

Table 6.24 Water quality measurement summary of the sample ponds including light penetration and water quality factors measured with the Hydrolab

		Po	nd $1(20)$	06)		Pond 2			Pond 3		Pond 4	Pond 5	Pond 6	Pond 7	Pond 8	Pond 9	Pond 10
		10	10 1 (20	00)		(2006)			(2006)		(2007)	(2007)	(2007)	(2007)	(2007)	(2007)	(2007)
	Up		0.64			1.00			0.80		-	N.R.	-	-	-	-	-
Secchi	Down		0.61			1.10			0.90		-	N.R.	-	-	-	-	-
(m) Stratified	Average	0.63			1.05			0.85		Bottom (1.2)	N.R.	Bottom (0.65)	Bottom (0.65)	Bottom (0.90)	Bottom (0.60)	Bottom (0.35)	
Stratified	d Depths (m)	0.6	1.1	1.2	0.4	3.2	5.6	0.4	0.8	0.9	0.21		0.04	0.3	0.09	0.14	0.05
Otraumou	Temperature (°C)	8.96	8.96	8.97	7.01	6.99	6.97	7.01	7.01	7.01	14.50	N.R.	11.55	10.31	11.86	11.88	17.7
	pН	5.62	5.55	5.51	5.65	5.57	5.60	5.51	5.43	5.43	4.75	N.R.	4.17	6.40	6.34	4.98	7.08
Hydrolab	Conductivity (µS/cm)	27.5	27.5	27.5	24.9	25.1	25.3	22.1	22.1	22.2	31.7	N.R.	43.2	45.6	30.1	25.9	47.8
	DO%	97.0	93.5	90.8	96.9	89.2	88.4	95.6	93.6	90.0	106.5	N.R.	97.5	92.1	102.3	104.3	116.2
	DO (mg/L)	11.01	10.65	10.32	11.56	10.71	10.61	11.46	11.15	10.79	9.91	N.R.	9.69	9.42	10.07	10.30	10.20
	Turbidity (NTU's)	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	0.5	1.5	N.R.	N.R.	2.5

N.R. = Not Recorded



During the 2007 sampling program sediment samples were collected from Ponds 1, 4, 5, 6. 7, 8, 9, and 10. At each pond sediment was collected from the 0-5 cm and 5-10 cm horizons using a Ponar grab sampler, except Pond 9 where there wasn't enough material available to sample the 5-10 cm horizon. The samples were sent to AMEC's Mississauga Lab where an analysis of grain size distribution and metals scan was preformed on each sample. The grain size results were classified using the Unified Soil Classification System and are presented in Appendix E along with the results of the metals analyses.

6.3.1 Pond 1 (2006/2007)

The southern most section of this pond was first sampled on November 2 - 4, 2006. One double bag, and three single bag fyke nets, as well as four baited minnow traps were employed to sample the pond. All nets and traps were set for a total of 2 net nights; yielding a total catch of 56 brook trout, 40 threespine stickleback and 3 juvenile Atlantic salmon. A double-bag fyke net was set near the mouth of the inflow catching the majority of fish. Three additional single-bag fyke nets were set throughout the selected sections of the pond over detritus, muck and, to a lesser extent, gravel.

A larger portion of the pond was surveyed during the 2007 (See Figure 6-2) field program and it was found that the total area of Pond 1 which lies within the project footprint was 7.45 ha (all littoral) and had an average depth of 1.0 m, with a maximum depth of 1.2 m. The shoreline substrate was mostly comprised of muck, with a small amount of boulder, rubble, cobble and gravel present. The remaing littoral (vegetation) zone substrate (5.84 ha) was muck with aquatic vegetation.

One inflow tributary was located in the southwestern corner of the pond and was the site of most of the fish captures (at mouth of the inflow). Emergent vegetation, (mostly grass) was visible near the shoreline throughout the pond. There were large amounts of both emergent and submerge woody debris in the center and western portions of the pond.





