

REMBLER CREEK

Segments 1-2

Project:	Sensitive Habitat Inventory and Mapping (SHIM)
Location:	Kelowna, BC
Project No.:	06-054
Prepared for:	City of Kelowna
Prepared by:	Ecoscape Environmental Consultants Ltd.
Drawn by:	RW
Checked by:	KH
Projection:	NAD83-UTM Zone 11
Date:	January, 2007

25 12.5 0 25 50 75 Meters

1:1,500

N W E S

LEGEND

- Segment break
- Stream centreline
- Top of bank
- Culvert
- Discharge
- Erosion

Obstruction
- Dam

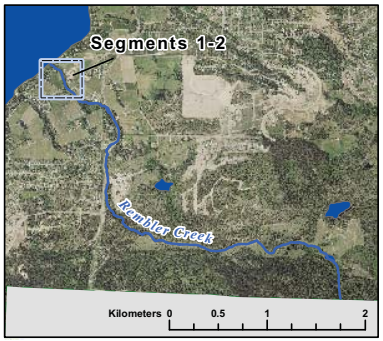
Waterbody
- Tributary
- Other

wetland
- Shallow open water
- Marsh
- Swamp

Modification
- Catchbasin
- Channelization
- Dam / Flood gate
- Fences
- Garbage / Pollution
- Retain wall / Bank stability
- Rip rap
- Road
- Water withdrawal

SOURCE INFORMATION

Base Map:	82E.083 Kelowna
Orthophoto:	2003, provided by City of Kelowna
Stream Information:	Field Inventory
Location Information:	Field, GPS (Trimble GEO XM & XT)
Feature Information:	Field Inventory
Date of Inventory:	2006/9
Inventory Management:	Kyle Hawes, R.P.Bio.



City of Kelowna

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Segments 3-4

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25 12.5 0 25 50 75 Meters

1:1,500

N W E S

LEGEND

- Segment break
- Stream centreline
- Top of bank
- Culvert
- Discharge
- Erosion

Obstruction
- Dam

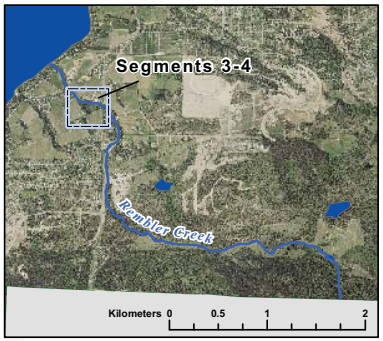
Waterbody
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wetland
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- Swamp

Modification
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Segment 5

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Projection:	NAD83-UTM Zone 11
Date:	January, 2007

25 12.5 0 25 50 75 Meters

1:2,000

N
W E
S

LEGEND

- Segment break
- Stream centreline
- Top of bank
- Culvert
- Discharge
- Erosion

