# **Headwater Drainage Feature Assessment 6150 Thunder Road, Ottawa**

**Updated Report** 

July 15, 2021

#### **Submitted To:**

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#### 1.0 INTRODUCTION

This report is an updated Headwater Drainage Feature Assessment written by Kilgour & Associates Ltd. (KAL) on behalf of Avenue 31 in support of potential future development at 6150 Thunder Road in Ottawa, Ontario (the "Site").

#### 2.0 HEADWATER DRAINAGE FEATURES

#### 2.1 Overview

Seven headwater drainage features (HDFs) on the Site were initially reviewed in 2018 using field methodologies identified with the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (CVC & TCRA, 2013) (the "HDF Guidelines"). Six HDFs (R1 through R6) all drain to a permanent watercourse identified within this report as channel R7. The features were studied during the spring and summer of 2018 as part of a due-diligence review of the site prior to the commencement of planning for the site, though the formal HDFA report was not completed at the time.

Much of the southern half of the Site was cleared of vegetation in 2019. The site was briefly revisited on October 8, 2020, to note where portions of the Site landcover had been cleared. As vegetation clearing was permissible on the site at the time under City bylaws, the descriptions and management recommendations provided in this report reflect current site conditions.

Two additional existing channels have been noted since that time along the western boundary of the Site (R8 and R9), which was not part of the initial review in 2018. Two further temporary drainage channels (R10 and R11) were added to the Site in 2021.

This updated report describes current site conditions.

#### 2.2 Assessment Methodology

#### 2.2.1 Channel Form and Fish

Headwater channels R1 through R7 on the Site were investigated three times in 2018 following *Evaluation*, *Classification and Management of Headwater Drainage Features Guidelines* (Toronto and Region Conservation Authority and Credit Valley Conservation, 2014) to document their hydrological and riparian and terrestrial habitat. On April 12, 2018 (i.e. during the spring freshet), KAL biologists Liza Hamilton and Tyler Peat identified and described seven channelized features on the Site (reaches R1 through R7; Figure 2), noting the channel dimensions, substrate, form, and riparian vegetation.

Channel R1 is the roadside ditch along Thunder Road. This feature is unlikely to be altered (realigned) in any meaningful way under future development plans. All other channels on site had been (i.e. in 2018) located within young, early successional wooded areas and coniferous plantation covering former agricultural fields. A single small wetland pocket was observed at the upstream end of Channel R4. Natural landcover along Channels R6, R5 and most of R2 was completely removed in 2019.



Channel R7, the permanent watercourse crossing the north end of the Site is highly linearized, U-shaped drainage channel, though it does not have status as a municipal or ward drain. All other channels are small, shallow, linear, U-shaped agricultural ditches or swales that ultimately connect to Channel R7.

Channels R3 and R4, and the north half of Channel R2 were all wet until mid-summer in 2017, but only so because of the presence of beaver dams along Channel R7, which prevented the site from draining normally. With the dams having been removed, Channels other than R7, can be expected to run dry shortly after the spring freshet. Channels R5, R6 and the upper half of Channel R2 are ephemeral and ran dry very quickly after the freshet, even when beaver dams were present. Small numbers of fish were observed in all areas below Channel R 7 is considered as a potential fish habitat.

On June 21, 2018, KAL biologists Rob Hallett and Tyler Peat conducted an electrofishing survey of R1, R3, R4, and a portion of R2 north of R4. These channels were deemed at the time to be sufficiently wet to potentially support fish, whereas R2, R5, and R6 were dry at the time of electrofishing surveys and therefore not able to support fish. R7, a permanent stream, was not fished as the project does not propose to alter or build within 30 m of that feature. As a permanently flowing channel connected to larger creeks downstream, R7 is considered to directly support fish regardless.

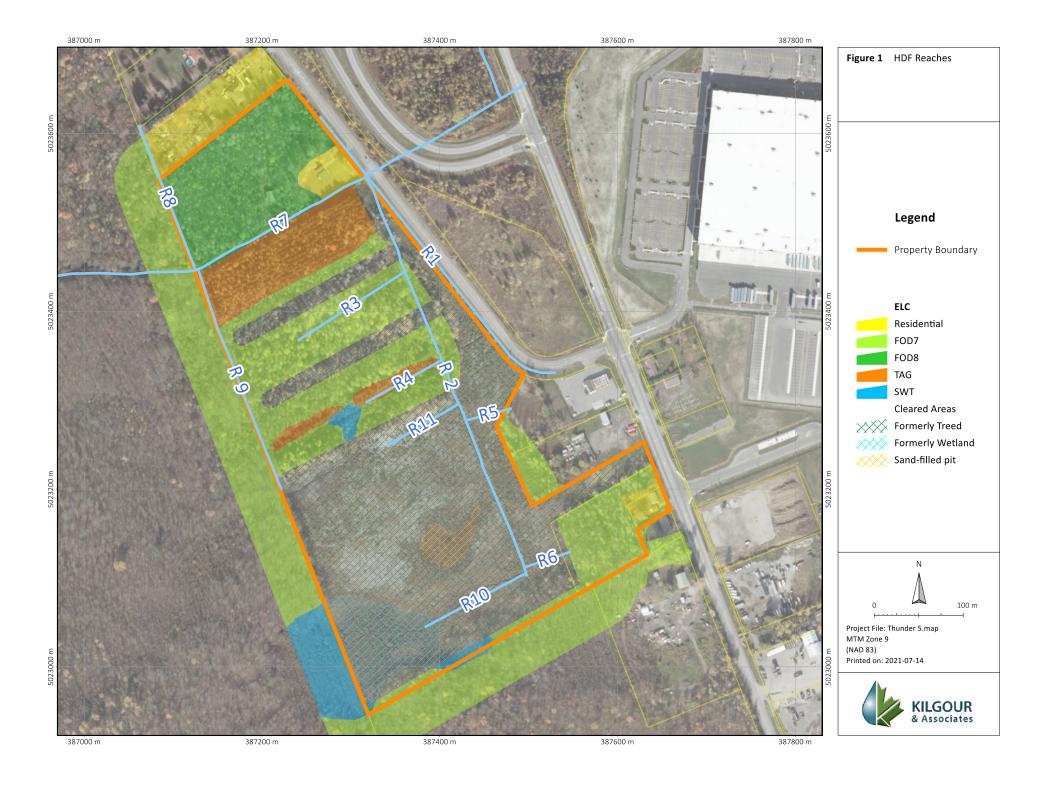
Several beaver dams were removed from R7 just west of the Site in late June 2018. The effect on Site water levels was observed on July 5, 2018, by KAL biologist Terry Hams while completing bird surveys, with flows R7 noted as being greatly reduced and all other channels having dried. On June 8, 2021, KAL biologist Anthony Francis noted channel R7 was hydrated but had no perceptible flow. Channels R1 through R6 were fully dry, except for the bottom ~25 m of R2, which held shallow (<10 cm) of backwater from R7.

Channel R8 was initially noted during the field visit of October 8, 2020, by KAL biologist Ed Malindzak. The channel was observed to wet at the time. Given its direct connection to R7, it is presumed to provide fish habitat. Given its location at the rear of the Site, however, the feature will not be subject to alteration and no development is proposed within 30 m of its top-of-bank. No further study is deemed to be required at this time.

Channel R9 was first noted on June 8, 2021, as a dry shallow ditch along the western property line leading northward to R7. KAL biologist Nick Moore returned the feature on June 22, 2021, to take measurements and photos. The feature is a shallow, linear, dirt swale, 1 - 1.5 m in width, with no obvious bank substructure. It was fully dry along its entire length. It likely conveys some runoff during the spring freshet but is unlikely to provide aquatic habitat beyond that.

Channel R10 was dug as an eastward-running, linear drainage channel sometime in either late fall 2020 or spring 2020. The 2 m wide swale was excavated in the bare sandy soil of the cleared portion at the south end of the site. City of Ottawa air photos from 2019 (Ottawa, 2021) suggest some natural surface drainage may have previously occurred along that route, though no headwater features were evident there during site surveys through the 2018 field season. Channel R11 is a similarly sized and formed feature at the north end of the cleared area, dug within the same time frame. City of Ottawa air photos (Ottawa, 2021) do not suggest any channel had existed there previously. Both R10 and R11 were fully dry on June 8, 2021.





#### 2.2.2 Vegetation

KAL Biologist, Terry Hams, completed an initial tree inventory and an ecological land classification (ELC) of the Site on June 20, 2018. Vegetation cover on the Site was described following standard ELC methods, including the collection of soil samples (Lee *et al.*, 1998).

As the south half of the Site was cleared and partially regraded in 2019, the ELC for the Site and the tree information for the remaining stands were updated by Ed Malindzak (October 15, 2020) and Anthony Francis (on October 18, 2020). The updated tree survey identified the size and species distributions of trees within forested areas of the Site.

#### 2.2.3 Anurans

Site amphibian (anuran) surveys were conducted and lead by KAL biologists, Rob Hallett and Liza Hamilton, following protocols set forth by the Marsh Monitoring Program (Bird Studies Canada *et al.*, 2008). Three surveys are completed to identify early, mid, and, late-season breeding amphibian species generally in April, May, and June, respectfully, though survey dates are temperature dependent. Surveys are completed on nights of calm weather with temperatures above 5 degrees Celsius (°C), 10°C, and 17°C for each of the three respective survey periods. Surveys begin a half-hour after sunset and are finished by midnight with a five-minute recording period at each survey station. Amphibian species are recorded at each point along with the estimated distance from observers, calling code, an estimate of the number of individuals, and estimated directions of calling anurans.

