cobble/Fi	ine Cob	ble/Coarse	Boulder	Berdrock
						20		15	35					20	10

 Shoreline Vegetation Band1

 Category
 Stage
 Shrub Cover (%)
 Tree Cover (%)
 Bandwidth (m)
 Overhanging (%)

 Coniferous forest
 Mature forest
 Moderate 10-50
 Abundant >50
 50
 0

 Shoreline Vegetation Band2

 Category
 Stage
 Veteran Trees
 Wildlife Trees

 Coniferous forest
 Mature
 No
 Yes

Aquatic Vegetation (%)
Aquatic vegetation Submergent Emergent Floating
2 100

Littora	al Zone			
Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
Wide >50m	Moderate	Yes	No	No







Segment Length (n) Shore Type	Sh	ore Type Modification	on Slope	La	nd Use	Level of	Impact	Disturb	ed		Natural		Class Co	omment	
239	Gravel		None	Low	In	dustrial	Hig	h	90%			10%				
Shore Type (%)	11								1				-			
Cliff/Bluff	Gravel Bea	ch	Rocky Shore	Sar	d Beach	Stream	m Mouth	'	Vetland		Others	S				
	100															
Land Use																
Commercial	Forestry		Natural Area		Park	Recre	eation	-	Rural	5	Single Fam	ily	Indus	strial	Urban Park	
													Х			
Substrate(%)			1			ı										
Marl	Mud O	ganic	Fines	Sand	Gravel/F	ine G	ravel/Cobble	С	obble	Cobbl	e/Fine	Cobble/Co	oarse	Boulder	Berdrock	
			10		35	33		20						2		
Shoreline Vegeta	ion Band1			l.	ı	11				5	Shoreline	Vegetation	Band2			
Category	Stage		Shrub Cover (%)	Tree Co	ver (%)	Bandwidt	th (m)	Overha	nging (%)		Category	1	9	stage	Veteran Trees	Wildlife
Coniferous forest	Young forest		Sparse < 10	Sparse ·	<10	50		0		1 1	Conifero	us forest	١	oung	No	No
Aquatic Vegetatio	n(%)		•	•				Littora	Zone							L
Aquatic vegetation	Submergent	E	mergent	Floating			Littoral Zon	ie (m)	Juvenile Rear	ring	Staging		Migra	tion	Large Woody	
10	100						Wide >50m	1	Low		Nο		Nο		No.	









General Segment Classification

ocherui ocginent olu	Janication							
Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
246	Gravel	Retaining Wall	Low	Industrial	High	100%	0%	

Shore Type (%)						
Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
	100					

Land Use								
Commercial	Forestry	Natural Area	Park	Recreation	Rural	Single Family	Industrial	Urban Park
							Х	

Substrate(%) Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock

90 Shoreline Vegetation Band1
Category Stage Shoreline Vegetation Band2

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)	Category	Stage	Veteran Trees	Wildlife Trees
Herb/Grass	Herb/Grass	Sparse <10	Sparse <10	50	0	None	None	No	No

Aquatic vegetation	n (%)			Littora	i Zone			
Aquatic vegetation	Submergent	Emergent	Floating	Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
20	100			NA	Low	No	No	Yes









General Segment	Classification																
Segment Length (m) Shore Typ	pe SI	hore Type Modification	n Slope	Lan	d Use	Level of I	mpact	Distur	bed		Natural		Class C	Comment		
721	Gravel	-	Retaining Wall, Dock,	Low	Single	Family	High	1	1009	%		0%					
Shore Type (%)	u .		•														
Cliff/Bluff	Gravel	Beach	Rocky Shore	Sand	Beach	Stream	Mouth	V	Vetland		Other	S					
	10	0															
Land Use					,												
Commercial	Fores	stry	Natural Area	Pa	rk	Recrea	ation	F	Rural	S	Single Fan	nily	Indus	strial	Urban	Park	
											х						
Substrate(%)			•		•		•			•		•					
Marl	Mud	Organic	Fines	Sand	Gravel/Fir	ne Gra	avel/Cobble	C	obble	Cobble	e/Fine	Cobble/Co	arse	Boulder	Ве	rdrock	
			20		25	25		20						10			
Shoreline Vegetat	ion Band1			Į.							Shoreline	e Vegetation	Band2	2	ı		
Category	Stage		Shrub Cover (%)	Tree Cove	er (%)	Bandwidth	(m)	Overha	nging (%)		Categor	У	S	tage	Veter	ran Trees	Wildlife Tree
Herb/Grass	Grass/herb	ı	Moderate 10-50	Sparse <1	10	50		0			Conifero	us forest	N	Mature	No		No
Aquatic Vegetatio	n(%)		1	1				Littoral	Zone				ı.				-
Aquatic vegetation	Submergent		Emergent	Floating			Littoral Zone	e (m)	Juvenile Rea	aring	Stagin	9	Migrat	ion	Large We	oody	
25	100					-	Wide >50m		Moderate		Voc		No		No.		









Segment Length (m	n) Shore	е Туре	Shore Type Modification	on Slop	e L	and Use	Level of Ir	mpact	Disturbed	t	Natural		Class C	omment	
522	Stre	eam	Dock	Lov	1	Park	None	9	0%		100%		Wilson	n Creek	
Shore Type (%)	ı				L.							ı		- I	
Cliff/Bluff	Grav	vel Beach	Rocky Shore	Sa	nd Beach	Stre	am Mouth	W	/etland	Ot	ners				
							100								
Land Use	I		L												
Commercial	Fo	orestry	Natural Area		Park	Rec	creation	R	ural	Single I	amily	Ind	ustrial	Urban Park	
					Х										
Substrate(%)	I			1											
Substrate(%) Marl	Mud	Organ	ic Fines	Sand	Gravel	Fine	Gravel/Cobble	Со	obble C	obble/Fine	Cobble/	'Coarse	Boulder	Berdrock	
	Mud	Organ	ic Fines	Sand	Gravel/		Gravel/Cobble	Co	obble C	cobble/Fine	Cobble/	'Coarse	Boulder 10	Berdrock	
Marl		Organ		Sand					obble C		Cobble/		10	Berdrock	
Marl Shoreline Vegeta		Organ					20	40	obble C		ne Vegetation		10	Berdrock Veteran Trees	Wildlife Tro
Marl Shoreline Vegeta	tion Band1		10		20 over (%)	2	20	40		Shorel Cate	ne Vegetation		10		Wildlife Tro
Marl Shoreline Vegeta Category Coniferous forest	tion Band1 Stage Mature		10 Shrub Cover (%)	Tree C	20 over (%)	2 Bandwi	20	40 Overhar	nging (%)	Shorel Cate	ne Vegetatio		10 I2 Stage	Veteran Trees	
Substrate(%) Marl Shoreline Vegeta Category Coniferous forest Aquatic Vegetation	tion Band1 Stage Mature	forest	10 Shrub Cover (%)	Tree C	20 over (%)	2 Bandwi	20	40 Overhar 0 Littoral	nging (%)	Shorel Cated	ne Vegetation	on Band	10 I2 Stage	Veteran Trees	









