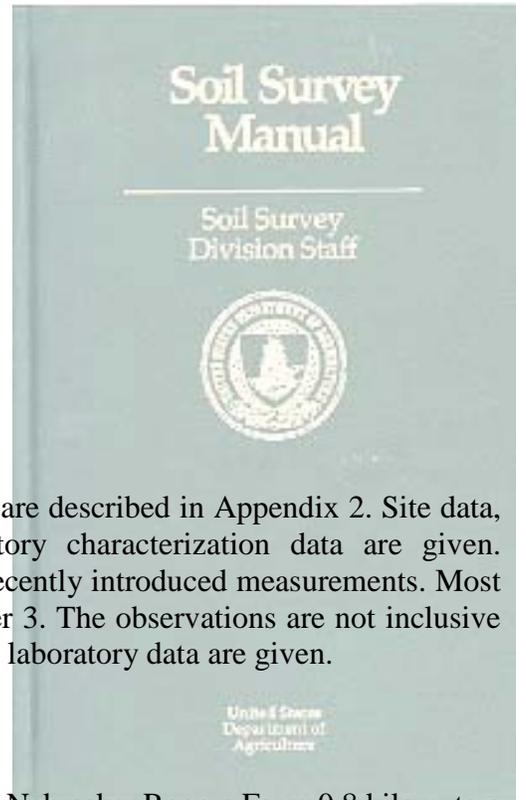


## APPENDIX

# 3

## Pedon Data



**P**edons were sampled in each of the map units that are described in Appendix 2. Site data, a detailed soil profile description, and laboratory characterization data are given. Recorded field observations show several of the recently introduced measurements. Most measurements and classifications are discussed in Chapter 3. The observations are not inclusive of what should or could be done. For each pedon, selected laboratory data are given.

### Sharpsburg Pedon Description

Location: Lancaster County, Nebraska, University of Nebraska, Rogers Farm 0.8 kilometers south and 4.5 kilometers east of Prairie Home; 378 m west and 74 m south of the northeast corner sec. 12; NW 1/4, NW 1/4, NE 1/4, NE 1/4, sec. 12, T10N, R8E.

Classification: fine, smectitic, mesic Typic Argiudolls

Vegetation: Soybean (*Glycine max* (L.) Merr.) recently harvested

Parent material: Loess

Physiography: Lower side slope

Relief: 15 to 50 m

Elevation: 368 m

Slope: 5 percent

Aspect: 310° (NW)

Erosion: Slight

Drainage: Moderately well

Ground water: Deep

Salt or alkali: None

Stoniness: None

Described and sampled by: R.W. Fenwick and R.B. Grossman, November 7, 1988.

Soil Number: S88NE-109-020.

Remarks: The upper part of the soil is assumed to be developed in Wisconsin loess and the lower part in Illinoian loess. Part of the delineation lacked sufficient depth of a moist color value of 3 or less for a Mollisol probably because of postcultural erosion. A site was selected in a lower backslope position within a few tens of meters of alluvial fill where postcultural erosion had been relatively less. The position in the landscape is not typical for the naming soil of the map unit.

**Ap1** - 0 to 8 cm; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; slightly hard, friable; many fine and very fine roots; common fine vesicular pores; strongly acid<sup>1</sup>; clear smooth boundary.

**Ap2** - 8 to 18 cm; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; slightly hard, friable; many fine and very fine roots; common fine vesicular pores; strongly acid; abrupt smooth boundary.

**FIGURE A-1**



Interrow on harvested soybeans, 35 to 40 percent covered by crop residue. Not compacted by traffic during harvest. Yellow object in photo is 5x2 cm in size.

**A** - 18 to 28 cm; dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; hard, friable; common fine roots; numerous worm casts; common fine tubular pores; moderately acid; clear smooth boundary.

**BAt** - 28 to 38 cm; dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure parting to moderate very fine subangular blocky; hard, friable; many fine roots; many fine tubular pores; few dark fillings in root channels; faint clay films on faces of peds; moderately acid; clear smooth boundary.

**Bt1** - 38 to 51 cm; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to moderate fine subangular blocky; hard, friable; common fine roots; few fine tubular pores; faint dark clay films on faces of peds; slightly acid; gradual smooth boundary.

<sup>1</sup> Low pH probably due to nitrogen fertilizer additions.

**Bt2** - 51 to 76 cm; brown (10YR 4/3) silty clay loam, brown (10YR 5/3) dry; weak medium prismatic structure parting to moderate fine subangular blocky; hard, firm; common fine roots; faint clay films on faces of peds; slightly acid; gradual smooth boundary.

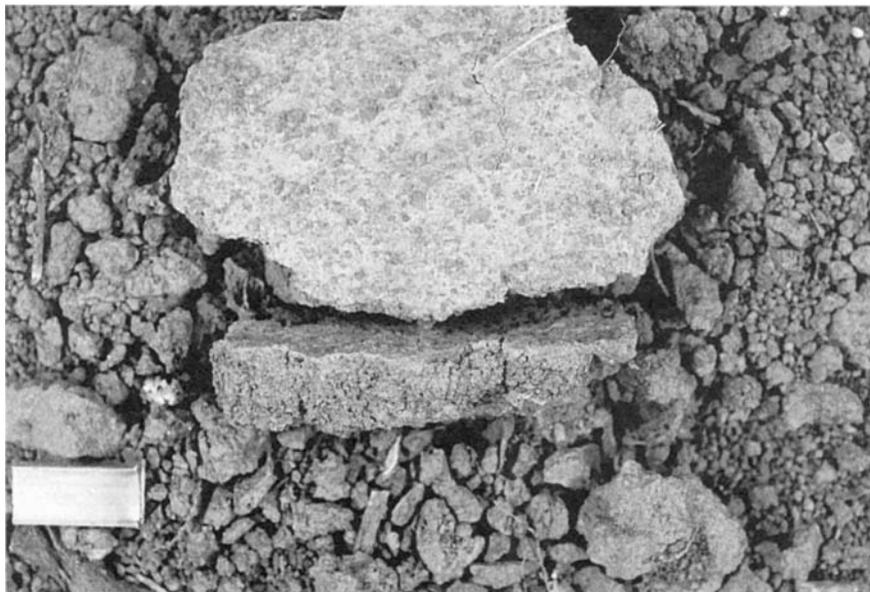
**BC1** - 76 to 94 cm; brown (10YR 4/3) and pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) and very pale brown (10YR 7/3) dry; few fine faint yellowish brown (10YR 5/6) iron concretions; moderate fine prismatic structure; hard, firm; few dark brown (10YR 3/3) coatings on faces of peds; few fine roots; slightly acid; gradual smooth boundary.

