October 2017

Fulton Grove Community Park Retention Area Overview

Submitted to:

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1 INTRODUCTION

The land owned by 6165347 Manitoba Inc. and 7138793 Manitoba Ltd. within the Parker Lands Major Redevelopment Site is slated to undergo development of the property into a transit-oriented residential community development project (TOD) known as Fulton Grove.

A +/- 4-acre portion of aspen/oak vegetation is being considered to be maintained and integrated into the residential neighborhood as a community park greenspace. Several possible locations and polygon configurations of the remnant aspen/oak vegetation are options for this community park greenspace.

The determination of the best possible location and polygon configuration for the community park greenspace is based on a variety of factors. An aspect of consideration for the potential location of the community park greenspace, is the vegetation characteristics and the intended community park greenspace use.

As such, the current trail network and elevation associated with the various potential community park greenspace polygon options is presented. This includes an assessment of the present vegetation characteristics based on approximate tree age and greenspace polygon biodiversity, as well as an investigation of the presence of native species, invasive/non-native species, and noxious weed species.

Based on the Fulton Grove transit-oriented residential community development project planned within the Project Footprint Area and the likely intended use of the community park greenspace, forthcoming elevation variations and human impact within and around the retained greenspace are considered. These impeding dynamics are likely to translate into shifts in greenspace vegetation characteristics.

2 PROJECT FOOTPRINT AREA

The 6165347 Manitoba Inc. and 7138793 Manitoba Ltd. Fulton Grove development property located within the Parker Lands Major Re-Development site covers an area approximately 19.22 ha in size **(Appendix 1, Map 1)**. Prior to clearing activities, the Project Footprint Area **(Appendix 1, Map 1)** was comprised of 10.39 hectares of aspen/oak habitat, 3.44 hectares of grasslands, and 5.40 hectares of wetland habitats (EcoLogic, 2016). The Project Footprint Area is located within an urban matrix, situated: to the south of the CN railroad line that runs parallel to Taylor Avenue; to the east of the Winnipeg Humane Society property; and to the north of the future City of Winnipeg Bus Rapid Transit Corridor and existing Manitoba Hydro transmission line corridor. Construction activities are currently underway on the lands adjacent to the Project Footprint Area. The construction related activities include those associated with the City of Winnipeg Southwest Rapid Transit Corridor Project (Stage 2), the Parker Storm Retention Basin,

as well as the Waverley Underpass Project. In July and following in September 2017, portions of the Project Footprint Area were cleared with ongoing grading occurring in late October and November, 2017.

3 GREENSPACE CLASSIFICATION

In 2005, the City of Winnipeg surveyors ranked a portion of Project Footprint Area, aspen/oak vegetation as “A” grade quality, based on criteria used by the City of Winnipeg for the Ecologically Significant Natural Lands Strategy & Policy grading system (City of Winnipeg, 2007). The Grade “A” ranking of the aspen/oak habitat (**Appendix 1, Map 2**) remained categorized as such until 2015. In December of 2015, the City of Winnipeg provided the developer with a refinement of the total Grade A aspen/oak area with a tapered delineation of preferred aspen/oak habitat for potential retention within the Project Footprint Area (**Appendix 1, Map 2**).

In December of 2016 the City of Winnipeg provided the developer with a 1 to 10 grading system for parts of the Grade A aspen/oak forest, refining areas they classified as key habitats with their higher preference for community park greenspace retention. Delineated polygons allocated a 10 rank by the City of Winnipeg, represented the polygons considered to be of highest vegetation quality and highest preference for retention versus polygons ranked with 1, which were considered to be of the lowest vegetation quality and the lowest preference rank for greenspace retention (**Appendix 1, Map 2**). Based on these polygon rankings, the City of Winnipeg provided two possible overall +/- 4-acre areas of their highest preference for community park greenspace retention within the Project Footprint Area (**Appendix 1, Map 2**).

In May of 2017 (after the developers DASZ pre-application submission), the City of Winnipeg supplied the developer with another set of options (n=2) for preference for community park greenspace retention areas. The May 2017 polygons represented an overall area greater than the +/- 4 acres in order to offer the developer some leeway for the final community park greenspace retention area location. The City of Winnipeg May 2017 preference polygons did not directly align with the City of Winnipeg December 2016 1 to 10 grading system.