Amphibian surveys were performed on April 23, May 30, and June 21, 2018 (Table 2). Three stations were surveyed in wetland and aquatic habitats (F1 through F3; Figure 2). Station F3 was located at the north end of the Site with the observers facing south. Stations F1 and F2 were the same point located near the southwestern corner of the Site, but with one observer facing south (F1) and one facing north (F2).

Table 1 Summary of frog survey times and weather conditions

Survey Date	Temperature (°C)	Weather conditions	Wind speed (km/hour)
23-Apr-18	10*	Clear	4
30-May-18	21*	Mostly Cloudy	11-14
21-Jun-18	17**	Clear	7 - 10

<sup>\*</sup> Temperatures on these nights were warmer than the preceding nights, with evening temperatures just above 5°C and 10°C, respectively, within a few days of the surveys. Frogs for the period would still be expected to be calling regardless.

#### 2.3 Component Classifications

The following tables summarize the functions provided by the Site channels.



<sup>\*\*</sup> Temperatures on this night just reached the minimum required temperature but had been were warmer the preceding nights, with evening temperatures above 17°C. Frogs for the period would still be expected to be calling regardless.

### **Table 2. Hydrology Classification**

Hydrology Classification					ion	
Drainage Feature	Assessment	Flow Conditi	ons	Flow		Hydrological
	Period	Description	(OSAP Code)	Classification	Modifiers	Function
	April 12, 2018	Standing water			Road sided ditch. Water	
R1	June 21, 2018	Standing water	4	4 Enhemeral	remained in this reach for a longer period of time than usual	Contributing
	July 5, 2018	Dry	d		due to beaver dams in R7.	
	April 12, 2018	Standing water		Intermittent		Valued (lower half)
R2	June 21, 2018	Upper channel: Dry Lower channel: standing water	3	(lower half)  Ephemeral (upper half)	Water remained in lower portion of this reach for a longer period of time than usual due to beaver dams in R7.	Contributing (upper half)
	July 5, 2018	Dry		(4660: 11411)		(apper nam,
	April 12, 2018	Standing water			Water remained in this reach for	
R3	June 21, 2018	Standing water	4	Intermittent	a longer period of time than usual due to beaver dams in R7.	Valued
	July 5, 2018	Dry				
	April 12, 2018	Standing water			Water remained in this reach for	
R4	June 21, 2018	Standing water	4	Intermittent	a longer period of time than usual due to beaver dams in R7.	Valued
	July 5, 2018	Dry				
	April 12, 2018	Standing water				
R5	June 21, 2018	Dry	1	Ephemeral		Contributing
	July 5, 2018	Dry				
	April 12, 2018	Standing water				
R6	June 21, 2018	Dry	3	Ephemeral		Contributing
	July 5, 2018	Dry				
	April 12, 2018	Surface flow			Conducts flows from the east across the Site and on to	
R7	June 21, 2018	Surface flow	1	Perennial	neighbouring properties to the west. As a permanent perennial	Important
	July 5, 2018	Surface flow			feature, this channel is not considered an HDF.	
	October 8, 2020	Standing Water				
R8	June 22, 2021	Standing Water, bottom end, otherwise dry	1	Potentailly perennial	May contain water late into the season.	Important
R9	June 22, 2021	Dry	3	Ephemeral		Contributing
R10	June 8, 2021	Dry	3	Ephemeral		Contributing
R11	June 8, 2021	Dry	3	Ephemeral		Contributing



Table 3. Riparian Classification (Updated 2020)

		Riparian Class	ification	
Drainage Feature	OSAP Descriptions	OSAP Riparian Codes	ELC Codes	Riparian Conditions
R1	RUB – Cleared LUB – Road shoulder	RUB – 1 LUB – 1	-	Limited Functions
R2	RUB – Cleared/Forest LUB – Cleared	RUB – 2 LUB – 4	-	Limited Functions (Upper half) Important Functions (Lower half)
R3	RUB – Forest LUB – Forest	RUB – 6/2 LUB – 6/2	CUF CUF	Important Functions
R4	RUB – Forest LUB – Forest	RUB – 6/2 LUB – 6/2	CUW CUW	Important Functions
R5	RUB – Cleared LUB – Cleared	RUB – 6 LUB – 6	-	Limited Functions
R6	RUB - Cleared LUB - Cleared	RUB – 2 LUB – 6	-	Limited Functions
R7	RUB - Forest LUB – Meadow	RUB – 6 LUB – 4/6	CUW FOD	Important Functions*
R8	RUB – Forest LUB – Forest	RUB – 6/2 LUB – 6/2	CUF CUF	Important Functions
R9	RUB – Forest LUB – Forest	RUB – 6/2 LUB – 6/2	CUF CUF	Important Functions
R10	RUB – Cleared LUB – Cleared	RUB – 6 LUB – 6	-	Limited Functions
R11	RUB – Cleared LUB – Cleared	RUB – 6 LUB – 6	-	Limited Functions

RUB – right upstream bank

LUB – left upstream bank



<sup>\* &</sup>quot;Important Function" level is discussed further in Section 3.1

Table 4. Fish and Fish Habitat Classification, June 21, 2018

	Riparian Classification					
Drainage Feature	Fish Observation • Fishing effort	Fish & Fish Habitat Designation*	Modifiers/Notes			
R1	Incidental fish present, no SAR present.  • 630 SS = ~5.3s/m²	Contributing Functions	20 fish (13 Central Mudminnows, 3 Brassy Minnows, 1 Brook Stickleback, and 3 Northern Redbelly Dace. These species are very common and highly tolerant. Only present as beaver dam backed up water into to this feature. Feature dried as soon as the dam was removed. Shallow feature is considered unlikely to support fish without the dams being present.			
R2	Fish present lower half only, no SAR present.  • 721 SS = 2.7 s/m2	Valued Functions (lower half) Contributing Functions (upper half)	155 fish (60 Central Mudminnows, 52 Brook Stickleback, 15 Northern Redbelly Dace, 8 Pumpkinseeds, 1 Fathead Minnow, and 1 Creek Chub). These species are very common and highly tolerant. Only present as beaver dam backed up water into to this feature. Feature dried as soon as the dam was removed. Bottom most end may provide some habitat in wet years regardless.			
R3	Incidental fish, no SAR present.  • 339 SS = 4.8 s/m2	Contributing Functions	130 fish (73 Central Mudminnows, 52 Brook Stickleback, and 3 Fathead Minnows, and 2 Pumpkinseeds). These species are very common and highly tolerant. Only present as beaver dam backed up water into to this feature. Feature dried as soon as the dam was removed. Shallow feature is considered unlikely to support fish without the dams being present.			
R4	Incidental fish, no SAR present.  • 327 SS = 2.7 s/m <sup>2</sup>	Contributing Functions	32 Brook Stickleback were observed. This species is very common and highly tolerant. Only present as beaver dam backed up water into to this feature. Feature dried as soon as the dam was removed. Shallow feature is considered unlikely to support fish without the dams being present.			
R5	No fish present, no SAR present.  • Dry	Contributing Functions				
R6	No fish present, no SAR present.  • Dry	Contributing Functions				
R7	Fish assumed present.	Valued Functions	Permanent channel assumed to have fish at all times of the year.			
R8	Fish assumed present.	Valued Functions	Permanent channel assumed to have fish at all times of the year.			
R9	No fish present, no SAR present.  • Dry	Contributing Functions				
R10	No fish present, no SAR present.  • Dry	Contributing Functions				
R11	No fish present, no SAR present.  • Dry	Contributing Functions				

<sup>\*</sup>Fish and Fish Habitat Designation is constrained by the HDF Guidelines definitions. "Modifiers" provides significant caveats to those designations.

SS = shocking seconds



### **Table 5. Terrestrial Habitat Classification (Updated 2020)**

Drainage Feature	Description	Amphibians	Terrestrial Classification
R1	Roadside ditch.	No frogs were observed in the feature.	Limited Functions
R2	Lower half includes some portions within plantation forest. Upper half was located within moist forest/plantation (no adjacent wetland evident during surveys), but surrounding area has now been fully cleared.	No frogs were observed in the feature.	Contributing Functions (lower half)  Limited Functions (upper half)
R3	Flows through plantation forest.	No frogs were observed in the feature.	Contributing Functions
R4	Upstream end is a small wetland pocket. Flows through plantation forest very near the clearing edge.	No frogs were observed in the feature.	Valued Functions
R5	All surrounding vegetation has been cleared.	No frogs were observed in the feature.	Limited Functions
R6	All surrounding vegetation has been cleared.	No frogs were observed in the feature.	Limited Functions
R7	Permanent stream within a forested area.	No frogs were observed in the feature.	Valued Functions
R8	Permanent stream within a forested area.	As no frogs were observed in R7, frog presence here is considered unlikely.	Valued Functions
R9	Ephemeral channel within a forested area with no adjacent wetlands features.	Frog presence here is considered unlikely.	Contributing Functions
R10	Newly dug ephemeral channel within a cleared area.	Frog presence here is considered unlikely.	Limited Functions
R11	Newly dug ephemeral channel within a cleared area.	Frog presence here is considered unlikely.	Limited Functions



### 2.4 Reach Summary

Dimensions of the HDF reaches are summarized in Table 5.

Table 6. Reach Dimensions During Spring Freshet (April 12, 2018)

Drainage Feature	Length (m)	Mean Bankfull Width (m)	Mean Wetted Width (m)	Mean Depth (m)
R1	401 (along the Site edge)	4.0	1.6	0.19
R2	485	3.0	90	0.90
R3	144	2.0	2.0	0.18
R4	145	3.0	3.0	-
R5	54	2.0	1.4	0.26
R6	55	2.5	1.2	0.32
R7	218 (on the Site)	5.1	3.2	-
R8	175	2		
R9	265	1.5		
R10	242	2.5		
R11	95	2.5		



#### 3.0 MANAGEMENT RECOMMENDATIONS

The classification categories identified in Section 2 provide the basis of the management recommendations provided here. The following flow chart (Figure 2) combines and translates the classification results to management recommendations.

