

WOODY SPECIES PLANTING PLAN

FOR THE ANTELOPE VALLEY STATION RAW WATER PIPELINE PROJECT

Prepared for

North Dakota Public Service Commission
Bismarck, North Dakota

by

BASIN ELECTRIC POWER COOPERATIVE

January 2007

Contents

1.0 Introduction	1-1
2.0 Planting Plan	2-1
3.0 Plant Survivability Monitoring.....	3-1
4.0 References	4-1

List of Appendices

Appendix A – Memorandum of Understanding – Antelope Valley Tree Replacement Program

List of Tables

Table 1	Woody Species Observed, Estimated to be Removed, and Removed Along the Proposed Route.....	1-2
Table 2	Woody Species Observed and Removed Along the Proposed Route and NDGFD Preferred Species.....	2-3

List of Figures

Figure 1	Harmony Lake Wildlife Management Area.....	2-4
----------	--	-----

1.0 Introduction

An inventory of woody species within the 150-foot-wide construction right-of-way (ROW) along the Antelope Valley Station raw water pipeline route was conducted by ENSR biologists in May 2005. A woody species inventory report was completed by ENSR in June 2005 and was provided to Basin Electric Power Cooperative (BEPC) for review. The report was later sent to the North Dakota Public Service Commission (PSC) for review as supplemental information to the Route Permit Application, which was submitted to the PSC in November 2004. The report provided a summary of the species and numbers of woody plants present within the construction ROW and estimated numbers of plants that would be impacted by pipeline construction. The locations of these woody plants along the pipeline route were illustrated on aerial photograph-based maps.

After pipeline construction had been completed in September 2006, BEPC personnel revisited these woody species' populations to determine the species and numbers of woody plants within the 150-foot-wide construction ROW that were not removed during pipeline construction. **Table 1** lists the species and numbers of woody plants that were observed during the woody species inventory conducted in May 2005, the numbers of woody plants that were estimated to be removed during pipeline construction, and the species and numbers of woody plants that were removed during pipeline construction.

As stated in the mitigation section of the Route Permit Application, BEPC committed to the replacement of woody species removed during pipeline construction. After the completion of pipeline construction, BEPC has coordinated with the landowners regarding the loss of woody species on their property and has provided compensation to landowners in accordance with the individual easements. In addition to this compensation, BEPC proposes to plant woody species on the Harmony Lake Wildlife Management Area (WMA) located approximately 6 miles northwest of Hazen, North Dakota, to provide additional compensation for the loss of cover and food provided by woody species along the proposed route.

The purpose of this plan is to provide details regarding the planting and monitoring of woody species' plantings on the Harmony Lake WMA, as partial mitigation for the loss of woody species related to pipeline construction.

Table 1 Woody Species Observed, Estimated to be Removed, and Removed Along the Proposed Route

Common Name	Scientific Name	Number of Individuals in 150-foot-wide ROW	Estimated Number of Individuals to be Removed During Construction	Actual Number of Individuals Removed During Construction
Trees				
Box elder	<i>Acer negundo</i>	57	57	31
Green ash	<i>Fraxinus pennsylvanica</i>	21	21	15
American elm	<i>Ulmus americana</i>	37	0	4
Siberian elm	<i>Ulmus sibiricus</i>	245	58	48
Plains cottonwood	<i>Populus deltoides</i>	977	955	756
American plum	<i>Prunus americana</i>	43 ¹ (429 clones)	43	3
Russian olive	<i>Eleagnus angustifolia</i>	64	64	49
Hawthorn	<i>Crataegus rotundifolia</i>	5	2	1
TOTAL		1,449	1,200	907
Shrubs				
Western snowberry	<i>Symphoricarpos occidentalis</i>	381 ¹ (3,812 clones)	381	35
Chokecherry	<i>Prunus virginiana</i>	73 ¹ (727 clones)	73	18
Buffaloberry	<i>Sheperdia canadensis</i>	106	85	80
Bristly gooseberry	<i>Ribes setosa</i>	73	48	66
Wild rose	<i>Rosa arkansana</i>	18	10	0
Serviceberry	<i>Amelanchier alnifolia</i>	9	9	9
Skunkbush	<i>Rhus trilobata</i>	45	45	45
Sandbar willow	<i>Salix exigua</i>	137 ¹ (1,365 clones)	137	99
Common lilac	<i>Syringa vulgaris</i>	83	80	27
Siberian peashrub	<i>Caragana arborescens</i>	76	71	62
Cherry	<i>Prunus sp.</i> (introduced shrub)	19	19	19
Wild honeysuckle	<i>Lonicera dioica</i>	1	1	1
TOTAL		1,021	888	461

¹Assumes an average of 10 clones for every plant.