Based on the transit-oriented residential community development plans, the developer allocated and provided two preference areas for the community park greenspace area of which, the City of Winnipeg May 2017 preferred greenspace retention polygons did overlap in the southernmost option with the developers preferred community park greenspace location (**Appendix 1, Map 2**).

4 VEGETATION CHARACTERIZATION

Potential community park greenspace retention polygon areas were used for the vegetation characterization conducted on October 11 and 12, 2017. Each of the potential community park greenspace polygons is allocated a name identification for the vegetation characterization work (ranging from polygon A through polygon H). Based on the City of Winnipeg 1-10 ranking system, only polygons at either end of the 1-10 classification spectrum (polygons named 1, 2, 8, 9 and 10)

were assessed. **Table 1, Appendix 1, Map 3** represent the potential community park greenspace polygon name identification as well as the overall polygon size.

Table 1: Greenspace Polygon Name Identification and Size

Polygon Name Identification	Area (m²)
A	2187.94
B	3383.27
C	4014.87
D	2638.93
E	2316.03
F	5057
G	2629.85
H	2737.52

4.1 Trail Network

The Project Footprint Area has been heavily used by humans in the past with a matrix of human and dog walking trails that exist throughout the Project Footprint Area. Trails act as transportation networks for people and pets, as well as transportation vectors for invading plant species (Tyser & Worley 1992). As such, recreation trails, while offering human recreational enjoyment opportunities, also have the potential to significantly alter local vegetation and soil properties, and act as efficient networks for the introduction of exotic species into previously native vegetation areas (Adkison & Jackson 1996).

During the baseline environmental surveys conducted in June 2016, biologists walked existing trails throughout the Project Footprint Area, tracking their path on hand-held GPS units. Based on the path tracking data that were generated during field work in combination with publicly available trail data that was derived from satellite imagery, the trails within the Project Footprint Area were digitized and categorized. The trails were categorized into three categories: small trails (width of 0.75 m); medium trails (width of 1.5 m); and large trails (width of 3.0 m). To validate these categorizations of trail width, these trail widths were verified during the June 2016 field work with measurements taken to ensure width representations for each trail category were accurate (Ecologic, 2016).

In October 2017, each of the trail networks were spatially clipped in ArcGIS 10.3 to the potential community park greenspace polygons (**Appendix 1, Map 3**), to identify the amount of current trail within each potential greenspace polygon (**Table 2, Appendix 1, Map 4**).

Given the significant degree of past human influence along these trails, invasive and weedy species encroachment was favored, resulting in invasive species and non-native weed expansion along trail edges. The degree of spread of weedy and invasive species associated with each trail category were measured and quantified and also clipped to each potential greenspace polygon. The degree of weedy and invasive species encroachment on small trails was determined to be 0.5 m (for a total width of trail plus weedy buffer of 1.25 m); on medium trails was determined to be 1.0 m (for a total width of trail plus weedy buffer of 2.50 m); and on large trails was determined to be 2.0 m (for a total width of trail plus weedy buffer of 5.0 m).

Based on these quantifications, the total proportion of each potential greenspace polygon comprised of trail network and weedy and invasive species encroachment was calculated (**Table 2, Appendix 1, Map 4**).

Table 2: Amount of Footprint within each Potential Greenspace Polygon Lost to Trail Network and Weedy/Invasive Species Encroachment

Site	Area (m²)	Area of Trails (m²)	Proportion of Trails in Greenspace Polygon (%)	Area of Trails and Encroachment Area (m²)	Proportion of Trails and Encroachment (%)
A	2187.94	43.79	2.00%	72.94	3.33%
B	3383.27	171.18	5.06%	268.66	7.94%
C	4014.87	239.69	5.97%	409.41	10.20%
D	2638.93	27.02	1.02%	45.02	1.71%
E	2316.03	139.04	6.00%	263.37	11.37%
F	5057	334.47	6.61%	520.77	10.30%
G	2629.85	391.76	14.90%	594.18	22.59%
H	2737.52	81.79	2.99%	135.62	4.95%

The greenspace polygons currently with the highest percentage of trail network and invasive/weedy species encroachment are G, E, F, and C respectively. Each of these noted polygons represents an area of over 10.2% of the total potential greenspace polygon footprint lost to trail and the invasive/weedy encroachment associated with the trail network.

