Mill Creek

Sensitive Habitat Inventory and Mapping (SHIM)
Inventory Summary — Segments 1-5

Segment	Primary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Substrates (%) [a]						Channel (m)				Cover (%) [b]							
							O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Total Cover	B	DP	IV	LWD	OV	SWD	UC
1.0	Channelized	378	Slough	0.0	1-20%	Unknown	99	1	0	0	0	0	5.00	8.00	0.50	1.00	10	0	50	0	0	50	0	0
2.0	Channelized	162	Run	0.5	1-20%	Unknown	15	35	25	25	0	0	3.50	8.00	0.40	1.00	10	0	35	0	0	65	0	0
3.0	Modified	280	Run	1.0	41-70%	Unknown	15	35	25	24	1	0	4.10	7.00	0.40	0.75	15	1	74	0	0	0	25	0
4.0	Channelized	383	Run	1.0	41-70%	Unknown	20	64	10	5	1	0	4.10	7.00	0.40	0.75	5	1	74	0	0	0	25	0
5.0	Modified	707	Run	1.0	41-70%	Resident	20	64	10	5	1	0	5.50	7.50	0.20	0.75	10	0	60	0	0	0	0	40

a. Substrate codes: O=organics; F=silt/sand; G=gravel; C=cobble; B=boulder; R=bedrock

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

Segment	Left Bank Riparian					Right Bank Riparian					Level of Impact [c]	Enhancement Opportunity
	Class	Qualifier	Stage	Shrub cover	Bank stability	Class	Qualifier	Stage	Shrub cover	Bank stability		
1.0	Broadleaf forest	Urban residential	mature forest	<5%	High	Herbs/grasses	Urban residential	young forest	<5%	High	6	Low
2.0	Broadleaf forest	Urban residential	mature forest	<5%	High	High Impervious	Urban residential	young forest	<5%	High	6	Low
3.0	Broadleaf forest	Urban residential	mature forest	<5%	High	High Impervious	Urban residential	young forest	<5%	High	5	Low
4.0	Broadleaf forest	Urban residential	mature forest	<5%	High	High Impervious	Urban residential	young forest	<5%	High	6	Low
5.0	Broadleaf forest	Urban residential	mature forest	<5%	High	Broadleaf forest	Urban residential	mature forest	<5%	High	5	Moderate

c. Impact rating: 0=nil; 1 = 1-bank low; 2 = 1-bank moderate; 3 = 1-bank high; 4 = both banks low; 5 = both banks moderate; 6 = both banks high

Segment: 1

Stonework and retaining walls both banks. Within highwater level of Okanagan Lake.



Segment: 2

Retaining wall and stonework both banks.



Segment: 3

Heavily urban-ized with discontinuous retaining walls. Not completely channelized.



Segment: 4

Continuous retaining walls both banks.



Segment: 5

Discontinuous retaining walls on outside bends where naturally prone to bank ero-sion.



Mill Creek

Sensitive Habitat Inventory and Mapping (SHIM) Segments 1-5

30 0 30 60 90 Meters

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Map:	1 of 19
Title:	Segments 1-5 of 74
Projection:	NAD 83, 11 North
Prepared for:	City of Kelowna
Prepared by:	Ecoscape Environmental Consultants
Drawn by:	KH
Date:	December, 2005

LEGEND

- Stream centreline
- Top of bank
- Segment break

Modification
- Bridge
- Channelization
- Dam/floodgate
- Fences
- Garbage/Pollution
- Livestock crossing
- PipeCrossing
- Retain Wall/Bank stability
- Water Withdrawal

Waterbody
- Discontinued
- Ditch
- Natural Springs
- Other
- Side Channel
- Tributary
- Wetland
- Wetland (polygon)

- Erosion
- Discharge
- Culvert

Fish habitat
- Deep Pool
- Instream Vegetation
- Instream woody debris
- Other
- Over Stream Vegetn.
- Spawning Habitat
- Undercut Bank

Obstruction
- Beaver Dam
- Dam
- Persistent Debris

- Enhancement



2 0 2 4 6 8 Kilometers

Inset Map

Source Information

Base map:	82E.083 Kelowna
Orthophotos:	2003, provided by City of Kelowna
Stream information:	field inventory
Location information:	field, GPS (Trimble Geo XM)
Feature information:	field inventory
Date of inventory:	2005/11
Inventory management:	Kyle Hawes, R.P.Bio.