Obstruction
- Dam

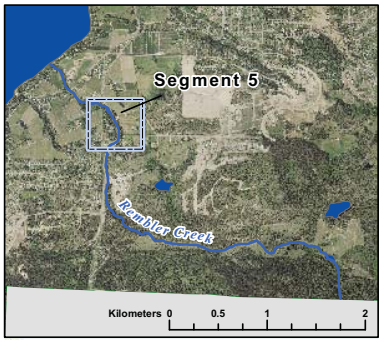
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wetland
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Modification
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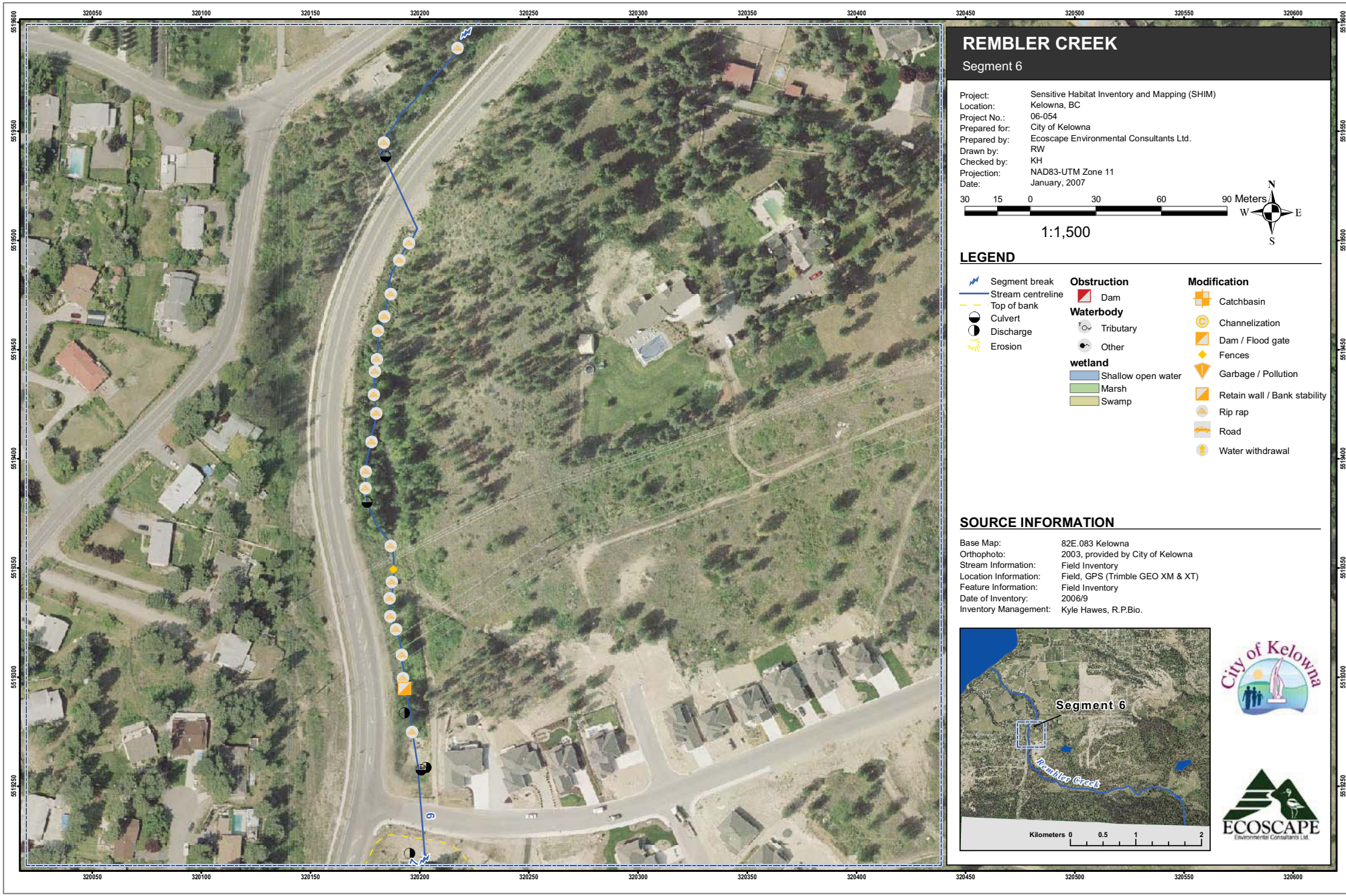
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Feature Information:	Field Inventory
Date of Inventory:	2006/9
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Segment 6

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Date:	January, 2007

30 15 0 30 60 90 Meters

1:1,500

N W E S

LEGEND

- Segment break
- Stream centreline
- Top of bank
- Culvert
- Discharge
- Erosion

Obstruction
- Dam

Waterbody
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Modification
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REMBLER CREEK

Segments 7-9

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Drawn by:	RW
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30 15 0 30 60 90 Meters

1:2,000

N W E S

LEGEND

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Obstruction
- Dam

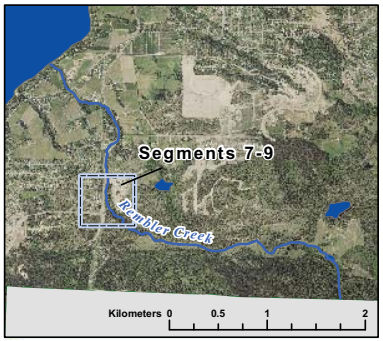
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REMBLER CREEK

Segments 10-12

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Prepared by:	Ecoscape Environmental Consultants Ltd.
Drawn by:	RW
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Projection:	NAD83-UTM Zone 11
Date:	January, 2007

30 15 0 30 60 90 Meters

1:2,500

N W E S

LEGEND

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- Top of bank
- Culvert
- Discharge
- Erosion