Figure 6-1 Southern section of Pond 1 surveyed during the 2006 and 2007 field programs. Green line denotes the northern boundary of the surveyed area.

Habitat Quantification

A DFO generated spreadsheet was used for habitat quantification, the spreadsheet was used in conjunction with the habitat data collected in the field and the species presence data. Table 6-25 presents an overview of the habitat information used to determine habitat areas. Table 6-26 shows the habitat suitabilities of each habitat type for the species present, i.e., brook trout, Atlantic salmon and threespine stickleback. DFO spreadsheet calculations were used to determine final habitat equivalent units of each habitat type present. Table 6-27 presents the total HEU values for Atlantic salmon, brook trout and three spine stickleback, the calculated values were 0.53 ha, 5.01 ha and 7.42 ha respectively.



Step 1	Note: Only enter the values in the	cells shade	d blue, the s	ubtotals, to	tals and ra	atios will be calculated
	Fnter I ake name		POND 1		1	
Part 1 Entering Lake denth(s)	Enter Eate name.					
IF I are Denth is less than or equal	to 10 m:		IE Lako Do	nth is are	ator than	10 m·
	to 10 m.		IF Lake De	pui is grea		<u>10 III.</u>
Pa	thi	UK			Path	2
A Enter Depth of Littoral Zone:	1		A-1 Enter r	nean dept	h of Non-	Littoral Zone:
B Enter Mean Depth of Lake:	1		B-1 Enter of	depth of B	enthic Zo	ne:
			-			
Path 2 (Continued)						
IF Lake Depth is greater than 10 m:	Mean depth of Non-Littoral	Zone:		(Reduced	Value)	
	Depth of the Benthic Zor	ne:		(Reduced	Value)	
	· · ·				,	
	Benthic Pelagic ratio				1	
Part 2 Enter the values for the estin	nated bottom surface area:					
	Littoral Zone (No veget	ation):				
Substrate:	Coarse	m ²	Medium	m ²	Fine	m ²
	Bedrock:	4.19	Rubble:	199.75	Sand:	0.00
	Boulder:	92.13	Cobble:	226.13	Silt:	0.00
			Gravel:	83.75	Muck:	15,444.63
					Clay:	0.00
			-			
	SubTotals:	96		510)	15,445
	Littoral Zone (Vegeta	tion)				
Substrate	Caaraa	m ²	Madium	m ²	Fine	m ²
Substrate.	Bodrooki		Bubbler	0.00	Fille	0.00
	Deulder:	0.00	Rubble.	0.00	Sanu.	0.00
	Boulder:	0.00	Cobble:	0.00	SIIT:	0.00
			Gravei:	0.00	MUCK:	58,444.31
					Clay:	0.00
			1	-		
	Sub l otals:	0		()	58,444
	Non-Littoral Zone	9		0		
Substrate:	<u>Coarse</u>	m²	<u>Medium</u>	m²	Fine	m²
	Bedrock:	0.00	Rubble:	0.00	Sand:	0.00
	Boulder:	0.00	Cobble:	0.00	Silt:	0.00
			Gravel:	0.00	Muck:	0.00
					Clay:	0.00
	SubTotals:	0		()	0
					4	
Part 3 Summary Table for Bottom S	ourface Area Totals:					
		1				
Habitat Types	Bottom Surface area (m ²)					
ittoral Coarse/No vegetation						
ittoral Medium/No vegetation	510					
ittoral Fine/No vegetation	510					
	15,445					
	16,051					
ittoral Madium (/acetation	0					
	0					
	58,444					
Subtotal Littoral/Vegetation	58,444					
Subtotal Littoral	74,495					
Non-littoral Coarse/Pelagic	0					
Non-littoral Medium/Pelagic	0					
Non-littoral Fine/Pelagic	0					
Subtotal nonlittoral	0					
Total Available Habitat	74 495					

Table 6.25 Summary of Pond 1 habitat values used to calculate bottom areas.