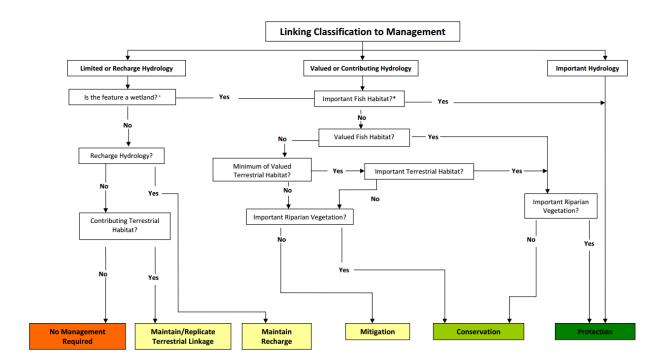


Figure 2. Headwater Drainage Feature Assessment (HDFA) flow chart providing direction on management options

#### 3.1 Management Recommendations for Reaches

#### Channels R1, R5, R6, R10, R11 and the upper half of R2

These features are fully within the cleared area. They are ephemeral channels that do not provide fish habitat. Following the HDFA Guide flow chart linking component classification to management directives (Figure 2), these reaches:

- 1. Provide Contributing Hydrology.
- 2. Do not provide Important Fish Habitat;
- 3. Do not provide Valued Fish Habitat;
- 4. Do not provide Valued Terrestrial Habitat;
- 5. Do not provide Important Riparian Vegetation.



This chain of classification descriptors leads to a management directive of **Mitigation**. These features are not required to be maintained per se, but their functionality must be replicated or enhanced through lot level conveyance measures as part of the site stormwater management system. As the features convey runoff to more ecologically important reaches, replacement features/systems, should be vegetated to mimic online wet vegetation pockets to the extent possible, and should convey water to the same final receiver (i.e. R7). Lot level conveyance features would form part of the Site's future stormwater management system. As such, the replacement features would not require either setbacks or a natural channel design, nor would they need to be comparable dimensions so long as they function to provide the required conveyance and opportunity for allochthonous input.

#### Channels R3, R4 and R9

These reaches are small, ephemeral to intermittent drainage features located entirely within a treed area. While some fish were observed when beaver dams backed up water into them (R2 and R4), they are not considered valued fish habitat as the features now dry too quickly in the spring to support fish. The HDFA Guide flow chart linking component classification to management directives (Figure 2) progresses as follows:

- 1. Provides Contributing/Valued Hydrology;
- 2. Does not provide Important Fish Habitat;
- 3. Does provide Valued Fish Habitat;
- 4. Does not provide Valued Terrestrial Habitat; and
- 4. Provides Important Riparian Vegetation.

This chain of classification descriptors leads to a management directive of **Conservation** for this reach. The feature may be maintained or be realigned using natural channel design techniques to enhance their overall productivity. If realigned, the features may be relocated on or off the Site. In either case, the riparian corridors must be maintained or enhanced. If catchment drainage will be removed due to diversion of stormwater flows, lost functions should be restored through enhanced lot level controls (e.g. restore original catchment using clean roof drainage).

#### **Channels R2 (lower half)**

This reach, with its direct connection to R7 likely retains some water well into summer providing some potential fish habitat for tolerant forage fish. The HDFA Guide flow chart linking component classification to management directives (Figure 2) progresses as follows:

- Provides Contributing/Valued Hydrology;
- 2. Does not provide Important Fish Habitat;
- 3. Provides Valued Fish Habitat;
- 4. Provides Important Riparian Vegetation.

This chain of classification descriptors would typically lead to a management directive of **Protection** for this reach, based in part on the assessment of "Important Riparian Vegetation". Under a management directive of **Protection**, the feature should not generally be relocated. For this feature, however, the



assessment of "Important Riparian Vegetation" comes from only the west side. The east side of the channel has limited vegetation and is generally located within <30 m of the Thunder Road (it connects with R7 within 3 m of the roadway), thus preventing options for an undisturbed, naturalized buffer on that side. The management recommendation for this feature is thus **Conservation** to allow its relocation. The feature should be realigned westward to allow for an improved, naturalized setback with an enhancement of the riparian corridors. Drainage must still be conveyed to R7 and stormwater management systems on the site must be designed to avoid impacts (i.e. sediment, temperature) to this headwater channel.

#### **Channel R7 and R8**

This perennial channel conveys off-site flows across the property. As a permanent stream, it does not qualify as headwater feature. As feature with important hydrology, it automatically receives a management directive of **Protection**. As such, this reach may be maintained and/or enhanced, but should not generally be relocated. Improvements, however, could be possible to its overall channel form and thus some minor realignment may be considered within that context. The riparian zone should be protected and enhanced where feasible. The hydro-period must be maintained. Use natural channel design techniques or wetland design to restore and enhance existing habitat features if and where needed. Stormwater management systems must be designed to avoid impacts (i.e. sediment, temperature) to this headwater channel.

#### 4.0 CLOSURE

This report provides detailed descriptions of the HDFs on the Thunder Road site, as well as management recommendations to direct future development near those features. Points of clarification can be addressed to the undersigned.

Anthony Francis, PhD

KILGOUR & ASSOCIATES LTD.



#### 5.0 REFERENCES

- Bird Studies Canada, United States Environmental Protection Agency, and Environment Canada. 2008.

  Marsh Monitoring Program Participant's Handbook for Surveying Amphibians (Revised).

  Available online at: https://www.birdscanada.org/bird-science/marsh-monitoring-program/
- Credit Valley Conservation and Toronto Region Conservation Authority. 20147. Evaluation, Classification and Management of Headwater Drainage Features.
- Lee, H.R., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, North Bay.



### **Appendix A: Site Photos**

Note: Reach numbers located within the comment lines directly on photos indicate the order in which they were originally photographed and do not necessarily reflect the final assigned reach numbers used throughout this report.



**Upstream view** 



**Downstream view** 







Upstream view Downstream view







Upstream view

Downstream view







**Upstream view** 

Downstream view







Upstream view Downstream view







Upstream view Downstream view







Upstream view Downstream view



Kilgour & Associates Ltd. A-7

**Appendix B: Field Notes** 





### Daily Work Plan for Field Work

Client/Project #: SIMP 773

Date: 2018/04 / 12

Personnel Data: CHTP

Anticipated Worst Outcome/ Catastrophic Failure (describe):

Date of Birth YYYY/MM/DD	Emergency contact and number	Staff hazard review initials@
1983/05/08	M. Vegiard 613-993-5683	Det.
1988/07/19	Mirable Miller 613-138-6611	TP
Tell Control of the C		
	\983/05/09	1983/05/00 M. Vegiard 613-993-5683

If there are more than four crew, use a second sheet; \*indicates person responsible for check in / check out; \*e initial if staff has had the opportunity to review the hazard assessment and mitigations for this project, is aware of risks, and agrees the work can be done safely.

Vehicle (circle those that apply)	Owner	Licence
KAL Truck (Chev Silverado), Grey	Bruce Kilgour	685 7JZ (Ontario)
QUAD	Bruce Kilgour	2CK47 (Ontario)
QUAD Trailer	2317833 Ontario	M7807M (Ontario)
Tracker	2317833 Ontario	C23182ON (Transport Canada)
Tracker Trailer	2317833 Ontario	J3161S (Ontario)
Red Inflatable	2317833 Ontario	C23183ON (Transport Canada)
Inflatable Trailer	Bruce Kilgour	J7553K (Ontario)
White inflatable	Kilgour & Associates Ltd.	unmarked
LIZA'S HONDA FIT	L. HAMILTON.	NEd HSM

escribe Anticipated [					
HOFA V	S:H #1 0	9150	Thirder	Rd, Ct	teue on.
Map is attached? Y⊠	N				
eck in / Check out Pr	ocedure				
eck in / Check out Pr		Charles	1+2+54	-	
		Cherles	Hatry		8
AL Contact Person and cel	number:		Hatry		5
AL Contact Person and cel otel Details	number:	WA WA.	Hatry arrial 10	departure	-

He CH hasn't heard from us in over 4 his he Emergency Response Procedure (describe):
Calls born. If no one answers he calls all

Home Base:	Field Location:
Time leaving &:30	Time arriving 9-50
Time returning 11:15.	Time Leaving 1/100

Person	Pre-Field Condition	Post-Field Condition
LIZA	GCCP	6000
TYLER	GOOD.	GOED
Vehicle	Pre-Field Condition	Post-Field Condition
LIZA'S HENDA FIT	600P.	GOP.
TO COMMENT	Start km: 80 105	End km: 82155

				(dealla	Calil	oration				
Unit	Serial No.	Pre		рН		Cond.		Turbidity		DO
Offic	Serial IVO.	/ Post	4	7	10	1413	0			100% Sat.
pH pen		Pre								
pri peri		Post								
YSI Pro Plus	der aue sta	Pre	S DAY	Marin			SULTER LE	FINA 3	HEU BOAR	
TSI PIO PIUS		Post		/				198		
HI Turb. Meter		Pre								
ni Turb. Meter		Post								
Lamotte Turb.		Pre							Lane State	
Meter		Post								
/		Pre								
		Post						958	CONT. No.	E3/19/E3 \ 11-2

Rules of thumb (when to flag your result):

