



Ecological Recovery Monitoring Program for Certified Reclaimed Sites in Alberta: Field Datasheets for Grassland Wellsites

By

InnoTech Alberta

ERMP Project Advisory Group

May 29, 2017

Ecological Recovery Monitoring Program Development Project

The Alberta Biodiversity Monitoring Institute contracted InnoTech Alberta in 2017 to develop the direction, framework and implementation plan for the Ecological Recovery Monitoring Program. The Project has been divided into a series of Tasks:

Task 1: Describe the Goals and Objectives for a Long-Term Monitoring Program in Alberta

Task 2: Develop a Science-Based, Practical Protocol for the Long-Term Monitoring Program

Task 3: Develop an Information Distribution Plan

Task 4: Develop an Implementation Plan for the Long-Term Monitoring Program

Project Team

The Project was led by InnoTech Alberta Reclamation Team staff (Small, C., and Powter, C.) with the advice and guidance from a Project Advisory Group (PAG). The PAG consisted of members from: Alberta Environment and Parks, ABMI, the University of Alberta, InnoTech Alberta, Canadian Forest Service, ATCO Electric, and several technical specialist consultants. PAG members included:

- Chris Powter – Enviro Q&A Services Inc.
- Christina Small – InnoTech Alberta
- Andrew Underwood – InnoTech Alberta
- Jim Schieck – InnoTech Alberta/Alberta Biodiversity Monitoring Institute (ABMI)
- Jim Herbers – Alberta Biodiversity Monitoring Institute (ABMI)
- Arnold Janz – Alberta Environment and Parks (AEP)
- Gordon Dinwoodie – Alberta Environment and Parks (AEP)
- John Begg - Alberta Environment and Parks (AEP)
- Anne McIntosh – University of Alberta
- Jeff Battigelli – University of Alberta
- Cindy Shaw – Canadian Forest Service
- Cindy Craig – ATCO Electric
- Ivan Whitson – I Whitson Innovations Inc.

Documents produced for each Task were developed as drafts by InnoTech Alberta and then discussed with the PAG in a workshop format to develop a consensus position on the key Program components. The final draft document of each Task informed development of the next Task document.

Report

This is one of three field datasheet reports, prepared under Task 2. The other datasheet reports support protocols for forested land and cultivated land.

This report may be cited as:

ERMP Project Advisory Group, 2017. Ecological Recovery Monitoring Program for Certified Reclaimed Sites in Alberta: Field Datasheets for Grassland Wellsites. 14 pp.

Table of Contents

1. Access Description	1
2. Site Coordinate Establishment – GPS Coordinates.....	3
3A. Site Level Human Disturbance (Within the 1 Ha): Wellsite	4
3B. Site Level Human Disturbance (Within the 1 Ha): Reference	5
4. Site Photos	6
5. 2-Dimensional Cover (5x5 m plot).....	7
6. Shrub and 2-D Cover: Shrub Species Cover 5x5m	8
7A. Plant and Lichen Cover by Species: Wellsite.....	9
7B. Plant and Lichen Cover by Species: Reference	10
8. Vascular Plant Search.....	11
9. Soil Bulk Density, EC, pH, SOC and TN samples.....	12

1. Access Description

Date: _____

Crew Member(s): _____

Maps Where
Access Is Recorded:

1:24,000	
1,62,500	
Other	

Establishment and
GPS Information:

Accuracy ²	
Declination ³	
Established ⁴	

Location of Site Centre:

Latitude ¹	
Longitude ¹	

Distance and Direction from Nearest Town:

Camp Location:

Time from Camp To Site:

Access Summary⁵:

Truck Access to Site

GPS Label at Start Point with Latitude & Longitude	Road Name & Type (Condition)	Distance and Direction to Site Centre or Next Waypoint

Quad Access to Site

GPS Label at Start Point with Latitude & Longitude	Trail Description	Distance and Direction to Site Centre or Next Waypoint

Walking Access to Site Centre and 4 Corners of the Wellsite

GPS Label at Start Point with Latitude & Longitude	Trail Description	Distance and Direction to Site Centre or Next Waypoint

- 1 – Record decimal degrees (5 decimals)
- 2 – Record GPS accuracy (in metres)
- 3 – Record declination used to establish site
- 4 – Check off when site is established or indicate in summary why site not established
- 5 – Describe in brief how to get to the site and any access challenges (boat required, river crossing, winch etc.)