					Littoral		Non-Littoral Zone				
	Species	Life Stage	Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic
		Spawning	0.00	0.00	0.00	NA	NA	0.00	NA	NA	0.00
		YOY	0.50	0.89	0.00	NA	NA	0.00	NA	NA	0.00
		Juvenile	0.50	0.95	0.00	NA	NA	0.00	NA	NA	0.00
1	Atlantic Salmon (anadromous)	Adult	0.00	0.00	0.00	NA	NA	0.00	NA	NA	0.00
Г		Spawning	0.00	0.84	0.67	NA	NA	0.67	NA	NA	0.00
		YOY	0.50	1.00	0.00	NA	NA	0.00	NA	NA	0.00
		Juvenile	0.50	1.00	0.00	NA	NA	0.00	NA	NA	0.00
2	Brook Trout (freshwater resident)	Adult	0.00	0.67	0.00	NA	NA	0.00	NA	NA	0.00
		Spawning	0.00	0.67	1.00	NA	NA	0.89	NA	NA	0.00
		YOY	0.00	0.00	0.00	NA	NA	0.00	NA	NA	0.00
		Juvenile	0.00	0.00	0.00	NA	NA	0.00	NA	NA	0.00
3	Threespine stickleback (Freshwater resident)	Adult	0.00	0.67	1.00	NA	NA	1.00	NA	NA	0.00

Table 6.26 Habitat suitabilities for species present within Pond 1.

 Table 6.27 Habitat equivalent units for species present within Pond 1, measured in m².

		Littoral Zone						N			
	Species	Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic	Total Available Habitat
□ 1	Atlantic Salmon (anadromous)	48	484	0	0	0	0	0	0	0	532.3
2	Brook Trout (freshwater resident)	48	510	10348	0	0	39158	0	0	0	50063.8
□ 3	Threespine stickleback (Freshwater resident)	0	341	15445	0	0	58444	0	0	0	74230.5

6.3.2 Pond 2 (2006)

Pond 2 was located approximately 800 m northwest of Pond 1 within the Project footprint. This pond was sampled on October 27, 28 & 31, 2006; with two weather days (Oct. 29 & 30) preventing the crew from gaining access to the site. A total of one double bag fyke net, three single bag fyke nets and four baited minnow traps were fished over 3 net nights, respectively yielding a total catch of 66 brook trout. The double-bag fyke net was set near the mouth of the inflow and caught the majority of fish. The three single-bag fyke nets were set throughout the pond over gravel, cobble and rubble substrates.

The average depth of the pond measured 3.1 m, being 5.6 m at its deepest location. This was the deepest of all sampled ponds, as it contained a deep hole on its east side. The visible shallow bottom consisted of muck and detritus. The littoral shoreline substrate was comprised of rubble, cobble and gravel; while substrate in the non-littoral zone was exclusively muck. The ponds' outflow was on the east side which drained out through the bog. The total area of the pond was 2.6 ha, of which 2.20 ha was littoral (no vegetation) and 0.43 ha was non-littoral.

Figure 6-3 shows the bathymetry of Pond 2, figure 6-4 illustrates the extent of the littoral and non-littoral zone and figure 6-5 is a photograph showing Pond 2.



Habitat Quantification

A DFO generated spreadsheet was used for habitat quantification, the spreadsheet was used in conjunction with the habitat data collected in the field and the species presence data. Table 6-28 presents an overview of the habitat information used to determine habitat areas. Table 6-29 shows the habitat suitabilities of each habitat type for the species present, i.e., brook trout, Atlantic salmon and threespine stickleback. DFO spreadsheet calculations were used to determine final habitat equivalent units of each habitat type present. Table 6-30 presents the final HEU values for all three species; however, brook trout was the only species present in Pond 2; the total HEU's for brook trout are 2.2 ha.



Figure 6-2 Bathymetric contours for Pond 2 November, 2006, Southern Head, NL.







Figure 6-3 Pond 2 littoral zone (<2.0 m) and non littoral zone (>2.0 m), Southern Head, NL, November, 2006.