Obstruction
- Dam

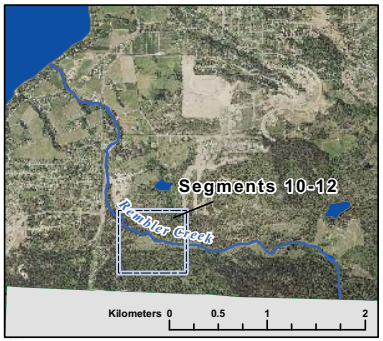
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Segment 13

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Drawn by:	RW
Checked by:	KH
Projection:	NAD83-UTM Zone 11
Date:	January, 2007

80 40 0 80 160 240 Meters

1:5,000

N W E S

LEGEND

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- Stream centreline
- Top of bank
- Culvert
- Discharge
- Erosion

Obstruction
- Dam

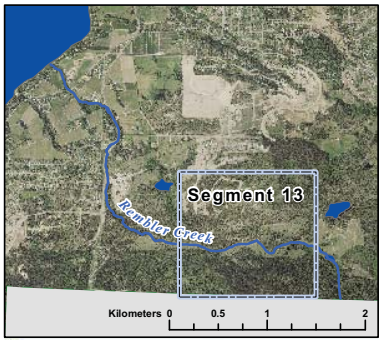
Waterbody
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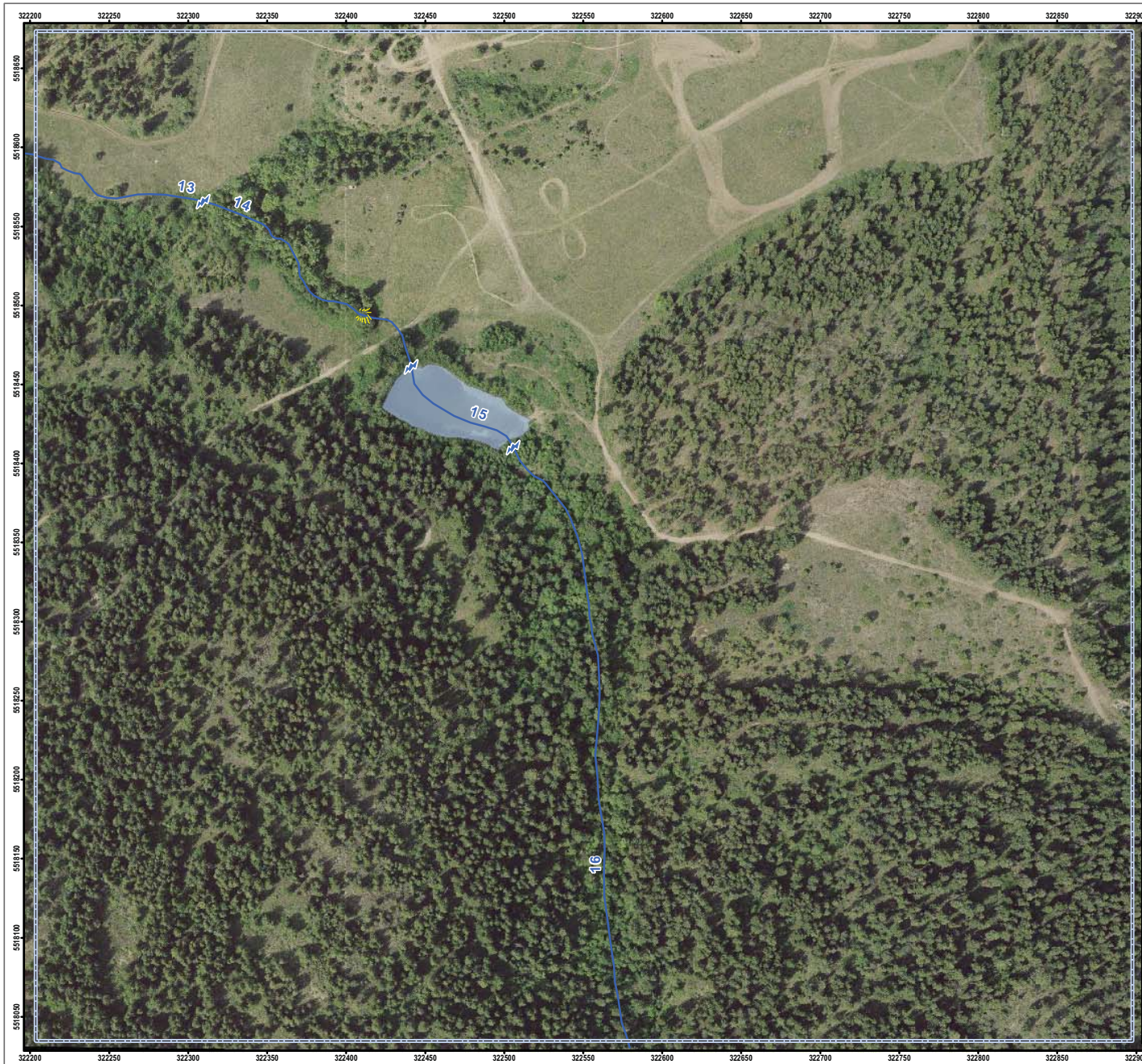
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Segments 14-16

