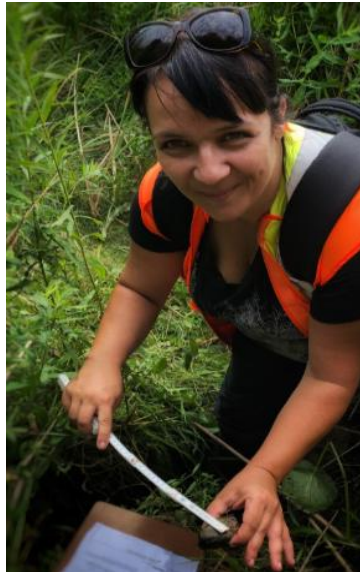


Going Against the Flow through Streamlining Data Collection Methods

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- **Senior Fluvial Geomorphologist**
- 14 years of experience



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- **Water Monitoring Technician and Topographic Surveyor**
- 12 years of experience



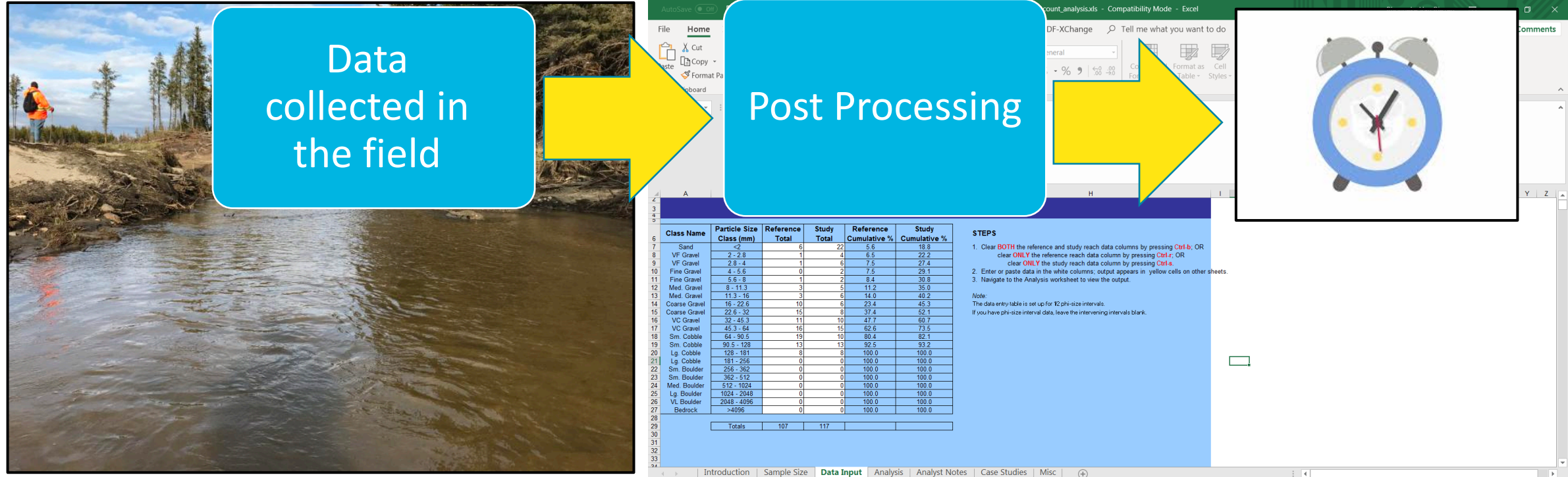
A photograph of a person in waders standing in a stream, using a surveying instrument. A yellow tripod-mounted instrument is visible on the left bank. The background is a dense forest with trees showing autumn foliage. The water in the stream is calm and reflects the surrounding trees.