Figure 6-4 Pond 2



Table 6.28 Summary of Pond 2 habitat values used to calculate aerial extents.

Step 1						
	Note: Only enter the values in the o	cells shaded	d blue, the s	ubtotals, to	als and rati	os will be calculated aut
	Enter Lake name:		POND 2			
Part 1 Entering Lake depth(s):					1	
IF Lake Dopth is loss than or equal to	10 m·		IE Laka Da	nth is area	tor than 10)
IF Lake Depth is less than of equal to	<u>iom.</u>	00	IF Lake De	pui is grea		<u>, m.</u>
Path		UK			Path 2	
A Enter Depth of Littoral Zone:	2		A-1 Enter r	nean depti	n of Non-Li	ittoral Zone:
B Enter Mean Depth of Lake:	3		B-1 Enter of	depth of Be	enthic Zon	e:
			-			
Path 2 (Continued)						
IF Lake Depth is greater than 10 m	Mean depth of Non-Littoral	Zone:		(Reduced	(alua)	
in Earle Departie greater than to m.				Inconcen	(aluc)	
	Double of the Double Tou	-			(-()	
	Depth of the Benthic Zon	e:		(Reduced	value)	
	Benthic Pelagic ratio:					
					-	
Dort 2 Entor the values for the setting	d hattam aurfaas sees					
Fart 2 Enter the values for the estimate	eu bottom surrace area:					
	Littoral Zone (No veget	ation):		0		
Substrate:	Coarse	m²	Medium	m²	Fine	m⁴
	Bedrock:	219.69	Rubble:	4,586.03	Sand:	1,345.60
	Boulder:	1,290.68	Cobble:	7,551.84	Silt:	0.00
			Gravel:	6,975.16	Muck:	0.00
				-,	Clay:	0.00
					olay.	0.00
	CubTatala	4 540	1	40.440		1.240
	Sub i otais:	1,510		19,113		1,346
	Littoral Zone (Vegeta	tion)				
Substrate:	Coarse	m²	Medium	m²	Fine	m ²
	Bedrock:	0.00	Rubble:	0.00	Sand:	0.00
	Boulder:	0.00	Cobble:	0.00	Silt	0.00
		0.00	Gravel:	0.00	Muck:	0.00
			Glavei.	0.00	Cloy#	0.00
					Clay.	0.00
						0
	SubTotals:	0		0		0
	SubTotals:	0		0		0
	SubTotals:	0		0		0
	SubTotals: Non-Littoral Zone	0		0		0
Substrate:	SubTotals: Non-Littoral Zone Coarse	0 m ²	Medium	0 m ²	Fine	0
Substrate:	SubTotals: Non-Littoral Zone Coarse Bedrock:	0 m ²	Medium Rubble:	0 m ²	Fine Sand:	0 m ²
Substrate:	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder	0 m ² 0.00	Medium Rubble: Cobble:	0 m ² 0.00	Fine Sand: Silt:	0 m ² 0.00
Substrate:	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder:	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00	Fine Sand: Silt: Muck:	0 0.00 0.00 4.353.00
Substrate:	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder:	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 0.00 4,353.00
Substrate:	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder:	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 0.00 4,353.00 0.00
Substrate:	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder:	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 0.00 4,353.00 0.00
Substrate:	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals:	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
Substrate:	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals:	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
Substrate:	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals:	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
Substrate: Part 3 Summary Table for Bottom Surf	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: ace Area Totals:	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 0.00 4,353.00 0.00
Substrate: Part 3 Summary Table for Bottom Surf	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: ace Area Totals:	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 0.00 4,353.00 0.00 4,353
Substrate: Part 3 Summary Table for Bottom Surf	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: ace Area Totals: Bottom Surface area (m ²)	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
Substrate: Part 3 Summary Table for Bottom Surf Habitat Types Littoral Coarse/No vegetation	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: ace Area Totals: Bottom Surface area (m ²) 1.510	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
Substrate: Part 3 Summary Table for Bottom Surf Habitat Types Littoral Coarse/No vegetation Littoral Medium/No vegetation	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: SubTotals: ace Area Totals: Bottom Surface area (m²) 19 113	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 0.00 4,353.00 0.00 4,353
Substrate: Part 3 Summary Table for Bottom Surf Habitat Types Littoral Coarse/No vegetation Littoral Fine/No vegetation	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: ace Area Totals: Bottom Surface area (m ²) 1,510 19,113 1 346	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 0.00 4,353
