

Year 4 Monitoring Report

Bucky's Branch Mitigation Project

FINAL

DMS Project #: 100109 | Contract #: 7861

DWR # 2019-1404 | RFP: 16-007703

Randolph County, North Carolina

Cape Fear River Basin

Randleman Lake Watershed

HUC 03030003



Prepared By:



Resource Environmental Solutions, LLC
For Environmental Banc and Exchange, LLC

Prepared For:

NC Department of Environmental Quality
Division of Mitigation Services

January 2024



3600 Glenwood Ave, Suite 100
Raleigh, NC 27612

Corporate Headquarters
6575 West Loop South, Suite 300
Bellaire, TX 77401
Main: 713.520.5400

January 10, 2024

Jeremiah Dow
NC DEQ Division of Mitigation Services
217 West Jones Street
Raleigh, NC 27604

RE: Bucky's Branch Mitigation Site: Year 4 Draft Monitoring Report (NCDMS ID 100109)

Listed below are comments provided by DMS on November 21, 2023 regarding the Bucky's Branch Mitigation Site Draft Year 4 Monitoring Report and RES' responses.

1. Report states that multiflora rose was treated in 2022. Please confirm that no invasives were identified or treated in 2023.

No invasives have been identified or treated in 2023. A sentence was added in Section 1.4 stating this as well.

2. While DMS has not visited the site yet in 2023, please confirm that all corners have witness posts as required in RFP 16-007703 which states "The Vendor shall place a 6-foot tall durable witness post at each corner in the conservation easement boundary. Posts shall be made of material that will last a minimum of 20 years. The Vendor shall attach a conservation easement sign to each witness post..." Signage attached to the fence post at the corner is also acceptable, but the corner witness post must still be in place. We have observed at other fenced sites that corner witness posts were not installed inside the easement line.

Based on communication on December 8th, 2023, stating "I wanted to follow up on the comments I made regarding the corner monuments. I found an old email from Jeff Horton from 2020 that says the following:

"Anytime a treated wooden round post is located within 3 ft of the corner we appreciate the clean marking by using that same post. No need to add the extra marking. The requirement is to have a physical marking devise that can be used to help locate the in the ground monumentation. If the fence were located 10 ft away then we would absolutely require the corner to receive the extra above ground witness."

I'm confident that this guidance will be changing, but for your projects, the fence posts are probably sufficient based on what we have historically allowed. You can disregard the



comments discussing corner witness posts inside of fenced areas at Bohemian, Rhapsody, and Bucky's. Any comments regarding corner marking where there is no fencing will still apply." RES will disregard the above comment.

Table of Contents

1	Project Summary	1
1.1	Project Location and Description	1
1.2	Monitoring Protocol and Project Success Criteria.....	1
1.3	Project Components.....	3
1.4	Riparian Mitigation Approach.....	3
1.5	Construction and As-Built Conditions.....	3
1.6	Year 4 Monitoring Performance	3
2	Reference	4

Appendix A: Background Tables and Site Maps

- Table 1: Buffer Project Areas and Assets
- Table 2: Project Activity and Reporting History
- Table 3: Project Contacts Table
- Table 4: Project Background Information
- Figure 1: Site Location Map
- Figure 2: Current Conditions Plan View

Appendix B: Vegetation Assessment Data

- Table 5: Plant Species Summary
- Table 6: Vegetation Plot Mitigation Success Summary Table
- Table 7: Stem Count Total and Planted by Plot Species

Appendix C: Monitoring Photos

- Vegetation Monitoring Plot Photos
- General Monitoring Photos

Appendix D: Year 4 Vegetation Datasheets

- Year 4 Vegetation Datasheets

1 Project Summary

1.1 *Project Location and Description*

The Bucky's Branch Project is within the Randleman Lake Watershed of the Cape Fear River Basin within the 8-digit Hydrologic Unit Code (HUC) 03030003, 14-digit HUC 03030003010060 and DWR Subbasin Number 03-06-08.

The Project is located in Randolph County approximately 3 miles southeast of Glenola, North Carolina (**Figure 1**). To access the Project head east on Banner Whitehead Road from I-74 and turn left on Farlowe Davis Drive; the Project is approximately 0.25 miles north on the left. The coordinates are 35.859 °N and - 79.881 °W.

Environmental Banc & Exchange, LLC (EBX), a wholly owned subsidiary of Resource Environmental Solutions (RES), is pleased to provide this Monitoring Report for the Bucky's Branch Riparian Buffer Mitigation Project (Project) as a full-delivery buffer mitigation project for the Division of Mitigation Services (DMS) (DMS #100109). This Project provides riparian buffer mitigation credits for unavoidable impacts due to development within the Randleman Lake Watershed of the Cape Fear River Basin, United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC – 03030003) (**Figure 1**). The Project is in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 and the Randleman Lake Water Supply Watershed Buffer Rule 15A NCAC 02B .0250.

The conservation easement of the Bucky's Branch Project totals approximately 6.17 acres and includes one unnamed tributary that drains into Randleman Lake approximately 0.75 miles downstream of the Project. Land use within the Project is primarily non-forested pasture and grazed riparian forest. The Project area has been used extensively for agricultural purposes for over 70 years. The lack of forested riparian buffer, long-term presence of livestock, and past land management actions are all contributing water quality stressors and have led to the loss of bank stabilizing vegetation.