2. Site Coordinate Establishment – GPS Coordinates

Site: _____

Date: _____

Data collected by _____

Description of weather (e.g., overcast, sunny, raining): _____

Which **wellsite** quadrant will include bryophyte/lichen plot?¹ _____

Which **reference** quadrant will include bryophyte/lichen plot? _____

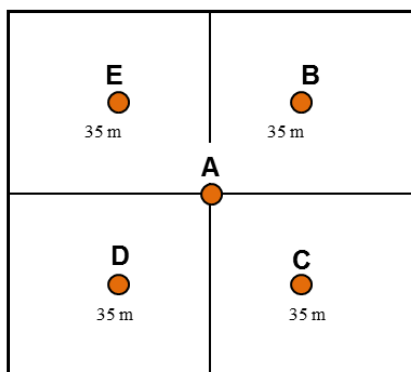
Location	UTM coordinates ¹		Bearing ²	Comments
	Easting ²	Northing ²	(0-359°)	
Wellsite Centre - A			n/a	
Well BORE			n/a	
B - Centre of B 10x10 m plot				
C - Centre of C 10x10 m plot				
D - Centre of D 10x10 m plot				
E - Centre of E 10x10 m plot				
F - Centre of F 10x10 m plot			n/a	
G - Centre of G 10x10 m plot			n/a	
H - Centre of H 10x10 m plot			n/a	
I - Centre of I 10x10 m plot			n/a	

1 – Record coordinates when measuring out the site on the ground. Mark a waypoint and record the UTMS for each of the 9 plot centres listed.

2 – Record the bearing on your compass standing at wellsite centre of each of the four corners of the wellsite and record those bearings. Those will be the bearings for the 4 transects running from the wellsite centre to the wellsite corners.

I 35 m
from
wellsite
edge

F 35 m
from
wellsite
edge



H 35 m
from
wellsite
edge

G 35 m
from
wellsite
edge

¹ Ideally select the quadrant that looks like it has more microhabitat for lichens and bryophytes – otherwise randomly select one of the four quadrants for both the wellsite (B-E), and reference areas (F-I).

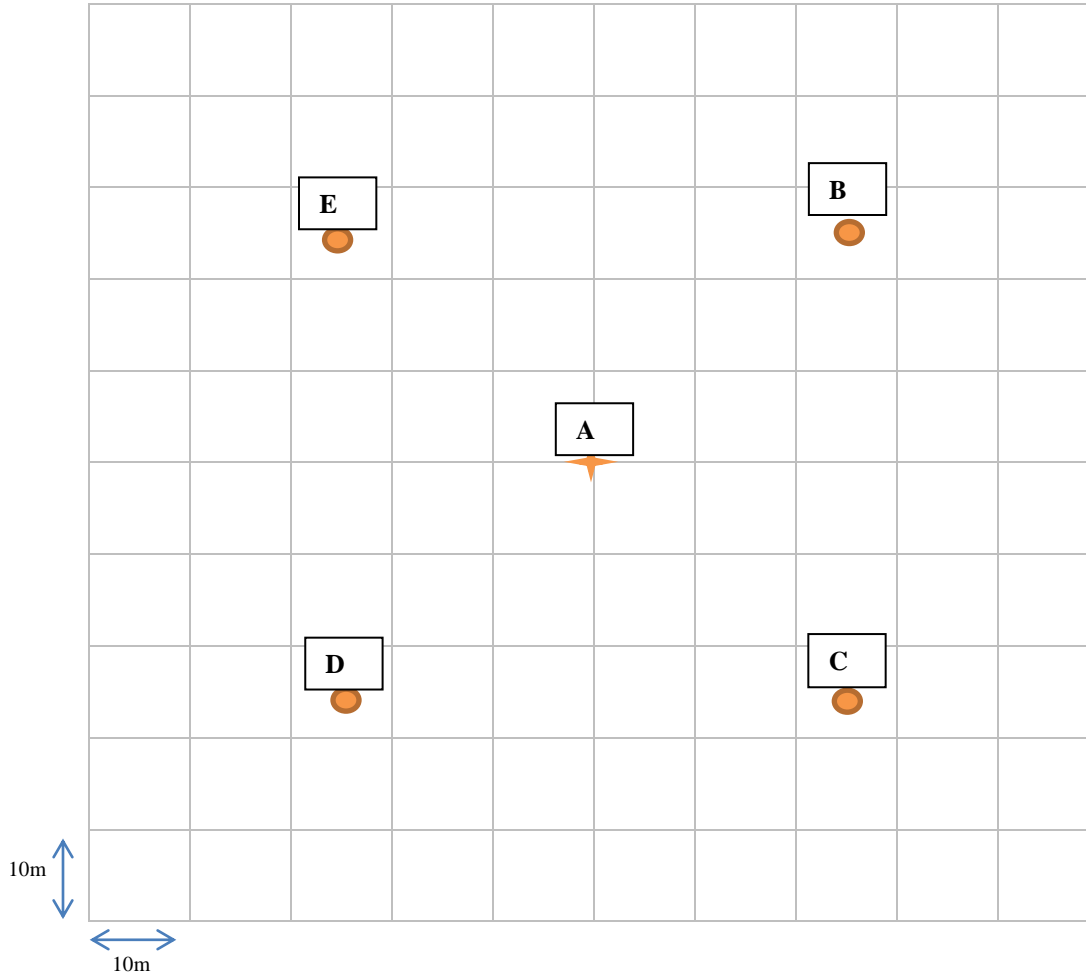
3A. Site Level Human Disturbance (Within the 1 Ha): Wellsite