Segment Length (m)	Shore Type	Shore Type Modif	cation	Slope	Land	d Use Le	evel of Impact	Disturb	oed	Natur	al	Class C	Comment	
316	Gravel	Retaining Wall, Do	k, Trail	Moderate	Pa	ark	High	70%	ò	30%				
Shore Type (%)	1					L		1		1				
Cliff/Bluff	Gravel Beac	n Rocky S	nore	Sand B	each	Stream Mout	th	Wetland		Others				
	100													
Land Use		I					I		-,					
Commercial	Forestry	Natural	rea	Park	(Recreation		Rural	Sin	igle Family	In	dustrial	Urban Park	
				Х										
Substrate(%)			I		J.						- 1	·	-	
Marl N	ud Org	anic Fines	5	Sand	Gravel/Fin	ne Gravel/C	Cobblo (alala a	Cobble/I	Eino Co	oble/Coarse	Boulder	Berdrock	
						0.0.00	CODDIC	Cobble	CODDIE/I	rine Co	obie/Coaise	boulder	Derdrock	
		20			20	20	20	obbie	Copple/i	rille Col	obie/Coaise	20	Derdrock	
Shoreline Vegetatio	n Band1	20			20			ODDIE		oreline Vege		20	Beruroek	
	n Band1 Stage	20 Shrub Cover	(%)	Tree Cover			20	anging (%)	Sh			20	Veteran Trees	Wildlife Trees
Shoreline Vegetatio Category Coniferous forest			` '	l	(%)	20	20		Sh	oreline Vege		20 d2		Wildlife Trees
Category	Stage Young forest	Shrub Cover	` '	Tree Cover	(%)	20 Bandwidth (m)	20 Overh	anging (%)	Sh	oreline Vege		20 d2 Stage	Veteran Trees	
Category Coniferous forest Aquatic Vegetation	Stage Young forest	Shrub Cover	` '	Tree Cover Moderate 1	(%)	20 Bandwidth (m) 50	20 Overh.	anging (%)	Sh (oreline Vege	tation Ban	20 d2 Stage	Veteran Trees	









General Segment Classification

Contorui Coginioni Ciu								
Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
7317	Rock	Retaining Wall, Trail	Moderate	Natural	None	0%	100%	

Shore Type (%)						
Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
		99		1		

Land Use								
Commercial	Forestry	Natural Area	Park	Recreation	Rural	Single Family	Industrial	Urban Park
		Х						

Substrate(%)										
Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
					3	2	10			85	

Shoreline Ve	getation Band1							Shoreline	Vegetation Band	2		
					3	2	10			85		1
Widir	IVIGG	Organic	111103	Juliu	Graventine	Gravely Gobble	CODDIC	CODDIC/T IIIC	CODDIC/ COURSE	Doulder	Derarock	ı

Agustic Vogetation	(0/)	_	•		Litteral Zene			_			
Coniferous forest	Young forest	Moderate 10-50	Abundant >50	50	0	Coniferous forest	Mature		No	No	
Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)	Category	Stage		Veteran Trees	Wildlife Trees	

Aquatic vegetation	1 (70)			Littoral Zone					
Aquatic vegetation	Submergent	Emergent	Floating	Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody	
2	100			Narrow	Low	No	No	No	









General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modifica	ation S	lope	Land Use	Level of I	mpact	Disturbe	ed	Na	ural		Class Co	omment	
873	Stream	Trail	l	Low	Natural	Low	/	5%		9!	5%		Bonanza	a Creek	
Shore Type (%)			1					ı		1					
Cliff/Bluff	Gravel Beach	Rocky Sho	re	Sand Beach	Str	ream Mouth	V	Vetland		Others					
	50					50									
Land Use	· ·	l .			1				1						
Commercial	Forestry	Natural Are	ea	Park	Re	ecreation	F	Rural	Si	ingle Family		Industrial		Urban Park	
		х													
Substrate(%)		•	•		•									-	
Marl 1	Mud Orga	nic Fines	Sand	Gra	avel/Fine	Gravel/Cobble	C	obble	Cobble	/Fine	Cobble/Coa	irse B	oulder	Berdrock	
				90		9						1			
Shoreline Vegetation	on Band1	l .	1						S	horeline V	egetation	Band2		1	
Category	Stage	Shrub Cover (%) Tree	e Cover (%)	Bandv	vidth (m)	Overha	nging (%)		Category		Stage		Veteran Trees	Wildlife Trees
Coniferous forest	Mature forest	Abundant >50	Abu	ındant >50	50		0		1	Coniferous	forest	Mature		No	Yes
Aquatic Vegetation	(%)		1			<u>u</u>	Littoral	Zone				1			
Aquatic vegetation	Submergent	Emergent	Floating			Littoral Zon	e (m)	Juvenile Rear	ing	Staging		Migration		Large Woody	
50	100					Wide >50m		High		Yes		Yes		No	







Segment Length (n) Sh	nore Type	Shore	Type Modification	n Slope	Lan	d Use	Level of I	mpact	Disturb	oed		Natural		Class C	omment	
493		Sand	Ret	aining Wall, Dock	Moderat	e Single	Family	High	1	1009	%		0%				
Shore Type (%)	ı							1		1		ı					1
Cliff/Bluff		Gravel Beach	1	Rocky Shore	Sand	d Beach	Stream	n Mouth	V	Vetland		Others	i				
						100											
Land Use																	-
Commercial		Forestry		Natural Area	P	ark	Recrea	ation	F	Rural	,	Single Fam	ily	Indu	strial	Urban Park	
												Х					
Substrate(%)	· ·							1							•		_
Marl	Mud	Orga	anic	Fines	Sand	Gravel/Fin	ne Gra	avel/Cobble	Co	obble	Cobbl	e/Fine	Cobble/Co	arse	Boulder	Berdrock	
					100												
Shoreline Vegeta	tion Ban	nd1								<u> </u>		Shoreline	Vegetation	Banda	2		4
Category	Stag	ge		Shrub Cover (%)	Tree Cov	er (%)	Bandwidth	n (m)	Overha	nging (%)		Category		5	Stage	Veteran Trees	Wildlife Tre
Herb/Grass	Herl	b/Grass		Sparse <10	Sparse <	10	50		0		7	Landscap	ed	5	Sparse	No	No
Aquatic Vegetati	on(%)		- 1		L	I		I	Littoral	Zone						<u> </u>	L .
Aquatic vegetation	Subme	ergent	Eme	ergent	Floating			Littoral Zone	e (m)	Juvenile Rea	ring	Staging		Migra	tion	Large Woody	1
100	85		15				1	Wide >50m		High		Yes		Yes		No	1







General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
3426	Rock	Retaining Wall, Dock,	Steep	Natural	None	0%	100%	

Shore Type (%)						
Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
		95	4	1		

Land Use								
Commercial	Forestry	Natural Area	Park	Recreation	Rural	Single Family	Industrial	Urban Park
		Х						

Substrate(%	5)										
Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
				5	5	3	10			60	15

Shoreline Veg	getation Band1							Shoreline	Vegetation Band2	2	
				5	5	3	10			60	15
IVIGIT	Wida	Organic	111103	Suriu	Gravel/Tille	Gravely Gobble	OODDIC	OODDIC/TITIC	CODDIC/ COURSE	Dodiaci	Derarock

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)
Coniferous forest	Mature forest	Moderate 10-50	Abundant >50	50	0

oreline Vegetation Ban	d2		
Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	No	Yes

Aquatic Vegetation (%)
Aquatic vegetation Subm Submergent Emergent Floating 100

Littora	i Zone			
Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
Narrow	High	Yes	Yes	No









Wildlife Trees

General Segment Classification

General Segment Gla	33IIICation								_
Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment	
2216	Gravel	Dock	Moderate	Natural	None	0%	100%	Shannon Creek	1

Shore Type (%)						
Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
	79	20		1		

Land Use								
Commercial	Forestry	Natural Area	Park	Recreation	Rural	Single Family	Industrial	Urban Park
		Х						

Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
				15		35	35			10	5
Shoreline Ve	getation Band1							Shoreline	Vegetation Band2	!	