The goal of the Project is to restore and enhance ecological function to the existing stream and riparian area by establishing appropriate plant communities while minimizing temporal and land disturbing impacts. Restoration of a native hardwood forest to the riparian buffer and surrounding areas and the removal of livestock aid in filtering runoff from agricultural fields, thereby reducing nutrient and sediment loads to Project channels and the overall watershed. Restoration and enhancement of the Randleman Lake riparian buffer and surrounding area (as defined in 15A NCAC 02B .0250) results in a reduction of the water quality stressors that affected the Project: livestock access and a lack of vegetated riparian buffer. Immediate water quality benefits and pollutant removal within the vicinity of the Project include the exclusion of livestock access to streams and reduction in nutrient loads from agricultural land-uses. This Project is consistent with the management strategy for maintaining and protecting riparian areas in the Randleman Lake watershed. Project attributes are summarized in **Table 1**.

1.2 *Monitoring Protocol and Project Success Criteria*

Annual vegetation monitoring and visual assessments will be conducted. Riparian vegetation monitoring is based on the "Carolina Vegetation Survey-Ecosystem Enhancement Program Protocol for Recording Vegetation: Level 2 Plot Sampling Only Version 4.2". Monitoring plots were installed a minimum of 100 meters squared in size and cover at least two percent of the planted mitigation area. These plots were

randomly placed throughout the planted riparian buffer mitigation area (4.83 acres) and are representative of the riparian restoration and enhancement areas where applicable (i.e. when enhancement credit is being generated from supplemental planting under 15A NCAC 02B .0295 (n)). The following data is recorded for all trees in the plots: species, height, planting date (or volunteer), and grid location. All stems in plots are flagged with flagging tape. Data is processed using the CVS data entry tool. In the field, the four corners of each plot were permanently marked with PVC at the origin and metal conduit at the other corners. Photos of each plot are to be taken from the origin each monitoring year. There are four fixed vegetation monitoring plots (**Figure 2**).

Photos are to be taken at all vegetation plot origins each monitoring year and be provided in the annual reports. Visual inspections and photos will be taken to ensure that enhancement areas are being maintained and compliant. The measures of vegetative success for the Project are the survival of at least four native hardwood tree species, where no one species is greater than 50 percent of stems, at a density of at least 260 stems per acre at the end of Year 5. Native volunteer species may be included to meet the performance standards as determined by NC Division of Water Resources (DWR).

A visual assessment of the conservation easement is also performed each year to confirm:

- Fencing is in good condition throughout the site;
- No livestock access within the conservation easement area;
- No encroachment has occurred;
- No invasive species in areas where invasive species were treated,
- Diffuse flow is being maintained in the conservation easement areas; and
- There has not been any cutting, clearing, filling, grading, or similar activities that would negatively affect the functioning of the buffer.

Component/ Feature	Monitoring	Maintenance through project close-out
Vegetation	Annual vegetation monitoring	Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be treated by mechanical and/or chemical methods. Any vegetation requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations. Vegetation maintenance activities will be documented and reported in annual monitoring reports. Vegetation maintenance will continue through the monitoring period.
Invasive and Nuisance Vegetation	Visual Assessment	Invasive and noxious species will be monitored and treated so that none become dominant or alter the desired community structure of the Project. Locations of invasive and nuisance vegetation will be mapped.
Project Boundary	Visual Assessment	Project boundaries were identified in the field to ensure clear distinction between the mitigation project and adjacent properties. Boundaries shall be marked with signs identifying the property as a mitigation project and will include the name of the long-term steward and a contact number. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by Project conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis. Easement monitoring and staking/ signage maintenance will continue in perpetuity as a stewardship activity.
Livestock Fencing	Visual Assessment	Livestock fencing was placed outside the easement limits. Maintenance of fencing is the responsibility of the landowner.

1.3 Project Components

This Project generates 183,312.294 riparian buffer mitigation credits within a 6.17-acre conservation easement. These are derived from buffer restoration and buffer enhancement. The riparian buffer mitigation credits generated service Randleman Lake buffer impacts within the Randleman Lake Watershed. The total mitigation credits that the Bucky's Branch Mitigation Project generate are summarized below and a more detailed table is in **Appendix A**.

Mitigation Totals	Used Area Square Feet	Credits
Restoration	210,571	161,815.794
Enhancement via Cattle Exclusion	42,993	21,496.500
Total Riparian Buffer	253,564	183,312.294

1.4 Riparian Mitigation Approach

Restoration activities included planting a composition of native bare-root tree species based on reference reach data and excluding livestock from the stream and buffer area. The restoration of plant communities within the Project not only provide stabilization and improve water quality within the easement limits but also provide ecological benefits to the entire watershed.

Enhancement occurred in forested areas within the Project, along BY1, where grazing occurred adjacent to the stream in accordance with the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (o)(6) (**Figure 2**). All livestock was removed from the easement and the fence was installed to exclude access to riparian areas and their associated streams.