- DO (mg/L): < 5 mg/L, check that YSI is calibrated to 100% saturation, if yes, then use HACH kit to confirm low DO
- pH: If < 6.5 or > 9, check pH meter vs buffer solutions
- If unit cannot calibrate, it <u>must be serviced</u>, so notify Bruce Kilgour

#### Issues with field equipment

Do not forget to mention all equipment issues to Rob Hallett as soon as possible

**Datasheet Log** 



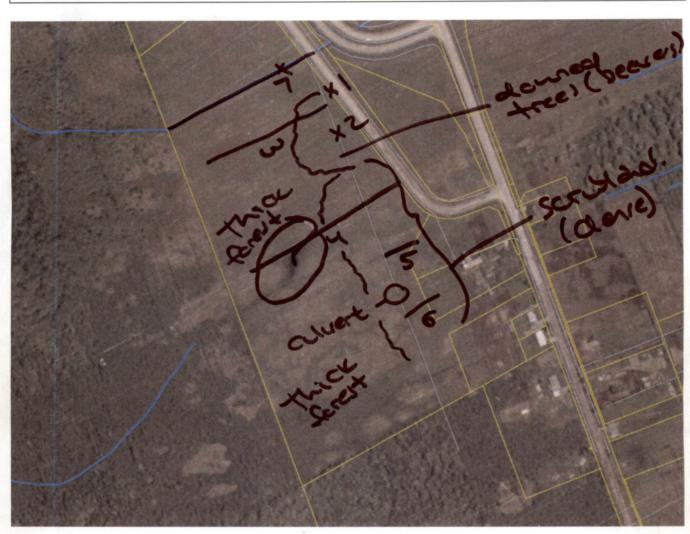
## Field Map

Client/Project #: SIMP773 Crew: LH TP

Date: 2018/64/12

Location: 6150 Thursda Rd.

HDFA Visit #1



Notes



### **General Notes Sheet**

Client/Project #: S 149773 Crew: CH TD

Date: 2012/04/12

Location: 1550 Theoder Rd.

Time (hh:mm)	Map Pin	Easting	Northing	Description/Note
9.30	3			defined channel
	Stat	465023	5001492	freza aver
	ed	464908	5021419	- depth 18cm
				-susstrate frezen
				~ g.o. M. appex. watted
				la extracted since cent
				masure.
				- ferest on eigher side
				of chanel
				- Hoderate buch ferent
		<u>.</u>		m B) Moderate to
				derse hixen birch 201
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**CREW INITIALS:** 

FINAL FIELD PACKAGE: P \_\_\_\_ OF \_\_\_

ream Code	Site Code	Zone [18]	Easting	7	Northing	1	Date (YYYY	(MM)	(DD)	Time (24h	
ream Name		[18]	465	001	502			5 - 6 9	- 10	CPI	Ca
Roadside	D:405				Don		ow Freshe		- 1	stream Site L	ength (n
ccess Route	10,46				Site Description		JW O Freshe	С О Зра	Te _		
	der Rd.						1-4	(	0.	1001	_
1 100	ser no,				Read	510c 1	140,0	lay	Inco	Ler Rol	
					-	-4					
					J [		pstream Photo:	# Photo N	ame	-	-
ptional Features later Temp (C) Air Temp (C)	pH Condu	ctivity (Ns) Turbidity	(NTV) Dissolved	O <sub>2</sub> (ppm)	Number of upstr		oughness	7/10/07/	anne		
2 2					1 5 8			===			-
						6.8.3					
stream Feature(s)	Sedime		hetted	wels	ed Bakf	- 1		Unama	am t anninud	linal Candiana	ġ.
sature Distance (m) Bearing umber	Type Flow Transp		th Feeture Wid	th (m) pr Dept	h (mm) Entrenchme	ent. Feat	1.5-10 m 10-	Matter	am Longitudi d Distance (m		
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3 stream Flow Measure(s)	Depth (mm)—		tydraulic Head (m	-Record EIT			e — Distance (	m)————————————————————————————————————		-Time (sec)	
3 stream Flow Measure(s)	Depth (mm)	3 1	tydraulic Head (m	-Record EIT	HER Hydraulic Head OF			n)	1	-Time (sec)2	3
3 attream Flow Measure(s)	— Depth (mm)—	3 1	tydraulic Head (m	-Record EIT	HER Hydraulic Head OF				1	-Time (sec)	
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3 stream Flow Measure(s)	— Depth (mm)———————————————————————————————————	3 1	tydraulic Head (m	-Record EIT	HER Hydraulic Head OF				1	-Time (sec)	
3 stream Flow Measure(s)	— Depth (mm)——2	3 1	tydraulic Head (m	-Record EIT	HER Hydraulic Head OF					-Time (sec)	
3 stream Flow Measure(s)	Depth (mm)	3 1	hydraulic Head (m	-Record EIT	HER Hydraulic Head OF					-Time (sec)	
3 Stream Flow Measure(s) afture Wetted mber Width (m)	— Depth (mm)———————————————————————————————————	3 1	tydraulic Head (m	-Record EIT	HER Hydraulic Head OF					-Time (sec)	
stream Flow Measure(s) stream Wetled mber Width (m) 1		3 1	2	Record EITI	HER Hydraulic Head OF					-Time (sec)	
3 stream Flow Measure(s) stream Wetted mber Width (m) 1	2 17 dis	3 1	2 2 2 2 2 3 4 4 7 7	Record EITI	HER Hydraulic Head OF Volume (it) 1 2	3				Time (sec)	

Date:				Project #:			Rec	order	/Crew:				
Stream Name:				Stream Co				Code					
Site Limits:	Ups	stream	WP#		-				essment:	□ Sa	imple 1	Unconn	ected HDF:
		wnstream	WP#					2 /1001	ossinon.		imple 2		t connected
Direction of Assessmen	nt:			Upstream	□ D	ownstre	am				ample 3		nstream netv
Flow Influence		☐ Fres	het (1)				Spate (2)				☐ Baseflo	ow (3)	TEN.
Flow Condition		☐ Dry	(1) nding Water	(2)			Interstitial Flow		)		☐ Substa	ntial Flow	v (5)
Feature Type		☐ Defi	ned Natural	Channel (1)			No Defined F Tiled Feature Wetland (6)	Featu	re (4)		☐ Swale ☐ Roadsi	de Ditch	(8)
Feature Vegetation			Lawn		Cropped (3)		Meadow (4)		Scrubland	(5)	Wetland(6)		rest (7)
										(-,			
Riparian Vegetation 0 - 1.5 m Left Bank	П	None (1)	Птент	(2) <b>□</b>	Oad (2)			П	O Nand	- n	Manual (C		E
Right Bank		None (1) None (1)	☐ Lawn		Cropped (3)		Meadow (4) Meadow (4)			A CONTRACTOR OF THE PARTY OF TH	Wetland (6 Wetland (6	-	Forest (7)
													LNIE
1.5 - 10 m Left Bank Right Bank		None (1) None (1)	☐ Lawn		Cropped (3)		Meadow (4) Meadow (4)				Wetland (6 Wetland (6	The second second	Forest (7)
10 - 30 m Left Bank		None (1)	☐ Lawn		Cropped (3)		Meadow (4)			A STATE OF THE PARTY OF THE PAR	Wetland (6		Forest (7)
Right Bank		None (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)		Scrubland	(5)	Wetland (6	) [	Forest (7)
Channel Gradient (S4				Clinometer	(2) La		vel (3)	Surv	vey Level (4		Other (5)  Gradient (°		LiDAR (6)
Channel Gradient (S4 Distance (m):	.M7) — S2.M3)	Clay	(Hard Pan)			):					Gradient (°	): _	LiDAR (6)  0 mm) Bedr
Channel Gradient (S4  Distance (m):  Dominant Substrate (  Sub-Dominant Substr	.M7) — S2.M3)	Clay	(Hard Pan	) Silt	Elevation (cm) Sand (0.00	): 6-2 mm) <b>_</b>	) Gravel (2	22-66	mm) Cob	Die (67-2	Gradient ( <sup>o</sup>	): ulder (25l	0 mm) Bedr C
Channel Gradient (S4 Distance (m):	S2.M3)	Clay  2.M3)  Can't Mea	(Hard Pan)	) Silt  D nimal (1)  Banl	Elevation (cm)	6-2 mm) 0% Mod	Gravel (2) derate (2) an Width (3)	22-66	40 - 60% H	ble (67-2	Gradient (°49 mm) Bo	): ulder (250	0 mm) Bedri
Channel Gradient (S4  Distance (m):  Dominant Substrate ( Sub-Dominant Substr  Feature Roughness  Width Measurement  Channel Dimensions	S2.M3)	Clay  2.M3)  Can't Mea	(Hard Pan)	) Silt	Sand (0.00	6-2 mm)  0% Mod  Mea	gerate (2) an Width (3) Bankfull	22-66	40 - 60% F Estimated	igh (3)	Gradient (°49 mm) Bo	ulder (256	0 mm) Bedri
Channel Gradient (S4 Distance (m):  Dominant Substrate ( Sub-Dominant Substr Feature Roughness Width Measurement Channel Dimensions Entrenchment	S2.M3) rate (S2 Fea	Clay  2.M3)  Can't Mea  ture Width	(Hard Pan)  < 10% Mir assure (1)  (m):	) Silt	Sand (0.00 C C C C C C C C C C C C C C C C C C	6-2 mm)  0% Mod  Mea	derate (2) Bankfull m Righ	Depth	40 - 60% H Estimated th (mm)	igh (3)	Gradient (° 49 mm) Bo	ulder (256	0 mm) Bedri
Channel Gradient (S4  Distance (m):  Dominant Substrate ( Sub-Dominant Substr  Feature Roughness  Width Measurement  Channel Dimensions  Entrenchment  Surface Flow Method	S2.M3) rate (S2 Fea	Clay  2.M3)  Can't Mea  ture Width  > 40	(Hard Pan) (10% Mir asure (1) (m): (m):	nimal (1) Banl	Sand (0.00 Cand Cand Cand Cand Cand Cand Cand Cand	6-2 mm) 0% Mod Mea	derate (2) Bankfull m Righ	Depth at Ban	40 - 60% F Estimated h (mm)	igh (3)  (4)  m  e (3)	Gradient (° 49 mm) Bo	ulder (256	0 mm) Bedri
Channel Gradient (S4 Distance (m):  Dominant Substrate ( Sub-Dominant Substr Feature Roughness Width Measurement Channel Dimensions Entrenchment	S2.M3) rate (S2 Fea	Clay  Can't Mea  ture Width  > 40  Perched C	(Hard Pan) (10% Mir asure (1) (m): (m):	) Silt	Sand (0.06  Sand (0.06  Lambda 10 - 40  kfull (2)  Left Bank  Hydraulic  raulic head (mo	6-2 mm) 0% Mod Mea	derate (2) Bankfull m Righ Volume	Depth at Ban	40 - 60% F Estimated th (mm)	igh (3)  (4)  m  e (3)	Gradient (° 49 mm) Bo GIS (5)  Total w ance (m)	ulder (256	0 mm) Bedri
Channel Gradient (S4 Distance (m):  Dominant Substrate ( Sub-Dominant Substr Feature Roughness Width Measurement Channel Dimensions Entrenchment Surface Flow Method	S2.M3) rate (S2 Fea Total:	Clay  Can't Mea  ture Width  > 40  Perched C	(Hard Pan) (Hard Pan) (10% Mir asure (1) (m): (m): (m): (a) m (culvert (1) (epth (mm)) 2 3	) Silt	Elevation (cm)  Sand (0.06  Left Bank  Hydraulic  raulic head (mi	6-2 mm) 0% Mod Mea  Head (2 m) 3	derate (2) Bankfull m Righ Volume	Depth Ban Dista	40 - 60% H Estimated th (mm)	igh (3)  (4)  me (3)	Gradient (° 49 mm) Bo  GIS (5)   Total w  ance (m) 2 3	ulder (250 00% Extre 00% Extre 01 Measure 01 Hestimate 03 Measure 04 Hestimate 05 Measure 06 Measure 07 Measur	0 mm) Bedra C C C C C C C C C C C C C C C C C C C

