I. CHANGES IN SOIL PHYSICAL PROPERTIES RESULTING

FROM SWINE EFFLUENT AMENDMENTS

TO A CALCAREOUS SILT LOAM

AND

II. A MIXED METHODS EVALUATION OF THE COMPUTER APPLET *SOIL TEMPERATURE CHANGES WITH DEPTH AND TIME* AS AN UNDERGRADUATE

TEACHING TOOL

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CHAPTER II

PREFACE

This dissertation contains two chapters. Chapter I of this dissertation is entitled <u>Changes in Soil Physical Properties Resulting from Swine Effluent Amendments to a</u> <u>Calcareous Silt Loam</u>. Chapter II is entitled <u>A Mixed Methods Evaluation of the</u> <u>Computer Applet Soil Temperature Changes with Depth and Time as an Undergraduate</u> <u>Teaching Tool</u>. Both chapters are formatted as stand-alone articles for submission to the Soil Science Society of America Journal and the Journal of Natural Resources and Life Science Education, respectively.

CHAPTER I

Changes in Soil Physical Properties Resulting from Swine Effluent Amendments

to a Calcareous Silt Loam

EXECUTIVE SUMMARY

The expanding swine industry in the Oklahoma panhandle not only generates increased revenue, but billions of gallons of effluent that without proper management potentially pose a significant threat to soil and water quality. When land-applied at rates based on plant nutrient requirements, applications of effluent to cropland can replace costly fertilizer inputs without compromising the environment. In addition, swine effluent applications have the potential to improve soil structural, physical, and management properties. Therefore, the objectives of this study were to identify and quantify changes in aggregate stability, organic carbon, particle size distribution, bulk density, and soil morphological properties of a Richfield silt loam resulting from various rates of: (1) anhydrous ammonia, beef manure, and swine effluent to conventionally-managed, continuous corn, (2) urea and swine effluent to continuous forage, and (3) swine effluent using sprinkler and flood application techniques to a no-tilled corn-wheat-fallow rotation. Soil samples were collected from long-term, swine effluent research experiments located at the Oklahoma Panhandle Research and Extension Center in Goodwell, Oklahoma. Analyses showed swine effluent amendments had little to no effect on soil physical and morphological properties under the three management systems after 2 to 5 years of application. Differences in water stable aggregates, surface organic carbon contents, and surface bulk density were beginning to emerge between treatments, but were not significant or consistent across treatments and management systems. It is expected that as applications of swine effluent continue, soil properties will continue to change, warranting their reevaluation in the future.

INTRODUCTION

The landscape of the Oklahoma panhandle has undergone significant changes in the past 10 years, as the once desolate short grass prairie is now home to numerous large swine (Sus scrofa domesticus) production facilities. Between 1992 and 1997, Texas County, Oklahoma experienced a 70-fold increase in its hog population, from approximately 13,500 head in 1992 to over 900,000 head in 1997 (National Agricultural Statistics Service [NASS], 1997) making Texas County the third largest hog-producing county in the United States. Of the approximate 1.69 million hogs sold in Oklahoma annually, 1.45 million or 86% are produced in Texas County alone (NASS, 1997).

The expanding Oklahoma swine industry not only generates increased revenue, but billions of gallons of effluent that without proper management and utilization could threaten high plains ecosystems. Swine effluent management problems are not limited to Oklahoma, but are rather a nationwide concern. According to the U.S. General Accounting Office (1995), between 1978 and 1994, the total number of hog operations of all sizes nationwide decreased approximately 67% while the national hog inventory remained the same. In 1992, approximately 2,500 hog operations nationwide housed more than 1,000 animals onsite. These large operations housed approximately 30% of the nation's hog inventory, totaling an estimated 15 million hogs.

Most waste generated by large swine production facilities is stored in outdoor, earthen lagoons until it is land-applied (Kosco and Hall, 1999; Miner, 1999). In these systems, waste is flushed out of confinements using fresh or recycled water, resulting in effluents containing a mixture of the flush water, feces, urine, spilled feed, as well as undigested dietary components, endogenous end-products and indigenous bacteria from the lower intestinal tract (Sutton et al., 1999). Approximately 500 to 2,000 L of flush water are used for every 1,000 kg of animal per day, resulting in effluents containing

very low concentrations of solids (0.3 to 2%) (Vanotti and Hunt, 1999). Giusquianai et al. (1998) found that most effluent constituents are found in the solid phase, with only sodium, nitrogen and 22.4% of the total organic carbon occurring predominantly in the liquid fraction.

When land-applied at rates based on plant nutrient requirements, use of effluent on cropland can replace costly fertilizer inputs without compromising the environment (Sutton et al., 1978). In addition, when properly land-applied, organic constituents of animal waste have the potential to improve soil structural and physical properties by increasing the organic matter content.

Studies by Ndayegamiye and Cote (1989), Nath et al. (1973), Biswas and Ali (1969), Biswas and Khosla (1971), Klute and Jacob (1949), Williams and Cooke (1961), and Free (1949) found that soil organic carbon contents were significantly increased with various rates of animal waste amendments. Specifically, Mbagwu (1989b) found that the lower inherent organic carbon content of the soil, the higher the relative improvement in residual organic carbon.

According to Sparling et al. (2003), the benefits of increasing soil organic carbon contents are numerous, as soil organic matter promotes soil cation exchange and fertility, soil aggregation and porosity, water infiltration and storage, and microbial growth (Allison, 1973; Sloan, 1990; Reeves, 1997; Karlen, Andrews, and Doran 2001). In addition, increases in soil organic carbon help reduce the amount of carbon dioxide in the atmosphere (Lal, 2001).

Numerous studies have also found that organic waste applications increase the amount of water stable soil aggregates in the soil (Pagliaiet al., 1981; Browning and Milan, 1944; Benebi et al., 1998; Mbagwu, 1989a, 1989b; Nath et al., 1973; Young, 1974; Guttay et al., 1956; Mbagwu and Bazzoffi, 1988). The effects of organic matter on aggregate stability is considerable, as the organic carbon content of aggregates was

found to account for approximately 73 to 98% of aggregates' tendency to disperse (Mbagwu, 1990) and Tiarks (1973) found the relationship between organic carbon and aggregate stability was linear.

Both long-term (Biswas and Khosla, 1971; Klute and Jacob, 1949; Williams and Cooke, 1961) and short-term studies (Gupta et al., 1977; Kladviko and Nelson, 1979; Mays et al., 1973; Salter and Haworth, 1961; Tiarks et al., 1974; Unger and Stewart, 1974; Volk and Ullery, 1973; Webber, 1978; Weil and Kroontje, 1979; Hazef, 1974) found animal waste applications decrease bulk density. Studies have found bulk density is inversely related to the amount of manure applied (Tiarks, 1973), as well as soil organic matter content, aggregate stability, and soil respiration (Martens and Frankenburger, 1992).

However, swine effluent applications above those needed for plant nutrient needs can potentially impair soil quality. Often, the concentrated nature of swine production and economic limitations that discourage long distance transportation of waste, result in the frequent and continued application of effluent to the same land (Duffera et al., 1999). Over application of swine effluent to cropland can lead to the rapid increase in soil P concentrations. High concentrations of soil P in of themselves are not detrimental, but the off-site movement of the P and/or P laden soil though runoff and erosion can significantly impair surface water quality (Sharpley and Menzel, 1987). In addition, large applications of effluent have been found to decrease a soil's hydraulic conductivity (Vanderholm and Beer, 1970) resulting from the dispersion of aggregates due to the accumulation of Na⁺ (Khaleel et al., 1981).

The objectives of this study were to identify and quantify changes in organic carbon, aggregate stability, bulk density, particle size distribution, and soil morphological properties of a Richfield silt loam resulting from various application rates of:

- (1) Anhydrous ammonia, beef manure, and swine effluent to conventionallymanaged, continuous corn
- (2) Urea and swine effluent to a continuous forage system
- (3) Swine effluent using sprinkler and flood application techniques to a no-tilled corn-wheat-fallow rotation.

This research provided valuable information on the effects of swine effluent amendments to calcareous soils in a semi-arid environment. Previous research on animal waste amended soils has primarily focused on historical hog producing states, such as Iowa and North Carolina, where soils are typically acidic to neutral and the climate is sub-humid to sub-tropical.

MATERIALS AND METHODS

Site Descriptions

Soil samples were collected from long-term research experiments located at the Oklahoma Panhandle Research and Extension Center (OPREC) in Goodwell, Oklahoma (36°35'38"N 101°36'48"W). The Richfield series (fine, smectitic, mesic Aridic Argiustoll) is the sole soil mapped in the study experiments (USDA-OAES, 1961). Three experimental plots (701, 702 and 703B) were utilized in this research.

A randomized complete block was established for Experiments 701, 702, and 703B for the evaluation of soil properties receiving: 0, 168 and 504 kg N ha⁻¹ of beef manure, swine effluent, and anhydrous ammonia applications under conventionallymanaged, continuous corn (*Zea mays L.*); 0, 168 and 504 kg N ha⁻¹ swine effluent and urea applications to buffalograss (Bison, *Buchloe dactyloides(Nutt) Englem*), bermudagrass (Midland, *Cynodon dactylon (L) Pers.*), pubescent wheatgrass (Luna, *Thinopyrum Intermedium (Host) Barkworth and Dewey*) and orchardgrass (Paute, *Dactylis glomerata* L.); and 0, 0.5x, 1x, and 2x applications of sprinkle and surface applied swine effluent applications (where x equaled 201 kg N ha⁻¹ in 1999 and 224 kg N ha⁻¹ in 2000) under a no-tilled corn-wheat-fallow (*Zea mays L- Triticum aestivum*-fallow) rotation, respectively. All treatments within an experiment were repeated in triplicate. Experiment 701 was established in 1995 and Experiments 702 and 703B were established in 1998. All experiments were supplemented with sprinkler irrigation as needed to maintain proper crop growth.

The treatments in Experiments 701 and 702 were abbreviated in the following manner: 0 kg N ha⁻¹ (CTL), 168 kg N ha⁻¹ swine effluent (SE168), 504 kg N ha⁻¹ swine effluent (SE504), 168 kg N ha⁻¹ beef manure (BF168), 504 kg N ha⁻¹ beef manure (BF504), 168 kg N ha⁻¹ anhydrous ammonia (AA168), 504 kg N ha⁻¹ anhydrous ammonia

(AA504), 168 kg N ha⁻¹ urea (UR168), and 504 kg N ha⁻¹ urea (UR504). In Experiment 703B, the treatments were abbreviated as follows: 0 kg N ha⁻¹ no-till (CTL), 0 kg N ha⁻¹ tilled (TIL), 0.5x sprinkler-applied swine effluent (SPR0.5), 1x sprinkler-applied swine effluent (SPR1), 2x sprinkler-applied swine effluent (SPR2), surface-applied swine effluent (SUR0.5), 1x surface-applied swine effluent (SUR1), 2x surface-applied swine effluent (SUR2), 168 kg N ha⁻¹ anhydrous ammonia (AA1), and 336 kg N ha⁻¹anhydrous ammonia (AA2).

