At the New Mexico NRCS Technical Resources Web Site, http://www.nm.nrcs.usda.gov/technical/tech-notes/range.html, click on the Excel file that applies to the method (single rank or multiple ranks) used to collect data. Save the file to your computer. The technical note (http://www.nm.nrcs.usda.gov/technical/tech-notes/range/range104.pdf) mentions 2 spreadsheets (a sample version and an empty "ready-to-use" version) for each method. The spreadsheets (now only one per method) have since been updated and include sample data that is cleared by running a macro.

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Range Technical Note

The following documents require Adobe Acrobat, or Microsoft Word.

NUMBER	DATE ISSUED	RANGE TECH NOTE SUBJECT
RNGE-106	1/29/10	Transmittal - Grazing Lands Conservation Planning Tool (PDF; 168 KB) Grazing Lands Conservation Planning Tool (XLS; 1790 KB) Grazing Lands Conservation Planning Tool - Sample (XLS; 1629 KB) Grazing Lands Conservation Planning Tool Field Sheet (PDF; 51 KB)
RNGE-105	10/29/09	The "Hemi Exclosure" a new tool for Riparian Protection (PDF; 601 KB)
RNGE-104	10/26/09	Transmittal - Hybrid Sampling Procedure for Developing Ecological Site Descriptions (PDF; 37 KB)
		Dry-Weight-Rank Field Sheet (PDF; 14 KB)
		Dry-Weight-Rank Field Sheet (single-ranks sample) (PDF; 165 KB)
		Dry-Weight-Rank Field Sheet (multiple-ranks sample) (PDF; 165 KB)
		Expanded-Plot Field Sheet (PDF; 10 KB)
		Expanded-Plot Field Sheet (sample) (PDF; 30 KB)
		Community Production Spreadsheet (single ranks) (XLS; 1284 KB)
		Community Production Spreadsheet (single-ranks sample) (XLS; 1287 KB)
		Community Production Spreadsheet (multiple ranks) (XLS; 1626 KB)
		Community Production Spreadsheet (multiple-ranks sample) (XLS; 1630 KB)
		Tutorial (PDF; 569 KB)
RNGE-103	3/19/09	Transmittal - New Mexico Department of Game and Fish Recommendations for Constructing Wire Fences for Livestock in Big Game Habitats (PDF; 447 KB)

Hit Ctrl+d to run a macro that clears all sample data and notes.

Enter dry-weight-rank (DWR) quadrat dimensions in “DWR Summary" Worksheet.

	A	B	C	D	E
1		Σ			
2		mean			
3	Sample Quadrats			Harvested Quadrats	
4	Rank	Tally	Total X Rank	Rank	Avg. Weight

Quadrat dimensions						Quadrat area			
Side 1		Side 2		diameter		rectangular		circular	
in	cm	in	cm	in	cm	in^2	cm^2	in^2	cm^2
	40		40				1600		

Macros used in this workbook

Ctrl+f Filters, sorts, and imports sample quadrat data displayed in Columns A, B, and C in this worksh

Ctrl+w Runs regression analysis on harvested quadrats to determine production (regression analysis ou

Ctrl+d Deletes all sample data and notes in this workbook.

After entering all data, run macros Ctrl+f and Ctrl+w in succession to recalculate total production.

Read Me | DWR Summary | DWR | Expanded plot-woodies | Expanded plot-succulents

Enter surface cover, standard, weight (if clipped), rank, and species code for all sampled plots in "DWR" Worksheet.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	# plots		Cover type		B	H	W	RF	C	BR	O	Notes:								
2	25		Cover (%)		4.0	8.0	12.0	12.0	20.0	24.0	20.0									
3			Rank Tally		BOGR2	KRLA2	BOCU	PASM	GUSA2											
4	Σ		25	1	12	5	4	2	2											
5	Σ		20	2	6	8	5	1	0											
6	Σ		15	3	4	3	4	4	0											
7			Weighting		BOGR2	KRLA2	BOCU	PASM	GUSA2											
8	Σ		175	7	84	35	28	14	14											
9	Σ		40	2	12	16	10	2	0											
10	Σ		15	1	4	3	4	4	0											
11	Σ	230	Weighted		100	54	42	20	14											
12	Σ	100	Composition (%)		43	23	18	9	6											
13	Reconstruction factors			Air Dry Wt																
14				Ungrazed																
15				Growth																
16				Climate																
17	Reconstructed Community Production		Species		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
18–21					BOGR2	KRLA2	BOCU	PASM	GUSA2											
22			kg/ha																	
23			lbs/ac																	
24	Plot	Cover	Standard	Weight	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank
25	1	B	1	11	1															
26	2	O	2	25	1															
27	3	C	5	83	1	2														
28	4	C	3	44	1	2														
29	5	BR	4	61	1	2		3												
30	6	RF	2.5		1	2		3												
31	7	H	2		1	2		3												
32	8	BR	3.5		1	2		3												
33	9	C	3.5		1	3	2													