Aquatic Vegetation	(%)		<u> </u>		Littoral Zone				-
Coniferous forest	Mature forest	Moderate 10-50	Abundant >50	50	0	Coniferous forest	Mature	No	i
Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)	Category	Stage	Veteran Trees	ı

Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating	Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
60	100			Wide >50m	High	Yes	Yes	No







General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
4327	Rock	Dock	Steep	Natural	None	0%	100%	

Snore Type (%)						
Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
		99		1		

	Land Use								
	Commercial	Forestry	Natural Area	Park	Recreation	Rural	Single Family	Industrial	Urban Park
ĺ			Х						

	Substrate(%	.)										
	Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
ſ							5	5			60	30

Shoreline Vegetatio	Shoreline Vegetation Band1									
Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)					
Coniferous forest	Mature forest	Moderate 10-50	Abundant >50	50	0					

Shoreline Vegetation Band2					
Category	Stage				
Coniferous forest	Mature				

Veteran Trees	Wildlife Trees
No	No

Aquatic Vegetation (%)										
Aquatic vegetation	Submergent	Emergent	Floating							
3	100									

Littoral Zone									
Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody					
Wide >50m	Moderate	Yes	No	No					







Segment Length	n (m)	Shore Type	SI	hore Type Modificat	ion	Slope	Lar	nd Use	Level of	Impact	Distur	rbed		Natural		Class C	Comment		
1256		Cliff/Bluff		None		Steep	Na	ntural	Nor	ne	09	0%		100%	Wragge		ge Creek	Creek	
Shore Type (%	6)	u .																	
Cliff/Bluff		Gravel Be	ach	Rocky Shore	;	Sand	Beach	Strear	m Mouth	'	Wetland		Others	S					
100																			
and Use		l.																	
Commercial		Forestry		Natural Area		Par	·k	Recre	eation	I	Rural	5	Single Fam	ily	Indu	strial	Urban	Park	
				х															
Substrate(%)				1			1					11						-	
Marl	Mı	lud O	ganic	Fines	,	Sand	Gravel/Fi	ne G	ravel/Cobble	С	obble	Cobble	e/Fine	Cobble/C	oarse	Boulder	Ве	rdrock	
							5	5								10	80		
Shoreline Vege	etatior	n Band1		1	1	I		ı			I		Shoreline	Vegetatio	n Band	2			
Category		Stage		Shrub Cover (%)	Tree Cove	r (%)	Bandwidt	h (m)	Overha	anging (%)		Category	'	,	Stage	Vete	ran Trees	Wildlife T
Coniferous fores	it	Mature forest		Moderate 10-50		Abundant	>50	50		0			Conifero	us forest	1	Mature	No		No
Aquatic Veget	ation ((%)		•						Littora	I Zone				1				
Aquatic vegetati	on S	Submergent	E	Emergent	Floati	ng			Littoral Zon	ie (m)	Juvenile Re	aring	Staging		Migra	tion	Large We	oody	
	_								Mido > E0m	,	Low		Voc		Voc		No.		







General Segment Classification Segment Length (m) Shore Type Modification Level of Impact Disturbed Class Comment Shore Type Slope Land Use Natural 22964 Rock Dock, Groyne Moderate Natural Low 1% 99% Shore Type (%) Cliff/Bluff Gravel Beach Rocky Shore Sand Beach Stream Mouth Wetland Others 10 Land Use Natural Area Park Single Family Commercial Forestry Recreation Rural Industrial Urban Park Х Substrate(%) Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble Cobble/Fine Cobble/Coarse Boulder Berdrock 43 50 Shoreline Vegetation Band2 Shoreline Vegetation Band1 Overhanging (%) Category Shrub Cover (%) Tree Cover (%) Bandwidth (m) Category Stage Veteran Trees Wildlife Trees Coniferous forest Mature forest Moderate 10-50 Abundant >50 50 0 Coniferous forest Mature No No Littoral Zone Aquatic Vegetation (%)

Littoral Zone (m)

Wide >50m

Juvenile Rearing

Moderate



Submergent

Emergent

5

Floating

Aquatic vegetation

10

Staging

Yes

Migration

Yes

Large Woody

No





General Segment Classification
Segment Length (m) Shore Type

Segment Length (m	Snore Type	Sr	nore Type Modificati	on	Siope	Lan	id Use	Level of	Impact	Distu	irbea		Naturai		Class C	Comme	nt	
6567	Cliff/Bluff	R	etaining Wall, Groyi	ne	Moderate	Na	ntural	Lov	W	1'	%		99%					
Shore Type (%)	II					-		1				-						
Cliff/Bluff	Gravel Be	ach	Rocky Shore	!	Sand Be	each	Stream	n Mouth	\	Vetland		Othe	rs					
99								1										
Land Use						I					·							
Commercial	Forestry	'	Natural Area		Park		Recrea	ation	F	Rural	5	Single Fa	mily	Ind	ustrial	Ur	ban Park	
			х															
Substrate(%)	10		II.			ı		J.			-		ı					
Marl	Mud O	rganic	Fines		Sand	Gravel/Fin	ie Gr	avel/Cobble	С	obble	Cobble	e/Fine	Cobble/C	oarse	Boulder		Berdrock	
				2											40	5	8	
Shoreline Vegetat	ion Band1		I.								:	Shorelin	e Vegetatio	n Ban	12			
Category	Stage		Shrub Cover (%))	Tree Cover ((%)	Bandwidth	n (m)	Overha	nging (%)		Catego	ry		Stage	١	/eteran Trees	Wildlife Tr
Coniferous forest	Mature forest		Sparse <10		Abundant >	50	50		0		T i	Conifer	ous forest		Mature	1	Vo	No
Aquatic Vegetatio	n(%)		1		1	Į.			Littoral	Zone						<u> </u>		
Aquatic vegetation	Submergent	Е	Emergent	Float	ting			Littoral Zon	e (m)	Juvenile Re	aring	Stagir	ıg	Migi	ation	Larg	e Woody	

Wide >50m

Moderate



Yes







General Segment Classification

5	Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
	711	Stream	Retaining Wall, Groyne	Moderate	Natural,Single Family	High	45%	55%	

Shore Type (%) Cliff/Bluff Gravel Beach Rocky Shore Sand Beach Stream Mouth Wetland Others 40 60

Land Use Commercial Forestry Natural Area Park Recreation Rural Single Family Industrial Urban Park

Substrate(%) Marl Mud Organic Fines Sand Gravel/Fine Gravel/Cobble Cobble

Cobble/Coarse Cobble/Fine Boulder Berdrock 55 30

Shoreline Vegetation Band1 Category Shrub Cover (%) Tree Cover (%) Bandwidth (m) Overhanging (%) Coniferous forest Mature forest Moderate 10-50 50 0 Sparse <10

Shoreline Vegetation Band2 Veteran Trees Category Stage Coniferous forest Mature No

Wildlife Trees No

Aquatic Vegetation(%) Aquatic vegetation Submergent Emergent Floating 30 65 35

Littoral Zone Juvenile Rearing Migration Littoral Zone (m) Staging Large Woody Wide >50m High Yes Yes No



CREEK ASSESSMENTS

Silverton, Carpenter and Wilson Creeks, located in the most urbanized sections of the Slocan Lake foreshore, have had their downstream sections channelized in the past. These creeks have undergone multiple modifications in the past, including acting as conduits for storm water, extensive riparian clearing and bank stabilization and straightening of their channels to reduce flooding within the towns. However, these streams have sufficient flow and still contain fish and spawning habitat for species like kokanee, rainbow trout and bull trout and likely for fish species such as sculpins and suckers. Whatever their present condition, there remains potential for improvement of fish habitat in all these creeks.