Soil Sample Collection

All soil cores were collected using a tractor-mounted Gidding's hydraulic soil probe equipped with a 4.45 cm by 122 cm core barrel during October 2000. Cores were collected within the middle of each treatment plot, with care taken to avoid heavily disturbed areas. Individual soil cores were stored in separate plastic core tubes and returned to Oklahoma State University for further analysis. Additional samples of the surface soil (0-7.6 cm) were collected, bagged separately, and used in aggregate stability analysis.

Soil Analyses

All soil profiles were described using the standard format and nomenclature of the Soil Survey Staff (1993). Once described, the 0-10 cm depth increment of each core was air-dried and ground to pass through a #10 brass sieve (2 mm square openings). The <2 mm fractions were used for particle size and organic carbon analyses.

Soil bulk densities were determined for the 0 to 15.24 cm and 15.25 to 30.48 cm intervals of each subplot using a modified core method (4A3) described in Soil Survey Staff (1996). Five samples of each depth increment were collected in each plot using a hand-driven bulk density probe. Aggregate stability was determined for each surface 0-

7.6 cm soil sample using the wet sieving method (4G1) outlined by the Soil Survey Staff (1996). Aggregate samples from each plot were run in triplicate. Particle size distribution was determined using a modified pipette method described in Konen (1999). A sample pretreatment of 30% hydrogen peroxide was used to ensure all silt and clay particles acted discretely, as opposed to remaining in organo-mineral aggregates (Gee and Bauder, 1986). Organic carbon was determined using the modified Mebius method, where oxidizable organic carbon was reduced using potassium dichromate in the presence of sulfuric acid. The remaining chromium was quantified using a spectrophotometer at 590 nm (Nelson and Sommers, 1982).

Data Analysis

Data was analyzed using the PROC MIXED procedure in Statistical Analysis Systems (SAS) (SAS Institute, 2002). Backwards-stepwise regression was performed to determine the correlation between various soil properties using the PROC REG (SELECTION = BACKWARD) procedure in SAS.

RESULTS AND DISCUSSION

Soil Physical and Morphological Properties Relating to Swine, Beef and Anhydrous Ammonia Applications to Conventionally Managed, Continuous Corn

Selected Morphological Properties

Average depth of mollic color was not significantly different between the control and the six treatments (Table 1-1). Mollic color is defined as a moist soil color having a value and chroma equal to or less than 3. However, the SE504 treatment had a significantly shallower average depth of mollic color (47 cm) when compared to the AA168 (62 cm) and BF504 (63 cm) treatments, with p-values of 0.0458 and 0.0417, respectively. This difference was not thought to be treatment induced, but rather resulted from inherent soil variability.

N-Source	Rate kg N ha ⁻¹	Depth of Mollic Color	Depth to Argillans	Depth to Carbonates
Swine	· · · · · ·			
	168	56abc	18a	50a
	504	47a	26a	54a
Beef				
	168	56abc	18a	60a
	504	63bc	19a	63a
AA				
	168	62bc	23a	68a
	504	52abc	13a	58a
Control		-		
· · · ·	0	57abc	16a	58a

Table 1-1. Average depth of mollic color, depth to argillans and depth to carbonates by N-source and rate for Experiment 701.

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

There were no significant differences in depth to argillans and depth to carbonates between the treatments. Depth of argillans was determined by first presence of clay films on peds and depth to carbonates was determined by first presence of effervescence when the soil was treated with 1 N hydrochloric acid.

No significant differences in morphological properties between treatments was expected, due to the relatively short duration of the experiment (5 years).

No treatments in Experiment 701 contained granular structure within the surface horizon. Annual tillage practices likely resulted in the destruction of the granular peds through increased compression (compaction) and the stimulation of organic matter decomposition.

Organic Carbon and Aggregate Stability

Mean surface (0-10 cm) organic carbon content of the BF504 treatment was significantly higher than all other treatments and control (Table 1-2). Similar studies (Tiarks et al, 1974; Unger and Stewart, 1974; Haghiri et al., 1978) have found that high rates of beef manure can increase the organic carbon content of soils over a short period of time, as beef manure typically contains a high percentage of organic materials (approximately 46 to 55% total solids, feedlot manure) (LPES, 2002).

AA168, AA504 and SE168 treatments had significantly lower percentages of water stable aggregates in the surface horizon when compared with the control (Table 1-3). It is thought that the destruction of water stable aggregates in the anhydrous ammonia and swine effluent treatments is possibly the result of aggregate dispersion due to increasing sodium concentrations, as preliminary data shows that the application of both N-sources is increasing the amount of sodium found in the soil (Table 1-3). This is consistent with Khaleel et al. (1981) who found increased dispersion of aggregates in swine effluent treated soils due to buildup of effluent-derived Na⁺. Other investigators

have also reported that applications of wastes containing high concentration of Na⁺, resulting in aggregate dispersion and reduction in water infiltration and percolation (Powers et al., 1975; Travis et al., 1971).

 Table 1-2. Average surface organic carbon and water stable aggregates by N-source

 and rate for Experiment 701.

	N-Source	Rate	Organic Carbon	Water Stable Aggregates	
		kg N ha ⁻¹	% (w/w)	%	
	Swine				
	4	168	1.0a	16.4a	
1		504	0.9a	18.7ab	
	Beef				
		168	1.0a	18.3ab	
		504	1.5b	18.7ab	
	AA				
		168	1.0a	13.3a	
		504	0.9a	9.9a	
	Control				
		0	1.0a	26.5b	

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

Table 1-3. Average surface sodium by N-source and rate for Experiment 701.

	N-Source	Rate	Sodium	
		kg N ha ⁻¹	mg L ⁻¹	
<u></u>	Swine		· · · · · · · · · · · · · · · · · · ·	
		168	72.0ab	
		504	85.7a	
	Beef			
		168	57.6b	
		504	54.7b	•
	AA			
	а	168	54.7b	
		504	68.9ab	
	Control	•••		
		0	50.2b	

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

++ Unpublished data, J.C. Turner (2003), Oklahoma State University

It is also possible that the flood application of effluent is destroying aggregates, as Gregorich et al. (1993) found that the sudden wetting of a soil can decrease the strength and stability of soil aggregates. Aggregate disintegration by wetting is dependent upon the rate of wetting (Quirk and Panabokke, 1962; Kay and Angers, 1999) and is thought to occur due to differential swelling of soil materials and/or aggregate explosion due to entrapped air (Panabokke and Quirk, 1957; Quirk and Panabokke, 1962).

Analysis of the data using backward-stepwise regression found that surface bulk density was very weakly correlated (p-value = 0.0831, $R^2 = 0.1153$) with the percentage water stable aggregates in Experiment 701 (Table 1-4).

	· · · · · · · · · · · · · · · · · · ·			
Predictor Variable	Beta	p-value		
 Intercept	-26.37625			

31.68867

0.0831

Surface bulk density

Table 1-4. Regression coefficient for percent water stable aggregates in Experiment 701

These results are contrary to those of Tiarks (1973), who found an almost linear relationship between surface water stable aggregates and organic carbon contents and Kemper and Koch (1966) who found a good correlation between clay content (in the range between 5 and 90%) and wet sieve aggregate stability in soils from semi-arid regions.

Further research is needed to better define the soil properties influencing the stabilization of aggregates in these fields.

Bulk Density

Average surface bulk densities for the treatments were not significantly different than the CTL (Table 1-5). However, surface bulk density for AA504 treatment was significantly lower than for SE504 treatment (p-value = 0.0302). It is thought that because the swine effluent was applied via flooding, the large amount of effluent applied to the SE504 plots may have resulted in the destruction of non-water stable soil aggregates and the subsequent filling of pores with dispersed sediments, thereby increasing the bulk density as discussed in Nemati et al. (2000).

N-Source	Rate	Surface Bulk Density	Subsurface Bulk Density
	kg N ha ⁻¹	Mg m ⁻³	
Swine			
	168	1.48ab	1.62abc
	504	1.52a	1.60abc
Beef			
	168	1.47ab	1.54c
	504	1.46ab	1.71ab
AA			
	168	1.38ab	1.57abc
	504	1.34b	1.46abc
Control			· · · · · · · · · · · · · · · · · · ·
	0	1.45ab	1.62bc

Table 1-5. Average surface and subsurface bulk density by N-source and rate for

Experiment 701.

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

The surface bulk densities of all treatments were approaching that considered root limiting in silt loam (1.45 Mg m⁻³) and clay loam soils (1.5 Mg m⁻³) (Daddow and Warrington, 1983).

Average subsurface bulk densities for all treatments, with the exception of AA504, were not significantly different than the CTL. In addition, the average subsurface

bulk density of the BF504 treatment was significantly higher than for the AA504 and BF168 treatments. Reasons for the increase in subsurface bulk density with increasing rates of beef manure are unclear. Observed differences in all subsurface bulk densities are thought to be due to inherent soil variability, as the effect of the treatments on bulk densities would likely be small at the depth sampled.

Data analysis using backward-stepwise regression found that surface bulk density was weakly correlated with the combination of percentage water stable aggregates and surface sand content (p-value = 0.0126, $R^2 = 0.3055$) (Table 1-6).

Predictor Variable	Beta	p-value	
Intercept	0.93971		
Water stable aggregates	0.00422	0.0306	
Sand	0.01422	0.0171	

Table 1-6. Regression coefficients for surface bulk density in Experiment 701

The positive relationship between water stable aggregates and surface bulk density are contrary to what was expected. One would have expected a negative correlated of water stable aggregates with surface bulk density, as increases in stable aggregation often result in decreased in bulk density.

Several studies found bulk density was inversely related to soil organic matter content, aggregate stability, and soil respiration (Martens and Frankenburger, 1992). However, this research found no relationship between surface soil organic carbon and surface bulk density.

Soil Texture

There were no differences in the surface sand and clay contents between treatments (Table 1-7). However, average surface silt content of SE504 was significantly lower than AA504. This difference is most likely a result of spatial variation rather than amendments applied.

Table 1-7. Average surface sand, silt, and clay contents by N-source and rate for

N-Source	Rate	Sand	Silt	Clay
t	kg N ha ⁻¹		%%	
Swine				
	168	30a	45ab	25a
	504	31a	43a	26a
Beef				
	168	31a	45ab	24a
	504	30a	47ab	23a
AA				
	168	30a	46ab	24a
	504	28a	50b	23a
Control				
	0	29a	47ab	24a

Experiment 701.

+ Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

Soil Physical and Morphological Properties Relating to Swine Effluent and Urea

Applications to Continuous Forage

The presentation of statistical comparisons between treatments was limited to within a single grass species.

Selected Morphological Properties

Within the bermudagrass plots, SE168 had a significantly deeper average depth of mollic color than the UR treatments (Table 1-8). Also, average depth to carbonates were deepest in the SE treatments and shallowest in the CTL.

Within the wheatgrass plots, UR504 had a significantly deeper depth of mollic color than the CTL. Additionally, UR168 had significantly deeper average depth to carbonates than SE168, SE504, UR504, and the CTL.

There were no differences in depth to argillans between treatments within a grass and no treatments contained granular structure within the surface horizon.

