

APPENDIX D

AQUATIC FIELD SURVEY RESULTS

- Fish Habitat and Fish Habitat Survey Results
 - Water Quality Analysis Results

Common Name	Scientific Name	Observed (O) Likely to Occur (L)
American eel	<i>Anguilla rostrata</i>	L
Atlantic salmon	<i>Salmo salar</i>	O
Brown trout (sea run)	<i>Salmo trutta</i>	L
Brook trout (sea run)	<i>Salvelinus fontinalis</i>	L
Creek chub	<i>Semotilus atromaculatus</i>	O
Gaspereau (alewife)	<i>Alosa pseudoharengus</i>	L
Nine-spine stickleback	<i>Pungitius pungitius</i>	O
American shad	<i>Alosa sapidissima</i>	L
Rainbow smelt	<i>Osmerus mordax</i>	L
Northern redbelly dace	<i>Phoxinus eos</i>	O
Banded killifish	<i>Fundulus diaphanus</i>	O
Three-spine stickleback	<i>Gasterosteus sculeatus</i>	O
Four-spine stickleback	<i>Apeltes Quadracus</i>	O

Order	Family	Found at Crossing #	Tolerance Value ¹
Diptera	Simuliidae	5 – upstream	6
Diptera	Tipulidae	5 – upstream	3
Diptera	Other	5 – upstream	
Diptera	Tipulidae	5- downstream	3
Diptera	Other	5- downstream	
Coleoptera	Psephenidae	5-downstream	4
Ephemeroptera	Ephemerillidae	5-downstream	1
Diptera	Simuliidae	8 - upstream	6
Diptera	Chironomidae	8 – upstream	6-8
Diptera	Other	8 – upstream	
Ephemeroptera	Ephemerillidae	8 – upstream	1
Trichoptera	Odontoceridae	8 – upstream	0
Trichoptera	Limnephilidae	8 – upstream	4
Plecoptera	Perlidae	8 - upstream	1
Coleoptera	Psephenidae	8 - downstream	4
Diptera	Chironomidae	8 - downstream	6-8
Ephemeroptera	Ephemerillidae	8 - downstream	1
Trichoptera	Odontoceridae	8 - downstream	0
Diptera	Other	8 - downstream	

¹ Mandaville S.M. 2002. Benthic Macroinvertebrates in freshwater- Tolerance Family Level.

Tolerance value range from 0 for organisms very intolerant of organic wastes to 10 for organisms very tolerant to organic wastes.

Fish Habitat Survey Parameters

physical units:	riffles, pools, runs, glides/flats, falls, cascades, chute, rapids
stream morphology:	main channel, braided, spilt channel, etc.
substrate composition:	detritus, composed of small organic particles silt/clay, <0.08 mm sand 0.08 - 4.75 mm gravel 4.75 - 75 mm cobble 75-300 mm boulder >300 mm bedrock
embeddedness:	0-20%, 20-35%, 35-50%, >50%
stream depth:	average of ?, ? and ? across channel
widths:	wet and channel width
bank height:	height of bank at waters edge
water velocity:	measured time for floating object to travel one metre
bank stability:	75-100% stable, little or no erosion, no slumping, growth of vegetation 50-75% moderately stable, eroding at moderate pace, 2:1 angle, vegetation on slope 0-50% highly unstable, 1:1 angle, loose material rolling down, trees toppled
instream cover:	undercut banks, ricks, logs, trees, pools, debris none 0%, sparse 0-25%, moderate 25-75%, dense 75-100%
overhead cover:	0-20%, 20-50%, 50-75% >75%
bank cover:	percentage cover and species
dissolved oxygen (DO):	calibrated DO meter
temperature:	calibrated dissolved oxygen meter
pH:	calibrated pH meter
conductivity:	calibrated conductivity meter

Rearing and Spawning Habitat Classification System

Rearing and spawning habitat was classified using a rating system. The categories within this system are as follows:

Table D3 Rearing and Spawning Habitat Classification System	
Type 1	Good salmonid spawning and rearing habitat
flows:	moderate riffles, current 0.1 to 0.3 m/s
depth:	relatively shallow, 0.3 to 1.0 m
substrate:	gravel to small cobble size rock, some larger rocks and boulders
Type 2	Good salmonid rearing habitat with limited spawning, usually only in isolated gravel pockets. Provides good feeding and holding areas.
flows:	heavier riffles to light rapids, current 0.3 to 1.0 m/s
depth:	variable from 0.3 to 1.5 m
substrate:	larger cobble/rubble size rock to boulders, some gravel pockets between larger rocks
Type 3	Good rearing habitat with no spawning capabilities, or used for migratory purposes.
flows:	very fast and turbulent, heavy rapids, chutes, small waterfalls, current > 1.0 m/s
depth:	variable, >1.5 m
substrate:	large rock and boulders, bedrock
Type 4	Poor juvenile salmonid rearing habitat with no spawning capability; may provide shelter and feeding habitat.
flows:	sluggish, currents <0.15 m/s
depth:	variable but often <0.5 m
substrate:	soft sediment or sand, occasionally large boulders or bedrock, aquatic macrophytes present in many locations
Type 5	No habitat available for rearing or spawning; usually too steep for fish access or intermittent headwater streams.
flows:	intermittent
depth:	variable <0.5 m
substrate:	variable from soft organic or gravel, cobble, sand

Table D4 Left and Right Bank Slopes, Proposed Highway #104 Antigonish June 2002

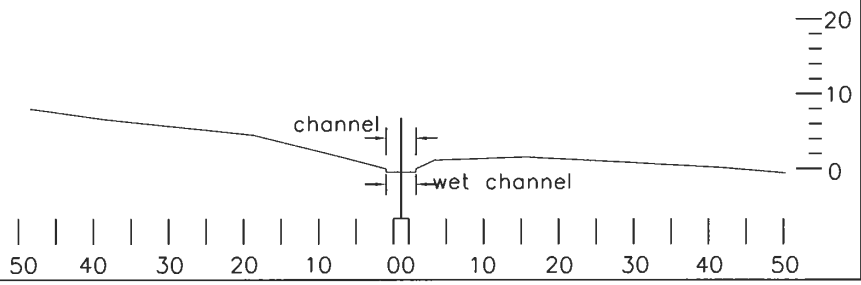
Stream Crossing No.	Left Bank		Right Bank	
	Distance (m)	Slope (%)	Distance (m)	Slope (%)
1 0+100	6.5	15	2.7	25
	11.7	14	12	2
	20	6	26	-3
	10	8	9	-5
2 0+800	6.2	15	3	45
	3	3	3.5	27
	5	-3	(Existing Highway)	
	36	0		
3 1+400	5	0	50	2
	7.3	10		
	42	2		
4 1+500	4.3	25	6.3	18
	23	2	17.9	7
	25	1	23.8	0
5 2+600	5.4	4	14.5	4
	5.7	7	13.1	9
	5.2	16	19.6	13
	5.4	30		
	10	31		
	9.8	32		
6 4+150	10.7	0	6	1
	40	1	11	0
7 5+500			10	1
			15	2
	19.5	3	8	6
	28	7	29.5	5
8 5+700	2	2	12	7
	5.9	3	3.4	35
	5.1	26	11	3
	18	1	12.8	1
	4	18	12	1
9 6+750			12	2
	3	58	2.2	25
	11.1	18	6.2	17
	15	8	15.6	4
10 6+950	20	6	17	2
	7.5	36	9.5	10
	32	3	14	39
			13.1	26
11 8+150			16.7	8
	7	44	8	14
	9	9	19	19
	14	2	25	10
12 9+000	25	12		
	50	1	10	1
			15	2
			22	1
13 10+200	4	20	6	14
	4.4	45	4	26
	10	9	5	14
	9	5	8	7
	11.5	6	12	6
	20	4		
14 10+850	1.3	47	1	55
	28	4	20	2
	17.7	0	17	18
	11	12	10	7
15 14+600	35	2	10	1
	15	1	20	2
			20	2

Table D5 Unnamed Brierly Brook Tributary (Stream Crossing No.1) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (0+100)	
Physical Units	Stream
Substrate	10% boulder, 40% cobble, 25% sand, 25% silt
Embeddedness	>50%
Mean Depth (cm)	12cm
Dimensions (m)	wet width 0 - 0.55m, channel width 1m
Bank Stability	50%-75 %
Overhead Cover	0%-20%
Bank Cover	grasses, sedges and rushes - 10%
Instream Cover	sparse 0%-25%
Physical Observations and Habitat Type	
Conductivity (µS/cm)	34
Flow (m ³ /s)	Not possible to calculate
Water Colour	colourless
pH	6.9
Temperature (°C)	14
Fish and Fish Habitat	No fish seen. Was not electrofished due to small size, low conductivity and apparent lack of habitat. Type 5 salmonid habitat.

Table D6 Unnamed Brierly Brook tributary (Stream Crossing No. 1) Erosion Sensitivity Level					
Bank	Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown clay-sand, some organic and gravel	moderate	15% – 8%	low	Moderate - low
Right	Dark reddish brown clay-sand with some organic and gravel	moderate	25% - (-5)%	moderate	moderate

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)

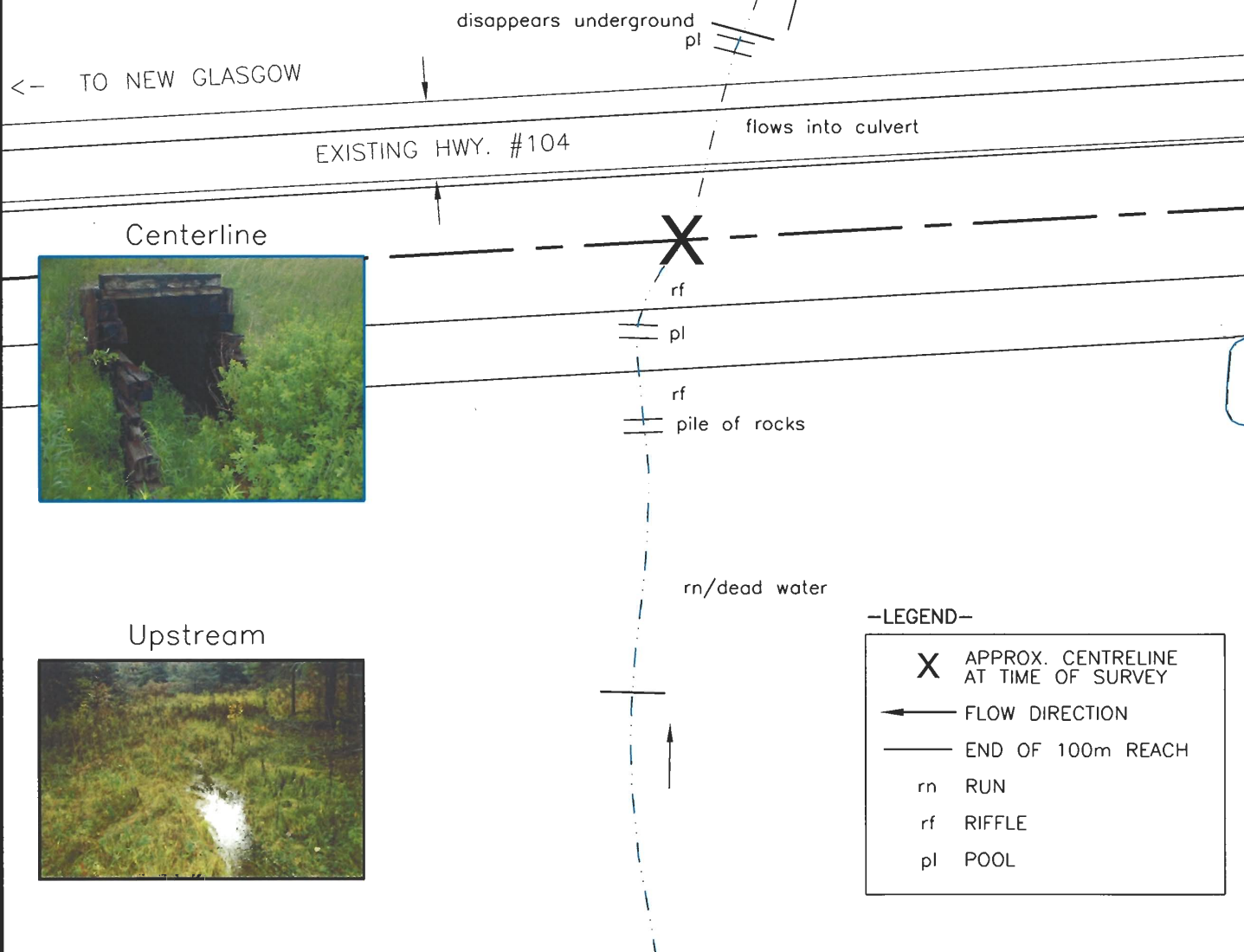
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PROFILE AT CENTERLINE



Downstream



Centerline



Upstream

-LEGEND-

- X** APPROX. CENTRELINE AT TIME OF SURVEY
- FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL

TRIBUTARY TO ANTIGONISH HWY #104
 HABITAT SURVEY
 STREAM CROSSING NO. 1

SCALE 1: 1000

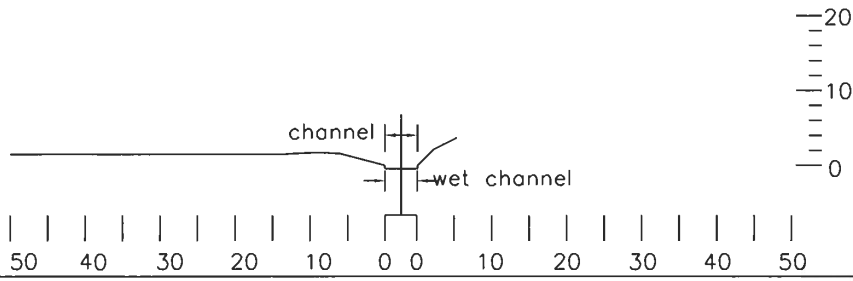


Table D7 Unnamed Stream (Stream Crossing No.2) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (0+800)	
Physical Units	Marsh drainage - stream
Substrate	Silt, 100%
Embeddedness	>50%
Mean Depth (cm)	40cm
Dimensions (m)	3.9m – wet width, 4.4m – channel width
Bank Stability	75%-100%
Overhead Cover	0%-20%
Bank Cover	Grasses, cattails and water horsetail – 15%
Instream Cover	Cattails and filamentous algae, some sections almost completely dominated with Typhus. Spp. (25% – 75%)
Physical Observations and Habitat Type (not available due to absence of flow)	
Conductivity (FS/cm)	168
Flow (m³/s)	N/A
Water Colour	brown
pH	5.54
Temperature (°C)	15.9
Fish and Fish Habitat	Brief electrofishing in open water at culvert yielded no specimens, poor footing and heavy vegetative cover limited electrofishing access in the marsh. This marsh has been identified as important overwintering habitat for brook trout (D. Goth, pers. comm. 2002) The stream also is likely important in maintaining the natural hydrologic function of its origin wetland. This site is rated based on morphology, substrate and habitat characteristics as Type 3 slamonid habitat.

Table D8 Unnamed Stream (Stream Crossing No.2) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown sandy clay with sandstone gravel, root hairs and roots.	moderate	15%-(-3)%	low	low
Right	Dark reddish brown silty clay sand, with some fine gravel	high	45% – 27%	high	high

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)

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Downstream



PROFILE AT CENTERLINE

STORAGE

TRUNK 4

dead water
rn
pl
rf
pl

Centerline

EXISTING HWY. #104

culvert under
highway

dead water



dead water

pl

-LEGEND-

- X** APPROX. CENTRELINE AT TIME OF SURVEY
- ← FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL

dead water

wetland

Upstream



TRIBUTARY TO ANTIGONISH HWY #104 HABITAT SURVEY STREAM CROSSING NO. 2

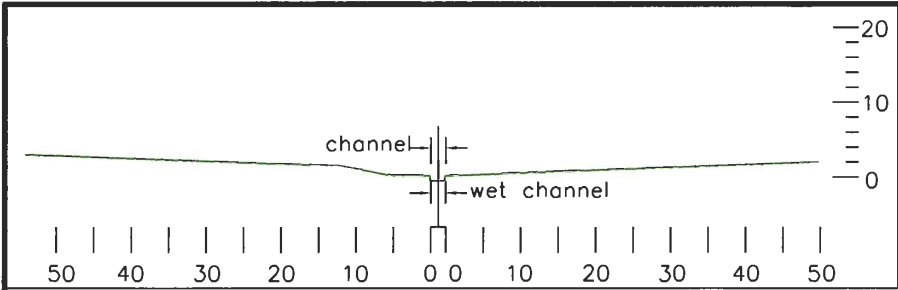
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Table D9 Unnamed Stream (Stream Crossing No.3) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (1+400)	
Physical Units	Intermittent marshy stream
Substrate	100% silt
Embeddedness	>50%
Mean Depth (cm)	5cm
Dimensions (m)	Undefined standing water marsh habitat, no definable stream morphology at time of survey
Bank Stability	75%-100%
Overhead Cover	20%-50%
Bank Cover	Water horsetail, grey alder and cattails – 15%
Instream Cover	Cattails, rushes and water horsetail (25%-75%)
Physical Observations and Habitat Type (not available due to absence of flow)	
Conductivity (FS/cm)	1012
Flow (m³/s)	NA - due to low water conditions at time of survey
Water Colour	colourless
pH	6.8
Temperature (°C)	16.4
Fish and Fish Habitat	Although not characteristic, preferred trout habitat, this site is connected to the marsh that has been outlined as overwintering trout habitat(DFO). Electrofishing was not possible due to the limiting morphological dimensions of the stream at time of survey. Based on morphology and habitat characteristics this stream denotes a salmonid habitat rating of Type 5.