5 ELEVATION

The landscape grading of the Regional Parker Lands Major Redevelopment Area, including the CN railway, the commercial development of lands to the west, and the grading of the hydro corridor to the south, has resulted in water runoff from neighboring properties draining onto the Project Footprint Area resulting in standing/pooling water over large portions of the site. Some portions of the Project Footprint Area have more standing water than other portions, depending on the existing elevation. Over time, areas characterized by long-term standing water and/or

saturated soils yield shifts in vegetation species diversity favoring species that can tolerate saturated soils e.g. common buckthorn (*Rhamnus cathartica*) and deterring species requiring drier soils e.g. bur oak, (*Quercus macrocarpa)*.

AutoCAD files provided by the developer in March 2017 included elevation points for areas within and surrounding the potential greenspace polygons. Using the "create TIN" tool within the ArcGIS, a Triangular Irregular Network (TIN) was created using the elevation point data provided. The elevation points within the Project Footprint Area were used to create the TIN, visually displays the difference in elevation for each potential greenspace polygons, by creating a network of triangles between the neighboring elevation points. The triangles were merged generating polygons of similar elevation. The analysis results in a series of polygons representing the elevation for a given area, displayed using a self-determined color ramp (**Appendix 1, Map 5**). **Table 3, Appendix 1, Map 5** represent the elevation range for each potential greenspace polygon.

Table 3: Elevation Range of each Potential Greenspace Polygon

Site	Min elevation (m)	Min elevation (feet)	Max elevation (m)	Max elevation (feet)	Average elevation (m)	Average elevation (feet)
A	232.54	762.72	232.68	763.17	232.6	762.93
B	232.31	761.98	232.57	762.84	232.39	762.23
C	232.31	761.98	232.57	762.84	232.39	762.23
D	232.75	763.42	232.99	764.2	232.86	763.77
E	232.47	762.51	232.77	763.47	232.62	762.98
F	232.47	762.51	232.85	763.74	232.69	763.23
G	232.39	762.23	232.79	763.54	232.63	763.03
H	232.63	763.02	233.16	764.75	232.91	763.93

The potential community park greenspace polygons with the highest current elevation are polygons H, D, F, and G respectively. These polygons have been subject to less long-term water pooling and ground saturation in comparison to polygons characterized by lower elevation. Polygons with the current lowest elevation are C, B, and A. As a result of the Regional Parker Land Major Re-Development Area past drainage regimes, site areas characterized by lower elevation have been notably subject to vegetation diversity shifts, favoring species best able to tolerate saturated soils (e.g. common buckthorn).

6 FIELD SURVEY

6.1 Survey Methods

Field vegetation characterizations were undertaken to compare tree approximate age, the presence of native species, invasive/non-native species, and noxious weed species within the potential community park greenspace polygons. Adopting the survey methodologies of Redburn and Strong (2008), tree species and ages, shrub understory, and herb cover (where possible given survey seasonal timing) were recorded along transects. Given the survey seasonal timing occurring late within the growing season, determination of tree canopy % cover, shrub % cover and identification of complete ground herb layers were not possible.

For each of the potential community park greenspace polygons assessed, the centroid location of each polygon was determined using ArcGIS 10.3 (**Appendix 1, Map 6**). The centroid locations for each potential community park greenspace polygon were loaded into hand-held GPS units and were located during field work (**Appendix 1, Map 6**). From the centroid location within each potential community park greenspace polygon, a transect of 15 m was surveyed on either side of the centroid for a total transect length of 30m. Once at the potential community park greenspace polygon centroid, a straight line transect was laid using a 30 m measuring tape. Transect locations and azimuths were recorded.

