

## **APPENDIX B: SEGMENT, CREEK & WETLAND ASSESSMENTS**

## SEGMENT ASSESSMENTS

### Slocan Lake: Segment 1



#### General Segment Classification

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
				x				

#### Substrate (%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdbrock
				60	20	20					

#### Shoreline Vegetation Band1

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

#### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Landscape	Sparse	No	No

#### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
0			

#### Littoral Zone

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

## Slocan Lake: Segment 2



### 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
							x	

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
					40	40	10			10	

### Shoreline Vegetation Band1

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)
Landscape	Sparse	Sparse <10	Sparse <10	50	0

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Landscaped	Sparse	No	No

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
0			

### Littoral Zone

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

### Slocan Lake: Segment 3



#### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
589	Cliff/Bluff	Retaining Wall, Trail	Very Steep	Natural	Medium	40%	60%	

#### 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
				x				

#### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
										20	80

#### Shoreline Vegetation Band1

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)
Coniferous forest	Young forest	Sparse <10	Moderate 10-50	50	0

#### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Young	No	No

#### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
0			

#### Littoral Zone

Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
NA	Low	Yes	Yes	Yes



## Slocan Lake: Segment 4



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
749	Cliff/Bluff	None	Very Steep	Natural	None	0%	100%	

### 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
		x						

### 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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	No	Yes

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
0			

### Littoral Zone

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

## Slocan Lake: Segment 5



### General Segment Classification

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				

### 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	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
							20			50	30

### Shoreline Vegetation Band1

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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	<20	Yes

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
0			

### Littoral Zone

Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
Narrow	Low	No	No	No

## Slocan Lake: Segment 6



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
5905	Cliff/Bluff	None	Very Steep	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
		x						

### 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	Young forest	Moderate 10-50	Abundant >50	50	0

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	No	No

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
0			

### Littoral Zone

Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
Narrow	Low	No	No	No



## Slocan Lake: Segment 7



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
406	Rock	Dock, Groyne	Low	Single Family	Medium	40%	60%	

### Shore Type (%)

Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
	50	50				

### 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	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
			10		10	10	15			45	10

### Shoreline Vegetation Band1

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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Sparse	No	No

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
5	100		

### Littoral Zone

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



## Slocan Lake: Segment 8



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
10785	Cliff/Bluff	Dock	Very Steep	Natural	None	0%	100%	Enterprise Creek

### Shore Type (%)

Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
95				2		

### 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	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
										50	50

### 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
0			

### Littoral Zone

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

## Slocan Lake: Segment 9



### General Segment Classification

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
		x						

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
				5	20	25	45			5	

### 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	No

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
20	100		

### Littoral Zone

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

## Slocan Lake: Segment 10



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
1699	Gravel	Retaining Wall, Dock,	Moderate	Single Family	High	100%	0%	Silverton Creek

### Shore Type (%)

Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
	85			15		

### 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	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
					10	50	30			10	

### Shoreline Vegetation Band1

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)
Coniferous forest	Young forest	Moderate 10-50	Sparse <10	50	0

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Mixed forest	Sparse	No	No

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
40	100		

### Littoral Zone

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



## Slocan Lake: Segment 11



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
3161	Gravel	Dock, Groyne	Low	Natural	Medium	10%	90%	

### 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
		x						

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
					15	15	25			40	5

### Shoreline Vegetation Band1

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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	No	No

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
5	100		

### Littoral Zone

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



## Slocan Lake: Segment 12



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
2519	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		

### 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	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
					20	20	30			30	

### Shoreline Vegetation Band1

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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Sparse	No	No

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
5	70	30	

### Littoral Zone

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

## Slocan Lake: Segment 13



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
4522	Rock	Retaining Wall, Trail	Low	Natural	Low	1%	99%	

### Shore Type (%)

Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
10	35	54		1		

### 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	Cobble/Fine	Cobble/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		

