Sensitive Habitat Inventory and Mapping (SHIM)
Inventory Summary — Segments 14-17

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
14.0	Modified	763	Riffle/Pool	1.5	1-20%	Resident	5	0	20	50	25	0	4.50	6.50	0.20	0.75	20	45	40	0	0	10	0	5
15.0	Modified	262	Run	1.0	41-70%	Unknown	85	5	4	5	1	0	5.50	6.50	0.40	0.80	40	1	49	0	5	30	5	10
16.0	Modified	249	Run	1.0	1-20%	Unknown	45	25	15	15	0	0	4.50	6.00	0.25	0.70	20	0	65	0	5	15	5	10
17.0	Modified	233	Riffle/Pool	2.0	71-90%	Potential	5	15	25	55	0	0	4.00	5.80	0.20	0.65	10	0	65	0	5	15	5	10

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

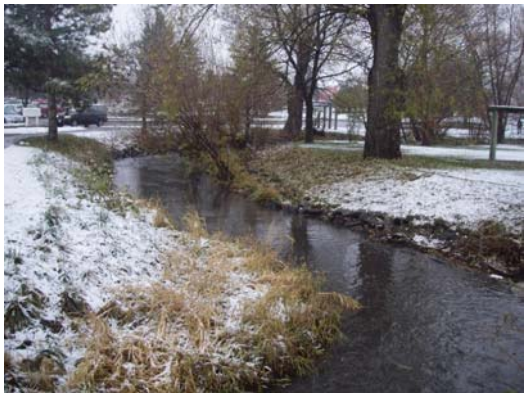
b. Cover codes: B=boulder; DP=deep pool; IV=instream vegetation; LWD=large woody debris; OV=overstream vegetation; SWD=small woody debris; UC=undercut bank

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		
14.0	Mixed forest	Recreation	young forest	<5%	High	Broadleaf forest	Recreation	mature forest	<5%	High	5	Moderate
15.0	Broadleaf forest	Disturbed	young forest	67-100%	Medium	Broadleaf forest	Disturbed	young forest	67-100%	Medium	1	Low
16.0	Herbs/grasses	Urban residential	low shrubs <2m	5-33%	Low	Shrubs	Disturbed	tall shrubs 2-10m	67-100%	Medium	5	Very_high
17.0	Broadleaf forest	Urban residential	sapling >10m	67-100%	Medium	Broadleaf forest	Urban residential	young forest	67-100%	Medium	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: 14

Parkland. Retaining walls and rip rap along majority of segment length on both banks.



Segment: 15

Deep run-slough hydraulic character influenced by beaver activity.



Segment: 16

Weak riffle-pool at bottom of segment. Considerable riparian disturbance and bank instability.



Segment: 17

Riffle-pool-run



Mill Creek

Sensitive Habitat Inventory and Mapping (SHIM) Segments 14-17

30 0 30 60 90 Meters

N
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Map:	4 of 19
Title:	Segments 14-17 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

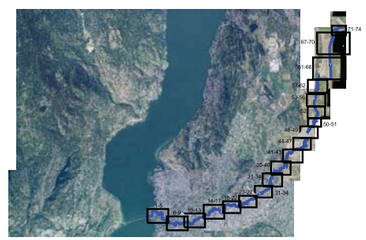
Waterbody
- Discontinued
- Ditch
- Natural Springs
- Other
- Side Channel
- Tributary
- Wetland
- Wetland (polygon)