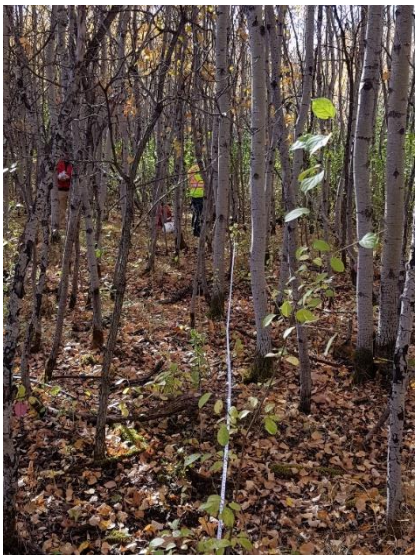
At each 5 m interval along the transect tape a 2.5 m x 2.5 m quadrat was used to identify shrubs 1 to 2 m tall (Redburn & Strong, 2008). The occurrence of native species and invasive/non-native plant species were noted where visible along the transect. No attempt was made to quantify herb species as many were senescent due to the change of season.

Further, for each 30 m transect, a second sample plot area was generated measuring 30 m (the full length of the transect) x 20 m wide rectangular sample plot. Within this larger sample plot trees > 2.5 m tall were identified and dominant and sub-dominant species were measured for diameter and age (where growth rings can be measured). Within the 30 m x 20 m sample plot, the largest tree of each tree species was measured for diameter as well as assessed for approximate age by collecting a sample using an increment borer (**Photograph 1**) and counting tree growth rings (Redburn & Strong, 2008). For consistency, the left side of each polygon transect was used for the 30 m x 20 m tree sampling plot (Redburn & Strong, 2008). Along each 30 m transect, a total of five shrub/understory survey quadrats and one tree sample plot were characterized (**Appendix 1, Map 7**).

Photo 1: (UTM Y 5523408.6 UTM X 631481.8) Example of the increment borer used to collect core sample for counting tree growth rings October 11, 2017

All data gathered along each transect were recorded on data sheets and later transferred into a database for analysis. **Appendix 2** provides an example of a completed field data sheet.

Photos 2, 3, 4: Example of transects used to collect shrub and understory vegeation within each potential greenspace polygon October 11, 2017



6.2 Survey Results

Within each potential community park greenspace polygon, a 30 m transect was used. **Table 4** provides the transect location and azimuth used within each potential community park greenspace polygon characterization.

Table 4: Transect location and Azimuth used for each Potential Greenspace Polygon Characterization

Site	Transect Azimuth (degrees)	Date Sampled
A	20	11-Oct
B	282	11-Oct
C	360	11-Oct
D	20	11-Oct
E	250	11-Oct
F	107	11-Oct
G	248	11-Oct
H	326	11-Oct

Appendix 1, Map 8 presents the locations of the sampled aspen and oak trees within each potential community park greenspace polygon option.

Based on all of the data collected, a master database was developed. These data are provided in **Appendix 3. Appendix 3** presents the native species, invasive and exotic species, the largest tree sampled age and diameter of the largest tree at breast height. A summary of these data is provided in **Table 5.**

Table 5: Summary of Data from each Potential Greenspace Polygon Characterized

Category of Assessment	A	B	C	D	E	F	G	H
Number of Native Species	6	3	1	5	6	6	6	7
Number of Invasive/Exotic Species	2	1	1	0	0	2	1	0
ASPEN - DBH (cm)	15	15	31	28	31	12	24	12
ASPEN - Age (years)	36	24	50	49	47	37	36	27
OAK - DBH (cm)				13		29	26	18
OAK - Age (years)				32		82	78	66
Total Polygon Area (m2)	2188	3383	4015	2639	2316	5057	2630	2738
Area of Trails (m2)	44	171	240	27	139	334	392	82

Proportion of Trails (%)	2	5	6	1	6	7	15	3
Area of Trails & Encroachment Area (m2)	73	269	409	45	263	521	594	136
Proportion of Trails and Encroachment (%)	3	8	10	2	11	10	23	5
Min elevation (m)	233	232	232	233	232	232	232	233
Min elevation (feet)	763	762	762	763	763	763	762	763
Max elevation (m)	233	233	233	233	233	233	233	233
Max elevation (feet)	763	763	763	764	763	764	764	765
Average elevation (m)	233	232	232	233	233	233	233	233
Average elevation (feet)	763	762	762	764	763	763	763	764