Going Against the Flow through Streamlining Data Collection Methods

Latornell Conservation Symposium
November 20th, 2019

- Introductions
- How data has previously been collected
- Tools
 - Hardware
 - Software
- Summary

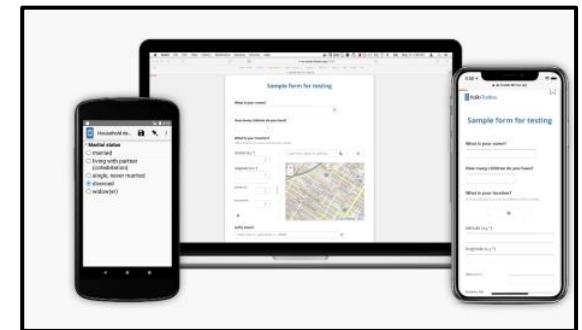
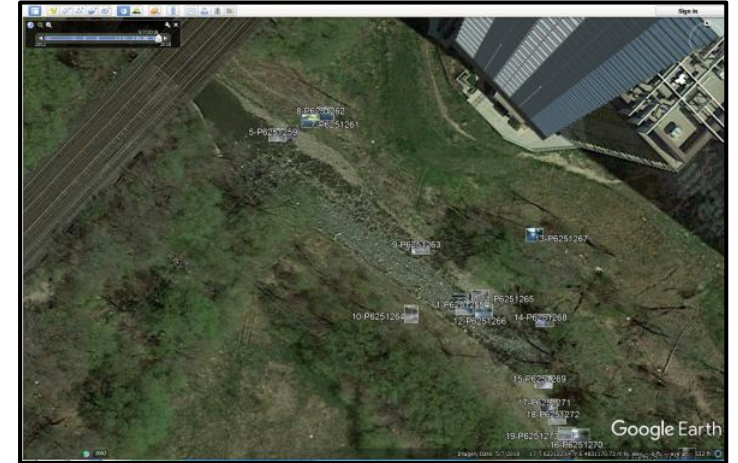
Data Collection Methods



- Data collected in the field can require multiple pieces of equipment including portable GPS units, cameras, and equipment for note taking.
- This results in post processing data entry

Why have Collector Apps become Important?

1. Save time and money with GIS-based data collection:
 - Reduce data entry time and delays
 - Improve quality and format of output
2. Create digital output
 - Innovation is key
3. Avoid data loss
 - Data is saved in the cloud and can be visualized instantaneously by someone else at the office
 - Regular syncing
4. Involve GIS Specialists to ensure you and the client get what you need.
 - No need to reinvent the wheel
 - Build on existing experience



Examples of types of data that can be collected

- **Point Data**

- Culverts, outfalls, vegetation

- **Line data**

- Manmade/Anthropogenic influences on the watercourse i.e. bank modifications, in-stream structures, erosion sites

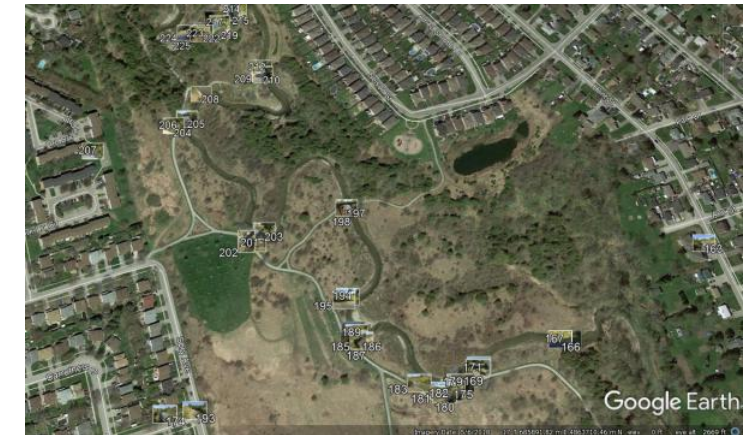
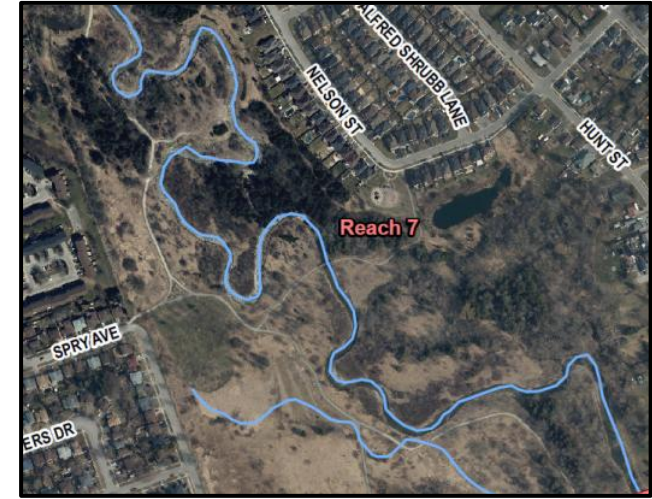


- **Polygon data**

- Study sites, regions of interest, calculate area

- **Photographs**

- Can be GPS'd and then converted to a kmz file to show on Google Earth



Tools: Hardware & Operating System

- Which system works best? It depends on what type of data needs to be collected and the end use compatibility of the data.