**BC2** - 94 to 112 cm; brown (10YR 4/3) silty clay loam, brown (10YR 5/3) dry; few fine faint yellowish brown (10YR 5/4 and 5/6) iron concretions; weak medium prismatic structure; hard, firm; streaks of pale brown (10YR 6/3) and very dark grayish brown (10YR 3/2) along surfaces of peds; neutral; gradual smooth boundary.

**BCb** - 112 to 142 cm; brown (7.5YR 5/4) silty clay loam, light brown (7.5YR 6/4) dry; common fine faint yellowish brown (10YR 5/6) iron concretions; moderate medium prismatic structure; hard, friable; common coatings of dark brown (7.5YR 3/2) on surfaces of peds; neutral; gradual smooth boundary.

**C** - 142 to 178 cm; brown (7.5YR 4/4) and dark reddish brown (5YR 3/3) silty clay loam, light brown (7.5YR 6/4) and reddish brown (5YR 4/3) dry; few fine faint strong brown (7.5YR 5/6) iron concretions; massive; hard friable, neutral.

**FIGURE A-2**



Raindrop impact crust specimens from interrow which was compacted during harvest. Object in photo is 1 cm in length.

Surface, near surface: The sampling trench extended across four interrows. Figure A-1 shows an interrow that did not undergo traffic and related compaction during harvest. The adjacent interrow to the right underwent traffic during harvest and related compaction. The other two interrows did not undergo traffic in harvest. Two of the interrows, including the one shown in figure A-1, are 35 to 40 percent covered by crop residue. The other two are 75 to 100 percent covered by crop residue. Linear roughness was measured based on 31 points, 5 cm apart. The

standard deviation for the axis of the nontraffic interrow shown in figure 1 was 0.26 cm. For the adjacent interrow that underwent traffic during harvest, the standard deviation was 1.3 cm. Raindrop impact crust was present in convex locations.

Figure A-2 shows the crust specimen. Median rupture resistance of the crust was 5 N with a range of 5 to 7 N for eleven specimens. The crust was in the moderate class. The strongly reconstituted part of the crust was 1 to 2 mm thick. The crust in the concave interrow axis was somewhat weaker. The median was 4 N with a range of 2 to 5 N (weak to moderate) for 11 specimens. Thickness was 2 to 3 mm.

The Ap horizon consists of two subhorizons (fig. A-3). The Ap1 had been subject recently to mechanical bulking and the Ap2 to mechanical compaction. The Ap2 averages 15 cm thick in the second interrow, which was subject to mechanical compaction during harvest. The other three interrows range narrowly in average thickness from 7 to 8 cm. Penetration resistance was measured at 17 points 5 to 10 cm apart where the Ap2 horizon was relatively strongly expressed. The median was 2.2 MPa with a range of 1.7 to 2.6 MPa. The water content was 22.1 percent. The suction should be between 1/3 and 2 bar (Baumer, 1986).

**FIGURE A-3**



Two subhorizons of the Ap horizon of Sharpsburg silty clay loam. The Ap1 (0-8 cm) has been mechanically bulked and the Ap2 (8-16 cm) has been mechanically compacted

*** PRIMARY CHARACTERIZATION DATA ***																						
(LANCASTER COUNTY, NEBRASKA)																		PRINT DATE 11/06/90				
S88NE-109-020																						
SAMPLED AS : SHARPSBURG; FINE, MONTMORILLONITIC, MESIC, TYPIC ARGIUOLL																						
NSSL - PROJECT 89P 18, LANCASTER CO																		U.S. DEPARTMENT OF AGRICULTURE				
- PEDON 89P 85, SAMPLES 89P 770-779																		SOIL CONSERVATION SERVICE				
- GENERAL METHODS 1B1A, 2A1, 2B																		NATIONAL SOIL SURVEY LABORATORY				
																		LINCOLN, NEBRASKA 68508-3866				
	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10--	-11--	-12--	-13--	-14--	-15--	-16--	-17--	-18--	-19--	-20--		
SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL			CLAY		SILT		SAND					COARSE		FRACTIONS (MM)			(>2MM) WT PCT OF WHOLE SOIL		
			CLAY LT .002	SILT .002	SAND .05	FINE LT .0002	CO3 LT .002	FINE .002	COARSE .02	VF .05	F .10	M .25	C .5	VC 1	2	5	20	.1				
			←		PCT		OF <2MM		(3A1)		→					←		PCT OF <75MM(3B1)			→	
89P 770S	0- 8	Ap1	30.6	65.9	3.5			20.9	45.0	3.4	0.1	--	--	--	--	--	--	--	TR	--		
89P 771S	8- 18	Ap2	33.1	63.5	3.4			21.0	42.5	3.3	0.1	--	--	--	--	--	--	--	TR	--		
89P 772S	18- 28	A	37.8	59.1	3.1			21.4	37.7	3.1	--	--	--	--	--	--	--	--	--	--		
89P 773S	28- 38	BAt	38.6	58.8	2.6			21.9	36.9	2.6	--	--	--	--	--	--	--	--	--	--		
89P 774S	38- 51	Bt1	39.8	57.9	2.3			22.4	35.5	2.3	--	--	--	--	--	--	--	--	--	--		
89P 775S	51- 76	Bt2	38.0	60.1	1.9			24.9	35.2	1.9	--	--	--	--	--	--	--	--	--	--		
89P 776S	76- 94	Bc1	31.1	65.3	3.6			30.7	34.6	2.2	0.8	0.4	0.2	--	--	--	--	--	1	--		
89P 777S	94- 112	Bc2	31.0	64.5	4.5			31.3	33.2	2.2	1.3	0.9	0.1	--	--	--	--	--	2	--		
89P 778S	112- 142	Bcb	32.2	62.0	5.8			29.2	32.9	3.1	1.5	1.0	0.2	--	--	--	--	--	3	--		
89P 779S	142- 178	C	31.8	61.9	6.3			26.1	35.8	3.2	1.7	1.2	0.2	--	--	--	--	--	3	--		