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40 20 0 40 80 120 Meters

1:2,500

N W E S

LEGEND

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Obstruction
- Dam

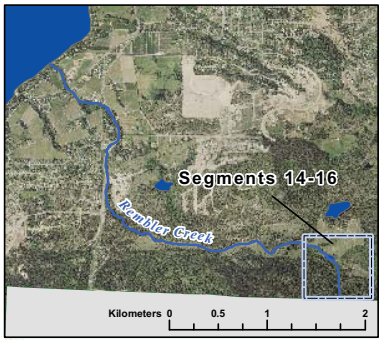
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City of Kelowna

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Rembler Creek
Segment(s): 1 - 2

Segment	Primary	Secondary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Comment Class
1.0	Modified		337.182	Cascade	9.0	>90%	Unknown	Modifications at lake and riparian disturbance - garbage/debris dumps over banks. Some erosion and natural down-cutting into clay bank.
2.0	Channelized		104.121	Cascade	8.0	0	Unknown	Channelized through old field with severe weed invasion.

	Substrates (%) [a]						Channel (m)				
Segment	O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Comment Substrates/Channel
1.0	0	90	9	1	0	0	1.50	2.00	0.03	0.25	Silt-clay substrates with embedded gravels.
2.0	0	0	1	70	29	0	2.00	4.50	0.03	0.25	Rip rap substrates.

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

	Cover (%) [b]								
Segment	Total Cover	B	DP	IV	LWD	OV	SWD	UC	Comment Cover
1.0									Absolute barrier at Okanagan Lake (concrete catch basin-culvert) precludes upstream fish migration.
2.0									

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

Left Bank Riparian								
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
1.0	Mixed forest	Natural	mature forest	67-100%	>=5	<5	Medium	Ravine
2.0	Herbs/grasses	Disturbed	low shrubs <2m	<5%	No	No	High	100% cover of invasive forbs including knapweed; mustard; thistle; burdock.
Right Bank Riparian								
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
1.0	Mixed forest	Natural	mature forest	67-100%	>=5	<5	Medium	Ravine
2.0	Herbs/grasses	Disturbed	low shrubs <2m	<5%	No	No	High	100% cover of invasive forbs including knapweed; mustard; thistle; burdock.

Segment	Comment - Flora	Comment - Flora
1.0	Cottonwood; fir; pine; Oregon grape; water birch; Douglas maple; nightshade; burdock; raspberry.	
2.0	Burdock; mustards; nightshade; Northern watercress; sow thistle; mullein.	

	Level of Impact [c]		Enhancement Opportunity	
Segment	Rating	Comment	Rating	Comment
1.0	1_bank_low	Encroachment to top of bank and some debris over banks and adjacent stream channel.	Low	
2.0	Both_banks_high		High	Riparian restoration, channel restoration, weed management.

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





Rembler Creek
Segment(s): 3 - 4

Segment	Primary	Secondary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Comment Class
3.0	Modified	Wetland	66.460	Standing	0.0	0	Unknown	Settling pond-shallow open water - tall rush marsh and tall shrub thicket margin.
4.0	Modified		231.097	Cascade	7.0	>90%	Unknown	Modified, young aspen-cottonwood stand over bottom 25m of Segment 4.

	Substrates (%) [a]						Channel (m)				
Segment	O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Comment Substrates/Channel
3.0	30	70	0	0	0	0	15.00	20.00	1.00	1.50	
4.0	10	85	5	0	0	0	0.60	1.20	0.05	0.50	Down-cut in areas with channel confined/restricted to 0.6m width.