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Note: Enter green (fresh, undried) weight for harvested quadrats (standards). Rank species by their green weight. Reconstruction factors adjust production values accordingly.

If using workbook for multiple ranks, each species has 3 columns for rank.

Enter Rank 1 in left column, Rank 2 in center column, and Rank 3 in right column.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
1	# plots		Cover type		B	H	W	RF	C	BR	O	Notes:																					
2	25		Cover (%)		4.0	8.0	12.0	12.0	20.0	24.0	20.0																						
3			Rank Tally		BOGR2			KRLA2			BOCU			PASM			GUSA2																
4	Σ		25	1	12			5			4			2			2																
5	Σ		25	2	9			9			5			2			0																
6	Σ		25	3	9			5			5			6			0																
7			Weighting		BOGR2			KRLA2			BOCU			PASM			GUSA2																
8	Σ		175	7	84			35			28			14			14																
9	Σ		50	2	18			18			10			4			0																
10	Σ		25	1	9			5			5			6			0																
11	Σ	250	Weighted		111			58			43			24			14																
12	Σ	100	Composition (%)		44			23			17			10			6																
13	Reconstruction factors			Air Dry Wt																													
14				Ungrazed																													
15				Growth																													
16				Climate																													
17–19	Reconstructed Community Production		Species		1			2			3			4			5			6			7			8			9			10	
20–21					BOGR2			KRLA2			BOCU			PASM			GUSA2																
22			kg/ha																														
23			lbs/ac																														
24	Plot	Cover	Standard	Weight	Rank			Rank			Rank			Rank			Rank			Rank			Rank			Rank			Rank			Rank	
25	1	B	1	11	1				2				3																				
26	2	O	2	25	1				2				3																				
27	3	C	5	83	1				2				3																				
28	4	C	3	44	1				2				3																				
29	5	BR	4	61	1				2				3																				
30	6	RF	2.5		1				2							3																	
31	7	H	2		1				2							3																	
32	8	BR	3.5		1				2							3																	
33	9	C	3.5		1				2							3																	

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Enter reconstruction factors for each species.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	# plots		Cover type		B	H	W	RF	C	BR	O	Notes:								
2	25		Cover (%)		4.0	8.0	12.0	12.0	20.0	24.0	20.0									
3			Rank Tally		BOGR2	KRLA2	BOCU	PASM	GUSA2											
4	Σ		25	1	12	5	4	2	2											
5	Σ		20	2	6	8	5	1	0											
6	Σ		15	3	4	3	4	4	0											
7			Weighting		BOGR2	KRLA2	BOCU	PASM	GUSA2											
8	Σ		175	7	84	35	28	14	14											
9	Σ		40	2	12	16	10	2	0											
10	Σ		15	1	4	3	4	4	0											
11	Σ	230	Weighted		100	54	42	20	14											
12	Σ	100	Composition (%)		43	23	18	9	6											
13	Reconstruction factors			Air Dry Wt	80%	50%	80%	95%	50%											
14				Ungrazed	50%	90%	50%	80%	90%											
15				Growth	80%	90%	80%	90%	90%											
16				Climate	80%	80%	80%	90%	80%											
17–19	Reconstructed Community Production		Species		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
20–21					BOGR2	KRLA2	BOCU	PASM	GUSA2											
22			kg/ha																	
23			lbs/ac																	
24	Plot	Cover	Standard	Weight	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank
25	1	B	1	11	1															
26	2	O	2	25	1															
27	3	C	5	83	1	2														
28	4	C	3	44	1	2														
29	5	BR	4	61	1	2		3												
30	6	RF	2.5		1	2		3												
31	7	H	2		1	2		3												
32	8	BR	3.5		1	2		3												
33	9	C	3.5		1	3	2													

Read Me | DWR Summary | **DWR** | Expanded plot-woodies | Expanded plot-succulents

Hit "Ctrl+f" from anywhere in workbook to run a macro that filters and sorts sample quadrat data and displays them in Columns A, B, and C in "DWR Summary" Worksheet. Harvested quadrat data summary is displayed in Columns D and E.