Things to consider:

- **Expanded Storage**
 - Internal Storage Capacity
 - Photos, software and background mapping are “heavy”
 - 32 GB Minimum
- **Flexible Programming**
- **Internal GPS accuracy**
- **Easy set-up**
- **Cost**
 - Cheap: \$500 CAD and upwards
 - Quick to recuperate cost with time saved in data entry!



What are the Needs?

- One doesn't need to necessarily create a new collector application as there are many already existing
- Essentially, one needs to create the field sheets that need to go into them and the collector app collects and stores the data
- Staff training:
 - Creation of field forms,
 - Data collection with the app and
 - Data post processing

Form Design

Ask Questions
(Design & Publish)



Get Answers
(Collect Data)



Make Decisions
(View & Analyse
in ArcGIS)



Image Courtesy of [Survey123](#)



- Kobo Collect is an example of Collector Application
- In situations where a map is not needed, survey sheets can easily be created and strong programming skills are not needed
- Sheets can be developed in Excel and then uploaded on the Kobo App or the field form can be created from the Kobo toolbox website with user friendly boxes
- At the moment, Kobo Collect is only available for Android, but one can use the form on iOS within a browser

Tools: Software - Kobo Collect

<https://www.kobotoolbox.org/>



Choose one of the options below to continue. You will be prompted to enter name and other details in further steps.

Build from scratch

Use a template

Upload an XLSForm

Import an XLSForm via URL

Desktop



Application



survey choices settings types

KoBoCollect v1.14.0a
Part of KoBoToolbox

Fill Blank Form

Edit Saved Form

Send Finalized Form

Rapid Geomorphology

Survey Description

* Date & Time of the Survey

Select date

Nov 30, 2018

Select time

01:34

Rapid Geomorphology

Channel characterization > Geometry >

Channel geometry High Medium Low

Entrenchment

Width / Depth ratio

Sinuosity

Slope

Rapid Geomorphology

Take pictures of the study reach (1)





Photo

Take Picture

Choose Image

Tools: Software - iAuditor and Fulcrum



Site Type:	Creek
Site Name:	HC-A(12)
🕒 2:07 PM EDT	
Unanswered	
Flow?	On
Discharge (m3/s)	0.0120
YSI?	On
YSI Photo	
— Photos	
 	
Photo 29	Photo 30
Water Samples Taken?	Off
Logger Downloaded?	off
Upstream	
— Photos	
	
