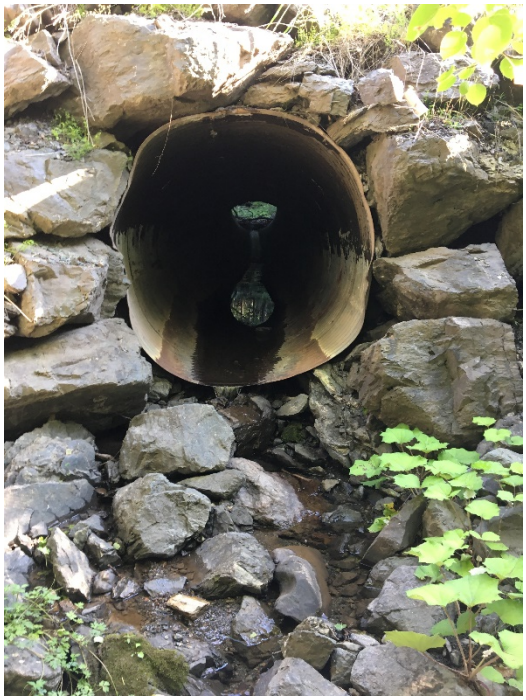
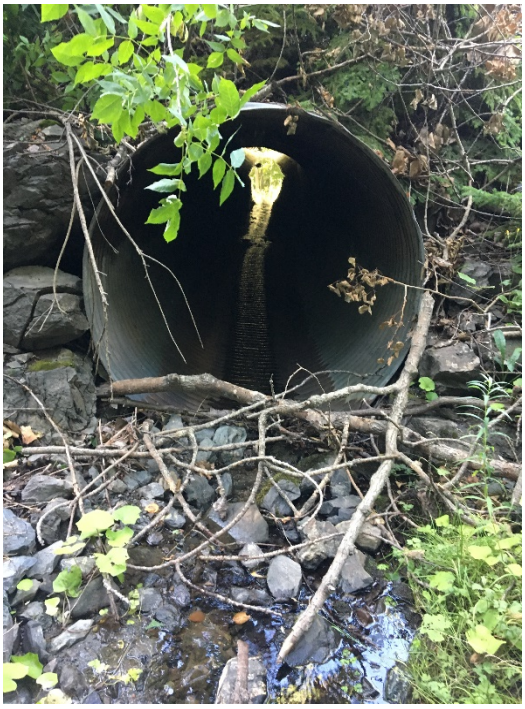
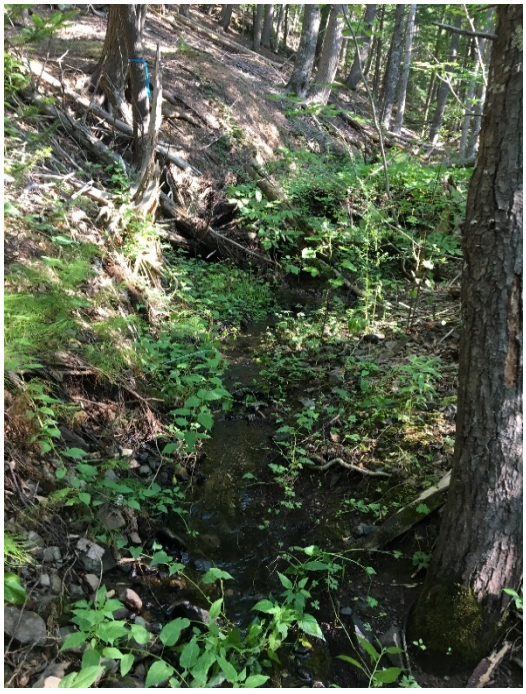
APPENDIX B: PHOTOLOG



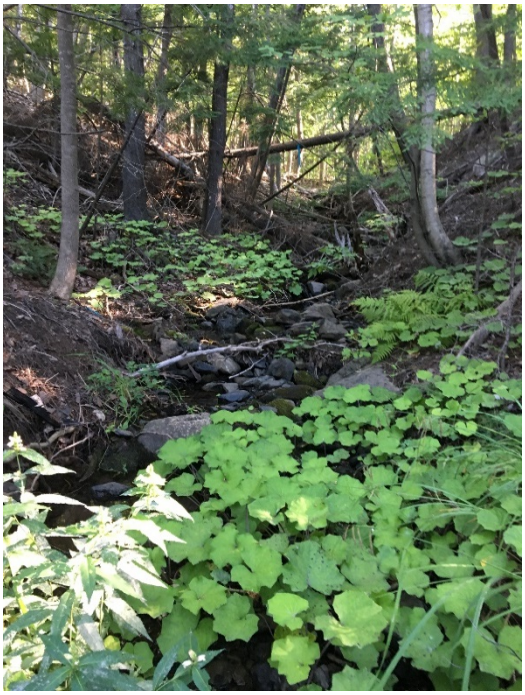
Waypoint 1: Hung culvert beneath Quarry Access Road, looking upstream from culvert outflow. *At time of assessment, culvert is impassable to fish and lacks a plunge pool*



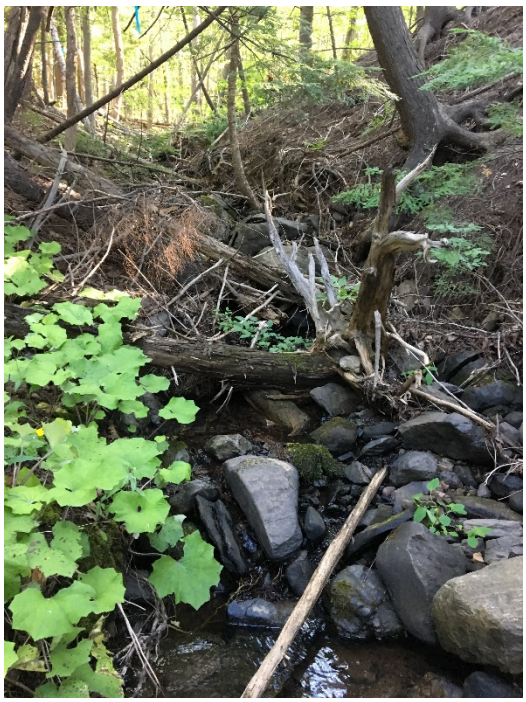
Waypoint 1: Culvert beneath Quarry Access Road, looking downstream from culvert inflow.