One invasive species, common buckthorn, a species able to tolerate saturated soils, was present in several of the potential community park greenspace polygons characterized, and most predominately present in A, F, C, B. **Photograph 5** illustrates common buckthorn identified in polygon option B. Common buckthorn leaves come out early in spring and remain on the plant until late fall which shades out most native plants resulting in common buckthorn becoming the dominant vegetation species in areas where it presides (Tree Canada, 2017). Common buckthorn fruits, leaves, and bark are cathartic (purging) to most animals but birds eat them readily. Birds are largely responsible for the spread of common buckthorn since the seeds within the fruit pass through the bird without damage (Tree Canada, 2017).

In all polygons, trembling aspen *(Populus tremuloides*) was the dominant tree species. In several polygons, bur oak was present, most notably present in polygon options H, G, and F. Only in polygon option C was there the presence of young ash (*Fraxinus pennsylvanica*) trees (**Photograph 6**).

Photo 5: (UTM Y 5523458.7 UTM X 631512.3) Example of Common Buckthorn presence in potential greenspace polygon B on October 11, 2017

Photo 6: (UTM Y 5523499.9 UTM X 631361.7) Example of young Ash presence in potential greenspace polygon C on October 11, 2017

7 COMMUNITY PARK GREENSPACE OUTLOOK

Given the potential development of the Fulton Grove transit-oriented residential community, the site will be dominated by human land uses and human activity. The Fulton Grove community park greenspace will support human walking, dog walking, and potentially house a children's playground. The development of the Project Footprint Area in conjunction with adjacent construction and property development, variations in site elevation are anticipated. In light of these dynamics, shifts in current greenspace vegetation characteristics are anticipated to occur over time.

7.1 Greenspace Future Use & Vegetation Characteristics

Currently, aspen is the dominant tree species in all community park greenspace polygon options. The oldest aspen trees are located in polygons in the southern portion of the Project Footprint Area and the older oak are located in the northern portion of the Project Footprint Area. In several of the community park greenspace polygon options, common buckthorn presides. Only in one polygon, community park greenspace polygon option B was there the presence of young ash trees, a third tree species noted over and beyond aspen and oak. Polygons with higher elevation currently house more oak.

Past use of the Project Footprint Area as a recreational space for human and dog walking activities has led to the introduction of invasive/non-native vegetation species and bolstered their spread within the forested area of the site, reducing overall ecological integrity. Regardless of the community park greenspace location and polygon configuration, future use of the greenspace area for human and dog walking related activities will have an effect on invasive species dynamics along trail corridors and result in shifts in vegetation characteristics (Adkison & Jackson, 1996). Trail networks within the retained greenspace will result in soil erosion, soil compaction, and vegetation trampling by human and dog walking related activities (Adkison & Jackson, 1996).

Given the intended use of the retained greenspace is aimed to support local community member recreation by way of human and dog walking activities and potentially accommodate a children's playground, the overall ecological integrity of the retained greenspace polygon will be subject to impact and diminish in quality. In all polygon options, the retained greenspace site will be isolated, surrounded by residential homes, a road network, rapid transit way, and a railway and void of habitat connectivity. These factors in combination with human disturbance and human pressures will result in vegetation characteristics shifts and reduce the overall functionality of the site as favorable wildlife habitat.

7.2 Elevation

The Project Footprint Area is set to undergo potential transformation into a transit-oriented residential community. Consequently, the current elevation within the Project Footprint Area will change dramatically, in some areas up to 3 meters.

Further, the Regional Parker Lands Major Re-Development Area is presently undergoing development through a series of regional concurrent projects including the City of Winnipeg's Stage 2 Rapid Transit Corridor, the Waverly Street Underpass, as well as the Project Footprint Area residential development. Significant changes to the overall site topography are expected to occur including modification to the past drainage regimes. As regional elevation patterns are modified, over time, these elevation changes will result in changes to soil saturation levels and shifts within the vegetation community diversity.

8 SUMMARY

Several potential locations and polygon configurations are being considered for the Fulton Grove community park greenspace area. The decision of where the community park greenspace will be located is based on a number of factors. As an aspect of this consideration, vegetation characteristics were investigated including the current trail network, elevation, tree stand diversity, tree age, and the presence of invasive and non-native species within potential community park greenspace polygons.