	A	B	C	D	E
1		Σ	63	15	228.0
2		mean	2.52	3	45.6
3	Sample Quadrats			Harvested Quadrats	
4	Rank	Tally	Total X Rank	Rank	Avg. Weight
5	1	3	3	1	10.0
6	1.5	4	6	2	27.0
7	2	5	10	3	46.0
8	2.5	4	10	4	62.0
9	3	2	6	5	83.0
10	3.5	3	10.5		
11	4	2	8		
12	4.5	1	4.5		
13	5	1	5		

Quadrat dimensions						Quadrat area			
Side 1		Side 2		diameter		rectangular		circular	
in	cm	in	cm	in	cm	in^2	cm^2	in^2	cm^2
	40		40				1600		

Macros used in this workbook

Ctrl+f Filters, sorts, and imports sample quadrat data displayed in Columns A, B, and C in this worksh

Ctrl+w Runs regression analysis on harvested quadrats to determine production (regression analysis ou

Ctrl+d Deletes all sample data and notes in this workbook.

After entering all data, run macros Ctrl+f and Ctrl+w in succession to recalculate total production.

Read Me | DWR Summary | DWR | Expanded plot-woodies | Expanded plot-succulents

Hit "Ctrl+w" from anywhere in workbook to run a macro that calculates regression and displays output in "Read Me" Worksheet.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	***Hover cursor over cells with red triangle in upper right corner to reveal comment, starting with this one.***												
2	Location					Notes							
3	Soil Survey Area					Map Unit					Map Unit Component		
4	Name					ESD Name					S&T State		
5	Date					ESD ID					S&T Plant Community		
6													
7													
8	Regression Output												
9													
10	Standard	Weight	x*y	x^2	y^2	Σ x*y	Σ x * Σ y	Σ x^2	(Σ x)^2	(Σ y)^2	Σ y^2	Σ x	Σ y
11	1	11	11	1	121	1315	9325	85	625	139129	20487	25	373
12	1	9	9	1	81								
13	2	25	50	4	625	n	slope	intercept	r	r^2			
14	2	29	58	4	841	9	17.93	-8.36	0.9972	0.9944			
15	3	44	132	9	1936								
16	3	48	144	9	2304								
17	4	61	244	16	3721								
18	4	63	252	16	3969								
19	5	83	415	25	6889								

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Unreconstructed production data appear in “DWR Summary" Worksheet.

	A	B	C	D	E
1		Σ	63	15	228.0
2		mean	2.52	3	45.6
3	Sample Quadrats			Harvested Quadrats	
4	Rank	Tally	Total X Rank	Rank	Avg. Weight
5	1	3	3	1	10.0
6	1.5	4	6	2	27.0
7	2	5	10	3	46.0
8	2.5	4	10	4	62.0
9	3	2	6	5	83.0
10	3.5	3	10.5		
11	4	2	8		
12	4.5	1	4.5		
13	5	1	5		

Quadrat dimensions						Quadrat area			
Side 1		Side 2		diameter		rectangular		circular	
in	cm	in	cm	in	cm	in^2	cm^2	in^2	cm^2
	40		40				1600		

	36.8	grams/quadrat
Ŷ =	2301	kg/ha
	2053	lbs/ac

Macros used in this workbook

Ctrl+f Filters, sorts, and imports sample quadrat data displayed in Columns A, B, and C in this worksh

Ctrl+w Runs regression analysis on harvested quadrats to determine production (regression analysis ou

Ctrl+d Deletes all sample data and notes in this workbook.

After entering all data, run macros Ctrl+f and Ctrl+w in succession to recalculate total production.