### Littoral Zone

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

## Slocan Lake: Segment 14



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
239	Gravel	None	Low	Industrial	High	90%	10%	

### 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
							x	

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
			10		35	33	20			2	

### Shoreline Vegetation Band1

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)
Coniferous forest	Young forest	Sparse <10	Sparse <10	50	0

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Young	No	No

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
10	100		

### Littoral Zone

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

## Slocan Lake: Segment 15



### General Segment Classification

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
							x	

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
			90							10	

### Shoreline Vegetation Band1

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)
Herb/Grass	Herb/Grass	Sparse <10	Sparse <10	50	0

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
None	None	No	No

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
20	100		

### Littoral Zone

Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
NA	Low	No	No	Yes



## Slocan Lake: Segment 16



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
721	Gravel	Retaining Wall, Dock,	Low	Single Family	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
						x		

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
			20		25	25	20			10	

### Shoreline Vegetation Band1

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)
Herb/Grass	Grass/herb	Moderate 10-50	Sparse <10	50	0

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	No	No

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
25	100		

### Littoral Zone

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

## Slocan Lake: Segment 17



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
522	Stream	Dock	Low	Park	None	0%	100%	Wilson Creek

### 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
			x					

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
			10		20	20	40			10	

### Shoreline Vegetation Band1

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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	No	No

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
0			

### Littoral Zone

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

## Slocan Lake: Segment 18



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
316	Gravel	Retaining Wall, Dock, Trail	Moderate	Park	High	70%	30%	

### 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
			x					

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
			20		20	20	20			20	

### Shoreline Vegetation Band1

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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Mixed forest	Mature	No	Yes

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
50	90	10	

### Littoral Zone

Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
Wide >50m	Moderate	Yes	Yes	Yes



## Slocan Lake: Segment 19



### General Segment Classification

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
		x						

### Substrate(%)

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

### Shoreline Vegetation Band1

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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	No	No

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
2	100		

### Littoral Zone

Littoral Zone (m)	Juvenile Rearing	Staging	Migration	Large Woody
Narrow	Low	No	No	No



## Slocan Lake: Segment 20



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
873	Stream	Trail	Low	Natural	Low	5%	95%	Bonanza Creek

### Shore Type (%)

Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
	50			50		

### 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	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
					90	9				1	

### Shoreline Vegetation Band1

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)
Coniferous forest	Mature forest	Abundant >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
50	100		

### Littoral Zone

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

## Slocan Lake: Segment 21



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
493	Sand	Retaining Wall, Dock	Moderate	Single Family	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
						x		

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
				100							

### Shoreline Vegetation Band1

Category	Stage	Shrub Cover (%)	Tree Cover (%)	Bandwidth (m)	Overhanging (%)
Herb/Grass	Herb/Grass	Sparse <10	Sparse <10	50	0

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Landscaped	Sparse	No	No

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
100	85	15	

### Littoral Zone

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

## Slocan Lake: Segment 22



### 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
		x						

### Substrate(%)

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

### 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

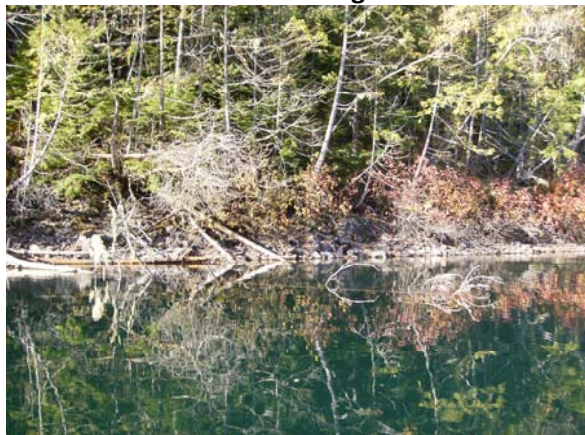
### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
25	100		

