

**APPENDIX D**

**SHRUB AND TREE DENSITY (STEMS/ACRE) BY PLOT FOR WOODLAND SAMPLE  
SITES - VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006**

<b>Ecological Group and Site</b>	<b>Table</b>	<b>Page</b>
<b>WOODLAND</b>		
Riparian Woodland (RW)	D1	D-1
Deciduous Tree Woodland (DTW)		
<b>LOAMY</b>		
Loamy Overflow (LyOv)	D2	D-9

**Footnotes for the tables in Appendix D:**

Binomials follow Great Plains Flora Association (1986).

Density counts of low shrubs were made in two 2x2 meter (m) quadrats at each sample site, and converted to plants per acre using a conversion factor of 505.87. Density counts of tall shrubs were made in two 4x4 m quadrats at each sample site, and converted to plants per acre using a conversion factor of 126.47. Tree density was counted in two 10x10 m quadrats at each sample site, and converted to plants per acre using a conversion factor of 20.23.

dbh = diameter at breast height class.

n = number of samples

TABLE D1

SHRUB AND TREE DENSITY (STEMS PER ACRE) FOR 4 PLOTS IN THE LOAMY OVERFLOW ECOLOGICAL SITE -  
VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006

	RIPARIAN WOODLAND																	
	PLOT NUMBER																	
	RW-1	RW-2	RW-3	RW-4	RW-5	RW-6	RW-7	RW-8	RW-9	RW-10	RW-11	RW-12	RW-13	RW-14	RW-15	RW-16	RW-17	RW-18
<b>LOW SHRUBS</b>																		
<b>Artemisia cana</b>																		
immature																		
mature																		
Total live																		
<b>Atriplex nuttallii</b>																		
immature																		
mature																		
Total live																		
<b>Ribes setosum</b>																		
immature			1518												1012		506	506
mature			1012				506									506	1012	1518
Total live			2529				506								1012	506	1518	2023
<b>Rosa arkansana</b>																		
immature																		
mature																		
Total live																		
<b>Rosa woodsii</b>																		
immature			6070						1012	3035								
mature			19223						7082	5565								
Total live			25294						8094	8600								
<b>Symphoricarpos occidentalis</b>																		
immature			14164	2529	506		2529		5059	27317			1518	2529	7082	9612	16188	6576
mature			68798	10623	4047		15682		3541	41481			7082	31870	25294	41481	102692	32376
Total live			82963	13153	4553		18211		8600	68798			8600	34399	32376	51093	118879	38952
<b>TALL SHRUBS</b>																		
<b>Cornus stolonifera</b>																		
immature																		
mature									506									
Total live									506									

TABLE D1

SHRUB AND TREE DENSITY (STEMS PER ACRE) FOR 4 PLOTS IN THE LOAMY OVERFLOW ECOLOGICAL SITE -  
VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006

	RIPARIAN WOODLAND																	
	PLOT NUMBER																	
	RW-1	RW-2	RW-3	RW-4	RW-5	RW-6	RW-7	RW-8	RW-9	RW-10	RW-11	RW-12	RW-13	RW-14	RW-15	RW-16	RW-17	RW-18
<b>Lonicera tatarica</b>																		
immature			126															
mature			379															
Total live			506															
<b>Prunus americana</b>																		
immature																		379
mature																		
Total live																		379
<b>Prunus virginiana</b>																		
immature			379				379	7082										126
mature			126					5059				632						126
Total live			506				379	12141				632						253
<b>Ribes odoratum</b>																		
immature																		
mature																		2782
Total live																		2782
<b>Salix exigua</b>																		
immature																		
mature									2150									
Total live									2150									
<b>Salix lutea</b>																		
immature																		
mature									632									
Total live									632									
<b>Shepherdia argentea</b>																		
immature										759								
mature										1897								
Total live										2656								

TABLE D1

SHRUB AND TREE DENSITY (STEMS PER ACRE) FOR 4 PLOTS IN THE LOAMY OVERFLOW ECOLOGICAL SITE -  
VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006