1.5 Construction and As-Built Conditions

Revegetation of the Site included treating invasive species and planting native hardwood bare root trees. Prior to planting, RES prepped the site by spraying and ripping the easement. Piedmont Alluvial Forest is the target community type for the riparian restoration areas. The community is defined by Schafale (2012). The planting of bare root trees occurred in May 2020. Deviations from the initial planting plan were due to bare root availability. A list of the planted species can be found in **Table 2**. Additionally, a temporary and permanent seed mixture was applied in areas where cattle caused bare areas. The mixture included black-eyed susan (*Rudbeckia hirta*) which is a perennial, pollinator species.

1.6 Year 4 Monitoring Performance

Monitoring of the four permanent vegetation plots completed on November 1st, 2023. Vegetation tables are in **Appendix B**, associated photos are in **Appendix C**, and individual tree heights are in **Appendix D**. Year 4 monitoring data indicates that all plots are exceeding the success criteria of 260 planted stems per acre. Planted stem densities ranged from 324 to 607 planted stems per acre with a mean of 455 planted stems per acre across all plots. A total of 15 native species were documented within the plots. Volunteer species were noted during Year 4 monitoring, averaging 283 stems per acre, and are expected to increase in upcoming years. The average tree height observed was 3.6 feet.

Visual assessment of vegetation outside of the monitoring plots indicates that the herbaceous vegetation is becoming well established throughout the project. Multiflora rose (*Rosa multiflora*), was treated via foliar

spray in August 2022. However, no invasive species were identified or treated in 2023 but RES will continue to monitor and treat as necessary. A small portion of the fence was fixed in November of 2022 from a tree falling on the fence, associated photos of this repair can be found in **Appendix C**. Another portion of the fence has damage to the top section of the fence and will be fixed as soon as possible. The area of damage can be found in **Figure 2** and photos of the damage can be found in **Appendix C**. The fence is overall in good condition and therefore has maintained cattle exclusion. Additionally, there were no signs of encroachment or concentrated flow in the easement area.

2 Reference

Lee Michael T., Peet Robert K., Roberts Steven D., and Wentworth Thomas R., 2008. *CVS-EEP Protocol for Recording Vegetation Level*. Version 4.2

NC Environmental Management Commission. 2010. Rule 15A NCAC 02B .0250 - Randleman Lake Water Supply Watershed: Protection and Maintenance of Existing Riparian Buffers.

NC Environmental Management Commission. 2014. Rule 15A NCAC 02B.0295 - Mitigation Program Requirements for the Protection and Maintenance of Riparian Buffers.

Resource Environmental Solutions, LLC (2020). Bucky's Branch Mitigation Project – Final Mitigation Plan.

Schafale, M.P. 2012. Classification of the Natural Communities of North Carolina, Fourth Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, NCDENR, Raleigh, NC.

Appendix A

Project Background Tables and Site Maps

Table 1. Buffer Project Areas and Assets

Credit Type	Location	Subject?	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Creditable Area (sf)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
Buffer	Rural	Yes	I / P	Restoration	0-100	BY1	137,802	137,802	1	100%	1	137,802.000
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	0-100	BY1	42,993	42,993	2	100%	2	21,496.500
Buffer	Rural	Yes	I / P	Restoration	101-200	BY1	72,769	72,769	1	33%	3.0303	24,013.794
Total								253,564				183,312.294

**Table 2. Project Activity and Reporting History
Bucky's Branch Site**

**Elapsed Time Since planting complete: 3 Yr., 6 Mo.
Number of reporting Years¹: 4**

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Restoration Plan	NA	Jan-20
Final Design – Construction Plans	NA	NA
Stream Construction	NA	NA
Site Planting	NA	May-20
As-built (Year 0 Monitoring – baseline)	May-20	May-20
Year 1 Monitoring	Nov-20	Dec-20
Supplemental Bareroot Planting	NA	Jan-21
Year 2 Monitoring	Nov-21	Nov-21
Invasive Species Treatment	NA	Aug-22
Year 3 Monitoring	Oct-22	Nov-22
Year 4 Monitoring	Nov-23	Nov-23
Year 5 Monitoring		

¹ = The number of reports or data points produced excluding the baseline

**Table 3. Project Contacts Table
Bucky's Branch Site**

Planting Contractor	H&J Forestry
Planting contractor POC	Matt Hitch
Nursery Stock Suppliers	Arborgen
Monitoring Performers	RES / 3600 Glenwood Ave, Suite 100, Raleigh, NC 27612
Monitoring POC	Hannah Gadai (704) 516-5170

Table 4. Project Background Information			
Project Name		Bucky's Branch	
County		Randolph	
Project Area (acres)		6.17	
Project Coordinates (latitude and longitude)		Latitude: 35.859 N Longitude: -79.881 W	
Planted Acreage (Acres of Woody Stems Planted)		4.83	
Project Watershed Summary Information			
Physiographic Province		Southern Outer Piedmont	
River Basin		Cape Fear	
USGS Hydrologic Unit 8-digit	03030003	USGS Hydrologic Unit 14-digit	03030003010060
DWR Sub-basin		03-06-08	

Vegetation Condition Assessment

Invasive Species

		Target Community		
		Present	Marginal	Absent
Absent	No Fill			
	Present			



Legend

- Conservation Easement
- Stream Top of Bank
- Vegetation Plot**
- >260 stems/acre
- Buffer Mitigation**
- Restoration, 0-100
- Restoration, 101-200
- Enhancement, 0-100
- X-X-X Broken Fence 2023
- X-X-X Fence Repair 2022

