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TREE AND SHRUB SURVIVAL IN SHELTERBELT RENOVATION PROJECT AT DICKINSON EXPERIMENT STATION, 1995

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SUMMARY

Data presented in Tables 1-3 reports the survival of trees planted in the spring of 1995. Data was collected on August 30, 1995 to measure survival through summer growing conditions. In Table 1, the shrubs were an understory planting between a row of mature ponderosa pine and various mature deciduous tree species. One-half of the row was prepared by tillage while the second one-half of the row was planted directly into kill down smooth bromegrass or into a no-till situation. The shrubs were alternated in the rows in pairs. The sequence is designed as such: 2 American cranberrybush plants, 2 Juneberry plants, and 2 Nannyberry viburnum plants. This sequence was repeated within the same row.

The survival rate of shrubs planted on the tilled pre-treatment site was highest with American Cranberrybush and Juneberry at 100%. Nannyberry viburnum had a 58% survival rate under the same conditions. On the no-till pretreatment site, the trees were hand planted into the weed barrier. Survival rates were highest on the American Cranberrybush at 90%, Juneberry and Nannyberry had a 79% and 75% survival rate respectfully. Overall performance of the three species was highest on American Cranberrybush with 95%, Juneberry, 85% and Nannyberry viburnum had the lowest survival rate of 67%. This may indicate that the Nannyberry may require special handling at planting or is sensitive to conditions when planted into the weed barrier fabric. The overall survival rate of plants under the tilled pretreatment was slightly higher than the no-till pretreatment site, 85% vs. 81%.

Table 2 shows survival of various number of tree species with agroforestry benefits, wood, nuts, or Christmas trees. All trees were planted into two types weed barrier fabric. The fabric will be observed and performance and economic costs

compared. Seed sources of the Rocky Mountain Douglas-fir used at the three planting sites at the Experiment Station should be compared on performance and surviving trees maintained as a potential seed orchard.

Of the tree species grown in tree shelters, black walnut had the highest survival rate at 88% while Ohio Buckeye was at 50%. Ohio Buckeye has performed poorly in tree shelters and usually go into a dormant stage in first years planting, 50%. None of the Ohio Buckeye appeared dead. The second part of the species diversification demonstration involved four conifer species. Colorado spruce and ponderosa pine had the highest survival rate of 88% and 78% respectively These two species have been proven very hardy statewide. The Rocky Mountain Douglas-fir (Denbigh Seed Source) had a 50% survival rate while Siberian larch had 0% survival rate. The difference may be related to species handling at planting on their tolerance to conditions produced by weed barrier fabric.

Table 3 shows survival rates of trees planted in the ponderosa pine/Colorado spruce understory. The understory had a 6 to 8 inch deep pine needle mulch. The stand was opening up to sunlight and some smooth bromegrass had invaded the site. Threes were planted into the pine mulch with minimal disturbance. The mulch is viewed as desirable in soil moisture retention, soil acidification properties and a source of organic matter. Various fir species and ponderosa pine were planted to determine potential species use in finding an available hardy seed source and potential tree species for the region and state. Smooth bromegrass needs to be controlled to limit further invasion and competition to the windbreak planting. As the trees grow, it is hoped that weed competition will be shaded out (see map).

Survival rates on all four conifer species were high. The ponderosa pine and white fir had the highest survival rate at 97% and 95% respectively. The Rocky Mountain Douglas-fir (Flathead Lake, Montana) which is its closest native stand, had a survival rate of 88%. Fraser fir, which is native to the Appalachian Mountains, had a survival rate of 75% through the first growing season. Survival rate over winter will help determine the species value in western North Dakota. Any of the fir trees that survive over the next years are potential seed sources for local use for ornamental-landscape, Christmas trees or conservation plantings. Overall survival of all tree species planted was a high 91% which shows the value of utilizing existing conifer needle mulches or other organic mulches.

Acknowledgments

Mountain Home Nursery is located at The Flathead Lake, Montana.

Seed source of Rocky Mountain Douglas-fir was collected by Greg Morgenson at Lincoln-Oakes Nurseries at Bismarck.