DEPTH (CM)	ORGN C	TOTAL N	EXTR P	TOTAL S				DITH-CIT EXTRACTABLE				(RATIO/CLAY)				ATTERBERG				(- BULK DENSITY -)				COLE				(WATER CONTENT)				WRD WHOLE SOIL
				6A1C PCT	6B3A <2MN	6S3 PPM	6R3A PERCENT	62CB	6G7A	6D2A	8D1	CEC	BAR	15	LL	PI	MOIST	4F1	4F	4A3A	4A1D	4A1H	4D1	4D1	4B4	4B1C	4B1C	4B1C	15	4B2a	4C1	
0- 8	2.05										0.39																			11.9		
8- 18	1.80										0.44																			14.4		
18- 28	1.68										0.44																			16.8		
28- 38	1.32										0.45																			17.2		
38- 51	1.02										0.44																			17.5		
51- 76	0.56										0.44																			16.7		
76- 94	0.38										0.45																			14.1		
94- 112	0.43										0.43																			13.4		
112- 142	0.56										0.42																			13.5		
142- 178	0.49										0.43																			13.7		

ANALYSES: ALL ON SIEVED <2MM BASIS

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S88NE-109-020

PRINT DATE 11/06/90

SAMPLED AS: SHARPSBURG; FINE, MONTMORILLONITIC, MESIC, TYPIC ARGIUDDOLL  
 NATIONAL SOIL SURVEY LABORATORY PEDON 89P 85, SAMPLE 89P 770-779

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10--	-11--	-12--	-13--	-14--	-15--	-16--	-17--	-18--	-19--	-20--	
DEPTH (CM)	(--- NH4OAC EXTRACTABLE BASES ---)					ACID-ITY	EXTR AL	(--- CEC ---)			AL SAT	-BASE SUM	SAT-NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	COND MMHOS /CM	(--- PH ---)				
	CA	MG	NA	K	SUM			SUM	NH4-CATS	BASES + AL								CACL2 .01M	H2O		
	5B5A	5B5A	5B5A	5BA5	6Q2B	6H5A	6G9B	5A3A	5A8B	5A3B	5G1	5C3	5C1	6E1G	8E1	81		8C1F	8C1F		
	6N2E	6O2D	6P2B	6Q2B														1:2	1:1		
						MEQ / 100 G					PCT										
0- 8																				4.8	5.4
8- 18																				4.5	5.3
18- 28																				4.7	5.6
28- 38																				5.3	5.9
38- 51																				5.4	6.3
51- 76																				5.7	6.2
76- 94																				5.9	6.5
94-112																				6.1	6.6
112-142																				6.1	6.8
142-178																				6.2	6.8

## Bakeoven - Condon

Two pedons were sampled for laboratory characterization in the vicinity of the typifying sites of the map unit for the soil survey area. The pedons occur on a convex ridge about 150 m wide that trends northeast to southwest. The area has moderately deep soils on mounds (Condon) and soils that are shallow to bedrock between the mounds (Bakeoven). Mounds occupy about 30 percent of the area shown in figure A-4. Figure A-5, an area of 0.36 ha within which the pedons were sampled, is a photograph that shows the pattern of mounds. The mounds are 15 to 20 m in diameter and 1 to 2 m high. In all probability, the origin is related to periglacial processes combined with movement by wind of finer materials (Green, 1982). The area generally slopes to the west, except for the southeast corner which slopes to the east, and is 40 m from the break to very steep side slopes of the Deschutes River Canyon. Figure A-6 shows the pedon of Bakeoven.

### Bakeoven Pedon Description

Location: Wasco County, Oregon, 550 m south and 315 m east of the northwest corner of sec. 15; NE 1/4, SW 1/4, sec. 15, T3S. R14E. Latitude 45° 18' 59" N. Longitude 121° 03' 57" W.

Classification: loamy-skeletal, mixed, superactive, mesic Lithic Haploxerolls

Vegetation: Range

Sandberg bluegrass (*Poa secunda* J. Presl.) - 45 percent

Stiff sagebrush (*Artemisia rigida* (Nutt.) Gray) - 20 percent

Phlox (*Phlox* L.) - 5 percent

Buckwheat (*Eriogonum* Michx.) - 5 percent

Blue-eyed Mary (*Collinsia parviflora* Lindlo)

Parent material: Mixed water and wind-transported soil material from the underlying basalt

Physiography: Intermound, part of ridgetop plateau

Relief: 0.5 to 1.5 meters

Elevation: 1,000 meters

Slope: 4 percent

Aspect: 220° (SW)

Erosion: Moderate

Drainage: Well-drained

Ground Water: Very deep

Salt or alkali: None

Stoniness: 2 percent

Described and sampled by: R. Fenwick, R. W. Langridge, and R.B. Grossman, April 4, 1989.

Soil number: S89OR-065-001.

