

Digital Solutions for Post-Remediation and Reclamation Vegetation Management

A Case Study from northeastern Alberta

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Agenda

- Project Context and the “Why”
- Scoping a Solution
- Mobile Data Collection
- Web Mapping & Exploring Your Data
- Where Do We Go From Here?

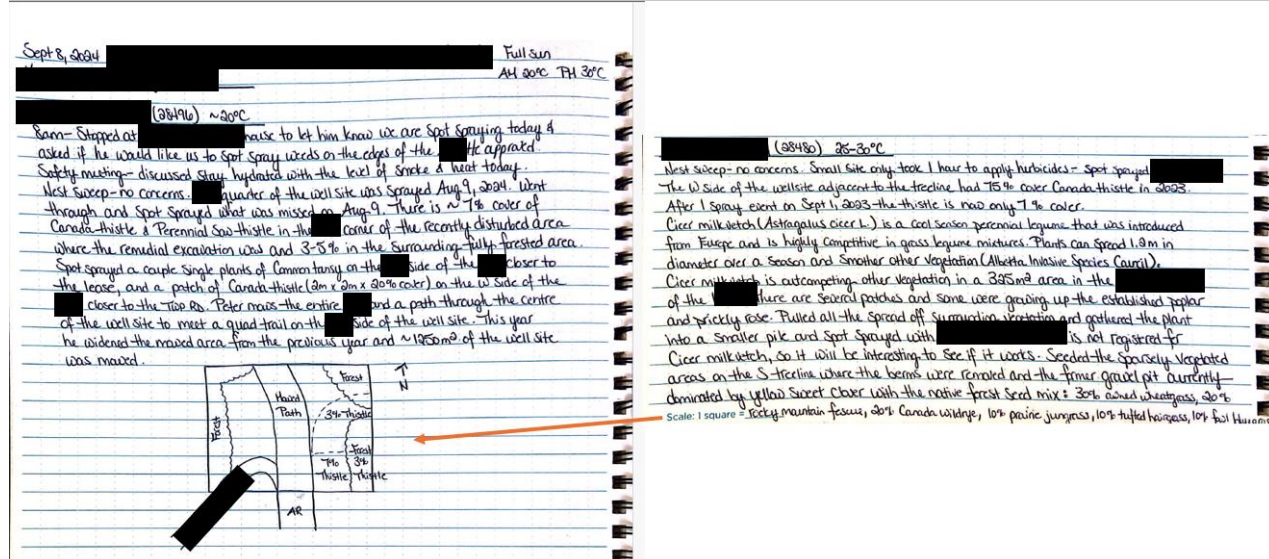


Project Context and the Why



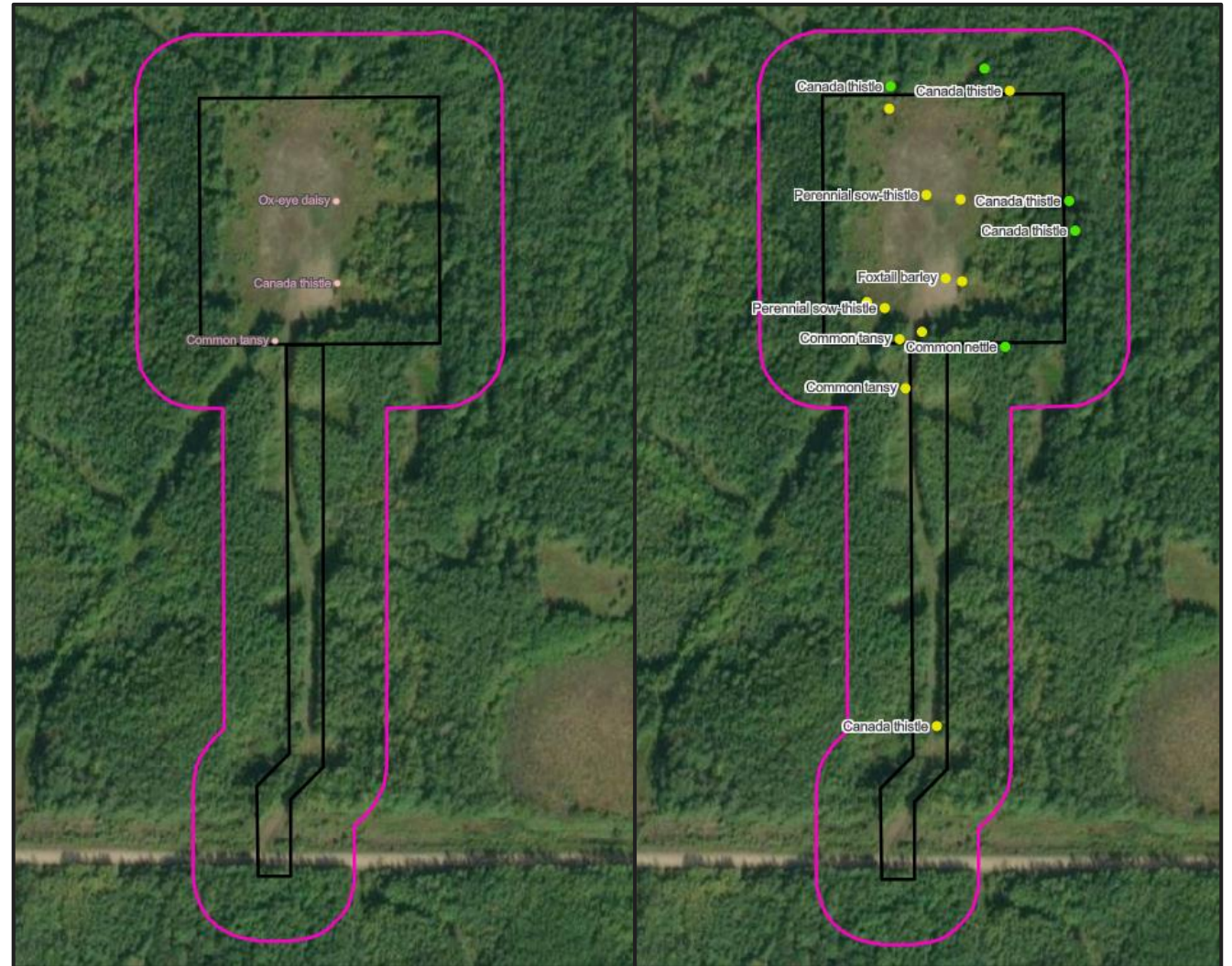
Site Overview and Previous State

- Portfolio of Forested and Tame Pasture Well Leases
 - Approximately 50 active sites
- Northeastern Alberta
- Vegetation Management
 - Weed control events and document
 - Precursor to DSA
- Supported since 2013
- Lots of field notes



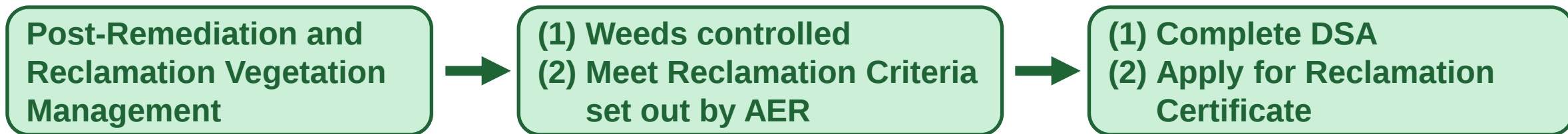
Continual Improvement

- Lots of observations
 - 2022 | 44 locations, 31 polygons
 - 2023 | 93 locations, 88 polygons
 - 2024 | 264 locations, 223 areas
 - 2025 | 230 locations, 197 areas
 - **Four years, > 1000 observations**
 - **More years to go... (~5 years?)**
- Photos..
- Summaries by Site
- Historically: Avenza and Notes
- 5-6 field staff over the years
- Striving for continual improvement



Motivation and Why

- Trajectory to a site end-land use
 - Efficiently assessing and monitoring
 - Sites are often forested
 - Answering a key question: have we controlled weeds to the point that the desirable vegetation will outcompete weeds?
- Complete a Detailed Site Assessment and Apply for Reclamation Certificate
 - Demonstrate that the (1) weeds are controlled; (2) landscape, soils and desirable vegetation meets the Reclamation Criteria



Industry-Wide Questions

- PTAC Study
 - Industry-wide challenges for weed management in Forested Green Areas
- This Study
 - Our growing dataset helps understanding of how to best optimize weed management in Forested White Areas
 - Unique Challenges with greater exposure to domestic and other human activities



Challenges Before This Solution



Hard to tease out trends and quantify



Review content and data spatially



“One-Stop Shop” non-existent

Scoping a Solution



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Scoping It Out



What do you need collect? What background information do you need? Offline?



What do you need to report? How do you need to report?



Attributes and data constraints?