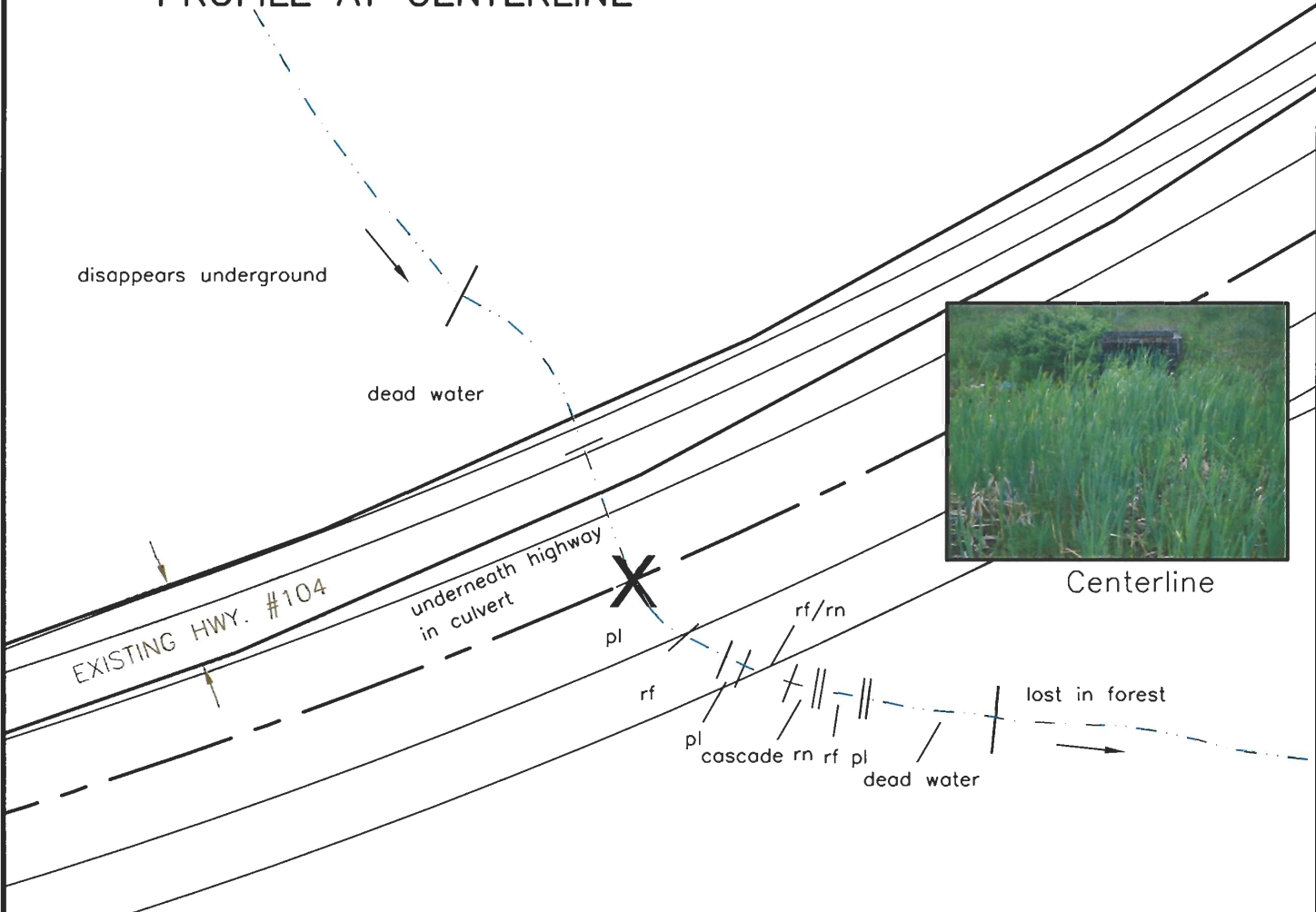
Table D10 Unnamed Stream (Stream Crossing No.3) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown clay sand with gravel.	moderate	10%	negligible	low
Right	Dark reddish brown clay silt sand with gravel and root hairs.	moderate	2%	negligible	low

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)



PROFILE AT CENTERLINE

Upstream



Centerline

Downstream



-LEGEND-

- APPROX. CENTRELINE AT TIME OF SURVEY
- FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL

TRIBUTARY TO ANTIGONISH HWY #104
HABITAT SURVEY
STREAM CROSSING NO. 3

SCALE 1: 1000

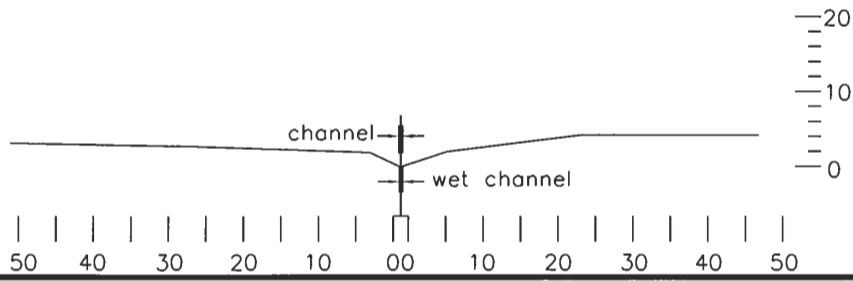


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Table D11 Unnamed Stream (Stream Crossing No.4) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (1 + 500)	
Physical Units	Marshy stream with standing water (concrete culvert at existing highway)
Substrate	Cobble 30%, sand 50%, silt 20%
Embeddedness	>50%
Mean Depth (cm)	30cm
Dimensions (m)	0.45m below culvert, 2-3m standing water above culvert
Bank Stability	75%-100%
Overhead Cover	0%-20%
Bank Cover	Grammanoid spp., buttercups, water horsetails and grey alder, 15%
Instream Cover	Horsetails and cattails, some woody debris (0-20%)
Physical Observations and Habitat Type	
Conductivity (FS/cm)	1830
Flow (m³/s)	NA (due to standing nature of water and shallow gradient)
Water Colour	yellow
pH	6
Temperature (°C)	16
Fish and Fish Habitat	No fish or fish habitat at time of survey. As with crossing 3 this site does flow from the marsh identified as salmonid overwintering habitat. Type 3 Salmonid habitat.

Table D12 Unnamed Tributary (Stream Crossing No.4) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown clay sand with coarse gravel.	moderate	25% – 1%	moderate	moderate
Right	Dark reddish brown clay sand to sand clay with gravel.	moderate	7% – 18%	moderate	moderate

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)



PROFILE AT CENTERLINE

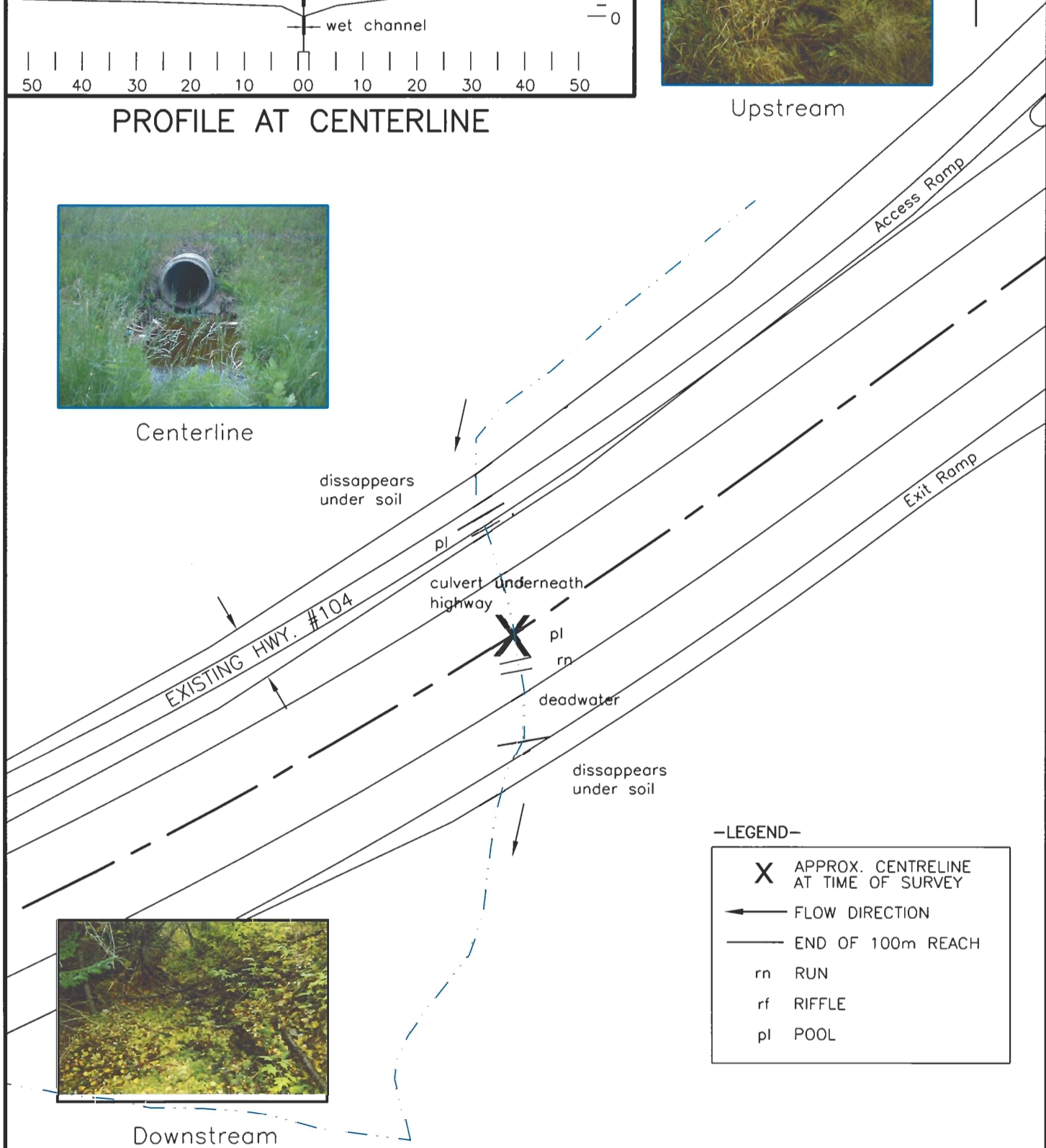


Upstream



Centerline

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-LEGEND-

- APPROX. CENTRELINE AT TIME OF SURVEY
- FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL



Downstream

TRIBUTARY TO ANTIGONISH HWY #104
HABITAT SURVEY
STREAM CROSSING NO. 4

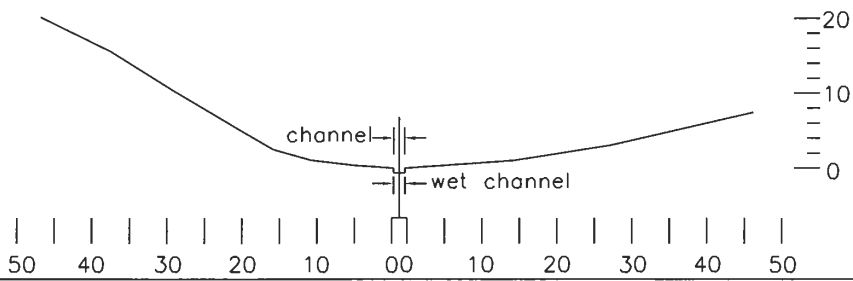
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Table D13 Unnamed Stream (Stream Crossing No. 5) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (2 + 600)	
Physical Units	Small brook
Substrate	40% boulder, 20% cobble, 40% silt
Embeddedness	20%-35%
Mean Depth (cm)	4cm
Dimensions (m)	0.60m wet width, 1.5m channel width
Bank Stability	50%-75%
Overhead Cover	Black spruce, and grey alder – (50%)
Bank Cover	Club moss, black spruce, sensitive fern - (20%)
Instream Cover	Woody debris, sparse (0-20%)
Physical Observations and Habitat Type	
Conductivity (FS/cm)	411
Flow (m³/s)	NA (not enough water to calculate)
Water Colour	colourless
pH	6.6
Temperature (°C)	12
Fish and Fish Habitat	Salmonid habitat rating of Type 3. Heavy siltation and low discharge would limit the potential for spawning habitat. Although there would be a possibility that the habitat could be utilized in a transitory nature by brook trout and cyprinides.

Table D14 Unnamed brook (Stream Crossing No.5) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish silty clay sand, some organic	moderate	4% – 32%	high	Moderate - high
Right	Dark reddish silty clay sand, some organic with lower moisture content than left side.	moderate	4%– 13%	low	Moderate - low

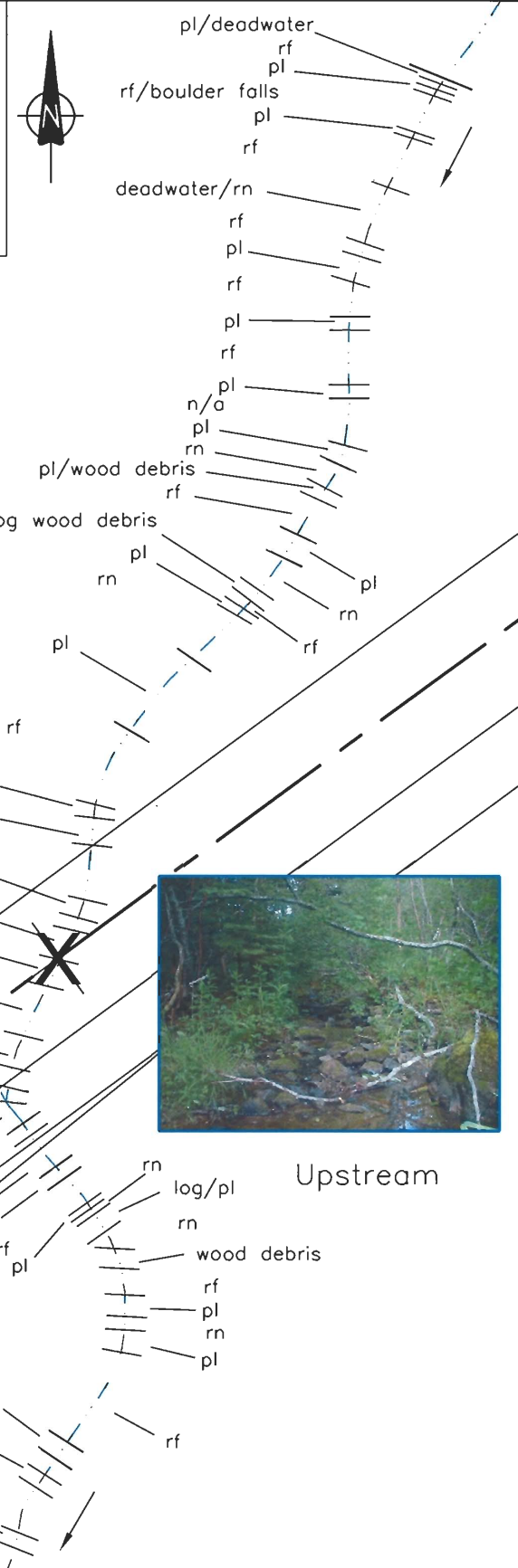
*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)



PROFILE AT CENTERLINE

—LEGEND—

- X** APPROX. CENTRELINE AT TIME OF SURVEY
- ← FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL



Downstream



Centreline



Upstream



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TRIBUTARY TO ANTIGONISH HWY #104
HABITAT SURVEY
STREAM CROSSING NO. 5

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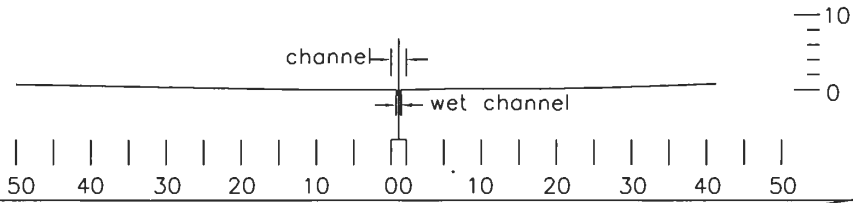


Table D15 Unnamed Stream (Stream Crossing No.6) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (4+150)	
Physical Units	Stream in low lying marshy area
Substrate	100% Silt
Embeddedness	>50%
Mean Depth (cm)	7cm
Dimensions (m)	Wet width 0.4m, Channel width 0.62m
Bank Stability	50% - 75%
Overhead Cover	20% -50%, grey alders
Bank Cover	Black spruce, sensitive fern, grammanoid spp., 10 %
Instream Cover	Woody debris, (20%)
Physical Observations and Habitat Type	
Conductivity (FS/cm)	658
Flow (m³/s)	NA – due to low water conditions at time of survey
Water Colour	colourless
pH	6.5
Temperature (°C)	15
Fish and Fish Habitat	This site had heavy siltation and high turbidity. The salmonid habitat was marginal and classified as Type 4. Electrofishing did yield four three-spine sticklebacks and one nine-spine stickleback. Four-spine stickleback and northern redbelly dace have also been observed in this brook (Taylor and Juurlink 2004).

Table D16 Unnamed Stream (Stream Crossing No.6) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dar reddish brown silty clay sand. Slightly wet with minimal organics	moderate	1%	negligible	low
Right	Same as left with higher organic content.	moderate	1% - 2%	negligible	low

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)

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Downstream

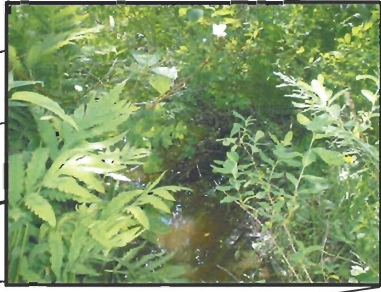
PROFILE AT CENTERLINE

HIGHWAY #104

ACCESS RAMP

no defined channel

Centerline



standing water/pl

rf

pl

culvert

pl

pl

culvert

pl

rf

culvert

pl/rn

rf

pl

HIGHWAY # 104 EXIT RAMP

Upstream



STORAGE

-LEGEND-

- APPROX. CENTRELINE AT TIME OF SURVEY
- FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL

STORAGE

TRIBUTARY TO ANTIGONISH HWY #104 HABITAT SURVEY STREAM CROSSING NO. 6

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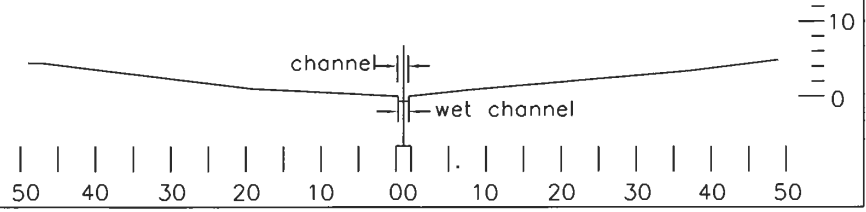


Table D17 Unnamed Stream (Stream Crossing No.7) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (5 + 500)	
Physical Units	Small turbid stream, with heavy sinuosity and standing water.
Substrate	100% Silt
Embeddedness	>50%
Mean Depth (cm)	4cm
Dimensions (m)	0.85 wet width, 1.45 channel width
Bank Stability	50%-75%
Overhead Cover	0%-20% some small soft woods
Bank Cover	Grey alder and thistle, 10%
Instream Cover	Woody debris and macrophytes (0%-20%)
Physical Observations and Habitat Type	
Conductivity (FS/cm)	300
Flow (m³/s)	NA – due to low water conditions at time of survey.
Water Colour	brown
pH	7.1
Temperature (°C)	16.1
Fish and Fish Habitat	This stream was assessed as Type 3 salmonid habitat. Electrofishing was not conducted because of lack of sufficient water volume.