	Headwater Drainage Feature	
Stream Code Site Code	Zone Easting 2 19 464999	Northing Date (YYYY) (MM) (DD) Time (24hr) 5027573 2018-04-12 69:15
Stream Name	X LEE LET LITT	Discharge Approximates Baseflow? Upstream Site Length (m.
Diton #1		O Baseflow @ Freshet O Spate
Access Route		Site Description
Thuder Pd.		Diton Time down length of
		Droparty Derelai to Thinks
		Rd. O
Optional Features Water Temp (C) Air Temp (C) pH	Conductivity (Ns) Turbidity (NTV) Dissolved O <sub>2</sub> (ppm)	Number of upstream features   Upstream Photo # Photo Name   Roughness
2 2		
Upstream Feature(s)	Sediment Transport Wetted Wetter	
Feature Distance (m) Bearing Type Flow Number	Adjacent Feature Deposition MT	(mm) Entrenchment Feat 0.1.5 m 1.5.10 m 10.30 m Method Distance (m) Elevation Rise (co)
	2 0.90 90	30 11444474
2		
3		
4		
	The second of	
)pstream Flow Measure(s)		ER Hydraulic Head OR Volume OR Distance
Feature Wetted Depth (I Number Width (m) 1 2	mm) Hydraulic Head (mm) 3 1 2 3	Volume (it) — Distance (m) — Time (sec) — 1 2 3 1 2 3
Comments		
Substrate -	modely sitt	
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		With the second
		P. C. Committee of the
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	1		U	Inconst	trained l	leadwate:	Dra	inage Fea	ature Asses	sme	nt		
Date:					Project #:			Reco	order/Crew:			1	
Stream Nam	ne:				Stream Co	de:		Site	Code:		Mais		
Site Limits:			stream vnstream	WP#	_			Field	Assessment:		ample 1 ample 2	Unconnect  Not co	
Direction of	Assessment:				Upstream		ownstr	eam			ample 3	to downst	ream network
Flow Influer	nce		☐ Fres	het (1)				Spate (2)			☐ Basef	flow (3)	
Flow Condi	tion		☐ Dry	(1) iding Water	(2)		00	Interstitial Flow			☐ Subst	antial Flow (5	)
Feature Typ	oe .		☐ Cha		Channel (1)			No Defined F Tiled Feature Wetland (6)	The second secon		☐ Swale ☐ Roads ☐ Pond	side Ditch (8)	
Feature Veg	getation		None (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)	☐ Scrubland	5) 🗆	Wetland(6	6) D Fores	t (7)
Riparian Ve	getation												
0 - 1.5 m	CONTRACTOR AND		None (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)	☐ Scrubland	5)	Wetland (	6) 🗆 F	orest (7)
Children of the Control of the Contr	Right Bank		None (1)	☐ Lawn	The state of the s	Cropped (3)		Meadow (4)	☐ Scrubland	-	Wetland (	-	orest (7)
1.5 - 10 m	Left Bank		None (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)	☐ Scrubland	5) 🗆	Wetland (	6) 🗆 F	orest (7)
	Right Bank		None (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)	☐ Scrubland	5) 🗆	Wetland (	6) 🗆 F	orest (7)
10 - 30 m	Left Bank		None (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)	☐ Scrubland	5)	Wetland (	6) 🗆 F	orest (7)
	Right Bank		None (1)	☐ Lawn	(2)	Cropped (3)		Meadow (4)	☐ Scrubland	5)	Wetland (	6) 🗆 F	orest (7)
	Substrate (S2			(Hard Pan	) Silt	Sand (0.0		n) Gravel (2	22-66 mm) Cobi	ole (67-	Gradient ( 249 mm) B		nm) Bedrock
Feature Roo Width Meas Channel Dir						A Comment of the Comment	train to the same of the same		40 - 60% H Estimated Depth (mm)	_		60% Extrem  Measure/0	
Entrenchme	ent To	tal:	□ <sub>&gt; 40</sub>	m 🗆	< 40 m	Left Bank		m Righ	nt Bank	m	Total	width	m
Surface Flo	Mathad	П	Perched (	Subsect (4)					Distance by Tim	- (2)		Estimated	
		_											
wetted	Width (m)			<b>epth (mm)</b> 2 3		raulic head (m	3	1 2	e (L) 2 3	1		3 1	7 ime (s)
Sediment	t Transport	Adj	acent	□ None		☐ Rill (2)		Rill and Gull		Gully (4		Outlet Scour (	5)
- 20.310/11		Fea	ature	□ None	et Erosion (6 e (1) et Erosion (6	☐ Rill (2)		Rill and Gull	nk Erosion (7) y (3)	Gully (4	4) 🗆 0	Other (8) Outlet Scour (9) Other (8)	5)
Sediment D	eposition		Measures	s (mm):									
□ Non	ne (1)	Min C	nimal: < 5 m	ım (2)	☐ Mod	lerate: 5-30 mn	n (3)	☐ Substan	tial: 31-80 mm (4	) [	Extensive	e: > 80 mm (5	)

eam Code	Site Code	Zone	ter Drainage I		lorthing	own-Stre		te (YYYY)	(MM)	(DD)	Time (24h	ur)
eam Code	5	18	1465103		50213	327	72		- 6H	- 12	10	15
eam Name						Discharge	Approxim	ates Basefi	ow?	Up	stream Site L	ength (n
di, ton			E PT		400	O Base	eflow 🔘	Freshet	O Spat			
ccess Route				S	ite Description							
Star	t- 4650	14 50	021327,		Derne	Lordon	a	to 1	non	Old	4ch	
Star	- 46510	3 50	521327	-	Sec	and (	2018	(6				
				3			1	- 2 D E				
											-	
ptional Features —				T Num	ber of upstrea	m features		n Photo #	Photo Na	ame		
ater Temp (C) Air Temp (C) p	H Conductivity	y (Ns) Turbidity (I	NTV) Dissolved O <sub>2</sub> (p	pm)	2 2		Roughne	SS				
											3	Ř. I
awaan Faansatal	Sediment		E1		2011				0.19		77. 6	
stream Feature(s) siture Distance (m) Bearing	Type Flow Transport	Sediment Widt	th Feature Width (m)	Method (mm)	B-411	Feat F	Riparian V	egetation —			inal Gradient	t
amber	Adjacent Feature	Deposition MT		-or Department	Width (m)	Veg Left R	m 1.5-1 light Left	0 m 10-30 Right Left F	m Wethoo	5 Distance (m	Rise (cO)	
1	1 2	3	1.4	260	2.04	112	5 5	55	5			
							ī					
3												
3												
3												
3				Secord EITHER Hydr	aulic Head OR V	olume OR Dista	III III III III III III III III III II			13		
3 Stream Flow Measure(s)	— Depth (mm)—		ydraulic Head (mm)	secord EITHER Hydr	aulic Head OR V	folume OR Dista		-Distance (m)			-Time (sec)	
3 Stream Flow Measure(s)	— Depth (mm)———————————————————————————————————			lecord EITHER Hydr		Volume OR Dista		-Distance (m)	3	1	-Time (sec)	
3 atream Flow Measure(s)	— Depth (mm)———————————————————————————————————			decord EITHER Hydr				-Distance (m)		1	-Time (sec) ——	
3 Stream Flow Measure(s)	Depth (mm)—2 3			lecord EITHER Hydr				-Distance (m)		1	-Time (sec)	
3 Stream Flow Measure(s)	Depth (mm) — 2 3			Record EITHER Hydr				-Distance (m)		1	Time (sec) — 2	3
3 Stream Flow Measure(s)	Depth (mm)—2 3			Secord EITHER Hydr				-Distance (m)		1	-Time (sec) — 2	
3 Stream Flow Measure(s)	Depth (mm) — 2 3			lecord EITHER Hydr				-Distance (m)			-Time (sec) — 2	
3 Stream Flow Measure(s) stream Wetted whole Width (m)	2 3	1	ydraulic Head (mm) — 3	3 1				-Distance (m)			-Time (sec) — 2	
stream Flow Measure(s) ature Wetted mber Width (m) 1	2 3	1	ydraulic Head (mm) — 3	3 1				-Distance (m)			-Time (sec) — 2	
3 Stream Flow Measure(s) sture Wetted mber Width (m)	Depth (mm)—  2  3  SUDSTAN	1	ydraulic Head (mm) — 3	3 1				-Distance (m)			Time (sec)—2	