2.0 Planting Plan

BEPC and ENSR staff coordinated with Arvid Anderson of the North Dakota Game and Fish Department (NDGFD) to discuss the possibility of planting woody species on the Harmony Lake WMA, which would expand the wildlife winter cover plantings within the WMA and provide additional winter cover and food that would be beneficial for various wildlife species. The NDGFD agreed to the planting of woody species at the WMA and would provide direction, in cooperation with the Natural Resources Conservation Service (NRCS) Tree Service, as to the species to be planted, winter cover planting options, successful planting techniques, species for planting, planting arrangements, and survivability monitoring (Anderson 2006). In order to formalize the agreement between BEPC and NDGFD, both parties developed a Memorandum of Understanding that documents their mutual agreement and commitments regarding the planting plan and survivability monitoring (Appendix A).

Prior to the establishment of the Harmony Lake WMA, the land was mined for lignite coal in the 1980s as part of the Freedom Mine. After mining had been completed in this area, Coteau Properties Company reached an agreement with the NDGFD to transfer ownership of this land to the NDGFD in order to create the Harmony Lake WMA. This agreement was possible through the cooperative efforts of the Coteau Properties Company, NDGFD, and the Reclamation Division of the North Dakota PSC, which regulates the reclamation of mined lands within the state of North Dakota. Reclamation of disturbed land within the WMA was completed to provide a diversity of habitats for a variety of wildlife species. **Figure 1** illustrates the Harmony Lake WMA, lake, wetlands, and existing wildlife winter cover planting areas. The 637-acre Harmony Lake WMA is dedicated to wildlife production, hunting, fishing, and other compatible outdoor recreational opportunities and consists of a 45-acre lake, 45 acres of wetlands, 305 acres of grassland, and 242 acres of historic mine spoil piles.

Table 2 lists the species and numbers of woody plants observed within the pipeline construction ROW, species and numbers of woody plants removed during construction, numbers of plants that would be needed for planting using a 3:1 ratio (i.e., plants to be planted:plants removed during construction), and NDGFD preferred species and numbers of plants to be planted. The proposed plantings of NDGFD preferred species would occur in the grassland areas. A total of three tree species, American plum, hawthorn, and Manchurian crabapple, and 1,350 saplings would be planted in the WMA. These species were selected by the NDGFD since they are trees of smaller stature and would be less likely to be used by raptors for perching and the hunting of upland game birds as compared to taller tree species. Two of the three tree species, the American plum and hawthorn, were observed along the pipeline route. A total of 12 shrub species and 4,950 plants would be planted in the WMA, of which 9 shrub species were observed along the pipeline route. The majority of the tree and shrub species are native to the region. The preferred tree and shrub species were selected by the NDGFD since they have exhibited winter hardiness, drought tolerance, and fire resistance, and readily became established in other NDGFD planting areas within the region. Although BEPC proposes to plant fewer trees than the projected number of trees to be planted based on a 3:1 ratio, BEPC would plant shrubs at a greater than 10:1 ratio to offset the planting of fewer trees and provide more optimal winter cover and food for wildlife within the WMA.