	RIPARIAN WOODLAND																	
	PLOT NUMBER																	
	RW-1	RW-2	RW-3	RW-4	RW-5	RW-6	RW-7	RW-8	RW-9	RW-10	RW-11	RW-12	RW-13	RW-14	RW-15	RW-16	RW-17	RW-18
<b>TREES</b>																		
<b>Acer negundo</b>																		
<1 inch dbh	40		101	81	40		40								81		142	
1-4 inch dbh				101	61			101			40				142			
4-8 inch dbh		20		40	324			20							243			
8-12 inch dbh					40										61			
12-16 inch dbh	20										20							
16-20 inch dbh																		
Total live	61	20	101	223	465		40	121			61				526		142	
<b>Fraxinus pennsylvanica</b>																		
<1 inch dbh			121	384	101		40		789	40			81		728	202	142	81
1-4 inch dbh				101	182				324	20		40	223	20	81	121		425
4-8 inch dbh	20	81			40		20	20	20			40	81			223		202
8-12 inch dbh		81			40		20					40	81		40	20	81	
12-16 inch dbh	40	20				20		20					81					61
16-20 inch dbh								40										20
Total live	61	182	121	486	364	20	81	81	1133	61		121	546	20	850	566	283	728
<b>Populus deltoides</b>																		
<1 inch dbh																		
1-4 inch dbh																		
4-8 inch dbh																		
8-12 inch dbh																		
12-16 inch dbh																		
16-20 inch dbh																		
28-32 inch dbh																		
40-44 inch dbh																		
Total live																		
<b>Salix amygdaloides</b>																		
<1 inch dbh																		
1-4 inch dbh																		
4-8 inch dbh																		
8-12 inch dbh			20															
12-16 inch dbh			61															
16-20 inch dbh			61															
28-32 inch dbh																		
32-36 inch dbh																		
Total live			142															

TABLE D1

SHRUB AND TREE DENSITY (STEMS PER ACRE) FOR 4 PLOTS IN THE LOAMY OVERFLOW ECOLOGICAL SITE -  
VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006

	RIPARIAN WOODLAND																	
	PLOT NUMBER																	
	RW-1	RW-2	RW-3	RW-4	RW-5	RW-6	RW-7	RW-8	RW-9	RW-10	RW-11	RW-12	RW-13	RW-14	RW-15	RW-16	RW-17	RW-18
<b>Ulmus americana</b>																		
<1 inch dbh			61													1537	749	344
1-4 inch dbh																61		101
4-8 inch dbh			20													20		40
8-12 inch dbh			20															
12-16 inch dbh												20						
16-20 inch dbh																		
Total live			101										20		1618	749	486	
<b>TOTAL LOW SHRUBS</b>																		
IMMATURE			21752	2529	506		2529		6070	30352			1518	2529	8094	9612	16694	7082
MATURE			89033	10623	4047		16188		10623	47046			7082	31870	25294	41987	103703	33893
TOTAL LIVE			110786	13153	4553		18717		16694	77398			8600	34399	33387	51599	120397	40975
<b>TOTAL TALL SHRUBS</b>																		
IMMATURE			506				379	7082		759								506
MATURE			506					5059	3288	1897			632	2782				126
TOTAL LIVE			1012				379	12141	3288	2656			632	2782				632
<b>TOTAL SHRUBS</b>																		
IMMATURE			22258	2529	506		2909	7082	6070	31111			1518	2529	8094	9612	16694	7588
MATURE			89539	10623	4047		16188	5059	13911	48943			7715	34652	25294	41987	103703	34020
TOTAL LIVE			111797	13153	4553		19097	12141	19982	80054			9232	37182	33387	51599	120397	41608
<b>TOTAL TREES</b>																		
<1 INCH DBH	40		283	465	142		81		789	40			81		809	1740	1032	425
1-4 INCH DBH				202	243			101	324	20	40	40	223	20	223	182		526
4-8 INCH DBH	20	101	20	40	364		20	40	20			40	81		243	243		243
8-12 INCH DBH		81	40		81		20					40	81		101	20	81	
12-16 INCH DBH	61	20	61			20		20			20		81	20			61	
16-20 INCH DBH			61					40										20
28-32 INCH DBH																		
32-36 INCH DBH																		
40-44 INCH DBH																		
TOTAL LIVE	121	202	465	708	829	20	121	202	1133	61	61	121	546	40	1376	2185	1173	1214

Footnotes given on index page D-i.