Large streams, such as Silverton, Carpenter, Wilson, Bonanza, Shannon, Wragge, Wee Sandy and Evans creeks, contain the majority of critical habitat for most fish species using riverine habitats in their life cycle (e.g., rainbow trout, westslope cutthroat trout, bull trout, kokanee). Except for Silverton Creek, the lower reaches of these streams are in most part in good condition. Silverton Creek has been influenced by urbanisation, most of its riparian vegetation was removed and replaced by lawns or by zones of exposed soil.

Most of the creeks around Slocan Lake are not likely fish bearing due to natural barriers created by the high gradients on their lower reaches. The lower reaches of the larger creeks such as Enterprise, Evans, Wee Sandy and Silverton may be accessible to fish but high gradients quickly act as fish barriers in the upstream sections. Some of these creeks however are known to support a resident fish population. Many years ago, the headwaters of creeks such as Enterprise, Silverton, Carpenter and Shannon were stocked with fish by local prospectors and trappers. Wilson and Bonanza are the only Slocan Lake tributaries with no known fish barrier in their lower reaches.

Although located in a highly developed area, the Slocan Lake outlet (Segment 1) offers excellent spawning grounds within the margins of the lake outflow. The site has long outwash gravel bars with half-embedded boulders. During the survey, most fish observed were within the tailout of the lake outlet. Fish species of all stages were observed using the area, including schools of YOY and juvenile fish.



Bonanza Marsh Overview Assessment

Bonanza Creek runs through this wetland. The dense shrub vegetation within the marsh and along the riparian area of the creek provides excellent overhanging cover for fish. Mountain whitefish (Derosa, pers. comm. 2008) and sculpins spp. (Kokanee 1997) are known to utilize the complex wetland channel system. Birds are particularly abundant in the marsh, due to the availability of food and the diversity of habitats for nesting and rearing. The tall grasses of the marsh provide nesting habitat for duck and goose species while several older stands of cottonwood and western red cedar offer potential nesting habitat for raptors and for cavity nesters like wood ducks and pileated woodpeckers and for the blue-listed blue heron.

Various species of reptiles and amphibians are also present in Bonanza Marsh (Kokanee 1997). Juvenile pacific tree frogs (Hyla regilla) are known to inhabit the shrub vegetation of the marsh (Kokanee 1997). The shrub vegetation also provides a rich and diverse habitat, which many mammals use for cover and as migration corridors. Signs of bears and ungulates such as, deer and elk were observed throughout the area. The marsh has a series of stagnant pools and several side channels showing evidence of beaver activity, further increasing the complexity of the habitat (Kokanee 1997, Gebhart 2000).



APPENDIX C:

Fish & Wildlife Results



Table 1: Wildlife Observations and Habitat Quality

Segment #	Species Observed	Location	Wildlife Signs	Habitat Quality
1 Slocan			-deer browse on foreshore	RATED POOR: -segment located within town boundary, segment highly utilized by pedestrians and as a public beach -most shrub vegetation removed -some avian habitat but poor potential habitat for mammals, reptiles & amphibians
2 Slocan				RATED POOR: -segment located within the town boundary & industrial zone -no riparian area, highly disturbed foreshore -presence of 2 creek mouths within industrial foreshore
3	2 American krestrels 1 common flicker 3 common mergansers 2 hawks (spp.)	In tunnel & cliff Feeding on moths outside tunnel Within littoral zone Perched in riparian area		RATED MODERATE: -some riparian area within the northern section of segment -log boom along littoral -abandoned tunnel offers nesting potential for avian species
4			-5 wildlife trees -3 veteran trees	RATED EXCELLENT: -highly diversified riparian & upland areas -dense mature forest with veteran & wildlife trees -nesting potential for avian species
5	1 bald eagle	Perched in a veteran tree	-1 wildlife tree -1 veteran tree	RATED EXCELLENT: -highly diversified riparian & upland areas -dense mature forest with veteran & wildlife trees -nesting potential for avian species
6	1 black bear 2 ospreys	In riparian area Perched in riparian area	-bear & deer scats	RATED MODERATE: -although the riparian and upland forest offer good wildlife habitat, human disturbance from the proximity of the cottages must impact wildlife habitat
7			-3 wildlife trees -1 veteran tree	RATED MODERATE: -although the riparian and upland forest offer good wildlife habitat, human disturbance from the proximity of the cottages must impact wildlife
8	1 osprey 2 mergansers 3 Barrow' goldeneyes 4 bald eagles	Within riparian area Within littoral Within littoral Perched on veteran tree within riparian area	-6 wildlife trees -6 veteran trees	RATED MODERATE: -habitat wildlife habitat diversity but access difficult due to high bank gradient good wildlife habitat diversity but access difficult due to high bank gradient -dense shrub undercover offers potential habitat for small mammals -presence of seepages & outcrop faces offer habitat for amphibians & small mammals -presence of a commercial wharf



Segment #	Species Observed	Location	Wildlife Signs	Habitat Quality
9	1 white-tailed deer	Within riparian area	-7 wildlife trees -4 veteran trees -several deer trails -several deer browses -1 bear tree with claw marks & fur	RATED EXCELLENT: -vegetated shore offers feeding grounds for mammals -avian & small mammals habitat potential within the veteran & wildlife trees -dense riparian & upland forest
			-bear scat	-seepages, bedrock & boulders within riparian offer suitable habitat for reptiles & amphibians
10 Silverton	3 common mergansers 2 gull spp. 2 Canada goose	Within littoral zone At the creek's mouth Within the littoral zone		RATED POOR: -some foreshore modifications & thin riparian area -segment located within the village of Silverton
	3 common ravens 2 common mergansers	Within the littoral zone Within the riparian area Within the littoral zone		-public beach -pedestrian trails within the segment
	1 American dipper 1 mallard	On a rock, within the creek Along foreshore		-thin riparian vegetation along the creek -creek mouth offers good feeding habitat for fish-eating bird & mammal species -poor nesting potential
11			bear scat	RATED MODERATE: -riparian & upland forest offer potential avian habitat -some undercover removal with poor habitat potential for small mammals -mixed forest with suitable undercover for small mammals -footprint of a campsite area
12 New Denver	5 red squirrels 5 cedar waxings	In mature stands in public campground In mature stands within riparian area	-beaver browses & tracks each side of creek & within lake foreshore -deer browses within riparian area	RATED POOR: -segment located within town boundary -segment highly disturbed by a public marina, parking lot & housing -small pedestrian trails & Galena Trail within riparian area -2 groynes
13	5 red squirrels	Within riparian area	-several deer tracks & 5 deer scats within riparian & on Galena Trail -deer browses in riparian undercover -6 bear scats within riparian & Galena Trail	RATED EXCELLENT: -mature forest & shrub layer offer habitat to small & large mammals -abundance of berry bushes along the shore -several windfall trees offer habitat to small mammals -riparian has no modifications
14 Rosebery			-several bear scats & deer tracks on Galena Trail	RATED POOR: -some mature trees but industrial activities (log boom & staging area) & highway at proximity -outcrop slope mixed with second growth stands offer some reptile habitat
15 Rosebery				RATED POOR: -massive industrial retaining wall -modified foreshore -log boom staging covers all segment -no riparian vegetation