Site: _____

Date: _____

Data collected by: _____

Place arrow point north on sheet to indicate direction of North



Human Disturbance Codes (in addition to the well pad disturbance which encompasses the entire wellsite):

None (**NONE**) – No human caused disturbance

Linear-pipeline (**PIPE**)

Linear-powerline (**POWER**)

Linear-seismic (**SEIS**) – Any type of cutline or seismic line

Railway (**RAIL**)

Road-paved (**ROADP**) – Any type of road with paved surface

Road-unpaved (**ROADG**) – Any type of road with an unpaved but improved surface (i.e. gravel)

Trail (**TRAIL**) – Any type of truck or ATV trail with an unimproved surface

Cultivated crop/field (**CULT**) – Any type of cultivated field that is used to grow agriculture crops

Pasture (**PAST**) – Any type of pasture (tame or native), grazing reserve, etc.

Residential (**RES**) – Any type of human dwelling, farm building, or farm yard in a rural or acreage setting

Bare ground – undetermined cause (**BARE**) – Human-caused bare ground for which the cause cannot be determined

Other (**OTHER**) – Specify other disturbance type

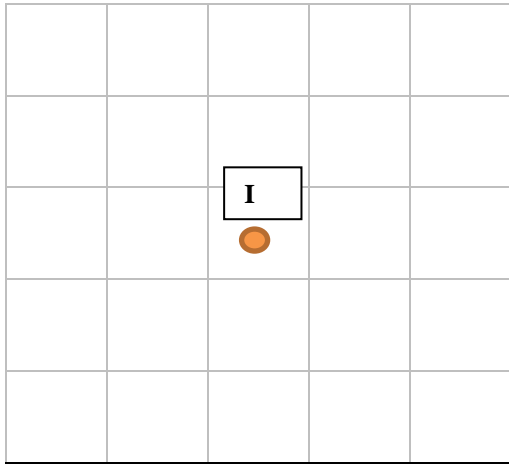
3B. Site Level Human Disturbance (Within the 1 Ha): Reference