Substrate: Part 3 Summary Table for Bottom Surf Habitat Types Littoral Coarse/No vegetation Littoral Medium/No vegetation Littoral Fine/No vegetation Subtat Littoral No vegetation Littoral Littoral No vegetation	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: ace Area Totals: Bottom Surface area (m ²) 1,510 19,113 1,346 21 660	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
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Substrate: Part 3 Summary Table for Bottom Surf Habitat Types Littoral Coarse/No vegetation Littoral Medium/No vegetation Littoral Fine/No vegetation Subtotal Littoral/No vegetation Littoral Coarse/Vegetation Littoral Medium/No vegetation	Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: Coarse Bottom Surface area (m ²) 1,510 19,113 1,346 21,969 0	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 0.00 4,353.00 0.00 4,353
Substrate: Part 3 Summary Table for Bottom Surf Habitat Types Littoral Coarse/No vegetation Littoral Medium/No vegetation Littoral Fine/No vegetation Littoral Littoral/No vegetation Littoral Coarse/Vegetation Littoral Medium/Vegetation Littoral Medium/Vegetation	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: SubTotals: Bottom Surface area (m²) 1,510 19,113 1,346 21,969 0	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
Substrate: Part 3 Summary Table for Bottom Surf Habitat Types Littoral Coarse/No vegetation Littoral Medium/No vegetation Littoral Littoral/No vegetation Littoral Coarse/Vegetation Littoral Fine/No vegetation Littoral Fine/Vegetation Littoral Fine/Vegetation Littoral Fine/Vegetation Littoral Fine/Vegetation Littoral Fine/Vegetation Littoral Fine/Vegetation	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: ace Area Totals: Bottom Surface area (m²) 1,510 19,113 1,346 0 0 0	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
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Substrate: Part 3 Summary Table for Bottom Surf Habitat Types Littoral Coarse/No vegetation Littoral Medium/No vegetation Littoral Fine/No vegetation Littoral Coarse/Vegetation Littoral Coarse/Vegetation Littoral Fine/Vegetation Littoral Littoral/Vegetation Littoral Littoral/Vegetation Subtotal Littoral Littoral Non-littoral Coarse/Pelagic	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: SubTotals: ace Area Totals: Bottom Surface area (m²) 1,510 19,113 1,346 0	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 0.00 0.00 4,353.00 0.00
Substrate: Part 3 Summary Table for Bottom Surf Habitat Types Littoral Coarse/No vegetation Littoral Medium/No vegetation Littoral Coarse/Vegetation Littoral Coarse/Vegetation Littoral Medium/Vegetation Littoral Medium/Vegetation Littoral Medium/Vegetation Littoral Medium/Vegetation Littoral Medium/Vegetation Non-littoral Coarse/Pelagic Non-littoral Medium/Pelagic	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: SubTotals: Bottom Surface area (m²) 1,510 19,113 1,346 21,969 0 0 0 0 0 0 0 0 0 0	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
Substrate: Substrate: Habitat Types Littoral Coarse/No vegetation Littoral Medium/No vegetation Littoral Coarse/No vegetation Littoral Fine/No vegetation Littoral Coarse/Vegetation Littoral Medium/Vegetation Littoral Medium/Vegetation Littoral Medium/Vegetation Nittoral Fine/Vegetation Non-littoral Coarse/Pelagic Non-littoral Medium/Pelagic Non-littoral Fine/Pelagic	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: SubTotals: ace Area Totals: Bottom Surface area (m²) 1,510 19,113 1,346 21,969 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353
Substrate: Substrate: Habitat Types Littoral Coarse/No vegetation Littoral Medium/No vegetation Littoral Fine/No vegetation Littoral Fine/No vegetation Littoral Fine/No vegetation Littoral Littoral/No vegetation Littoral Fine/Vegetation Littoral Addition Subtotal Littoral/No vegetation Littoral Kedium/Vegetation Subtotal Littoral/Vegetation Subtotal Littoral Non-littoral Coarse/Pelagic Non-littoral Fine/Pelagic Subtotal Littoral Subtotal Littoral	SubTotals: Non-Littoral Zone Coarse Bedrock: Boulder: SubTotals: SubTotals: ace Area Totals: Bottom Surface area (m²) 1,510 19,113 1,346 21,969 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 m ² 0.00 0.00	Medium Rubble: Cobble: Gravel:	0 m ² 0.00 0.00 0.00	Fine Sand: Silt: Muck: Clay:	0 m ² 0.00 4,353.00 4,353