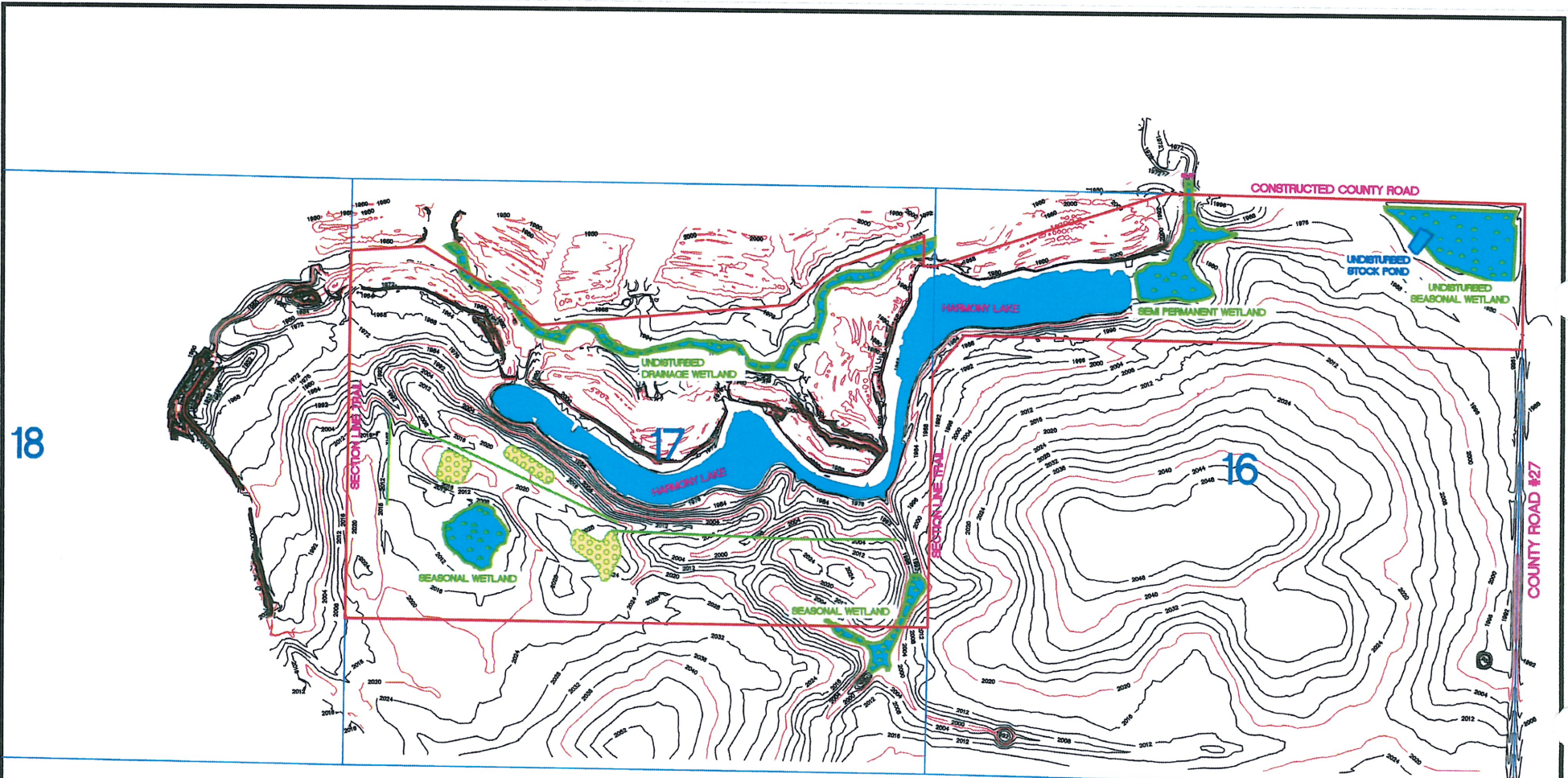
Bare root stock would be planted to a maximum depth of 12 inches below the soil surface and plants would be typically spaced on 4-foot centers. Existing surface soils would provide adequate growth media for the establishment on trees and shrubs. Therefore, soil amendments would not be incorporated into the surface soils prior to planting. A mechanical planter would be used to plant the bare root stock and simultaneously lay weed barrier fabric adjacent to the plants. The fabric would not only prevent the growth of weeds immediately adjacent to plants but also would enhance soil moisture retention and minimize soil erosion. Conservation grade trees and shrubs would be obtained from Lincoln Oaks Nursery, a regional nursery based in Bismarck, North Dakota, which supplies plants that are endemic to the region. Trees and shrubs would be intermixed to provide a diversity of vegetative structure that is beneficial to wildlife. BEPC proposes to complete the planting

of trees and shrubs during the Spring of 2007. Based on NDGF's experience in the planting of the preferred woody species and use of these planting techniques in other areas, a 90 percent survivability rate of tree and shrub plants is anticipated.