Variations in morphological properties between treatments was believed to be due to inherent soil variability rather than effects of treatments applied.

Grass	N-Source	Rate	Depth of Mollic Color	Depth to Argillans	Depth to Carbonates
		kg ha ⁻¹		cm	
Buffalograss			_		
	Swine	168	63a	14a	61a
		504	55a	12a	64a
	Urea	168	65a	16a	61a
		504	69a	19a	64a
	Control	0	66a	17a	71a
Bermudagrass					
	Swine	168	83a	16a	91a
		504	69a	12a	79a
	Urea	168	58b	19a	61b
		504	58b	6a	65b
	Control	0	53b	15a	58c
Orchardgrass					
-	Swine	168	64a	10a	68a
		504	60a	16a	62a
	Urea	168	62a	16a	69a
		504	67a	15a	67a
	Control	0	62a	13a	63a
14/hostarooo					
Wheatgrass	Swino	160	57 ~b	10-	61-
	Swine	168	57ab	19a	61a
	1 Jania	504	62ab	16a	65a
	Urea	168	55ab	14a	84b
		504	67a	14a	65a
	Control	0	47b	16a	57a

Table 1-8. Average depth of mollic color, depth to argillans and depth to carbonates by

N-source and rate for Experiment 702.

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) within a single grass species as determined by analysis of variance.

Organic Carbon and Aggregate Stability

There were no differences in surface (0 - 10 cm) organic carbon contents between treatments within the buffalograss, bermudagrass, and orchardgrass plots (Table 1-9). However in the wheatgrass plots, U540 contained significantly more surface organic carbon than SE168. This increase could potentially be due to increased inputs of plant residue or increased storage of soil organic matter with increased N applications. However, because increased amounts of organic carbon were only found in one of the eight 504 kg N ha⁻¹ treatments, it is possible that difference is caused by natural variability in soil organic carbon contents.

There were no significant differences in the amount of water stable aggregates within the buffalograss plots (Table 1-9).

Within the bermudagrass plots, SE168 had significantly more stable aggregates than SE504, UR504, and CTL; UR168 treatment had significantly more stable aggregates than UR504; and the CTL had significantly more stable aggregates than SE504 and UR504. The reasons for the decline in water stable aggregates in SE504 and UR504 are unclear, but may be linked to small declines in organic carbon quality and quantity at the high application rates (as seen in the SE504 rate), buildup of Na⁺, destruction of aggregates due to rapid wetting in the SE504 treatment, or differences in surface bulk densities.

Within the orchardgrass plots, the CTL had significantly higher amounts of water stable aggregates than the SE and UR treatments. It is unclear as to what is causing the serious decline in the amount of water stable aggregates in the N-amended plots, as the decrease cannot be tied to treatment, organic carbon contents or surface bulk density.

Grass	N-Source	Rate	Organic Carbon	Water Stable Aggregates	
· · · ·		kg ha ⁻¹	% (w/w)	%	
Buffalograss					
	Swine	168	1.3a	24a	
		504	1.2a	10b	
	Urea	168	1.4a	23a	
		504	1.5a	10b	
	Control	0	1.1a	30a	
Bermudagrass					
	Swine	168	1,5a	34acde	
		504	1.3a	11bd	
	Urea	168	1.3a	31acde	
		504	1.4a	21bcd	
	Control	0	1.3a	39ce	
Orchardgrass					
	Swine	168	1.4a	9a	
		504	1.4a	7a	
	Urea	168	1.5a	14a	
		504	1.2a	5a	
	Control	0	1.3a	24b	
Wheatgrass					
	Swine	168	1.2a	26acd	
		504	1.5ab	10bd	
	Urea	168	1.4ab	35acd	
		504	1.6b	15ab	
•	Control	0	1.4ab	13abd	

Table 1-9. Average depth of organic carbon and water stable aggregates by N-source

and rate for Experiment 702.

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) within a single grass species as determined by analysis of variance.

Orchardgrass treatments in Experiment 702 also contained fewer water stable aggregates than conventionally-tilled treatments of Experiment 701. This is contrary to previous research that has found that continuous forage/grass systems increase surface

water stable aggregates due to the lack of tillage and soil aeration and increases in organic carbon over conventionally-tilled fields (Cambardella and Elliot, 1992; Patton, unpublished data).

In the wheatgrass plots, SE168 had significantly more water stable aggregates than SE504. Also, UR168 had significantly more stable aggregates than SE504, UR504 and the CTL. This was similar to trends seen in the bermudagrass plots, where 504 rates of SE and UR had less water stable aggregates than those receiving lower N rates. These differences may be linked to differences in organic carbon quality and quantity, microbial activity, or differences in surface bulk densities between the low and high N application rates, but further investigation into these claims is needed.

Backward-stepwise regression determined that the combination of depth of mollic color, depth to carbonates, and subsurface bulk density were weakly correlated (p-value = 0.0083, $R^2 = 0.2074$) to the amount of water stable aggregates (Table 1-10).

	······································	
Predictor Variable	Beta	p-value
Intercept	-28.00937	
Depth of Mollic Color	-0.033620	0.0626
Depth to Carbonates	0.38428	0.0065
Subsurface Bulk Density	30.18916	0.0591
	Intercept Depth of Mollic Color Depth to Carbonates	Predictor VariableBetaIntercept-28.00937Depth of Mollic Color-0.033620Depth to Carbonates0.38428

Table 1-10. Regression coefficients for percent water stable aggregates in Experiment

Bulk Density

Few differences in surface and subsurface bulk densities were found between treatments (Table 1-11). In the buffalograss and bermudagrass plots, SE504 had significantly higher average surface bulk densities than UR168. Swine effluent

applications via flooding may be resulting slaking of non-stable aggregates and subsequent filling of pores with dispersed sediments, leading to increased bulk density (Nemati et al., 2000). In addition, the sheer weight of the effluent may have contributed to compaction of the surface soil layer.

Grass	N-Source	Rate	Surface Bulk Density	Subsurface Bulk Density
		kg ha ⁻¹	Mg	m ⁻³
Buffalograss				
	Swine	168	1.43ab	1.46a
	•	504	1.57a	1.46a
	Urea	168	1.36b	1.45a
		504	1.45ab	1 <i>.</i> 42a
	Control	0	1.40ab	1.44a
Bermudagrass				
-	Swine	168	1.34ab	1.48ab
		504	1.42ab	1.43ab
	Urea	168	1.28a	1.41ab
		504	1.45b	1.37a
	Control	0	1.41ab	1.57b
Orchardgrass				
	Swine	168	1.45a	1.47a
·		504	1.50a	1.45a
	Urea	168	1.56a	1.41a
		504	1.48a	1.36a
	Control	0	1.44a	1.33a
Wheatgrass				
	Swine	168	1.56a	1.42a
		504	1.46a	1.42a
	Urea	168	1.39a	1.48a
	:	504	1.42a	1.41a
	Control	0	1.45a	1.43a

Table 1-11. Average depth of surface and subsurface bulk densities by N-source and

rate for Experiment 702.

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) within a single grass species as determined by analysis of variance.

Backward-stepwise regression determined the combination of depth to argillans and depth to carbonates were very weakly (p-value = 0.384, R^2 = 0.1200) correlated to surface bulk density (Table 1-12).

Predictor Variable	Beta	p-value
Intercept	1.66975	
Depth to argillans	-0.00389	0.0612
Depth to carbonates	-0.00250	0.0282

Table 1-12. Regression coefficients for surface bulk density in Experiment 702

Soil Texture

There were no significant differences in surface sand contents between treatments (Table 1-13).

	702.	· · ·			
Grass	N-Source	Rate	Sand	Silt	Clay
		kg ha ⁻¹		%%	
Buffalograss				-	
	Swine	168	23a	53b	24a
		504	23a	52b	25a
	Urea	168	22a	53b	25a
		504	23a	51ab	26a
	Control	0	23a	49a	28b
Bermudagrass					
	Swine	168	24a	53a	23a
		504	21a	53a	26ab
	Urea	168	22a	53a	25ab
		504	23a	52a	25ab
	Control	0	23a	51a	26b
Orchardgrass					
·	Swine	168	23a	52a	25a
		504	23a	52a	25a
	Urea	168	23a	53a	25a
		504	23a	51a	26a
	Control	0	21a	54a	25a
Wheatgrass					
•	Swine	168	22a	51a	27a
		504	23a	52a	25a
	Urea	168	22a	53a	25a
		504	22a	53a	25a
	Control	0	23a	52a	25a

Table 1-13. Surface sand, silt and clay contents by N-source and rate for Experiment

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) within a single grass species as determined by analysis of variance.

Statistical differences in average surface silt and clay contents between

treatments were present. However, these differences are within the range of error for the particle size procedure (\pm 3%).

Soil Physical and Morphological Properties Relating to Various Application Rates of Swine Effluent Using Sprinkler and Flood Application Techniques to a No-tilled Corn-Wheat-Fallow rotation

Selected Morphological Properties

No differences in depth of mollic color and depth to argillans were found between treatments (Table 1-14). Average depth to carbonates was significantly greater in the AA2 and SUR2 treatments than in the CTL, SPR0.5 and SPR1 treatments.

Variations in depth to carbonates were likely tied to an episode of soil disturbance, rather than treatments applied. It is believed that many of the plots in Experiment 703B were disturbed during the installation of a nearby natural gas well (personal communication, Laurence Bohl, OPREC Station Superintendent, May 30, 2003) during the early to late 1970's. This disturbance, rather than the treatments applied, is the probable cause of differences in depths to carbonates.

Only five of the 42 soil cores collected from Experiment 703B contained granular structure in the A-horizon. The treatment and depth of granular structure were as follows: control (12 cm), 1x surface-applied swine effluent (4 cm), 2x surface-applied swine effluent (17 cm), 1x anhydrous ammonia (10 cm), and 2x anhydrous ammonia (10 cm).

Table 1-14. Average depth of mollic color, depth to argillans and depth to carbonates by

N-Source	Rate	Depth of Mollic Color	Depth to Argillans	Depth to Carbonates
			cmc	
Sprinkle			· · · · · · · · · · · · · · · · · · ·	
•	0.5x	43a	27a	35abcg
	1x	43a	23a	36abcdg
	2x	38a	13a	44abcdefg
Surface				-
	0.5x	40a	16a	40abcdeg
	1x	42a	16a	46bcdefg
	2x	53a	20a	48cdef
AA				
	1x	46a	26a	40abcdefg
	2x	51a	25a	50def
Control		-		
	0	44a	17a	38abcfg
Tillage				5
	0	48a	18a	42abcdefg

N-source and rate for Experiment 703B.

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

Organic Carbon and Aggregate Stability

There was no significant difference in surface organic carbon contents among treatments and the controls (Table 1-15). In contrast to previous research, tillage had the most significant effect on promoting the amount of water stable aggregates (Table 1-14). TIL contained significantly more water stable aggregates than SPR1, SUR2, AA1, AA2, and CTL treatments. Reason for increased aggregate stability in the tilled plots is unclear, as previous research has found that tillage destroys water stable aggregates (Baldock and Kay, 1987; Canarache, 1999).