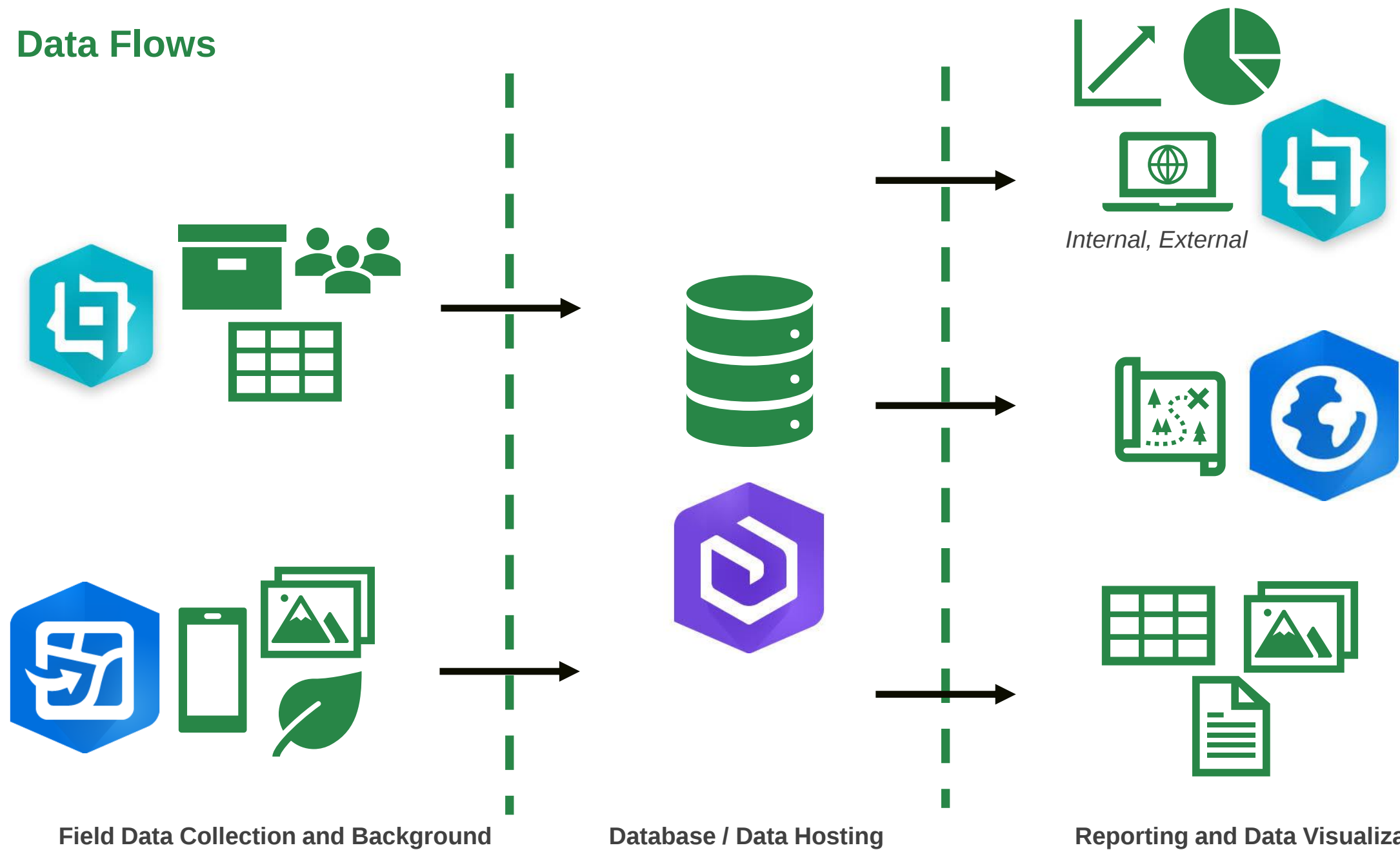


Off-the-shelf applications (e.g., ESRI) available?