Date:					Proje	ect #:			Reco	order	/Crew:					
Stream Nar					Stre	am Coo			Site	Code	):					
Site Limits:			tream vnstream		P# P#				Field	Ass			mple 1 mple 2		nected H ot conne	
Direction of	Assessment:				☐ Upst	ream		Downstr	eam			] Sa	mple 3	to do	wnstream	netwo
Flow Influe	ence		☐ Fresi	het (1)					Spate (2)				☐ Baset	flow (3)		
Flow Cond	lition		☐ Dry (☐ Stan		ater (2)				Interstitial Flow		)		☐ Subst	tantial Flo	w (5)	
Feature Ty	ре	i	□ Defir	ned Nati	ural Chai				No Defined F	eatu	re (4)		☐ Swale		(8)	
			☐ Multi		3-4-				Wetland (6)				☐ Pond	1		
Feature Ve Riparian V			None (1)	□ La	wn (2)	_	Cropped (3)		Meadow (4)		Scrubland (5)		Wetland(6	6) <b>□</b> F	orest (7)	
0 - 1.5 m	DATE OF THE PROPERTY OF THE PR		None (1)	□ La	wn (2)		Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (	(6) <b>C</b>	Forest	(7)
	Right Bank		None (1)		wn (2)		Cropped (3)		STATISTICS OF THE PARTY OF THE PARTY.		Scrubland (5)		Wetland (	No. of Contract of	Forest	
1.5 - 10 m	Left Bank		None (1)	□ La	wn (2)		Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (	(6)	Forest	(7)
	Right Bank		None (1)		wn (2)		Cropped (3)				Scrubland (5)		Wetland (		Forest	
10 - 30 m	Left Bank		None (1)	□ La	wn (2)		Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (	(6)	Forest	(7)
	Right Bank		None (1)	☐ La	wn (2)		Cropped (3)		Meadow (4)		Scrubland (5)		Wetland (	(6)	Forest	(7)
	Substrate (Sa			(Hard F	'an)	Silt	Sand (0.	06-2 mn	n) Gravel (2	22-66	mm) Cobble	(67-2	49 mm) B	oulder (2	50 mm)	Bedro
Feature Ro	oughness			< 10%	Minimal	(1)	☐ 10 -	40% Mc	oderate (2)		40 - 60% High	(3)		60% Ext	reme (4)	
	surement										Estimated (4)	-				)
Width Inca	imensions	Feat	ture Width	(m): _					Bankfull	Dept	h (mm)					
		tal:									nk			width _		_m
	nent To	_			1)		Hydraulie	Head	(2)	Dist	ance by Time (	3)	L	Estima	ited (4)	
Channel D	ow Method		Perched C	culvert (	'/		,								Time	(s)
Channel D Entrenchn Surface Fl			Wetted De				raulic head (r			e (L)	3	Dist 1	ance (m) 2	3	1 2	
Channel D Entrenchn Surface Fl Wetted	ow Method		Wetted De	epth (m	m)	Hyd 1	raulic head (r 2	nm) 3	Volume 1 2 Rill and Gully Instream Ba	y (3)	3 — — — — Gu	1	2	3 — — — Outlet Sco	1 2	

Headwater Drainage Features - Up- and Down- Stream Site Code Date (YYYY) Stream Code Stream Name Discharge Approximates Baseflow? Upstream Site Length (m) O Baseflow Freshet Spate Access Route Site Description Desperdicular to Proper Photo Name Upstream Photo # Optional Features -Number of upstream features -Roughness Water Temp (C) Air Temp (C) Conductivity (Ns) Turbidity (NTV) Dissolved O2 (ppm) Sediment Upstream Feature(s) hetted hetted Feat 0.1,5 m 1.5-10 m 10-30 m
Veg Left Right Left Right Left Right Upstream Longitudinal Gradient Transport Feature Width (m) BE Depth (mm) Feature Distance (m) Bearing Type Flow Sediment Width Entrenchment Feat. \_ Method Distance (m) Elevation Adjacent Feature Deposition MT Width (m) Number Rise (dO) Used 1 2 3 4 -Record EITHER Hydraulic Head OR Volume OR Distance -Upstream Flow Measure(s) -Hydraulic Head (mm) -Distance (m) -Time (sec)-Volume (It)-Wetted Depth (mm) Number Width (m) faczen Substrate - had silt SIMP773

Date:					Pro	ject #:			Reco	rder/	Crew:						
Stream Nar	me:				Str	eam Coo	de:		Site	Code	: _						
Site Limits:			tream Instream		WP# WP#	=				Asse	essment:		Sample 1 Sample 2			cted HDF: connected	
Direction of	Assessment:				☐ Up:	stream	□ Do	ownstr	eam				Sample 3		to downs	stream ne	twork
Flow Influe	ence		☐ Fres	het (1	1)				Spate (2)				□ Ва	aseflow	(3)		
Flow Cond	lition		□ Dry □ Star		Water (2)				Interstitial Flow		)		□ St	ubstantia	al Flow (	(5)	
Feature Ty	ре		☐ Cha	nneliz	latural Chared or Cor ad (3)				No Defined F Tiled Feature Wetland (6)		re (4)				Ditch (8	)	
Feature Ve			None (1)		Lawn (2)		Cropped (3)		Meadow (4)		Scrubland (	5)	☐ Wetlan	nd(6) [	☐ Fore	st (7)	
Riparian V	THE RESIDENCE HARDSON AND ADDRESS OF THE PARTY OF THE PAR	_		_									_		and the same of th		
) - 1.5 m	Left Bank Right Bank	A DATE OF THE PARTY OF	None (1) None (1)		Lawn (2) Lawn (2)		Cropped (3)		Meadow (4) Meadow (4)		Scrubland (	-	☐ Wetlan			Forest (7) Forest (7)	
1.5 - 10 m	Left Bank		None (1)		Lawn (2)		Cropped (3)		Meadow (4)		Scrubland (	5)	☐ Wetla	nd (6)		Forest (7)	
	Right Bank		None (1)	10000	Lawn (2)				A COLOR DE LA COLO		Scrubland (		□ Wetla			Forest (7)	
10 - 30 m	Left Bank		None (1)		Lawn (2)		Cropped (3)		Meadow (4)		Scrubland (		☐ Wetlan	The second second		Forest (7)	
	Right Bank Gradient (S4.M		None (1)		Lawn (2)		Cropped (3)		Meadow (4)		vey Level (4)		☐ Other			Forest (7) LiDAR (6)	
	Substrate (S2			(Har	d Pan)	Silt	Sand (0.00		n) Gravel (2	22-66	mm) Cobb	ole (67	Gradio 7-249 mm)		er (250	mm) Bed	drock
	surement		ture Width	asure (m):		Banl	La 10 - 4 kfull (2)	☐ Me		Dept	h (mm)	(4)	GIS (5	5) <b>I</b> M			m
Surface Fl	ow Method		Perched (	Culve	rt (1)		Hydraulic	Head	(2)	Dist	ance by Tim	e (3)			stimated	d (4)	
	d Width (m)		Wetted D				raulic head (m						istance (n			Time (s)	
				2	3		2	3	1 2		3	1		3	1	2	3
	nt Transport		acent		None (1) Sheet En None (1)	osion (6)	□ Rill (2)	00	Rill and Gully Instream Bar Rill and Gully	nk En	osion (7)	Gully	(4)	Other	t Scour		
Sedimen		1 00							1 1								
Sedimen		1 00			Sheet Er	osion (6)			Instream Bar	nk Er	osion (7)			Other	(8)		