Table 1. Agroforestry Demonstration: Fruiting Shrubs on Weed Barrier. Tilled or no-till prior to planting.

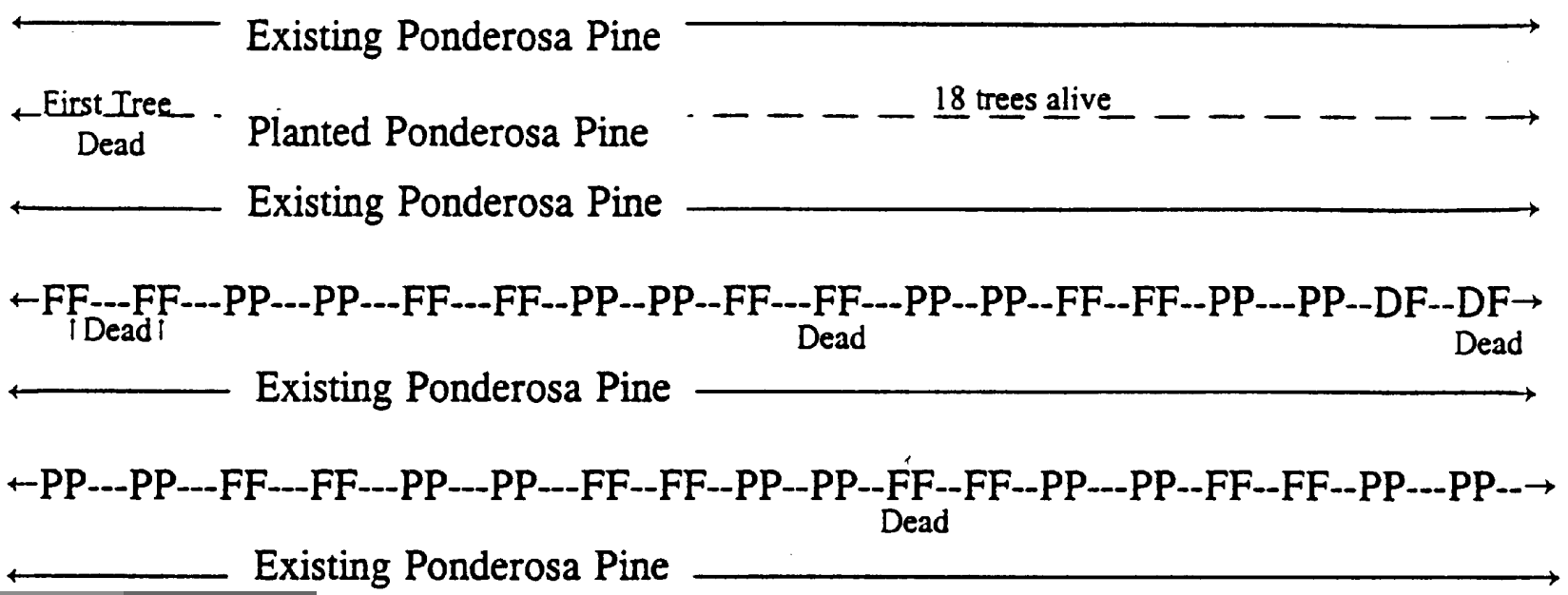
	Tilled Site				No-Till Site				Totals			
Fruit Crop	Survival No.	%	Dead No.	%	Survival No.	%	Dead No.	%	Survival No.	%	Dead No.	%
Nannyberry	11	58	8	42	15	75	5	25	26	67	13	33
American Cranberrybush	18	100	0	0	18	90	2	10	36	95	2	5
Juneberry	15	100	0	0	19	79	5	21	34	87	5	13
Total	44	85	8	15	52	81	12					