TABLE D1

SHRUB AND TREE DENSITY (STEMS PER ACRE) FOR 4 PLOTS IN THE LOAMY OVERFLOW ECOLOGICAL SITE -  
VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006

	RIPARIAN WOODLAND														DECIDUOUS TREE WOODLAND			
	PLOT NUMBER														Mean	PLOT		Mean
	RW-19	RW-20	RW-21	RW-22	RW-23	RW-24	RW-25	RW-26	RW-27	RW-28	RW-29	RW-30	RW-31	RW-32	n=32	DTW-1	DTW-2	n=2
<b>LOW SHRUBS</b>																		
<b>Artemisia cana</b>																		
immature																		
mature			1518												47.4			
Total live			1518												47.4			
<b>Atriplex nuttallii</b>																		
immature																		
mature																2529		1264.7
Total live																2529		1264.7
<b>Ribes setosum</b>																		
immature		1012													142.3		506	252.9
mature		1518					2529	506	1012						316.2			
Total live		2529					2529	506	1012						458.4		506	252.9
<b>Rosa arkansana</b>																		
immature																		
mature																2529		1264.7
Total live																2529		1264.7
<b>Rosa woodsii</b>																		
immature		1518	1012												395.2			
mature		2023	5059												1217.2			
Total live		3541	6070												1612.5			
<b>Symphoricarpos occidentalis</b>																		
immature	17200	17705	21247			3541				2529					4932.2		506	252.9
mature	123938	105727	51093			41987				1012	20741				22795.8	26305	4553	15429.0
Total live	141138	123432	72339			45528				1012	23270				27728.0	26305	5059	15682.0
<b>TALL SHRUBS</b>																		
<b>Cornus stolonifera</b>																		
immature																		
mature															15.8			
Total live															15.8			

TABLE D1

SHRUB AND TREE DENSITY (STEMS PER ACRE) FOR 4 PLOTS IN THE LOAMY OVERFLOW ECOLOGICAL SITE -  
VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006

	RIPARIAN WOODLAND														DECIDUOUS TREE WOODLAND						
	PLOT NUMBER													Mean	PLOT		Mean				
	RW-19	RW-20	RW-21	RW-22	RW-23	RW-24	RW-25	RW-26	RW-27	RW-28	RW-29	RW-30	RW-31	RW-32	n=32	DTW-1	DTW-2	n=2			
<b>Lonicera tatarica</b>																					
immature																					
mature																					
Total live																					
<b>Prunus americana</b>																					
immature																					
mature																					
Total live																					
<b>Prunus virginiana</b>																					
immature	253	253				1012												885		442.6	
mature						5565												379		189.7	
Total live	253	253				6576												1265		632.4	
<b>Ribes odoratum</b>																					
immature																					
mature																					
Total live																					
<b>Salix exigua</b>																					
immature																					
mature																					
Total live																					
<b>Salix lutea</b>																					
immature																					
mature																					
Total live																					
<b>Shepherdia argentea</b>																					
immature																					
mature																		632		316.2	
Total live																		632		316.2	

TABLE D1

SHRUB AND TREE DENSITY (STEMS PER ACRE) FOR 4 PLOTS IN THE LOAMY OVERFLOW ECOLOGICAL SITE -  
VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006

	RIPARIAN WOODLAND														DECIDUOUS TREE WOODLAND			
	PLOT NUMBER													Mean	PLOT		Mean	
	RW-19	RW-20	RW-21	RW-22	RW-23	RW-24	RW-25	RW-26	RW-27	RW-28	RW-29	RW-30	RW-31	RW-32	n=32	DTW-1	DTW-2	n=2
<b>TREES</b>																		
<b>Acer negundo</b>																		
<1 inch dbh	40	81					405	40							34.1			
1-4 inch dbh		40													15.2			
4-8 inch dbh		61										40			23.4			
8-12 inch dbh								20				40	20		5.7			
12-16 inch dbh							20					40			3.2			
16-20 inch dbh																		
Total live	40	182					425	61				121	20		81.6			
<b>Fraxinus pennsylvanica</b>																		
<1 inch dbh	910	61	61			20			40						118.9		20	10.1
1-4 inch dbh	20					101							20		52.5	142	40	91.0
4-8 inch dbh		40	20	20	61	20			61				40		31.6	61	121	91.0
8-12 inch dbh		81			61	20			40	40		101		81	25.9		121	60.7
12-16 inch dbh				20					40			101	40	40	15.2		20	10.1
16-20 inch dbh															1.9			
Total live	931	182	81	40	121	162	0	40	182			202	40	182	245.9	202	324	263.0
<b>Populus deltoides</b>																		
<1 inch dbh																		
1-4 inch dbh																		
4-8 inch dbh																		
8-12 inch dbh																		
12-16 inch dbh																		
16-20 inch dbh																		
28-32 inch dbh									20						0.6			
40-44 inch dbh									20						0.6			
Total live									40						1.3			
<b>Salix amygdaloides</b>																		
<1 inch dbh																		
1-4 inch dbh																		
4-8 inch dbh																		
8-12 inch dbh															0.6			
12-16 inch dbh															1.9			
16-20 inch dbh															1.9			
28-32 inch dbh									20						0.6			
32-36 inch dbh									20						0.6			
Total live									40						5.7			