Making It Right-Sized

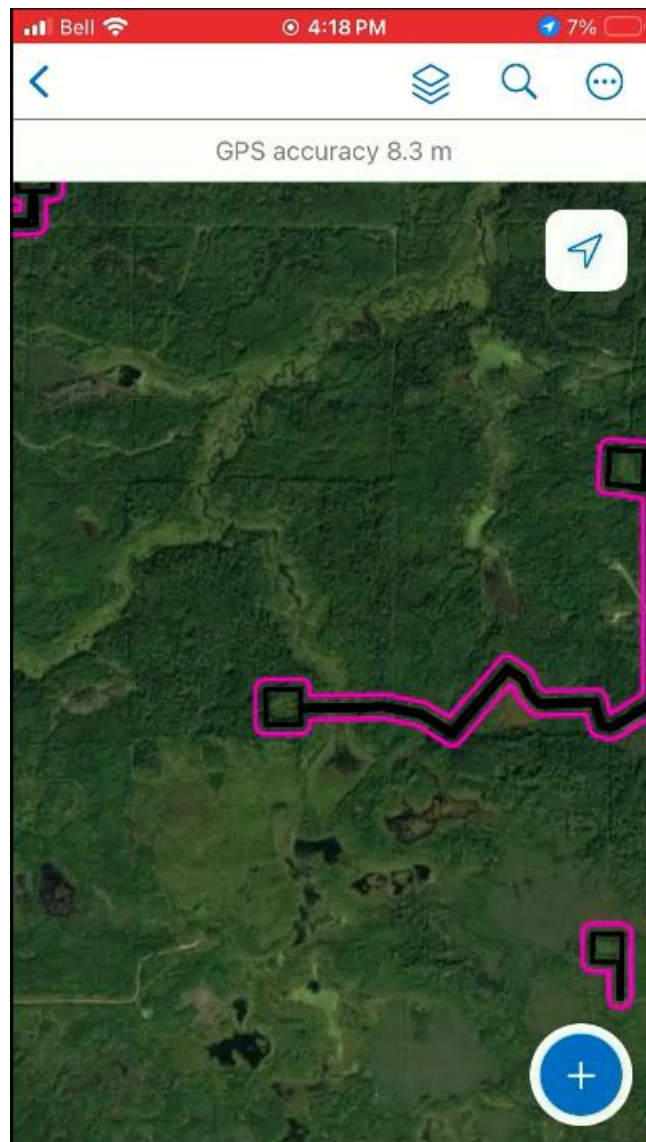
Data Flows



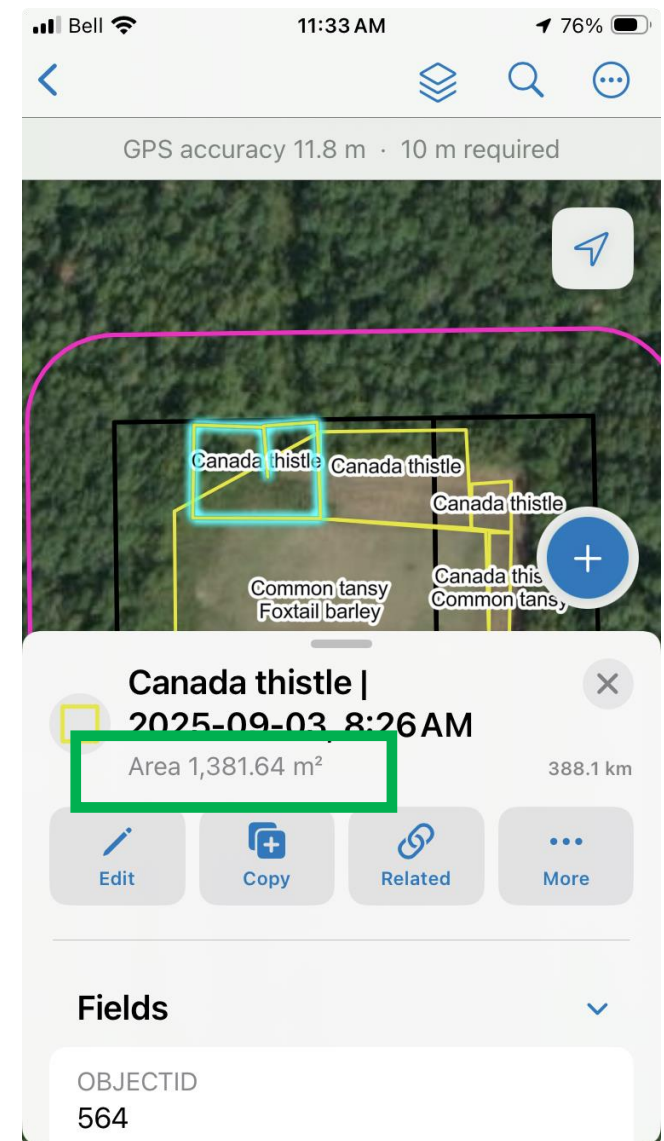
Mobile Data Collection



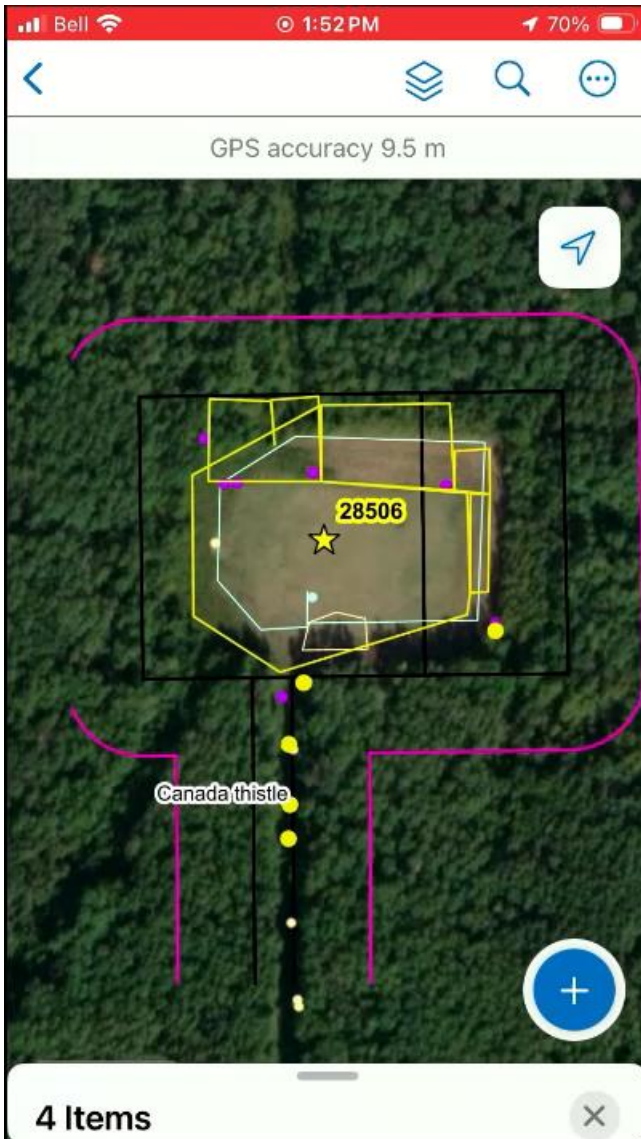
Assessment Areas



Points or Polygons?



Through Time?