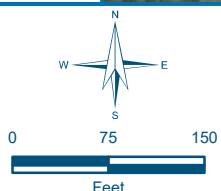
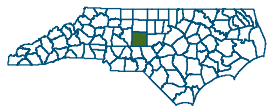


Figure 2 - Current Conditions Plan View

**Bucky's Branch Mitigation Site
MY4 2023**

Randolph County, North Carolina

Date: 11/15/2023
Drawn by: HG
Checked by: JM
1 inch = 150 feet



Document Path: R:\ResGIS\Projects\GIS\01730_Bucky's Branch\MY4_2023\Figure 2_CCPV_MY4_Bucky's Branch.mxd

Appendix B

Vegetation Assessment Data

Table 5. Bucky's Branch Planted Species Summary

Common Name	Scientific Name	Total Stems Planted
Sycamore	<i>Platanus occidentalis</i>	1,000
Tulip Poplar	<i>Liriodendron tulipifera</i>	900
Willow Oak	<i>Quercus phellos</i>	900
Green Ash	<i>Fraxinus pennsylvanica</i>	700
Northern Red Oak	<i>Quercus rubra</i>	600
River Birch	<i>Betula nigra</i>	500
White Oak	<i>Quercus alba</i>	500
Water Oak	<i>Quercus nigra</i>	500
Eastern Redbud	<i>Cercis canadensis</i>	400
Black Walnut	<i>Juglans nigra</i>	400
Southern Crabapple	<i>Malus angustifolia</i>	400
Persimmon	<i>Diospyros virginiana</i>	200
American Plum	<i>Prunus americana</i>	100
Elderberry	<i>Sambucus canadensis</i>	100
Total		7,200

Table 6. Bucky's Branch Vegetation Plot Mitigation Success Summary

Plot #	Planted Stems/Acre	Volunteer Stems/Acre	Total Stems/Acre	Success Criteria Met?	Average Planted Stem Height (ft)
1	445	647	1093	Yes	2.9
2	324	40	364	Yes	2.3
3	607	202	809	Yes	4.9
4	405	243	647	Yes	3.7
Project Avg	445	283	728	Yes	3.6

Table 7. Bucky's Branch Stem Count Total and Planted by Plot Species

Scientific Name	Common Name	Species Type	Current Plot Data (MY4 2023)												Annual Means														
			100109-01-0001			100109-01-0002			100109-01-0003			100109-01-0004			MY4 (2023)			MY3 (2022)			MY2 (2021)			MY1 (2020)			MY0 (2020)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree												6			6						1						
Acer nigrum	black maple	Tree									2						2												
Acer rubrum	red maple	Tree									2						2												
Betula nigra	river birch	Tree	3	3	3										3	3	3	3	3	3	4	4	4	4	4	4	13	13	13
Celtis laevigata	sugarberry	Tree										4	4	4	4	4	4	4	4	4	5	5	5	6	6	6			
Cercis canadensis	eastern redbud	Tree				2	2	2							2	2	2	2	2	2	3	3	3	4	4	4	5	5	5
Diospyros virginiana	common persimmon	Tree							3	3	4	1	1	1	4	4	5	4	4	4	3	3	3	3	3	3	7	7	7
Fraxinus pennsylvanica	green ash	Tree	3	3	19	1	1	2							4	4	21	4	4	16	2	2	17	1	1	6	1	1	1
Juglans nigra	black walnut	Tree										2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	3	3	3
Liriodendron tulipifera	tuliptree	Tree				1	1	1							1	1	1	1	1	1	2	2	2	3	3	3	5	5	5
Malus angustifolia	southern crabapple	Tree	1	1	1	2	2	2							3	3	3	3	3	3	3	3	3	5	5	5	11	11	11
Platanus occidentalis	American sycamore	Tree							6	6	6	2	2	2	8	8	8	8	8	8	6	6	6	7	7	7	6	6	6
Prunus americana	American plum	Tree																			1	1	1				7	7	7
Quercus alba	white oak	Tree	1	1	1	1	1	1							2	2	2	3	3	3	3	3	3	3	3	3	4	4	4
Quercus nigra	water oak	Tree																									7	7	7
Quercus phellos	willow oak	Tree	2	2	2				6	6	6	1	1	1	9	9	9	9	9	9	8	8	8	12	12	12	30	30	30
Quercus rubra	northern red oak	Tree	1	1	1	1	1	1							2	2	2	3	3	3	4	4	4	5	5	5	5	5	5
Sambucus canadensis	Common Elderberry	Shrub																									3	3	3
Stem count			11	11	27	8	8	9	15	15	20	10	10	16	44	44	72	45	45	57	45	45	61	54	54	59	107	107	107
size (ares)			1			1			1			1			4			4			4			4			4		
size (ACRES)			0.02			0.02			0.02			0.02			0.10			0.10			0.10			0.10			0.10		
Species count			6	6	6	6	6	6	3	3	5	5	5	6	12	12	15	12	12	12	13	13	14	12	12	12	14	14	14
Stems per ACRE			445	445	1093	324	324	364	607	607	809	405	405	647	445	445	728	455	455	577	455	455	617	546	546	597	1083	1083	1083