In this experiment, no soil properties were significantly correlated with the amount of water stable aggregates as determined by backward-stepwise regression.

Table 1-15. Average surface organic carbon and water stable aggregates by N-source

N-Source	Rate	Organic Carbon	Water Stable Aggregates
		% (w/w)	%
Sprinkle			
•	0.5x	1.1a	11ab
	1x	1.1a	9a
	2x	1.1a	11ab
Surface		•	
	0.5x	1.1a	13ab
	1x	1.1a	11ab
	2x	1.1a	9a
AA			
	1x	1.2a	7a
	2x	1.2a	10a
Control			
	0	1.1a	10a
Tillage			
0	0	1.0a	16b

and rate for Experiment 703B.

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

Bulk Density

Average surface bulk densities varied wildly among treatments (Table 1-16). However, it is important to note that there were no consistent differences in surface bulk densities between the two application methods of swine effluent, between the tillage control and the no-till control, or between rates within swine effluent application methods.

Much like the surface bulk densities, average subsurface bulk densities were highly variable among treatments. Only AA1 had a subsurface bulk density different than the CTL. In addition, the average subsurface bulk density for AA1 was significantly higher than SPR1, SPR2, SUR1, SUR2 and AA2. Reasons for the high bulk density in the AA1 are unclear. The wide variations in surface and subsurface bulk densities are likely a remnant of previous field disturbances when the natural gas well and accompanying pipelines were installed. Table 1-16. Average surface and subsurface bulk densities by N-source and rate for

N-Source	Rate	Surface Bulk Density	Subsurface Bulk Density
			Mg m ⁻³
 Sprinkle		······································	
	0.5x	1.41abcd	1.51abcdef
	1x	1.47ac	1.45abcdf
	2x	1.40bcd	1.44abcd
Surface			
	0.5x	1.36bcd	1.51abef
	1x	1.34bcd	1.46abcdf
	2x	1.39abcd	1.42abd
AA			
	1x	1.34bd	1.59cef
	2x	1.44acd	1.44abcd
Control			
	0	1.42acd	1.48abcdf
Tillage	-		
	0	1.47ac	1.54acef

Experiment 703B.

+ Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

No soil properties were significantly correlated with surface bulk density within

this experiment.

Soil Texture

No differences in percentages of sand and silt contained in the surface horizon were found between treatments (Table 1-17). Differences in clay may be due to previous soil disturbance or natural soil variability.

Table 1-17. Average surface sand, silt, and clay contents by N-source	rce and rate for
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N-Source	Rate	Sand	Silt	Clay	
 			······%····		
Sprinkle					
•	0.5x	15a	53a	32ab	
	1x	14a	51a	35ab	
	2x	15a	53a	32ab	
Surface					
	0.5x	15a	52a	33ab	
	1x	16a	56a	28a	
	2x	15a	52a	34ab	
AA					
	1x	16a	48a	36b	
	2x	14a	52a	34b	
Control					
	0	17a	50a	33b	
Tillage		•			
0 -	0	15a	52a	.33ab	

Experiment 703B.

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

Changes in Soil Physical and Morphological Properties Relating to Swine Effluent Applications under Conventional, No-till, and Continuous Forage Management

Systems

Data addressing differences in soil properties arising from swine effluent applications were compiled using soil samples and analyses from Experiments 701, 702 and 703B. Swine effluent applications at the 0.5x and 2x rates in Experiment 703B were used in this discussion, as they are comparable to 168 and 504 kg ha⁻¹ N rates applied in Experiments 701 and 702. Statistical analyses were not completed between experiments due to the lack of replication. Therefore, only general trends will be discussed.

Selected Morphological Properties

Changes in morphological properties are thought to be insensitive to the shortterm treatments employed and so, no differences in properties were expected between treatments and/or management systems (Table 1-25). Therefore, observed differences between experiments are thought to be due to past management practices or natural soil variability rather than treatments and management systems evaluated (Table 1-18). In the case of Experiment 703B, the shallow depth of mollic color and depth to carbonates likely resulted from the installation of a natural gas well.

Table 1-18. Average depth to mollic color, depth to argillans, and depth to carbonates

for swine effluent treatments under conventional, no-till and continuous

Experiment	Rate	Depth of Mollic Color	Depth to Argillans	Depth to Carbonates
	kg N ha ⁻¹		cm	
701	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	<u> </u>	
	168	56	18	50
Continuous Corn	504	47	26	54
	0	57	16	58
702				
Buffalograss	168	63	16	61
-	504	55	12	64
	0	66	15	71
Bermudagrass	168	83	14	91
-	504	69	12	79
	0	53	17	58
Orchardgrass	168	64	10	68
·	504	60	16	62
	0	62	13	62
Wheatgrass	168	57	19	61
0	504	62	16	65
	0	47	16	57
703B	0.5x sprinkle	43	27	35
	2x sprinkle	38	13	44
No-till Corn-	0.5 x surface	40	16	40
Wheat-Fallow	2x surface	53	20	48
	0	44	17	38

forage management systems

Organic Carbon and Aggregate Stability

Tillage had a considerable effect on the amount of surface organic carbon stored in the soils (Table 1-19). The conventionally-tilled plots of Experiment 701 consistently had less surface organic carbon than continuous forage and no-tilled plots of Experiments 702 and 703B, respectively. It has been well proven that soil disturbance via tillage significantly decreases the organic carbon content of the soil, as soil aeration promotes the short-term microbial oxidation of organics (Canarache, 1991).

Table 1-19. Average organic carbon and water stable aggregates for swine effluent

treatments under conventional, no-till and continuous forage management

Experiment	Rate	Organic Carbon	Water Stable Aggregates
	kg N ha ⁻¹	% (w/w)	%
701			
	168	1.0	16
Continuous Corn	504	0.9	19
·	0	1.0	27
702			
Buffalograss	168	1.3	24
-	504	1.2	10
	0	1.1	30
Bermudagrass	168	1.5	34
·	504	1.3	11
	0	1.3	39
Orchardgrass	168	1.4	9
-	504	1.4	7
	0	1.3	24
Wheatgrass	168	1.2	26
•	504	1.5	· 11
	0	1.4	13
703B	0.5x sprinkle	1.1	11
	2x sprinkle	1.1	11
No-till Corn-	0.5 x surface	1.1	13
Wheat-Fallow	2x surface	1.1	9
	0	1.1	. 11

systems

Furthermore, continuous forage systems had larger organic carbon accumulations when compared to no-tilled systems. The accumulation of organic carbon in forage systems likely stems from the prolific root systems of forage grasses, which contribute large amounts of organic matter from above and below ground plant biomass to soil organic carbon pools, as well as from the reduction in the rate of mineralization due to decreased soil disturbance (Saniju et al., 2003; Cambardella and Elliot, 1992).

Increasing rates of swine effluent seemed to promote the decrease of surface organic carbon contents in the conventionally-tilled plots and in soils under warm season grasses (bermudagrass and buffalograss), while increasing organic carbon contents under no-till management and cool season grasses (orchardgrass and buffalograss). Differences in effects of higher rates of swine effluent on soil organic carbon contents under the two management systems and between the two types of grasses are puzzling and needs to be further investigated. However, it is thought that increased N applications without comparable increases in deposited or applied C resulted in the oxidation of native soil organic matter in the conventionally-tilled plots (Nemati et al., 2000).

In addition, surface applications of swine effluent lead to increased accumulation of organic carbon when compared to sprinkler swine effluent applications. Reasons for the differences are uncertain, as the same amount of effluent-derived water and organic matter should have been applied via both methods. It is possible that surface applications of effluent saturated the soils for a longer period of time than the sprinkler applications, resulting in depressed microbial activity and organic carbon decomposition. However, this has yet to be proven.

In general, water stable aggregates were most abundant under continuous forage and lowest under the no-tilled corn-wheat-fallow rotation. This trend was expected, as the proliferation of roots and lack of tillage within the forage system is known to promote the formation of soil aggregates (Saniju et al., 2003; Cambardella and Elliot, 1992); while fallowing decreases the amount of water stable aggregates due to non-continuous additions of plant residue (Monreal et al., 1995).

In addition, water stable aggregates amounts tended to decrease from low to high rates of swine effluent and is likely caused by increases in soil Na⁺ concentrations

with increasing swine effluent applications. This is consistent with the results of Powers et al. (1975) and Travis et al. (1971) who reported applications of wastes containing high concentrations of sodium, dispersed soil aggregates and reduced water infiltration and percolation.

Backward-stepwise regression found in swine effluent amended treatments, depth to carbonates and surface bulk density were very weakly correlated (p-value = 0.0079, $R^2 = 0.2060$) with the percentage water stable aggregates (Table 1-20).

Table 1-20. Regression coefficients for percent water stable aggregates in swine

Predictor Variable	Beta	p-value
Intercept	-49.64814	
Depth to carbonates	0.17076	0.0344
Surface bulk density	37.01965	0.0160

effluent amended plots across experiments

Bulk Density

There were no clear-cut trends in surface bulk density between management systems (Table 1-21). However, increased application rates of swine effluent typically resulted in increased soil bulk density. This compaction is likely due to soil dispersion (either from Na⁺ or physical destruction of aggregates by the effluent) or the sheer weight of flood-applied effluent on the soil.

Much like surface bulk densities, treatments with high rates of swine effluent tended to have higher bulk densities than treatments where lower rates were applied.

The subsurface bulk densities were highest in the tillage treatments and lowest in the continuous forage treatments (Table 1-21). Tillage is known to increase the bulk density of the soil, particularly at the depth of tillage (Brady and Weil, 2002, p. 143).

Decreased bulk density in the forage treatments is possibly due to root growth and subsequent formation of aggregates and pores (Saniju et al., 2003).

Experiment	Rate	Surface Bulk Density	Subsurface Bulk Density
	kg N ha ⁻¹	N	⁄lg m ⁻³
701			
	168	1.48	1.62
Continuous Corn	504	1.52	1.60
	0	1.45	1.62
702			
Buffalograss	168	1.43	1.46
-	504	1.57	1.46
	0	1.40	1.44
Bermudagrass	168	1.34	1.48
-	504	1.42	1.43
	0	1.41	1.57
Orchardgrass	168	1.45	1.48
-	504	1.50	1.45
	0	1.44	1.33
Wheatgrass	168	1.56	1.42
•	504	1.46	1.42
	0	1.45	1.43
703B	0.5x sprinkle	1.41	1.51
	2x sprinkle	1.40	1.44
No-till Corn-	0.5 x surface	1.36	1.51
Wheat-Fallow	2x surface	1.39	1.42
THOUL LOOT	0	1.42	1.48

 Table 1-21. Average surface and subsurface bulk densities for swine effluent treatments

 under conventional, no-till and continuous forage management systems

In swine effluent amended treatments, surface silt content and subsurface bulk density were very weakly correlated (p-value = 0.0304, $R^2 = 0.1533$) with surface bulk density (Table 1-22).

