

TREE INVENTORY REPORT – INVENTORY OF THE RIGHT-OF-WAY

Center to Grand Forks, North Dakota
345 kV Transmission Line Project

Case Number PU-09-670
Project #3363

Prepared for:

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March 20, 2012

Updated February 24, 2014



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1.0 Scope of Work

Carlson McCain, Inc. (Carlson McCain) inventoried trees and shrubs for Minnkota Power Cooperative, Inc.'s (Minnkota) Center to Grand Forks 345 kV Transmission Line Project (Project). The proposed Project is approximately 250 miles in length and extends from near Center, North Dakota, to Grand Forks, North Dakota. The proposed transmission line begins at the Center 345 kV Substation located near the Milton R. Young Power Station and terminates at the Prairie Substation located on the southwest edge of Grand Forks, North Dakota.

Trees and shrubs were inventoried in accordance with the Tree and Shrub Inventory Plan (Inventory Plan) that was filed with the North Dakota Public Service Commission (Commission) as Exhibit N during the Project's Route Permit Application hearings (Appendix A to this report). The inventory was conducted across the proposed 150-foot-wide right-of-way (ROW) dated January 13, 2012 (as filed with the Commission). Carlson McCain biologists, Anthony DeMars, Ryan Krapp, and Greg Meyer, conducted an initial tree and shrub inventory during September 2010. Carlson McCain biologists, Greg Meyer, Miranda Meehan, and Chad Tucker, conducted the second phase of the tree and shrub inventory during 2011.

2.0 Procedures

Carlson McCain utilized the Commission approved Inventory Plan, while conducting the tree and shrub inventory. The Inventory Plan outlines the tree and shrub sampling methods utilized to survey high-density areas along the proposed ROW and are provided in Appendix A. Standard data forms were completed for each inventoried tree/shrub site. Each site was assigned a unique identification that consisted of the site's section, township, range, and identification number, i.e. 1414760-01. Data collected at each site included, observer, date, site id, woodland type, tree/shrub species, invasive species, tally, and total number. An example of the inventory sheet can be found in the Inventory Plan (Appendix A). Technical references including the North Dakota Tree Handbook and USDA Plants Database were used to identify and define the characteristics of tree and shrub species encountered during the inventory.

Windbreaks, Shelterbelts, and Other Planted Areas

Trees and shrubs located in windbreaks, shelterbelts, and other planted areas in the Project ROW were counted by direct stem count or by the approved sampling methods in high-density areas. Planted trees that were greater than 1 inch diameter at breast height (DBH) were inventoried for replacement.

Colony forming shrubs located in planted areas were delineated in the field with a GPS unit or on aerial photography and were inventoried by the shrub sampling method for high-density areas. Colony forming shrubs include juneberry, hawthorn, chokecherry, plum, western snowberry, and buffaloberry.

Native Growth Areas

In native growth areas, trees and shrubs were counted by direct stem count or by the approved sampling methods in high-density areas. Direct stem counts were conducted for small native growth areas while the tree and shrub sampling methods were used in high-density areas. Trees greater than 1 inch DBH were inventoried for replacement.

Colony forming shrubs located in native growth areas were delineated in the field with a GPS unit or on aerial photography and were inventoried by the shrub sampling method for high-density areas. Colony forming shrubs include juneberry, hawthorn, chokecherry, plum, western snowberry, buffaloberry, and sandbar willow.

3.0 Results

Native and planted trees and shrubs were inventoried at approximately 406 individual sites along the proposed Project ROW. Thirty-seven tree, shrub, and sub-shrub species were identified (Table 1). Native tree and shrub areas included shrub dominated drainages, gallery forests along the Missouri and Sheyenne Rivers, and tree and shrub patches near wetland areas. Planted tree and shrub areas included windbreaks, dense shelterbelts, and tree rows.

Green ash, box elder, and cottonwood were the most common tree species found in the proposed Project ROW. All three species are native to North Dakota and have been extensively planted in the state. Western snowberry is the most prevalent native shrub. Hawthorn and chokecherry are also common native shrubs found in the proposed Project ROW. Red raspberry is a prevalent subshrub in the Project ROW. Two invasive species, peashrub (Siberian) and Siberian elm, have been commonly planted throughout the proposed Project ROW. Tree and Shrub Count Forms are available from Minnkota by request.