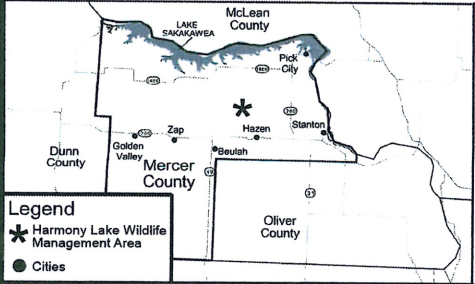
Table 2 Woody Species Observed and Removed Along the Proposed Route and NDGFD Preferred Species

Common Name	Scientific Name	Number of Individuals in 150-foot-wide ROW	Actual Number of Individuals Removed During Construction	Number of Plants for Replanting (Mitigation ratio 3:1)	NDGF Preferred Species	NDGF Recommended Number of Plants for Replanting
Trees						
Box elder	<i>Acer negundo</i>	57	31	93	No	0
Green ash	<i>Fraxinus pennsylvanica</i>	21	15	45	No	0
American elm	<i>Ulmus americana</i>	37	4	12	No	0
Siberian elm	<i>Ulmus sibiricus</i>	245	48	144	No	0
Plains cottonwood	<i>Populus deltoides</i>	977	756	2,268	No	0
American plum	<i>Prunus americana</i>	43 ¹ (429 clones)	3	9	Yes	750
Russian olive	<i>Eleagnus angustifolia</i>	64	49	147	No	0
Hawthorn	<i>Crataegus rotundifolia</i>	5	1	3	Yes	300
TOTAL		1,449	907	2,721	NA	1,050
Shrubs						
Western snowberry	<i>Symphoricarpos occidentalis</i>	381 ¹ (3,812 clones)	35	105	No	0
Chokecherry	<i>Prunus virginiana</i>	73 ¹ (727 clones)	18	54	Yes	500
Buffaloberry	<i>Sheperdia canadensis</i>	106	80	240	Yes	750
Bristly gooseberry	<i>Ribes setosa</i>	73	66	198	Yes	0
Wild rose	<i>Rosa arkansana</i>	18	0	0	Yes	600
Serviceberry	<i>Amelanchier alnifolia</i>	9	9	27	Yes	300
Skunkbush	<i>Rhus trilobata</i>	45	45	135	Yes	300
Sandbar willow	<i>Salix exigua</i>	137 ¹ (1,365 clones)	99	297	No	0
Common lilac	<i>Syringa vulgaris</i>	83	27	81	Yes	500
Siberian peashrub	<i>Caragana arborescens</i>	76	62	186	Yes	500
Cherry	<i>Prunus sp.</i> (introduced shrub)	19	19	57	Yes	300
Wild honeysuckle	<i>Lonicera dioica</i>	1	1	3	Yes	0
TOTAL		1,021	461	1,383	NA	3,750
NDGF Additional Preferred Plant List						
Trees						
Manchurian crabapple	<i>Malus baccatta</i> var. <i>mandshurica</i>	NA	NA	NA	Yes	300
Shrubs						
Cottoneaster	<i>Cottoneaster lucidus</i>	NA	NA	NA	Yes	300
Golden currant	<i>Ribes odoratum</i>	NA	NA	NA	Yes	300
Redosier dogwood	<i>Cornus sericea</i>	NA	NA	NA	Yes	300
Staghorn sumac	(Smooth sumac) <i>Rhus typhina</i>	NA	NA	NA	Yes	300
Total Trees		1,449	907	2,721	NA	1,350
Total Shrubs		1,021	461	1,383	NA	4,950

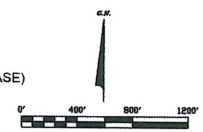
¹ Assumes an average of 10 clones for every plant.



Regional Map



- LEGEND**
- BOND RELEASE BOUNDARY
 - DOUBLE ROW GAME AND FISH TREE PLANTING (PLANTED AFTER BOND RELEASE)
 - SHRUB PLANTINGS



Woody Species Planting Plan

Figure 1
Harmony Lake Wildlife Management Area

3.0 Plant Survivability Monitoring

NDFGD staff would complete a survival count of the trees and shrubs on an annual basis for 2 years after planting. The NDGFD would replace any trees and shrubs that did not survive after a 2-year growing period.