- 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 18-22

Segment	Primary	Secondary	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
18.0	Modified		211	Run	1.0	0	Unknown	10	45	15	25	5	0	3.50	6.50	0.28	0.65	15	15	80	0	1	2	2	0
19.0	Modified		522	Riffle/Pool	1.5	21-40%	Unknown	10	30	20	35	5	0	4.00	6.00	0.20	0.65	10	0	55	0	5	10	25	5
20.0	Modified	Beaver Pond	142	Beaver Pond	0.0	71-90%	Unknown	80	5	5	10	0	0	12.00	6.00	1.60	1.00	80	0	90	0	8	1	1	0
21.0	Modified	Beaver Pond	157	Slough	1.0	>90%	Unknown	25	10	25	39	1	0	5.00	9.00	0.65	0.65	90	1	64	0	10	15	10	0
22.0	Natural		353	Riffle/Pool	1.5	71-90%	Potential	1	29	25	45	0	0	5.00	6.50	0.21	0.60	10	5	40	0	35	5	10	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		
18.0	High Impervious	Disturbed	low shrubs <2m	5-33%	Medium	Herbs/grasses	Disturbed	low shrubs <2m	5-33%	Medium	5	High
19.0	Broadleaf forest	Disturbed	young forest	67-100%	Medium	Broadleaf forest	Disturbed	young forest	67-100%	Medium	4	High
20.0	Broadleaf forest	Natural	young forest	67-100%	Medium	Broadleaf forest	Disturbed	young forest	67-100%	Medium	1	Low
21.0	Shrubs	Disturbed	tall shrubs 2-10m	67-100%	Medium	Shrubs	Natural	tall shrubs 2-10m	67-100%	Medium	2	Nil
22.0	Broadleaf forest	Natural	mature forest	34-66%	High	Broadleaf forest	Natural	mature forest	67-100%	Medium	1	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: 18

Steep left bank fill slope.



Segment: 19

Riffle-pool-run. Intermittent Industrial/ municipal encroachment to top of bank.



Segment: 20

Natural with railway encroachment near top of segment along left bank.



Segment: 21

Railway confinement along left bank and cliff-bluff along right bank.



Segment: 22

Not recently disturbed, although a portion of the left bank was previously diked.



Mill Creek

Sensitive Habitat Inventory and Mapping (SHIM) Segments 18-22

30 0 30 60 90 Meters

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Map:	5 of 19
Title:	Segments 18-22 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

Erosion

Discharge

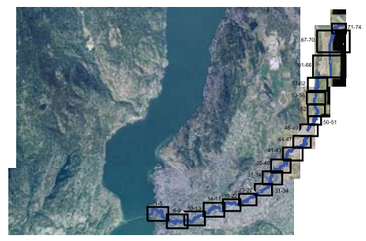
Culvert

Obstruction
- Beaver Dam
- Dam
- Persistent Debris

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

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

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 23-27

Segment	Primary	Secondary	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
23.0	Modified		253	Riffle/Pool	2.0	41-70%	Unknown	1	24	25	50	0	0	5.50	7.00	0.20	0.60	10	0	45	0	35	5	10	5
24.0	Natural	Beaver Pond	176	Slough	1.0	1-20%	Unknown	1	24	25	50	0	0	10.00	10.00	1.20	0.75	90	0	45	0	35	1	14	5
25.0	Modified		355	Run	1.5	1-20%	Potential	20	10	30	39	1	0	4.00	6.00	0.45	0.65	30	5	30	0	20	15	20	10
26.0	Channelized		150	Run	1.5	71-90%	Unknown	5	20	20	45	10	0	5.00	6.00	0.30	0.65	35	20	80	0	0	0	0	0
27.0	Modified	Beaver Pond	572	Slough	0.5	1-20%	Unknown	55	15	15	10	5	0	8.50	5.50	1.00	0.90	90	5	70	0	15	0	5	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		
23.0	Broadleaf forest	Disturbed	young forest	67-100%	Medium	Broadleaf forest	Natural	young forest	67-100%	Medium	2	Low
24.0	Broadleaf forest	Natural	mature forest	67-100%	Medium	Broadleaf forest	Natural	young forest	67-100%	Medium	0	Low
25.0	Herbs/grasses	Disturbed	tall shrubs 2-10m	5-33%	Medium	Herbs/grasses	Unknown	tall shrubs 2-10m	5-33%	Medium	4	Moderate
26.0	Broadleaf forest	Disturbed	young forest	34-66%	Medium	Broadleaf forest	Disturbed	young forest	34-66%	Medium	5	Low
27.0	Herbs/grasses	Disturbed	tall shrubs 2-10m	5-33%	High	Herbs/grasses	Disturbed	young forest	67-100%	Medium	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: 23

Riffle-pool-run.