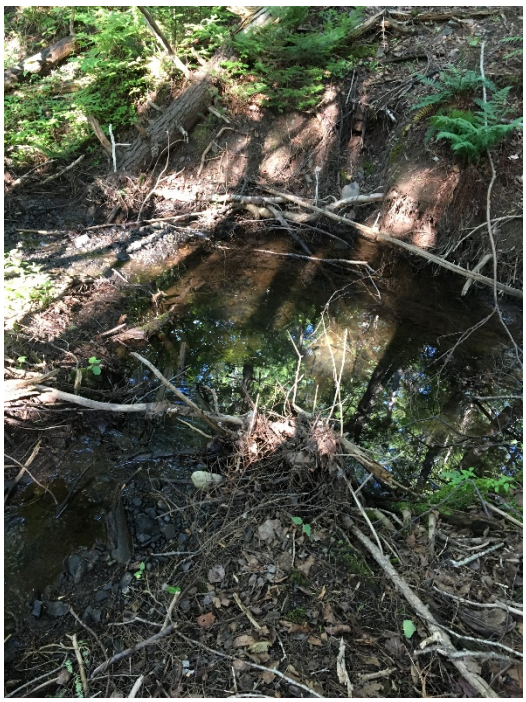
Waypoint 1: Looking upstream from Quarry Access Road culvert.



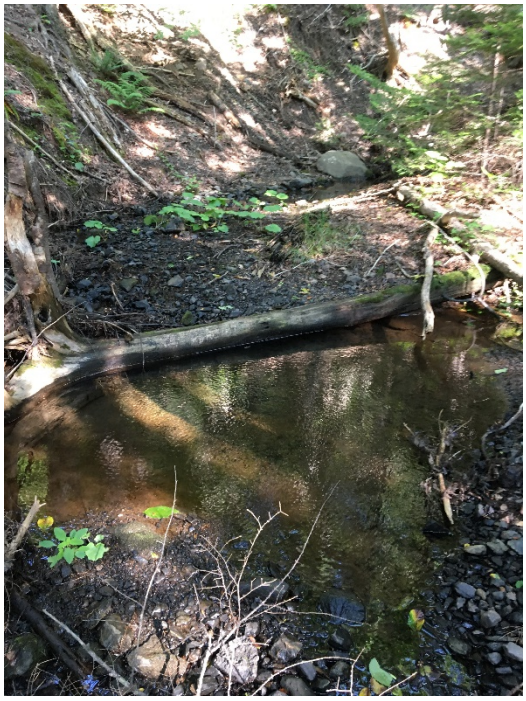
Waypoint 2: Large woody debris (LWD) and boulder cluster.



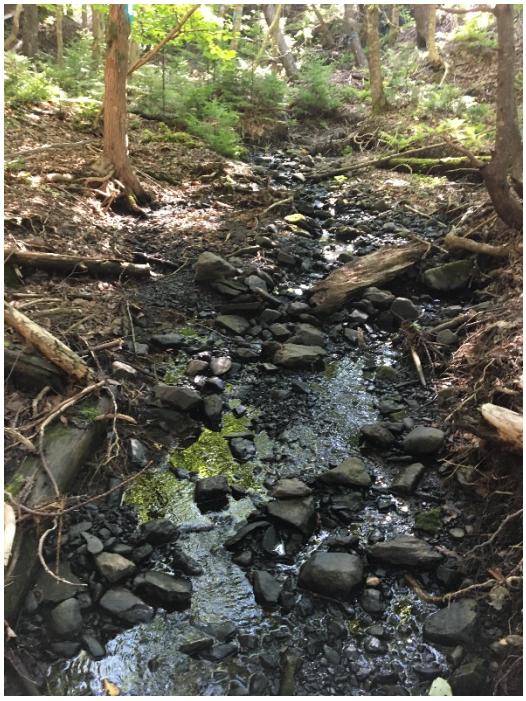
Waypoint 3: Run. Water depth of 3cm, wetted width of 50cm, bank height of 60cm. Substrate dominated by cobble and gravel.



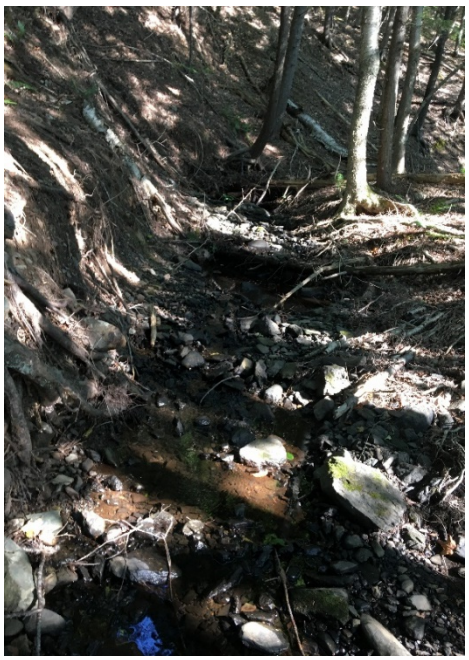
Waypoint 4: Pool. Maximum depth of 42 cm.