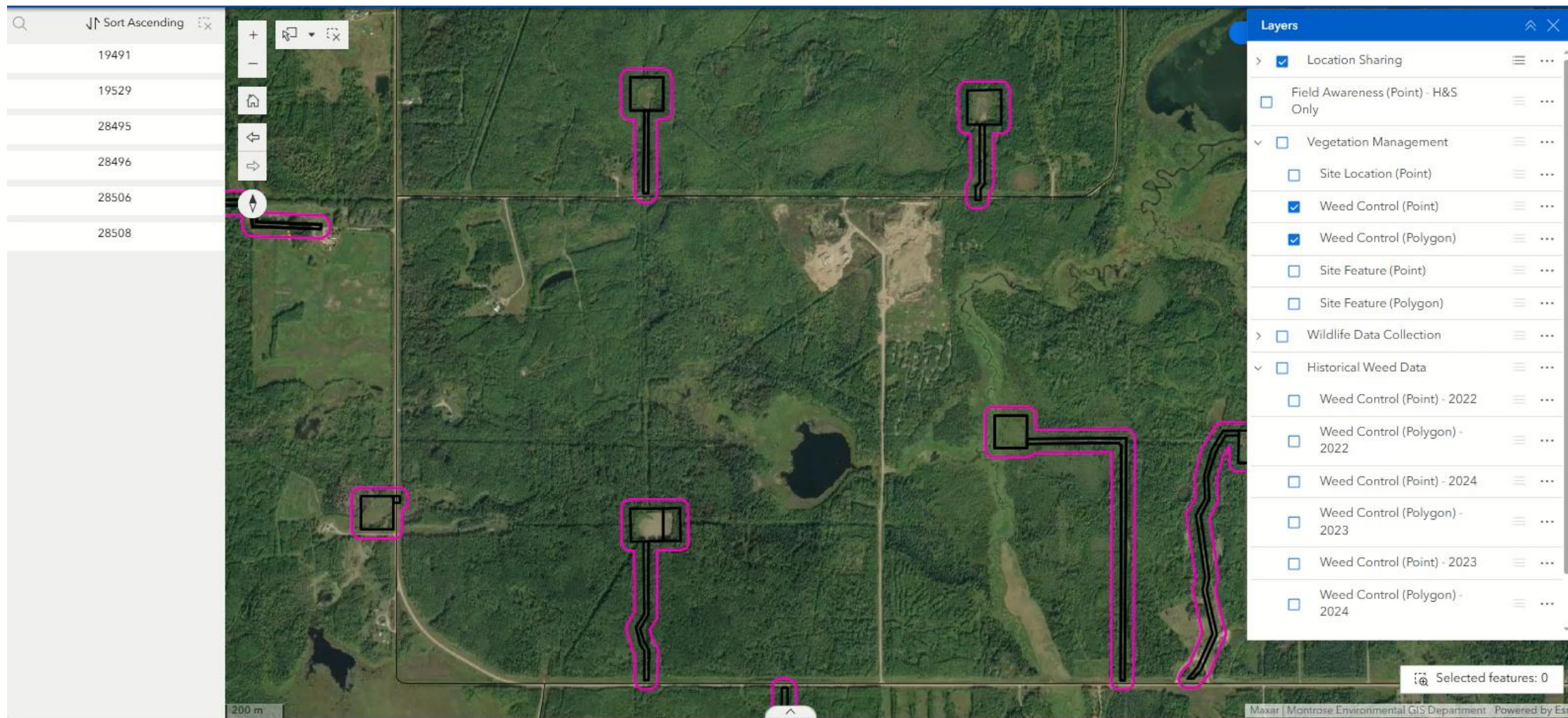
Web Mapping & Exploring Your Data



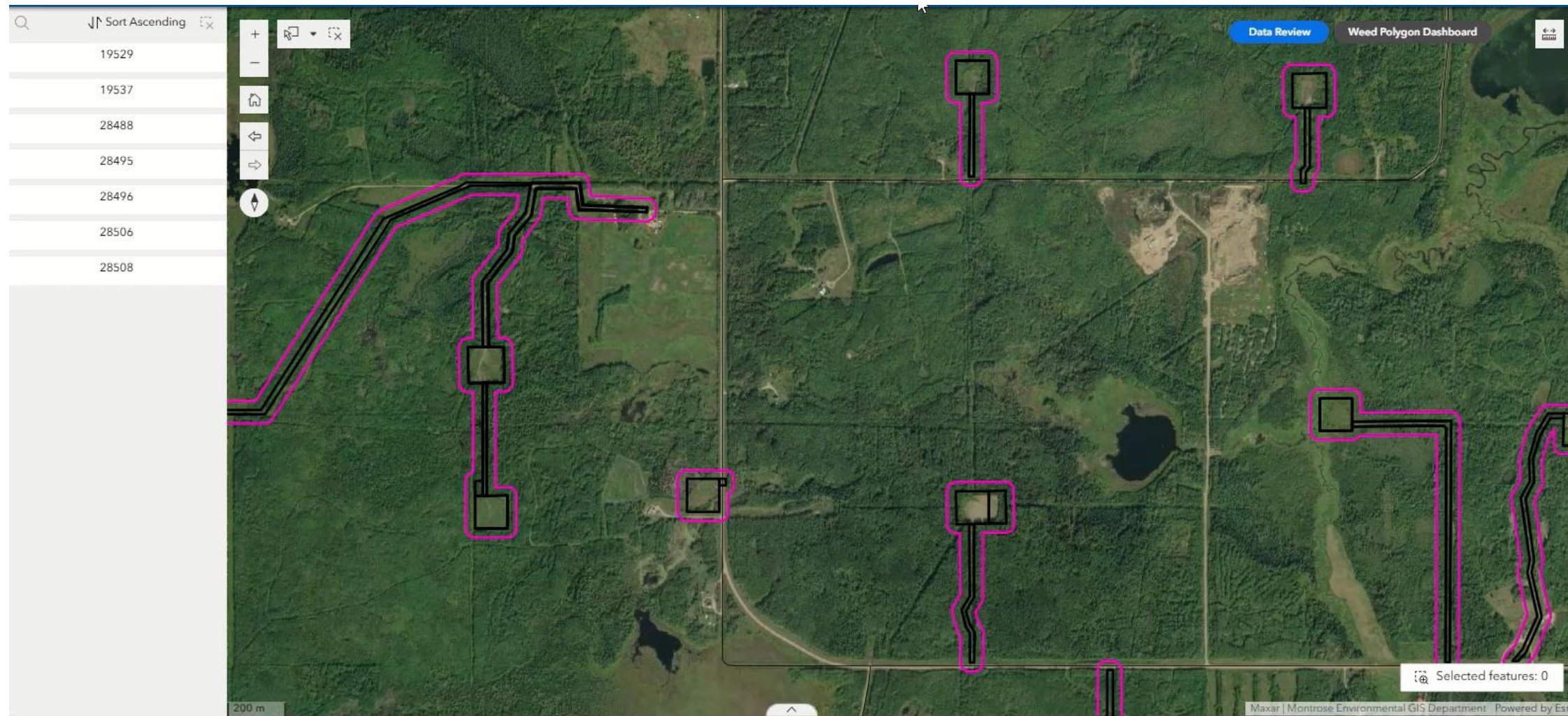