Table D18 Unnamed Stream (Stream Crossing No.7) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown silty clay sand with gravel and root hairs	moderate	2%-7%	low	low - moderate
Right	Same as left with smaller gravel component.	moderate	5%-7%	low	low - moderate

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)

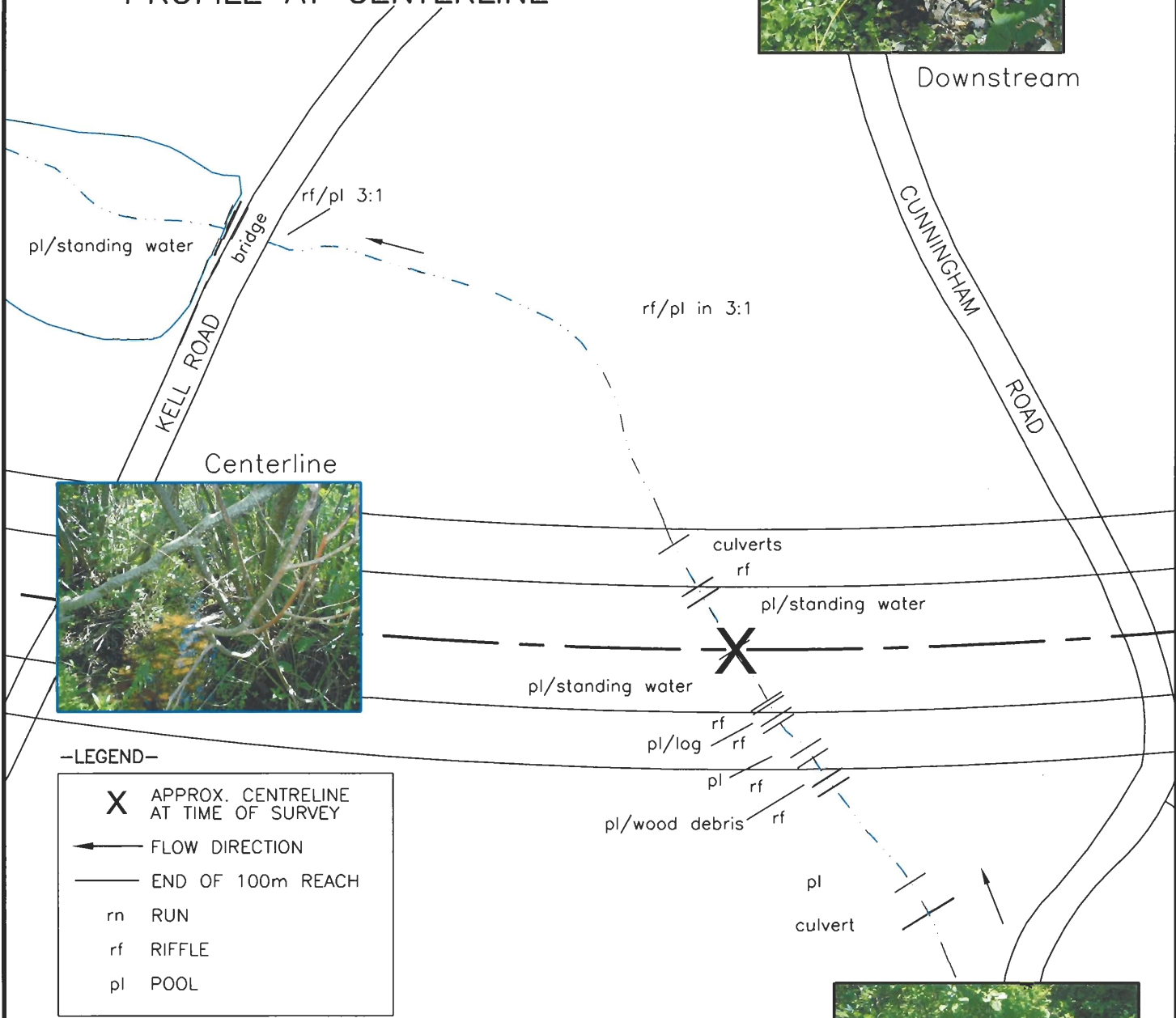
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PROFILE AT CENTERLINE



Downstream



-LEGEND-

- X** APPROX. CENTRELINE AT TIME OF SURVEY
- FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL



Upstream



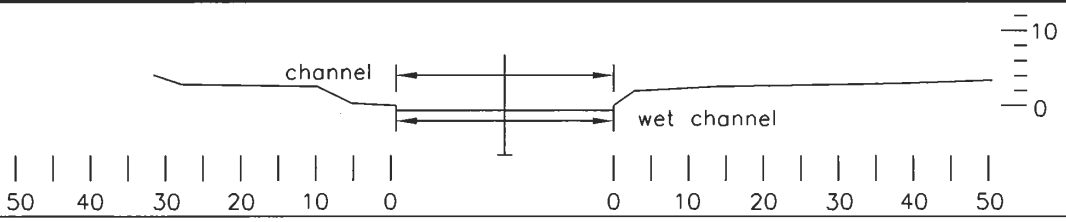
TRIBUTARY TO ANTIGONISH HWY #104 HABITAT SURVEY STREAM CROSSING NO. 7

SCALE 1: 1000

Table D19 West River Antigonish (Stream Crossing No.8) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (5 +700)	
Physical Units	River - riffle at ROW
Substrate	Boulder 15%, cobble 75%, gravel 10%
Embeddedness	0% - 20%
Mean Depth (cm)	avg. depth at ROW = 30cm
Dimensions (m)	24m wet width, 29m channel width
Bank Stability	50%-75% (20% undercutting on west bank)
Overhead Cover	0%-20%, partially cleared at ROW
Bank Cover	Grasses, alders and grammanoid species - 10%
Instream Cover	Boulders, woody debris and filamentous algae, 20%
Physical Observations and Habitat Type	
Conductivity (FS/cm)	447
Flow (m³/s)	4.39m ³ /s, corrected surface velocity = 0.61m/s , crossectional area = 7.20m ²
Water Colour	Clear
pH	5.85
Temperature (°C)	15.7
Fish and Fish Habitat	<p>The West River is one of Nova Scotia's premiere fall salmon recreational fisheries. Atlantic salmon, brown trout and brook trout all inhabit the system along with a host of cyprinides and sticklebacks species which include: northern red-belly dace, creek chub, banded killifish, common white sucker, three spine stickleback, and nine-spine stickleback, all of which were sampled during electrofishing at the ROW (see electrofishing results).</p> <p>The ROW crossing is an example of highly productive riffle habitat. Small pools below the riffle were heavily populated with Atlantic salmon parr, and can be classified as excellent rearing and potential spawning habitat for salmonids especially Atlantic Salmon. The electrofishing was confined to the ROW and the results did not show the presence of either brown or brook trout. This could possibly be explained because of the dominance Atlantic salmon parr at the ROW. Both brown and brook trout do however have strong populations in the river (D. Goth, pers. comm. 2002)</p> <p>The West River is rated as Type 1 salmonid habitat.</p>

Table D20 West River Antigonish (Stream Crossing No.8) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown silty sand. With some organics.	high	1% - 26%	moderate	Moderate - high
Right	Same as left.	moderate	1% - 35%	high	Moderate - high

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)



PROFILE AT CENTERLINE

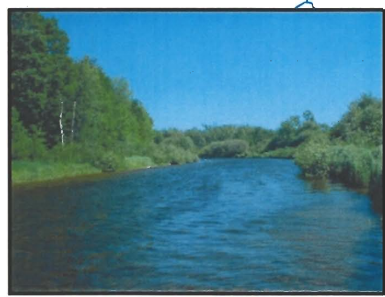
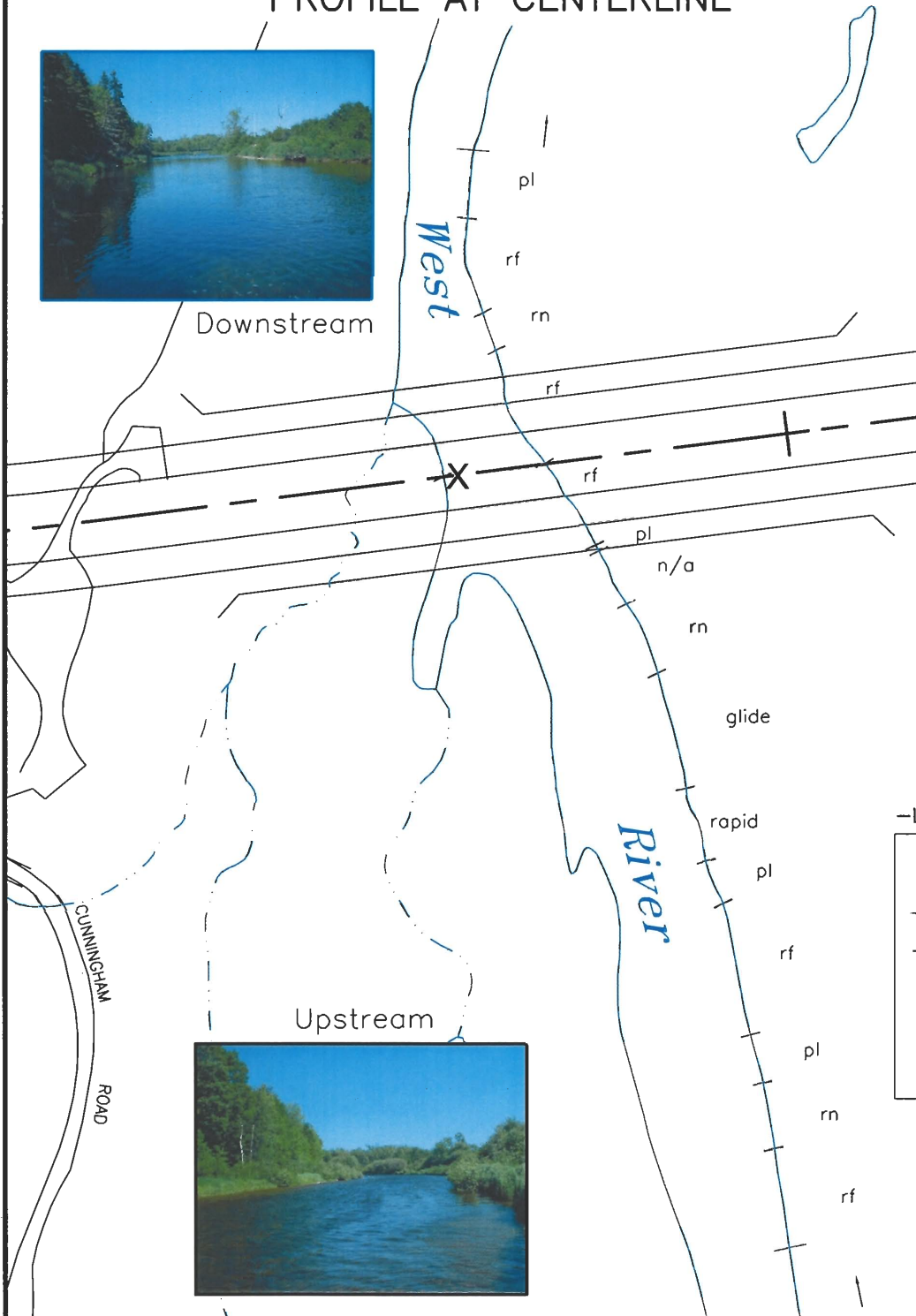


Downstream



Centerline

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Upstream

-LEGEND-

	APPROX. CENTRELINE AT TIME OF SURVEY
	FLOW DIRECTION
	END OF 100m REACH
rn	RUN
rf	RIFFLE
pl	POOL

TRIBUTARY TO ANTIGONISH HWY #104
 HABITAT SURVEY
 STREAM CROSSING NO. 8

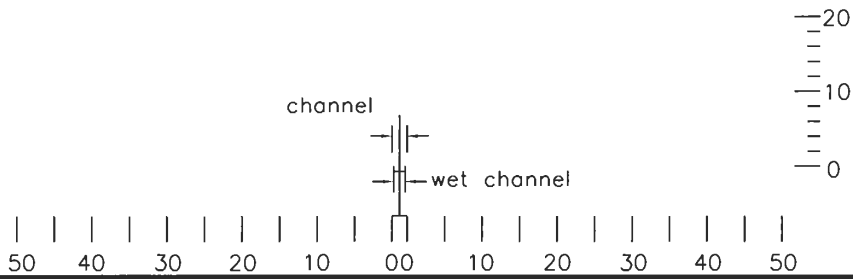
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Table D21 Unnamed Stream (Stream Crossing No.9) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (6 +750)	
Physical Units	Intermittent boggy stream
Substrate	Boulder 10%, Cobble 60%, Gravel 20%, Silt 10%
Embeddedness	25%
Mean Depth (cm)	3cm
Dimensions (m)	1.5m channel width
Bank Stability	75%-100% (banks 25% undercut)
Overhead Cover	Black spruce (30%)
Bank Cover	Mosses, ferns –5%
Instream Cover	Undercut banks sparse(0%-20%)
Physical Observations and Habitat Type	
Conductivity (FS/cm)	382
Flow (m³/s)	NA – due to absence of flowing water
Water Colour	Colourless
pH	6.88
Temperature (°C)	13.6
Fish and Fish Habitat	Type 5 salmonid habitat, - intermittent nature, lack of definable morphology and low flow combine to create poor potential salmonid rearing or spawning habitat.

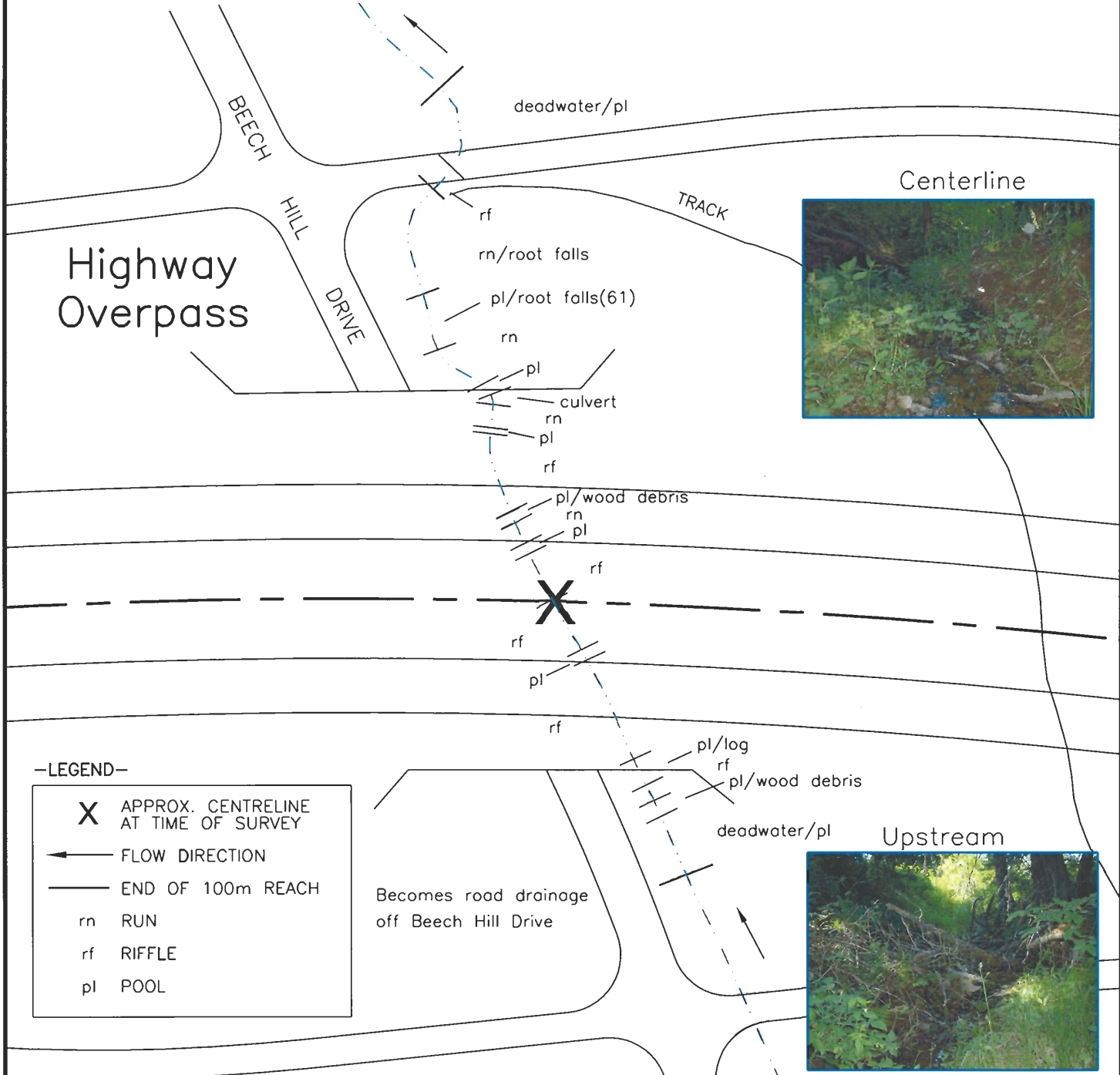
Table D22 Unnamed Stream(Stream Crossing No.9) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown clay sand with gravel and root hairs.	moderate	2%-35%	high	Moderate-high
Right	Same as left but with no gravel.	moderate	6%-58%	Very high	high

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)



Downstream

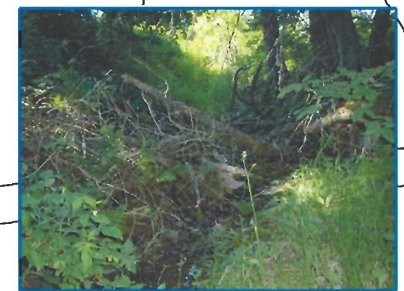
PROFILE AT CENTERLINE



Centerline

-LEGEND-

- X** APPROX. CENTRELINE AT TIME OF SURVEY
- ← FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL



Upstream

TRIBUTARY TO ANTIGONISH HWY #104
HABITAT SURVEY
STREAM CROSSING NO. 9

SCALE 1: 1000

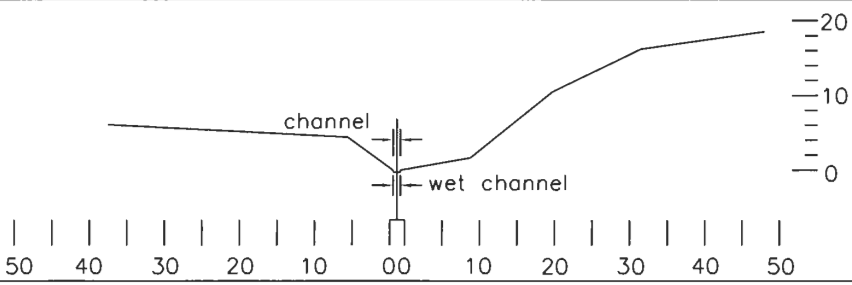


Table D23 Unnamed Stream (Stream Crossing No.10) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (6 + 950)	
Physical Units	Small meandering stream – (completely clogged with logging slash at ROW)
Substrate	Cobble 30%, Gravel 40%, silt 30%
Embeddedness	>50%
Mean Depth (cm)	7cm
Dimensions (m)	0.40m wet width, 1m channel width
Bank Stability	75%-100%
Overhead Cover	0%-20%
Bank Cover	logged and eroded banks
Instream Cover	Stream bed completely covered with slash , dense >75%
Physical Observations and Habitat Type (not available due to absence of flow)	
Conductivity (FS/cm)	65
Flow (m³/s)	NA – due to absence of water velocity
Water Colour	Colourless
pH	7.2
Temperature (°C)	16
Fish and Fish Habitat	Stream greatly affected by poor logging practice, which have increased erosion and sedimentation. This stream was classified as Type 4 salmonid habitat at the time of survey. In periods of greater discharge, this stream could potentially provide marginal habitat for salmonid species. However the stream could be utilized for migratory purposes and has important hydrologic function for the health of the parent watershed (<i>i.e.</i> West River)

Table D24 Unnamed Stream (Stream Crossing No.10) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown silty sand with gravel, some organics	high	36%-3%	high	high
Right	Same as left, slightly higher moisture content.	high	8%-39%	high	high

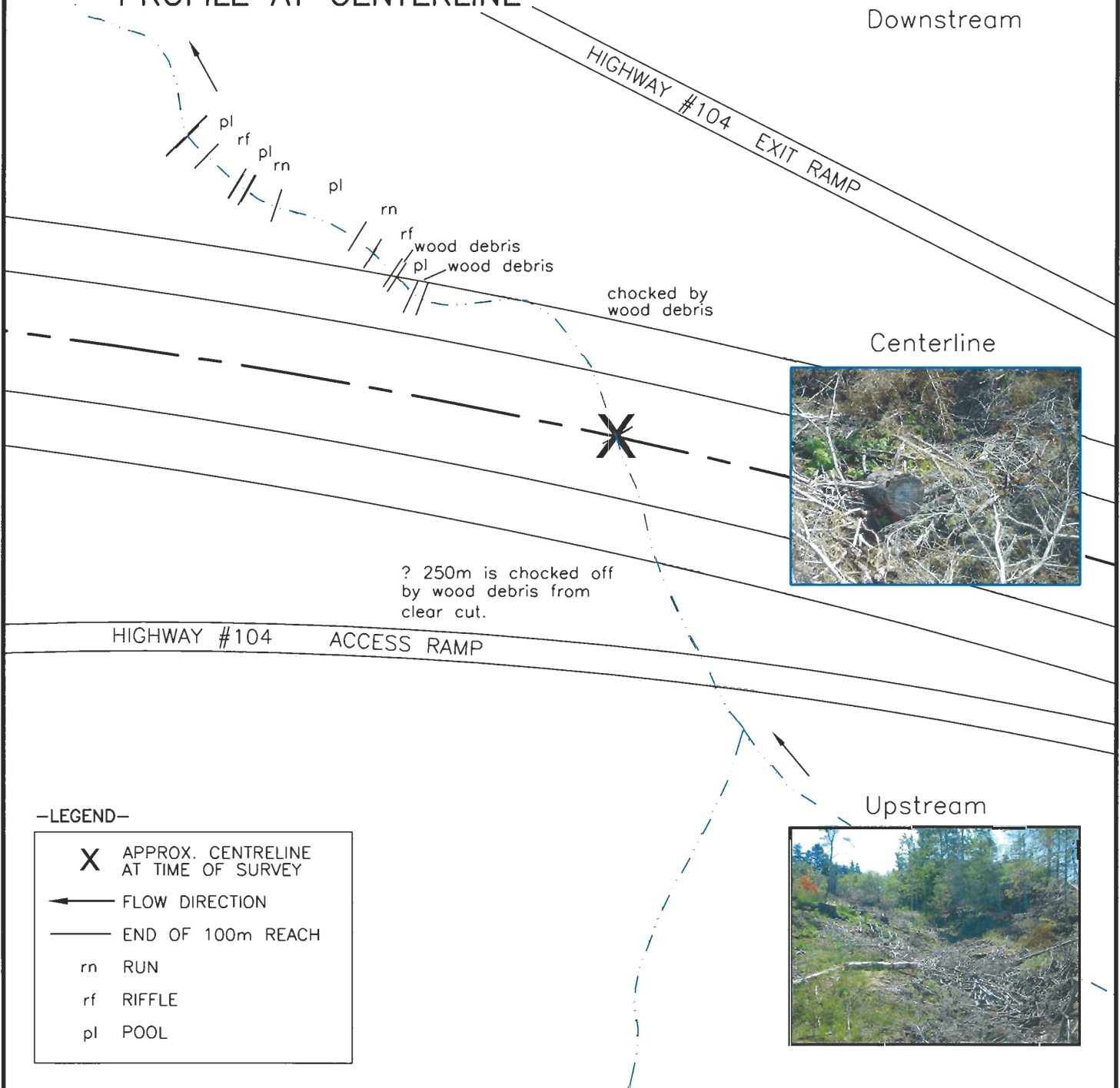
*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)