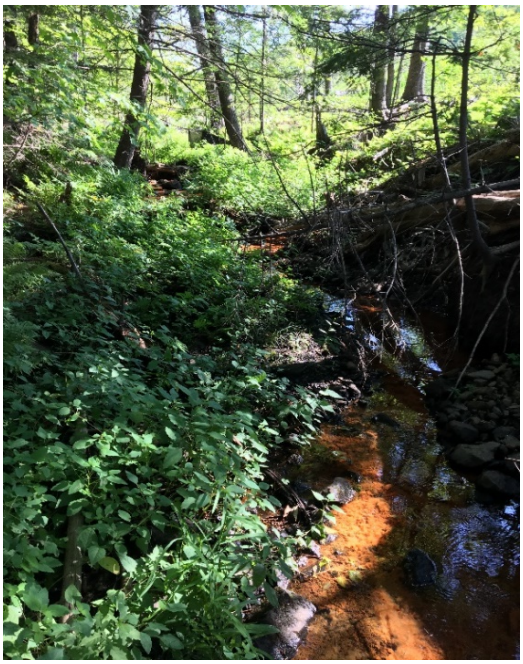
Waypoint 5: Pool. Maximum depth of 41 cm.



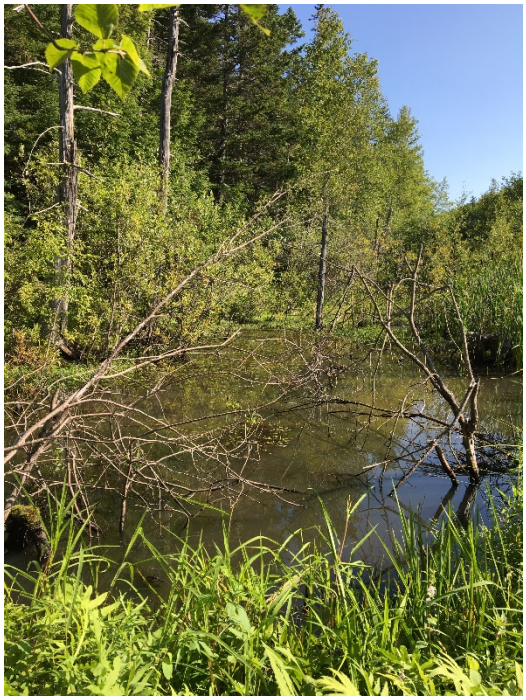
Waypoint 6: Run. Increased gradient (approximately 10%), minimal water flow, no refuge pools.



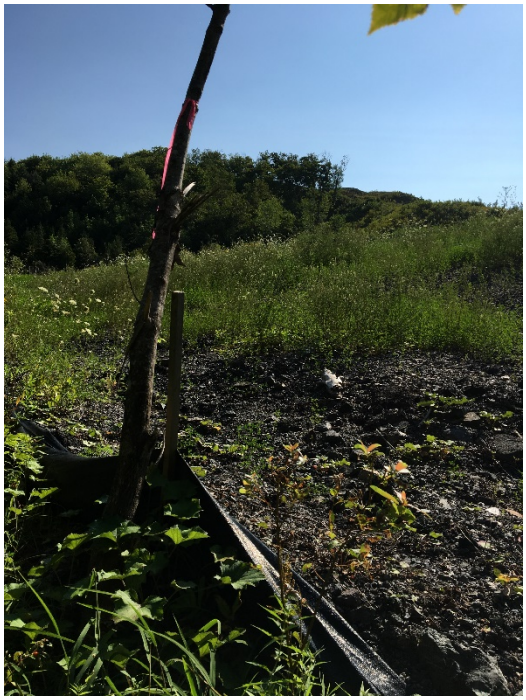
Waypoint 7: Channel uniformity continues. Minimal water flow, no refuge pools. Bank height of 120 cm.



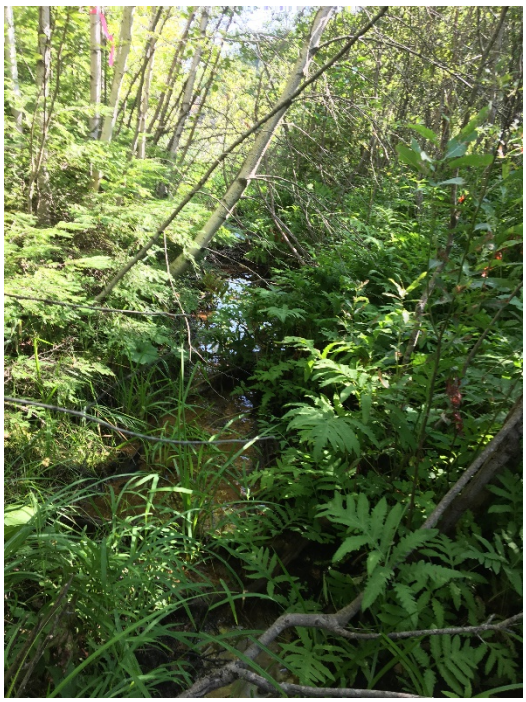
Waypoint 8: Watercourse at wetland outlet. Gently sloping at this location.