Segment #	Species Observed	Location	Wildlife Signs	Habitat Quality
16 Rosebery				RATED POOR: -segment located within housing area & boat launch -presence of several groynes -lawn replacing riparian vegetation
17 Rosebery			-several coyote, deer and beaver tracks within foreshore & gravel bars -several deer & beaver browses within foreshore	RATED MODERATE: -riparian all removed on creek left bank & foreshore -suitable mammal habitat in Rosebery Parkland
18 Rosebery	1 bald eagle	Perched in a veteran tree	-2 veteran trees -1 bald eagle nest in mature cottonwood within riparian -deer & beaver browses within riparian	RATED MODERATE: -most of Rosebery Parkland includes in segment -large portion of undercover shrubs -portion of riparian disturbed by highway's footprint -potential for avian habitat within the Parkland where mature stands, veteran trees & shrubs may act as nesting area
19	2 western toads 1 river otter 1 pileated woodpecker 1 common raven	On foreshore On foreshore Within riparian Within riparian	-10 veteran trees -2 wildlife trees -bear & deer tracks on Galena Trail	RATED EXCELLENT: -potential for wildlife habitat within riparian -good reptile habitat within seepage zones & angular rocks (blasted rocks from highway construction) along the Galena Trail shoulders -mature forest extends approx. 60m upland with several veteran trees -thick layer of shrubs offers excellent browsing for ungulates & habitat for perching
20 Hills	10 cedar waxings 2 dark-eyed juncos 2 bald eagles 5 gull (spp.) 2 bald eagle 1 eagle (spp.) 3 eared grebe 1 sandpiper (spp.) 7 common raven 4 American crows 9 common mergansers 7 mallards 1 killdeer 1 mink	Within creek's riparian Within creek's riparian Along creek bank Within littoral Within riparian On braided outlet Within riparian Within riparian Within littoral Within littoral On braided outlet On creek's bank	-several veteran & wildlife trees within Bonanza Marsh -abundant songbird species nests -3 eagle nests (spp.) in mature trees -3 beaver dams on Bonanza Creek -several bear tracks - abundant bear, coyote & beaver tracks on foreshore -abundant beaver browses -4 bear scats on foreshore	RATED EXCELLENT: -segment entirely located within Bonanza Marsh -complex wetland system with abundant shrub species -abundant berry shrubs -excellent avian & mammal habitats although segment surrounded by private lands & highly utilized as a fishing area & public beach -excellent reptile & amphibian habitat -good feeding habitat for raptor & duck species -excellent nesting habitat for raptors (veteran & mature trees) -wetland & fish bearing Bonanza Creek offer excellent weasel, mink & river otter habitat -plenty of woodpecker habitat within beaver ponds (hollow trees)
21 Hills	26 Canada geese	Within foreshore area, on private lands & docks		RATED POOR: -segment highly disturbed by vegetation removal, housing & human activities
22	1 black-capped chickadee	Within riparian	-4 wildlife trees -hundreds of deer tracks & browsed patches within riparian	RATED EXCELLENT: -forest of mature stands up to the high water mark -excellent overhanging vegetation -highly diversified vegetation -excellent mammal & avian habitat



Segment #	Species Observed	Location	Wildlife Signs	Habitat Quality
23	2 American crows	In riparian	-hundreds of deer tracks & browse	RATED EXCELLENT:
	2 bald eagles		patches within riparian	-forest of mature stands up to the high water mark
	2 Barrow's goldeneyes		7 wildlife trees	-excellent overhanging vegetation
	1 eagle (spp.)		-7 veteran trees	-highly diversified vegetation
	3 (11 /		-several deer tracks & browses within	-excellent mammal & avian habitat
			riparian	-excellent riparian vegetation with thick undercover layer
				-presence of several seepage grounds offering herptile habitat
				-good nesting habitat & browsing vegetation
24	4 gull (spp.)	In littoral zone & riparian		RATED EXCELLENT:
	1 hawk (spp.)			-excellent mammal & avian habitat
				-excellent riparian vegetation with thick undercover layer
				-presence of several seepage grounds offering herptile habitat
				-good nesting habitat & browsing vegetation
				-presence of rocky islands with minimal vegetation (2 shrubs)
25	1 salamnder (spp.)	On rocky outcrop on foreshore	-7 wildlife trees	RATED EXCELLENT:
	1 common Gartner snake	In shale formation on foreshore	-12 veteran trees	-forest of mature stands up to the high water mark
	2 Barrow's goldeneyes	In riparian	1	-good overhanging vegetation
		·		-shale formations & angular rocks offer excellent habitat for herptiles
				and small mammals
				-presence of several seepage grounds offering herptile habitat
26			-abundant wildlife & veteran trees	RATED EXCELLENT:
Valhalla Park			-abundant raptor and passerine nests	-forest of mature stands up to the high water mark
				-good overhanging vegetation
				-shale formations & angular rocks offer excellent habitat for herptiles
				and small mammals
				-presence of several seepage grounds offering herptile habitat
				-excellent nesting & browsing habitat
27			-abundant wildlife & veteran trees	RATED EXCELLENT:
Valhalla Park			-abundant raptor and passerine nests	-forest of mature stands up to the high water mark
				-good overhanging vegetation
				-shale formations & angular rocks offer excellent habitat for herptiles
				and small mammals
				-presence of several seepage grounds offering herptile habitat
	1.0	1		-excellent nesting & browsing habitat
28	10 cedar waxings	In riparian	-5 perching bird nests	RATED EXCELLENT:
	5 dark-eyed juncos	4	-several deer tracks & browses within	-although riparian & upland areas have some disturbances
	1 common flicker		riparian	(cottages, trails), segment has excellent attributes for wildlife habitat