Appendix C

Monitoring Photos

Bucky's Branch Vegetation Monitoring Plot Photos MY4



Vegetation Plot 1 (11/01/2023)



Vegetation Plot 2 (11/01/2023)



Vegetation Plot 3 (11/01/2023)



Vegetation Plot 4 (11/01/2023)

Bucky's Branch General Monitoring Photos MY4



Fence repair (11/11/2022)



Fence Damage (11/01/2023)

Appendix D

Year 4 Vegetation

Datasheets

BUCKYS

Plot (continued): 100109-01-0001					Oct 2022 Data			THIS YEAR'S DATA								
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Notes*	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Vegetation Monitoring Data (VMD) Datasheet

Please fill in any missing data and correct any errors.

Plot 100109-01-0001		Party:		Role:		Date last planted:	
VMD Year (1-5): <input type="text" value="4"/>	Date: <input type="text" value="/ / - / /"/>	<input type="checkbox"/> Check box if plot was not sampled, specify reason below <div style="border: 1px solid black; height: 50px; width: 100%;"></div>		<div style="border: 1px solid black; height: 100px; width: 100%;"></div>		New planting date m/yy? <input type="text" value="/ /"/>	
Taxonomic Standard:							
Taxonomic Standard DATE:							
Latitude or UTM-N: (dec. deg. or m)	Datum: <input type="text" value="NAD83/WGS84"/>						
Longitude or UTM-E:	UTM Zone: <input type="text" value=""/>						
Coordinate Accuracy (m): <input type="text" value="10"/>	X-Axis bearing (deg): <input type="text" value="210"/>						
Plot Dimensions: X: <input type="text" value="10"/> Y: <input type="text" value="10"/>		<input type="checkbox"/> Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)					

Plot (continued): 100109-01-0001					Oct 2022 Data			THIS YEAR'S DATA						
ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Height 1cm*	DBH 1 cm	Notes*	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
1	Betula nigra	a	R	0.4	0.3	50.0			50		<input type="checkbox"/>	1		
5	Quercus phellos	i	R	6.5	0.2	69.0			75		<input type="checkbox"/>	3		
7	Fraxinus pennsylvanica	l	R	8.0	2.6	70.0			80		<input type="checkbox"/>	3		
8	Quercus alba	i	R	6.4	2.6	40.0			40		<input type="checkbox"/>	3		
10	Malus angustifolia	e	R	3.1	2.9	35.0			500		<input type="checkbox"/>	3		
11	Quercus rubra	c	R	1.6	3.1	108.0	DBH?	<input type="checkbox"/>	110		<input type="checkbox"/>	3		
15	Betula nigra	h	R	5.3	5.5	80.0			82		<input type="checkbox"/>	3		
16	Betula nigra	k	R	6.8	5.3	100.0			100		<input type="checkbox"/>	3		
22	Quercus phellos	d	R	2.7	8.6	70.0			70		<input type="checkbox"/>	3		
23	Quercus phellos	b	R	1.0	8.8	45.0			MISSING		<input type="checkbox"/>			
435	Fraxinus pennsylvanica	g	U	4.9	2.2	90.0			90	1	<input type="checkbox"/>	3		
436	Fraxinus pennsylvanica	f	U	3.5	3.0	153.0	0.2	<input type="checkbox"/>	80	.6	<input type="checkbox"/>	3		

stems: 12 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 1
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown
 ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EPP Entry Tool ver. 2.3.1

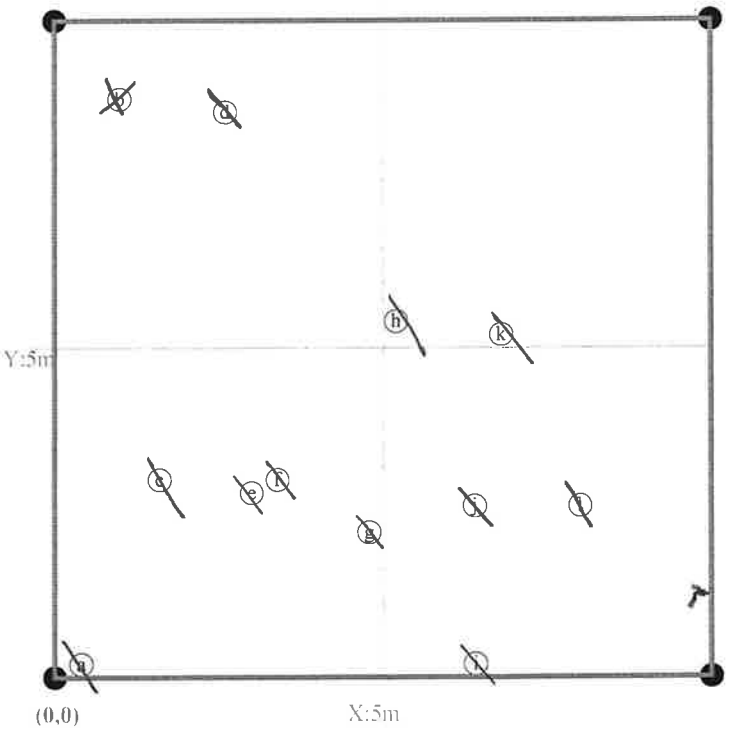
Plot (continued): 100109-01-0001				Oct 2022 Data			Notes*	THIS YEAR'S DATA							
ID	Species	map char	source (m)	X (m)	Y (m)	ddh (mm)		Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*