Field investigations identified aspen trees as the dominant tree species in all potential greenspace polygon options with the oldest aspen trees located in the southerly portions of the Project Footprint Area. Common buckthorn, an aggressive invasive species, was prevalent in several of the greenspace polygon options, especially the southerly polygon options. This invasive species is able to thrive in saturated soils and may choke out other native vegetation reducing overall vegetation diversity in areas within which it is located. All possible community park greenspace polygons are characterized by past human trail networks with invasive/weedy species encroachment.

In all polygon options, the retained greenspace site will be isolated, surrounded by residential homes, a road network, rapid transit way, a railway and void of habitat connectivity. These factors in combination with human disturbance and human pressures will result in vegetation characteristics shifts and reduce the overall functionality of the site as favorable wildlife habitat. Resultantly, the site will undergo reduced biodiversity, invasive/non-native species introduction and spread, and lessened functionality of the site as suitable wildlife habitat.

Regardless of location or polygon configuration, given the intended use of the retained greenspace is aimed to support local community member recreation by way of human and dog walking activities and potentially accommodate a children's playground, the overall ecological integrity of the retained greenspace polygon will be subject to impact and diminish in quality.

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Appendix 1: Report Mapping

Map 1: Project Footprint Area with Pre-clearing Habitat Types

Map 2: Chronology of Potential Greenspace Classification within the Project Footprint Area

Map 3: Potential Greenspace Polygons within the Project Footprint Area

Map 4: Trail Network and Invasive/Weedy Species Encroachment within each Potential Greenspace Polygon

Map 5: Elevation within each Potential Greenspace Polygon

Map 6: Potential Greenspace Polygon Centroids

Map 7: Potential Greenspace Polygon Survey Quadrats and Sample Plot

Map 8: Locations of Sampled Trembling Aspen and Bur Oak Trees

Appendix 2: Field Data Sheet

2

VEGETATION SURVEY **Plot** A

Day 11 Month 10

UTM Zone: _____ U _____ E _____ N (NAD 83) Collected by: _____ Transect Azimuth: 20 NE °

Aspect: _____ ° Slope: _____ % Photograph Derek

Notes:
Young aspen. (pockets of dead aspen) few shrubs except for (buckthorn) Rhamnus at one end. sampling to L of tape
PHOTO

WP	Species	1	2	3	4	5			Other Species	1	2	3	4	5	Mean
	Tree >2.5 m *(20- x 30-m)*														
003	Aspen 46 cm														
	74.6														
	Tall shrub 1 – 2.5 m *(2.5-m x 2.5-m)*														
	Viburnum rafinesq.	✓	✓	✓	✓	✓									
	Dogwood	✓													
	Saskatoon	✓													
	Oak		✓												
	Nannyberry		✓		✓										
	Aspen			✓		✓									
	Buckthorn					✓									
	Ground stratum *(1-m x 1-m plots)*														

Appendix 2: Vegetation Assessment Field Data

Site	F				
Plots	5m	10m	15m	20m	25m
Common Shrub Species					
Aspen - (*Populus tremuloides*)					
Oak - (*Quercus macrocarpa*)					
Nannyberry - (*Viburnum lentago*)		X		X	X
Downy Arrow-wood - (*Viburnum rafinesquianum*)	X	X	X		
Highbush Cranberry - (*Viburnum opulus*)			X		X
Dwarf Birch - (*Betula pumila*)		X	X	X	
Green Ash - (*Fraxinus pennsylvanica*)					
Wild Red Currant - (*Ribes triste*)					
Snowberry - (*Symphoricarpus alba)*					
Dogwood		X			X
Saskatoon - (*Amelanchier alnifolia*)	X	X	X	X	X
Invasive/Exotic Species					
Common Buckthorn - (*Rhamnus cathartica*) (exotic non-native) invasive see website					X
Tartarian Hneysuckle - (*Lonicera tatarica*) (exotic non-native) likely a garden escape				X	
	DBH (cm)	Age (years)	y_proj	x_proj	
Tree Species (aged)					
Aspen	12.3	37	5523409	631482	
Oak	28.5	82	5523418	631493	
Site	A				
Plots	5m	10m	15m	20m	25m
Common Shrub Species					
Aspen - (*Populus tremuloides*)			X		X
Oak - (*Quercus macrocarpa*)		X			
Nannyberry - (*Viburnum lentago*)		X		X	
Downy Arrow-wood - (*Viburnum rafinesquianum*)	X	X	X	X	X
Highbush Cranberry - (*Viburnum opulus*)					
Dwarf Birch - (*Betula pumila*)					
Green Ash - (*Fraxinus pennsylvanica*)					
Wild Red Currant - (*Ribes triste*)					
Snowberry - (*Symphoricarpus alba)*					
Dogwood	X				
Saskatoon - (*Amelanchier alnifolia*)	X				
Invasive/Exotic Species					
Common Buckthorn - (*Rhamnus cathartica*) (exotic non-native) invasive see website					X