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Downstream

PROFILE AT CENTERLINE



-LEGEND-

- APPROX. CENTRELINE AT TIME OF SURVEY
- FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL

TRIBUTARY TO ANTIGONISH HWY #104
 HABITAT SURVEY
 STREAM CROSSING NO. 10

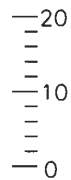
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Table D25 Unnamed Stream (Stream Crossing No.11) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (8 +150)	
Physical Units	Still water section of small meandering stream, Beaver dam 40 m below center line.
Substrate	Silt 100%
Embeddedness	>50%
Mean Depth (cm)	0.50m
Dimensions (m)	Still water dimension –15m
Bank Stability	0%-50% toppled trees and slumping
Overhead Cover	0%-20% Riparian zone completely logged
Bank Cover	Grasses, graminoid spp. and small red spruce,)5%-20%
Instream Cover	Lilles, woody debris – 15%
Physical Observations and Habitat Type	
Conductivity (FS/cm)	225
Flow (m³/s)	NA – due to absence of water velocity
Water Colour	Brown
pH	6.38
Temperature (°C)	18.6
Fish and Fish Habitat	<p>Downstream of the ROW was electrofished to assess the species composition of the brook since a beaver dam created a large pool of water at the ROW. All morphological features were spot electrofished. During electrofishing it was noted that severe damage to the riparian zone had resulted in increased sedimentation and loss of fish habitat. Apparent trout habitat was devoid of salmonid presence. The results did however yield some cyprinide and stickleback species that included; northern redbelly dace, common white sucker, creek chub, three spine stickleback and nine-spine sticklebacks (see electrofishing results).</p> <p>Increased sedimentation and photic exposure, a result of logging, has likely changed stream from a cold water stream with salmonid sustaining DO levels to a cool water stream with marginal DO levels. The absence of brook trout in the electrofishing results is likely a result of the species being pushed to more thermally and oxygen stable areas of the brook such as areas influenced by ground water discharge. This habitat rates as Type 2 salmonid habitat although has been compromised by logging influence.</p>

Table D26 Unnamed Stream (Stream Crossing No.11) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown silty sand with gravel, with some organics.	high	12%-44%	high	high
Right	Same as left	high	10%-14%	low	moderate

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)



channel
wet channel

PROFILE AT CENTERLINE



Downstream

Downstream: After pool of water the stream has a 3:1 pool/riffle ratio.

Pool of water



-LEGEND-

X	APPROX. CENTRELINE AT TIME OF SURVEY
←	FLOW DIRECTION
—	END OF 100m REACH
rn	RUN
rf	RIFFLE
pl	POOL



Centerline

Upstream=Wetland

Upstream



TRIBUTARY TO ANTIGONISH HWY #104
HABITAT SURVEY
STREAM CROSSING NO. 11

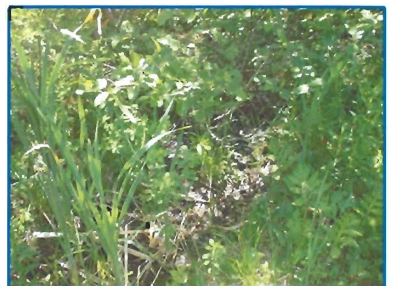
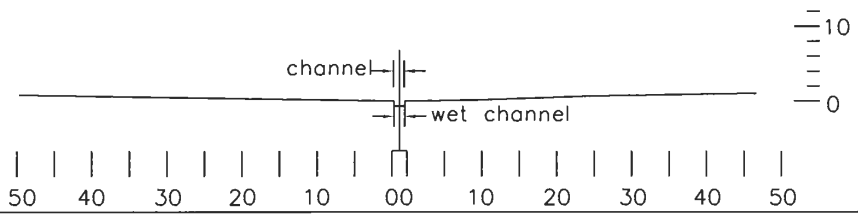
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Table D27 Unnamed Stream (Stream Crossing No. 12) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (9 +000)	
Physical Units	Marshy ditch, choked with decaying plant matter
Substrate	Silt 100%
Embeddedness	>50%
Mean Depth (cm)	5cm
Dimensions (m)	1.1m wet width, 1.4m channel width
Bank Stability	50%-75%
Overhead Cover	Alder, cattails 0%-20%
Bank Cover	Wild red raspberry, grey alder, grasses and cattails (15%)
Instream Cover	Cattails (25%)
Physical Observations and Habitat Type	
Conductivity (FS/cm)	450
Flow (m³/s)	NA – due to absence of water velocity
Water Colour	Yellow
pH	6.8
Temperature (°C)	19.3
Fish and Fish Habitat	Type 5 salmonid habitat at time of survey. Not electrofished because of small physical dimensions and heightened water temperatures. No fish were seen during the survey, although it does have the potential to host fish during periods of greater discharge.

Table D28 Unnamed Stream (Stream Crossing No. 12) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Black organic silt/peat	high	1%	negligible	low-moderate
Right	Black peat	high	2%	negligible	low-moderate

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)



PROFILE AT CENTERLINE

Downstream

Both Upstream and Downstream of R.O.W. the stream channel was ill defined and composed of pool of standing water which dissappeared under the forest floor. We could not decide on the direction of flow. The stream had a pool of water at the centerline and at 10,32, & 76M Upstream and at 47 & 67M Downstream.

Track



Centerline



Upstream

-LEGEND-

- APPROX. CENTRELINE AT TIME OF SURVEY
- FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL

TRIBUTARY TO ANTIGONISH HWY #104
HABITAT SURVEY
STREAM CROSSING NO. 12

SCALE 1: 1000



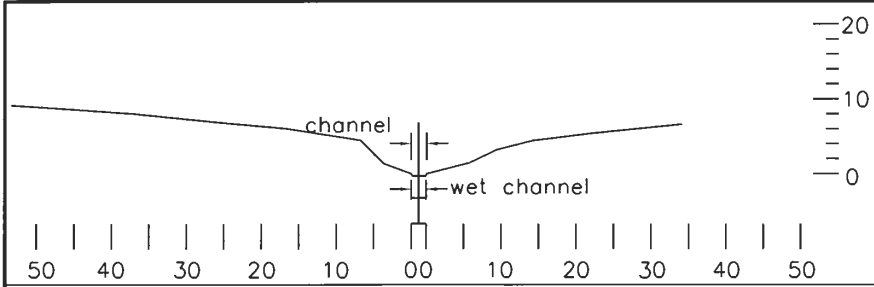
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Table D29 Unnamed Stream (Stream Crossing No.13) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (10 +200)	
Physical Units	Ditch (completely dry at time of survey)
Substrate	Boulder 60%, rubble 40%
Embeddedness	0-20%
Mean Depth (cm)	Dry
Dimensions (m)	Undefinable due to overgrowth at time of survey
Bank Stability	75%-100%
Overhead Cover	Black spruce, choke cherry, gery alder 25%-50%
Bank Cover	NA
Instream Cover	NA
Physical Observations and Habitat Type (not available due to absence of water)	
Conductivity (FS/cm)	N/A
Flow (m³/s)	N/A
Water Colour	N/A
pH	N/A
Temperature (°C)	N/A
Fish and Fish Habitat	Type 5 for salmonid habitat.

Table D30 Unnamed Stream (Stream Crossing No.13) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown silty sand, with some organics	high	4%-45%	high	high
Right	Same as left	moderate	6%-26%	moderate	moderate

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)

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PROFILE AT CENTERLINE



Downstream



EXISTING HWY. #104

old roadway
old culvert suspended
2M from stream bed



Centreline



Upstream

No water at time of study. However we can assume that this section has a pool/riffle ratio of 3:1 in periods of high water due to stream characteristics.

-LEGEND-

- X APPROX. CENTRELINE AT TIME OF SURVEY
- ← FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL

stream becomes drainage channel

TRIBUTARY TO ANTIGONISH HWY #104

HABITAT SURVEY

STREAM CROSSING NO. 13

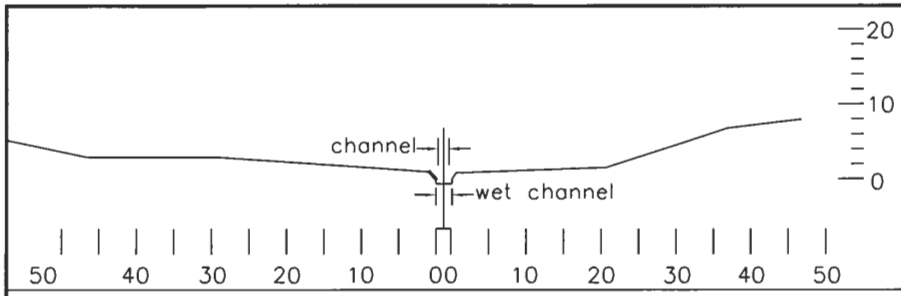
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Table D31 Unnamed Stream (Stream Crossing No.14) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (10 + 850)	
Physical Units	Agricultural drainage ditch
Substrate	Silt 100%
Embeddedness	>50%
Mean Depth (cm)	Dry
Dimensions (m)	1.5m
Bank Stability	50-75%
Overhead Cover	none
Bank Cover	Cattails, grasses (10%
Instream Cover	none
Instream Cover	Grasses and sedges (75-100%)
Physical Observations and Habitat Type (not available due to absence of water)	
Conductivity (FS/cm)	N/A
Flow (m ³ /s)	N/A
Water Colour	N/A
pH	N/A
Temperature (°C)	N/A
Fish and Fish Habitat	Type 5 for salmonid habitat.

Table D32 Unnamed Stream (Stream Crossing No.14) Erosion Sensitivity Level					
Bank	Particle Size Class and % Composition	Relative Soil Erodibility	Slope (50 m back), %	Slope Class	Overall Sensitivity
Left	Dark reddish brown silty sand, with root hairs	High	0%-47%	Very high	High-very high
Right	Dark reddish brown silty clay sand, with root hairs	Moderate	2%-55%	Very high	high

*Relative erodibility based on particle size class/texture of samples collected 10cm deep 5m from stream bank.
Slope class: negligible (0-5%), low (6-15%), moderate (16-30%), high (31-45%), very high (46-60%) extreme (>60%)



PROFILE AT CENTERLINE



Downstream

-LEGEND-

- X APPROX. CENTRELINE AT TIME OF SURVEY
- ← FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL

No water in stream at the time of survey. However both upstream and downstream of R.O.W. would consist of pools/deadwater areas only at times of highwater.



Centreline



Upstream

TRIBUTARY TO ANTIGONISH HWY #104
 HABITAT SURVEY
 STREAM CROSSING NO. 14

SCALE 1: 1000

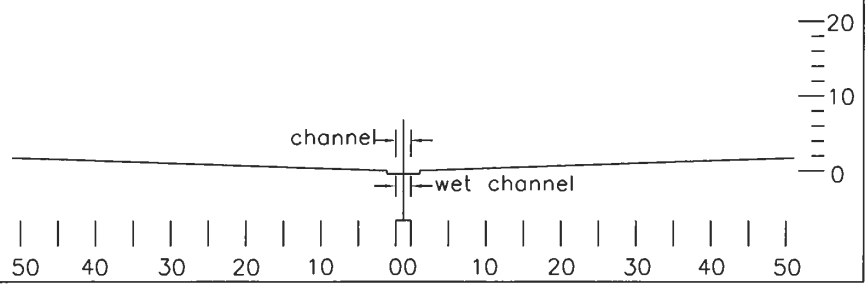


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Table D33 Unnamed Stream (Stream Crossing No.15) Fish Habitat Summary	
Aquatic Habitat Evaluation at ROW (14 + 600)	
Physical Units	Overgrown, intermittent ditch stream, runs parallel to existing highway
Substrate	Silt 100%
Embeddedness	>50%
Mean Depth (cm)	3cm
Dimensions (m)	1.5m
Bank Stability	50-75%
Overhead Cover	none
Bank Cover	Cattails (15%)
Instream Cover	none
Physical Observations and Habitat Type (not available due to absence of flow)	
Conductivity (FS/cm)	450
Flow (m³/s)	N/A due to low waterconditions at tiem of survey
Water Colour	Colourless, with oily sheen on surface
pH	7.3
Temperature (°C)	16
Fish and Fish Habitat	Type 5 for salmonid habitat.

Note: Erosion sensitivity levels were not acquired for crossing 15 as this stretch of the old and new alignment are in the same location; therefore, the stream banks at ROW are under the exiting highway, and soil could not be sampled.

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PROFILE AT CENTERLINE

No water at time of survey.



Centreline

EXISTING HWY. #104



-LEGEND-

- X APPROX. CENTRELINE AT TIME OF SURVEY
- ← FLOW DIRECTION
- END OF 100m REACH
- rn RUN
- rf RIFFLE
- pl POOL

TRIBUTARY TO ANTIGONISH HWY #104
HABITAT SURVEY
STREAM CROSSING NO. 15

SCALE 1: 1000



**Table D34 Fish Species Caught, Stream Crossings Proposed Highway 104
Antigonish, June 24, 2002**

Stream Crossing	Fish Species	Total Length (cm)	Fork Length (cm)	Notes
No. 6 4+150 m	1. three-spine stickleback			
	2. three-spine stickleback			
West River No. 8 5+700 m	3. three-spine stickleback			
	4. three-spine stickleback			
	1. nine-spine stickleback			
	1. Atlantic salmon (<i>Salmo salar</i>)	13.0	12.5	- Many other small salmon were observed
	2. Atlantic salmon	10.1	9.3	
	3. Atlantic salmon	11.0	10.2	
	4. Atlantic salmon	9.5	8.8	
	5. Atlantic salmon	8.9	8.1	
	6. Atlantic salmon	13.0	11.9	
	7. Atlantic salmon	11.0	10.2	
	8. Atlantic salmon	10.3	9.5	
9. Atlantic salmon	9.7	9.1		
10. Atlantic salmon	9.2	8.5		
11. Atlantic salmon	3.6	3.4		
	1. white sucker (<i>Catostomus commersoni</i>)			- All non-salmonids were not measured due to small size (all less than 10.0 cm)
	2. white sucker			- White sucker were abundant in a still-water adjacent to the crossing that is connected to the West River.
	3. white sucker			
	4. white sucker			
	5. white sucker			
	1. banded killifish (<i>Fundulus diaphanus</i>)			- Banded killifish were abundant in a still-water adjacent to the crossing that is connected to the West River.
	2. banded killifish			
	3. banded killifish			
	4. banded killifish			
	1. creek chub (<i>Semotilus atromaculatus</i>)			- Creek chub were abundant in a still-water adjacent to the crossing that is connected to the West River.
	2. creek chub			
	3. creek chub			
	4. creek chub			
	5. creek chub			
	6. creek chub			
	1. Northern redbelly dace (<i>Chrosomus eos</i>)			
	2. Northern redbelly dace			
	3. Northern redbelly dace			
	4. Northern redbelly dace			
	1. three-spine stickleback (<i>Gasterosteus aculeatus</i>)			
	2. three-spine stickleback			
	3. three-spine stickleback			
	1. nine-spine stickleback (<i>Pungitius pungitius</i>)			

**Table D34 Fish Species Caught, Stream Crossings Proposed Highway 104
Antigonish, June 24, 2002**

Stream Crossing	Fish Species	Total Length (cm)	Fork Length (cm)	Notes
No. 11 8+150 m	1. creek chub			- Many small creek chub were caught and observed
	2. creek chub			
	3. creek chub			
	4. creek chub			
	5. creek chub			
	6. creek chub			
	7. creek chub			
	8. creek chub			
	9. creek chub			
	10. creek chub			
	1. Northern redbelly dace			
	2. Northern redbelly dace			
	3. Northern redbelly dace			
	4. Northern redbelly dace			
5. Northern redbelly dace				
6. Northern redbelly dace				
1. nine-spine stickleback				
1. three-spine stickleback				

Date Generated
11-Jul-2002
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Client ID: 5+700 6+950
Project ID: 16949-1 16949-1
PSC Analytical ID: 02-H034261 02-H034262
Matrix: Water Water
Duplicate of:
Date Sampled:
Client Description:

Parameters	Method	EQL	Units	20020703-A	20020703-A
PASC-H-:04823	Total Water Digest	-		Orthophosphorous; EQL = 0.02 due to elevated method	Orthophosphorous; EQL = 0.02 due to elevated method blank.
PASC-H-:50920	Inorganic Comment	Comment	Text	blank.	
PASC-H-RCAp:01010	Sodium	ICP-OES	0.1 mg/L	64.6	6
PASC-H-RCAp:01020	Potassium	ICP-OES	0.1 mg/L	0.8	2
PASC-H-RCAp:01030	Calcium	ICP-OES	0.1 mg/L	23.4	6.4
PASC-H-RCAp:01050	Magnesium	ICP-OES	0.1 mg/L	1.9	2.4
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	COBAS	5 mg/L	16	21
PASC-H-RCAp:01070	Sulfate	COBAS	2 mg/L	50	9
PASC-H-RCAp:01080	Chloride	COBAS	1 mg/L	95	5
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	COBAS	0.5 mg/L	3.2	3.6
PASC-H-RCAp:01100	Ortho Phosphate (as P)	COBAS	0.01 mg/L	< 0.02	< 0.02
PASC-H-RCAp:01105	Nitrite	COBAS	0.01 mg/L	< 0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	COBAS	0.05 mg/L	< 0.05	0.21
PASC-H-RCAp:01115	Nitrate (as N)	COBAS	0.05 mg/L	< 0.05	0.21
PASC-H-RCAp:01120	Ammonia (as N)	COBAS	0.05 mg/L	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	COBAS	5 TCU	7	22
PASC-H-RCAp:01180	Turbidity	NEPH.	0.1 NTU	0.5	32
PASC-H-RCAp:01190	Conductance (RCAp)	Electrode	1 uS/cm	502	73
PASC-H-RCAp:01200	pH	Electrode	-	7.3	6.9
PASC-H-RCAp:01220	Hardness (as CaCO3)	Calculated	0.1 mg/L	66.3	25.9
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	Calculated	1 mg/L	16	21
PASC-H-RCAp:01240	Carbonate (as CaCO3)	Calculated	1 mg/L	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	Calculated	1 mg/L	249	48
PASC-H-RCAp:01270	Cation Sum	Calculated	0.1 meq/L	4.16	0.83
PASC-H-RCAp:01280	Anion Sum	Calculated	0.1 meq/L	4.04	0.76
PASC-H-RCAp:01290	Ion Balance	Calculated	- %	1.41	4.36
PASC-H-RCAp:01311	Langlier Index @ 4C	Calculated	-	-1.99	-2.80
PASC-H-RCAp:01312	Langlier Index @ 20C	Calculated	-	-1.59	-2.40
PASC-H-RCAp:01313	Saturation pH @ 4C	Calculated	- Units	9.29	9.7
PASC-H-RCAp:01314	Saturation pH @ 20C	Calculated	- Units	8.89	9.3
PASC-H-RCAp:02010	Aluminum	ICP-MS	10 ug/L	20	1800
PASC-H-RCAp:02020	Antimony	ICP-MS	2 ug/L	< 2	< 2
PASC-H-RCAp:02030	Arsenic	ICP-MS	2 ug/L	< 2	< 2
PASC-H-RCAp:02040	Barium	ICP-MS	5 ug/L	30	38
PASC-H-RCAp:02050	Beryllium	ICP-MS	5 ug/L	< 5	< 5
PASC-H-RCAp:02060	Bismuth	ICP-MS	2 ug/L	< 2	< 2
PASC-H-RCAp:02070	Boron	ICP-MS	5 ug/L	14	12
PASC-H-RCAp:02080	Cadmium	ICP-MS	0.3 ug/L	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	ICP-MS	2 ug/L	< 2	2
PASC-H-RCAp:02100	Cobalt	ICP-MS	1 ug/L	< 1	2
PASC-H-RCAp:02110	Copper	ICP-MS	2 ug/L	< 2	5
PASC-H-RCAp:02130	Iron	ICP-MS	20 ug/L	70	1900
PASC-H-RCAp:02140	Lead	ICP-MS	0.5 ug/L	< 0.5	2.2
PASC-H-RCAp:02150	Manganese	ICP-MS	2 ug/L	8	200
PASC-H-RCAp:02160	Molybdenum	ICP-MS	2 ug/L	< 2	< 2
PASC-H-RCAp:02170	Nickel	ICP-MS	2 ug/L	< 2	4
PASC-H-RCAp:02180	Selenium	ICP-MS	2 ug/L	< 2	< 2
PASC-H-RCAp:02200	Silver	ICP-MS	0.5 ug/L	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	ICP-MS	5 ug/L	240	23
PASC-H-RCAp:02230	Thallium	ICP-MS	0.1 ug/L	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	ICP-MS	2 ug/L	< 2	< 2
PASC-H-RCAp:02250	Titanium	ICP-MS	2 ug/L	2	32
PASC-H-RCAp:02260	Uranium	ICP-MS	0.1 ug/L	< 0.1	0.1
PASC-H-RCAp:02270	Vanadium	ICP-MS	2 ug/L	< 2	2
PASC-H-RCAp:02280	Zinc	ICP-MS	2 ug/L	4	26
PASC-H-RCAp:04060	Phosphorus	ICP-OES	0.1 mg/L	0.1	0.2
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	U.V.-ox	0.5 mg/L	1.9	7.6
PASC-H-RCAp:50770	RCAp Comments	Comment	Text		

Date Generated
11-Jul-2002
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0209056H.XLS

1+500 16949-1 02-H034263 Water	14+600 16949-1 02-H034264 Water	8+150 16949-1 02-H034265 Water
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Parameters		20020703-A	20020703-A	20020703-B
PASC-H-:04823	Total Water Digest	Orthophosphorous; EQL = 0.02 due to elevated method	Orthophosphorous; EQL = 0.02 due to elevated method	Orthophosphorous; EQL = 0.02 due to elevated method
PASC-H-:50920	Inorganic Comment	blank.	blank.	blank.
PASC-H-RCAp:01010	Sodium	147	86.2	14.2
PASC-H-RCAp:01020	Potassium	1.3	0.7	1.6
PASC-H-RCAp:01030	Calcium	63.9	22.3	27.6
PASC-H-RCAp:01050	Magnesium	6.2	5.3	4.5
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	170	57	49
PASC-H-RCAp:01070	Sulfate	25	8	48
PASC-H-RCAp:01080	Chloride	210	150	10
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	4.1	2.8	0.5
PASC-H-RCAp:01100	Ortho Phosphate (as P)	< 0.02	< 0.02	< 0.02
PASC-H-RCAp:01105	Nitrite	< 0.01	< 0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	0.07	0.07	0.06
PASC-H-RCAp:01115	Nitrate (as N)	0.07	0.07	0.06
PASC-H-RCAp:01120	Ammonia (as N)	0.05	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	30	27	39
PASC-H-RCAp:01180	Turbidity	3	1.5	1.5
PASC-H-RCAp:01190	Conductance (RCAp)	1140	628	245
PASC-H-RCAp:01200	pH	7.8	6.5	7.4
PASC-H-RCAp:01220	Hardness (as CaCO3)	185	77.5	87.4
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	169	57	49
PASC-H-RCAp:01240	Carbonate (as CaCO3)	1	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	560	310	136
PASC-H-RCAp:01270	Cation Sum	10.1	5.32	2.41
PASC-H-RCAp:01280	Anion Sum	9.85	5.54	2.26
PASC-H-RCAp:01290	Ion Balance	1.42	2.03	3.11
PASC-H-RCAp:01311	Langlier Index @ 4C	-0.06	-2.27	-1.32
PASC-H-RCAp:01312	Langlier Index @ 20C	0.34	-1.87	-0.92
PASC-H-RCAp:01313	Saturation pH @ 4C	7.86	8.77	8.72
PASC-H-RCAp:01314	Saturation pH @ 20C	7.46	8.37	8.32
PASC-H-RCAp:02010	Aluminum	110	90	40
PASC-H-RCAp:02020	Antimony	< 2	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	< 2	< 2
PASC-H-RCAp:02040	Barium	180	190	20
PASC-H-RCAp:02050	Beryllium	< 5	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 2	< 2
PASC-H-RCAp:02070	Boron	17	7	20
PASC-H-RCAp:02080	Cadmium	< 0.3	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	< 2	< 2	< 2
PASC-H-RCAp:02100	Cobalt	< 1	6	< 1
PASC-H-RCAp:02110	Copper	5	2	2
PASC-H-RCAp:02130	Iron	310	1600	130
PASC-H-RCAp:02140	Lead	< 0.5	0.6	< 0.5
PASC-H-RCAp:02150	Manganese	260	3600	42
PASC-H-RCAp:02160	Molybdenum	< 2	< 2	< 2
PASC-H-RCAp:02170	Nickel	< 2	3	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	93	110	210
PASC-H-RCAp:02230	Thallium	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 2	< 2
PASC-H-RCAp:02250	Titanium	3	< 2	4
PASC-H-RCAp:02260	Uranium	0.9	< 0.1	0.1
PASC-H-RCAp:02270	Vanadium	< 2	< 2	< 2
PASC-H-RCAp:02280	Zinc	5	10	3
PASC-H-RCAp:04060	Phosphorus	0.1	0.1	0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	5.8	4.5	12.9
PASC-H-RCAp:50770	RCAp Comments			

<u>Date Generated</u>
11-Jul-2002
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0+800 16949-1 02-H034266 Water	2+600 16949-1 02-H034267 Water	5+500 16949-1 02-H034268 Water
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Parameters		20020703-B	20020703-B	20020703-B
PASC-H-:04823	Total Water Digest	Orthophosphorous; EQL = 0.02 due to elevated method	Orthophosphorous; EQL = 0.02 due to elevated method	Orthophosphorous; EQL = 0.02 due to elevated method
PASC-H-:50920	Inorganic Comment	blank.	blank.	blank.
PASC-H-RCAp:01010	Sodium	23.3	57.2	36.5
PASC-H-RCAp:01020	Potassium	0.5	1.2	1
PASC-H-RCAp:01030	Calcium	9.6	26.7	18.2
PASC-H-RCAp:01050	Magnesium	1.4	3.5	4.6
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	17	61	35
PASC-H-RCAp:01070	Sulfate	19	10	9
PASC-H-RCAp:01080	Chloride	35	95	72
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	< 0.5	3.4	2.2
PASC-H-RCAp:01100	Ortho Phosphate (as P)	< 0.02	< 0.02	< 0.02
PASC-H-RCAp:01105	Nitrite	< 0.01	< 0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	0.06	0.09	0.08
PASC-H-RCAp:01115	Nitrate (as N)	0.06	0.09	0.08
PASC-H-RCAp:01120	Ammonia (as N)	< 0.05	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	82	36	43
PASC-H-RCAp:01180	Turbidity	8.8	36.2	2.6
PASC-H-RCAp:01190	Conductance (RCAp)	174	443	337
PASC-H-RCAp:01200	pH	6.5	7.4	7.1
PASC-H-RCAp:01220	Hardness (as CaCO3)	29.7	81.1	64.4
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	17	61	35
PASC-H-RCAp:01240	Carbonate (as CaCO3)	< 1	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	99	234	165
PASC-H-RCAp:01270	Cation Sum	1.62	4.14	2.9
PASC-H-RCAp:01280	Anion Sum	1.73	4.11	2.92
PASC-H-RCAp:01290	Ion Balance	3.04	0.36	0.34
PASC-H-RCAp:01311	Langlier Index @ 4C	-3.13	-1.25	-1.95
PASC-H-RCAp:01312	Langlier Index @ 20C	-2.73	-0.85	-1.55
PASC-H-RCAp:01313	Saturation pH @ 4C	9.63	8.65	9.05
PASC-H-RCAp:01314	Saturation pH @ 20C	9.23	8.25	8.65
PASC-H-RCAp:02010	Aluminum	200	1300	150
PASC-H-RCAp:02020	Antimony	< 2	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	< 2	< 2
PASC-H-RCAp:02040	Barium	23	67	37
PASC-H-RCAp:02050	Beryllium	< 5	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 2	< 2
PASC-H-RCAp:02070	Boron	7	12	8
PASC-H-RCAp:02080	Cadmium	< 0.3	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	< 2	2	< 2
PASC-H-RCAp:02100	Cobalt	1	1	1
PASC-H-RCAp:02110	Copper	3	3	3
PASC-H-RCAp:02130	Iron	1700	1500	730
PASC-H-RCAp:02140	Lead	1.3	1.9	< 0.5
PASC-H-RCAp:02150	Manganese	170	230	310
PASC-H-RCAp:02160	Molybdenum	< 2	< 2	< 2
PASC-H-RCAp:02170	Nickel	< 2	3	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	35	64	78
PASC-H-RCAp:02230	Thallium	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 2	< 2
PASC-H-RCAp:02250	Titanium	4	28	5
PASC-H-RCAp:02260	Uranium	< 0.1	0.2	< 0.1
PASC-H-RCAp:02270	Vanadium	< 2	2	< 2
PASC-H-RCAp:02280	Zinc	10	20	8
PASC-H-RCAp:04060	Phosphorus	0.2	0.2	0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	15.5	8.7	9.8
PASC-H-RCAp:50770	RCAp Comments			

Date Generated 11-Jul-2002
Spreadsheet File Name 0209056H.XLS

6+750 16949-1 02-H034269 Water	4+150 16949-1 02-H034270 Water	1+400 16949-1 02-H034271 Water
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Parameters		20020703-B	20020703-B	20020703-B
PASC-H-:04823	Total Water Digest	Orthophosphorous; EQL = 0.02 due to elevated method	Orthophosphorous; EQL = 0.02 due to elevated method	Orthophosphorous; EQL = 0.02 due to elevated method
PASC-H-:50920	Inorganic Comment	blank.	blank.	blank.
PASC-H-RCAp:01010	Sodium	33.5	70.1	318
PASC-H-RCAp:01020	Potassium	2.2	2.7	1.2
PASC-H-RCAp:01030	Calcium	32.7	64.1	55
PASC-H-RCAp:01050	Magnesium	6.1	9	5.4
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	69	120	140
PASC-H-RCAp:01070	Sulfate	21	50	71
PASC-H-RCAp:01080	Chloride	74	120	460
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	4.3	4.1	2.7
PASC-H-RCAp:01100	Ortho Phosphate (as P)	< 0.02	< 0.02	< 0.02
PASC-H-RCAp:01105	Nitrite	< 0.01	0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	0.09	0.12	0.09
PASC-H-RCAp:01115	Nitrate (as N)	0.09	0.11	0.09
PASC-H-RCAp:01120	Ammonia (as N)	0.11	0.05	< 0.05
PASC-H-RCAp:01170	Color	23	130	45
PASC-H-RCAp:01180	Turbidity	18.9	55.6	2.4
PASC-H-RCAp:01190	Conductance (RCAp)	400	780	2030
PASC-H-RCAp:01200	pH	7.3	7.8	7.9
PASC-H-RCAp:01220	Hardness (as CaCO3)	107	197	160
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	69	119	139
PASC-H-RCAp:01240	Carbonate (as CaCO3)	< 1	< 1	1
PASC-H-RCAp:01250	TDS (Calculated)	216	393	998
PASC-H-RCAp:01270	Cation Sum	3.66	7.06	17.1
PASC-H-RCAp:01280	Anion Sum	3.91	6.83	17.3
PASC-H-RCAp:01290	Ion Balance	3.37	1.65	0.58
PASC-H-RCAp:01311	Langlier Index @ 4C	-1.21	-0.20	-0.14
PASC-H-RCAp:01312	Langlier Index @ 20C	-0.81	0.2	0.26
PASC-H-RCAp:01313	Saturation pH @ 4C	8.51	8	8.04
PASC-H-RCAp:01314	Saturation pH @ 20C	8.11	7.6	7.64
PASC-H-RCAp:02010	Aluminum	590	2100	90
PASC-H-RCAp:02020	Antimony	< 2	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	2	< 2
PASC-H-RCAp:02040	Barium	110	180	150
PASC-H-RCAp:02050	Beryllium	< 5	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 2	< 2
PASC-H-RCAp:02070	Boron	11	29	13
PASC-H-RCAp:02080	Cadmium	< 0.3	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	< 2	5	< 2
PASC-H-RCAp:02100	Cobalt	1	3	< 1
PASC-H-RCAp:02110	Copper	5	11	10
PASC-H-RCAp:02130	Iron	770	4700	90
PASC-H-RCAp:02140	Lead	1.1	7.6	0.7
PASC-H-RCAp:02150	Manganese	72	1800	12
PASC-H-RCAp:02160	Molybdenum	< 2	< 2	< 2
PASC-H-RCAp:02170	Nickel	2	5	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	70	310	99
PASC-H-RCAp:02230	Thallium	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 2	< 2
PASC-H-RCAp:02250	Titanium	13	53	3
PASC-H-RCAp:02260	Uranium	0.1	0.2	0.4
PASC-H-RCAp:02270	Vanadium	< 2	4	< 2
PASC-H-RCAp:02280	Zinc	18	69	6
PASC-H-RCAp:04060	Phosphorus	0.1	0.2	0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	5.5	19.5	9.8
PASC-H-RCAp:50770	RCAp Comments			

Date Generated
11-Jul-2002
Spreadsheet File Name
0209056H.XLS

No # 5 DUP	0+100
16949-1	16949-1
02-H034272	02-H034273
Water	Water
02-H034271	

Parameters			
PASC-H-:04823	Total Water Digest	20020703-B	20020703-B
		Orthophosphorous; EQL = 0.02 due to elevated method	Orthophosphorous; EQL = 0.02 due to elevated method
PASC-H-:50920	Inorganic Comment	blank.	blank.
PASC-H-RCAp:01010	Sodium	320	3.6
PASC-H-RCAp:01020	Potassium	1.4	0.6
PASC-H-RCAp:01030	Calcium	57.9	3
PASC-H-RCAp:01050	Magnesium	5.5	1
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	140	10
PASC-H-RCAp:01070	Sulfate	89	12
PASC-H-RCAp:01080	Chloride	460	4
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	2.7	3
PASC-H-RCAp:01100	Ortho Phosphate (as P)	0.01	0.02
PASC-H-RCAp:01105	Nitrite	< 0.01	0.02
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	0.09	0.11
PASC-H-RCAp:01115	Nitrate (as N)	0.09	0.09
PASC-H-RCAp:01120	Ammonia (as N)	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	45	49
PASC-H-RCAp:01180	Turbidity	2.1	14.5
PASC-H-RCAp:01190	Conductance (RCAp)	2030	41
PASC-H-RCAp:01200	pH	7.8	6.7
PASC-H-RCAp:01220	Hardness (as CaCO3)	167	11.6
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	139	10
PASC-H-RCAp:01240	Carbonate (as CaCO3)	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	1020	34
PASC-H-RCAp:01270	Cation Sum	17.3	0.41
PASC-H-RCAp:01280	Anion Sum	17.6	0.57
PASC-H-RCAp:01290	Ion Balance	0.94	16.6
PASC-H-RCAp:01311	Langlier Index @ 4C	-0.22	-3.64
PASC-H-RCAp:01312	Langlier Index @ 20C	0.18	-3.24
PASC-H-RCAp:01313	Saturation pH @ 4C	8.02	10.3
PASC-H-RCAp:01314	Saturation pH @ 20C	7.62	9.94
PASC-H-RCAp:02010	Aluminum	90	730
PASC-H-RCAp:02020	Antimony	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	< 2
PASC-H-RCAp:02040	Barium	150	20
PASC-H-RCAp:02050	Beryllium	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 2
PASC-H-RCAp:02070	Boron	14	7
PASC-H-RCAp:02080	Cadmium	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	< 2	< 2
PASC-H-RCAp:02100	Cobalt	< 1	< 1
PASC-H-RCAp:02110	Copper	11	2
PASC-H-RCAp:02130	Iron	100	400
PASC-H-RCAp:02140	Lead	0.7	< 0.5
PASC-H-RCAp:02150	Manganese	12	38
PASC-H-RCAp:02160	Molybdenum	< 2	< 2
PASC-H-RCAp:02170	Nickel	< 2	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	100	11
PASC-H-RCAp:02230	Thallium	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 2
PASC-H-RCAp:02250	Titanium	4	23
PASC-H-RCAp:02260	Uranium	0.4	0.1
PASC-H-RCAp:02270	Vanadium	< 2	< 2
PASC-H-RCAp:02280	Zinc	6	12
PASC-H-RCAp:04060	Phosphorus	0.1	< 0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	9.3	4.4
PASC-H-RCAp:50770	RCAp Comments		EQL for K raised to <0.2 due to elevated blanks.