Table 1. Summary of Tree and Shrub Inventory

Growth Form	Common Name	Species	Reproduction ¹	Invasive or Non-native	Burleigh	Eddy	Foster	Grand Forks	Griggs	McLean	Nelson	Oliver	Sheridan	Steele	Wells	Total
Trees - Planted	Maple	<i>Acer ginnala</i>	se	yes	0	0	0	0	0	0	0	0	5	0	0	5
	Box Elder	<i>Acer negundo</i>	se	no	0	38	3	477	53	3	14	0	43	0	202	833
	Russian Olive	<i>Elaeagnus angustifolia</i>	se	yes	0	3	11	167	0	0	3	0	3	0	92	279
	Green Ash	<i>Fraxinus pennsylvanica</i>	se	no	0	605	127	610	29	161	30	56	12	121	1272	3,023
	Rocky Mountain juniper	<i>Juniperus scopulorum</i>	se	no	0	0	0	0	2	0	0	0	0	0	0	2
	Eastern Red Cedar	<i>Juniperus virginiana</i>	se	no	0	8	0	12	0	0	0	0	16	2	17	55
	Crabapple	<i>Malus spp.</i>	se, su	yes	0	0	28	77	0	0	0	0	0	9	20	134
	White Spruce	<i>Picea glauca</i>	se	yes	0	0	0	75	0	0	0	0	0	0	0	75
	Colorado Spruce	<i>Picea pungens</i>	se	yes	2	0	0	11	0	8	0	0	0	1	3	25
	Ponderosa Pine	<i>Pinus ponderosa</i>	se	yes	351	4	0	0	0	0	0	40	9	0	0	404
	Scotch Pine	<i>Pinus sylvestris</i>	se	yes	0	0	0	0	0	0	0	0	11	4	0	15
	Cottonwood	<i>Populus deltoides</i>	se, su	no	0	219	9	711	55	8	17	0	16	16	332	1,383
	Quaking Aspen	<i>Populus tremuloides</i>	se, su	no	0	0	0	0	0	0	0	4	0	0	0	4
	Bur Oak	<i>Quercus macrocarpa</i>	se	no	0	0	0	0	1	0	0	0	0	0	0	1
	Peachleaf Willow	<i>Salix amygdaloides</i>	se	no	0	49	4	441	0	0	22	1	0	3	1	521
	Black Willow	<i>Salix nigra</i>	se,su	no	0	0	0	0	19	0	0	0	0	0	0	19
	White Willow	<i>Salix alba</i>	Su	yes	0	0	0	1	0	2	0	0	0	0	0	3
	American Elm	<i>Ulmus americana</i>	se	no	0	66	0	37	9	0	0	0	36	0	262	410
Siberian Elm	<i>Ulmus pumila</i>	se	yes	849	186	55	133	274	375	9	0	227	115	113	2,336	
Trees - Native	Box Elder	<i>Acer negundo</i>	se	no	0	24	0	37	310	13	0	222	3	0	58	667
	Russian Olive	<i>Elaeagnus angustifolia</i>	se	yes	0	0	0	32	3	33	0	6	4	0	17	95
	Green Ash	<i>Fraxinus pennsylvanica</i>	se	no	950	20	0	17	1,419	222	128	753	0	0	12	3,521