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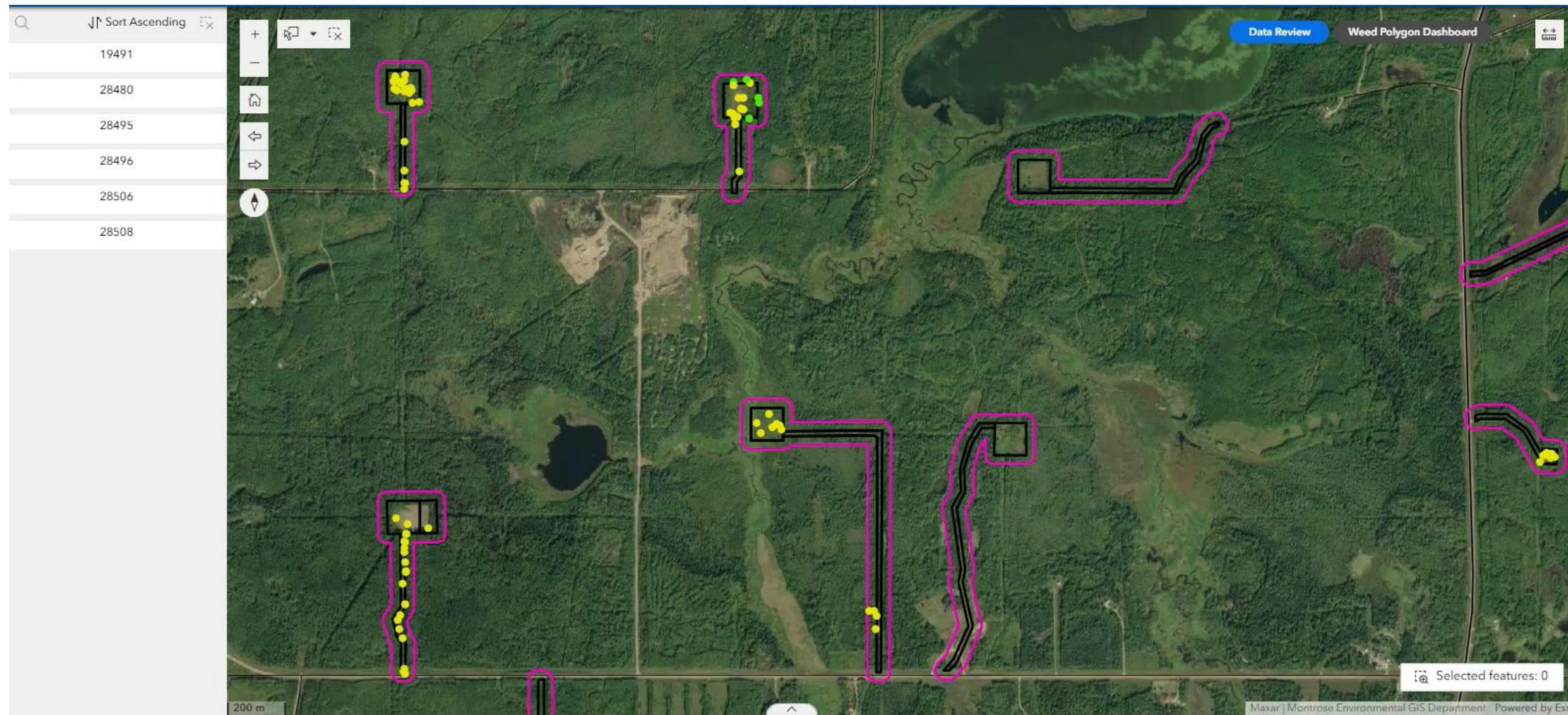
Observations Through Time