Table 2: Fish observations & general fish habitat

Segment #	Sampling					Fish S	pecies O	bserved					General Observations
	technique	BB	С	КО	CSU	MW	NSC	RB	RSC	CC	CCG	CRH	
1 Slocan	VO, UC, SK				32	87	3	3	100		4		HIGH FISH QUALITY HABITAT: -High quality fish habitat for all stages & species -Abundant habitat & available spawning substrate -Except for RSC, most species associated with littoral edge
2 Slocan	VO, UC, SK												HIGH FISH QUALITY HABITAT: -Presence of a log boom & segment highly modified with disturbed shoreline -2 creek mouths
3	VO, UC												LOW FISH QUALITY HABITAT: -SK was impossible due to a large log boom
4	VO, UC, SK												LOW FISH QUALITY HABITAT: -steep littoral
5	VO, UC, SK					23			150	3			LOW FISH QUALITY HABITAT: -RSC & MW found in boulder habitat associated with littoral edge -CC found in shallow cobbles -Uniform substrate, poor fish cover
6	VO, UC, SK												LOW FISH QUALITY HABITAT: -steep littoral, poor fish cover
7	VO, UC, SK					4				4			LOW FISH QUALITY HABITAT: -CC found between cobbles, MW observed in boulder habitat on littoral edge -Potential shore spawning habitat for KO -Some large & small woody debris -private beach associated with recreational activities
8	VO, UC, SK		7			108	1	3	722	5	53	13	MODERATE FISH QUALITY HABITAT: -All species observed within littoral edge -Segment with a very steep drop-off -Presence of large woody debris -MW & RB observed in fast water, in large pools in Enterprise Creek -MW also found schooling and cruising the outlet sandy bottom of Vevey & Enterprise creeks
9	VO, UC, SK		4			22				46	878		HIGH FISH QUALITY HABITAT: -CC observed in gravel & round cobbles in shallow areas -MW observed cruising the littoral edge -Potential MW spawning habitat
10 Silverton	VO, UC, SK				10	86			202	10			HIGH FISH QUALITY HABITAT: -RSC observed on boulder-cobble outcrop -Presence of large woody debris -MW schooling & observed feeding from the surface to bottom in creek's outflow -CC were dispersed & larger CC observed using larger substrate
11	VO, UC, SK		50		22	19	2			34			MODERATE FISH QUALTIY HABITAT: -Fish observed between boulders & angular rocks (from highway construction) at the edge of littoral zone
12 New Denver	VO, UC, SK		15	2	20	8	13		36	42			HIGH FISH QUALITY HABITAT: -All fish observed along littoral edge in shallow cobbles and in very steep littoral drop-off in Carpenter Creek's mouth -1 KO carcass



Segment #	Sampling					Fish S	oecies Ok	servec	k				General Observations
	technique	BB	С	КО	CSU	MW	NSC	RB	RSC	CC	CCG	CRH	
13	VO, UC, SK		10				1		90	13			MODERATE FISH QUATLIY HABITAT:
													-NSC & CC found in shallow cobbles
													-RSC found in boulder outcrops along littoral drop-off
													-Potential spawning habitat for MW & KO
													-Abundant small woody debris deposit associated with old mining activities
14	VO, UC, SK								30	15			LOW FISH QUALITY HABITAT:
Rosebery													-All fish observed were hiding in substrate
15	VO, UC												LOW FISH QUALITY HABITAT:
Rosebery													-Extensive debris from log boom activities
													-No SK
16	VO, UC, SK												MODERATE FISH QUALITY HABITAT:
Rosebery													-Good mix of gravel/ cobbles & some fish cover
,													-Littoral disturbed by several private beaches, groynes, docks, etc.
17	VO, UC, SK		2			69		2		14			HIGH FISH QUALITY HABITAT:
Rosebery													-Very productive segment located within Wilson Creek's mouth
-													-Plenty of invertebrate, outflow extends 50m offshore
													-MW & RB observed feeding in outflow
18	VO, UC, SK				1	22			40	13			MODERATE FISH QUALITY HABITAT:
Rosebery													-Large submerged barge
_													-MW & RSC observed using the abandoned barge as a feeding area
19	VO, UC, SK	1	1		10	36				9			LOW FISH QUALITY HABITAT:
													-CC & MW observed feeding on littoral drop-off
													-1 dead burbot
													-Potential shore spawning habitat for KO
													-C & CC observed between boulders
													-no diversity in substrate, poor fish cover
20	VO, UC, SK		1	20	2	45							HIGH FISH QUALITY HABITAT:
Hills													-segment includes Bonanza Creek's mouth
													-thick layer of aquatic vegetation
													-KO carcasses only
													-C hiding in vegetation
	VO 110 6''					0.1							-MW observed feeding & using sand/silt patches near vegetation
21	VO, UC, SK					36			60	1			HIGH FISH QUALITY HABITAT:
Hills													-Bonanza Creek's alluvial fan overlap this segment
													-thick layer of aquatic vegetation
													-KO carcasses only
22	VO 110 CV												-All fish observed were hiding in vegetation HIGH FISH QUALITY HABITAT:
22	VO, UC, SK												
00	VO 112 217												-diversify substrate with potential for spawning, feeding & sheltering
23	VO, UC, SK												HIGH FISH QUALITY HABITAT:
	<u></u>	J]	<u> </u>	<u> </u>	<u> </u>	<u> </u>		<u> </u>	<u> </u>	<u> </u>	-diversify substrate with potential for spawning, feeding & sheltering



Segment #	Sampling					Fish S	pecies O	bserved					General Observations
	technique	BB	С	КО	CSU	MW	NSC	RB	RSC	CC	CCG	CRH	
24	VO, UC, SK		1		22		107	1					MODERATE FISH QUALITY HABITAT:
													-MW observed feeding within steep shoreline
													-C observed between boulders & abundant large woody debris
													-Potential shore spawning habitat for KO (outwashed gravel bars, groundwater
													seepage, angular cobbles)
													-RB & some CSU observed within Shannon Creek's outlet
25	VO, UC, SK			1		12		1	570			2	LOW FISH QUALITY HABITAT:
													-Low diversity in substrate, poor fish cover
													-MW & CRH observed hiding between scarce boulders
													-RSC schooling along steep shoreline
													-RB observed along shoreline
													-KO carcass
26	VO, UC												MODERATE FISH QUALITY HABITAT:
Valhalla													-some diversity in fish cover
Park													-cobble, gravel, boulder, large woody debris
													-some areas steep littoral drop-off zones
													-no SK in Park
27	VO, UC, SK												MODERATE FISH QUALITY HABITAT:
Valhalla													-highly diversified fish habitat
Park													-cobble, gravel, boulder, large woody debris
													-some areas steep littoral drop-off zones
													-no SK in Park
28	VO, UC, SK				3	8			3	20			HIGH FISH QUALITY HABITAT:
													-RSC & RB observed on boulder outcrop
													-CC & CSU observed in shallow cobbles
													-MW observed cruising the steep shoreline drop-off
													-aquatic vegetation fish cover
													-Slocan River outlet overlaps this segment
TOTAL	= 4141	1	91	23	122	585	127	10	2003	229	935	15	

.Sampling technique; VO (visual observation), UC (underwater camera), SK (snorkeling)

.Fish species: BB (burbot), C (cyprinids spp.), KO (kokanee), CSU (largescale sucker), MW (mountain whitefish), NSC (northern pikeminnow), RB (rainbow trout), RSC (redside shiner), CC (sculpin spp.), CCG (slimy sculpin), CRH (torrent sculpin)



Table 3: Number of fish species observed per shore type

Shore type	пэн эрс	CICS ODSC	rved pe	7 311010		h Species	Observe	-d			
Shore type	BB	С	КО	CSU	MW	NSC	RB	RSC	CC	CCG	CRH
Stream mouth				32	87	3	3	100		4	
		2			69		2		14		
		1	20	2	45						
				3	8			3	20		
Sub-Total=418		3	20	37	209	3	5	103	34	4	
Sand					36			60	1		
Sub-Total=97					36			60	1		
Gravel				10	86			202	10		
		50		22	19	2			34		
								30	15		
				1	22			40	13		
Sub-Total=556		50		33	127	2		272	72		
Rocky					23			150	3		
					4				4		
		4			22				46	878	
		15	2	20	8	13		36	42		
		10				1		90	13		
	1	1		10	36				9		
		1		22		107	1				
Sub-Total=1572	1	31	2	52	93	121	1	276	117	878	
Cliff/Bluff		7			108	1	3	722	5	53	13
			1		12		1	570			2
Sub-Total=1498		7	1		120	1	4	1292	5	53	15
TOTAL FISH SPECIES=4141	1	91	23	122	585	127	10	2003	229	935	15