Tree Inventory Report / Center to Grand Forks Transmission Line Project

Growth Form	Common Name	Species	Reproduction ¹	Invasive or Non-native	Burleigh	Eddy	Foster	Grand Forks	Griggs	McLean	Nelson	Oliver	Sheridan	Steele	Wells	Total	
	Rocky Mountain Juniper	<i>Juniperus scopulorum</i>	se	no	0	0	0	0	0	0	0	6	0	0	0	6	
	Eastern Red cedar	<i>Juniperus virginiana</i>	se	no	0	0	0	0	0	0	0	0	0	0	4	4	
	Colorado Spruce	<i>Picea pungens</i>	se	yes	0	1	0	0	0	0	0	0	0	0	0	1	
	Cottonwood	<i>Populus deltoides</i>	se, su	no	147	29	5	244	27	4	0	12	5	20	150	643	
	Quaking Aspen	<i>Populus tremuloides</i>	se, su	no	53	0	0	0	0	137	0	12	2	0	54	258	
	Bur Oak	<i>Quercus macrocarpa</i>	se	no	0	0	0	0	19	0	0	11	0	0	0	30	
	Peachleaf Willow	<i>Salix amygdaloides</i>	se	no	8	93	2	2,002	35	5	8	73	12	13	204	2,455	
	Black Willow	<i>Salix nigra</i>	se, su	no	0	0	0	0	18	4	0	0	1	0	208	231	
	American Elm	<i>Ulmus americana</i>	se	no	496	5	0	0	127	1	0	31	0	0	0	660	
	Siberian Elm	<i>Ulmus pumila</i>	se	yes	3	0	0	214	9	13	15	0	0	0	0	254	
TOTAL TREES					2,859	1,350	244	5,298	2,409	989	246	1,227	405	304	3,021	18,352	
Shrubs - Planted	Juneberry	<i>Amelanchier alnifolia</i>	su, cf	no	0	0	0	2	0	0	0	0	0	0	0	2	
	Siberian Peashrub	<i>Caragana arborescens</i>	se	yes	0	841	2	78	794	487	105	0	60	20	459	2,846	
	European Cotoneaster	<i>Cotoneaster integerrimus</i>	se	yes	0	0	0	554	10	0	3	0	0	0	0	567	
	Silverberry	<i>Elaeagnus commutata</i>	se, cf	no	0	0	0	0	0	0	40	0	0	0	0	40	
	Honey Locust	<i>Gleditsia triacanthos</i>	se	yes	0	0	0	0	0	0	1	0	0	0	0	1	
	Honeysuckle	<i>Lonicera tatarica</i>	se	no	0	0	0	60	3	0	0	0	0	0	0	63	
	American Plum	<i>Prunus americana</i>	su, cf	no	0	0	0	56	0	32	0	0	0	0	66	0	154
	Chokecherry	<i>Prunus virginiana</i>	su, cf	no	0	385	0	274	96	0	2	0	0	0	23	67	847
	Common Buckthorn	<i>Rhamnus cathartica</i>	se	no	0	0	0	91	3	0	0	0	0	0	0	100	194
	Willow	<i>Salix spp.</i>	su, cf	no	0	0	4	0	0	0	0	30	0	0	16	1	51
	Buffaloberry	<i>Shepherdia argentea</i>	su, cf	no	0	0	0	0	0	0	15	0	18	0	0	0	33
Lilac	<i>Syringa vulgaris</i>	su, cf	yes	0	5	15	69	120	9	9	51	12	8	44	0	333	
Shrubs - Native	Juneberry	<i>Amelanchier alnifolia</i>	su, cf	no	3,138	0	0	0	147	463	0	34	0	0	0	3,644	