Photo 31	
Downstream	
— Photos	
	
Photo 32	

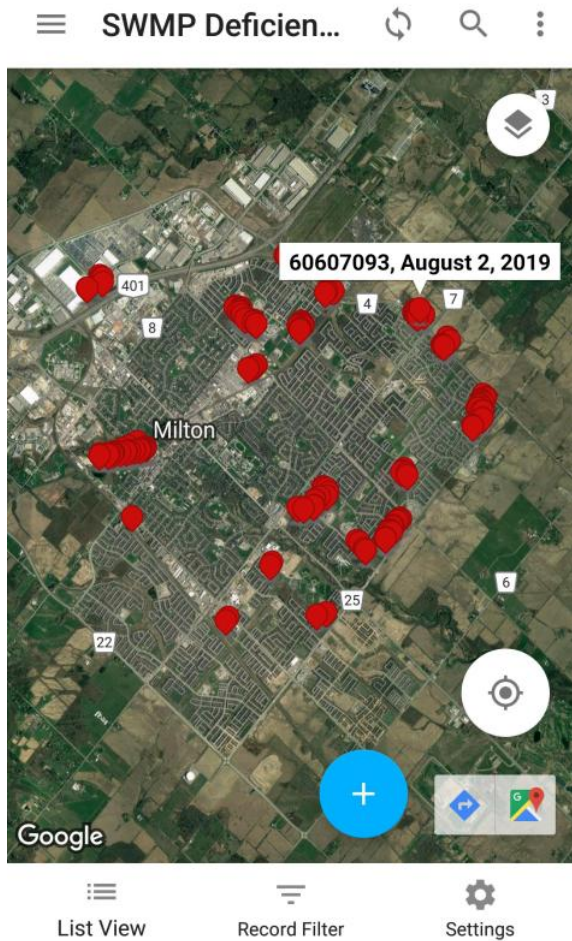
iAuditor

- Excellent alternative to written field note keeping, however, more simplified relative to other options
- Properly structured forms provide outline to ensure systematic and consistent note keeping from multiple inspectors
- Less spatial integration with primary export format to PDF or Word

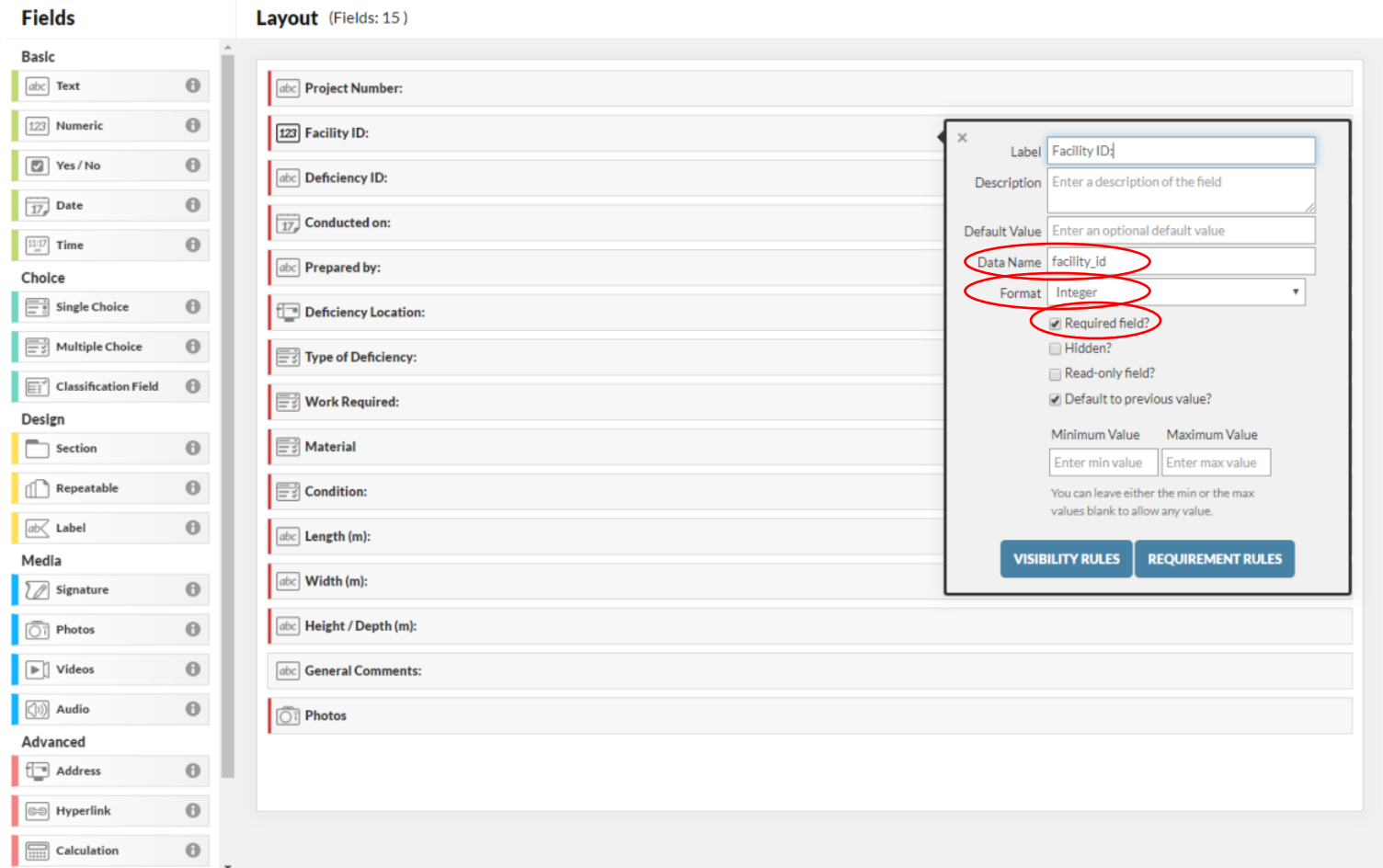
Fulcrum

- Great for general field note keeping but improved export options
- Inspection fields include alias designations that encourage easy ArcGIS integration
- Advanced users with some programming experience can integrate formulas and calculations into their forms