 Table 1-22. Regression coefficients for surface bulk density in swine effluent amended

 plots across experiments

Predictor Variable	Beta	p-value
Intercept	2.57028	
Surface Silt Content	-0.35512	0.0810
Subsurface bulk density	-0.01159	0.0090

Surprisingly, subsurface bulk density was negatively correlated with surface bulk density. Positive or no correlation was expected, as long-term properties or management factors that affect the surface were expected to have the same or no effect on the subsurface.

Soil Texture

Surface soil texture was coarsest in the conventionally-managed, continuous corn treatments (> % sand) and finest in the no-till plots (> % clay) (Table 1-23). Due to the lack of vegetative cover most of the year, conventionally-managed treatments may have experienced higher rates of wind erosion than continuous forage or no-till treatments, where the soil was covered with vegetation or residue. Increased wind erosion would result in the coarsening of soils as finer particles, such as the silts are blown away.

Increased surface clay content in the no-till plots was likely resulted from the installation of the natural gas well, as trenches/holes were filled in with argillic subsoils.

Table 1-23. Average surface sand, silt, and clay for swine effluent treatments under

Experiment	Rate	Sand	Silt	Clay
	kg N ha ⁻¹		%%%%%	
701			· · · · ·	
	168	30	45	25
Continuous Corn	504	31	43	26
	0	29	47	24
702				
Buffalograss	168	23	53	24
U I	504	23	52	25
	0	23	49	28
Bermudagrass	168	24	53	23
Ŷ	504	21	53	26
	0	23	51	26
Orchardgrass	168	23	52	25
.	504	23	52	25
	0	21	54	25
Wheatgrass	168	22	51	27
	504	23	52	25
	0	23	52	25
703B	0.5x sprinkle	15	53	32
	2x sprinkle	15	53	32
No-till Corn-	0.5 x surface	15	52	33
Wheat-Fallow	2x surface	15	52	34
	0	17	50	33

conventional, no-till and continuous forage management systems

CONCLUSIONS

Over the short-term (2 to 5 years), swine effluent applications had little effect on soil morphological and physical properties of a fine, smectitic, mesic Aridic Argiustoll under conventional, continuous corn, continuous forage and no-till corn-wheat-fallow management systems when compared to beef manure and commercial fertilizer applications. Although not significantly different at the time of this research, differences in soil properties under various rates of swine effluent applications are beginning to appear and are expected to become more pronounced over the duration of the experiment. This research suggests treatments receiving high rates of swine effluent were beginning to experience degradation in soil properties, as increases in surface bulk density and decreases in surface organic carbon and surface water stable aggregates were found.

Reevaluation of the properties targeted in this research at various intervals in the future will provide a continuous assessment of the temporal nature of soil physical property changes induced by various rates of swine effluent applications to three different management systems. Results of this research can be used as baseline for evaluating these changes, as inherent soil variability between plots was a limiting factor in this study.

In addition to the soil properties evaluated in this research, future studies could potentially benefit from additional analyses pertaining to: Na⁺ concentrations, aggregate size fractionation, root density profiles, soil microbial activity, soil glomalin and extracellular polysaccharide concentrations, organic carbon fractionation, organic matter quality, soil macrofauna (earthworm) activity, factors influencing aggregate stability (iron, calcium carbonate, etc), and small-scale evaluations of soil variability at the OPREC complex. It is believed that because so little is known about the changes in soil physical

properties resulting from swine effluent applications in semi-arid regions on calcareous soils, future researchers need to go beyond "typical" analyses conducted in this research in order to truly understand the soil chemical, biological, and physical factors influencing soil organic carbon concentrations, surface bulk densities and water stable aggregates in these systems.

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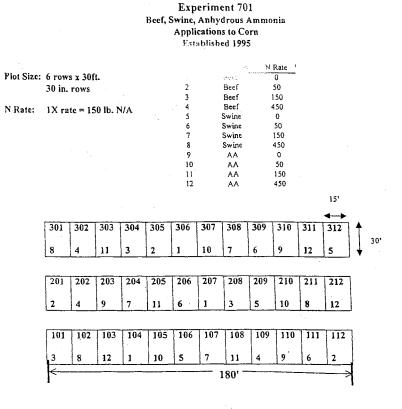
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Appendix 1-1. Plot Map for Experiment 701, Oklahoma Panhandle Research and Extension Center, Goodwell, Oklahoma



N R

Experiment 702 Swine Effluent Applications to Year-Round Forage Systems

Plot Layout

Grass Treatment	Grass Species	Fertilizer Treatment	Fertilizer Source
Gl	Bermudagrass	Fl	попе
G2	Buffalo grass	F2	50 lb./A Swine
63	Wheatgrass	F3	150 lb./A Swine
G4	. Orchardgrass	F4	450 lb./A Swine
		F5	50 lb./A AN
	· · · · · · · · · · · · · · · · · · ·	F6	150 lb./A AN
		F7	450 lb./A AN

5'	R	ep 1			R	ep 2	,	1		Rep	3				Rep	4	
111 G3 F5	121 G1 F4	131 G4 F2	141 G2 F1	211 G2 F5	221 G3 F2	231 GI F6	241 G4 F5		311 G4 F7	321 G2 F7	331 G1 F1	341 G3 F5		411 G3 F5	421 G2 F1	431 G4 F2	441 G1 F6
112 G3 F6	122 G1 F5	132 G4 F1	142 G2 F5	212 G2 F4	222 G3 F5	232 G1 F1	242 G4 F4		312 G4 F4	322 G2 F3	332 G1 F5	342 G3 F4]	412 G3 F4	422 G2 F5	432 G4 F4	442 G1 F5
113 G3 F4	123 G1 F7	133 G4 F5	143 G2 F6	213 G2 F7	223 G3 F3	233 G1 F3	243 G4 F7		313 G4 F1	323 G2 F6	333 G1 F3	343 G3 F7		413 G3 F2	423 G2 F2	433 G4 F3	443 G1 F4
114 G3 F 3	124 G1 F1	134 G4 F6	144 G2 F3	214 G2 F2	224 G3 F6	234 G1 F4	244 G4 F3		314 G4 F2	324 G2 F5	334 G1 F7	344 G3 F3		414 G3 F1	424 G2 F3	434 G4 F6	444 G1 F7
115 G3 F1	125 G1 F6	135 G4 F4	145 G2 F2	215 G2 F1	225 G3 F7	235 G1 F7	245 G4 F6	ŀ	315 G4 F5	325 G2 F4	335 G1 F6	345 G3 F6		415 G3 F3	425 G2 F6	435 G4 F7	445 G1 F1
116 G3 F7	126 G1 F3	136 G4 F7	146 G2 F4	216 G2 F3	226 G3 F4	236 G1 F5	246 G4 F1		316 G4 F3	326 G2 F2	336 G1 F2	346 G3 F1		416 G3 F7	426 G 2 F4	436 G4 F1	446 G1 F2
117 G3 F2	127 G1 F2	137 G4 F3	147 G2 F7	217 G2 F6	227 G 3 F1	237 G1 F2	247 G4 F2		317 G4 F6	327 G2 F1	337 G1 F4	347 G3 F2		417 G3 F6	427 G2 F7	437 G4 F5	447 G1 F3
			1	10' alley					Center P	ivot Wh	eel Trac	k	-		_		

⊤ 5' alley

49

Ν

Experiment 702 Swine Effluent Applications to Year-Round Forage Systems

Plot Layout

Ν

Grass Treatment	Grass Species	Fertilizer Treatment	Fertilizer Source
Gl	Bermudagrass	F1	none
G2	Buffalo grass	F2	50 lb./A Swine
G3	Wheatgrass	F3	150 lb./A Swine
.G4	, Orchardgrass	F4	450 lb./A Swine
		F5	50 lb./A AN
		F6	150 lb./A AN
		F7	450 lb./A AN

	5'	Re	ep 1			R	ep 2			I	Rep	3			Rep	4	
;	111 G3 F5	121 G1 F4	131 G4 F2	141 G2 F1	211 G2 F5	221 GJ F2	231 G1 F6	241 G4 F5		311 G4 F7	321 G2 F7	331 G1 F1	341 G3 F5	411 G3 F5	421 G2 F1	431 G4 F2	441 G1 F6
	112 G3 F6	122 G1 F5	132 G4 F1	142 G2 F5	212 G2 F4	222 G3 F5	232 G1 F1	242 G4 F4		312 G4 F4	322 G2 F3	332 G1 F5	342 G3 F4	412 G3 F4	422 G2 F5	432 G4 F4	442 G1 F5
	113 G3 F4	123 G1 F7	133 G4 F5	143 G2 F6	213 G2 F7	223 G3 F3	233 G1 F3	243 G4 F7		313 G4 F1	323 G2 F6	333 G1 F3	343 G3 F7	413 G 3 F 2	423 G2 F2	433 G4 F3	443 G1 F4
	114 G3 F3	124 G1 F1	134 G4 F6	144 G2 F3	214 G2 F2	224 G3 F6	234 G1 F4	244 G4 F3		314 G4 F2	324 G2 F5	334 G1 F7	344 G3 F3	414 G3 F1	424 G2 F3	434 G4 F6	444 G1 F7
	115 G3 F1	125 G1 F6	135 G4 F4	145 G2 F2	215 G2 F1	225 G3 F7	235 G1 F7	245 G4 F6	l	315 G4 F5	325 G2 F4	335 Gl F6	345 G3 F6	415 G3 F3	425 G2 F6	435 G4 F7	445 G1 F1
	116 G3 F7	126 G1 F3	136 G4 F7	146 G2 F4	216 G2 F3	226 G3 F4	236 G1 F5	246 G4 F1		316 G4 F3	326 G2 F2	336 G1 F2	346 G3 F1	416 G3 F7	426 G2 F4	436 G4 F1	446 G1 F2
	117 G3 F2	127 G1 F2	137 G4 F3	147 G2 F7	217. G2 F6	227 G3 F1	237 G1 F2	247 G4 F2		317 G4 F6	327 G2 F1	337 G1 F4	347 G3 F2	417 G3 F6	427 G2 F7	437 G4 F5	447 G1 F3
	∱ 5'	alley		1	0' alley					Center P	ivot Who	el Tracl	k				

Appendix 1-3. Plot Map for Experiment 703B, Oklahoma Panhandle Research and Extension Center, Goodwell, Oklahoma

Experiment 703 Corn-Wheat Rotation Swine Effluent Applications to Cropping Systems Established 1998

Applicati	ion Method and Rate			
		Τп	Application	N Rate
		1	Sprinkler	0.5x
Plot Size	: 6 rows x 30ft.	2	Sprinkler	1.0x
	30 in. rows	3	Sprinkler	2.0x
		4	Surface	0.5x
N Rate:	1x = 150 lb. N/A	5	Surface	1.0x
	12 120 18:1014	6	Surface	2.0x
		7	Injection	0.5x
		8	Injection	1.0x
		9	Injection	2.0x
		10	Check	0x
		11	Check	0x
		12	AA	1.0x
		13	AA .	2.0x
		14	Tillage Check	0x