Read Me | DWR Summary | DWR | Expanded plot-woodies | Expanded plot-succulents

Cover values and reconstructed DWR community production and production by species values appear in "DWR" Worksheet.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	# plots		Cover type		B	H	W	RF	C	BR	O	Notes:								
2	25		Cover (%)		4.0	8.0	12.0	12.0	20.0	24.0	20.0									
3			Rank Tally		BOGR2	KRLA2	BOCU	PASM	GUSA2											
4	Σ		25	1	12	5	4	2	2											
5	Σ		20	2	6	8	5	1	0											
6	Σ		15	3	4	3	4	4	0											
7			Weighting		BOGR2	KRLA2	BOCU	PASM	GUSA2											
8	Σ		175	7	84	35	28	14	14											
9	Σ		40	2	12	16	10	2	0											
10	Σ		15	1	4	3	4	4	0											
11	Σ	230	Weighted		100	54	42	20	14											
12	Σ	100	Composition (%)		43	23	18	9	6											
13	Reconstruction factors			Air Dry Wt	80%	50%	80%	95%	50%											
14				Ungrazed	50%	90%	50%	80%	90%											
15				Growth	80%	90%	80%	90%	90%											
16				Climate	80%	80%	80%	90%	80%											
17	Reconstructed Community Production				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
20			Species		BOGR2	KRLA2	BOCU	PASM	GUSA2											
22	4371		kg/ha		2502	417	1051	293	108											
23	3899		lbs/ac		2232	372	937	262	96											
24	Plot	Cover	Standard	Weight	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank
25	1	B	1	11	1															
26	2	O	2	25	1															
27	3	C	5	83	1	2														
28	4	C	3	44	1	2														
29	5	BR	4	61	1	2		3												
30	6	RF	2.5		1	2		3												
31	7	H	2		1	2		3												
32	8	BR	3.5		1	2		3												
33	9	C	3.5		1	3	2													

Read Me | DWR Summary | **DWR** | Expanded plot-woodies | Expanded plot-succulents

In "Expanded plot-woodies" Worksheet, enter plot size and reconstruction factors, species code, weight unit, and number of weight units per plot for woody species.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	# plots =	4	0.01	← Enter size of expanded plot in acres (use 0.01 for a 1/100-acre plot).								ft^2	m^2	acres	Reconstructed woody produ		
2															45 kg/ha		40 l
3	Air Dry Wt	50%	50%	60%	40%												
4	Ungrazed	80%	70%	90%	90%												
5	Growth	90%	90%	90%	90%												
6	Climate	80%	80%	80%	80%												
7	kg/ha	15	5	21	5												
8	lbs/ac	13	4	19	4												
9		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10	Species	ATCA2	ARTR2	ERNA10	SAVE4												
11	Weight unit (g)	25	25	15	20												
12	Plot 1	7	2														
13	2	1		15													
14	3		1		4												
15	4	3		10	2												
16	5																
17	6																
18	7																
19	8																
20	9																
21	10																
22	11																
23	12																
24	13																
25	14																
26	15																
27	16																
28	17																
29	18																
30	19																
31	20																
32	21																
33	22																
34	23																

Read Me | DWR Summary | DWR | **Expanded plot-woodies** | Expanded plot-succulents

Reconstructed expanded plot production of woody species and total woody production values are displayed.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	# plots =	4	0.01	← Enter size of expanded plot in acres (use 0.01 for a 1/100-acre plot).								ft^2	m^2	acres	Reconstructed woody production			
2															45 kg/ha		40 lbs/ac	
3	Air Dry Wt	50%	50%	60%	40%													
4	Ungrazed	80%	70%	90%	90%													
5	Growth	90%	90%	90%	90%													
6	Climate	80%	80%	80%	80%													
7	kg/ha	15	5	21	5													
8	lbs/ac	13	4	19	4													
9		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
10	Species	ATCA2	ARTR2	ERNA10	SAVE4													
11	Weight unit (g)	25	25	15	20													
12	Plot 1	7	2															
13	2	1		15														
14	3		1		4													
15	4	3		10	2													
16	5																	
17	6																	
18	7																	
19	8																	
20	9																	
21	10																	
22	11																	
23	12																	
24	13																	
25	14																	
26	15																	
27	16																	
28	17																	
29	18																	
30	19																	
31	20																	
32	21																	
33	22																	
34	23																	

Read Me | DWR Summary | DWR | **Expanded plot-woodies** | Expanded plot-succulents