Tools: Software - Fulcrum



Application view



Desktop view

ESRI's Data Collection Methods

- If a background map is required, Collector for ArcGIS is more suitable as it:
 - Allows spatial feature collection (points, lines, polygons)
 - Integrate attributes for data description and analysis
 - Helps locate in the field with background base maps
 - Can provide measurements on the map (distances, areas).
- If observations to collect are more designed for repetitive work, Survey123 forms can be more appropriate as it:
 - Proposes series of questions in a hierarchical manner
 - Calculates indices, values, etc., based on data collection
 - Can locate field observation with integration of waypoints
- Survey 123 and Collector for ArcGIS
 - Can be used with or without internet connection

Tools: Software - Survey123 for ArcGIS



Fire Severity Assessment

% Elevated fuel burnt: 30

% Elevated fuel unburnt: 40

% Elevated fuel scorched: 30

Total: Must be equal to 100%
100

Canopy layer

Vegetation structural form

Life form and height of tallest stratum	Percentage foliage cover of tallest plant layer			
	Dense (70-100%)	Mid-dense (30-70%)	Sparse (10-30%)	Very sparse (<10%)
Trees > 30 m	Tall closed-forest	Tall open-forest	Tall woodland	Tall open-woodland
Trees 10-30 m	Closed-forest	Open-forest	Woodland	Open-woodland
Trees 5-10 m	Low closed-forest	Low open-forest	Low woodland	Low open-woodland
Shrubs 2-8 m	Closed-scrub	Open-scrub	Tall shrubland	Tall open-shrubland
Shrubs 0-2 m	Closed-heath	Open-heath	Low shrubland	Low open-shrubland