													15'
													∢→
301	302	303	304	305	306	307	308	309	310	311	312	313	314
12	8	6	4	14	10	13	9	1	3	5	7	11	2
										-			
201	202	203	204	205	206	207	208	209	210	211	212	213	214
13	8	2	6	9	10	11	1	5	4	3	12	14	7
-													
101	102	103	104	105	106	107	108	109	110	111	112	113	11
9.	13	5	10	8	4	3	7	6	2	1	14	11	12
/		1			- -				-1	-			

N

Appendix 1-4. Summary of 1998 through 2000 Swine Effluent Analyses

Lab ID	Animal Source	Date	Experiment	Digest	Acidified	EC(field)	pН	%N	%C	NH ₃ (mg/l)	DM%	Ortho-P	<u> </u>				Dig	restion					
				<u> </u>		dS m ⁻¹	-			mg L ⁻¹			Na	Ca	Mg	к	Mn	s	в	P	Fe	Zn	Cu
								1				mg L"	mg L"	mg L°1	mg L"	mg L ⁻¹	mg L 1	mg L"	mg L '				
M981	Swine	May 12-98	702	35/20	yes	35.4	NA	0.413	0.0818	4153	2.16	42.80	169.750	82.338	27.353	417.38	0.336	•	2.562	48.458	6.785	14.245	0.12
M983	Swine	May 12-98	702	35/20	yes	33.7	NA	0.4713	0.2232	2040	1.83	48.20	171.150	103.600	32.200	433.13	0.534	1.	3.189	53.008	18.603	1.216	0.15
M9810	Swine	June 5-98	702	35/20		17.9	NA	0.1158	0.1783	970	1.28	59.10	109.725	55.510	13.300	361.73	0.399	1.	2.791	28.368	6.979	18.270	0.4
M9811	Swine	June 5-98	702	NA	NA	17.1	NA	NA	NA	998	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	- N/
M990001	Swine	14-May-99	702	30/190	yes	10.52	N/A	0.0992	0.1646	867	1.36	46.3	292.790	108.490	15.561	1102.00	0.504		6.606	46.043	4.864	11.900	1.64
M990002	Swine	10-Jun-99	702	25/190	yes	10.11	N/A	0.0983	0.1269	783	1.68	51.4	316.692	97.812	29.572	1144.56	0.682		7.395	50.996	6.452	16.469	2.10
M990004	Swine	14-May-99	702	25/100	yes	10.51	N/A	0.0975	0.1456	826.6	1.62	52.3	327.104	140.904	35.082	1276.80	1.181		8.588	63.688	65.816	16.796	2.0
M990014	Swine	10-Jun-99	702	50/35	NO	10.42	7.8	0.0925	0.2166	805.7	0.63	29.9							1	}			
M0019	Swine	10-Apr-00	702 cool-season	100/190	yes		7.7	0.1075	0.1940	797.3	1.09	31.5	227.43	129.77	20.79	942.59	0.47		3.58	49.61	3.84	7.76	1.9
M0020	Swine	10-Apr-00	702 cool-season	100/190	no	9.72	7.7	0.1062	0.2596	797.3	0.60	37.9	210.52	120.27	18.30	870.58	0.40		3.40	44.29	3.49	6.90	1.7
M0025	Swine	08-May-00	702	100/190	yes	10.23	7.81	0.1053	0.1647	768.6	1,17	57.9	205.96	130.53	30.19	849.87	0.72	1.	3.09	59.07	7.13	15.52	3.1
M0026	Swine	08-May-00	702	100/190	no	10.08	7.80	0.1034	0.2285	768.6	0.61	52_	<u>.</u>	· ·		•	•		•	<u> </u>			
M0027	Swine	08-May-00	702	100/190	yes	9.98	7.81	0.1054	0.2016	797.0	0.81	57.9	209.00	133.19	32.28	863.74	0.77		3.24	62.09	7.00	16.34	3.3
M0028	Swine	08-May-00	702	100/190	no	10.24	7.74	0.1092	0.2720	797.0	0.60	57.9		. ·			•		<u>.</u>	· ·			
M0029	Swine	08-May-00	702	48/35	yes	9.50	7.84	0.1084	0.1890	799.5	1.24	59.5							I	<u> </u>	L		L
M0030	Swine	08-May-00	702	50/35	no	10.22	7.81	0.1060	0.2577	799.5	0.58	57.4							I				
M0031	Swine	08-May-00	702	50/35	yes	10.30	7.83	0.1083	0.1622	719,2	0.98	62.6							L				
M0032	Swine	08-May-00	702	50/35	no ·	10.04	7.81	0.1039	0.2283	719.2	0.60	54.7		L				L	<u> </u>	L			
M0033	Swine	08-May-00	702	50/35	yes	10.05	7.81	0.1068	0.2213	753.0	0.70	57						L	ļ	<u> </u>			
M0034	Swine	08-May-00	702	50/35	no	10.05	7.84	0.1021	0.2663	753.0	0.60	55.9		L				!	L		L		
M0077	Swine	09-Jun-00	702 warm	25/190	yes	10.68	7.87	0.1117	0.1343	960	1.30	38.3	260.76	121.07	42.18	1061.72	0.66	<u> · </u>	10.43	52.44	8.95	20.89	3.9
M0078	Swine	09-Jun-00	702 warm	25/190	по	10.68	7.87	0.0840	0.1991	810	0.56	34	273.14	131.63	45.07	1114.16	0.70	49.86	11.07	55.71	8.96	21.68	3.4
M0122	Swine	15-May-01	702	50/25	y	NA	NA			1233.0	1.3	87.52	·	I				 	ļ	 			
M0123	Swine	15-May-01	702	50/35	n	12.55	8.09			1181.5	0.76	79.90		ļ				ļ	ļ	<u> </u>		┝──┥	—
M0124	Swine	25-May-01	702	50/35		11.32	8.22			967.5	0.70			L				<u> </u>	 	┣		└───	
M0125	Swine	11-Jun-01	702	50/25	n	11.24	7.83		l	1084.5	0.68			<u> </u>	ļ				<u> </u>	<u> </u>	L	┝───┤	<u> </u>
M0126	Swine	11-Jun-01	702	50/35	y	NA	NA		I	1047.0	1.29			 					<u> </u>	<u> </u>	L	 	
M0127	Swine	11-Jun-01	702	50/25	n	11.41	7.84		L	941.5	0.65							ļ				┢───┥	
M0128	Swine	11-Jun-01	702	50/25	у	NA	NA		L	982.0	1.49	L		l	ļ	·		<u> </u>			L		<u>i </u>

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Appendix 1-5. Official Richfield Series Description

National Soil Survey Center Lincoln, Nebraska

United States Department of Agriculture

http://www.statlab.iastate.edu/cgi-bin/osd/osdname.cgi?-P Retrieved: July 21, 2000 LOCATION RICHFIELD Established Series Rev. PRF, JW 05/2000

RICHFIELD SERIES

The Richfield series consists of very deep, well drained, moderately slowly permeable soils. These soils formed in calcareous loess on tableland plains.

TAXONOMIC CLASS: Fine, smectitic, mesic Aridic Argiustolls **TYPICAL PEDON:** Richfield silt loam - in a cultivated field. (Colors are for dry soil unless otherwise stated.)

Ap--0 to 6 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable; slightly plastic and slightly sticky; neutral; clear smooth boundary. (4 to 8 inches thick)

Bt--6 to 16 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, firm; plastic and sticky; common fine faint clay films; slightly alkaline; gradual smooth boundary. (8 to 14 inches thick)

BCk1--16 to 20 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, firm; few soft accumulations of carbonate; strong effervescence; moderately alkaline; clear smooth boundary. (4 to 12 inches thick)

BCk2--20 to 30 inches; light gray (10YR 7/2) silty clay loam, grayish brown (10YR 5/2) moist; weak granular structure; slightly hard, friable; few soft accumulations of carbonate; strong effervescence; moderately alkaline; gradual smooth boundary. (8 to 20 inches thick)

C--30 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, friable; porous; strong effervescence; strongly alkaline.

TYPE LOCATION: Grant County, Kansas; 9 miles east and 3 miles north of Ulysses; 1,000 feet west and 100 feet south of the northeast corner, sec. 12, T. 28 S., R. 36 W.

RANGE IN CHARACTERISTICS:

Mean annual soil temperature: 47 to 59 degrees F Depth to secondary calcium carbonate: 10 to 24 inches Thickness of the mollic epipedon: 9 to 20 inches Thickness of the solum: 16 to 37 inches CEC/clay ratios are less than 90 me/100g in the solum Particle-size control section (weighted average): Clay content: 35 to 42 percent An eroded and dry phase is recognized A horizon: Hue: 10YR Value: 4 or 5 and 2 or 3 moist Chroma: 2 or 3 Texture: silt loam, but range includes silty clay loam, clay loam, loam, very fine sandy loam, and fine sandy loam Reaction: neutral to mildly alkaline Some pedons have a thin transitional horizon between the A and Bt horizons

Bt horizon: Hue: 10YR Value: 4 or 5 and 3 or 4 moist Chroma: 2 or 3 Texture: silty clay loam or silty clay, averaging 35 to 42 percent clay Clay content: 35 to 42 percent Reaction: neutral to moderately alkaline

Bk,BCk horizon: Hue:10YR Value: 5 to 7 and 4 to 6 moist Chroma: 2 or 3 Texture: silty clay loam or silt loam Clay content: 20 to 32 percent Reaction: slightly alkaline or moderately alkaline

C horizon: Hue: 10YR Value: 6 to 8 and 4 to 6 moist Chroma: 2 to 4 Texture: silty clay loam, clay loam, or silt loam Calcium carbonate equivalent: 10 to 15 percent Reaction: moderately alkaline or strongly alkaline This horizon is usually calcareous loess, but in some pedons when the loess mantle is

thin, contrasting material is between depths of 40 and 60 inches. In some pedons the substratum contains buried horizons.

COMPETING SERIES: There are no series in the same family. Closely related soils are: Ashfork: have paralithic contact above 40 inches

Bethune: have weakly cemented soft calcareous sandstone ranges from 20 to 40 inches

Blackpipe: have paralithic contact above 40 inches

Boneek: have in the upper Bt horizon, redder hue

Boquillas: have paralithic contact above 40 inches

Chapin: have a redder hue in the Bt horizon

Collbran: have a redder hue in the Bt horizon

Collide: formed in eolian and reworked eolian material derived from sandstone and are on terraces and fans

Emigrant: have paralithic contact above 40 inches

Huggins: have paralithic contact above 40 inches

Kube: have a higher CEC/clay ratio in the solum

Leyden: have paralithic contact above 40 inches

Loma: have a redder hue in the Bt horizon, have carbonates throughout Nuncho: contain more than 15 percent fine sand or coarser in the in the series control section

Nunn: contain more than 15 percent fine sand or coarser in the in the series control section

Querc: have paralithic contact above 40 inches

Rednun: have a redder hue in the Bt horizon, contain more than 15 percent fine sand or coarser in the in the series control section

Ryus: have carbonates throughout

Savo: have a thinner mollic epipedon and have cooler temperatures

Showlow: have paralithic contact above 40 inches

Standley: contains more than 15 percent coarse fragments

Thunderbird: have paralithic contact above 40 inches

Torreon: have a solum thicker than 30 inches

Weld: have hue of 5Y and 7.5YR

Wormser: have paralithic contact above 40 inches

GEOGRAPHIC SETTING:

Parent material: derived from loess ranging from three feet to more than 10 feet in thickness

Landform: are on tablelands that commonly have a plane surface, but the surface ranges from slightly concave to slightly convex

Slopes: 0 to 6 percent

Elevation: 2600 to 4000 feet

Mean annual temperature: 45 to 57 degrees F

Mean annual precipitation: 13 to 22 inches

Precipitation pattern:

Frost-free period: 140 to 185 days.