### Littoral Zone

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

### Slocan Lake: Segment 23



#### General Segment Classification

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

#### 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
		x						

#### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
				15		35	35			10	5

#### 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	No

#### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
60	100		

#### Littoral Zone

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



## Slocan Lake: Segment 24



### 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%	

### 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
		x						

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
						5	5			60	30

### 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	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

## Slocan Lake: Segment 25



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
1256	Cliff/Bluff	None	Steep	Natural	None	0%	100%	Wragge Creek

### 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
		x						

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
					5	5				10	80

### 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	No

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
0			

### Littoral Zone

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

## Slocan Lake: Segment 26



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
22964	Rock	Dock, Groyne	Moderate	Natural	Low	1%	99%	

### Shore Type (%)

Cliff/Bluff	Gravel Beach	Rocky Shore	Sand Beach	Stream Mouth	Wetland	Others
30	10	59		1		

### 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	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
				2		5				50	43

### 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	No

### Aquatic Vegetation (%)

Aquatic vegetation	Submergent	Emergent	Floating
10	95	5	

### Littoral Zone

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



## Slocan Lake: Segment 27



### General Segment Classification

Segment Length (m)	Shore Type	Shore Type Modification	Slope	Land Use	Level of Impact	Disturbed	Natural	Class Comment
6567	Cliff/Bluff	Retaining Wall, Groyne	Moderate	Natural	Low	1%	99%	

### 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
		x						

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
				2						40	58

### Shoreline Vegetation Band1

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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	No	No

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
0			

### Littoral Zone

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

## Slocan Lake: Segment 28



### General Segment Classification

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
						x		

### Substrate(%)

Marl	Mud	Organic	Fines	Sand	Gravel/Fine	Gravel/Cobble	Cobble	Cobble/Fine	Cobble/Coarse	Boulder	Berdrock
				5	5	5				55	30

### Shoreline Vegetation Band1

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

### Shoreline Vegetation Band2

Category	Stage	Veteran Trees	Wildlife Trees
Coniferous forest	Mature	No	No

### Aquatic Vegetation(%)

Aquatic vegetation	Submergent	Emergent	Floating
30	65	35	

### Littoral Zone

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

## CREEK ASSESSMENTS

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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

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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 kestrels	In tunnel & cliff		RATED MODERATE: -some riparian area within the northern section of segment -log boom along littoral -abandoned tunnel offers nesting potential for avian species
	1 common flicker	Feeding on moths outside tunnel		
	3 common mergansers	Within littoral zone		
	2 hawks (spp.)	Perched in riparian area		
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	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
	2 ospreys	Perched in riparian area		
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	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
	2 mergansers	Within littoral		
	3 Barrow' goldeneyes	Within littoral		
	4 bald eagles	Perched on veteran tree within riparian area		