					Littoral		Non-Littoral Zone				
	Species	Life Stage	Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic
		Spawning	0.00	0.00	0.00	NA	NA	NA	NA	NA	0.00
		YOY	0.50	0.89	0.67	NA	NA	NA	NA	NA	0.00
		Juvenile	0.50	0.95	0.67	NA	NA	NA	NA	NA	0.00
1	Atlantic Salmon (anadromous)	Adult	0.00	0.00	0.00	NA	NA	NA	NA	NA	0.00
		Spawning	0.00	0.84	0.84	NA	NA	NA	NA	NA	0.17
		YOY	0.50	1.00	0.00	NA	NA	NA	NA	NA	0.00
		Juvenile	0.50	1.00	0.00	NA	NA	NA	NA	NA	0.00
2	Brook Trout (freshwater resident)	Adult	0.00	0.67	0.67	NA	NA	NA	NA	NA	0.00
		Spawning	0.00	0.67	1.00	NA	NA	NA	NA	NA	0.34
		YOY	0.00	0.00	0.00	NA	NA	NA	NA	NA	0.00
		Juvenile	0.00	0.00	0.00	NA	NA	NA	NA	NA	0.00
3	Threespine stickleback (Freshwater resident)	Adult	0.00	0.67	0.67	NA	NA	NA	NA	NA	0.50

Table 6.29 Habitat suitabilities for possible species present within Pond 2.

Table 6.30 Habitat equivalent units for possible species present within Pond 2, measured in m².

		Littoral Zone					NO				
	Species	Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic	Total Available Habitat
1	Atlantic Salmon (anadromous)	755	18157	902	0	0	0	0	0	0	19814.6
2	Brook Trout (freshwater resident)	755	19113	1130	0	0	0	0	0	740	21738.2
□ 3	Threespine stickleback (Freshwater resident)	0	12806	1346	0	0	0	0	0	2177	16328.7

6.3.3 Pond 3 (2006)

Pond 3 (Figure 6-5) is located approximately 100 m north of Pond 2 and is the headwaters for sample stream T3. Sampling was conducted on October 31 and November 2, 2006. A total of one double bag and three single bag fyke nets and four baited minnow traps were deployed to sample fish in the pond. The double-bag fyke net was set near the mouth of the inflow and caught the majority of fish. The three single bag fyke nets were set throughout the pond, and were generally set over muck and gravel. Both nets and traps were set for a total of 2 net nights, fishing period and yielded a catch of 24 brook trout.

The total area of the pond is 1.47 ha (littoral habitat). The average depth was 0.7 m and the deepest location measured 0.9 m. The pond substrate consisted predominantly of cobble, gravel and muck. The outflow of the pond was located at the northwest side of the pond.