Structural form code: Open Forest

Application view

Rapid Geomorphic Assessment

Form Preview Schema Preview Settings

Date & Time of the Survey: 19/09/2017 3:06 PM

Name of the River

Reach ID

Name of the Recorder

Select the Evidence(s) of Aggradation

Lateral Bars: Yes No NA

Coarse materials in riffles embedded: Yes No NA

Siltation in pools: Yes No NA

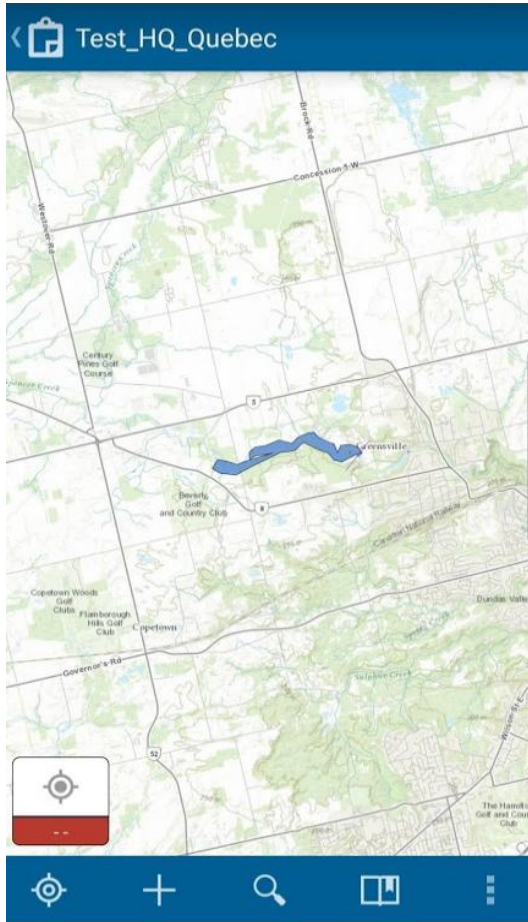
Mid-Channel Bars: Yes No NA

Deposition on Point Bars: Yes No NA

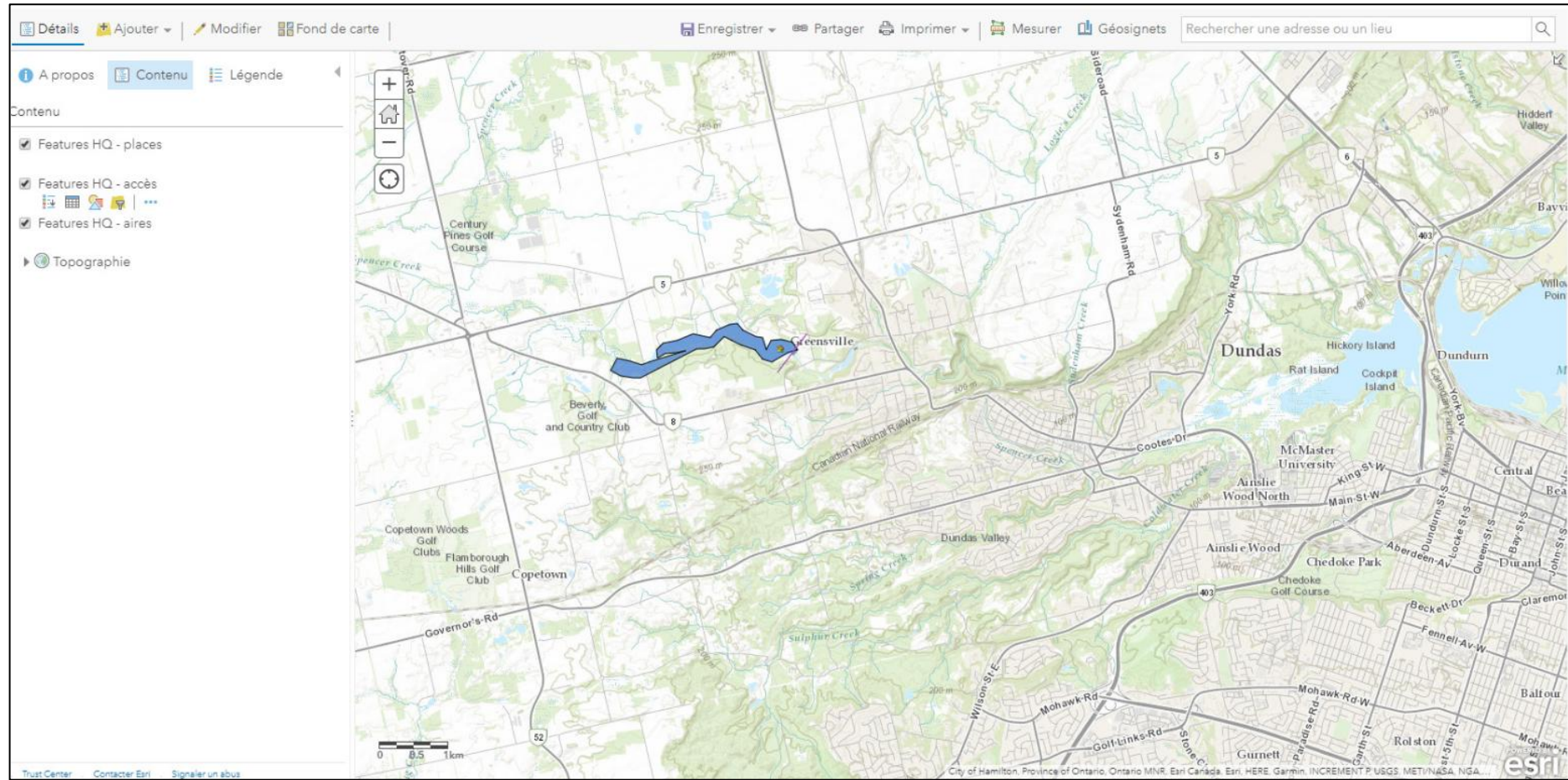
Poor longitudinal sorting of bed materials

Desktop view

Tools: Software - Collector for ArcGIS



Application view




Desktop view



Tools: Software - ArcGIS Collector and Survey123



- Survey123 for ArcGIS 
 - Simple and intuitive form-centric data gathering solution for creating, sharing, and analyzing surveys.
 - May offer more efficient data collection for Fluvial Geomorphological surveys – can associate several data entries with the same point.
 - Auto-calculate survey results within the application
 - Can use both depending on the best fit for the job
 - Both compatible with AECOMs Portal, saving money on Esri server costs.