Remarks: Soil Thickness is approximately 5 to 10 cm greater under the sagebrush canopy than outside the canopy.

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*  
(WASCO COUNTY, OREGON)

S89OR-065-001

PRINT DATE 11/06/90

SAMPLED AS: BAKEOVEN; LOAMY-SKELETAL, MIXED, MESIC LITHIC HAPLOXEROLL

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
NATIONAL SOIL SURVEY LABORATORY  
LINCOLN, NEBRASKA 68508-3866

NSSL - - PROJECT 89P 102, MANUAL CHAR  
- PEDON 89P 524, SAMPLES 89P2917-2921  
- GENERAL METHODS 1B1A, 2A1, 2B

SAMPLE NO.	DEPTH (CM)	HORIZON	FRACTIONS (MM) (->2MM)																
			CLAY	SILT	SAND	FINE	COARSE	VF	F	M	C	VC	2	5	20	.1	PCT OF WHOLE SOIL		
			(TOTAL CLAY)			(CLAY)		(SILT)		(SAND)					(- COARSE FRACTIONS (MM) (->2MM) WEIGHT)		(->2MM) WT		
			LT	.02	.05	LT	CO3	LT	COARSE	VF	F	M	C	VC	2	5	20	.1	PCT OF WHOLE SOIL
			.002	.05	.02	.0002	.002	.02	.05	.10	.25	.50	1	2	5	20	.75	75	PCT OF WHOLE SOIL
			<			PCT OF		(3A1)		>					PCT OF		<75MM(3B1) >		
89P2917M	0- 5	A	5.4	23.6	71.0			11.5	12.1	8.7	9.5	9.8	21.2	21.8	17	4	--	70	21
89P2918M	5- 13	AB	8.3	31.5	60.2			17.0	14.5	11.2	9.6	8.5	16.1	14.8	15	2	15	65	22
89P2919M	13- 20	Bw	11.7	29.4	58.9			16.3	13.1	9.8	9.6	8.7	15.8	15.0	13	17	--	64	30
89P2920M	20- 30	2R													--	--	--	--	--
89P2921M	0- 20														6	4	60		74

DEPTH (CM)	ORGN C	TOTAL N	EXTR P	TOTAL (DITH-CIT) (RATIO/CLAY)					(ATTERBERG)		(- BULK DENSITY -)			(WATER CONTENT)					WRD WHOLE SOIL
				FE	AL	MN	CEC	BAR	LL	PI	FIELD MOIST	1/3	OVEN DRY	WHOLE SOIL	FIELD MOIST	1/10	1/3	15	
				PERCENT	OF	<2MM	8D1	8D1	4F1	4F	4A3A	4A1D	4A1H	4D1	4B4	4B1C	4B1C	4B2a	4C1
				<					PCT		<			PCT OF					
0- 5	0.77			2.2	0.1	0.1	2.56	0.98											5.3
5- 13	0.65			2.5	0.1	0.1	1.95	0.75											6.2
13- 20	0.84			2.7	0.1	0.1	1.71	0.70											8.2
20- 30																			
0- 20																			6.9

AVERAGES, DEPTH 0-20: PCT CLAY 9 PCT .1-75MM 66

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S890R-065-001

PRINT DATE 11/06/90

SAMPLED AS: BAKEOVEN; LOAMY-SKELETAL, MIXED, MESIC LITHIC HAPLOXEROLL  
 NATIONAL SOIL SURVEY LABORATORY PEDON 89P 524, SAMPLE 89P2917-2921

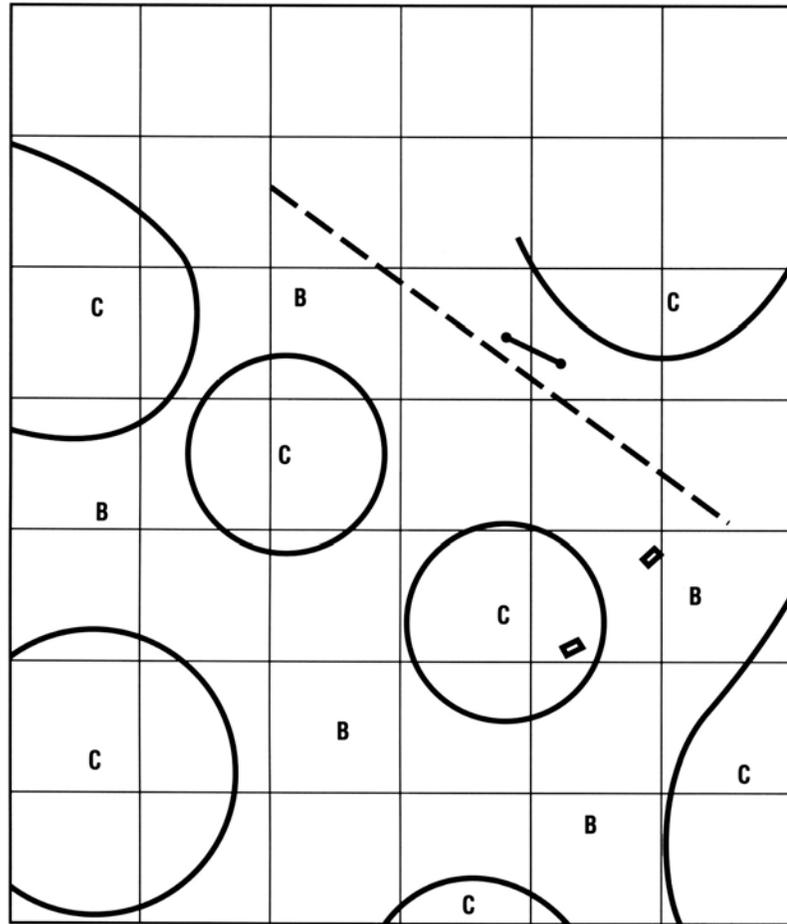
	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10--	-11--	-12--	-13--	-14--	-15--	-16--	-17--	-18--	-19--	-20--
DEPTH (CM)	(NH4OAC EXTRACTABLE BASES)					ACIDITY	EXTRAL	(CEC)			AL SAT	-BASE SUM	SAT-NH4 OAC	CO3 AS CACO3 A<2MM	RES. OHMS /CM	COND MMHOS /CM	(PH)			
	CA 5B5A 6N2E	MG 5B5A 6O2D	NA 5B5A 6P2B	K 5B5A 6Q2B	SUM BASES	6H5A G	6G9b	SUM CATS 5A3A	NH4 OAC 5A8B	BASES + AL 5A3B	5G1	5C3 PCT	5C1	6E1G	8E1	81	NAF 8C1D	CACL2 .01M 8C1F 1:2	H2O 8C1F 1:1	
0- 5	8.2	3.7	TR	0.3	12.2	3.1		15.3	13.8			80	88				9.4	6.4	7.2	
5- 13	9.6	4.4	TR	0.2	14.2	5.6		19.8	16.2			72	88				10.0	6.4	7.2	
13- 20	12.2	5.6	TR	0.1	17.9	4.7		22.6	20.0			79	89				10.1	6.0	6.9	
20- 30						3.8														
0- 20																				