Tree Inventory Report / Center to Grand Forks Transmission Line Project

Growth Form	Common Name	Species	Reproduction ¹	Invasive or Non-native	Burleigh	Eddy	Foster	Grand Forks	Griggs	McLean	Nelson	Oliver	Sheridan	Steele	Wells	Total
	Siberian Peashrub	<i>Caragana arborescens</i>	se	yes	0	0	0	4	2	0	0	0	0	0	0	6
	Red Osier Dogwood	<i>Cornus stolonifera</i>	su, cf	no	0	0	0	159	0	0	9	1,442	0	0	0	1,610
	Northern Hawthorn	<i>Crataegus rotundifolia</i>	su, cf	no	341	0	0	0	3,431	64	0	18,394	2	0	1,197	23,429
	European Cotoneaster	<i>Cotoneaster integerrimus</i>	se	yes	0	2	0	7	1	0	0	0	0	0	0	10
	Silverberry	<i>Elaeagnus commutata</i>	se, cf	no	0	0	7,700	589	699	0	0	7,845	0	0	1,146	17,979
	Creeping Juniper	<i>Juniperus horizontalis</i>	su, cf	no	0	0	0	0	0	0	0	183	0	0	0	183
	Honeysuckle	<i>Lonicera tatarica</i>	se	no	0	0	0	0	1	0	0	3,872	0	0	1	3,874
	American Plum	<i>Prunus americana</i>	su, cf	no	376	0	0	0	1,598	101	7	1,466	33	0	2	3,583
	Pin-cherry	<i>Prunus pensylvanica</i>	se	no	0	10	0	0	0	0	0	0	0	0	0	10
	Chokecherry	<i>Prunus virginiana</i>	su, cf	no	7,976	0	0	49	4,196	867	0	18,486	172	0	208	31,954
	Common Buckthorn	<i>Rhamnus cathartica</i>	se	no	0	0	0	0	58	0	0	934	0	0	37	1,029
	Willow	<i>Salix spp.</i>	su, cf	no	0	25	0	6,496	1	0	18,245	0	0	0	0	24,767
	Buffaloberry	<i>Shepherdia argentea</i>	su, cf	no	173	0	0	4	7	219	0	35,132	319	0	528	36,382
	Western Snowberry	<i>Symphoricarpos occidentalis</i>	se, cf	no	41,247	0	1,750	2,239	27,565	62,550	0	961,497	990,816	0	311	2,087,975
	Lilac	<i>Syringa vulgaris</i>	su, cf	yes	0	0	0	0	3	0	0	4	0	0	0	7
TOTAL SHRUBS		All Types			53,251	1,268	9,471	10,731	38,735	64,807	18,493	1,049,319	991,410	169	4,057	2,241,711
TOTAL SHRUBS		Colony-Forming			53,251	415	9,469	9,937	37,863	64,182	18,384	1,044,513	991,350	149	3,460	2,232,973
Sub-shrub - Native	Leadplant	<i>Amorpha canescens</i>	se	no	108	0	0	0	41	0	0	0	0	0	0	149
	Prairie Rose	<i>Rosa arkansana</i>	se	no	457	0	0	0	12	40	0	10	0	0	0	519
	Wood's Rose	<i>Rosa woodsii</i>	se, cf	no	51	0	0	0	2	37	0	17,384	0	0	0	17,474
	Red Raspberry	<i>Rubus idaeus</i>	su, cf	no	0	0	0	0	60,681	0	0	2,400	0	0	0	63,081
TOTAL SUB-SHRUB					616	0	0	0	60,763	77	0	19,344	0	0	0	81,223
GRAND TOTAL Trees, Shrubs-(all types), and Sub Shrubs					56,726	2,618	9,715	16,029	101,907	65,873	18,739	1,069,890	991,815	473	7,078	2,340,863
ACRES					20	17	2	21	17	9	3	30	16	5	27	167

¹se = seed, su=suckering, rh=rhizotamous, cf=colony forming

4.0 Recommendations

Carlson McCain, Inc. makes the following recommendations regarding mitigation:

- **Invasive Species.** Invasive species should be replaced with non-invasive native tree/shrub of similar height and canopy suitable for the mitigation area.
- **Colony-forming Shrub Species.** Colony-forming and/or suckering shrub species as described in Section 3.0 should be cut flush with the ground level where necessary to accommodate construction. These areas should then be allowed to regenerate naturally. Where ground disturbance [complete removal] is necessary, replacement should be made on a 1:4 basis with stem cuttings. A planting ratio of 1:2 is recommended for areas where moisture is not a limiting growth factor.

Minnkota has developed a Tree and Shrub Replacement Plan for the Project, which was approved in the Commission's Findings of Fact, Conclusions of the Law Order on August 25, 2012. Minnkota is in the process of finalizing agreements with the county soil and water conservation districts to implement the tree and shrub replacement for the Project. The replacement plan is based on the actual tree and shrub removal required for construction.

5.0 References

Minnkota Power Cooperative Inc. Tree and Shrub Inventory Plan. Center to Grand Forks Transmission Line Project. Case No. PU-09-670. February 2012.