Site: _____

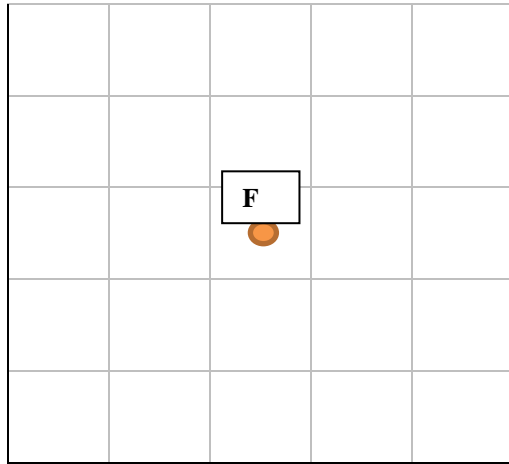
Date: _____

Data collected by: _____

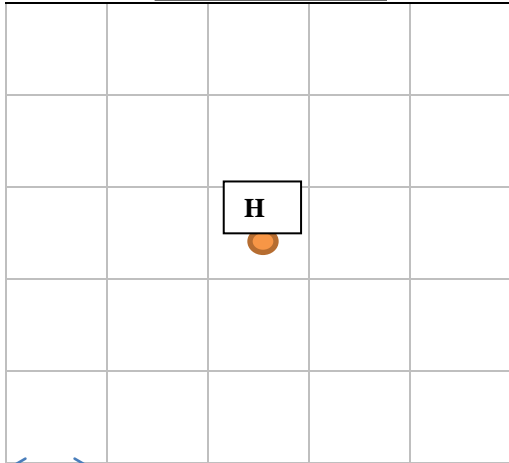
“I” Reference Quadrant



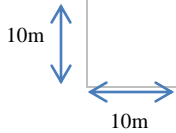
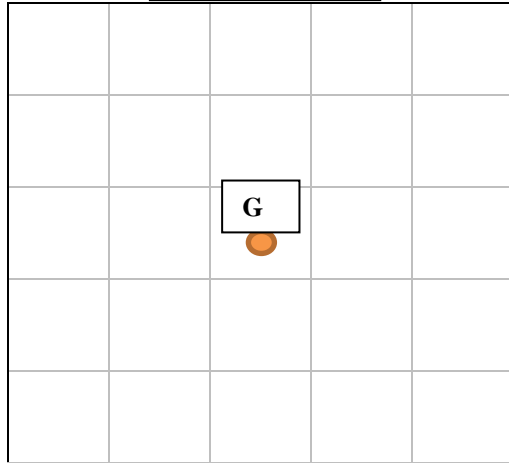
“F” Quadrant



“H” quadrant



“G” quadrant



* Each quadrant represents one of the reference areas – recognizing they are not contiguous in the field

Human Disturbance Codes:

None (**NONE**) – No human caused disturbance

Linear-powerline (**POWER**)

Bare ground – undetermined cause (**BARE**) – Human-caused bare ground for which the cause cannot be determined

Other (**OTHER**) – Specify other disturbance type

4. Site Photos

Site: _____

Date: _____

Data collected by: _____

Which reference quadrant was selected as most representative of reference condition? _____

	Oriented in Direction of 10x10 m plot centre			
Site Photographs ¹	B	C	D	E
Wellsite Quadrant Photographs (Record Photo #)				
Wellsite Representative Photograph (Record Photo #)				
	From middle of each reference quadrant, facing in a single direction:			
	F	G	H	I
Reference Site Quadrant Photographs (Record Photo #)				
Reference Site Representative Photograph (Record Photo #)				
Comments				

1 – Standing at the wellsite centre – one photo is taken in the direction of each sub-ordinal transect (i.e. towards wellsite corners) (total of 4 photographs), one representative site photo is taken from anywhere in the 1 ha wellsite area. For the reference area quadrant photos, photos are taken from the centre of the 10x10 m plot of one of the four quadrants that is selected as most representative of the reference condition, in each of four sub-ordinal directions. All photos are taken at eye level using a lens with a 35 mm focal length. Check the quality and focus of each photo and re-take if necessary.

5. 2-Dimensional Cover (5x5 m plot)

Site: _____

Date: _____

Data collected by: _____

Shrub Cover	A	B	C	D	E	F	G	H	I
Slope and Aspect ¹									
Total Shrub Cover 0.5-2m (%) ²									
Total Shrub Cover >2m (%) ³									
2-Dimensional Cover⁴									
Forbs/Herbs: Other Vascular Cover (%)									
Shrub Cover (<0.5 m) (%)									
Grass Cover (includes sedge/rush) (%)									
Moss Cover (%)									
Lichen Cover (%)									
Fungi Cover (%)									
Wood Cover (%) ⁵									
Litter Cover (%)									
Water Cover (%)									
Bare Mineral Ground Cover (%)									
Rock (%)									
Animal Matter (%)									
Comments									

1 – Record Slope (degree of slope) as: C= crest, T= toe, D= depression, L= level (0-2°), S1= 2-5°, S2= 6-10°, S3= 11-30°, S4= >30°. Record Aspect in degrees (direction water would flow).

2 – Cover estimates that would be obtained if a photograph had been taken from a height of 2 m, with shrubs <0.5 m tall removed. 0%, <1%, 5% increments.

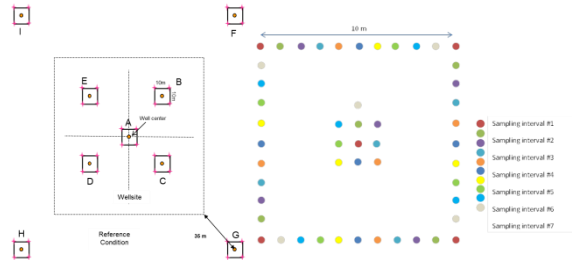
3 – Cover estimates that would be obtained if a photograph had been taken above all shrubs, with shrubs <2 m tall removed. 0%, <1%, 5% increments.