Natural Woody Stems - tallied by species										Explanation of cut-off & subsampling**
Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.):										<input type="checkbox"/> 10cm <input type="checkbox"/> 50cm <input type="checkbox"/> 100cm <input type="checkbox"/> 137cm
Species Name	Sub-Seed	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH			TREES — DBH		
		10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-	5-	=10 (write DBH)
frpe	—	4	5	6	—					
	—				—					
	—				—					
	—				—					
	—				—					
	—				—					
	—				—					
	—				—					
	—				—					
	—				—					

**Required if cut-off >10cm or subsample ? 100%. ●1 ●2 ●3 ●4 ●5 ●6 ●7 ●8 ●9 ●10 Form WS2, ver 9.1

Map of stems on plot 100109-01-0001

X-axis: 210° # stems: 12
map size: small



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubing, R=bare Root, M=Mechanically, U=Unknown p. 2
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-EEP Entry Tool ver. 2.3.1

Vegetation Monitoring Data (VMD) Datasheet

Please fill in any missing data and correct any errors.

Plot 100109-01-0002

VMD Year (1-5): Date:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec. deg. or m)

Longitude or UTM-E:

Coordinate Accuracy (m):

Plot Dimensions: X: Y:

Datum: NAD83/WGS84
UTM Zone:
X-Axis bearing (deg):

Party:
Role:

Date last planted:
New planting date m/yy?

Check box if plot was not

Notes: sampled, specify reason below

Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Oct 2022 Data		Notes*	THIS YEAR'S DATA					
						Height 1cm*	DBH 1 cm		Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
98	Liriodendron tulipifera	(a)	R	0.3	0.4	57.0			57		<input type="checkbox"/>	3		
99	Prunus americana	(c)	R	3.3	0.3	Missing			DEAD		<input type="checkbox"/>			
100	Quercus rubra	(b)	R	2.6	1.1	50.0			50		<input type="checkbox"/>	1		
108	Malus angustifolia	(d)	R	4.6	4.3	70.0			70		<input type="checkbox"/>	3		
110	Malus angustifolia	(f)	R	6.1	1.5	58.0			58		<input type="checkbox"/>	3		
111	Quercus alba	(h)	R	7.0	0.4	112.0	DBH?	<input type="checkbox"/>	112		<input type="checkbox"/>	3		
114	Cercis canadensis	(j)	R	8.2	2.9	55.0			40		<input checked="" type="checkbox"/>	3		
115	Fraxinus pennsylvanica	(i)	R	7.5	3.2	102.0	DBH?	<input type="checkbox"/>	108		<input type="checkbox"/>	3		
116	Cercis canadensis	(g)	R	6.2	6.9	Missing			DEAD		<input type="checkbox"/>			
117	Cercis canadensis	(e)	R	5.6	8.1	25.0			60		<input type="checkbox"/>	7		

stems: 10 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Natural Woody Stems - tallied by species										
Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): <input type="checkbox"/> 10cm <input type="checkbox"/> 50cm <input type="checkbox"/> 100cm <input type="checkbox"/> 137cm										
Species Name	Sub-Seed	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH			TREES — DBH		
		10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-	5-	=10 (write DBH)
trp										

**Required if cut-off >10cm or subsample ? 100%. Form WS2, ver 9.1

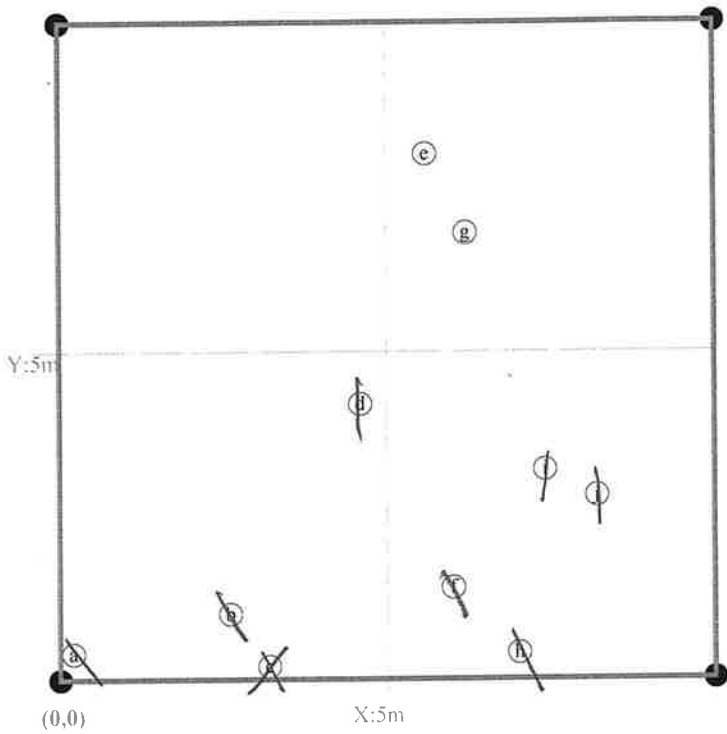
*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSeCTS, GAME, LIVESTock, Other/Unknown
 ANIMAl, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Map of stems on plot 100109-01-0002

X-axis: 125°



stems: 10
map size:
small



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

p. 4

*VIGOR: 4=excellent, 3=good, 2=fair,
1=unlikely to survive year, 0=dead,
M=missing.