North Dakota Tree Handbook. North Dakota Tree Information Center. North Dakota State University. ND Forest Service. <http://www.ag.ndsu.edu/trees/handbook/ndhand-1.htm> Accessed September 2010.

North Dakota Public Service Commission. Exhibit C1 North Dakota Public Service Commission Findings of Fact, Conclusion of Law and Order. Tree and Shrub Mitigation Specifications. 3p.

United States Department of Agriculture. Natural Resources Conservation Service. Plants Database. <http://plants.usda.gov/java/> Accessed February 2012.

APPENDIX A

Tree and Shrub Inventory Plan
(Route Hearing Exhibit N)

Tree and Shrub Inventory Plan

Center to Grand Forks Transmission Line Project

Case No. PU-09-670

Prepared for:



February 2012

Introduction

Minnkota Power Cooperative, Inc. (Minnkota) proposes to construct, own, and operate an approximate 250-mile-long 345 kV transmission line from the Center 345 kV Substation near Center, North Dakota to the Prairie Substation adjacent to Grand Forks, North Dakota. The project is called the Center to Grand Forks Project (case number PU-09-670). Minnkota will comply with the North Dakota Public Service Commission (Commission) tree and shrub replacement specifications. Minnkota proposes to contract HDR Engineering and McCain and Associates for the tree and shrub inventory. The tree and shrub mitigation specifications are found in Appendix A of this Tree and Shrub Inventory Plan (Plan). Specifically, this Plan outlines the process for completing the tree and shrub inventory within the 150-foot-wide right-of-way (ROW).

Within the Commission's tree and shrub mitigation specifications (Appendix A), Specification number 8 states that "The width of clear cuts through windbreaks, shelterbelts and all other wooded areas shall be limited to 50 feet or less unless otherwise approved by the NDPSC." Minnkota requests that the Commission approve clear clearing the entire 150-foot-wide ROW easement, if warranted.

Inventory Methods

Minnkota will inventory trees and shrubs, including those considered invasive species, to be cleared within the 150-foot-wide ROW easement. Inventories will be documented on standard forms and will include the inventory location, species present, and number of trees and shrubs in the location. An example form is found in Appendix B.

Windbreaks, Shelterbelts, and Other Planted Areas

In windbreaks, shelterbelts, and other planted areas, trees and shrubs anticipated to be cleared regardless of size will be counted by direct stem count. Trees that are one-inch or greater diameter at breast height (DBH) will be inventoried for replacement. Inventoried trees will be categorized into two separate groups:

- 1) one-inch to two inches DBH
- 2) greater than two inches DBH

In windbreaks, shelterbelts, and other planted areas, shrubs that form colonies (such as buffalo currant, chokecherry, dogwood, plum, pussy willow, sandbar willow, western snowberry, and Woods rose) and that are cut flush with the ground surface and not cleared, so as to leave the naturally occurring seed bank and root stock intact will not be direct stem counted. Instead, the area will be delineated on an aerial photo and indicated on construction drawings to not be cleared or have the ground disturbed. If ground disturbance occurs, Minnkota will conduct a direct stem count of the disturbance area or estimate the number of stems cleared using a Commission approved sampling estimate method (see Shrub Sampling Method, Appendix C).

Native Growth Areas

In native growth areas, trees that are one-inch or greater diameter at breast height (DBH) will be inventoried for replacement. Further, trees placed in the inventory will be categorized into two separate groups:

- 1) one-inch to two inches DBH
- 2) greater than two inches DBH

In high-density woodland areas, a Commission approved sampling method may be used in place of individual counting (see Tree Sampling Method, Appendix D).

In native growth areas, shrubs that form colonies (such as buffalo currant, chokecherry, dogwood, plum, pussy willow, sandbar willow, western snowberry, and Woods rose) and that are cut flush with the ground surface and not cleared, so as to leave the naturally occurring seed bank and root stock intact will not be direct stem counted. Instead, the area will be delineated on an aerial photo and indicated on construction drawings to not be cleared or have the ground disturbed. If ground disturbance occurs, Minnkota will conduct a direct stem count of the disturbance area or estimate the number of stems cleared using a Commission approved sampling estimate method (see Shrub Sampling Method, Appendix C).