Figure 6-5, Pond 3

Habitat Quantification

A DFO generated spreadsheet was used for habitat quantification, the spreadsheet was used in conjunction with the habitat data collected in the field and the species presence data. Table 6-31 presents an overview of the habitat information used to determine habitat areas. Table 6-32 shows the habitat suitabilities of each habitat type for the species present, i.e., brook trout, Atlantic salmon and threespine stickleback. DFO spreadsheet calculations were used to determine final habitat equivalent units of each habitat type present. Table 6-33 presents the final HEU values for all three species, however, brook trout was the only species present within pond 3; the total HEU's for brook trout are 1.1 ha.



Table 6.31 Summary of Pond 3 habitat values used to calculate aerial extents

Step 1	Note: Only enter the values in the c	ells shaded	d blue, the s	ubtotals, tot	als and rat	tios will be calcul	lated autor
	Enter Lake name:		POND 3				
Part 1 Entering Lake depth(s):	•				•		
IF Lake Depth is less than or equal to '	<u>10 m:</u>		IF Lake De	pth is grea	ter than 1	<u>0 m:</u>	
Path 2	1	OR			Path 2		
A Enter Depth of Littoral Zone:	1		A-1 Enter r	nean deptł	n of Non-L	ittoral Zone:	0
B Enter Mean Depth of Lake:	1		B-1 Enter of	depth of Be	enthic Zon	ie:	0
Path 2 (Continued)				-		-	
IF Lake Depth is greater than 10 m:	Mean depth of Non-Littoral Z	lone:		(Reduced	Value)		
	Depth of the Benthic Zon	e:		(Reduced	Value)		
	Dawthia Dalawia watia			-			
	Benthic Pelagic ratio:						
						4	
Part 2 Enter the values for the estimate	ed bottom surface area:						
	Littoral Zone (No veget	ation):					
Substrate:	Coarse	m ²	Medium	m ²	Fine	m ²	
	Bedrock:	28.97	Rubble:	35.64	Sand [.]	40.85	
1	Boulder:	17.24	Cobble:	96.19	Silt:	17.96	
			Gravel:	151.53	Muck:	14,279.73	
					Clay:	0.00	
	· · · · · · · · · · · · · · · · · · ·						
	SubTotals:	46		283		14,339	
-							
	Littoral Zone (Vegetat	ion)		0			
Substrate:	Coarse	m²	Medium	m²	Fine	m²	
	Bedrock:	0.00	Rubble:	0.00	Sand:	0.00	
	Boulder:	0.00	Cobble:	0.00	Silt:	0.00	
			Gravei:	0.00	MUCK:	53.89	
	I				Clay.	0.00	
	SubTotals	0		0		54	
	oub i otalo:	0		0		01	
	Non-Littoral Zone	t.					
Substrate:	Coarse	m²	Medium	m²	Fine	m ²	
	Bedrock:	0.00	Rubble:	0.00	Sand:	0.00	
	Boulder:	0.00	Cobble:	0.00	Silt:	0.00	
			Gravel:	0.00	Muck:	0.00	
	[Clay:	0.00	
1							
	SubTotals:	0		0		0	
Dent 2 Comment Table for Dettern Com							
Part 3 Summary Table for Bottom Surf	ace Area Totais:						
Habitat Types	Pottom Surface area (m^2)						
Littoral Coarse/No vegetation	Bottom Surface area (m.)						
Littoral Medium/No vegetation	283						
Littoral Fine/No vegetation	14 339						
subtotal Littoral/No vegetation	14.668						
Littoral Coarse/Vegetation	0						
Littoral Medium/Vegetation	0						
Littoral Fine/Vegetation	54						
Subtotal Littoral/Vegetation	54						
Subtotal Littoral	14,722						
Non-littoral Coarse/Pelagic	0						
Non-littoral Medium/Pelagic	0						
Non-littoral Fine/Pelagic	0						
Total Available Habitat	14 722						
Total Available Habitat	14,722						