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown
ANIMAl, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE
Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS-EEP Entry Tool ver. 2.3.1

Vegetation Monitoring Data (VMD) Datasheet

Please fill in any missing data and correct any errors.

Plot **100109-01-0003**

VMD Year (1-5): **4** Date: **11/1/23**

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N:

Longitude or UTM-E:

Coordinate Accuracy (m):

Datum: **NAD83/W**
 UTM Zone: **330**
 X-Axis bearing (deg): **330**

Party: **HG JS**
 Role:

Date last planted:
 New planting date m/yy? **1**
 Check box if plot was not sampled, specify reason below

Notes:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Oct 2022 Data		Notes*	THIS YEAR'S DATA					
						Height 1cm*	DBH 1 cm		Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
66	Diospyros virginiana	(i)	R	5.1	2.5	112.0	DBH?		135			3		
68	Diospyros virginiana	(e)	R	2.6	5.0	145.0	0.2		205	.4		3		
69	Quercus rubra	(a)	R	0.6	6.7	Missing			DEAD					
70	Platanus occidentalis	(b)	R	1.0	8.1	150.0	0.6		205	.7		3		
71	Platanus occidentalis	(c)	R	2.1	7.4	200.0	1.1		220	1.2		1		
73	Quercus phellos	(k)	R	5.5	3.6	Missing			45					
75	Quercus phellos	(q)	R	8.7	1.4	65.0			81					
82	Quercus rubra	(j)	R	5.2	5.9	Missing			DEAD					
85	Quercus phellos	(f)	R	3.7	9.2	60.0			63			3		
87	Quercus alba ph	(l)	R	5.7	7.0	45.0			45			1		
89	Quercus phellos	(o)	R	8.0	4.5	73.0			73					
92	Platanus occidentalis	(p)	R	8.3	6.8	190.0	0.6		310	1.5				
93	Quercus phellos	(n)	R	7.7	7.9	80.0			105					
94	Platanus occidentalis	(m)	R	7.4	9.3	135.0	DBH?		220	.4				
257	Platanus occidentalis	(h)	R	4.5	1.8	185.0	0.4		205	.5				
438	Diospyros virginiana	(g)	U	4.1	3.5	102.0	DBH?		115					
439	Platanus occidentalis	(d)	U	2.2	4.7	140.0	0.2		210	.4				

stems: 17

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown
 ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNOwn, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot (continued): 100109-01-0003

Oct 2022 Data

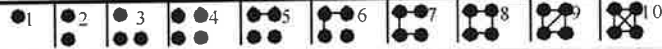
THIS YEAR'S DATA

ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Notes*	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
----	---------	----------	--------	-------	-------	----------	-------------	----------	--------	----------	-------------	----------	-----------	--------	---------	-------

Natural Woody Stems - tallied by species																	
Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): <input type="checkbox"/> 10cm <input type="checkbox"/> 50cm <input type="checkbox"/> 100cm <input type="checkbox"/> 137cm																	
Species Name	Sub-Seed	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH			TREES — DBH									
		10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-	5-	=10 (write DBH)							
Divi				1													
ackv			1														
acni		1															

Explanation of cut-off & subsampling**

**Required if cut-off >10cm or subsample ? 100%.

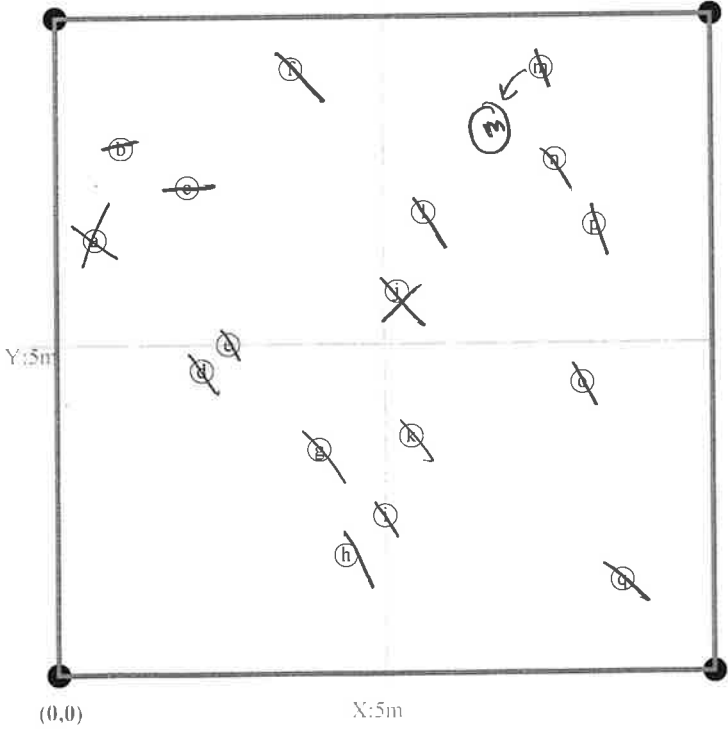


Form WS2, ver 9.1

Map of stems on plot 100109-01-0003

X-axis: 330°

stems: 17
map size: small



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubing, R=bare Root, M=Mechanically, U=Unknown
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.
 *DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INsects, GAME, LIVESTock, Other/Unknown
 ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNOwn, specify other.
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Vegetation Monitoring Data (VMD) Datasheet

Please fill in any missing data and correct any errors.