Tracking Progress (Sweep Requirements for Wildlife Act)



Attributes & Metadata



Photos & Attributes



2024-06-22

Primary weed species: 3% cover Perennial sow-thistle (73 sq m)

Secondary weed species: 0% cover (73 sq m)

Treated: Yes

Weed Control Method: Herbicide

Comment: Close to standing water, along tree line.



2024-08-07

Primary weed species: 1% cover Common nettle (261 sq m)

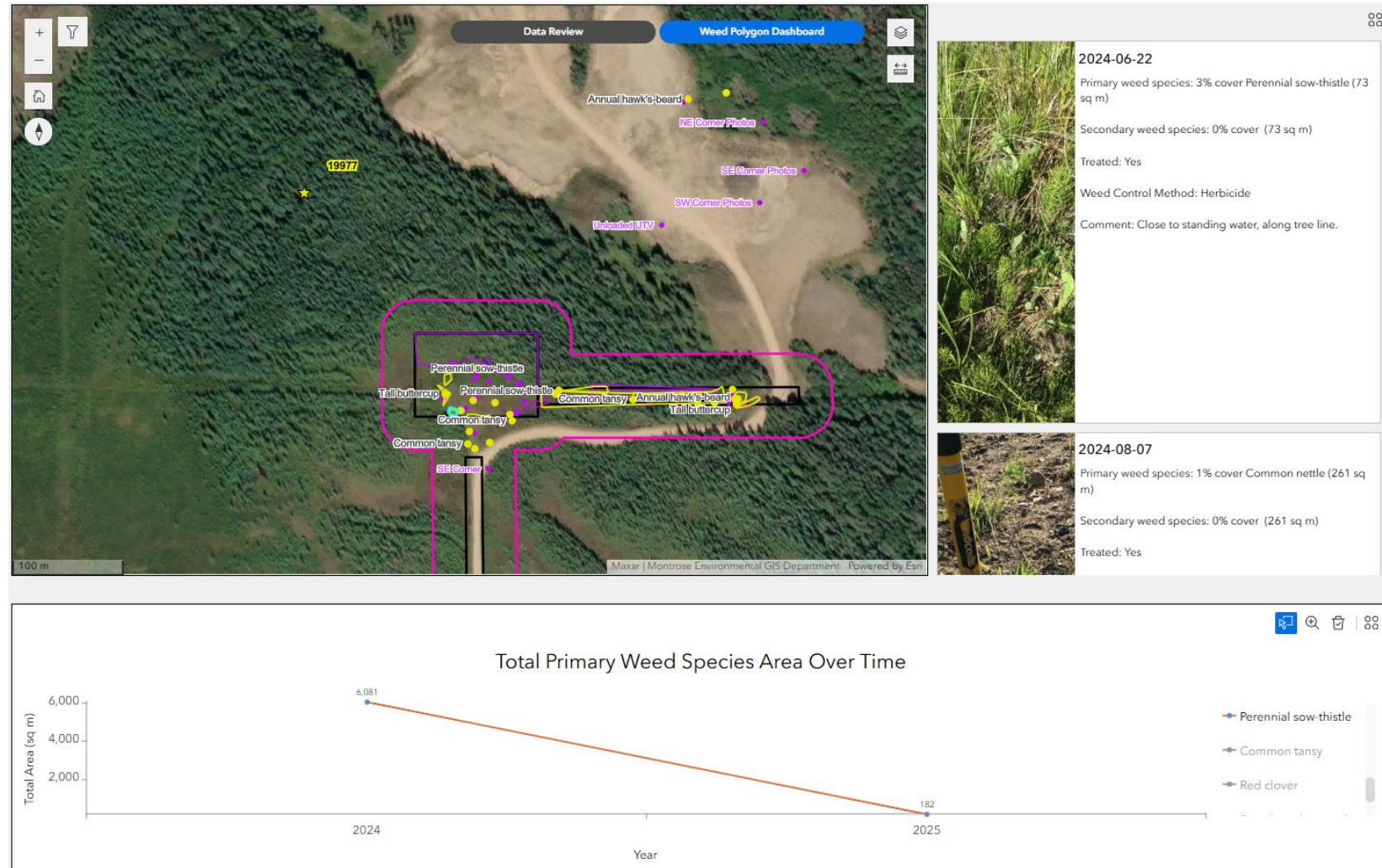
Secondary weed species: 0% cover (261 sq m)