				Littoral Zone							Non-Littoral Zone			
	Species	Life Stage	Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic			
		Spawning	0.00	0.00	0.00	NA	NA	0.00	NA	NA	0.00			
		YOY	0.50	0.89	0.45	NA	NA	0.00	NA	NA	0.00			
		Juvenile	0.50	0.95	0.22	NA	NA	0.00	NA	NA	0.00			
1	Atlantic Salmon (anadromous)	Adult	0.00	0.00	0.00	NA	NA	0.00	NA	NA	0.00			
		Spawning	0.00	0.84	0.73	NA	NA	0.67	NA	NA	0.00			
		YOY	0.50	1.00	0.00	NA	NA	0.00	NA	NA	0.00			
		Juvenile	0.50	1.00	0.00	NA	NA	0.00	NA	NA	0.00			
2	Brook Trout (freshwater resident)	Adult	0.00	0.67	0.45	NA	NA	0.00	NA	NA	0.00			
		Spawning	0.00	0.67	1.00	NA	NA	0.89	NA	NA	0.00			
		YOY	0.00	0.00	0.00	NA	NA	0.00	NA	NA	0.00			
		Juvenile	0.00	0.00	0.00	NA	NA	0.00	NA	NA	0.00			
3	Threespine stickleback (Freshwater resident)	Adult	0.00	0.67	0.56	NA	NA	1.00	NA	NA	0.00			

Table 6.32 Habitat suitabilities for possible species present within Pond 3.

Table 6.33 Habitat equivalent units for possible species present within Pond 3, measured in m².

				Littora	il Zone			NO			
	Species	Coarse/No Vegetation	Medium/No Vegetation	Fine/No Vegetation	Coarse/Vegetation	Medium/Vegetation	Fine/Vegetation	Coarse/Pelagic	Medium/Pelagic	Fine/Pelagic	Total Available Habitat
1	Atlantic Salmon (anadromous)	23	269	6452	0	0	0	0	0	0	6744.3
□ 2	Brook Trout (freshwater resident)	23	283	10467	0	0	36	0	0	0	10809.5
□ 3	Threespine stickleback (Freshwater resident)	0	190	14339	0	0	54	0	0	0	14582.9



6.3.4 Pond 4 (2007)

Pond 4 (Figure 6-7) is located on the northwest end of the project footprint and had a total area of 17,751.24 m². The average depth of the pond was 0.7 m and the deepest location measured 1.2 m. The ponds' outflow is located on the north end of the pond and flows northwest into North Harbour. There was no visible inflow located for this pond.

The pond was sampled for fish via fyke nets and baited minnow traps which were set throughout the pond. One single bag and one double bag fyke net and two minnow traps were set over seven days (broken into two periods). Following the first set the nets and traps were lifted, checked for fish and re-set in different locations throughout the pond for a second set. The first set fished for an average of 22hr's with no fish caught. The second fishing set averaged 142hr (approximately 6 days) with no catch in any of the nets or traps. This pond is not considered to contain fish habitat.



Figure 6-6, Pond 4

6.3.5 Pond 5 (2007)

Pond 5 (Figure 6-8) is one of a cluster of small, interconnected ponds located on the northwest side of the Project footprint. All of the ponds were evaluated for depth, and littoral substrate. Of the four ponds clustered together, Pond 5 was the only one deep enough to sample. The ponds' outflow was located on the south end and the inflow was located at the north end.



The deepest location in the pond measured 1.2 m with the average depth of 0.8m. The total area of the pond was $4,895.61 \text{ m}^2$. The pond was sampled for fish using a single bag fyke net set for 24hr's. No fish were caught in the net and therefore the pond is considered to not contain any fish habitat.



Figure 6-7, Pond 5

6.3.6 Pond 6 (2007)

Pond 6 (Figure 6-9) is located on the southeast end of the Project footprint. This total area of the pond was 2,415.63 m² and the deepest location measured was 0.65 m. The outflow was located on the east end of the pond. One single bag fyke net was set near the mouth of the outflow along with two minnow traps for approximately 2.5 hr. The pond was also angled (one rod) for 1.5 hr's using baited lures. No fish were caught in the net, traps or from angling and no fish were observed in the pond during the shoreline survey. As such, the pond is considered not to contain any fish habitat.