APPENDIX D:

Rare & Endangered Fish Species



Rare & Endangered Species

White Sturgeon (Acipenser transmontanus)

Most of the information available on the white sturgeon, and outlined briefly here, was compiled by R.L & L. Environmental Services in reports they published in the late 90s (1996, 1998, 2000). Anecdotal reports of white sturgeon sightings, years ago, suggested that remnant populations of white sturgeon may have been trapped behind or between the dams on both the Columbia and Kootenay Rivers and in larger lakes and tributaries of these systems. White sturgeon in Arrow Lake Reservoir were identified as a remnant population isolated from the parent population in the Columbia River by the construction of the Hugh L. Keenleyside Dam.

The presence of white sturgeon in Arrow Reservoir and Slocan Lake was first documented in 1995 when two fish were captured during the survey. To obtain additional information on this population, a second survey was conducted in 1996 and a third in 1997. One of the same fish captured in the 1996 survey. The tagged pre-spawning female was frequently tracked between November 1996 and March 1998. This fish exhibited localized movements in the Wragge Creek islands area and frequently visited Nemo Creek, Wee Sandy and Shannon Creek mouths. The shore of the lake in this area is characterized by large rocky island outcrops with some sand and silt substrates. Depths off these outcrops can be up to 90 m. White sturgeon have previously been observed by anglers in those areas. This high frequency of movement by a female in pre-spawning condition combined with a consistent selection of areas near tributary mouths was interpreted as a search for a spawning site (R.L. & L 1998, 2000). The frequent movements of the pre-spawning female may indicate suitable spawning habitats were not available in the Slocan Lake system. The capture of only two white sturgeon in Slocan Lake during three years of intensive study suggest the population density in the lake is very low and may consist of only a few individuals.

The limited availability of suitable spawning habitats and the absence of juveniles in the catch suggest the population is not reproducing successfully (R.L. & L 1996). The availability and suitability of white sturgeon spawning habitat in Slocan Lake was also examined during these studies. White sturgeon in other areas of the Columbia River drainage typically spawn in fast flowing water. In Slocan Lake, this type of habitat is only available in the lower reaches of some inflowing tributaries and in the Slocan River. Wilson Creek is the largest of the tributaries entering Slocan Lake. Investigations of this area revealed that although the lower reaches of the creek exhibit suitable flow velocities (i.e., greater than 1.0 m/s surface velocities) and substrates (clean cobble/boulder) for spawning, stream depths of less than 1 m in many areas may limit spawner access into the stream. Examination of Carpenter, Enterprise, and Silverton creeks revealed these systems also were too shallow (i.e., depths of less than 1 m) for use by spawning sturgeon. In addition, water temperatures in these tributaries are lower than the 14 to 16°C preferred by white sturgeon that spawn in the Waneta area of the Columbia River (R.L. & L. 1996). The same depth and temperature limitations also apply to all of the other tributaries that enter the lake. The only outflowing tributary, Slocan River, has limited potential to be used as a spawning area. Slocan River has areas with surface velocities greater than 1.0 m/s and clean cobble/boulder substrates, although depths rarely exceed 2 m. Any newly hatched larvae spawned in Slocan River would most likely be transported down into Brilliant Reservoir. To date, sampling in this reservoir has failed to capture white sturgeon.

Sturgeon movements related to feeding activity are influenced by factors such as water temperature and stream discharge that may influence catch-rates (COSEWIC 2003). The mouths of tributaries that supported spawning runs of kokanee were identified as good feeding grounds for white sturgeon (RL&L 2000). In 1995 and 1996, a fish was located in the Wragge Creek confluence area over the fall and winter period which suggested a use of this area for overwintering. The most striking feature of the Slocan Lake white sturgeon is the dark brown, almost black coloration (RL&L 2000).



Bull trout (Salvelinus confluentus)

In the Slocan Lake area, the bull trout is often mistakenly called "Dolly Varden" by local anglers. Bull trout and Dolly Varden look very similar, and were once considered the same species, but taxonomic work, published in 1978 and accepted by the American Fisheries Society in 1980, identified bull trout as distinct from the Dolly Varden. Compared to Dolly Varden, bull trout are generally larger, with a relatively longer and broader head. Bull trout are mainly an inland species, while Dolly Varden are more common in coastal areas. In British Columbia, the Dolly Varden and the bull trout have overlapping habitats along the coast, and both species can be found within the coastal watersheds.

The blue-listed bull trout is not well documented in Slocan Lake and its watershed. The only available data are from several Slocan Lake tributary reports conducted under the former Forest Renewal Inventory Program (Aquatic Resources 1996, Timberland 1999, 2000 & 2003, Kokanee 1997 & 2001). Bull trout presence was confirmed in the lake's main tributaries like Enterprise, Silverton, Carpenter, Wilson, Shannon, Wragge and Bonanza Creeks but no bull trout studies are available for the lake itself. During the tributary inventories, adfluvial bull trout were observed utilizing the lower reaches (Timberland 2000) for spawning or rearing.

According to several surveys, the Slocan Lake tributaries are suspected to support both resident and adfluvial populations of bull trout (Timberland 1999 & 2000, Kokanee 1997 & 2001). During these tributary surveys, bull trout were sampled in higher numbers than the rainbow trout. This may be explained by the fact that bull trout are a predatory species (Scott and Crossman 1990) and are more adapted to higher gradients and high water velocities (Ford *et al* 1995). The adfluvial bull trout share the same Salmonid habitat requirements as the rainbow trout and kokanee and, like them, utilize the entire lake and its foreshore for rearing, feeding, overwintering and migrating. Alluvial fans are important areas for foraging and staging and cliff/bluff shore types provide easy access to prey.

Westslope cutthroat trout (Oncorhynchus clarkia lewisi): Historic stocking of sport fish in Slocan Lake dates back to 1911 when 50,000 westslope cutthroat trout were released in the lake and several thousands more in a few headwater lakes of the watershed (FISS 2010, Timberland 1999 & 2000).

Westslope cutthroat trout are expected to utilize the Slocan Lake and tributary habitat in a similar manner to that of the other sport fish (i.e., kokanee, bull trout). They use the lake as a migratory corridor to gain access to their tributary spawning grounds. Young fish are expected to move into the lake habitat, to feed and seek refuge. The Slocan Lake watershed is suspected to carry both fluvial and adfluvial westsltope cutthroat trout populations. There is no existing data on lacustrine spawning habitat in Slocan Lake. According to Shephard *et al* (1984), except for the summer when water temperatures rise, cutthroat trout, like other salmonid species, will be associated with near-surface water. During the several stream samplings conducted between 1997 and 2003, (Timberland 1999, 2000 & 2003, Kokanee 1997 & 2001) westslope cutthroat trout were found in Enterprise, Shannon, Wilson, Silverton Creeks and the Slocan River. Some of these streams also supported resident westslope cutthroat trout populations within their watershed. No specific data on the adfluvial fish population was found in the literature review. Lake foreshore habitat utilization for westslope cutthroat trout is expected to be similar to that of bull trout, and other cold water salmonid species. As mentioned above, the species would likely be seeking out deep cool waters during the summer. With a maximum depth of 298 m and a mean depth of 171 m (Pieters 2001), cold-water refuge is easily accessed in Slocan Lake.