Treated: Yes



Trends

- Primary Weeds = Dominant Weed Species
- Area over time
- Demonstrated decrease in area of perennial sow thistle over time

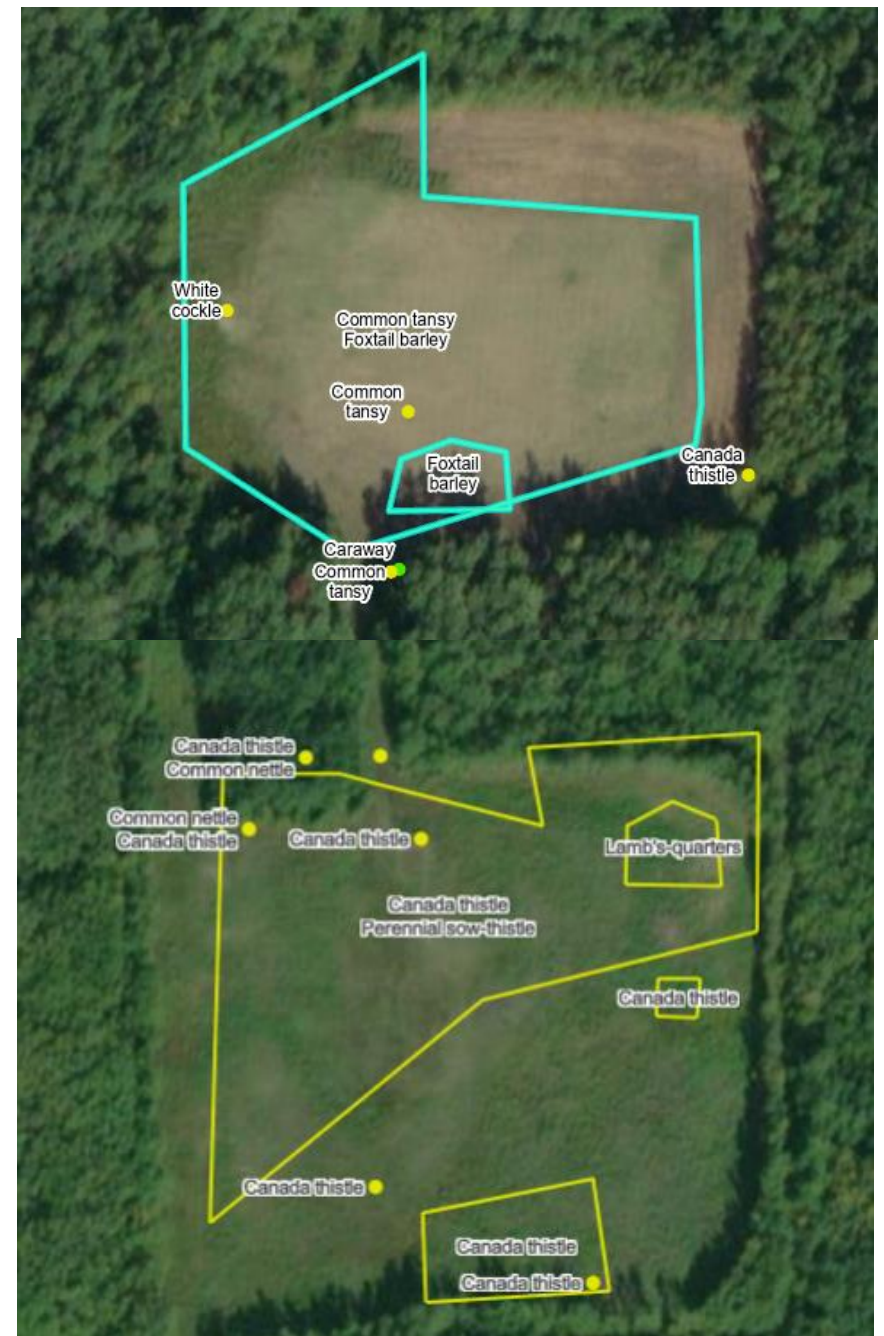


Where Do We Go From Here



Constraints and Suggestions

- Observing ≠ Quantifying
 - Observation-specific → Generalize to site-level
 - Points v. Polygons v. Site
- Further Attribute & Topological Constraints
- Consistent ‘observation’ locations and features
 - Establishing “stations”
- Self-serve Reports
- Backend Database Design To Accommodate
 - 1 → Many relationships
- Relatively “Free-form”



Self-Serve Reports

Construction and ESC Daily Inspection Log

INSPECTION INFO

Project Name:	
Site Code:	
Date	2024-08-29
Time of Arrival:	02:00 PM
Time of Departure:	02:30 PM
Inspector:	Mohamed Ali
Weather During Inspection:	Light rain
HAC Completed? :	Yes