Shrub Sampling Method

Per the Commission's Tree and Shrub Mitigation Specifications (Inventory Specification No. 6 in Appendix A), in high-density woodland areas, Minnkota proposes the following sampling method for the shrub inventory. The dimensions of the entire woodland stand within the ROW will be delineated to determine the area of the woodland. Shrub counts will be made in representative sample site areas within the woodland. Transect will be developed and the circular sample sites placed along the transect. The number of sample sites within a woodland stand will be dependent on woodland size and uniformity. A smaller, more uniform woodland stand would require fewer sample sites than a larger, less uniform woodland stand.

The sample sites will be 0.001 acres (3.72-foot radius circles). A rope 3.72 feet in length will be attached to a central stake and rotated in a circle (Appendix C). Shrubs within the circle will be counted. Tree and shrub density for the entire woodland area within the ROW will be calculated based on the average density from all of the sample locations within the woodland, weighted against the woodland size.

Tree Sampling Method

Per the Commission's Tree and Shrub Mitigation Specifications (Inventory Specification No. 6 in Appendix A), in high-density woodland areas, Minnkota proposes the following sampling method for the tree inventory. The dimensions of the entire woodland stand within the ROW will be delineated to determine the area of the woodland. Tree and shrub counts will be made in representative sample site areas within the woodland. Transect will be developed and the circular sample sites placed along the transect. The number of sample sites within a woodland stand will be dependent on woodland size and uniformity. A smaller, more uniform woodland stand would require fewer sample sites than a larger, less uniform woodland stand.

The sample sites will be 0.10 acres (37.42-foot radius circles). A rope 37.42 feet in length will be attached to a central stake and rotated in a circle (Appendix D). Trees and shrubs within the circle will be counted. Tree and shrub density for the entire woodland area within the ROW will be calculated based on the average density from all of the sample locations within the woodland, weighted against the woodland size.

Appendix A

Tree and Shrub Mitigation Specifications

Inventory

1. Trees and shrubs anticipated to be cleared, including those that are considered invasive species or noxious weeds (*e.g.*, *Caragana arborescens*, *Elaeagnus angustifolia*, *Rhamnus cathartica*, *Tamarix chinensis*, *T. parviflora*, *T. ramosissima*, *Ulmus pumila*), shall be inventoried before cutting. The inventory shall record the location, number, and species of trees and shrubs.
2. In windbreaks, shelterbelts and other planted areas, trees or shrubs anticipated to be cleared, regardless of size, shall be inventoried for replacement.
3. In native growth areas, trees anticipated to be cleared that are 1 inch diameter at breast height ("dbh") or greater shall be inventoried for replacement.
4. In native growth areas, shrubs anticipated to be cleared in the permanent right-of-way shall be inventoried for replacement.
5. In native growth areas outside the permanent right-of-way, shrubs shall be cut flush with the surface of the ground, taking care to leave the naturally occurring seed bank and root stock intact. If soil disturbance is necessary, the native topsoil shall be preserved and replaced after construction. Shrubs shall be allowed to regenerate naturally where native topsoil is preserved and replaced. Where native topsoil is not preserved and replaced, shrubs anticipated to be cleared shall be inventoried for replacement.
6. In native growth areas, trees and shrubs may be inventoried by actual count or by sampling method that will properly represent the woody vegetation population. A sampling plan developed by the company, filed with the North Dakota Public Service Commission (Commission) and approved prior to the start of construction shall define the sampling method to be used for trees, for tall shrubs and for low shrubs. The data from the sample plots shall be extrapolated to the total acreage of the wooded area to be cleared to determine the species and quantity of trees and shrubs to be replaced.

Clearing for Construction

7. Trees and shrubs shall be selectively cleared, leaving mature trees and shrubs intact where practical.
8. The width of clear cuts through windbreaks, shelterbelts and all other wooded areas shall be limited to 50 feet or less unless otherwise approved by the NDPSC. [Minnkota will clear within the 150-foot-wide ROW easement, if warranted.]
9. If the area of trees or shrubs actually cleared differs from the area inventoried, the difference in number of trees and shrubs to be replaced shall be noted on the inventory.