ream Code	Site Code		Zone	Easting	Non	hing		Date (YYYY)	(MM)	(DD)	Time (24hr	1)
	7	F-1-78-1/K	18	463981		50 216	500	2018	1-04	- 115	701	40
eam Name	39						-	proximates Base		Ups	stream Site Le	ength (
							O Baseflo	w O Fresher	O Spa	te		
ccess Route					Site	Description						
						ne.~	chan	nel fu	my P	erpor	25 love	
	J 1-3					to T	hinde	er Rd.	0		2	
		9 8 1										
ptional Features					□ Number	of upstream	TRAILITES	pstream Photo:	Photo N	ame		
fater Temp (C) Air Temp	(C) pH	Conductivity (Ns)	Turbidity (NT	V) Dissolved O <sub>2</sub> (ppm)			7   6	oughness				
2 2			<del></del>			6 6	1				1	_
						- (						
esture Distance (m) Bea		Sediment Fransport Sedi	ment Width		retted K	S-FU( Entrenchment		arian Vegetation		am Longitudi		
umber		jacent Feature Depo		1 canal remarking B	P Depth (mm)		Veg Left Righ	1.5-10 m 10- t Left Right Left		d Distance (m	Rise (d0)	
1	114		3	3.20	150 8	51(	652	527	2			
		TH F	٩H						$\sqcap$			
2		ᆜᆜᆜ	╡∺						H			
3			┙⊔						$\sqcup$			
3 4			╣						$\exists$			
			44									
4			44	Reco	ed EITHER Hydraul	ic Head OR Vol	lume OR Distance					
4 stream Flow Measure(			Hyd	Reco		ic Head OR Vol	lume OR Distance	oOistance (r	n)		Time (sec)	
stream Flow Measure(	s) — Depth (mm) 1 2	3	Hyd						n) — 3	1	Time (sec)——	
stream Flow Measure(	Depth (mm)	_	Hyd					Distance (r		1		
stream Flow Measure(	Depth (mm)	_	Hyd 1					Distance (r		1		
astream Flow Measure(	Depth (mm)	_	Hyd					Distance (r				
astream Flow Measure(	Depth (mm)	_	Hyd 1					Distance (r				
stream Flow Measure(	Depth (mm)	_	Hyd 1					Distance (r				
stream Flow Measure(	Depth (mm)	_	Hyd 1					Distance (r				
stream Flow Measure( ature Wetted mber Width (m)	Depth (mm)	3	1	raulic Head (mm)———————————————————————————————————	1	Volume (it)	3	Distance (r				
stream Flow Measure(	Depth (mm)  1 2	3 13 M	5-	raulic Head (mm) 3	1	Volume (it)	3	Distance (r				
stream Flow Measure(	Depth (mm)  1 2  COL = G.  SUSStreet	13 MI	1 	raulic Head (mm) 3	1 15 Cel .	Volume (it)	3	Distance (r	3			
stream Flow Measure(	Depth (mm)  1 2	13 M l	S. cole	Pocke	1 15 Cel .	Volume (it)	3	Distance (r	3			

Site Code:	Date:					Project #:			Reco	order/	/Crew:				
Downstream   WP#	Stream Na						A STATE OF THE STA			Code	e:				
Flow Condition	Site Limits								Field	Ass	essment:				
Procedition	Direction o	Assessment:				Upstream		Downstr	eam				Sample 3	to dow	nstream net
Standing Water (2)	Flow Influ	ence		☐ Fres	het (1)				Spate (2)				☐ Base	flow (3)	
Channelized or Constrained (2)	Flow Cond	lition				(2)							☐ Subs	tantial Flow	(5)
Multi-thread (3)	Feature Ty	ре													(8)
Right Bank															
0-1.5 m				None (1)	☐ Lawr	(2)	Cropped (3)		Meadow (4)		Scrubland (	5)	☐ Wetland(	6) 🗆 Fo	rest (7)
Right Bank	SADA DISSALAN CHICAGO	INCOME A DESIGNATION THE PARTY OF STREET, NO. 107		None (4)		(2)	0	-	Manday (C)	_	Carth	E)	□ Martant	(e) D	Format (7)
1.5 - 10 m   Left Bank	U - 1.5 M										A STATE OF THE PARTY OF THE PAR				
Right Bank															
10 - 30 m	1.5 - 10 m			The state of the s		CALL CONTRACTOR OF THE PARTY OF	The state of the s		The state of the s		STATE OF THE PARTY				CONTRACTOR OF THE OWNER, THE OWNE
Right Bank		Right Bank		None (1)	Lawr	1(2)	Cropped (3)		Meadow (4)		Scrubland (	5)	☐ Wetland	(6)	Forest (7)
Channel Gradient (S4.M7)	10 - 30 m			CONTRACTOR OF THE PARTY OF THE											
Distance (m):   Elevation (cm):   Gravel (22-66 mm)   Cobble (67-249 mm)   Boulder (250 mm)   Bedro		Right Bank		None (1)	☐ Lawr	(2)	Cropped (3)		Meadow (4)		Scrubland (	5)	☐ Wetland	(6)	Forest (7)
Width Measurement										22-66	mm) Cobb			Boulder (250	
Channel Dimensions   Feature Width (m):	Feature R	oughness						1						Name and Address of the Owner, when the Owner, which is the Owner, when the Owner, which is th	
Entrenchment   Total:     > 40 m       < 40 m     Left Bank   m   Right Bank   m   Total width   m   m	Width Mea	surement		Can't Mea	sure (1)	☐ Ban	kfull (2)	☐ Me	ean Width (3)		Estimated (	(4)	☐ GIS (5)	Measure	e/GIS (6)
Surface Flow Method Wetted Width (m) Wetted Depth (mm) 1 2 3 1 2 3 1 2 3 1 2 3 1 2  Adjacent None (1) Rill (2) Rill and Gully (3) Gully (4) Outlet Scour (5)  Sediment Transport  Adjacent None (1) Rill (2) Rill and Gully (3) Gully (4) Outlet Scour (5)  Feature None (1) Rill (2) Rill and Gully (3) Gully (4) Outlet Scour (5)	Channel D	imensions	Fea	ture Width	(m):		1,11		Bankfull	Dept	h (mm)				
Wetted Width (m)         Wetted Depth (mm)         Hydraulic head (mm)         Volume (L)         Distance (m)         Time (s)           1         2         3         1         2         3         1         2         3         1         2           Sediment Transport           Gally (4)         Outlet Scour (5)           Sheet Erosion (6)         Instream Bank Erosion (7)         Other (8)           Feature         None (1)         Rill (2)         Rill and Gully (3)         Gully (4)         Outlet Scour (5)	Entrenchr	nent To	tal:	□ <sub>&gt; 40</sub>	m 🗆	< 40 m	Left Bank		m Righ	t Bar	nk		_m Total	width	m
1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2   Sediment Transport	Surface E	ow Method		Perched C	Culvert (1)		☐ Hydraul	ic Head	(2)	Dist	tance by Tim	e (3)		Estimate	ed (4)
Adjacent	Surface F	d Width (m)		Wetted D	epth (mm)	Hyd	raulic head	(mm)	Volume	e (L)	12.13	ı	Distance (m)		Time (s)
Sediment Transport  Sheet Erosion (6) Instream Bank Erosion (7) Other (8)  Feature None (1) Rill (2) Rill and Gully (3) Gully (4) Outlet Scour (5)	29/2018			1	2 3	1	1 2	3	1 2	2	3	1	2	3 1	2
Sediment Transport  Sheet Erosion (6) Instream Bank Erosion (7) Other (8)  Feature None (1) Rill (2) Rill and Gully (3) Gully (4) Outlet Scour (5)					E LOUIS DO			I	Pill and Gull	(0)		Gully	(A) D	Outlet Scou	- (E)
Feature None (1) Rill (2) Rill and Gully (3) Gully (4) Outlet Scour (5)	29/2018		- Adja	acent	□ None	e (1)	☐ Rill (2)		Kill allu Gull	y (3)		Cully	(7)		r (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)	Wette	nt Transport	Adja	acent								Cumy			



### **Daily Work Plan for Field Work**

Client/Project #: 773

Date: 2018/06 /Z (

FINAL FIELD PACKAGE: P \_\_\_\_ OF \_\_\_

#### Personnel Data:

Staff Name	Date of Birth YYYY/MM/DD	Emergency contact and number	Staff hazard review initials®
R. 140 CLET	2990 /1/25	KATIE 613 851 5951	SR5
T. POAT	1988/07/19	MIRALDA 613 4366611	TP
	1 1 4 1 1	arran sarnasible for shook in fahask and @ initial if shaft	21 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

If there are more than four crew, use a second sheet; \*indicates person responsible for check in / check out; \* initial if staff has had the opportunity to review the hazard assessment and mitigations for this project, is aware of risks, and agrees the work can be done safely.

Vehicle (circle those that apply)	Owner	Licence
KAL Truck (Chey Silverado), Grey	Bruce Kilgour	685 7JZ (Ontario)
and the same of th	Bruce Kilgour	2CK47 (Ontario)
QUAD Trailer	2317833 Ontario	M7807M (Ontario)
Tracker	2317833 Ontario	C23182ON (Transport Canada)
Tracker Trailer	2317833 Ontario	J3161S (Ontario)
Red Inflatable	2317833 Ontario	C23183ON (Transport Canada)
Inflatable Trailer	Bruce Kilgour	J7553K (Ontario)
White inflatable	Kilgour & Associates Ltd.	unmarked

•	ncluding Location(s), Route(s) and Access Points and approx. schedule
complete HDFB	Ferry & Thurch Fould
Map is attached? Y⊠ N□	
Check in / Check out Procedure	
KAL Contact Person and cell number:	A Frences
Hotel Details	
Client Contact Person and cell number:	
Check in method and frequency:	
	. Ala c
Traffic enca	
nticipated Worst Outcome/ Catastrophic Failure (desci	ribe):
t	

Home Base:	Field Location: Thursday POAC
Time leaving \206	Time arriving \ 2.45
Time returning (130)	Time Leaving 1700

Person	Pre-Field Condition	Post-Field Condition
PA C	god	good
Vehicle	Pre-Field Condition	Post-Field Condition
	The second secon	A section of the sect
Total Control of the		SACOTOR ALGORITHOUS SCHOOL SACOLOGIST SACOLO
The second section of the sect	Start km:	End km:

					Cal	ibration				
l leit	Carial Na	Pre		рН		Cond.		Turbidity		DO
Unit	Serial No.	/ Post	4	7	10	1413	0			100% Sat.
-11		Pre								
pH pen		Post		12 42						
VOLD Dive	mx2	Pre	4.00	7.03	-	1410				
YSI Pro Plus		Post	4.63	7.00	-	1398		57.7%		
III Turk Mater		Pre								
HI Turb. Meter		Post								
Lamotte Turb.		Pre						1		constitution and
Meter		Post				4				
139		Pre								And the street
		Post						9.000	F k	AND PROPERTY.