DEPTH (CM)	SPODIC HORIZON CRITERIA						INDEX OF ACCUM
	NA PYROPHOSPHATE EXTRACTABLE						
	C	FE	AL	FE+AL	FE+AL	AL+C	
	PCT OF <2MM			(DIVIDED BY)			
	6A4A	6C8A	6G10	DI-Cl	PCT CLAY	PCT CLAY	
0- 5		TR	TR				
5- 13		TR	--				
13- 20		0.1	0.1	0.1			
20- 30							
0- 20							

ANALYSES: M= ALL ON SIEVED <2MM BASIS



FIGURE A-4



- C** Condon
- B** Bakeoven
- Roughness Measurement
- - Cover Transect
- ▭ Sample Pits S890R-065-001, 2

Sketch map of the area where the Condon and Bakeoven pedons were described and sampled. Cells are 10m on edge.

**FIGURE A-5**

Landscape of the Bakeoven-Condon complex mapping unit showing pattern of mounds (Condon) and intermounds (Bakeoven).

**FIGURE A-6**

Profile of Bakeoven very cobbly sandy loam.

**A** - 0 to 5 cm; dark brown (7.5YR 3/3) very cobbly sandy loam, brown (7.5YR 4/4) dry; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; 35 percent pebbles, 20 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

**AB** - 5 to 13 cm; dark reddish brown (5YR 3/3) very cobbly sandy loam, dark reddish brown (5YR 3/4) dry; weak fine subangular blocky structure, breaking to weak fine granular; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine and few medium roots; many very fine irregular pores; 20 percent pebbles, 35 percent cobbles, and 3 percent stones; neutral; clear smooth boundary.

**Bw** - 13 to 20 cm; dark reddish brown (5YR 3/3) extremely cobbly sandy loam, dark reddish brown (5YR 3/4) dry; weak fine subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine and few medium roots concentrated along faces of rock fragments; common very fine tubular pores; 20 percent pebbles, 50 percent cobbles, and 2 percent stones; neutral; abrupt wavy boundary.

**2R** - 20 cm; basalt.

Surface, near surface: The ground surface consists of 10-20 percent sagebrush and 80-90 percent intershrub. Figure A-7 shows the intershrub. Small mounds of soil material, low in rock fragments, are associated with the sage brush. Soil thickness is approximately 5 to 10 cm greater under the sagebrush canopy than outside the canopy. Bare areas 20 to 40 cm across occur. Most are recessed 5 to 10 cm below the vegetated parts. A minority of the bare areas are higher than the surrounding vegetated area and may be recently affected by frost action. The following is a numerical description of the cover for the shrub and intershrub components separately based on point counts.

FIGURE A-7



Close-up photo of ground surface near sample pit for Bakeoven very cobbly sandy loam component of Bakeoven-Condon complex. Yellow marker object is 5x5x2 cm in size.

Component Kind	Mulch		Canopy <sup>a</sup>		Rock Fragments		Area		
	Area pct	>2mm pct	Total pct	Effectiveness pct	Height m	>250mm pct	75-250mm pct	5-75mm pct	2-5mm pct
Shrub	17	0	20	70	<1/2	—	—	—	—
Inter-shrub	83	13	27	—	—	0	Tr	49	51

<sup>a</sup>Percent of rain drops assumed intercepted.

The soil-loss ratio (Wischmeier and Smith, 1978) of the shrub was 0.04 and the intershrub 0.16. The weighted average overall soil-loss ratio is 0.14. Roughness of the intershrub area was measured based on 31 points 10 cm apart with a correction for slope. The standard deviation was 1.3 cm. The overall color value of the dry ground surface, inclusive of the rock fragments, was 4.

### Condon Pedon Description

Location: Wasco County, Oregon, 550 m south and 310 m east of northwest corner sec. 15; NE 1/4, SW 1/4, NW 1/4, sec. 15, T3S, R14E. Latitude 45° 18' 59" N. Longitude 121° 03' 57" W.

Classification: fine-loamy, mixed, mesic Typic Haploxerolls

Vegetation: Range

Idaho fescue (*Festuca idahoensis* Elmer) - 30 percent

Cheatgrass (*Bromus tectorum* L.) - 25 percent

Sandberg bluegrass (*Poa secunda* J. Presl) - 20 percent

Basalt (Hangingpod) milkvetch (*Astragalus filipes* Torr. ex Gray)- 10 percent

Bluebunch wheatgrass (*Pseudoroegneria spicata* Pursh) A. Love - 5 percent

Other

Lupine (*Lupinus* L.)

Yarrow (*Achillea* L.)