4 – Cover estimates (0, <1%, and 5% increments) obtained if a photograph had been taken from a height of 0.5 m; **estimates must sum to 100%**.

5 – Includes DWD >2 cm plus the bases of live trees.

9. Soil Bulk Density, EC, pH, SOC and TN samples

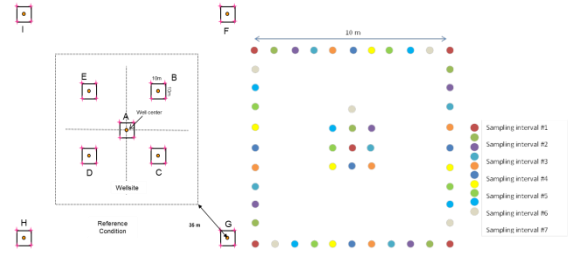
Site: _____
 Date: _____ Data collected by: _____
 Sheet 1 of 3



Sample ID	% elevation	Profile Depth (cm)		Comments/photo #'s
		Start	Finish	
W-A-1-0				
W-A-1-15				
W-A-1-30				
W-A-1-60				
W-A-2-0				
W-A-2-15				
W-A-3-0				
W-A-3-15				
W-A-4-0				
W-A-4-15				
W-A-5-0				
W-A-5-15				
W-B-1-0				
W-B-1-15				
W-B-1-30				
W-B-1-60				
W-B-2-0				
W-B-2-15				
W-B-3-0				
W-B-3-15				
W-B-4-0				
W-B-4-15				
W-B-5-0				
W-B-5-15				
W-C-1-0				
W-C-1-15				
W-C-1-30				
W-C-1-60				
W-C-2-0				
W-C-2-15				
W-C-3-0				
W-C-3-15				
W-C-4-0				
W-C-4-15				
W-C-5-0				
W-C-5-15				
W-D-1-0				
W-D-1-15				
W-D-1-30				
W-D-1-60				
W-D-2-0				
W-D-2-15				

9. Soil Sampling continued

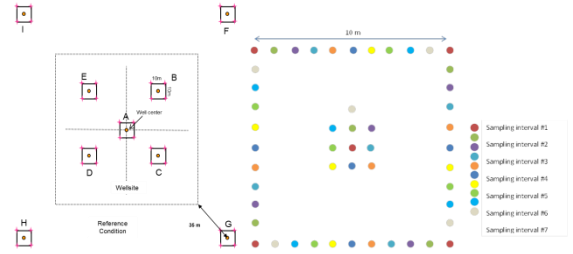
Site: _____
 Date: _____ Data collected by: _____
 Sheet 2 of 3



Sample ID	% elevation	Profile Depth (cm)		Comments/photo#'s
		Start	Finish	
W-D-3-0				
W-D-3-15				
W-D-4-0				
W-D-4-15				
W-D-5-0				
W-D-5-15				
W-E-1-0				
W-E-1-15				
W-E-1-30				
W-E-1-60				
W-E-2-0				
W-E-2-15				
W-E-3-0				
W-E-3-15				
W-E-4-0				
W-E-4-15				
W-E-5-0				
W-E-5-15				
R-F-1-0				
R-F-1-15				
R-F-1-30				
R-F-1-60				
R-F-2-0				
R-F-2-15				
R-F-3-0				
R-F-3-15				
R-F-4-0				
R-F-4-15				
R-F-5-0				
R-F-5-15				
R-G-1-0				
R-G-1-15				
R-G-1-30				
R-G-1-60				
R-G-2-0				
R-G-2-15				

9. Soil Sampling continued

Site: _____
 Date: _____ Data collected by: _____
 Sheet 3 of 3



Sample ID	% elevation	Profile Depth (cm)		Comments/photo#'s
		Start	Finish	
R-G-3-0				
R-G-3-15				
R-G-4-0				
R-G-4-15				
R-G-5-0				
R-G-5-15				
R-H-1-0				
R-H-1-15				
R-H-1-30				
R-H-1-60				
R-H-2-0				
R-H-2-15				
R-H-3-0				
R-H-3-15				
R-H-4-0				
R-H-4-15				
R-H-5-0				
R-H-5-15				
R-I-1-0				
R-I-1-15				
R-I-1-30				
R-I-1-60				
R-I-2-0				
R-I-2-15				
R-I-3-0				
R-I-3-15				
R-I-4-0				
R-I-4-15				
R-I-5-0				
R-I-5-15				