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Client ID:	1	2
Project ID:	16949	16949
PSC Analytical ID:	02-H067562	02-H067563
Matrix:	Water	Water
Duplicate of:		
Date Sampled:	31-Oct-02	31-Oct-02
Client Description:		

Parameters	Method	EQL	Units			
PASC-H-:01316	Total Suspended Solids	Grav.	0.5	mg/L	< 2	< 2
PASC-H-:04823	Total Water Digest		-		20021101-A	20021101-A
PASC-H-:50920	Inorganic Comment	Comment		Text		
PASC-H-RCAp:01010	Sodium	ICP-OES	0.1	mg/L	4.4	15
PASC-H-RCAp:01020	Potassium	ICP-OES	0.1	mg/L	0.6	1.2
PASC-H-RCAp:01030	Calcium	ICP-OES	0.1	mg/L	2.2	7.8
PASC-H-RCAp:01050	Magnesium	ICP-OES	0.1	mg/L	0.9	1.5
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	COBAS	5	mg/L	< 5	14
PASC-H-RCAp:01070	Sulfate	COBAS	2	mg/L	13	21
PASC-H-RCAp:01080	Chloride	COBAS	1	mg/L	8	17
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	COBAS	0.5	mg/L	3.4	3.4
PASC-H-RCAp:01100	Ortho Phosphate (as P)	COBAS	0.01	mg/L	< 0.01	0.02
PASC-H-RCAp:01105	Nitrite	COBAS	0.01	mg/L	< 0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	COBAS	0.05	mg/L	< 0.05	< 0.05
PASC-H-RCAp:01115	Nitrate (as N)	COBAS	0.05	mg/L	< 0.05	< 0.05
PASC-H-RCAp:01120	Ammonia (as N)	COBAS	0.05	mg/L	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	COBAS	5	TCU	43	120
PASC-H-RCAp:01180	Turbidity	NEPH.	0.1	NTU	0.9	2.1
PASC-H-RCAp:01190	Conductance (RCAp)	Electrode	1	uS/cm	50	123
PASC-H-RCAp:01200	pH	Electrode	-	Units	6	6.6
PASC-H-RCAp:01220	Hardness (as CaCO3)	Calculated	0.1	mg/L	9.2	25.7
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	Calculated	1	mg/L	< 5	14
PASC-H-RCAp:01240	Carbonate (as CaCO3)	Calculated	1	mg/L	< 5	< 1
PASC-H-RCAp:01250	TDS (Calculated)	Calculated	1	mg/L	36	76
PASC-H-RCAp:01270	Cation Sum	Calculated	0.1	meq/L	0.4	1.2
PASC-H-RCAp:01280	Anion Sum	Calculated	0.1	meq/L	0.6	1.2
PASC-H-RCAp:01290	Ion Balance	Calculated	-	%	20.5	0
PASC-H-RCAp:01311	Langlier Index @ 4C	Calculated	-		-4.78	-3.19
PASC-H-RCAp:01312	Langlier Index @ 20C	Calculated	-		-4.38	-2.79
PASC-H-RCAp:01313	Saturation pH @ 4C	Calculated	-	Units	10.8	9.79
PASC-H-RCAp:01314	Saturation pH @ 20C	Calculated	-	Units	10.4	9.39
PASC-H-RCAp:02010	Aluminum	ICP-MS	10	ug/L	270	170
PASC-H-RCAp:02020	Antimony	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02030	Arsenic	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02040	Barium	ICP-MS	5	ug/L	19	13
PASC-H-RCAp:02050	Beryllium	ICP-MS	5	ug/L	< 5	< 5
PASC-H-RCAp:02060	Bismuth	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02070	Boron	ICP-MS	5	ug/L	< 5	7
PASC-H-RCAp:02080	Cadmium	ICP-MS	0.3	ug/L	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02100	Cobalt	ICP-MS	1	ug/L	< 1	< 1
PASC-H-RCAp:02110	Copper	ICP-MS	2	ug/L	2	2
PASC-H-RCAp:02130	Iron	ICP-MS	20	ug/L	150	330
PASC-H-RCAp:02140	Lead	ICP-MS	0.5	ug/L	< 0.5	< 0.5
PASC-H-RCAp:02150	Manganese	ICP-MS	2	ug/L	20	15
PASC-H-RCAp:02160	Molybdenum	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02170	Nickel	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02180	Selenium	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02200	Silver	ICP-MS	0.5	ug/L	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	ICP-MS	5	ug/L	8	31
PASC-H-RCAp:02230	Thallium	ICP-MS	0.1	ug/L	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02250	Titanium	ICP-MS	2	ug/L	2	3
PASC-H-RCAp:02260	Uranium	ICP-MS	0.1	ug/L	< 0.1	< 0.1
PASC-H-RCAp:02270	Vanadium	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02280	Zinc	ICP-MS	2	ug/L	8	4
PASC-H-RCAp:04060	Phosphorus	ICP-OES	0.1	mg/L	< 0.1	< 0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	U.V.-ox	0.5	mg/L	9.6	16.5
PASC-H-RCAp:50770	RCAp Comments	Comment		Text	EQL for K elevated to <0.2 due to elevated blanks and	EQL for K elevated to <0.2 due to elevated blanks and

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3	4	5	6	7
16949	16949	16949	16949	16949
02-H067564	02-H067565	02-H067566	02-H067567	02-H067568
Water	Water	Water	Water	Water
31-Oct-02	31-Oct-02	31-Oct-02	31-Oct-02	31-Oct-02

Parameters		3	4	5	6	7
PASC-H-:01316	Total Suspended Solids	< 2	< 2	< 2	< 2	2.5
PASC-H-:04823	Total Water Digest	20021101-A	20021101-A	20021101-B	20021101-B	20021101-B
PASC-H-:50920	Inorganic Comment					
PASC-H-RCAp:01010	Sodium	47.1	29.2	29.5	18.5	6.5
PASC-H-RCAp:01020	Potassium	1.7	0.9	1.2	1.5	0.8
PASC-H-RCAp:01030	Calcium	43.1	33.4	11	29.8	6.1
PASC-H-RCAp:01050	Magnesium	4.4	3.7	1.7	4.5	1.9
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	94	87	33	67	16
PASC-H-RCAp:01070	Sulfate	18	21	15	31	10
PASC-H-RCAp:01080	Chloride	72	33	42	28	12
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	4.3	3.4	3.9	4.5	4
PASC-H-RCAp:01100	Ortho Phosphate (as P)	< 0.01	< 0.01	0.01	< 0.01	0.02
PASC-H-RCAp:01105	Nitrite	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	0.05	< 0.05	0.11	0.06	< 0.05
PASC-H-RCAp:01115	Nitrate (as N)	0.05	< 0.05	0.11	0.06	< 0.05
PASC-H-RCAp:01120	Ammonia (as N)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	25	25	84	26	47
PASC-H-RCAp:01180	Turbidity	2.2	3.1	3.2	7	5.8
PASC-H-RCAp:01190	Conductance (RCAp)	503	353	231	317	91
PASC-H-RCAp:01200	pH	7.9	8.1	7.5	7.9	7
PASC-H-RCAp:01220	Hardness (as CaCO3)	126	98.6	34.5	92.9	23.1
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	93	86	33	66	16
PASC-H-RCAp:01240	Carbonate (as CaCO3)	< 1	1	< 1	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	247	177	125	158	51
PASC-H-RCAp:01270	Cation Sum	4.61	3.27	2.01	2.7	0.77
PASC-H-RCAp:01280	Anion Sum	4.29	3.11	2.16	2.78	0.87
PASC-H-RCAp:01290	Ion Balance	3.6	2.46	3.79	1.36	6.25
PASC-H-RCAp:01311	Langlier Index @ 4C	-0.36	-0.29	-1.78	-0.65	-2.84
PASC-H-RCAp:01312	Langlier Index @ 20C	0.04	0.11	-1.38	-0.25	-2.44
PASC-H-RCAp:01313	Saturation pH @ 4C	8.26	8.39	9.28	8.55	9.84
PASC-H-RCAp:01314	Saturation pH @ 20C	7.86	7.99	8.88	8.15	9.44
PASC-H-RCAp:02010	Aluminum	50	780	210	160	270
PASC-H-RCAp:02020	Antimony	< 2	< 20	< 2	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	< 20	< 2	< 2	< 2
PASC-H-RCAp:02040	Barium	82	580	25	39	16
PASC-H-RCAp:02050	Beryllium	< 5	< 50	< 5	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 20	< 2	< 2	< 2
PASC-H-RCAp:02070	Boron	7	93	9	14	< 5
PASC-H-RCAp:02080	Cadmium	< 0.3	< 3	< 0.3	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	< 2	< 20	< 2	< 2	< 2
PASC-H-RCAp:02100	Cobalt	< 1	< 10	< 1	< 1	< 1
PASC-H-RCAp:02110	Copper	2	62	3	3	2
PASC-H-RCAp:02130	Iron	90	520	300	220	370
PASC-H-RCAp:02140	Lead	< 0.5	< 5	< 0.5	< 0.5	< 0.5
PASC-H-RCAp:02150	Manganese	10	34	8	90	31
PASC-H-RCAp:02160	Molybdenum	< 2	< 20	< 2	< 2	< 2
PASC-H-RCAp:02170	Nickel	< 2	< 20	< 2	< 2	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 20	< 2	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 5	< 0.5	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	46	450	25	110	19
PASC-H-RCAp:02230	Thallium	< 0.1	< 1	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 20	< 2	< 2	< 2
PASC-H-RCAp:02250	Titanium	2	20	4	6	6
PASC-H-RCAp:02260	Uranium	0.5	2.4	0.1	0.1	< 0.1
PASC-H-RCAp:02270	Vanadium	< 2	< 20	< 2	< 2	< 2
PASC-H-RCAp:02280	Zinc	4	120	10	10	10
PASC-H-RCAp:04060	Phosphorus	< 0.1	< 0.1	0.1	< 0.1	< 0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	6.2	6.4	11.8	6.1	10.2
PASC-H-RCAp:50770	RCAp Comments	EQL for K	EQL for K	EQL for K	EQL for K	EQL for K
		elevated to <0.2	elevated to <0.2	elevated to <0.3	elevated to <0.3	elevated to <0.3
		due to elevated	due to elevated	due to elevated	due to elevated	due to elevated
		blanks and	blanks and	blanks and	blanks and	blanks and

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8 16949	8 DUP 16949	9 16949	10 16949	11 16949
02-H067569	02-H067570	02-H067571	02-H067572	02-H067573
Water	Water	Water	Water	Water
31-Oct-02	31-Oct-02	31-Oct-02	31-Oct-02	31-Oct-02

Parameters		8	8 DUP	9	10	11
PASC-H-01316	Total Suspended Solids	2.5		< 2	3	< 2
PASC-H-04823	Total Water Digest	20021101-B	20021101-B	20021101-B	20021101-B	20021101-B
PASC-H-50920	Inorganic Comment			as verified by rep		
PASC-H-RCAp:01010	Sodium	19	19.6	37.5	4.3	8
PASC-H-RCAp:01020	Potassium	1	0.8	1.3	1.4	1.4
PASC-H-RCAp:01030	Calcium	8.9	9.1	36.7	4.1	11.2
PASC-H-RCAp:01050	Magnesium	1.2	1.2	6.3	1.6	2.1
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	11	12	47	11	18
PASC-H-RCAp:01070	Sulfate	22	22	30	13	28
PASC-H-RCAp:01080	Chloride	32	32	73	6	11
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	4.5	4.5	3.5	3.5	3.2
PASC-H-RCAp:01100	Ortho Phosphate (as P)	< 0.01	< 0.01	0.01	0.03	0.02
PASC-H-RCAp:01105	Nitrite	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	0.13	0.13	< 0.05	0.99	< 0.05
PASC-H-RCAp:01115	Nitrate (as N)	0.13	0.13	< 0.05	0.99	< 0.05
PASC-H-RCAp:01120	Ammonia (as N)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	27	27	23	42	47
PASC-H-RCAp:01180	Turbidity	2.3	2.4	4.7	7.8	10.9
PASC-H-RCAp:01190	Conductance (RCAp)	187	186	434	65	132
PASC-H-RCAp:01200	pH	7.1	7	7.8	6.9	7.2
PASC-H-RCAp:01220	Hardness (as CaCO3)	27.2	27.7	118	16.8	36.6
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	11	12	47	11	18
PASC-H-RCAp:01240	Carbonate (as CaCO3)	< 1	< 1	< 1	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	96	97	217	45	76
PASC-H-RCAp:01270	Cation Sum	1.4	1.43	4.02	0.56	1.12
PASC-H-RCAp:01280	Anion Sum	1.59	1.61	3.63	0.73	1.26
PASC-H-RCAp:01290	Ion Balance	6.38	5.91	5.13	12.9	5.77
PASC-H-RCAp:01311	Langlier Index @ 4C	-2.75	-2.80	-0.82	-3.27	-2.33
PASC-H-RCAp:01312	Langlier Index @ 20C	-2.35	-2.40	-0.42	-2.87	-1.93
PASC-H-RCAp:01313	Saturation pH @ 4C	9.85	9.8	8.62	10.2	9.53
PASC-H-RCAp:01314	Saturation pH @ 20C	9.45	9.4	8.22	9.77	9.13
PASC-H-RCAp:02010	Aluminum	120	130	140	410	460
PASC-H-RCAp:02020	Antimony	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02040	Barium	23	22	63	16	17
PASC-H-RCAp:02050	Beryllium	< 5	< 5	< 5	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02070	Boron	6	6	8	6	11
PASC-H-RCAp:02080	Cadmium	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02100	Cobalt	< 1	< 1	< 1	< 1	< 1
PASC-H-RCAp:02110	Copper	3	2	4	3	3
PASC-H-RCAp:02130	Iron	150	160	140	290	350
PASC-H-RCAp:02140	Lead	< 0.5	< 0.5	< 0.5	< 0.5	0.5
PASC-H-RCAp:02150	Manganese	19	17	11	9	16
PASC-H-RCAp:02160	Molybdenum	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02170	Nickel	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	72	73	72	15	74
PASC-H-RCAp:02230	Thallium	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02250	Titanium	2	3	3	11	11
PASC-H-RCAp:02260	Uranium	< 0.1	< 0.1	0.1	< 0.1	0.1
PASC-H-RCAp:02270	Vanadium	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02280	Zinc	10	5	12	26	11
PASC-H-RCAp:04060	Phosphorus	< 0.1	< 0.1	< 0.1	0.1	< 0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	5.1	4.8	5.5	8.4	9.5
PASC-H-RCAp:50770	RCAp Comments	EQL for K	EQL for K	EQL for K	EQL for K	EQL for K
		elevated to <0.3	elevated to <0.3	elevated to <0.3	elevated to <0.3	elevated to <0.3
		due to elevated	due to elevated	due to elevated	due to elevated	due to elevated
		blanks and	blanks and	blanks and	blanks and	blanks and

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12 16949	13 16949	14 16949	15 16949	15 DUP 16949
02-H067574	02-H067575	02-H067576	02-H067577	02-H067578
Water	Water	Water	Water	Water
31-Oct-02	31-Oct-02	31-Oct-02	31-Oct-02	31-Oct-02

Parameters		12	13	14	15	15 DUP
PASC-H-.01316	Total Suspended Solids	< 2	6	5	< 2	
PASC-H-.04823	Total Water Digest	20021101-B	20021101-B	20021101-B	20021101-B	20021101-B
PASC-H-.50920	Inorganic Comment					
PASC-H-RCAp:01010	Sodium	8.5	5.5	52.7	104	104
PASC-H-RCAp:01020	Potassium	1.4	7.9	4.6	0.8	0.7
PASC-H-RCAp:01030	Calcium	12	14.6	31.1	2.9	3
PASC-H-RCAp:01050	Magnesium	2.2	3.7	4.8	0.2	0.2
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	17	42	110	20	21
PASC-H-RCAp:01070	Sulfate	28	19	19	36	32
PASC-H-RCAp:01080	Chloride	11	11	59	140	140
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	3.2	2.9	3.9	2.4	2.3
PASC-H-RCAp:01100	Ortho Phosphate (as P)	0.02	0.29	0.15	0.02	0.02
PASC-H-RCAp:01105	Nitrite	< 0.01	0.02	< 0.01	< 0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	< 0.05	0.29	0.13	< 0.05	< 0.05
PASC-H-RCAp:01115	Nitrate (as N)	< 0.05	0.27	0.13	< 0.05	< 0.05
PASC-H-RCAp:01120	Ammonia (as N)	< 0.05	0.65	< 0.05	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	47	83	32	98	99
PASC-H-RCAp:01180	Turbidity	11.1	4.3	6	2.3	2.3
PASC-H-RCAp:01190	Conductance (RCAp)	132	146	470	596	594
PASC-H-RCAp:01200	pH	7.2	7.5	8	6.6	6.7
PASC-H-RCAp:01220	Hardness (as CaCO3)	39	51.7	97.4	8.1	8.3
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	17	42	109	20	21
PASC-H-RCAp:01240	Carbonate (as CaCO3)	< 1	< 1	1	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	77	92	242	299	295
PASC-H-RCAp:01270	Cation Sum	1.19	1.52	4.36	4.71	4.71
PASC-H-RCAp:01280	Anion Sum	1.24	1.57	4.27	5.1	5.04
PASC-H-RCAp:01290	Ion Balance	1.94	1.46	1.07	3.98	3.34
PASC-H-RCAp:01311	Langlier Index @ 4C	-2.32	-1.55	-0.33	-3.51	-3.37
PASC-H-RCAp:01312	Langlier Index @ 20C	-1.92	-1.15	0.07	-3.11	-2.97
PASC-H-RCAp:01313	Saturation pH @ 4C	9.52	9.05	8.33	10.1	10.1
PASC-H-RCAp:01314	Saturation pH @ 20C	9.12	8.65	7.93	9.71	9.67
PASC-H-RCAp:02010	Aluminum	390	170	90	410	460
PASC-H-RCAp:02020	Antimony	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02040	Barium	17	17	47	28	29
PASC-H-RCAp:02050	Beryllium	< 5	< 5	< 5	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02070	Boron	13	10	8	< 5	< 5
PASC-H-RCAp:02080	Cadmium	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02100	Cobalt	< 1	< 1	< 1	< 1	< 1
PASC-H-RCAp:02110	Copper	2	3	4	8	8
PASC-H-RCAp:02130	Iron	340	180	110	630	650
PASC-H-RCAp:02140	Lead	< 0.5	< 0.5	0.6	1.7	1.7
PASC-H-RCAp:02150	Manganese	17	29	21	25	25
PASC-H-RCAp:02160	Molybdenum	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02170	Nickel	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	80	59	96	9	9
PASC-H-RCAp:02230	Thallium	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02250	Titanium	9	4	3	7	11
PASC-H-RCAp:02260	Uranium	< 0.1	< 0.1	0.2	< 0.1	< 0.1
PASC-H-RCAp:02270	Vanadium	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02280	Zinc	5	7	6	8	7
PASC-H-RCAp:04060	Phosphorus	< 0.1	0.3	0.1	< 0.1	< 0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	9.6	16.5	8.1	12	13.4
PASC-H-RCAp:50770	RCAp Comments	EQL for K elevated to <0.3 due to elevated blanks and			EQL for K elevated to <0.3 due to elevated blanks and instrument precision.	EQL for K elevated to <0.3 due to elevated blanks and instrument precision.