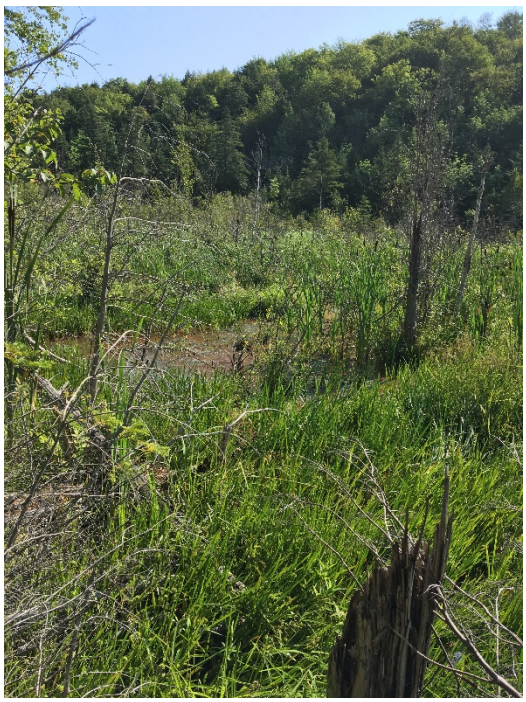
Waypoint 9: Southern extent of WL1 - open surface water adjacent to existing quarry boundary. Water depth - 30 cm. Mucky substrate.



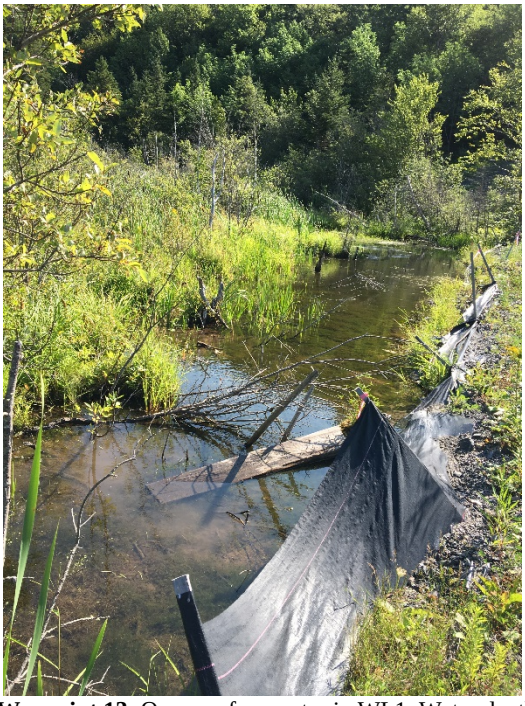
Waypoint 10: Wetland 1 edge adjacent to open surface water, impounded by old quarry rock pile.



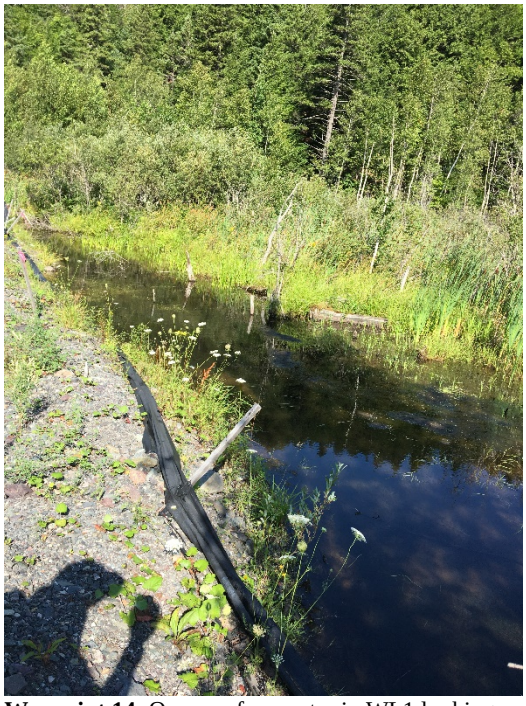
Waypoint 11: Watercourse channelizes within WL1. Fish access/habitat restricted to channel.



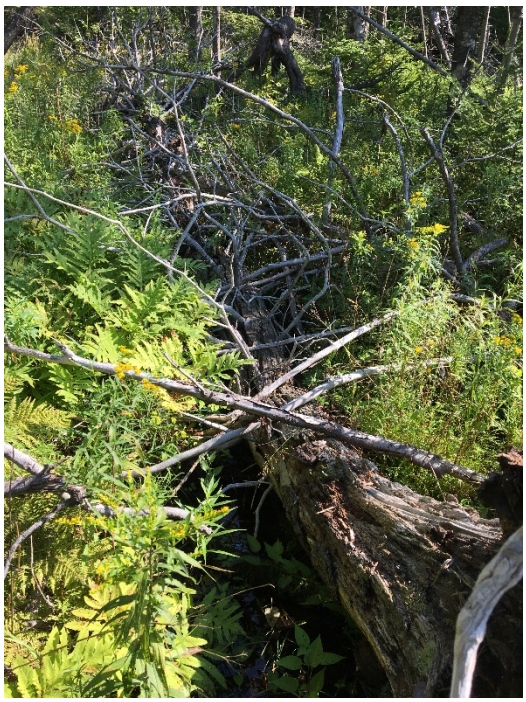
Waypoint 12: Channelized watercourse disperses into the wetland.



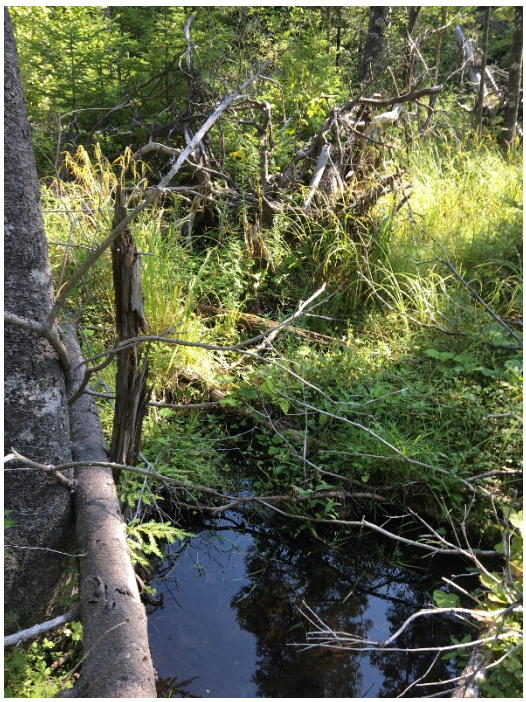
Waypoint 13: Open surface water in WL1. Water depth - 10cm. Mucky substrate.