Buckwheat (*Eriogonum* Michx)

Parent material: Mixed loess and pedisediments

Physiography: Ridgetop plateau, biscuit (mound)

Relief: 0.5 to 1.5 meters

Elevation: 1,000 meters

Slope: 8 percent Aspect: 120° (SE)

Erosion: Moderate

Drainage: Well-drained

Ground water: Very deep

Salt or alkali: None

Stoniness: None

Described and sampled by: R. W. Fenwick, R.B. Grossman, and R. W. Langridge April 28, 1989.

Soil number: S89OR-065-002.

**A** - 0 to 8 cm; dark brown (7.5 YR 3/2) loam, brown (7.5 YR 4/3) dry; weak fine subangular blocky structure parting to weak fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; 5 percent pebbles; neutral; clear smooth boundary.

**AB** - 8 to 18 cm; dark brown (7.5 YR 3/2) loam, brown (7.5 YR 4/3) dry; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine irregular pores; 5 percent pebbles; neutral; clear smooth boundary.

**Bw1** - 18 to 38 cm; dark brown (7.5 YR 3/3) loam, brown (7.5 YR 4/3) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; 5 percent pebbles; neutral; clear smooth boundary.

**Bw2** - 38 to 58 cm; dark brown (7.5 YR 3/3) loam, brown (7.5 YR 4/3) dry; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; 5 percent pebbles; neutral; clear wavy boundary.

**BC** - 58 to 66 cm; dark brown (7.5 YR 3/3) loam, brown (7.5 YR 4/3) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; 5 percent pebbles; neutral; abrupt wavy boundary.

**2R** - 66 cm; fractured basalt.

Surface, near surface: The outermost 1 to 3 m of the mounds (about half of the mound area) was subject to more traffic by grazing animals than the central portion. The outer portion has 30 to 40 percent bare soil compared to 10 percent or less in the central portion. The soil-loss ratio (Wischmeier and Smith, 1978) is 0.18 for the periphery and 0.07 for the central part.



\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S890R-065-002

PRINT DATE 11/06/90

SAMPLED AS: CONDON; FINE-SILTY, MIXED, MESIC TYPIC HAPLOXEROLL  
 NATIONAL SOIL SURVEY LABORATORY; PEDON 89P 525, SAMPLE 89P2922-2926

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10--	-11--	-12--	-13--	-14--	-15--	-16--	-17--	-18--	-19--	-20--
DEPTH (CM)	(NH4OAC EXTRACTABLE BASES)					ACID-ITY	EXTR AL	(CEC)		AL SAT	-BASE SUM	SAT-NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	COND. MMHOS /CM	(PH)			H2O	
	CA 5B5A 6N2E	MG 5B5A 6O2D	NA 5B5A 6P2B	K 5B5A 6Q2B	SUM BASES	6H5A	6G9B	SUM CATS 5A3A	NH4-OAC 5A8B	5G1	5C3	5C1	6E1G	8E1	81	8C1D	8C1F .01M	8C1F A:2	8C1F 1:1	
	MEQ / 100 G					G				PCT										
0- 8	11.2	4.2	TR	1.0	16.4	3.7		20.1	18.0		82	91					9.9	6.4	7.1	
8- 18	10.2	4.3	--	0.6	15.1	3.8		18.9	16.5		80	92					9.9	6.2	7.3	
18- 38	10.4	5.0	TR	0.2	15.6	3.8		19.4	17.2		80	91					10.0	6.2	7.0	
38- 58	11.2	5.8	TR	0.1	17.1	3.1		20.2	18.4		85	93					10.0	6.3	7.2	
58- 66	11.5	5.9	TR	0.1	17.5	3.2		20.7	18.4		85	95					9.9	6.4	7.0	

(SPODIC HORIZON CRITERIA)							INDEX OF ACCUM
(NA PYROPHOSPHATE EXTRACTABLE)							
DEPTH (CM)	C	FE	AL	FE+AL	FE+AL	AL+C	
	6A4A 6C8A 6G10			(DIVIDED BY)			
	PCT OF <2MM			DI-Cl	PCT	PCT	
				FE+AL	CLAY	CLAY	
0- 8		0.1	TR	TR		TR	
8- 18		0.1	0.1	0.1			
18- 38		TR	0.1	TR		TR	
38- 58		TR	TR				
58- 66		0.1	TR	TR		--	

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*  
(WASCO COUNTY, OREGON)

S890R-065-002

PRINT DATE 11/06/90

SAMPLED AS: CONDON; FINE-SILTY, MIXED, MESIC TYPIC HAPLOXEROLL

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
NATIONAL SOIL SURVEY LABORATORY  
LINCOLN, NEBRASKA 68508-3866

NSSL - - PROJECT 89P 102, MANUAL CHAR  
- PEDON 89P 525, SAMPLES 89P2922-2926  
- GENERAL METHODS 1B1A, 2A1, 2B

		-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10--	-11--	-12--	-13--	-14--	-15--	-16--	-17--	-18--	-19--	-20--
SAMPLE NO.	HZ NO	ACID OPT DEN	OXALATE FE	EXTRACTION		PHOSPHOUS		KCL MN	TOTAL C	WATER CONTENT				WATER DISPERSIBLE				MIN SOIL	AGGRT STABL		
		8J	6C9a	6V2	6G12	RET 6S4	CIT-ACID 6S5	6D3	6A2d	0.06 BAR 4B1c	1- BAR 4B1a	2- BAR 4B1a	15 BAR 4B2b	CLAY 3A1c	SILT SAND	SAND CLAY	SILT SML	SAND 8F1	CONT <5mm 4G1	<PCT>	
		← PCT OF		<2MM		← PPM		←		←				←				←		←	
89P2922	1	0.21	1.57	0.16	0.15	12							8.0	5.9	33.1	61.0					
89P2923	2	0.18	1.64	0.18	0.14	19							7.1	6.4	36.9	56.6					
89P2924	3	0.15	1.38	0.17	0.15	17							7.3	7.5	33.5	59.0					
89P2925	4	0.15	1.47	0.19	0.16	24							8.1	8.5	34.1	57.3					
89P2926	5	0.16	1.44	0.18	0.17	21							9.0	9.8	38.1	52.1					

## Lithic Haplargids

Location: Sierra County, New Mexico, L/7 Ranch; 11.3 kilometers south and 2.4 kilometers west of Engle; 640 m northwest of L/7 Ranch headquarters; 160 m east and 1040 m north of the southwest corner sec. 21; SE 1/4, SW 1/4, NW 1/4, sec. 21, T14S, R2W. Latitude 33°04'42" north, Longitude 107°03'28" west.