Plot **100109-01-0004**

VMD Year (1-5): Date: -

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec deg. or m)

Longitude or UTM-E:

Coordinate Accuracy (m):

Plot Dimensions: X: Y:

Datum:

UTM Zone:

X-Axis bearing (deg):

Party:	Role:

Date last planted:

New planting date m/yy?

Check box if plot was not sampled, specify reason below

Notes:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Oct 2022 Data		Notes*	THIS YEAR'S DATA					
						Height 1cm*	DBH 1 cm		Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
119	Juglans nigra	(b)	R	0.4	0.2	81.0			115			3		
121	Linodendron tulipifera	(c)	R	2.6	2.3	Missing			Dead					
126	Quercus rubra	(i)	R	6.6	2.1	45.0			Missing					
132	Quercus phellos	(a)	R	0.2	8.2	83.0			130			3		
134	Celtis laevigata	(d)	R	3.0	8.8	63.0			71			3		
135	Celtis laevigata JUNI	(e)	R	4.6	7.8	Missing			80			3		
136	Celtis laevigata	(g)	R	5.6	7.3	Missing			Dead					
137	Celtis laevigata	(h)	R	6.5	6.2	110.0	DBH?		110			3		
138	Celtis laevigata	(j)	R	7.5	5.3	60.0			65			3		
140	Celtis laevigata	(l)	R	9.4	2.9	67.0			70			3		
141	Platanus occidentalis	(m)	R	9.4	6.9	121.0	DBH?		174	.2		3		
144	Platanus occidentalis	(f)	R	4.6	9.2	80.0			120			3		
146	Quercus phellos	(k)	R	9.2	7.6	46.0			Missing					
263	Diospyros virginiana	(n)	R	9.6	5.0	150.0	0.2		195	.4		3		

stems: 14 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown
 *VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing
 *HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.
 *DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown
 ANIMAl, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

Plot (continued): 100109-01-0004				Oct 2022 Data			Notes*	THIS YEAR'S DATA							
ID	Species	map char	source (m)	X (m)	Y (m)	ddh (mm)		Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*

Natural Woody Stems - tallied by species										
Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): <input type="checkbox"/> 10cm <input type="checkbox"/> 50cm <input type="checkbox"/> 100cm <input type="checkbox"/> 137cm										
Species Name	Sub-Seed	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH			TREES — DBH		
		10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-	5-	=10 (write DBH)
<i>Box Elder</i>										


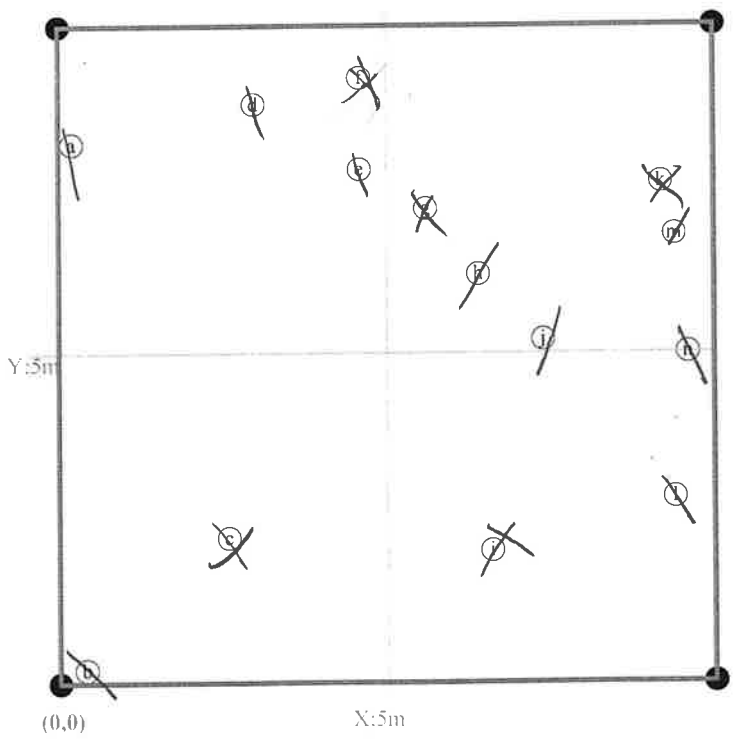
**Required if cut-off >10cm or subsample > 100%.

●1 ●2 ●3 ●4 ●5 ●6 ●7 ●8 ●9 ●10 Form WS2, ver 9.1

Map of stems on plot 100109-01-0004

X-axis: 340°

stems: 14
map size: small

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing

*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

p. 8

Printed in the CVS-EFP Entry Tool ver. 2.3.1