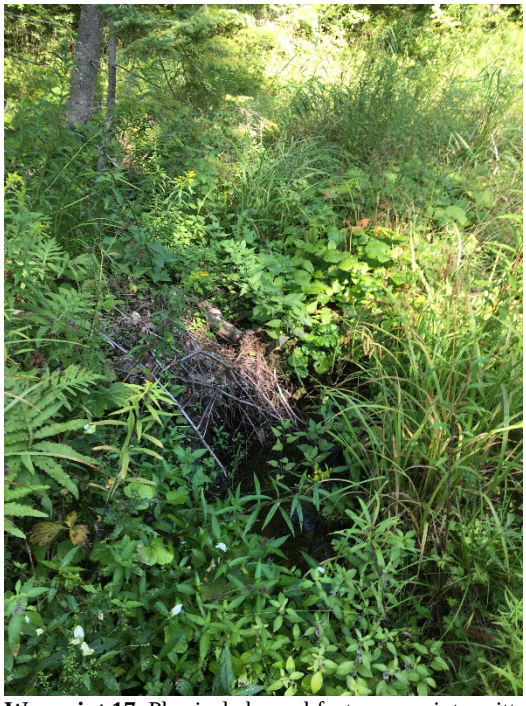
Waypoint 14: Open surface water in WL1 looking downstream.



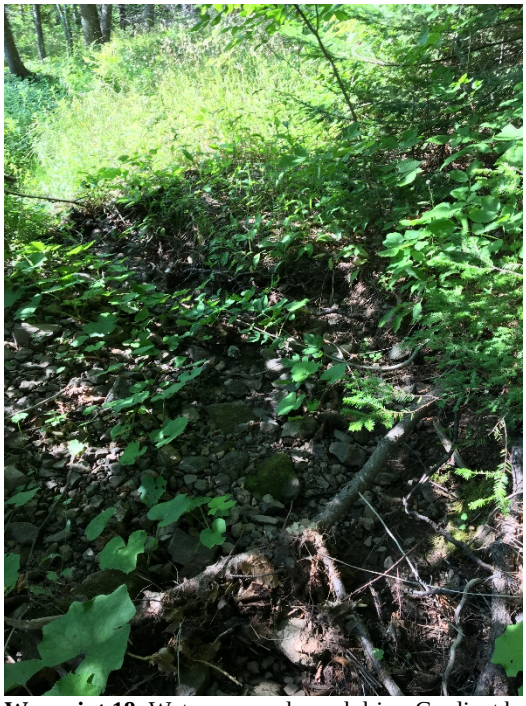
Waypoint 15: Watercourse 2 at WL1 inlet. Obscured by LWD and vegetation.



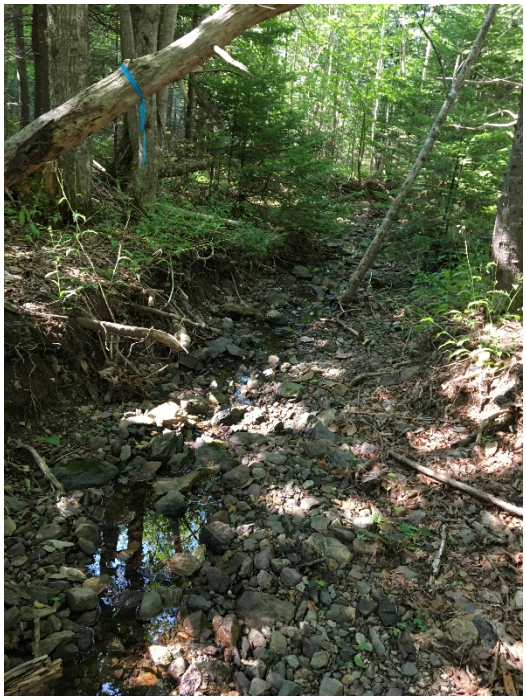
Waypoint 16: Wetland 1 inlet where some pooling has occurred. Maximum depth of 35 cm.



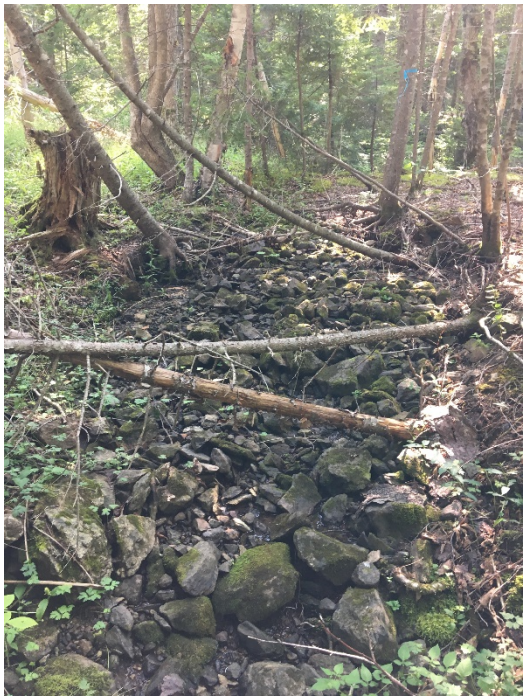
Waypoint 17: Physical channel features are intermittent, with multiple sub-surface runs and heavy in-stream vegetation. *No fish passage/habitat available upstream.*