Tartarian Hneysuckle - (*Lonicera tatarica*) (exotic non-native) likely a garden escape					
	DBH (cm)	Age (years)	y_proj	x_proj	
Tree Species (aged)					
Aspen	14.6	36	5523392	631521	
Site	D				
Plots	5m	10m	15m	20m	25m
Common Shrub Species					
Aspen - (*Populus tremuloides*)			X		
Oak - (*Quercus macrocarpa*)					
Nannyberry - (*Viburnum lentago*)		X		X	
Downy Arrow-wood - (*Viburnum rafinesquianum*)	X	X		X	
Highbush Cranberry - (*Viburnum opulus*)					
Dwarf Birch - (*Betula pumila*)					
Green Ash - (*Fraxinus pennsylvanica*)					
Wild Red Currant - (*Ribes triste*)					
Snowberry - (*Symphoricarpus alba)*					
Dogwood			X	X	
Saskatoon - (*Amelanchier alnifolia*)	X	X	X	X	X
Invasive/Exotic Species					
Common Buckthorn - (*Rhamnus cathartica*) (exotic non-native) invasive see website					
Tartarian Hneysuckle - (*Lonicera tatarica*) (exotic non-native) likely a garden escape					
	DBH (cm)	Age (years)	y_proj	x_proj	
Tree Species (aged)					
Aspen - (*Populus tremuloides*)	28.4	49	5523358	631434	
Oak - (*Quercus macrocarpa*)	12.7	32	5523369	631446	
Site	B				
Plots	5m	10m	15m	20m	25m
Common Shrub Species					
Aspen - (*Populus tremuloides*)					
Oak - (*Quercus macrocarpa*)		X			
Nannyberry - (*Viburnum lentago*)					
Downy Arrow-wood - (*Viburnum rafinesquianum*)					
Highbush Cranberry - (*Viburnum opulus*)					
Dwarf Birch - (*Betula pumila*)					
Green Ash - (*Fraxinus pennsylvanica*)					
Wild Red Currant - (*Ribes triste*)				X	
Snowberry - (*Symphoricarpus alba)*					

Dogwood	X		X		
Saskatoon - (*Amelanchier alnifolia*)					
Invasive/Exotic Species					
Common Buckthorn - (*Rhamnus cathartica*) (exotic non-native) invasive see website	X	X	X	X	X
Tartarian Hneysuckle - (*Lonicera tatarica*) (exotic non-native) likely a garden escape					
	DBH (cm)	Age (years)	y_proj	x_proj	
Tree Species (aged)					
Aspen - (*Populus tremuloides*)	14.6	24	5523459	631512	
Site	C				
Plots	5m	10m	15m	20m	25m
Common Shrub Species					
Aspen - (*Populus tremuloides*)					
Oak - (*Quercus macrocarpa*)					
Nannyberry - (*Viburnum lentago*)					
Downy Arrow-wood - (*Viburnum rafinesquianum*)					
Highbush Cranberry - (*Viburnum opulus*)					
Dwarf Birch - (*Betula pumila*)					
Green Ash - (*Fraxinus pennsylvanica*)					
Wild Red Currant - (*Ribes triste*)					
Snowberry - (*Symphoricarpus alba)*					
Dogwood				X	X
Saskatoon - (*Amelanchier alnifolia*)					
Invasive/Exotic Species					
Common Buckthorn - (*Rhamnus cathartica*) (exotic non-native) invasive see website	X	X	X	X	X
Tartarian Hneysuckle - (*Lonicera tatarica*) (exotic non-native) likely a garden escape					
	DBH (cm)	Age (years)	y_proj	x_proj	
Tree Species (aged)					
Aspen - (*Populus tremuloides*)	30.6	50	5523511	631511	
Site	E				
Plots	5m	10m	15m	20m	25m
Common Shrub Species					
Aspen - (*Populus tremuloides*)		X	X	X	X
Oak - (*Quercus macrocarpa*)					
Nannyberry - (*Viburnum lentago*)					
Downy Arrow-wood - (*Viburnum rafinesquianum*)	X				
Highbush Cranberry - (*Viburnum opulus*)					X