4.0 References

Anderson, A. 2006. North Dakota Game and Fish Department (NDGFD) – Assistant Wildlife Management Biologist, Riverdale, North Dakota Office. Personal Communication with Jon Alstad (ENSR) and Cris Miller (Basin Electric Power Cooperative) on November 27, 2006.

Appendix A

Memorandum of Understanding Antelope Valley Tree Replacement Program

Memo Of Understanding Antelope Valley Tree Replacement Program

Dated: January 4, 2007

Participants:

North Dakota Game and Fish Department
Basin Electric Power Cooperative

Purpose:

To provide a basis of understanding that describes Basin Electric Power Cooperative's (Basin), and the North Dakota Game and Fish Department's (NDGF) - Riverdale Office, intentions to cooperatively develop a working program to facilitate the planting of Woody Species, (e.g. trees and shrubs) on the North Dakota Game and Fish Managed Harmony Lake Wildlife Management Project Area.

Background:

1. Basin Electric Power Cooperative (Basin) underwent a water pipeline replacement project for our Antelope Valley Station, located in Mercer County, approximately 8 miles north near Beulah, North Dakota. This pipeline project underwent State Siting Act requirements of the North Dakota Public Service Commission (NDPSC). Route Permit 95 was issued for the project in 2005.
2. Route Permit 95 requires that the taking of Woody Species needed to be assessed and the woody species were to be replaced on a 3:1 ratio.
3. The NDGF has a need to provide additional food and habitat for wildlife at the Harmony Lake Wildlife Management Area (Harmony Lake), also situated in Mercer County approximately 5 miles north of Hazen, North Dakota.
4. There exists a mutual benefit for both Parties to pursue Woody Species Planting at Harmony Lake to benefit wildlife and citizens of the State of North Dakota and Mercer County

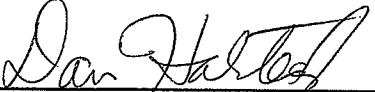
Principles:

1. The North Dakota Public Service Commission granted bond release for 637 acres in 2003 from Mine Permit NACT-9101. The post mine land use was changed to recreational and the surface ownership transferred to the State of North Dakota. The North Dakota Game and Fish Department has the management responsibility of the area that is now referred to as the Harmony Lake Wildlife Management Area.

2. NDGF sees the added benefit for Wildlife and natural resources of tree and shrub planting on the Harmony Lake Management area.
3. The woody species that were removed were quantified in a take list. The woody species take list will be evaluated by NDGF staff as to their applicability to a Wildlife Management area.
4. The outcome of the NDGF's evaluation process will be a recommendation by the species types and quantities of the individual species that will be incorporated into the Wildlife management plan for Harmony Lake. Basin recognizes that all of the woody species that were quantified in the take list may not be recommended for planting at Harmony Lake. The NDGF will use their experience and knowledge of tree planting survivability, tolerance to fire, benefits to wildlife for food and/or habitat and will exclude "nuisance" species, etc in their evaluation. If the individual species is not recommended for planting at Harmony Lake, the NDGF can either increase the amount of other species that are recommended from the species take list or the NDGF can recommend new species that were not on the pipeline project take list.
5. Basin will incur all the costs of the woody species planting at Harmony Lake. The costs will be developed utilizing the 2007 rates published by the Mercer County Natural Resource Conservation Service (NRCS) Tree Service. The planting project will utilize conservation grade trees/shrubs and will incorporate ground fabric for weed control.
6. NDGF past experience indicates that a planting survivability rate greater than 90% is expected. The NDGF will provide to Basin an annual assessment as to the survivability of the plantings for two years. Basin will incorporate this survivability report into their NDPSC filings for the project.

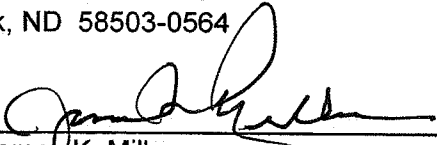
Signatures:

North Dakota Game and Fish - Riverdale Office
406 Dakota Ave
Riverdale, ND 58565

By: 
Dan Halstead
District Wildlife Resource Biologist

Date: 1-31-07

Basin Electric Power Cooperative
1717 E Interstate Avenue
Bismarck, ND 58503-0564

By: 
James K. Miller
Manager of Environmental Services

Date: 1-29-07