ECOSCAPE Environmental Consultants

City of Kelowna

Sensitive Habitat Inventory and Mapping (SHIM)
Inventory Summary — Segments 6-9

Segment	Primary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Substrates (%) [a]						Channel (m)				Cover (%) [b]							
							O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Total Cover	B	DP	IV	LWD	OV	SWD	UC
6.0	Channelized	110	Run	1.0	1-20%	Resident	15	35	35	15	0	0	4.00	7.00	0.35	0.75	20	0	40	0	0	30	30	0
7.0	Modified	593	Run	1.0	41-70%	Unknown	15	35	35	15	0	0	4.20	6.50	0.30	0.75	15	0	40	0	0	30	30	0
8.0	Channelized	139	Run	1.0	1-20%	Unknown	15	40	30	15	0	0	3.50	4.50	0.40	1.00	25	25	75	0	0	0	0	0
9.0	Modified	563	Run	1.5	41-70%	Resident	5	10	50	34	1	0	4.50	6.20	0.30	0.75	40	25	65	0	0	0	0	10

a. Substrate codes: O=organics; F=silt/sand; G=gravel; C=cobble; B=boulder; R=bedrock

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

Segment	Left Bank Riparian					Right Bank Riparian					Level of Impact [c]	Enhancement Opportunity
	Class	Qualifier	Stage	Shrub cover	Bank stability	Class	Qualifier	Stage	Shrub cover	Bank stability		
6.0	Broadleaf forest	Urban residential	tall shrubs 2-10m	5-33%	Medium	Broadleaf forest	Urban residential	young forest	5-33%	Medium	6	Low
7.0	Broadleaf forest	Urban residential	young forest	5-33%	Medium	Broadleaf forest	Urban residential	young forest	5-33%	Medium	5	Low
8.0	Broadleaf forest	Urban residential	young forest	5-33%	Medium	Broadleaf forest	Urban residential	young forest	5-33%	Medium	6	Low
9.0	Broadleaf forest	Disturbed	mature forest	<5%	Medium	Mixed forest	Urban residential	mature forest	5-33%	High	4	Moderate

c. Impact rating: 0=nil; 1 = 1-bank low; 2 = 1-bank moderate; 3 = 1-bank high; 4 = both banks low; 5 = both banks moderate; 6 = both banks high

Segment: 6

Continuous retaining walls on both banks.



Segment: 7

Discontinuous retaining walls along both banks.



Segment: 8

Continuous retaining walls and stonework on both banks.



Segment: 9

Predominantly run with weak riffle-pool development.



Mill Creek

Sensitive Habitat Inventory and Mapping (SHIM) Segments 6-9

30 0 30 60 90 Meters

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Map:	2 of 19
Title:	Segments 6-9 of 74
Projection:	NAD 83, 11 North
Prepared for:	City of Kelowna
Prepared by:	Ecoscape Environmental Consultants
Drawn by:	KH
Date:	December, 2005

LEGEND

- Stream centreline
- Top of bank
- Segment break

Modification
- Bridge
- Channelization
- Dam/floodgate
- Fences
- Garbage/Pollution
- Livestock crossing
- PipeCrossing
- Retain Wall/Bank stability
- Water Withdrawal

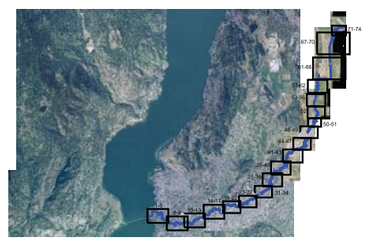
Waterbody
- Discontinued
- Ditch
- Natural Springs
- Other
- Side Channel
- Tributary
- Wetland
- Wetland (polygon)

- Erosion
- Discharge
- Culvert

Fish habitat
- Deep Pool
- Instream Vegetation
- Instream woody debris
- Other
- Over Stream Vegetn.
- Spawning Habitat
- Undercut Bank

Obstruction
- Beaver Dam
- Dam
- Persistent Debris

- Enhancement



2 0 2 4 6 8 Kilometers

Inset Map

Source Information

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Date of inventory:	2005/11
Inventory management:	Kyle Hawes, R.P.Bio.