Classification: loamy, mixed, thermic Lithic Haplargid

Vegetation: Range (mesquite, mixed grasses and shrubs)

Parent material: Sandstone and eolain material

Physiography: Valley slope of plateau

Relief: 1 to 5 m

Elevation: 1,460 m

Slope: 3 percent

Aspect: 75° (NE)

Erosion: Moderate

Drainage: Well drained

Ground water: Deep

Salt or alkali: None

Stoniness: None

Described by: R. Fenwick, R.B. Grossman, and C. Montoya, April 24, 1989.

Soil number: S89NM-051-001.

**A** - 0 to 4 cm; yellowish red (5YR 4/6) sandy loam, reddish brown (5YR 4/4) moist; weak fine granular structure; soft, friable, nonsticky, nonplastic; few very fine and fine roots; 5 percent fine pebbles; very slightly effervescent; moderately alkaline; abrupt smooth boundary.

**Bt** - 4 to 13 cm; yellowish red (5YR 4/8) sandy clay loam, yellowish red (5YR 4/6) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, slightly sticky, plastic; common faint clay films in pores and clay bridging sand grains; few fine, irregular soft masses of carbonates; few very fine and fine roots; few fine tubular pores; 5 percent fine pebbles; strongly effervescent, strongly alkaline; clear smooth boundary.

**Btk** - 13 to 23 cm; yellowish red (5YR 4/8) clay loam, yellowish red (5 YR 4/6) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky, plastic; common faint clay films on faces of peds and clay bridging sand grains; common fine platelike soft filaments and masses of carbonates; few fine and very fine roots; few fine tubular pores; 5 percent fine pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

**Bck** - 23 to 35 cm; grayish brown (10YR 5/2) and reddish brown (5YR 5/3) gravelly clay loam; massive; hard, firm; common medium and coarse irregular soft masses of carbonates; 20 percent pebbles; very few fine roots; violently effervescent; moderately alkaline; abrupt wavy boundary.

**2R1** - 35 to 43 cm; hard olive gray (5Y 5/2) fractured sandstone; fracture surfaces coated with reddish brown (5YR 5/3) coatings; carbonate as few small pendants on underside of fragments.

**2R2** - 43 cm; moderately hard, olive gray (5Y 5/2) thinly bedded sandstone.

A numerical description follows of the cover for the shrub and intershrub components separately. Areal percentages were obtained by point counting.

Component Kind	Mulch			Canopy		Rock Fragments Size			
	Area pct	>2mm pct	Total pct	Effectiveness pct	Height m	>250mm pct	75 mm pct	5 mm pct	2 mm pct
Shrub	10	0	100	50	<1/2	—	—	—	—
Inter-shrub	90	20	68	0		0	4	34	62

Based on the cover information, the soil-loss ratio (Wischmeier and Smith, 1978) was 0.27 for the shrub component and 0.52 for the intershrub. The overall soil-loss ratio was 0.48. The soil-loss ratio may be slightly lower during July and August, the period of maximum water erosion, because of more vegetation.

Roughness was determined for 31 points, 5 cm apart in a bare area that was relatively smooth along the assumed direction of overland flow. The standard deviation corrected for slope was 0.34 cm. The dry rupture resistance of the crust was 3N based on the average of nine determinations from each of two places a few meters apart. The thickness of the reconstituted part of the crust was 1 to 2 mm.

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*  
(SIERRA COUNTY, NEW MEXICO)

S89NM-051-001

PRINT DATE 11/06/90

SAMPLED AS : LITHIC HAPLARGID  
REVISED TO : LOAMY, MIXED, THERMIC LITHIC HAPLARGID

NSSL - PROJECT 89P 102, MANUAL CHAR  
- PEDON 89P 523, SAMPLES 89P2911-2916  
- GENERAL METHODS 1B1A, 2A1, 2B

U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
NATIONAL SOIL SURVEY LABORATORY  
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL													COARSE FRACTIONS (MM) (>2MM)											
			CLAY LT	SILT .002	SAND .05	FINE LT	CO3 LT	FINE .002	COARSE .02	VF .05	F .10	SAND .25	M .5	C .1	VC 1	2	5	20	.1	PCT OF							
			←			PCT OF <2MM			(3A1)			→				←				PCT OF <75MM(3B1)				→			
89P2911S	0- 4	A	9.7	10.9	79.4			6.1	4.8	10.8	27.3	24.5	12.7	4.1	2	4	--	70	6								
89P2912S	4- 13	BT	31.8	19.1	49.1		1.1	11.1	8.0	11.6	20.8	13.0	3.1	0.6	5	2	--	42	7								
89P2913S	13- 23	BtK	31.0	24.0	45.1		2.3	16.1	7.9	10.9	14.3	10.7	5.7	3.4	16	1	--	45	17								
89P2914S	23- 35	BCK													25	13	--		38								
89P2915S	35- 43	2R1													--	--	--		--								
89P2916S	43- 50	2R2													--	--	--		--								