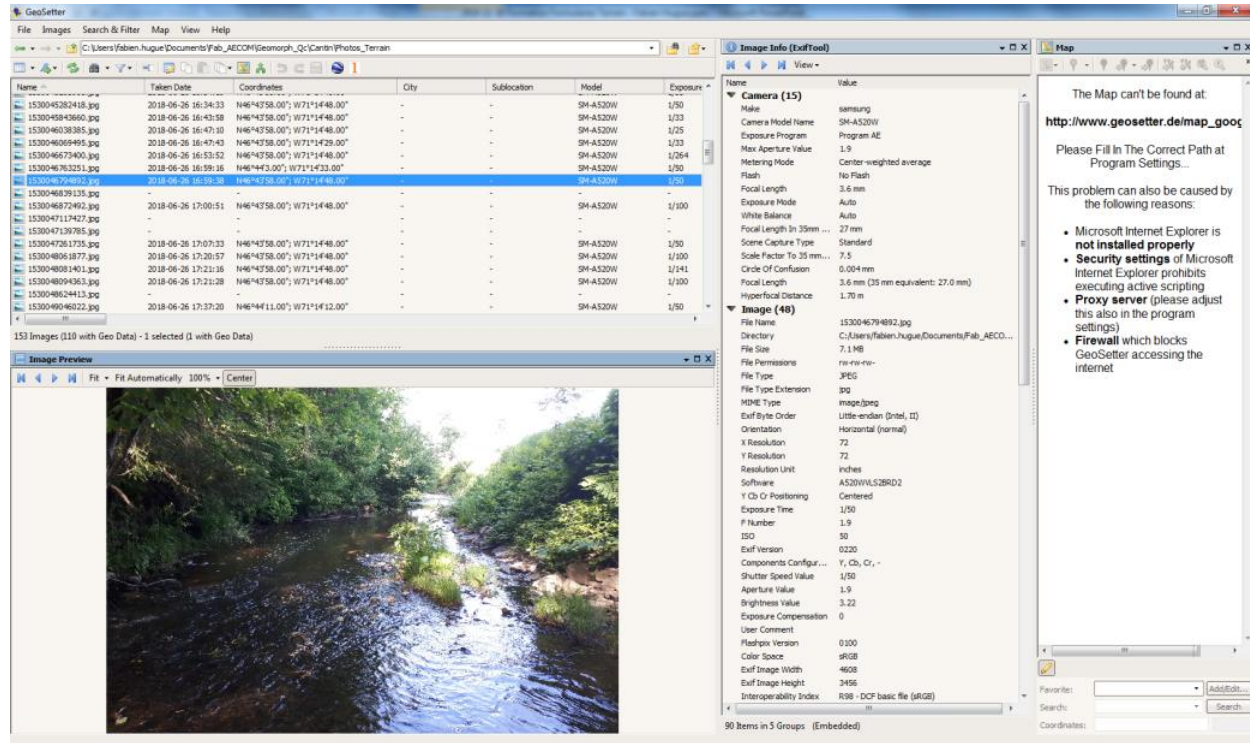


Practical Challenges

Some of the challenges with collector applications that we've come across include:

- Dealing with the weather – extreme cold or warm events can impact the battery capacity of your phone or tablet device
- Experience difficulties in the field collecting the data? If so, in some cases QC can be done directly in the field working with your GIS specialist back at the office.
- Continuing to update the forms based on field personnel input (missing or unnecessary form questions)

Locate the photos on a map: GeoSetter



Exporting photo coordinates to a .kmz file (Google Earth)

Summary

- It Saves Time and Money!
 - Transcribing traditionally mapped data takes ages!
 - There are multiple options/alternatives and some may be better suited to different projects
- Be prepared
 - Accidents can happen (damaged phones and Ipads)
 - Data Collection
 - Program your collector to prevent missing data
 - i.e. blank field does not allow the user to submit feature).
 - Take time to train and familiarise your team with the application and data collection requirements beforehand
 - Post Processing
 - Establish peer reviews to double check data before submission
 - Be transparent with the project team (even if that includes outside help)

Thank you!

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