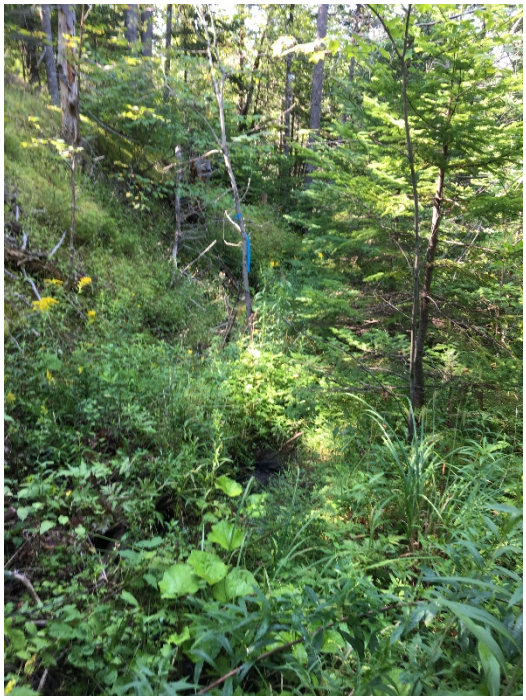
Waypoint 18: Watercourse channel dries. Gradient begins to increase upstream of wetland (>5%).



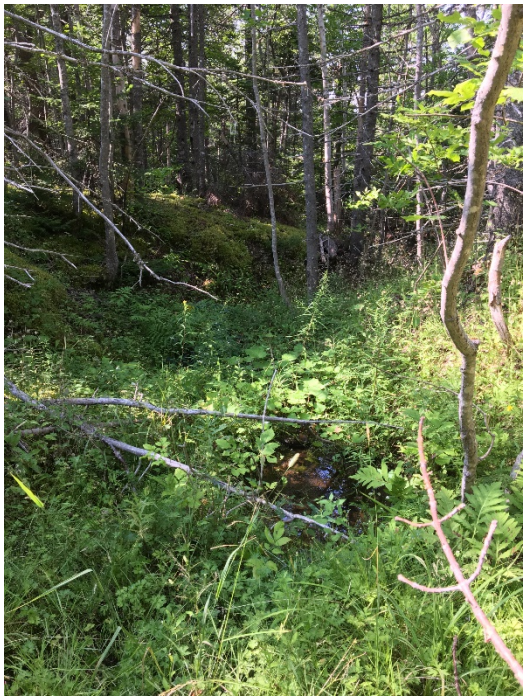
Waypoint 19: Typical channel characteristics. Negligible flow, with maximum water depth of 2 cm restricted to small pockets.



Waypoint 20: Steep, dry cobble run.

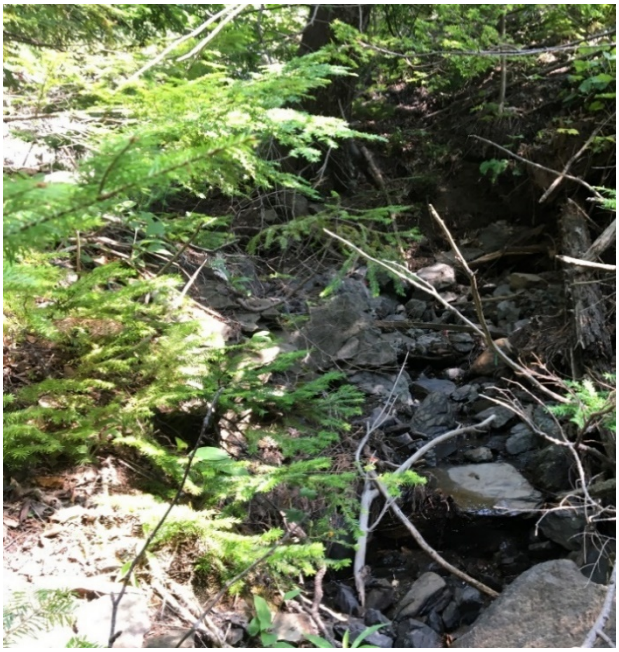


Waypoint 21: At channel split. WC3 (pictured) comprises ephemeral drainage.

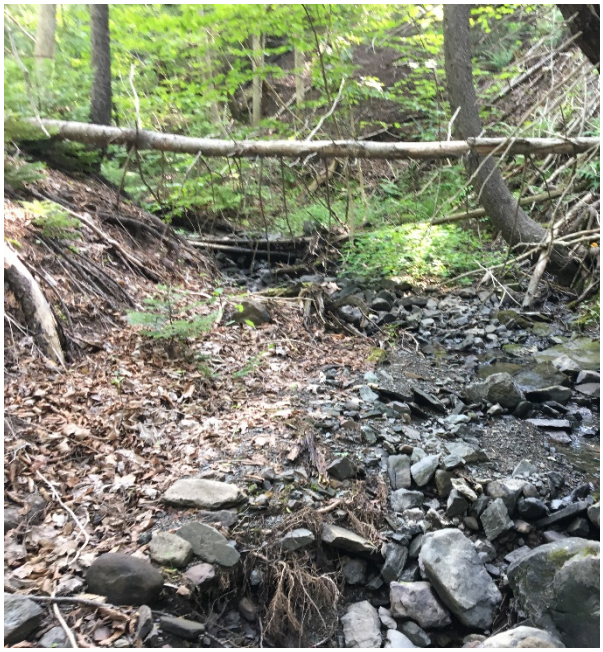


Waypoint 22: Upstream extent of watercourse in Study Area.