Date Generated
14-Feb-2003
Spreadsheet File Name
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Client ID:	1	2
Project ID:	16949-3	16949-3
PSC Analytical ID:	03-H006207	03-H006208
Matrix:	Water	Water
Duplicate of:		
Date Sampled:	6-Feb-03	6-Feb-03
Client Description:		

Parameters	Method	EQL	Units			
PASC-H-:01316	Total Suspended Solids	Grav.	0.5	mg/L	< 2	4.5
PASC-H-:04823	Total Water Digest		-		20030207-B	20030207-B
PASC-H-:50920	Inorganic Comment	Comment		Text	Color; EQL = 10 due to elevated method blank.	
PASC-H-RCAp:01010	Sodium	ICP-OES	0.1	mg/L	3.6	39.2
PASC-H-RCAp:01020	Potassium	ICP-OES	0.1	mg/L	0.4	0.8
PASC-H-RCAp:01030	Calcium	ICP-OES	0.1	mg/L	1.3	11.7
PASC-H-RCAp:01050	Magnesium	ICP-OES	0.1	mg/L	0.7	2.1
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	COBAS	5	mg/L	< 5	11
PASC-H-RCAp:01070	Sulfate	COBAS	2	mg/L	< 5	< 10
PASC-H-RCAp:01080	Chloride	COBAS	1	mg/L	6	66
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	COBAS	0.5	mg/L	3	3.2
PASC-H-RCAp:01100	Ortho Phosphate (as P)	COBAS/911	0.01	mg/L	< 0.02	< 0.02
PASC-H-RCAp:01105	Nitrite	COBAS	0.01	mg/L	< 0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	COBAS	0.05	mg/L	< 0.05	0.17
PASC-H-RCAp:01115	Nitrate (as N)	COBAS	0.05	mg/L	< 0.05	0.17
PASC-H-RCAp:01120	Ammonia (as N)	COBAS	0.05	mg/L	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	COBAS	5	TCU	29	34
PASC-H-RCAp:01180	Turbidity	NEPH.	0.1	NTU	0.5	1.4
PASC-H-RCAp:01190	Conductance (RCAp)	Electrode	1	uS/cm	34	269
PASC-H-RCAp:01200	pH	Electrode	-	Units	5.7	6.4
PASC-H-RCAp:01220	Hardness (as CaCO3)	Calculated	0.1	mg/L	6.1	37.9
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	Calculated	1	mg/L	< 5	11
PASC-H-RCAp:01240	Carbonate (as CaCO3)	Calculated	1	mg/L	< 5	< 1
PASC-H-RCAp:01250	TDS (Calculated)	Calculated	1	mg/L	23	140
PASC-H-RCAp:01270	Cation Sum	Calculated	0.1	meq/L	0.29	2.49
PASC-H-RCAp:01280	Anion Sum	Calculated	0.1	meq/L	0.38	2.3
PASC-H-RCAp:01290	Ion Balance	Calculated	-	%	12.2	3.86
PASC-H-RCAp:01311	Langlier Index @ 4C	Calculated	-		-5.30	-3.34
PASC-H-RCAp:01312	Langlier Index @ 20C	Calculated	-		-4.90	-2.94
PASC-H-RCAp:01313	Saturation pH @ 4C	Calculated	-	Units	11	9.74
PASC-H-RCAp:01314	Saturation pH @ 20C	Calculated	-	Units	10.6	9.34
PASC-H-RCAp:02010	Aluminum	ICP-MS	10	ug/L	160	110
PASC-H-RCAp:02020	Antimony	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02030	Arsenic	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02040	Barium	ICP-MS	5	ug/L	11	20
PASC-H-RCAp:02050	Beryllium	ICP-MS	5	ug/L	< 5	< 5
PASC-H-RCAp:02060	Bismuth	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02070	Boron	ICP-MS	5	ug/L	< 5	5
PASC-H-RCAp:02080	Cadmium	ICP-MS	0.3	ug/L	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02100	Cobalt	ICP-MS	1	ug/L	< 1	< 1
PASC-H-RCAp:02110	Copper	ICP-MS	2	ug/L	< 2	2
PASC-H-RCAp:02130	Iron	ICP-MS	20	ug/L	130	190
PASC-H-RCAp:02140	Lead	ICP-MS	0.5	ug/L	< 0.5	< 0.5
PASC-H-RCAp:02150	Manganese	ICP-MS	2	ug/L	26	53
PASC-H-RCAp:02160	Molybdenum	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02170	Nickel	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02180	Selenium	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02200	Silver	ICP-MS	0.5	ug/L	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	ICP-MS	5	ug/L	5	37
PASC-H-RCAp:02230	Thallium	ICP-MS	0.1	ug/L	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02250	Titanium	ICP-MS	2	ug/L	2	2
PASC-H-RCAp:02260	Uranium	ICP-MS	0.1	ug/L	< 0.1	< 0.1
PASC-H-RCAp:02270	Vanadium	ICP-MS	2	ug/L	< 2	< 2
PASC-H-RCAp:02280	Zinc	ICP-MS	2	ug/L	5	6
PASC-H-RCAp:04060	Phosphorus	ICP-OES	0.1	mg/L	< 0.1	< 0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	U.V.-ox	0.5	mg/L	4.9	5.3
PASC-H-RCAp:50770	RCAp Comments	Comment		Text	Orthophosphorous; EQL = 0.02 due to elevated method blank.	Color; EQL = 10 due to elevated method blank. Orthophosphorous; EQL = 0.02 due to elevated method blank.

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4	5	6
16949-3	16949-3	16949-3
03-H006209	03-H006210	03-H006211
Water	Water	Water
6-Feb-03	6-Feb-03	6-Feb-03

Parameters				
PASC-H-:01316	Total Suspended Solids	26.8	< 2	< 2
PASC-H-:04823	Total Water Digest	20030207-B	20030207-B	20030207-B
PASC-H-:50920	Inorganic Comment	Color; EQL = 10 due to elevated method blank.	Color; EQL = 10 due to elevated method blank.	
PASC-H-RCAp:01010	Sodium	214	80.3	60.7
PASC-H-RCAp:01020	Potassium	1.5	0.8	1.3
PASC-H-RCAp:01030	Calcium	38.9	15.8	28.5
PASC-H-RCAp:01050	Magnesium	3.7	1.9	4.2
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	53	14	41
PASC-H-RCAp:01070	Sulfate	26	23	17
PASC-H-RCAp:01080	Chloride	300	120	91
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	3	2.4	3.4
PASC-H-RCAp:01100	Ortho Phosphate (as P)	0.02	< 0.01	0.01
PASC-H-RCAp:01105	Nitrite	< 0.01	< 0.01	< 0.01
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	< 0.05	0.1	0.39
PASC-H-RCAp:01115	Nitrate (as N)	< 0.05	0.1	0.39
PASC-H-RCAp:01120	Ammonia (as N)	< 0.05	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	23	35	27
PASC-H-RCAp:01180	Turbidity	11.4	4.2	5.3
PASC-H-RCAp:01190	Conductance (RCAp)	1280	512	445
PASC-H-RCAp:01200	pH	7.6	7	7.4
PASC-H-RCAp:01220	Hardness (as CaCO3)	112	47.3	88.5
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	53	14	41
PASC-H-RCAp:01240	Carbonate (as CaCO3)	< 1	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	619	253	232
PASC-H-RCAp:01270	Cation Sum	11.6	4.46	4.45
PASC-H-RCAp:01280	Anion Sum	10.1	4.15	3.77
PASC-H-RCAp:01290	Ion Balance	7.07	3.63	8.25
PASC-H-RCAp:01311	Langlier Index @ 4C	-0.99	-2.52	-1.39
PASC-H-RCAp:01312	Langlier Index @ 20C	-0.59	-2.12	-0.99
PASC-H-RCAp:01313	Saturation pH @ 4C	8.59	9.52	8.79
PASC-H-RCAp:01314	Saturation pH @ 20C	8.19	9.12	8.39
PASC-H-RCAp:02010	Aluminum	340	250	300
PASC-H-RCAp:02020	Antimony	< 2	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	< 2	< 2
PASC-H-RCAp:02040	Barium	100	38	52
PASC-H-RCAp:02050	Beryllium	< 5	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 2	< 2
PASC-H-RCAp:02070	Boron	8	5	10
PASC-H-RCAp:02080	Cadmium	< 0.3	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	2	< 2	< 2
PASC-H-RCAp:02100	Cobalt	< 1	< 1	< 1
PASC-H-RCAp:02110	Copper	4	2	3
PASC-H-RCAp:02130	Iron	440	240	270
PASC-H-RCAp:02140	Lead	4.7	< 0.5	< 0.5
PASC-H-RCAp:02150	Manganese	36	14	90
PASC-H-RCAp:02160	Molybdenum	< 2	< 2	< 2
PASC-H-RCAp:02170	Nickel	< 2	< 2	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	74	34	96
PASC-H-RCAp:02230	Thallium	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 2	< 2
PASC-H-RCAp:02250	Titanium	12	6	10
PASC-H-RCAp:02260	Uranium	0.1	< 0.1	0.1
PASC-H-RCAp:02270	Vanadium	< 2	< 2	< 2
PASC-H-RCAp:02280	Zinc	10	8	21
PASC-H-RCAp:04060	Phosphorus	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	3.1	4.6	2.8
PASC-H-RCAp:50770	RCAp Comments	Orthophosphorous; EQL = 0.02 due to elevated method blank. Excess cations due to presence of turbidity.		Color; EQL = 10 due to elevated method blank. Cation values verified by repeat analysis.

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	7 16949-3 03-H006212 Water 6-Feb-03	8 16949-3 03-H006213 Water 6-Feb-03	9 16949-3 03-H006214 Water 6-Feb-03	10 16949-3 03-H006215 Water 6-Feb-03	11 16949-3 03-H006216 Water 6-Feb-03	
Parameters						
PASC-H-:01316	Total Suspended Solids	2.2	2.5	7.8	< 2	3.2
PASC-H-:04823	Total Water Digest	20030207-B	20030207-B	20030207-B	20030207-B	20030207-B
PASC-H-:50920	Inorganic Comment					
PASC-H-RCAp:01010	Sodium	7.7	20.6	54.4	4.2	11.6
PASC-H-RCAp:01020	Potassium	0.6	0.9	2.8	1	0.9
PASC-H-RCAp:01030	Calcium	4.8	9.7	21	3.5	8.7
PASC-H-RCAp:01050	Magnesium	1.5	1.6	3.7	1.4	1.7
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	8	16	40	10	12
PASC-H-RCAp:01070	Sulfate	10	16	16	11	20
PASC-H-RCAp:01080	Chloride	12	30	89	7	18
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	2.7	3.5	5.6	2.6	2.1
PASC-H-RCAp:01100	Ortho Phosphate (as P)	0.01	0.01	0.03	0.02	0.02
PASC-H-RCAp:01105	Nitrite	< 0.01	0.02	0.02	0.02	0.02
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	0.13	0.26	< 0.05	0.62	< 0.05
PASC-H-RCAp:01115	Nitrate (as N)	0.13	0.24	< 0.05	0.6	< 0.05
PASC-H-RCAp:01120	Ammonia (as N)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
PASC-H-RCAp:01170	Color	32	19	31	33	36
PASC-H-RCAp:01180	Turbidity	5.4	3.1	12.5	6.9	9.9
PASC-H-RCAp:01190	Conductance (RCAp)	72	167	404	51	118
PASC-H-RCAp:01200	pH	6.7	6.8	7.4	6.7	6.7
PASC-H-RCAp:01220	Hardness (as CaCO3)	18.2	30.8	67.7	14.5	28.7
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	8	16	40	10	12
PASC-H-RCAp:01240	Carbonate (as CaCO3)	< 1	< 1	< 1	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	45	93	217	40	70
PASC-H-RCAp:01270	Cation Sum	0.72	1.54	3.79	0.5	1.11
PASC-H-RCAp:01280	Anion Sum	0.72	1.52	3.65	0.67	1.17
PASC-H-RCAp:01290	Ion Balance	0.1	0.69	1.99	14.4	2.72
PASC-H-RCAp:01311	Langlier Index @ 4C	-3.54	-2.85	-1.54	-3.58	-3.11
PASC-H-RCAp:01312	Langlier Index @ 20C	-3.14	-2.45	-1.14	-3.18	-2.71
PASC-H-RCAp:01313	Saturation pH @ 4C	10.2	9.65	8.94	10.3	9.81
PASC-H-RCAp:01314	Saturation pH @ 20C	9.84	9.25	8.54	9.88	9.41
PASC-H-RCAp:02010	Aluminum	320	150	410	400	490
PASC-H-RCAp:02020	Antimony	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02040	Barium	13	23	46	13	15
PASC-H-RCAp:02050	Beryllium	< 5	< 5	< 5	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02070	Boron	< 5	6	5	5	8
PASC-H-RCAp:02080	Cadmium	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02100	Cobalt	< 1	< 1	< 1	< 1	< 1
PASC-H-RCAp:02110	Copper	2	2	5	5	2
PASC-H-RCAp:02130	Iron	290	170	470	310	390
PASC-H-RCAp:02140	Lead	< 0.5	< 0.5	1.8	< 0.5	< 0.5
PASC-H-RCAp:02150	Manganese	14	19	35	10	23
PASC-H-RCAp:02160	Molybdenum	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02170	Nickel	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	14	64	40	13	53
PASC-H-RCAp:02230	Thallium	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02250	Titanium	11	5	12	9	11
PASC-H-RCAp:02260	Uranium	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:02270	Vanadium	< 2	< 2	< 2	< 2	< 2
PASC-H-RCAp:02280	Zinc	8	4	15	8	6
PASC-H-RCAp:04060	Phosphorus	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	4.7	3.4	3.7	5.3	5
PASC-H-RCAp:50770	RCAp Comments	Color; EQL = 10 due to elevated method blank.				

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13	13 DUP
16949-3	16949-3
03-H006217	03-H006218
Water	Water
6-Feb-03	03-H006217
	6-Feb-03

Parameters			
PASC-H-:01316	Total Suspended Solids	8.5	
PASC-H-:04823	Total Water Digest	20030207-B	20030207-B
PASC-H-:50920	Inorganic Comment		
PASC-H-RCAp:01010	Sodium	3.5	3.6
PASC-H-RCAp:01020	Potassium	2.4	2.5
PASC-H-RCAp:01030	Calcium	8	8
PASC-H-RCAp:01050	Magnesium	2.1	2.2
PASC-H-RCAp:01060	Alkalinity (as CaCO3)	25	17
PASC-H-RCAp:01070	Sulfate	10	11
PASC-H-RCAp:01080	Chloride	7	6
PASC-H-RCAp:01090	Reactive Silica (as SiO2)	1.7	1.6
PASC-H-RCAp:01100	Ortho Phosphate (as P)	0.11	0.11
PASC-H-RCAp:01105	Nitrite	0.02	0.02
PASC-H-RCAp:01110	Nitrate + Nitrite (as N)	< 0.05	0.1
PASC-H-RCAp:01115	Nitrate (as N)	< 0.05	0.08
PASC-H-RCAp:01120	Ammonia (as N)	0.09	0.14
PASC-H-RCAp:01170	Color	34	34
PASC-H-RCAp:01180	Turbidity	5.3	5.5
PASC-H-RCAp:01190	Conductance (RCAp)	77	78
PASC-H-RCAp:01200	pH	7.3	7.2
PASC-H-RCAp:01220	Hardness (as CaCO3)	28.6	29
PASC-H-RCAp:01230	Bicarbonate (as CaCO3)	25	17
PASC-H-RCAp:01240	Carbonate (as CaCO3)	< 1	< 1
PASC-H-RCAp:01250	TDS (Calculated)	50	46
PASC-H-RCAp:01270	Cation Sum	0.79	0.81
PASC-H-RCAp:01280	Anion Sum	0.91	0.75
PASC-H-RCAp:01290	Ion Balance	6.86	4.23
PASC-H-RCAp:01311	Langlier Index @ 4C	-2.22	-2.49
PASC-H-RCAp:01312	Langlier Index @ 20C	-1.82	-2.09
PASC-H-RCAp:01313	Saturation pH @ 4C	9.52	9.69
PASC-H-RCAp:01314	Saturation pH @ 20C	9.12	9.29
PASC-H-RCAp:02010	Aluminum	210	220
PASC-H-RCAp:02020	Antimony	< 2	< 2
PASC-H-RCAp:02030	Arsenic	< 2	< 2
PASC-H-RCAp:02040	Barium	10	10
PASC-H-RCAp:02050	Beryllium	< 5	< 5
PASC-H-RCAp:02060	Bismuth	< 2	< 2
PASC-H-RCAp:02070	Boron	5	5
PASC-H-RCAp:02080	Cadmium	< 0.3	< 0.3
PASC-H-RCAp:02090	Chromium	< 2	< 2
PASC-H-RCAp:02100	Cobalt	< 1	< 1
PASC-H-RCAp:02110	Copper	2	2
PASC-H-RCAp:02130	Iron	240	260
PASC-H-RCAp:02140	Lead	< 0.5	< 0.5
PASC-H-RCAp:02150	Manganese	19	20
PASC-H-RCAp:02160	Molybdenum	< 2	< 2
PASC-H-RCAp:02170	Nickel	< 2	< 2
PASC-H-RCAp:02180	Selenium	< 2	< 2
PASC-H-RCAp:02200	Silver	< 0.5	< 0.5
PASC-H-RCAp:02220	Strontium	32	32
PASC-H-RCAp:02230	Thallium	< 0.1	< 0.1
PASC-H-RCAp:02240	Tin	< 2	< 2
PASC-H-RCAp:02250	Titanium	4	7
PASC-H-RCAp:02260	Uranium	< 0.1	< 0.1
PASC-H-RCAp:02270	Vanadium	< 2	< 2
PASC-H-RCAp:02280	Zinc	10	5
PASC-H-RCAp:04060	Phosphorus	0.2	0.2
PASC-H-RCAp:04070	Total Org. Carbon (by UV)	6.7	6.6
PASC-H-RCAp:50770	RCAp Comments		

Date Generated 30-Apr-2003
Spreadsheet File Name 0306333h.XLS

Client ID:	1	2
Project ID:	16949-3	16949-3
PSC Analytical ID:	03-H021187	03-H021188
Matrix:	Water	Water
Duplicate of:		
Date Sampled:	22-Apr-03	22-Apr-03
Client Description:		

Parameters	Method	EQL	Units		
C-H-:0 Total Suspended Solids	Grav.	0.5	mg/L	< 2	< 2
C-H-:0 Total Water Digest		-		20030424-A	20030424-A
C-H-:5 Inorganic Comment	Comment		Text	g/L due to elevag/L due to elev	
+RCA Sodium	ICP-OES	0.1	mg/L	3.4	21.5
+RCA Potassium	ICP-OES	0.1	mg/L	0.3	0.6
+RCA Calcium	ICP-OES	0.1	mg/L	1.3	8
+RCA Magnesium	ICP-OES	0.1	mg/L	0.6	1.2
+RCA Alkalinity (as CaCO3)	COBAS	5	mg/L	< 5	14
+RCA Sulfate	COBAS	2	mg/L	4	12
+RCA Chloride	COBAS	1	mg/L	5	34
+RCA Reactive Silica (as SiO2)	COBAS	0.5	mg/L	1.9	0.5
+RCA Ortho Phosphate (as P)	COBAS/911	0.01	mg/L	< 0.01	< 0.01
+RCA Nitrite	COBAS	0.01	mg/L	< 0.01	< 0.01
+RCA Nitrate + Nitrite (as N)	COBAS	0.05	mg/L	< 0.05	< 0.05
+RCA Nitrate (as N)	COBAS	0.05	mg/L	< 0.05	< 0.05
+RCA Ammonia (as N)	Auto Color	0.05	mg/L	< 0.05	< 0.05
+RCA Color	COBAS	5	TCU	30	36
+RCA Turbidity	NEPH.	0.1	NTU	2.7	0.3
+RCA Conductance (RCAp)	Electrode	1	uS/cm	32	167
+RCA pH	Electrode	-	Units	6.2	6.6
+RCA Hardness (as CaCO3)	Calculated	0.1	mg/L	5.7	24.9
+RCA Bicarbonate (as CaCO3)	Calculated	1	mg/L	< 5	14
+RCA Carbonate (as CaCO3)	Calculated	1	mg/L	< 5	< 1
+RCA TDS (Calculated)	Calculated	1	mg/L	20	86
+RCA Cation Sum	Calculated	0.1	meq/L	0.27	1.45
+RCA Anion Sum	Calculated	0.1	meq/L	0.33	1.49
+RCA Ion Balance	Calculated	-	%	8.93	1.34
+RCA Langlier Index @ 4C	Calculated	-		-4.80	-3.19
+RCA Langlier Index @ 20C	Calculated	-		-4.40	-2.79
+RCA Saturation pH @ 4C	Calculated	-	Units	11	9.79
+RCA Saturation pH @ 20C	Calculated	-	Units	10.6	9.39
+RCA Aluminum	ICP-MS	10	ug/L	190	50
+RCA Antimony	ICP-MS	2	ug/L	< 2	< 2
+RCA Arsenic	ICP-MS	2	ug/L	< 2	< 2
+RCA Barium	ICP-MS	5	ug/L	11	13
+RCA Beryllium	ICP-MS	2	ug/L	< 2	< 2
+RCA Bismuth	ICP-MS	2	ug/L	< 2	< 2
+RCA Boron	ICP-MS	5	ug/L	5	5
+RCA Cadmium	ICP-MS	0.3	ug/L	< 0.3	< 0.3
+RCA Chromium	ICP-MS	2	ug/L	< 2	< 2
+RCA Cobalt	ICP-MS	1	ug/L	< 1	< 1
+RCA Copper	ICP-MS	2	ug/L	2	2
+RCA Iron	ICP-MS	50	ug/L	120	110
+RCA Lead	ICP-MS	0.5	ug/L	< 0.5	< 0.5
+RCA Manganese	ICP-MS	2	ug/L	14	8
+RCA Molybdenum	ICP-MS	2	ug/L	< 2	< 2
+RCA Nickel	ICP-MS	2	ug/L	< 2	< 2
+RCA Selenium	ICP-MS	2	ug/L	< 2	< 2
+RCA Silver	ICP-MS	0.5	ug/L	< 0.5	< 0.5

All results expressed on a dry weight basis for soils and a wet weight (as received) basis for tissues.