ECOSCAPE Environmental Consultants

City of Kelowna

Sensitive Habitat Inventory and Mapping (SHIM)
Inventory Summary — Segments 10-13

Segment	Primary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Substrates (%) [a]						Channel (m)				Cover (%) [b]							
							O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Total Cover	B	DP	IV	LWD	OV	SWD	UC
10.0	Modified	557	Run	1.0	1-20%	Resident	40	15	25	24	1	0	4.60	7.00	0.35	0.75	15	5	70	0	5	20	0	0
11.0	Channelized	104	Run	1.5	1-20%	Resident	1	4	75	24	1	0	4.50	5.00	0.20	0.90	10	10	90	0	0	0	0	0
12.0	Channelized	335	Run	2.0	41-70%	Resident	1	4	30	60	5	0	4.00	6.50	0.28	0.75	15	15	65	0	0	15	0	5
13.0	Modified	329	Riffle/Pool	1.5	>90%	Resident	5	0	55	35	5	0	3.50	8.00	0.25	0.75	50	15	70	0	0	10	0	5

a. Substrate codes: O=organics; F=silt/sand; G=gravel; C=cobble; B=boulder; R=bedrock

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

Segment	Left Bank Riparian					Right Bank Riparian					Level of Impact [c]	Enhancement Opportunity
	Class	Qualifier	Stage	Shrub cover	Bank stability	Class	Qualifier	Stage	Shrub cover	Bank stability		
10.0	Broadleaf forest	Urban residential	young forest	34-66%	Medium	Broadleaf forest	Urban residential	sapling >10m	34-66%	Medium	5	Moderate
11.0	Herbs/grasses	Urban residential	young forest	<5%	High	Herbs/grasses	Urban residential	young forest	<5%	High	6	Moderate
12.0	Mixed forest	Urban residential	mature forest	5-33%	High	Broadleaf forest	Urban residential	mature forest	<5%	High	6	Moderate
13.0	Broadleaf forest	Urban residential	mature forest	5-33%	High	Broadleaf forest	Urban residential	mature forest	<5%	High	2	Low

c. Impact rating: 0=nil; 1 = 1-bank low; 2 = 1-bank moderate; 3 = 1-bank high; 4 = both banks low; 5 = both banks moderate; 6 = both banks high

Segment: 10

Discontinuous stonework and retaining walls on both banks. More urbanized than Segment 9.



Segment: 11

Retaining walls along both banks with instream enhancements occurring over entire segment length.



Segment: 12

Retaining walls along both banks with the exception of 60-m at bottom of segment.



Segment: 13

Instream enhancements adding considerable structural complexity and cover.





Mill Creek

Sensitive Habitat Inventory and Mapping (SHIM) Segments 10-13

30 0 30 60 90 Meters

N W E S

Map:	3 of 19
Title:	Segments 10-13 of 74
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Prepared for:	City of Kelowna
Prepared by:	Ecoscape Environmental Consultants
Drawn by:	KH
Date:	December, 2005

LEGEND

- Stream centreline
- Top of bank
- Segment break

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- Channelization
- Dam/floodgate
- Fences
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- Water Withdrawal

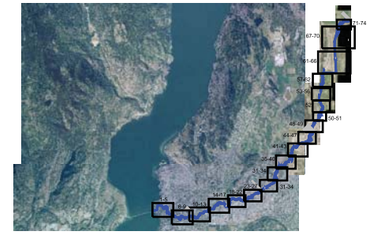
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