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

	Left Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
3.0	Shrubs	Disturbed	tall shrubs 2-10m	67-100%	No	No	High	Shrub thicket with cottonwood saplings.
4.0	Broadleaf forest	Natural	mature forest	67-100%	>=5	>=5	Low	Cottonwood-red-osier dogwood-Douglas maple riparian gully.

	Right Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
3.0	Herbs/grasses	Disturbed	low shrubs <2m	67-100%	No	No	High	Invasive forbs and mixed shrubs.
4.0	Broadleaf forest	Natural	mature forest	67-100%	>=5	>=5	Low	Cottonwood-red-osier dogwood-Douglas maple riparian gully.

Segment	Comment - Flora	Comment - Flora
3.0	Willow; cattail; cottonwood; fir; red-osier dogwood; invasive forbs; nettle.	Mallard; White-crowned Sparrow.
4.0	Cottonwood; water birch; alder; snowberry; aspen; Oregon grape; rose.	

	Level of Impact [c]		Enhancement Opportunity	
Segment	Rating	Comment	Rating	Comment
3.0	Both_banks_low	Modified/constructed basin - providing ecological benefits and increased biodiversity values.	Low	
4.0	1_bank_low		Low	

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





Rembler Creek
Segment(s): 5

Segment	Primary	Secondary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Comment Class
5.0	Ditch		545.866	Cascade	6.0	0	Unknown	Rip rap armoured channel along Chute Lk. Rd.

	Substrates (%) [a]						Channel (m)				
Segment	O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Comment Substrates/Channel
5.0	0	0	1	19	80	0	0.30	4.30	0.00	1.00	Rip rap. Discontinuous wetted sections.

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

	Left Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
5.0	High Impervious	Urban_Residential					High	Chute Lake Road.

	Right Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
5.0	Mixed forest	Disturbed	young forest	34-66%	No	No	High	

Segment	Comment - Flora	Comment - Flora
5.0	Fir; ponderosa pine; invasive forbs; graminoids.	

	Level of Impact [c]		Enhancement Opportunity	
Segment	Rating	Comment	Rating	Comment
5.0	Both_banks_high		Low	

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



Rembler Creek
Segment(s): 6

Segment	Primary	Secondary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Comment Class
6.0	Modified	Intermittent	404.807	Slough	4.0	21-40%	Unknown	Moist to wet gully with discontinuous flows/pooling - extensive channel/flood mitigation works.

	Substrates (%) [a]						Channel (m)				
Segment	O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Comment Substrates/Channel
	1	80	4	5	5	0	0.10	4.50	0.01	1.00	Cobble and bedrock represent rip rap channel modifications (check dams and rock aprons). Modified gully.

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

	Left Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
	Mixed forest	Urban_Residential	tall shrubs 2-10m	67-100%	No	No	High	Chute Lake Road at top of gully bank - disturbed riparian gully community.

	Right Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
	Mixed forest	Disturbed	young forest	67-100%	No	No	High	Mixed treed-tall shrub riparian gully.

Segment	Comment - Flora	Comment - Flora
	Ponderosa pine;fir;water birch;willow sp.;red-osier dogwood;burdock;thistle;grasses;water smartweed	

	Level of Impact [c]		Enhancement Opportunity	
Segment	Rating	Comment	Rating	Comment
	Both_banks_mod	Intensive channel works - however disturbance confined to check dam installation - no recontouring.	Low	

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



Rembler Creek
Segment(s): 7 - 9

Segment	Primary	Secondary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Comment Class
7.0	Modified	Wetland	236.133	Slough	4.0	41-70%	Unknown	Tall shrub swamp thicket - road fill slope (Chute Lake Road encroachment) along left bank. Discontinuous flows and defined channel.
8.0	Modified	Intermittent	159.449	Riffle/Pool	4.5	1-20%	Unknown	Riparian gully - burned - channel modifications in bottom of segment - moderate weed invasion.
9.0	Modified	Intermittent	98.308	Riffle/Pool	10.0	1-20%	Unknown	2.5 - 3.5 m channel down-cutting since fire and flood.

	Substrates (%) [a]						Channel (m)				
Segment	O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Comment Substrates/Channel
7.0	90	4	0	1	0	0	0.80	1.40	0.01	0.10	Channel poorly defined in areas and becomes wetland/standing water. Fibric organic/ soils/sand - cobbles occur at road slope toe.
8.0	35	60	4	1	0	0	0.50	1.40	0.01	0.10	Poorly defined channel in areas. Mix of fines and organic material in gully.
9.0	1	50	19	30	0	0	1.00	3.00	0.01	0.20	Scouring down to cobble more coarse substrates over clay.