Rules of thumb (when to flag your result):

- DO (mg/L): < 5 mg/L, check that YSI is calibrated to 100% saturation, if yes, then use HACH kit to confirm low DO
- pH: If < 6.5 or > 9, check pH meter vs buffer solutions
- If unit cannot calibrate, it <u>must be serviced</u>, so notify Bruce Kilgour

#### Issues with field equipment

Do not forget to mention all equipment issues to Rob Hallett as soon as possible

none.

**Datasheet Log** 

DWP, map, Fish x 4, noks



### Field Map

Client/Project #: SIMP773



HDFA Visit #1

Date: 20/8/06/201-Location: 6150 Thindler Rd.

etere, cheeren agertanel a

new notes are in red,



Date: 2018/06/21 Start Time:

Stream type: Ct	Crew: RH TP
Reach Classification: WK	Task: 1-1 OFA
Temperature: 26.0°C	Gear type: E
Conductivity: 365 2-45/cm	Seconds/ Set + Pull Time: 630
pH: 6.49	Length fished: ~ 60m
DO: 1.65 mg/4 / 20.8%	
7	
Fish were harely being	shorted a no men of issues
	Temperature: 26.0°C  Conductivity: 365 2 45/cm  pH: 6.49

Species	Number	Total	Notes/Stage + Health Observations
CNMD	⊠:	13	
BROWN	<b>6</b> ©	3	
BRST	*	1	
HRDC	4	3	



Date: 2018/06 /21 Start Time:

Location: Therefor Roal	Stream type: PROM	Crew: RM
(UTM NAD 83): 14	Reach Classification: UNK	Task: T\$
Watercourse: W	Temperature: 27.5°C	Gear type:
Reach/Station: ZA	Conductivity: 山多名	Seconds/ Set + Pull Time: 72
W-Depth: 3 640m	pH: 7.61	Length fished:
W-Width: 35m	DO: 51.9% U-4 me/L	
Fishing Details/Other Comments: Stort: 465 001 502	1575	h speand, not much feliresponse.

End: 465 026 501 1494 Ucry high spCand, not much helpergense

Species	Number	Total	Notes/Stage + Health Observations
Crimp	D'BB'BB B	60	
BRST	A A B B B	52	
NRDC	M ··	15	
PIMSO	ロ	8	
FTMN	•	ζ.	
CRCH	•	1	



Date: 20 6 / Start Time:

Location: Thunk (Roan)	Stream type: perm.	Crew:
(UTM NAD 83): 12	Reach Classification:	Task: HOFF
Watercourse: W	Temperature: Z5°C	Gear type:
Reach/Station: Reach 3	Conductivity: 3083	Seconds/ Set + Pull Time: 338.7
W-Depth: 30cm	pH: 7.67_	Length fished: $70_{\text{cm}}$
W-Width:	DO: <8% 4.75mg/L	
Fishing Details/Other Comments:  510RT 465028 5021496  END 464977 502147	J, –	

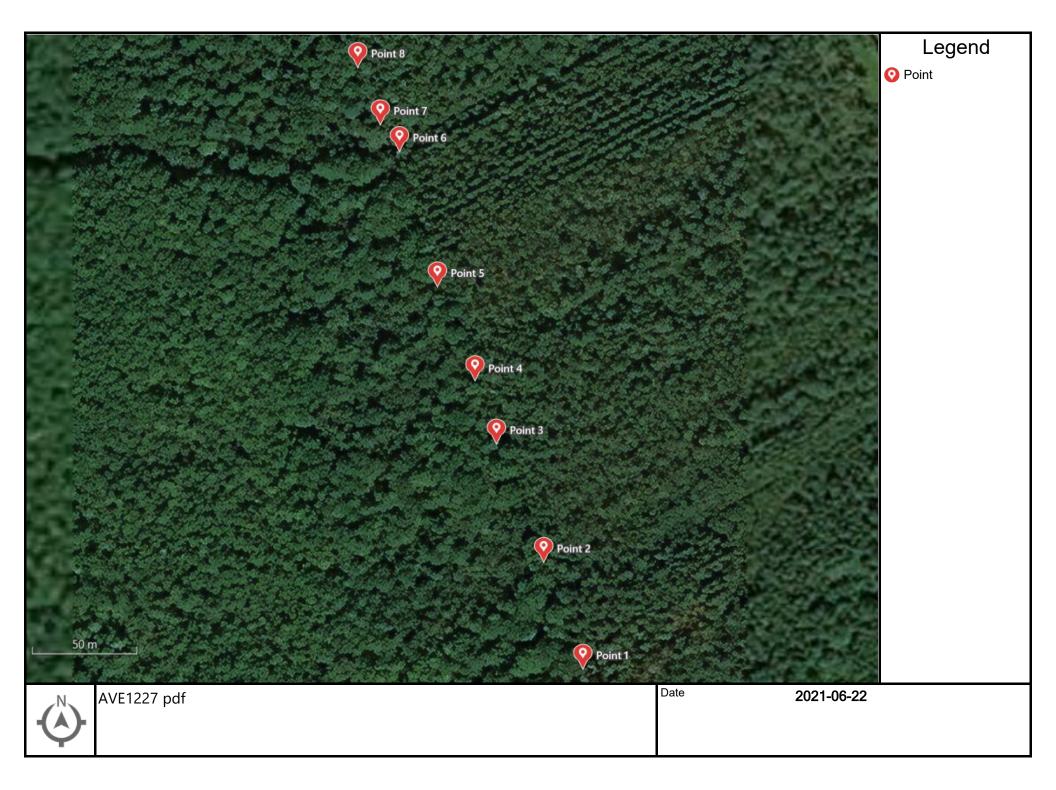
Number	Total	Notes/Stage + Health Observations
MADDED	73	
	52	
• •	3	
	2	
<u> </u>		
	·: ANDRE	*; 73 88 88 87 87 87 87 87 87 87 87



Date: 20 8/06 /2 \ Start Time:

Location: Thursday Road	Stream type: Pesw	Crew: RH -O
	Reach Classification:	Task: HOFA
Watercourse: On K	Temperature: 178	Gear type: Back Pack
Reach/Station: Reach 4	Conductivity: 123,9	Seconds/ Set + Pull Time: 37 7
	pH: 6.98	Length fished: 66 m
W-Width: 3cc	DO: 13,69 1.78 mg//	
Fishing Details/Other Comments: 51APT9-465065 502 END 465039 502	1389 -1373	

Species	Number	Total	Notes/Stage + Health Observations				
BRST							



### **Point**

Name	Description	Attachment	Latitude	Longitude	Altitude (m)	Date/Time
Point 8	North point	WIN_20210622_12_57_33_Pr WIN_20210622_12_57_39_Pr	45.34647400	-75.44961367	77.40	2021-06-22 12:57
Point 7	norh end	WIN_20210622_12_56_17_Pr WIN_20210622_12_56_22_Pr	45.34622833	-75.44947617	79.90	2021-06-22 12:56
Point 6	water starts at confluence	WIN_20210622_12_51_55_Pr WIN_20210622_12_52_12_Pr	45.34611350	-75.44935950	83.50	2021-06-22 12:51
Point 5	North of confluence		45.34553250	-75.44912767	86.90	2021-06-22 12:48
Point 4	cross of swLE going east	WIN_20210622_12_46_38_Pr WIN_20210622_12_46_45_Pr WIN_20210622_12_46_51_Pr		-75.44889800	84.30	2021-06-22 12:46
Point 3	North mid point	WIN_20210622_12_44_18_Pr WIN_20210622_12_44_24_Pr	45.34485850	-75.44876683	76.90	2021-06-22 12:43
Point 2	South mid swale	WIN_20210622_12_41_50_Pr WIN_20210622_12_41_56_Pr	45.34435100	-75.44847867	78.80	2021-06-22 12:41
Point 1	Start of swale	WIN_20210622_12_39_18_Pr WIN_20210622_12_39_37_Pr	45.34389283	-75.44823917	79.10	2021-06-22 12:38

# Point 8 images (2)



WIN\_20210622\_12\_57\_39\_Pro.jpg



WIN\_20210622\_12\_57\_33\_Pro.jpg

# Point 7 images (2)



WIN\_20210622\_12\_56\_22\_Pro.jpg



WIN\_20210622\_12\_56\_17\_Pro.jpg

# Point 6 images (2)



WIN\_20210622\_12\_52\_12\_Pro.jpg

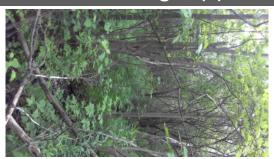


WIN\_20210622\_12\_51\_55\_Pro.jpg

## Point 4 images (3)



WIN\_20210622\_12\_46\_51\_Pro.jpg



WIN\_20210622\_12\_46\_45\_Pro.jpg



WIN\_20210622\_12\_46\_38\_Pro.jpg

# Point 3 images (2)



WIN\_20210622\_12\_44\_24\_Pro.jpg



WIN\_20210622\_12\_44\_18\_Pro.jpg

# Point 2 images (2)



WIN\_20210622\_12\_41\_56\_Pro.jpg



WIN\_20210622\_12\_41\_50\_Pro.jpg

# Point 1 images (2)



WIN\_20210622\_12\_39\_37\_Pro.jpg



WIN\_20210622\_12\_39\_18\_Pro.jpg