Segment: 24

Abundant instream woody debris and span logs mostly attributed to beaver activity.



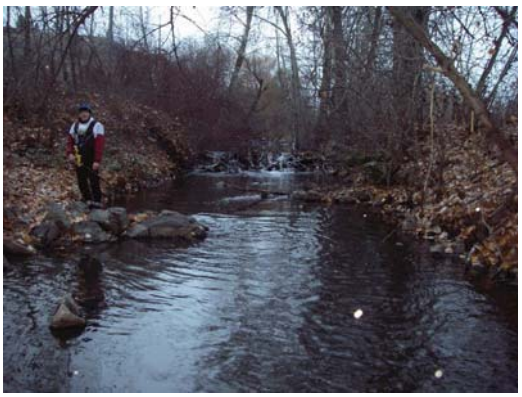
Segment: 25

Central Park. Predominantly run with intermittent weak riffle-pool character. Numerous enhancements



Segment: 26

Diking along both banks with railway along right bank and channelization to Flood diversion.



Segment: 27

Numerous log and rock bank revetments to mitigate erosion and enhance aquatic habitat complexity.



Mill Creek

Sensitive Habitat Inventory and Mapping (SHIM) Segments 23-27

30 0 30 60 90 Meters

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W E
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Map:	6 of 19
Title:	Segments 23-27 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

Obstruction
- Beaver Dam
- Dam
- Persistent Debris

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

- 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 28-30

Segment	Primary	Secondary	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
28.0	Modified		328	Riffle/Pool	1.5	71-90%	Unknown	1	32	33	33	1	0	4.60	8.30	0.22	0.75	65	1	15	0	49	15	15	5
29.0	Channelized		577	Riffle/Pool	1.5	71-90%	Unknown	10	20	25	40	5	0	5.00	6.50	0.17	0.65	10	5	20	0	40	15	15	5
30.0	Modified	Beaver Pond	147	Run	1.0	1-20%	Unknown	25	60	10	5	0	0	5.00	8.00	0.45	1.00	60	0	75	0	10	5	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		
28.0	Broadleaf forest	Disturbed	mature forest	67-100%	Medium	Broadleaf forest	Disturbed	mature forest	67-100%	Medium	4	Moderate
29.0	Broadleaf forest	Disturbed	young forest	34-66%	Medium	Broadleaf forest	Disturbed	young forest	67-100%	Medium	5	Moderate
30.0	Broadleaf forest	Disturbed	tall shrubs 2-10m	34-66%	Medium	Herbs/grasses	Disturbed	low shrubs <2m	34-66%	Medium	4	Very_high

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: 28

Riffle-pool-run.



Segment: 29

Riffle-pool-run. Channelized along right bank by rail-way and armoured over much of left bank.



Segment: 30

Evidence of riffle pool morphology prior to beaver activity. This area is now slow moving (slough).



Mill Creek

Sensitive Habitat Inventory and Mapping (SHIM) Segments 28-30

30 0 30 60 90 Meters

N W E S

Map:	7 of 19
Title:	Segments 28-30 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

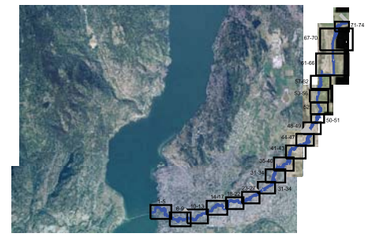
Waterbody
- Discontinued
- Ditch
- Natural Springs
- Other
- Side Channel
- Tributary
- Wetland
- Wetland (polygon)

- 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

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