SITE INFO

Project Type:	Pumping station
Site Area (Sq. m.):	25,778

EROSION SEDIMENT CONTROL INFO

Current Construction Activities:	Activities vary per site.
Working Area Soil Characteristics (Observed):	Varies, clays present
Waterbodies Close to Site	Yes
Distance from Working Area to Nearest Water Body:(m)	~200 North-East -
Rain Event?:	No
24 Hour Precipitation (mm):	n/a
Time Since Rainfall:	n/a
Is there active Construction?	Yes

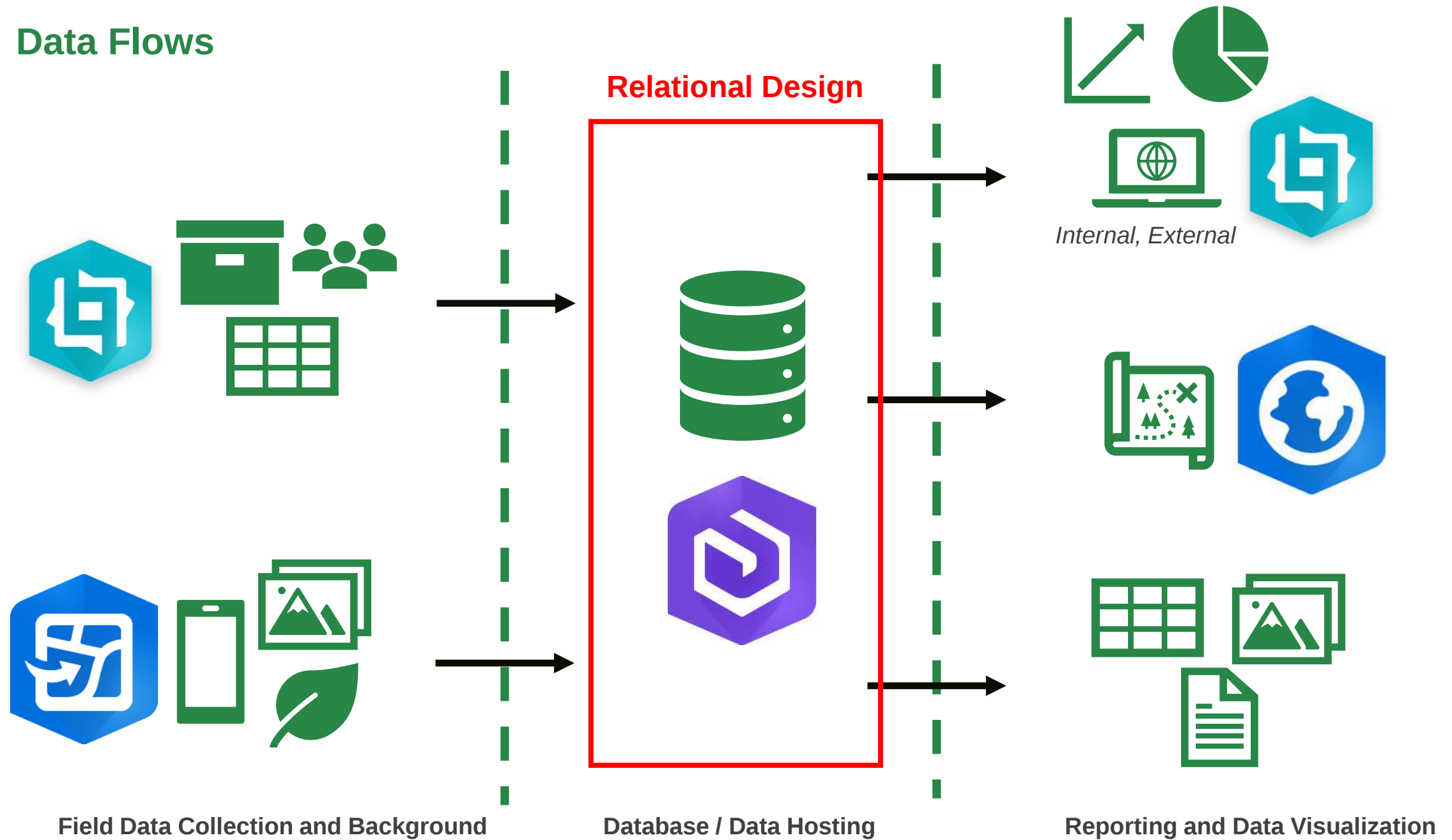
Feature Type	Date	Time	Comments	Status
ESC Barrier adjacent to CA regulated lands	2024-04-24	10:20	Degrading ESC measures along the east perimeter. The northern ESC measures are in more stable condition.	Action Required
ESC Barrier adjacent to CA regulated lands	2024-05-31	16:04	Perimeter ESC measures are aging, some isolated areas of damage.	Action Required
ESC Barrier adjacent to CA regulated lands	2024-06-28	14:40	Fence is present and functional, expected to be removed in near future.	No Issues Noted
ESC Barrier adjacent to CA regulated lands	2024-07-31	15:00	Site being decommissioned. Stockpile of granulars remain. Perimeter fence degrading but will not be required when final grading works	Not Applicable
ESC Barrier adjacent to CA regulated lands	2024-08-29	14:05	Topsoil placement as part of site decommissioning.	Not Applicable



Photo 3. August 29, 2024 - Topsoil temporary staging area



Data Flows



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Acknowledgements

- Thank you to my colleagues Cassandra McKenzie, Sheila Luther, and Sandy Lam for their project leadership, guidance, and technical contributions to this talk. This talk would not have been possible without their support.



Questions?



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