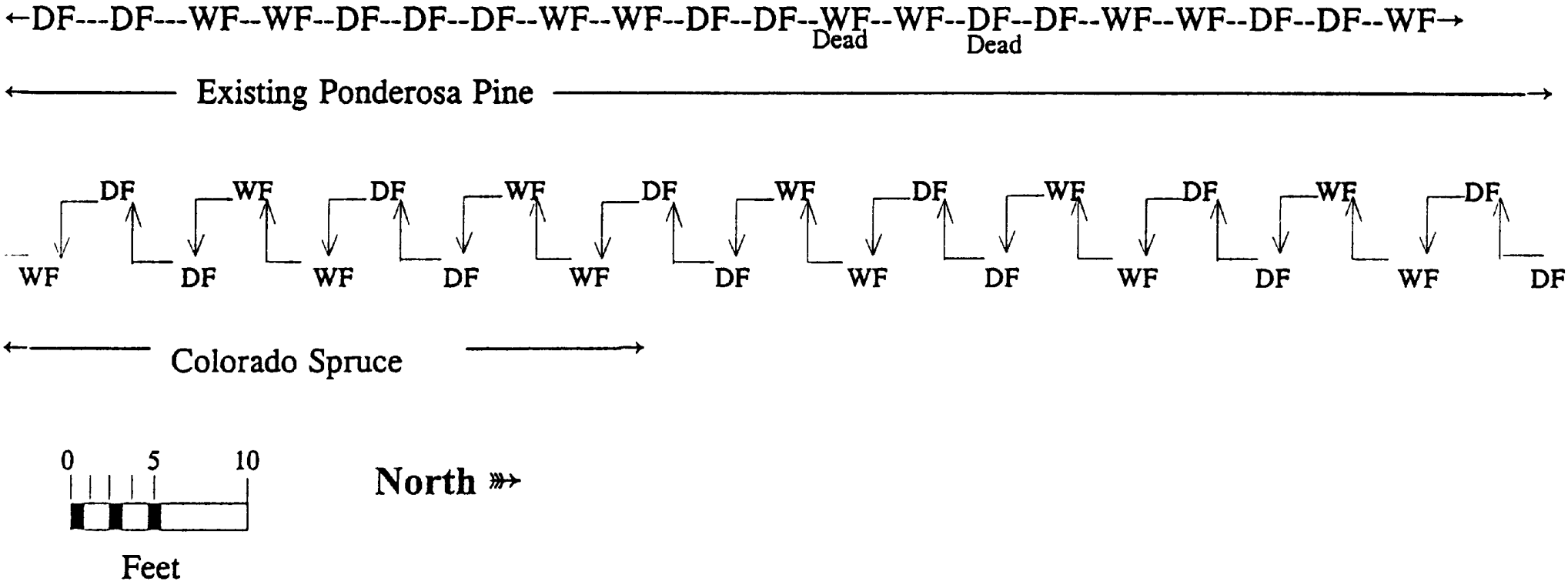
Table 2. Tree Species Diversity Demonstration - on Weed Barrier, 1995.

Tree Species	**Survival No.**	%	**Dead No.**	%	**Dormant No.**	%
Black Walnut	15	88	1	6	1 in tree shelters	6
Ohio Buckeye	5	50	0	0	5 in tree shelters	50
Siberian Larch	0	0	16	100	0	0
Douglas-fir (Denbigh source)	7	50	7	50	0	0
Colorado Spruce	22	88	3	12	0	0
Ponderosa Pine	18	78	5	22	0	0

Table 3. Understory Interplanting in Ponderosa Pine Needle Mulch, 1995.				
	Survival No.	%	**Dead No.**	%
Douglas-fir (Montana Seed Source) = DF (2)	22	88	3	12
White fir (Mountain Home Nursery) = WF	19	95	1	5
Fraser fir (Mountain Home Nursery) = FF	12	75	4	25
Ponderosa pine (ND Forest Service) = PP	36	97	1	3
Total	89	91	9	9

Map: 1995 Survival Data Taken August 1995, Dickinson Experiment Station





Legend

PP=Ponderosa Pine
FF=Fraser Fir
DF=Douglas Fir (Montana Source)
WF=White Fir
Planted 6 feet between pine and fir
Planted 6 feet between fir and fir

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