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

	Left Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
7.0	Disturbed wetland	Disturbed	sapling >10m	67-100%	No	No	High	Cottonwood-red-osier dogwood riparian gully/swamp thicket with Chute Lk. Rd. encroachment.
8.0	Herbs/grasses	Disturbed	low shrubs <2m	5-33%	>=5	No	High	Burned - water birch, pine, and fir snags with predominant herbs and grass - early successional.
9.0	Shrubs	Disturbed	low shrubs <2m	67-100%	>=5	No	Low	Considerable bank erosion.

	Right Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
7.0	Disturbed wetland	Disturbed	sapling >10m	67-100%	No	No	High	Cottonwood-red-osier dogwood riparian gully/swamp thicket - subdivision development on right bank
8.0	Herbs/grasses	Disturbed	low shrubs <2m	5-33%	>=5	No	High	Burned - water birch, pine, and fir snags with predominant herbs and grass - early successional.
9.0	Shrubs	Disturbed	low shrubs <2m	67-100%	>=5	No	Low	Considerable bank erosion.

Segment	Comment - Flora	Comment - Flora
7.0	Red-osier dogwood; willow sp.; alder; water birch; cottonwood; snowberry; Douglas maple; rose	
8.0	Thistle; fireweed; catnip; raspberry; graminoids; snowberry.	
9.0	Thistle; fireweed; Oregon grape; snowberry; raspberry; graminoids.	

	Level of Impact [c]		Enhancement Opportunity	
Segment	Rating	Comment	Rating	Comment
7.0	1_bank_low	Despite historic encroachments this gully has not been physically altered and regenerating well.	Nil	
8.0	1_bank_high	Disturbed in lower half by salvage logging and urban activities.	Moderate	Weed management.
9.0	1_bank_mod	Channel instability from fire-lack of vegetation-and increased flood activity since fire.	Low	

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


Segment 7


Segment 8


Segment 9

Rembler Creek
Segment(s): 10 - 12

Segment	Primary	Secondary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Comment Class
10.0	Modified	Intermittent	274.376	Cascade	9.0	21-40%	Unknown	Partially unburned fir canopy. Mixed small channel-dry gully - perhaps exacerbated by livestock movement along stream line.
11.0	Modified	Intermittent	151.060	Other	5.0	1-20%	Unknown	Predominantly dry gully with intermittent wetted areas to no defined channel. Cattle may have exacerbated development of small defined channel.
12.0	Modified	Intermittent	310.971	Other	0.2	0	Unknown	

	Substrates (%) [a]						Channel (m)				
Segment	O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Comment Substrates/Channel
10.0	10	70	10	10	0	0	0.80	1.00	0.01	0.20	Organic muck in depressional areas where pooling occurs.
11.0	5	75	15	5	0	0	0.00	0.50	0.00	0.15	Intermittent wetted seeps and poorly defined channel.
12.0	5	75	15	5	0	0	0.00	0.00	0.00	0.15	Discontinuous, very poorly defined channel through old field/meadow.

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

Left Bank Riparian								
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
10.0	Mixed forest	Disturbed	low shrubs <2m	34-66%	>=5	No	Medium	Burned - mixed gully stand of fir and water birch and ponderosa pine.
11.0	Coniferous forest	Disturbed	mature forest	5-33%	>=5	No	High	Partially intact (unburned) forest stand
12.0	Herbs/grasses	Disturbed			No	No	High	Old field/meadow

Right Bank Riparian								
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
10.0	Mixed forest	Disturbed	low shrubs <2m	34-66%	>=5	No	Low	Burned - mixed gully stand of fir and water birch and ponderosa pine.
11.0	Coniferous forest	Disturbed	mature forest	5-33%	>=5	No	Low	Partially intact (unburned) forest stand
12.0	Herbs/grasses	Disturbed			No	No	Low	Old field/meadow

Segment	Comment - Flora	Comment - Flora
10.0	Fir; water birch; fireweed; Oregon grape; snowberry; burdock; graminoids.	Red Breasted Nuthatch; Pygmy Nuthatch; Northern Flicker; Varied Thrush; Mountain Chickadee
11.0	Ponderosa pine; fir; snowberry; Oregon grape; rose; graminoids	R-BNuthatch;PYNuthatch;Northern Flicker; Varied Thrush; Downy Woodpecker;
12.0	Graminoids; sulphur cinquefoil; knapweed; bromes.	