In "Expanded plot-succulents" Worksheet, enter reconstruction factors, species code, weight unit, and number of weight units per plot for succulent species.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	# plots =	4	Plot size =	0.01	acres		Reconstructed succulent production				Notes:							
2							8 kg/ha		7 lbs/ac									
3	Conversion/Air Dry Wt	10%	50%	5%		15%	60%											
4	Ungrazed	80%	90%	100%		95%	80%											
5	Growth	90%		90%		90%												
6	Climate	100%		100%		100%												
7	kg/ha	1.37	1.53	0.10		2.38	2.57											
8	lbs/ac	1.22	1.36	0.09		2.13	2.30											
9		1		2		3		4		5		6		7		8		9
10	Species	OPUNT		FEEM		CYIM2												
11	Plant part	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg
12	Weight unit	10	5	10		20	10											
13	Plot 1	12	8			6	3											
14	2	4		3		5	2											
15	3																	
16	4																	
17	5																	
18	6																	
19	7																	
20	8																	
21	9																	
22	10																	
23	11																	
24	12																	
25	13																	
26	14																	
27	15																	
28	16																	
29	17																	
30	18																	
31	19																	
32	20																	
33	21																	
34	22																	
35	23																	

Read Me | DWR Summary | DWR | Expanded plot-woodies | **Expanded plot-succulents**

Reconstructed expanded plot production of succulent species and total succulent production values are displayed.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	# plots =	4	Plot size =	0.01	acres		Reconstructed succulent production				Notes:							
2							8 kg/ha		7 lbs/ac									
3	Conversion/Air Dry Wt	10%	50%	5%		15%	60%											
4	Ungrazed	80%	90%	100%		95%	80%											
5	Growth	90%		90%		90%												
6	Climate	100%		100%		100%												
7	kg/ha	1.37	1.53	0.10		2.38	2.57											
8	lbs/ac	1.22	1.36	0.09		2.13	2.30											
9		1		2		3		4		5		6		7		8		9
10	Species	OPUNT		FEEM		CYIM2												
11	Plant part	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg	fruit	veg
12	Weight unit	10	5	10		20	10											
13	Plot 1	12	8			6	3											
14	2	4		3		5	2											
15	3																	
16	4																	
17	5																	
18	6																	
19	7																	
20	8																	
21	9																	
22	10																	
23	11																	
24	12																	
25	13																	
26	14																	
27	15																	
28	16																	
29	17																	
30	18																	
31	19																	
32	20																	
33	21																	
34	22																	
35	23																	

Read Me | DWR Summary | DWR | Expanded plot-woodies | **Expanded plot-succulents**

Expanded plot production is automatically included in reconstructed community production in "DWR" Worksheet.

Rename and save file.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	# plots		Cover type		B	H	W	RF	C	BR	O	Notes:								
2	25		Cover (%)		4.0	8.0	12.0	12.0	20.0	24.0	20.0									
3			Rank Tally		BOGR2	KRLA2	BOCU	PASM	GUSA2											
4	Σ		25	1	12	5	4	2	2											
5	Σ		20	2	6	8	5	1	0											
6	Σ		15	3	4	3	4	4	0											
7			Weighting		BOGR2	KRLA2	BOCU	PASM	GUSA2											
8	Σ		175	7	84	35	28	14	14											
9	Σ		40	2	12	16	10	2	0											
10	Σ		15	1	4	3	4	4	0											
11	Σ	230	Weighted		100	54	42	20	14											
12	Σ	100	Composition (%)		43	23	18	9	6											
13	Reconstruction factors			Air Dry Wt	80%	50%	80%	95%	50%											
14				Ungrazed	50%	90%	50%	80%	90%											
15				Growth	80%	90%	80%	90%	90%											
16				Climate	80%	80%	80%	90%	80%											
17	Reconstructed Community Production		Species		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
18–21					BOGR2	KRLA2	BOCU	PASM	GUSA2											
22	4424		kg/ha		2502	417	1051	293	108											
23	3947		lbs/ac		2232	372	937	262	96											
24	Plot	Cover	Standard	Weight	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank
25	1	B	1	11	1															
26	2	O	2	25	1															
27	3	C	5	83	1	2														
28	4	C	3	44	1	2														
29	5	BR	4	61	1	2		3												
30	6	RF	2.5		1	2		3												
31	7	H	2		1	2		3												
32	8	BR	3.5		1	2		3												
33	9	C	3.5		1	3	2													

Read Me | DWR Summary | **DWR** | Expanded plot-woodies | Expanded plot-succulents