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 -bear scat	RATED EXCELLENT: -vegetated shore offers feeding grounds for mammals -avian & small mammals habitat potential within the veteran & wildlife trees -dense riparian & upland forest -seepages, bedrock & boulders within riparian offer suitable habitat for reptiles & amphibians
10 Silverton	3 common mergansers	Within littoral zone		RATED POOR: -some foreshore modifications & thin riparian area -segment located within the village of Silverton -public beach -pedestrian trails within the segment -thin riparian vegetation along the creek -creek mouth offers good feeding habitat for fish-eating bird & mammal species -poor nesting potential
	2 gull spp.	At the creek's mouth		
	2 Canada goose	Within the littoral zone		
	3 common ravens	Within the riparian area		
	2 common mergansers	Within the littoral zone		
	1 American dipper	On a rock, within the creek		
	1 mallard	Along foreshore		
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	In mature stands in public campground	-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
	5 cedar waxings	In mature stands within riparian area		
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
<b>16 Rosebery</b>				RATED POOR: -segment located within housing area & boat launch -presence of several groynes -lawn replacing riparian vegetation
<b>17 Rosebery</b>			-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
<b>18 Rosebery</b>	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
<b>19</b>	2 western toads	On foreshore	-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
	1 river otter	On foreshore		
	1 pileated woodpecker	Within riparian		
	1 common raven	Within riparian		
<b>20 Hills</b>	10 cedar waxings	Within creek's riparian	-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)
	2 dark-eyed juncos	Within creek's riparian		
	2 bald eagles			
	5 gull (spp.)	Along creek bank		
	2 bald eagle	Within littoral		
	1 eagle (spp.)	Within riparian		
	3 eared grebe	Within riparian		
	1 sandpiper (spp.)	On braided outlet		
	7 common raven	Within riparian		
	4 American crows	Within riparian		
	9 common mergansers	Within littoral		
	7 mallards	Within littoral		
	1 killdeer	On braided outlet		
	1 mink	On creek's bank		
<b>21 Hills</b>	26 Canada geese	Within foreshore area, on private lands & docks		RATED POOR: -segment highly disturbed by vegetation removal, housing & human activities
<b>22</b>	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 patches within riparian - -7 wildlife trees -7 veteran trees -several deer tracks & browses within riparian	<b>RATED EXCELLENT:</b> -forest of mature stands up to the high water mark -excellent overhanging vegetation -highly diversified vegetation -excellent mammal & avian habitat -excellent riparian vegetation with thick undercover layer -presence of several seepage grounds offering herptile habitat -good nesting habitat & browsing vegetation
	2 bald eagles			
	2 Barrow's goldeneyes			
	1 eagle (spp.)			
24	4 gull (spp.)	In littoral zone & riparian		<b>RATED EXCELLENT:</b> -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)
	1 hawk (spp.)			
25	1 salamnder (spp.)	On rocky outcrop on foreshore	-7 wildlife trees -12 veteran trees	<b>RATED EXCELLENT:</b> -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 common Gartner snake	In shale formation on foreshore		
	2 Barrow's goldeneyes	In riparian		
26 Valhalla Park			-abundant wildlife & veteran trees -abundant raptor and passerine nests	<b>RATED EXCELLENT:</b> -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 Valhalla Park			-abundant wildlife & veteran trees -abundant raptor and passerine nests	<b>RATED EXCELLENT:</b> -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
28	10 cedar waxings	In riparian	-5 perching bird nests -several deer tracks & browses within riparian	<b>RATED EXCELLENT:</b> -although riparian & upland areas have some disturbances (cottages, trails), segment has excellent attributes for wildlife habitat
	5 dark-eyed juncos			
	1 common flicker			



Table 2: Fish observations & general fish habitat

Segment #	Sampling technique	Fish Species Observed											General Observations
		BB	C	KO	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 QUALITY 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 technique	Fish Species Observed											General Observations
		BB	C	KO	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 Rosebery	VO, UC, SK								30	15			LOW FISH QUALITY HABITAT: -All fish observed were hiding in substrate
15 Rosebery	VO, UC												LOW FISH QUALITY HABITAT: -Extensive debris from log boom activities -No SK
16 Rosebery	VO, UC, SK												MODERATE FISH QUALITY HABITAT: -Good mix of gravel/ cobbles & some fish cover -Littoral disturbed by several private beaches, groynes, docks, etc.
17 Rosebery	VO, UC, SK		2			69		2		14			HIGH FISH QUALITY HABITAT: -Very productive segment located within Wilson Creek's mouth -Plenty of invertebrate, outflow extends 50m offshore -MW & RB observed feeding in outflow
18 Rosebery	VO, UC, SK				1	22			40	13			MODERATE FISH QUALITY HABITAT: -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 Hills	VO, UC, SK		1	20	2	45							HIGH FISH QUALITY HABITAT: -segment includes Bonanza Creek's mouth -thick layer of aquatic vegetation -KO carcasses only -C hiding in vegetation -MW observed feeding & using sand/silt patches near vegetation
21 Hills	VO, UC, SK					36			60	1			HIGH FISH QUALITY HABITAT: -Bonanza Creek's alluvial fan overlap this segment -thick layer of aquatic vegetation -KO carcasses only -All fish observed were hiding in vegetation
22	VO, UC, SK												HIGH FISH QUALITY HABITAT: -diversify substrate with potential for spawning, feeding & sheltering
23	VO, UC, SK												HIGH FISH QUALITY HABITAT: -diversify substrate with potential for spawning, feeding & sheltering