Creek outlets and lower tributary reaches are the only potential habitat areas for staging/spawning and rearing in Slocan Lake. Cliff/Bluff and Low Rocky shore types are suitable for adults since these areas provide deeper refuge habitat. More rigorous sampling will provide further information about this species' habitat utilization along the foreshore.



APPENDIX E:

Aquatic Habitat Index Results



AQUATIC HABITAT INDEX

Table1: Total shore length with a High, Moderate and Low Level of Impact

Level of Impact	Level of Impact (% of Shoreline)	Shore Length (m)
High	8.84%	7770
Moderate	4.73%	4158
Low	44.92%	39500
None	41.52%	36509
	Total SI	nore Length 87936.8

Table 2: Total length of natural and disturbed shorelines and their associated land uses

	Shoreline Length (%)	Shoreline Length (m)	Natural Shore Length (m)	Disturbed Shore Length (m)	Natural (%)	Disturbed (%)
Agriculture	0.0%	0	0	0	0.0%	0.0%
Commercial	0.0%	0	0	0	0.0%	0.0%
Conservation	0.0%	0	0	0	0.0%	0.0%
Forestry	0.0%	0	0	0	0.0%	0,0%
Industrial	0.9%	788	0	788	0.0%	0.0%
Multi Family	0.0%	0	0	0	0.0%	0.0%
Natural Area	89.4%	78654	77600	1053	98.7%	1.3%
Park	2.0%	1772	1103	668	62.3%	37.7%
Recreation	0.7%	590	354	236	60.0%	40.0%
Rural	0.0%	0	0	0	0.0%	0.0%
Single Family	7.8%	6846	1650	5196	24.1%	75.9%
Urban Park	0.0%	0	0	0	0.0%	0.0%
Transportation	0.0%	0	0	0	0.0%	0.0%
Institutional	0.0%	0	0	0	0.0%	0.0%



Table 3: Total length of shoreline and associated percentages within the different shore types

Shore Type	Description	Percentage of Total Shoreline (%)	Total Shoreline Length (m)
Rocky Shore	Cobble, boulder or bedrock substrate often prevalent along the base of steeper shorelines	41.4%	36441
Cliff / Bluff	Adjacent to steeper slopes, usually indicating a steep-sided lake basin or sudden drop-off	37.5%	32963
	Often associated with low gradient foreshore,		
Gravel Beach	coves with pockets of riparian vegetation among steeper hillsides or alluvial fans	17.4%	15274
Stream Mouth	A segment covered by a stream mouth	2.5%	2212
Sand Beach	Often associated with alluvial fans or other shoreline deposition areas	1.2%	1048
Wetland	A segment covered by a wetland	0.0%	0
Other		0.0%	0
Total		100.00%	87937



Table 4: Model value for substrate percentage per segment

Comments	F:	C l	Constant Fin	Carrel Car	0-1-1-1-	Davida	Dealmal
Segments	Fines	Sand	Gravel_FIn	Gravel_Coa	Cobble	Boulder	Bedrock
2	0	2.4		2 4	0 1.2	0.0	0
3	0	0	4	0		0.8	0
	0	0	0		0	1.6	1.6
5	0	0	0	0		0.4	1.9
6	0	0	0	0	2.4	4	0.6
7		0	1	1		0.4	1.9
8	0.8	0	0	0	1.8 0	3.6	0.2
9	0	0.2	2	2.5	5.4		0
10	0	0.2	<u>2</u> 1	Z.5	3.6	0.4	0
11	0	0	1.5	1.5	3.0	3.2	0.1
12	0	0	2	2	3.6	2.4	0.1
13	0	0	2	1.5	4.2	1.6	0.2
14	0.8	0	3.5	3.3	2.4	0.16	0.2
15	7.2	0	0	0	0	0.10	0
16	1.6	0	2.5	2.5	2.4	0.8	0
17	0.8	0	2.3	2.3	4.8	0.8	0
18	1.6	0	2	2	2.4	1.6	0
19	0	0	0.1	0.2	1.2	6.8	
20	0	0	9	0.9	0	0.08	0.04
21	0	4	0	0.7	0	0.00	0
22	0.24	0.2	0.5	0	1.2	4.96	0.3
23	0.21	0.6	0.0	3.5	4.2	0.8	0.1
24	0	0.0	0	0.5	0.6	4.8	0.6
25	0	0	0.5	0.5	0.0	0.8	1.6
26	0	0.08	0.0	0.5	0	3.2	0.86
27	0	0.08	0	0	0	3.2	1.16
28	0	0.2	0.5	0.5	0	4.4	0.6



Table 5: Summary of Natural & Disturbed Shoreline versus Land Uses

Land Uses	% of Shoreline Length	Shoreline Length (m)	Natural Shore Length (m)	Disturbed Shore Length (m)	% Natural	% Disturbed
Agriculture	0.0%	0	0	0	0.0%	0.0%
Commercial	0.0%	0	0	0		
Conservation	0.0%	0	0	0	0.0%	0.0%
Forestry	0.0%	0	0	0		
Industrial	0.9%	788	0	788	0.0%	100.0%
Multi Family	0.0%	0	0	0	0.0%	0.0%
Natural Area	89.4%	78654	77600	1053	98.7%	1.3%
Park	2.0%	1772	1103	668	62.3%	37.7%
Recreation	0.7%	590	354	236	60.0%	40.0%
Rural	0.0%	0	0	0		
Single Family	7.8%	6846	1650	5196	24.1%	75.9%
Urban Park	0.0%	0	0	0		
Transportation	0.0%	0	0	0	0.0%	0.0%
Institutional	0.0%	0	0	0	0.0%	0.0%

Table 6: Natural versus Disturbed Shorelines per shore type

Shore Type	Natural Shore Length (m)	Disturbed Shore Length (m)	% Natural	% Disturbed
Cliff / Bluff	32589	374.2	98.9%	1.1%
Rocky Shore	34967	1473.9	96.0%	4.0%
Gravel Beach	10833	4440.7	70.9%	29.1%
Sand Beach	179	868.8	17.1%	82.9%
Stream Mouth	1749	463.0	79.1%	20.9%
Wetland	0	0.0	0.0	0.0
Other	0	0.0	0.0%	0.0%



Table 7: Total number and density (# per km) of different shoreline modifications

Type of Modifications	Total (#)	# Per km
Docks	38	0.43
Groynes	66	0.75
Boat Launch	0	0.00
Mooring Buoy	0	0.00
Retaining Walls	29	0.33
Marinas	0	0.00
Marine Rails	0	0.00

Table 8: Shoreline impacted by substrate modification, road and railways, and retaining walls

Category	Shoreline (%)	Shore length (m)
Roadway	3%	2764
Retaining Wall	2%	1607
Railway	11%	9339
Substrate Modification	4%	3120
Total Shore Length		87937