	Level of Impact [c]		Enhancement Opportunity	
Segment	Rating	Comment	Rating	Comment
10.0	1_bank_mod	Cattle utilization through channel.	Low	Allow to regenerate naturally.
11.0	1_bank_mod	Livestock	Low	
12.0	1_bank_low	Livestock access throughout field.	Low	

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


Segment 10


Segment 11


Segment 12

Rembler Creek
Segment(s): 13

Segment	Primary	Secondary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Comment Class
13.0	Modified	Intermittent	1505.190	Other	0.0	0	Unknown	Majority of stream flows subsurface with very poorly defined channel - discontinuous vernal surface flows. Livestock access.

	Substrates (%) [a]						Channel (m)				
Segment	O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Comment Substrates/Channel
13.0	0	100	0	0	0	0	0.00	0.60	0.00	0.10	Discontinuous very poorly defined channel

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

Left Bank Riparian								
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
13.0	Herbs/grasses	Disturbed		<5%	No	No	High	Old field - high weed invasion ratio

Right Bank Riparian								
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
13.0	Herbs/grasses	Disturbed		<5%	No	No	High	Old field - high weed invasion ratio

Segment	Comment - Flora	Comment - Flora
13.0	knapweed; sulphur cinquefoil; bromes; mullein	

	Level of Impact [c]		Enhancement Opportunity	
Segment	Rating	Comment	Rating	Comment
13.0	Both_banks_mod		Nil	

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



Rembler Creek
Segment(s): 14 - 16

Segment	Primary	Secondary	Length (m)	Hydraulic	Gradient (%)	Crown Closure	Spawning Habitat	Comment Class
14.0	Natural	Ephemeral	184.104	Cascade	25.0	41-70%	Unknown	Cottonwood - red-osier dogwood riparian gully
15.0	Modified	Wetland	87.777	Standing	0.0	1-20%	Unknown	Constructed shallow open water/submerged aquatic
16.0	Natural	Ephemeral	397.796	Cascade	8.0	41-70%	Unknown	Burned

	Substrates (%) [a]						Channel (m)				
Segment	O	F	G	C	B	R	Wetted Width	Bankfull Width	Wetted Depth	Bankfull Depth	Comment Substrates/Channel
14.0	0	50	30	19	1	0	0.00	0.70	0.00	0.20	Intermittent flows - seepage through gully - channel well defined.
15.0	0	99	1	0	0	0	39.00	37.00	1.10	2.00	Outlet eroded causing pond to loose volume capacity.
16.0	0	0	30	70	0	0	0.40	1.70	0.08	0.30	

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

	Left Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
14.0	Broadleaf forest	Disturbed	tall shrubs 2-10m	67-100%	>=5	No	Low	Burned cottonwood forest
15.0	Mixed forest	Disturbed	Young forest	67-100%	>=5	No	High	Toe of prominent hill slope - fire disturbance
16.0	Mixed forest	Disturbed	Young forest	67-100%	>=5	No	Medium	

	Right Bank Riparian							
Segment	Class	Qualifier	Stage	Shrub cover	Snags	Veteran Trees	Bank stability	Comment
14.0	Broadleaf forest	Disturbed	tall shrubs 2-10m	67-100%	>=5	No	Low	Burned cottonwood forest
15.0	Broadleaf forest	Disturbed	young forest	67-100%	>=5	No	High	Toe of prominent hill slope - fire disturbance
16.0	Mixed forest	Disturbed	young forest	67-100%	>=5	No	Medium	

Segment	Comment - Flora	Comment - Flora
14.0	Cottonwood; water birch; fireweed; rose; red-osier dogwood; raspberry	
15.0	Cottonwood; fir; rose; red-osier dogwood; water birch	
16.0	Cottonwood; water birch; fir; Oregon grape; snowberry; fireweed	

	Level of Impact [c]		Enhancement Opportunity	
Segment	Rating	Comment	Rating	Comment
14.0	1_bank_low	Modified at top and bottom of gully	Nil	
15.0	1_bank_mod	Constructed berm on right bank creating pond	Low	
16.0	1_bank_low	Old flume	Low	

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