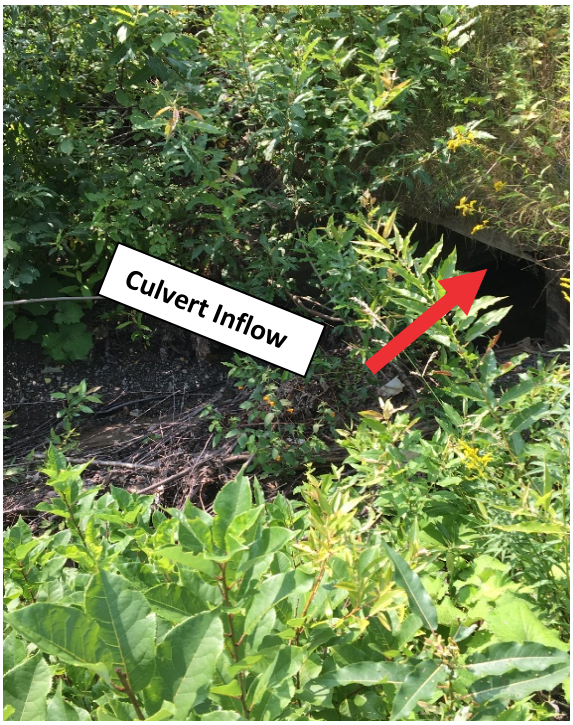
Downstream of the Quarry Access Road



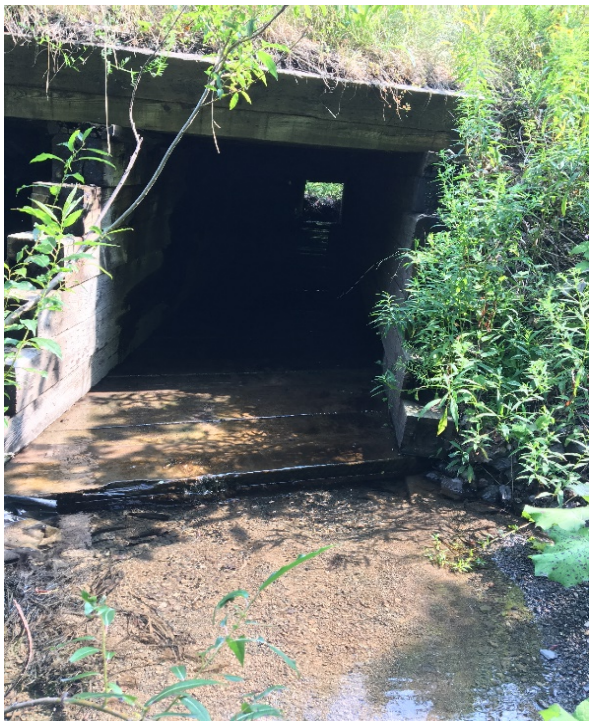
Waypoint 23: Watercourse 15 m downstream of Quarry Access Road culvert. Steep gradient with boulder in-filling and LWD. *Fish passage/habitat available only during continuous high flow conditions; however, steep gradient/lack of refuge may impede passage during these high flow periods.*



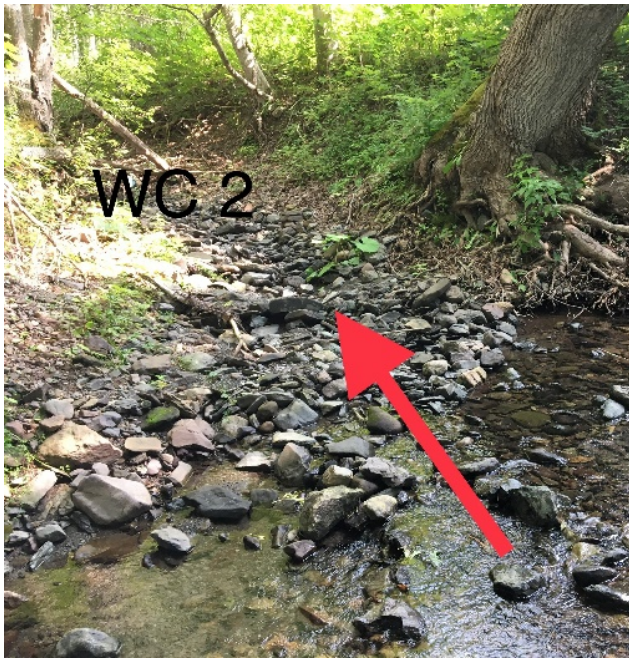
Waypoint 24: Representative of reach downstream of Quarry Access Road Culvert. Water in channel restricted to small pools with maximum water depths of 5 cm. *Fish passage/habitat available only during continuous high flow conditions.*



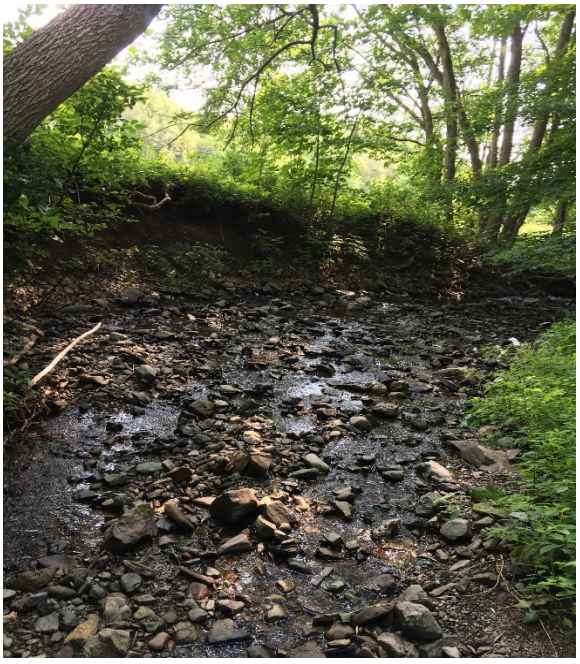
Waypoint 25: Debris pile at inflow of culvert beneath McLellans Mountain Glencoe Road. *Debris pile assessed as a barrier to fish passage.*