Segment #	Sampling technique	Fish Species Observed											General Observations
		BB	C	KO	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 Valhalla Park	VO, UC												MODERATE FISH QUALITY HABITAT: -some diversity in fish cover -cobble, gravel, boulder, large woody debris -some areas steep littoral drop-off zones -no SK in Park
27 Valhalla Park	VO, UC, SK												MODERATE FISH QUALITY HABITAT: -highly diversified fish habitat -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	Fish Species Observed										
	BB	C	KO	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		
<b>Sub-Total=418</b>		<b>3</b>	<b>20</b>	<b>37</b>	<b>209</b>	<b>3</b>	<b>5</b>	<b>103</b>	<b>34</b>	<b>4</b>	
Sand					36			60	1		
<b>Sub-Total=97</b>					<b>36</b>			<b>60</b>	<b>1</b>		
Gravel				10	86			202	10		
		50		22	19	2			34		
								30	15		
				1	22			40	13		
<b>Sub-Total=556</b>		<b>50</b>		<b>33</b>	<b>127</b>	<b>2</b>		<b>272</b>	<b>72</b>		
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				
<b>Sub-Total=1572</b>	<b>1</b>	<b>31</b>	<b>2</b>	<b>52</b>	<b>93</b>	<b>121</b>	<b>1</b>	<b>276</b>	<b>117</b>	<b>878</b>	
Cliff/Bluff		7			108	1	3	722	5	53	13
			1		12		1	570			2
<b>Sub-Total=1498</b>		<b>7</b>	<b>1</b>		<b>120</b>	<b>1</b>	<b>4</b>	<b>1292</b>	<b>5</b>	<b>53</b>	<b>15</b>
<b>TOTAL FISH SPECIES=4141</b>	<b>1</b>	<b>91</b>	<b>23</b>	<b>122</b>	<b>585</b>	<b>127</b>	<b>10</b>	<b>2003</b>	<b>229</b>	<b>935</b>	<b>15</b>



## **APPENDIX D:**

### **Rare & Endangered Fish Species**

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## Rare & Endangered Species

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### *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 westslope 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 Shore 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
Gravel Beach	Often associated with low gradient foreshore, 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

Segments	Fines	Sand	Gravel_Fin	Gravel_Coa	Cobble	Boulder	Bedrock
1	0	2.4	2	2	0	0	0
2	0	0	4	4	1.2	0.8	0
3	0	0	0	0	0	1.6	1.6
4	0	0	0	0	0	0.4	1.9
5	0	0	0	0	2.4	4	0.6
6	0	0	0	0	0	0.4	1.9
7	0.8	0	1	1	1.8	3.6	0.2
8	0	0	0	0	0	4	1
9	0	0.2	2	2.5	5.4	0.4	0
10	0	0	1	5	3.6	0.8	0
11	0	0	1.5	1.5	3	3.2	0.1
12	0	0	2	2	3.6	2.4	0
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
15	7.2	0	0	0	0	0.8	0
16	1.6	0	2.5	2.5	2.4	0.8	0
17	0.8	0	2	2	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	0.04
20	0	0	9	0.9	0	0.08	0
21	0	4	0	0	0	0	0
22	0.24	0.2	0.5	0	1.2	4.96	0.3
23	0	0.6	0	3.5	4.2	0.8	0.1
24	0	0	0	0.5	0.6	4.8	0.6
25	0	0	0.5	0.5	0	0.8	1.6
26	0	0.08	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 &amp; 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