Replacement

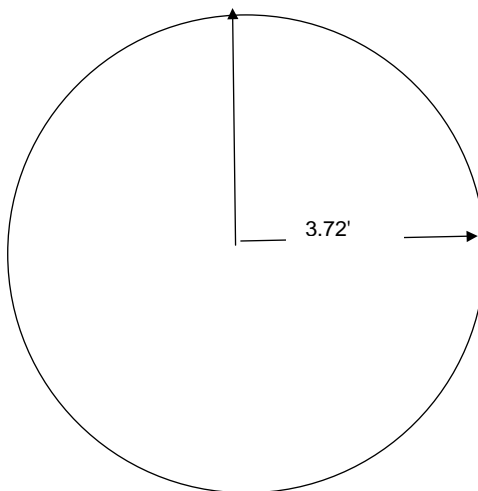
10. Prior to tree/shrub replacement, documentation identifying the number and variety of trees removed as well as the mitigation plan for the proposed number, variety, type, location and date of replacement plantings shall be filed with the NSPSC for approval.
11. Tree replacement shall be on a 2 to 1 basis with 2-year-old saplings. Shrub replacement shall be on a 2 to 1 basis with stem cuttings.
12. Trees and shrubs shall be replaced by the same species or similar species suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service.
13. Landowners shall be given the option of having replacement trees/shrubs planted off the right-of-way on the landowner's property or waiving that requirement in writing and allowing those replacement trees/shrubs to be planted at alternative locations.
14. At the conclusion of the project, documentation identifying the actual number, variety, type, location, and date of the replacement plantings shall be filed with the NDPSC.
15. Tree/shrub replacements shall be inspected once a year for three years, on about the anniversary of the plantings, and, on or shortly before October 1 of each year, a report shall be submitted to the NDPSC documenting the condition of replacement planting and any woodlands work completed. If after three years from the anniversary of the plantings the survival rate is less than 75%, the NDPSC may order additional planting(s).

Appendix C

Shrub Sampling Method

Sample Plot

- Circular sample plots with a radius of 3.72 feet, or area equivalent to 0.001 acres created with a central stake and rope.
- The rope, 3.72 feet in length, anchored to the central stake and rotated in a circle



Shrub Counts

- Direct stem counts from each plot
- Talled on work sheet by species

Woodland size

- GPS points taken in the field around boundary
- GIS used to calculate acreage

Calculations

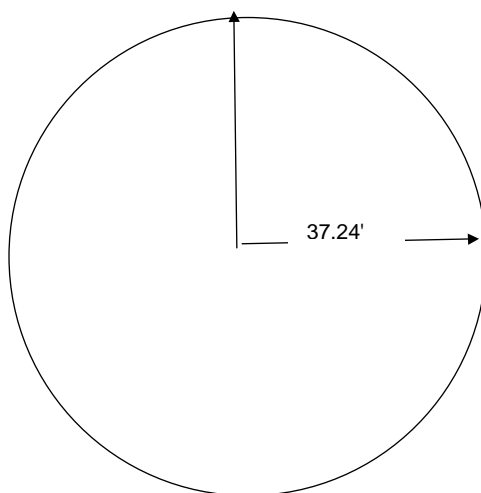
- Average determined from all plots sampled in a woodland area or area is equivalent to stems/0.001 acre
- Converted to a per acre basis (average times 1000)
- Total number per woodland determined by multiplying average number per acre with woodland size

Appendix D

Tree Sampling Method

Sample Plot

- Circular sample plots with a radius of 37.24 feet, or area equivalent to 0.10 acres created with a central stake and rope.
- The rope, 37.24 feet in length, anchored to the central stake and rotated in a circle



Tree Counts

- Direct stem counts from each sample site
- Talled on work sheet by species

Woodland size

- GPS points taken in the field around boundary
- GIS used to calculate acreage

Calculations

- Average determined from all plots sampled in a woodland area or area is equivalent to stems/0.10 acre
- Converted to a per acre basis (average times 10)
- Total number per woodland determined by multiplying average number per acre with woodland size