Thornthwaites Annual P-E Index: 24 to 34

GEOGRAPHICALLY ASSOCIATED SOILS:

Colby: are fine-silty and occupy steeper slopes

Dawes: have an abrupt textural change from the A to Bt horizon and are on slightly lower positions

Goshen: have a thicker mollic epipedon

Johnstown: are fine-silty, have sand, coarse sand or gravely coarse sand at 20 to 40 inches and are on similar positions

Keith: are fine-silty and are on similar positions

Ness: are more clayey and are on upland depressions

Rosebud: are fine-loamy and moderately deep over sandstone

Satanta: are fine-silty and are on similar positions

Ulysses: are fine-silty and are on upland hillslopes

DRAINAGE AND PERMEABILITY:

Drainage: well drained.

Permeability: moderately slow Runoff: slow or medium

USE AND VEGETATION: Most of the Richfield soils are cultivated to winter wheat and sorghum. Native vegetation is mainly short and mid grasses.

DISTRIBUTION AND EXTENT: Western Kansas and Nebraska, eastern Colorado, southwestern South Dakota and Oklahoma Panhandle. The series is of large extent.

MLRA OFFICE RESPONSIBLE: Salina, Kansas

SERIES ESTABLISHED: Reconnaissance Soil Survey of Western Kansas, 1910.

REMARKS:

Diagnostic horizons and features recognized in this pedon are: Mollic epipedon: the zone from the surface to 16 inches (A and Bt horizons) Argillic horizon: the zone from 6 to 16 inches (Bt horizon) Three sets of lab data support a borderline fine and fine-silty family, but range of characteristics presents a fine family soil.

National Cooperative Soil Survey U.S.A.

Appendix 1-6. Soil Core Descriptions for Experiment 701, Oklahoma Panhandle Research and Extension Center, Goodwell, Oklahoma

PROFIL	E:	701-101-1								_	% SLO	PE: < 2 %								
MAPPE	PROFILI	CLASSIFICA	TION:		Richtie	id Silt Loar	n				VEGET	ATION: Continu	ious corr	/ conve	ntional t	illage				
					Fine, s	ന്നപ്പെട്ട, ത	sic Aridic	Argiustoil			PAREN	T MATERIAL:	Calcario	us looss						
EPIPED	DN:	Mollic					_				COUNT	Y: Texas Co	unty, Ok	ahoma		_				
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Cambi	c					LOCAT	10N: Panhand	e Resea	ch and	Extentio	n Cente	, Good	weli, Ol	dahoma	
DATE S	AMPLED:	10	¥2/2000			DATE DE	SCRIBED		1/11/2001		CORE	LENGTH (cm):		112						
SAMPLI	ED BY:	Jason Parton				DESCRIBI	ED BY;	Jamie Pa	tton		CORE	DIAMETER (cm):								_
		Jamle Patton																		
Hanzon	Lower	Marthia color		ield Texture		. B	edox Feature	1		Structure		Costings	Con	R	ete	21		ncentrati	070	Boundary
	depih (cm)	(teloca)	Class	% City	X OF	Cefer	Amount	Size	Grade	Size	Shape	Турэ		Amount	Size		Тура	Attn	520	Dist
Ap	18	10YR 3/2	L	25	0				2	M/F	Sbk		Fr	2	F					A
							L		2	F	Sbk									
A1	30	10YR 3/2	L	27	0		ļ		2	M/F	Sbk		Fr	2	F					D
									2	F	Sbk									L
AB	51	10YR 3/2	ι	27	0				3	M/F	Pr	Argillans	Fr	.1	F/VF					D
									2	F	Pr			<u> </u>						
Bw1	65	10YR 3/3	L	27	0				2	M/F	Pr	Argillans	Fr	1	F/VF					D
				· · ·		L	1		2	M/F	Pr			<u> </u>						L
Bw2	78	10YR 3/4	L	26	0	·		·	2	M/F	Pr	Argillans	Fr	< 1	VF					A
				<u> </u>	ļ	·			2	F	Pr			<u> </u>			ļ			
Bk1	92	10YR 4/4	L	24	0				2	M/F	Pr	Argillans	Fr	<1	VF	٧s	Ca	<1	VF	G
				<u> </u>			1	<u> </u>	2	F	Pr			-			<u> </u>	<u> </u>		<u> </u>
Bk2	92+	10YR 4/4	L	26	0				2	M/F	Pr	Argilians	Fr	<1	VF	٧S	Ca	<1	VF/F	
			—	+			+		3	F	Pr		L	–	₋	ļ	L		ļ	
	1					 			 	. 	 		1				Į –	ļ		
		للمجريك	i	1		1	I	L	1	1			1	1	<u> </u>	1		ł		<u> </u>

PROFIL	E:	701-102-1									% SLO	PE: < 2 %								
MAPPE	D PROFILE	CLASSIFICA	TION:		Richlie	ki Silt Loam	1				VEGET	ATION: Continu	ious com	/ conve	ntional I	illage				
					Fine, s	mectic, me	sic Aridic	Argiustoll			PAREN	IT MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic						_			COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	TION: Panhandi	e Resea	rch and	Extentio	n Center	, Good	well, O	dahoma	
DATE S	AMPLED:	10	/2/2000	,		DATE DES	CRIBED		1/11/2001		CORE	LENGTH (cm):		122						
SAMPL	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Нотаро	Lower	Matria color	F	Neid Texture		R.	dox Feelure		1	Structure		Coatings	Con	P4	xota	Eff	C	oncentrati	003	Boundar
	depth (cm)	(moiat)	(1499	% City	% CF	Calor	Amount	Sige	Grade	Size	Shape	Type		Amount	Size		Туря	Ani	Size	Diet
Ap	13	10YR 3/2	SIL	25	D				2	M/C	Abk		Fr	3	F					D
	_								2	M/F	Abk							_		
BA	38	10YR 3/2	SiL	26	D				2	M	Pr		Fr	2	F					G
									2	F	Pr									1
Bt	58	10YR 3/4	CL	28	0		[]		2	м	Pr	Argillans	Fr	2	M/F					A
				ł			[2	F	Pr			1						
Btk1	75	10YR 4/4	CL	28	D				2	м	Pr	Argillans	Fr	1	M/F	s/vs	Ca	<1	VF	G
							1		2	F	Abk		1							
Bik2	105	10YR 4/4	L	24	0				2	M	Pr	Argillans	Fr	1	F	VS	Са	<1	F/VF	D
				1					2	F	Pr		1							
Btik3	105+	10YR 4/4	L	26	0		1		2	M	Pr	Argillans	Fr	1	F	٧S	Ca	<1	M/F	
	1			ļ	1.		1	r	3	F	Pr	l	1	1		1			ļ	
														. ·					ļ	
				1	· ·		1		T	1	1	T	1	1	1	(1			1

PROFIL	E:	701-103-1									% SLO	PE: <2%								
MAPPE	D PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loan	<u> </u>				VEGET	ATION: Continu	IOUS COTT	/ conve	ntional t	illage				
					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	le Resea	rch and	Extentio	n Cente	, Good	veli, O	lahoma	L .
DATE S.	AMPLED:	11	/2/2000			DATE DES	CRIBED		5/29/2002		CORE	LENGTH (cm):		120						
SAMPLE	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								_
		Jamie Patton											_							
Horizon	Lower	Martiniz scales		ield Texture		R	idox Feature	a	[Structure		Coalings	Com	-B	ots .	E#		ncentreli	0/1 8	Soundar
	depth (cm)	(noist)	Class	% Citay	% CF	Color	Amount	9ize	Grade	Siz#	Shape	Туре		Amount	Size_		Type	Amt	Size	Diat
Ap1	21	10YR 2/2	SIL	21	0	L			3	<u> </u>	Sbk	Argillans	н	<1	VF					D
			·						3	M	Sbk									
Ap2	35	10YR 2/2	SIL	23	0				2	M	Sbk	Argillans	Fr	< 1	VF					D
									2	FNF	Gr			L					<u> </u>	
ABt	48	10YR 3/2	SIL	25	0				2	M/F	Sbk	Argillans	Fr	<1	VF					D
								<u> </u>	2	F/VF	Gr									
Bt	64	10YR 3/4	SICL	29	0				2	M/F	Pr	Argillans	Fr	<1	VF					A
									2	M/F	Abk									
Btk1	93	10YR 4/3	SICL	28	0				2	C/M	Pr	Argillans	Fr	< 1	VF	s	Ca	< 1	м	D
	L						[<u> </u>	2	F	Pr		L	1		L			<u> </u>	_
Btk2	115	10YR 4/3	SiL	26	D		ļ		2	M/C	Pr	Argillans	Fr	< 1	VF	s	Са	< 1	м	A
								L	2	F	Pr		ļ	<u>I</u>	Ļ	ļ		<u> </u>		
CB	115+	10YR 4/4	SiL	17	D		. 		3	M	Pr	Argilians	Fr	<1	VF	м	Ca	<1	VF	1
			L					L	3	F	Sbk	ļ	— —	-	ļ	Į	—	l	Ļ	_
							ļ		.	ļ	ļ	L	Į –		1	1				1
				1	1		1	ł	1	I	1	l			1	I		t i	I	I

PROFIL	E:	701-104-1									% SLO	PE: < 2 %								
MAPPE	D PROFILE	CLASSIFICA	TION:		Richfie	d Silt Loan	n,				VEGET	ATION: Continu	IDUS COR	/ conve	intional t	illage				
					Fine, s	mectic, me	sic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unty, Ok	lahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT		_		Extentio	n Cente	. Good	well. Of	dahoma	i
DATE S	AMPLED:	10	/2/2000			DATE DES	SCRIBED		5/29/2002		CORE	LENGTH (cm):	-	120						<u> </u>
SAMPLI	ED BY:	Jason Parton				DESCRIBE	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm);								
		Jamie Patton							_											· · · ·
Norizon	Low	Matrix color	F	ield Texture		P	ndox Feature	4		Sinucture		Coatings	Con	B	2012	EX	6	thcentret	004	Boundar
	depth (cm)	(molat)	Class	% Clay	% CF	Color	Amount	9ize	Grade	9kre	Shape	Туре		Amount	· · ·		Туре	Am	Sze	Dist
Ap1	8	10YR 3/2	SIL	18	0				2	C/M	Sbk		Fr	<1	VF	_	<u> </u>			A
									2	M/F	Sbk									1
ABt	30	10YR 3/2	SIL	23	0		1		2	C/M	Sbk	Argillans	Fr	1	F/VF					D
				1					2	M/F	Sbk									
Bt1	47	10YR 3/3	SIL	26	0				2	м	Pr	Argillans	Fr	11	F/VF					D
							1		2	M/F	Abk									
Bt2	54	10YR 3/3	SICL	28	0		1		2	С/М	Pr	Argillans	Fr	< 1	VF					A
									2	M/F	Abk									
Bt3	68	10YR 4/3	SICL	32	0			1	2	C/M	Pr	Arglilans	Fr	<1	VF	s				A
					1 '			*******	2	M	Pr	×					1	ļ		
B1k1	93	10YR 4/4	SICL	32	0		t		2	C/M	Pr	Argillans	Fr	<1	VF	vs	Ca	2	м	T D
	1								2	M	Pr			1				-		1 ⁻
Btk2	113	10YR 4/6	SICL	27	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	M/F	D
	[]							[2	M	Pr		1			1	1			
CB	113+	10YR 4/4	SiL	20	0				2	M	Sbk	Argillans	Fr	< 1	VF	м	1	1		1
							1	1	2	M/F	Sbk		1							1