Dwarf Birch - (*Betula pumila*)	X				
Green Ash - (*Fraxinus pennsylvanica*)					
Wild Red Currant - (*Ribes triste*)					
Snowberry - (*Symphoricarpus alba)*					
Dogwood	X	X		X	X
Saskatoon - (*Amelanchier alnifolia*)		X		X	X
Invasive/Exotic Species					
Common Buckthorn - (*Rhamnus cathartica*) (exotic non-native) invasive see website					
Tartarian Hneysuckle - (*Lonicera tatarica*) (exotic non-native) likely a garden escape					
	DBH (cm)	Age (years)	y_proj	x_proj	
Tree Species (aged)					
Aspen - (*Populus tremuloides*)	30.6	47	5523466	631450	
Site	H				
Plots	5m	10m	15m	20m	25m
Common Shrub Species					
Aspen - (*Populus tremuloides*)				X	
Oak - (*Quercus macrocarpa*)					X
Nannyberry - (*Viburnum lentago*)			X		X
Downy Arrow-wood - (*Viburnum rafinesquianum*)	X	X	X	X	X
Highbush Cranberry - (*Viburnum opulus*)					
Dwarf Birch - (*Betula pumila*)					
Green Ash - (*Fraxinus pennsylvanica*)		X			
Wild Red Currant - (*Ribes triste*)					
Snowberry - (*Symphoricarpus alba)*					
Dogwood	X		X		
Saskatoon - (*Amelanchier alnifolia*)	X	X		X	X
Invasive/Exotic Species					
Common Buckthorn - (*Rhamnus cathartica*) (exotic non-native) invasive see website					
Tartarian Hneysuckle - (*Lonicera tatarica*) (exotic non-native) likely a garden escape					
	DBH (cm)	Age (years)	y_proj	x_proj	
Tree Species (aged)					
Aspen - (*Populus tremuloides*)	11.5	27	5523500	631362	
Oak - (*Quercus macrocarpa*)	18.4	66	5523498	631349	
Site	G				
Plots	5m	10m	15m	20m	25m
Common Shrub Species					

Aspen - (*Populus tremuloides*)					
Oak - (*Quercus macrocarpa*)		X		X	
Nannyberry - (*Viburnum lentago*)			X	X	X
Downy Arrow-wood - (*Viburnum rafinesquianum*)		X			X
Highbush Cranberry - (*Viburnum opulus*)					
Dwarf Birch - (*Betula pumila*)					X
Green Ash - (*Fraxinus pennsylvanica*)					
Wild Red Currant - (*Ribes triste*)					
Snowberry - (*Symphoricarpus alba)*					
Dogwood	X		X		X
Saskatoon - (*Amelanchier alnifolia*)	X				
Invasive/Exotic Species					
Common Buckthorn - (*Rhamnus cathartica*) (exotic non-native) invasive see website	X	X	X	X	
Tartarian Hneysuckle - (*Lonicera tatarica*) (exotic non-native) likely a garden escape					
	DBH (cm)	Age (years)	y_proj	x_proj	
Tree Species (aged)					
Aspen - (*Populus tremuloides*)	23.6	36	5523616	631438	
Oak - (*Quercus macrocarpa*)	25.7	78	5523597	631422	