Prepared For:
Benoit LaLonde

Date Generated
30-Apr-2003
Spreadsheet File Name
0306333h.XLS

Client ID:	1	2
Project ID:	16949-3	16949-3
PSC Analytical ID:	03-H021187	03-H021188
Matrix:	Water	Water
Duplicate of:		
Date Sampled:	22-Apr-03	22-Apr-03
Client Description:		

	Parameters	Method	EQL	Units		
+RCA	Strontium	ICP-MS	5	ug/L	5	26
+RCA	Thallium	ICP-MS	0.1	ug/L	< 0.1	< 0.1
+RCA	Tin	ICP-MS	2	ug/L	< 2	< 2
+RCA	Titanium	ICP-MS	2	ug/L	2	< 2
+RCA	Uranium	ICP-MS	0.1	ug/L	< 0.1	< 0.1
+RCA	Vanadium	ICP-MS	2	ug/L	< 2	< 2
+RCA	Zinc	ICP-MS	5	ug/L	5	< 5
+RCA	Phosphorus	ICP-OES	0.1	mg/L	< 0.1	< 0.1
+RCA	Total Org. Carbon (by UV)	U.V.-ox	0.5	mg/L	3.8	5.8
+RCA	RCAp Comments	Comment		Text	Elevated EQL	

All results expressed on a dry weight basis for soils and a wet weight (as received) basis for tissues.

		3	4	5	6
		16949-3	16949-3	16949-3	16949-3
	<u>Date Generated</u>	03-H021189	03-H021190	03-H021191	03-H021192
		Water	Water	Water	Water
	<u>Spreadsheet File Name</u>				
		0306333h.XLS			
		22-Apr-03	22-Apr-03	22-Apr-03	22-Apr-03
Parameters					
C-H:0	Total Suspended Solids	5	< 2	2	2.8
C-H:0	Total Water Digest	20030424-A	20030424-A	20030424-A	20030424-A
C-H:5	Inorganic Comment	Colour EQL			
I-RCA	Sodium	72.6	148	47.8	44.8
I-RCA	Potassium	1.5	1.4	0.6	1.3
I-RCA	Calcium	53.4	50.3	13	43.4
I-RCA	Magnesium	5.2	4.4	1.7	6.2
I-RCA	Alkalinity (as CaCO3)	110	130	20	44
I-RCA	Sulfate	15	20	6	55
I-RCA	Chloride	120	220	78	83
I-RCA	Reactive Silica (as SiO2)	2.8	1.9	2.2	2.1
I-RCA	Ortho Phosphate (as P)	< 0.01	< 0.01	< 0.01	< 0.01
I-RCA	Nitrite	< 0.01	< 0.01	< 0.01	< 0.01
I-RCA	Nitrate + Nitrite (as N)	< 0.05	< 0.05	< 0.05	< 0.05
I-RCA	Nitrate (as N)	< 0.05	< 0.05	< 0.05	< 0.05
I-RCA	Ammonia (as N)	< 0.05	< 0.05	< 0.05	< 0.05
I-RCA	Color	13	17	31	17
I-RCA	Turbidity	0.2	0.9	1.7	3
I-RCA	Conductance (RCAp)	658	1060	331	516
I-RCA	pH	7.9	8.1	7.4	7.8
I-RCA	Hardness (as CaCO3)	155	144	39.5	134
I-RCA	Bicarbonate (as CaCO3)	109	128	20	44
I-RCA	Carbonate (as CaCO3)	< 1	2	< 1	< 1
I-RCA	TDS (Calculated)	337	524	162	262
I-RCA	Cation Sum	6.29	9.35	2.89	4.66
I-RCA	Anion Sum	5.9	9.22	2.73	4.37
I-RCA	Ion Balance	3.22	0.68	2.83	3.25
I-RCA	Langlier Index @ 4C	-0.21	0.02	-2.04	-0.79
I-RCA	Langlier Index @ 20C	0.19	0.42	-1.64	-0.39
I-RCA	Saturation pH @ 4C	8.11	8.08	9.44	8.59
I-RCA	Saturation pH @ 20C	7.71	7.68	9.04	8.19
I-RCA	Aluminum	60	30	100	80
I-RCA	Antimony	< 2	< 2	< 2	< 2
I-RCA	Arsenic	< 2	< 2	< 2	< 2
I-RCA	Barium	110	100	28	58
I-RCA	Beryllium	< 2	< 2	< 2	< 2
I-RCA	Bismuth	< 2	< 2	< 2	< 2
I-RCA	Boron	8	< 5	7	12
I-RCA	Cadmium	< 0.3	< 0.3	< 0.3	< 0.3
I-RCA	Chromium	< 2	< 2	< 2	< 2
I-RCA	Cobalt	< 1	< 1	< 1	< 1
I-RCA	Copper	3	4	2	3
I-RCA	Iron	50	< 50	160	210
I-RCA	Lead	< 0.5	< 0.5	< 0.5	< 0.5
I-RCA	Manganese	24	9	8	230
I-RCA	Molybdenum	< 2	< 2	< 2	< 2
I-RCA	Nickel	< 2	< 2	< 2	< 2
I-RCA	Selenium	< 2	< 2	< 2	< 2
I-RCA	Silver	< 0.5	< 0.5	< 0.5	< 0.5

All results expressed on a dry weight basis for soils and a wet weight (as received) basis for tissues.

		3	4	5	6
		16949-3	16949-3	16949-3	16949-3
<u>Date Generated</u>		03-H021189	03-H021190	03-H021191	03-H021192
		Water	Water	Water	Water
<u>Spreadsheet File Name</u>		22-Apr-03	22-Apr-03	22-Apr-03	22-Apr-03
<u>Parameters</u>					
+RCA	Strontium	58	73	28	190
+RCA	Thallium	< 0.1	< 0.1	< 0.1	< 0.1
+RCA	Tin	< 2	< 2	< 2	< 2
+RCA	Titanium	2	< 2	3	3
+RCA	Uranium	0.7	0.4	< 0.1	0.1
+RCA	Vanadium	< 2	< 2	< 2	< 2
+RCA	Zinc	< 5	< 5	7	9
+RCA	Phosphorus	0.1	< 0.1	< 0.1	< 0.1
+RCA	Total Org. Carbon (by UV)	2	2.5	5	2.8
+RCA	RCAp Comments				

		7 16949-3	8 16949-3	9 16949-3	10 16949-3
<u>Date Generated</u> 30-Apr-2003		03-H021193	03-H021194	03-H021195	03-H021196
<u>Spreadsheet File Name</u> 0306333h.XLS		Water	Water	Water	Water
		22-Apr-03	22-Apr-03	22-Apr-03	22-Apr-03
Parameters					
C-H:0	Total Suspended Solids	3.5	< 2	4.5	2.5
C-H:0	Total Water Digest	20030424-A	20030424-A	20030424-B	20030424-B
C-H:5	Inorganic Comment				
†-RCA	Sodium	8	19.7	11.1	4.1
†-RCA	Potassium	0.6	0.5	0.7	0.9
†-RCA	Calcium	7	11.1	5.2	3.8
†-RCA	Magnesium	2	1.1	1.3	1.3
†-RCA	Alkalinity (as CaCO ₃)	18	9	9	8
†-RCA	Sulfate	4	17	8	5
†-RCA	Chloride	12	29	15	5
†-RCA	Reactive Silica (as SiO ₂)	0.8	4.2	2.5	1.6
†-RCA	Ortho Phosphate (as P)	0.02	< 0.01	0.03	0.02
†-RCA	Nitrite	< 0.01	0.01	0.01	< 0.01
†-RCA	Nitrate + Nitrite (as N)	< 0.05	0.1	< 0.05	0.61
†-RCA	Nitrate (as N)	< 0.05	0.09	< 0.05	0.61
†-RCA	Ammonia (as N)	< 0.05	< 0.05	< 0.05	< 0.05
†-RCA	Color	36	13	31	34
†-RCA	Turbidity	4.3	1.7	7.7	6.2
†-RCA	Conductance (RCAp)	91	174	91	54
†-RCA	pH	7.2	7.2	7.1	6.9
†-RCA	Hardness (as CaCO ₃)	25.7	32.2	18.3	14.8
†-RCA	Bicarbonate (as CaCO ₃)	18	9	9	8
†-RCA	Carbonate (as CaCO ₃)	< 1	< 1	< 1	< 1
†-RCA	TDS (Calculated)	45	89	49	29
†-RCA	Cation Sum	0.88	1.52	0.87	0.5
†-RCA	Anion Sum	0.79	1.36	0.77	0.45
†-RCA	Ion Balance	5.75	5.54	5.96	5.59
†-RCA	Langlier Index @ 4C	-2.52	-2.64	-3.05	-3.43
†-RCA	Langlier Index @ 20C	-2.12	-2.24	-2.65	-3.03
†-RCA	Saturation pH @ 4C	9.72	9.84	10.2	10.3
†-RCA	Saturation pH @ 20C	9.32	9.44	9.75	9.93
†-RCA	Aluminum	180	70	250	240
†-RCA	Antimony	< 2	< 2	< 2	< 2
†-RCA	Arsenic	< 2	< 2	< 2	< 2
†-RCA	Barium	16	22	15	11
†-RCA	Beryllium	< 2	< 2	< 2	< 2
†-RCA	Bismuth	< 2	< 2	< 2	< 2
†-RCA	Boron	< 5	6	< 5	5
†-RCA	Cadmium	< 0.3	< 0.3	< 0.3	< 0.3
†-RCA	Chromium	< 2	< 2	< 2	< 2
†-RCA	Cobalt	< 1	< 1	< 1	< 1
†-RCA	Copper	2	2	5	3
†-RCA	Iron	320	80	290	230
†-RCA	Lead	< 0.5	< 0.5	0.5	< 0.5
†-RCA	Manganese	29	12	12	8
†-RCA	Molybdenum	< 2	< 2	< 2	< 2
†-RCA	Nickel	< 2	< 2	< 2	< 2
†-RCA	Selenium	< 2	< 2	< 2	< 2
†-RCA	Silver	< 0.5	< 0.5	< 0.5	< 0.5

All results expressed on a dry weight basis for soils and a wet weight (as received) basis for tissues.

		7 16949-3	8 16949-3	9 16949-3	10 16949-3
<u>Date Generated</u> 30-Apr-2003		03-H021193	03-H021194	03-H021195	03-H021196
<u>Spreadsheet File Name</u> 0306333h.XLS		Water	Water	Water	Water
		22-Apr-03	22-Apr-03	22-Apr-03	22-Apr-03
<u>Parameters</u>					
+RCA	Strontium	20	88	11	12
+RCA	Thallium	< 0.1	< 0.1	< 0.1	< 0.1
+RCA	Tin	< 2	< 2	< 2	< 2
+RCA	Titanium	4	2	4	5
+RCA	Uranium	< 0.1	< 0.1	< 0.1	< 0.1
+RCA	Vanadium	< 2	< 2	< 2	< 2
+RCA	Zinc	7	< 5	5	5
+RCA	Phosphorus	< 0.1	0.1	0.1	< 0.1
+RCA	Total Org. Carbon (by UV)	5.4	1.4	4	4.5
+RCA	RCAp Comments				

	11 16949-3	11 DUP 16949-3	12 16949-3	13 16949-3
<u>Date Generated</u> 30-Apr-2003	03-H021197	03-H021198	03-H021199	03-H021200
<u>Spreadsheet File Name</u> 0306333h.XLS	Water	Water	Water	Water
	22-Apr-03	22-Apr-03	22-Apr-03	22-Apr-03
Parameters				
C-H:0 Total Suspended Solids	20.2		4.8	5
C-H:0 Total Water Digest	20030424-B	20030424-B	20030424-B	20030424-B
C-H:5 Inorganic Comment				
+RCA Sodium	16.5	17	10.1	16.8
+RCA Potassium	1	1.2	1	2.8
+RCA Calcium	16.6	17	13.7	13.3
+RCA Magnesium	2.8	2.9	2.3	2.9
+RCA Alkalinity (as CaCO3)	18	17	13	32
+RCA Sulfate	42	41	34	4
+RCA Chloride	22	22	11	20
+RCA Reactive Silica (as SiO2)	1.4	1.4	1.4	1.3
+RCA Ortho Phosphate (as P)	0.02	0.02	0.02	0.07
+RCA Nitrite	0.02	< 0.01	0.01	0.02
+RCA Nitrate + Nitrite (as N)	< 0.05	< 0.05	< 0.05	0.37
+RCA Nitrate (as N)	< 0.05	< 0.05	< 0.05	0.35
+RCA Ammonia (as N)	< 0.05	< 0.05	< 0.05	< 0.05
+RCA Color	39	39	40	33
+RCA Turbidity	22.8	23.2	12.1	9.3
+RCA Conductance (RCap)	195	194	143	149
+RCA pH	7.4	7.4	7.2	7.5
+RCA Hardness (as CaCO3)	53	54.4	43.7	45.1
+RCA Bicarbonate (as CaCO3)	18	17	13	32
+RCA Carbonate (as CaCO3)	< 1	< 1	< 1	< 1
+RCA TDS (Calculated)	113	113	82	82
+RCA Cation Sum	1.81	1.86	1.34	1.71
+RCA Anion Sum	1.86	1.82	1.28	1.31
+RCA Ion Balance	1.41	1.2	2.31	13.1
+RCA Langlier Index @ 4C	-1.97	-1.98	-2.38	-1.71
+RCA Langlier Index @ 20C	-1.57	-1.58	-1.98	-1.31
+RCA Saturation pH @ 4C	9.37	9.38	9.58	9.21
+RCA Saturation pH @ 20C	8.97	8.98	9.18	8.81
+RCA Aluminum	730	880	360	180
+RCA Antimony	< 2	< 2	< 2	< 2
+RCA Arsenic	< 2	< 2	< 2	< 2
+RCA Barium	28	28	17	16
+RCA Beryllium	< 2	< 2	< 2	< 2
+RCA Bismuth	< 2	< 2	< 2	< 2
+RCA Boron	13	12	12	6
+RCA Cadmium	< 0.3	< 0.3	< 0.3	< 0.3
+RCA Chromium	< 2	< 2	< 2	< 2
+RCA Cobalt	< 1	1	< 1	< 1
+RCA Copper	3	3	2	3
+RCA Iron	930	1100	380	200
+RCA Lead	1.4	1.6	< 0.5	< 0.5
+RCA Manganese	110	120	34	8
+RCA Molybdenum	< 2	< 2	< 2	< 2
+RCA Nickel	< 2	2	< 2	< 2
+RCA Selenium	< 2	< 2	< 2	< 2
+RCA Silver	< 0.5	< 0.5	< 0.5	< 0.5

All results expressed on a dry weight basis for soils and a wet weight (as received) basis for tissues.

		11 16949-3	11 DUP 16949-3	12 16949-3	13 16949-3
<u>Date Generated</u> 30-Apr-2003		03-H021197	03-H021198	03-H021199	03-H021200
<u>Spreadsheet File Name</u> 0306333h.XLS		Water	Water	Water	Water
		22-Apr-03	22-Apr-03	22-Apr-03	22-Apr-03
<u>Parameters</u>					
+RCA	Strontium	110	120	100	50
+RCA	Thallium	< 0.1	< 0.1	< 0.1	< 0.1
+RCA	Tin	< 2	< 2	< 2	< 2
+RCA	Titanium	11	15	7	4
+RCA	Uranium	0.1	0.1	< 0.1	< 0.1
+RCA	Vanadium	< 2	< 2	< 2	< 2
+RCA	Zinc	9	9	6	< 5
+RCA	Phosphorus	0.1	< 0.1	< 0.1	0.2
+RCA	Total Org. Carbon (by UV)	4.5	4.5	4.6	5.8
+RCA	RCAp Comments				is verified by rep

	14 16949-3	15 16949-3
<u>Date Generated</u> 30-Apr-2003	03-H021201	03-H021202
<u>Spreadsheet File Name</u> 0306333h.XLS	Water	Water
	22-Apr-03	22-Apr-03

Parameters			
C-H-0	Total Suspended Solids	2.8	< 2
C-H-0	Total Water Digest	20030424-B	20030424-B
C-H-5	Inorganic Comment		
I-RCA	Sodium	124	27.4
I-RCA	Potassium	4.5	0.7
I-RCA	Calcium	47.4	4.8
I-RCA	Magnesium	6.6	1.3
I-RCA	Alkalinity (as CaCO3)	120	6
I-RCA	Sulfate	9	4
I-RCA	Chloride	190	46
I-RCA	Reactive Silica (as SiO2)	2.7	2.7
I-RCA	Ortho Phosphate (as P)	0.09	< 0.01
I-RCA	Nitrite	< 0.01	< 0.01
I-RCA	Nitrate + Nitrite (as N)	0.33	< 0.05
I-RCA	Nitrate (as N)	0.33	< 0.05
I-RCA	Ammonia (as N)	< 0.05	< 0.05
I-RCA	Color	18	27
I-RCA	Turbidity	2.8	0.8
I-RCA	Conductance (RCAp)	955	186
I-RCA	pH	8.1	6.7
I-RCA	Hardness (as CaCO3)	146	17.3
I-RCA	Bicarbonate (as CaCO3)	119	6
I-RCA	Carbonate (as CaCO3)	1	< 1
I-RCA	TDS (Calculated)	458	91
I-RCA	Cation Sum	8.42	1.56
I-RCA	Anion Sum	7.97	1.5
I-RCA	Ion Balance	2.76	1.83
I-RCA	Langlier Index @ 4C	-0.03	-3.68
I-RCA	Langlier Index @ 20C	0.37	-3.28
I-RCA	Saturation pH @ 4C	8.13	10.4
I-RCA	Saturation pH @ 20C	7.73	9.98
I-RCA	Aluminum	70	120
I-RCA	Antimony	< 2	< 2
I-RCA	Arsenic	< 2	< 2
I-RCA	Barium	82	38
I-RCA	Beryllium	< 2	< 2
I-RCA	Bismuth	< 2	< 2
I-RCA	Boron	7	5
I-RCA	Cadmium	< 0.3	< 0.3
I-RCA	Chromium	< 2	< 2
I-RCA	Cobalt	< 1	< 1
I-RCA	Copper	4	3
I-RCA	Iron	110	210
I-RCA	Lead	0.8	< 0.5
I-RCA	Manganese	82	32
I-RCA	Molybdenum	< 2	< 2
I-RCA	Nickel	< 2	< 2
I-RCA	Selenium	< 2	< 2
I-RCA	Silver	< 0.5	< 0.5

All results expressed on a dry weight basis for soils and a wet weight (as received) basis for tissues.

	14 16949-3	15 16949-3
<u>Date Generated</u> 30-Apr-2003	03-H021201	03-H021202
<u>Spreadsheet File Name</u> 0306333h.XLS	Water	Water
	22-Apr-03	22-Apr-03
Parameters		
-RCA Strontium	130	23
-RCA Thallium	< 0.1	< 0.1
-RCA Tin	< 2	< 2
-RCA Titanium	3	< 2
-RCA Uranium	0.3	< 0.1
-RCA Vanadium	< 2	< 2
-RCA Zinc	< 5	8
-RCA Phosphorus	0.2	< 0.1
-RCA Total Org. Carbon (by UV)	3.1	4.3
-RCA RCAp Comments		