DEPTH (CM)	ORGN C	TOTAL N	EXTR P	TOTAL S				(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE		(- WATER CONTENT -)				WRD WHOLE SOIL	
				6R3A	6C2B	6G7A	6D2A	CEC 8D1	BAR 8D1	LL 4F1	PI 4F	FIELD MOIST 4A3A	1/3 BAR 4A1D	OVEN DRY SOIL 4A1H	WHOLE SOIL 4D1	FIELD MOIST 4B4	1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2a			
				← PERCENT OF <2MM →						PCT < 0.4MM		← G/CC →			← CM/CM →		← PCT OF <2MM →				← CM/CM →	
0- 4		0.15						1.05	0.46											4.5		
4- 13		0.34						0.60	0.36											11.3		
13- 23		0.35						0.64	0.37											11.5		
23- 35		0.61																		10.1		
35- 43																						
43- 50																						

AVERAGES, DEPTH 4-23: PCT CLAY 30 PCT .1-75MM 43p

\*\*\* PRIMARY CHARACTERIZATION DATA \*\*\*

S89NM-051-001

PRINT DATE 11/06/90

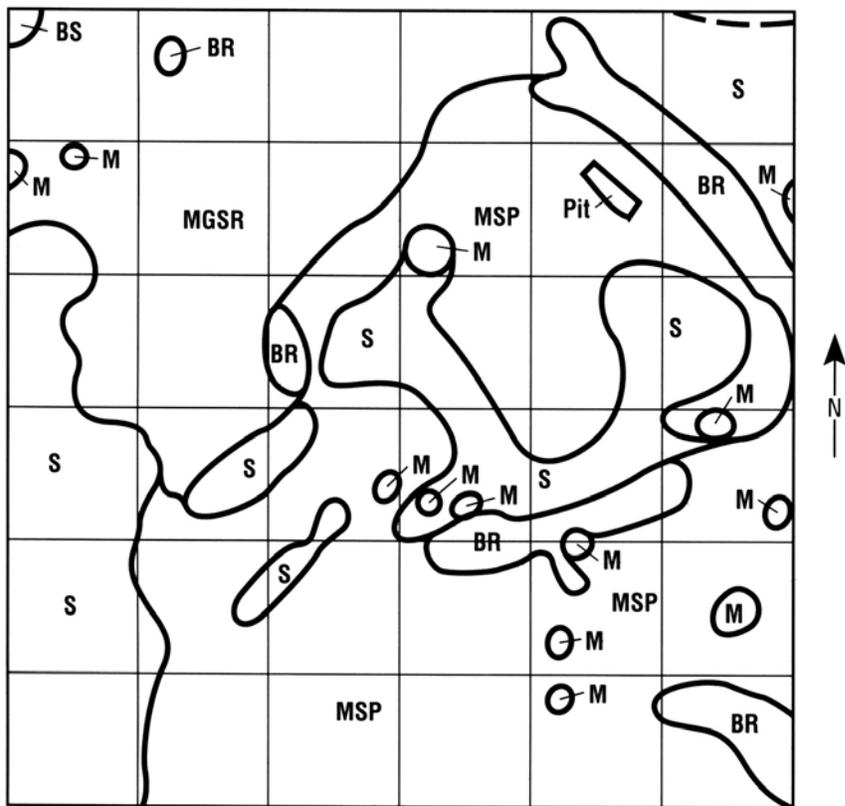
SAMPLED AS: LITHIC HAPLARGID  
 NATIONAL SOIL SURVEY LABORATORY; PEDON 89P 523, SAMPLES 89P2911-2916

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10--	-11--	-12--	-13--	-14--	-15--	-16--	-17--	-18--	-19--	-20--
DEPTH (CM)	(NH4OAC EXTRACTABLE BASES)				ACIDITY	EXTR AL	(CEC)			AL SAT	-BASE SUM	SAT-NH4 OAC	CO3 AS CACO3 <2MM	RES. OHMS /CM	COND. MMHOS /CM	(PH)				
	CA 5B5A 6N2E	MG 5B5A 6O2D	NA 5B5A 6P2B	K 5B5A 6Q2B	SUM BASES	6H5A	6G9B	SUM NH4-CATS 5A3A	NH4-OAC 5A8B	BASES + AL 5A3B	5G1	5C3 5C1	6E1G	8E1	81	CACL2 .01M 8C1F 1:2	H2O 8C1F 1:1			
	← MEQ / 100 G →						← →			← PCT →										
0- 4	14.4	1.1	--	0.5	16.0			16.0	10.2			100	100	TR	0.08	7.6	8.1			
4- 13		1.5	--	0.8					19.2			100	100	5	0.13	7.7	8.5			
13- 23		1.2	0.1	0.5					19.9			100	100	10	0.13	7.7	8.3			
23- 35		1.2	TR	0.4		--			19.6			100	100	18		7.6	8.1			
35- 43																				
43- 50																				

ANALYSES: M= ALL ON SIEVED <2MM BASIS

Figure A-8 is a map of the area where the pedon was sampled and figure A-9 shows the landscape. The sample pedon is shown in figure A-10 and a close up of the ground surface near the pedon is shown in figure A-11.

**FIGURE A-8**



- BR** Bedrock
- BS** Bare Ground, 10% snakeweed
- M** Mesquite with coppice dune 30-50 cm high
- MGSR** Mixed grass, shrub
- MSP** Mixed shrub, pebbles
- Pit** S89NM051-001
- S** Sandy soil
- - -** Gully 30 cm deep and 75 cm wide

Sketch map of the area where the Lithic Haplargid pedon was described and sampled.

**FIGURE A-9**

Landscape of the Lithic Haplargid mapping unit. Orientation is southwest to northeast. Shovel marks the sampling pit.

**FIGURE A-10**

Profile of Lithic Haplargid. Scale is in centimeters.

**FIGURE A-11**

Close-up of ground surface near sample pit for Lithic Haplargid. Yellow marker in photo is 5x5x2 cm in size