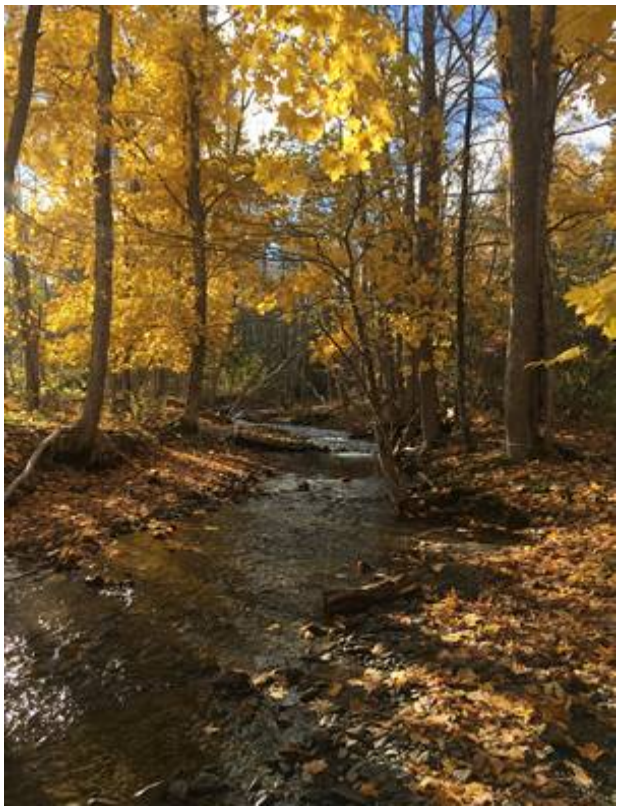
Waypoint 25: Culvert beneath McLellans Mountain Glencoe Road, looking upstream. Wooden, double-box culvert with inflow blocked by debris pile (LWD and gravel/sand).



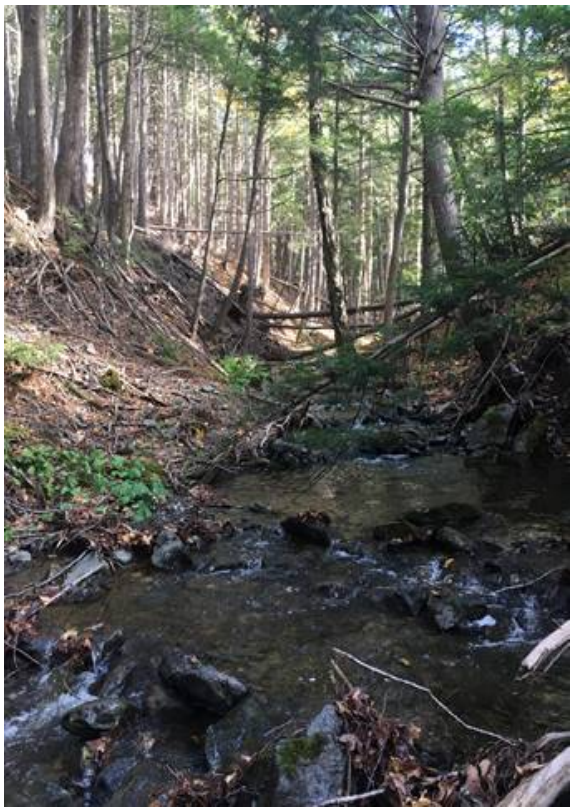
Waypoint 26: At confluence of WC2 and Stewart Brook. Dry channel conditions were observed at the time of assessment. *Fish passage/habitat within WC2 available only during continuous high flow conditions.*



Stewart Brook: Looking downstream (north)



Stewart Brook: Looking Upstream (south)



Watercourse 4

APPENDIX C: HYDROLOGICAL ASSESSMENT IMPACT PARAMETERS

Appendix C: Table 1 - Summary of input parameters to the Rational Method calculation

Watershed ID	Development Phase	Total Watershed Area	Wooded Area	Open Pit	Slope Classification	Runoff Coefficient (0% runoff from Quarry)[3]	Runoff Coefficient (5% runoff from Quarry)[3]	Runoff Coefficient (10% runoff from Quarry)[3]	Runoff Coefficient (20% runoff from Quarry)[3]	Rainfall Intensity
		(m^2)	(%)	(%)						mm/hr
WS-1	**Existing Conditions**	429,895	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area A	429,895	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area B	429,895	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area C	386,736	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
WS-2	**Existing Conditions**	513,838	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area A	446,740	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area B	373,949	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area C	459,289	81%	19%	Hilly	0.16	0.17	0.18	0.20	2.40
WS-4	**Existing Conditions**	1,761,027	87%	13%	Hilly	0.17	0.18	0.19	0.20	2.40
	After Development of Area A	1,828,143	84%	16%	Hilly	0.17	0.18	0.18	0.20	2.40
	After Development of Area B	1,900,953	81%	19%	Hilly	0.16	0.17	0.18	0.20	2.40
	After Development of Area C	1,900,953	81%	19%	Hilly	0.16	0.17	0.18	0.20	2.40
Wetland-1	**Existing Conditions**	389,679	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area A	365,812	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area B	294,646	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area C (Discharge below Wetland)	241,110	100%	0%	Hilly	0.20	0.20	0.20	0.20	2.40
	After Development of Area C (Discharge above Wetland)	379,448	64%	36%	Hilly	0.13	0.15	0.16	0.20	2.40

Notes:

[1]Soils in the area are Hopewell, well drained soils

[2]Classified as Group B soils - gravel loam

[3]Runoff coefficient taken as 0.2 for Hilly Woodland and Forest

[4]Taken from ODOT Hydraulics Manual