TABLE D1

SHRUB AND TREE DENSITY (STEMS PER ACRE) FOR 4 PLOTS IN THE LOAMY OVERFLOW ECOLOGICAL SITE -  
VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006

	RIPARIAN WOODLAND														DECIDUOUS TREE WOODLAND			
	PLOT NUMBER													Mean	PLOT		Mean	
	RW-19	RW-20	RW-21	RW-22	RW-23	RW-24	RW-25	RW-26	RW-27	RW-28	RW-29	RW-30	RW-31	RW-32	n=32	DTW-1	DTW-2	n=2
<b>Ulmus americana</b>																		
<1 inch dbh	202	20	61												92.9			
1-4 inch dbh															5.1			
4-8 inch dbh			40			20									4.4			
8-12 inch dbh															0.6			
12-16 inch dbh									20						1.3			
16-20 inch dbh																		
Total live	202	20	101			20			20						104.3			
<b>TOTAL LOW SHRUBS</b>																		
IMMATURE	17200	20235	22258			3541			2529						5469.7		1012	505.9
MATURE	123938	109268	57669			41987			2529	1518	21752				24376.6	31364	4553	17958.4
TOTAL LIVE	141138	129503	79927			45528			2529	1518	24282				29846.3	31364	5565	18464.3
<b>TOTAL TALL SHRUBS</b>																		
IMMATURE	253	253				1012									335.9	885		442.6
MATURE						5565									620.5	1012		505.9
TOTAL LIVE	253	253				6576									956.4	1897		948.5
<b>TOTAL SHRUBS</b>																		
IMMATURE	17453	20488	22258			4553			2529						5805.7	885	1012	948.5
MATURE	123938	109268	57669			47552			2529	1518	21752				24997.1	32376	4553	18464.3
TOTAL LIVE	141391	129756	79927			52105			2529	1518	24282				30802.8	33261	5565	19412.8
<b>TOTAL TREES</b>																		
<1 INCH DBH	1153	162	121			20		405	81						245.9		20	10.1
1-4 INCH DBH	20	40				101							20		72.7	142	40	91.0
4-8 INCH DBH		101	61	20	61	40			61				40	40	59.4	61	121	91.0
8-12 INCH DBH		81			61	20		40	61			101	40	101	32.9		121	60.7
12-16 INCH DBH				20				20	40	20		101	81	40	21.5		20	10.1
16-20 INCH DBH															3.8			
28-32 INCH DBH									20	20					1.3			
32-36 INCH DBH									20						0.6			
40-44 INCH DBH									20						0.6			
TOTAL LIVE	1173	384	182	40	121	182		465	283	61		202	162	202	438.7	202	324	263.0

Footnotes given on index page D-i.

TABLE D2

SHRUB AND TREE DENSITY (STEMS PER ACRE) FOR 4 PLOTS IN THE LOAMY OVERFLOW ECOLOGICAL SITE – VEGETATION STUDY AREA  
STARK COUNTY, NORTH DAKOTA, 2006-2007

	LOAMY OVERFLOW				
	PLOT NUMBER				Mean
	LyOv-1	LyOv-2	LyOv-3	LyOv-4	n=4
<b>LOW SHRUBS</b>					
<b>Artemisia cana</b>					
immature		1518			379.4
mature	506	3541		1012	1264.7
Total live	506	5059		1012	1644.1
<b>Rosa woodsii</b>					
immature					
mature		3035	1518	2023	1644.1
Total live		3035	1518	2023	1644.1
<b>Symphoricarpos occidentalis</b>					
immature	4047	5565	506	2529	3161.7
mature	76386	167949	158843	138608	135446.7
Total live	80433	173513	159349	141138	138608.4
<b>TOTAL LOW SHRUBS</b>					
IMMATURE	4047	7082	506	2529	3541.1
MATURE	76892	174525	160361	141644	138355.4
TOTAL LIVE	80939	181607	160867	144173	141896.5
<b>TOTAL SHRUBS</b>					
IMMATURE	4047	7082	506	2529	3541.1
MATURE	76892	174525	160361	141644	138355.4
TOTAL LIVE	80939	181607	160867	144173	141896.5

Footnotes given on index page D-i.