PROFIL	k	701-106-1				_					% SLO	PE: < 2 %								
MAPPEL	PROFILE	CLASSIFICA	TION:		Richfie	ld Silt Loan	1				VEGET	ATION: Continu	ious com	/ conve	ntional t	illage				
					Fine, s	mectic, ma	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	is loess						
EPIPEDO	N:	Mollic					-			1	COUNT	Y: Texas Co	unty, Oid	ahoma						
ຣປອຣນຊ	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and	Extentio	n Center	, Good	vell, Ol	dahoma	
DATE S.	AMPLED:	10	2/2000			DATE DES	CRIBED		1/5/2001		CORE	LENGTH (cm):		120						
SAMPLI		Jason Parton				DESCRIBE	D BY:	Jamie Pa	ton		CORE	DIAMETER (om):								
		Jamle Patton														_				
Hortzon	Lorent	Matrix color	<u></u>	jeld Texture	r	B	dox Feature		<u> </u>	Structure		Costings	Con	R	ota	EH	ŝ	ncentrati	ona	Soundary
	depth (cm)	(កាទ់ថា)	Cians	% Clay	% CF	Color	Amount	Siz •	Grade	Size	Shapa	Type		Amount	Size		Тура	Annt	Siz-	Diat
Ap1	7	10YR 3/2	SIL	25	0				3	M	Sbk		Fr	2	F					A
									3	M/F	Gr									<u> </u>
AB	16	10YR 3/2	SiL	25	0				2	<u>M</u>	Abk	Argillans	Fr	3	F					D
									2	F	Abk		- <u>-</u>	I	_			_		<u> </u>
Bt1	32	10YR 3/3	SICL	27	0				2	C/M	Abk	Argillans	Fr	3	F					D
									2	M/F	Abk		<u> </u>	_	<u> </u>				<u> </u>	<u> </u>
B12	51	10YR 3/3	CL	34	0				2	C/M	Abk	Argillans	Fr	<1	F				}	^
					-		<u> </u>		2	M/F	Abk			+					<u> </u>	<u> </u>
Bik1	69	10YR 3/4	SICL	30	0				2	M/F	Pr Pr	Argilians	Fr	<1	VF	s	Ca	<1	F	^
Btk2	106		0.01	30	0			}	_			A	Fr	<u> </u>	VF	vs	Ca	5		+
B1K2	106	10YR 4/4	SICL	30	0				2	C/M M/F	Pr Pr	Argillans	⊢r	< 1	VF	VS	Ca	1 5	м	^
B1k3	106+	10YB 4/4	<u> </u>	25	0	 	+		$\frac{2}{2}$	C/M	Sbk	Argillans	Fr	1	VF	VS/S	Сa	<1	M/F	
81K3	106+	10YH 4/4		25	0				2	M/F	Sbk	Argilians	Fr.	1	v⊦	1 15/5	Ca	1	M/F	1
							+		<u>+ ²</u> -	1 11/17	JODK		–	+	┝	-	+	-		+
			1		1				+	+	<u> </u>	 	1	ł		1			1.	
	L .		L	1	1					<u> </u>		L			1	1		1	1	<u> </u>

PROFILE	E:	701-107-1									% SLO	PE: <2%								
MAPPED	PROFILE	CLASSIFICA	TION:		Richfie	d Silt Loan	1				VEGET	ATION: Continu	ous com	/ conve	ntional L	iliage				
					Fine, s	mectic, me	sic Aridic.	Argiustoll			PAREN	T MATERIAL:	Calcario	is loess						
EPIPEDO	DN:	Mollic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic	_					LOCAT	ION: Panhand	e Resca	ch and	Extentio	n Cente	r, Good	well, Oi	dahoma	
DATE S	AMPLED:	10	12/2000			DATE DES	CRIBED		5/29/2002		CORE	LENGTH (cm);		120						
SAMPLE	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower	Ministra galer	F	isid Texture		R	dox Feelurs	•		Structure		Costings	Can	R.	eote	EH	~	ncentrati	005	Bounds
	depih (cm)	(moint)	Class	% Clay	% CF	Color	Arriogn	9124	Grada	Size	Shaqae	Туре		Arpount	9a.	<u> </u>	Туре	Aml	Sc.	Dist
Ap1	а	10YR 3/2	SIL	22	0				2	M/F	Gr		Fr	<1	F/VF					A
									2	F/VF	Gr									
A1	27	10YR 3/3	SIL	26	0		I		2	M/F	Sbk		Fr	<1	F/VF					D
				I					2	M/F	Gr									1
AB	40	10YR 3/3	SICL	28	0				2	M/F	Abk	Argillans	Fr	<1	VF					D
									2	F	Abk									ļ
BA	53	10YR 3/4	SICL	30	0				2	<u>M</u>	Pr	Argillans	Fr	<1	VF		1			A
			·						2	F	Pr									L
Bt1	65	10YR 4/3	SICL	32	0				2	M	Pr	Argillans	Fr	<1	VF	м			÷	A
			1						2	M/F	Pr			1						
Bük1	93	10YR 4/4	SIL	26	0		1		2	C/M	Pr	Argillans	Fr	< 1	VF	s	Ca	1	M/F	D
]				з	M/F	Sbk									
Bik2	93+	10YR 4/4	SiL	22	0		I		2	C/M	Pr	Argillans	Fr	< 1	VF	s	Ca	<1	F	
				I	I				3	M/F	Sbk				<u> </u>			I	1	
												1		1		1 -				
								1					1			1	1	1	}	

PROFIL	E:	701-108-1									% SLO	PE: <2%										
MAPPE	PROFILE	E CLASSIFICA	TION:		Richtie	ld Silt Loan	n				VEGETATION: Continuous com / conventional tillage											
					Fine, s	mectic, me	sic Aridic	Argiustoli			PARENT MATERIAL: Calcarious loss											
EPIPED	ON:	Mollic									COUNTY: Texas County, Oklahoma											
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic					_	LOCATION: Panhandle Research and Extention Center, Goodwell, Oklahoma											
DATE S	AMPLED:	CORE LENGTH (cm): 120																				
SAMPLED BY: Jason Parton DESCRIBED BY: Jamie Patton											CORE DIAMETER (cm):											
Jamie Patton																						
Herizon						Structure		Costings	Con	В	00la	E#	c	oncentrati	cns	Soundary						
	depth (cm)	(moist)	Cius	% Clay	% CF	Celor	Amount	Size	Grade	Se.	Shape	Туре		Ameunt	Size		Туре	Amt	Size	Diat		
Ap	15	10YR 3/3	SIL	19	0				2	C/M	Sbk		Fr	2	M/F					A		
						_			2	M/F	Sbk											
ABt	32	10YR 3/2	SIL	22	0				2	C/M	Sbk	Argillans	Fr	1	F/VF					D		
									2	M/F	Sbk											
Bt1	49	10YR 3/3	SICL	30	0				2	М	Pr	Argillans	Fr	<1	VF					A		
			L					•	2	M/F	Abk											
B12	60	10YR 3/4	SICL	28	0		1		2	M	Pr	Argillans	Fr	<1	VF	s			1	D		
									2	M/F	Abk											
Bik1	73	10YR 4/4	SiL	26	0		<u> </u>		2	C C	Pr	Argillans	Fr	< 1	VF	VS	Ca	< 1	м	D		
									2	M	Pr				1		1					
Btk2	98	10YR 4/6	SIL	26	0				2	С	Pr	Argillans	Fr	<1	VF	S.	Ca	1	M	A		
									2	M/F	Pr			1								
CB	98+	10YR 4/4	-L	20	0		4		3	С	Pr	Argilians	Fr	<1	VF	s	Ca	< 1	F			
									3	м	Sbk		L									
i									L		1	L					1	1				
]	1									1	1				1.			

PROFIL	:	701-109-1									% SLO	PE: < 2 %											
MAPPEI	PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loarn					VEGET	ATION: Continu	ous corn	/ conva	ntional (illage							
					Fine, s	mectic, mes	ic Aridic .	Argiustoil			PARENT MATERIAL: Calcarious loess												
EPIPEDO	DN:	Mollic									COUNTY: Texas County, Oklahoma												
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resea	rch and	Extentio	n Cente	, Good	well, Ci	dahoma				
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		6/18/2002		CORE	LENGTH (cm):		120									
SAMPLE													CORE DIAMETER (cm):										
		Jamie Patton									l												
Holgon			eld Texture	ute Bedox Fastures				l	Structure		Coatinge	Gen	Roote		E#	0	ncentrat	ions	Boundary				
	depiù (cm)	(moist)	Çiess	% Clay	% CF	Color	Amount	Sz.	Grede	Size	Shepe	Турь		Amount			Туре	Amt	Sz.	Diat			
Ар	15	10YR 3/2	SIL	26	0				2	<u>M</u>	Sbk		Fr	<1	VF					D			
									2	F	Sbk				l				L				
BIA	36	10YR 3/2	SICL	29	0				2	M	Sbk	Argillans	Fr	<1	VF					D			
L									- 2	F	Sbk			<u> </u>		_				<u> </u>			
Bt1	69	10YR 3/3	CL	29	0				2	<u>M</u>	Pr	Argillans	Fr	< 1	VF		Į			A			
									1	F	Pr			L		<u> </u>							
812	76	10YR 4/3	L	26	0				2	<u>M</u>	Pr	Argillans	Fr	<1	VF	w	1	1		G			
									2	F	Pr			_		L							
Bik1	110	10YR 4/4	L L	25	0		ļ		3	<u> </u>	Pr	Argilians	Fr	<1	VF	м	Са	<1	F	G			
						L			3	M	Pr				ļ		<u> </u>	ļ		}			
Btk2	110+	10YR 4/4	L	25	0				3	c	Pr	Argillans	Fr	<1	VF	м	Ca	<1	M/F				
							<u> </u>		3	M	Pr			-	.	ļ		L	ļ	<u> </u>			
									↓	ļ	ļ	·····			1		1						
			<u> </u>							ļ	4					L	-	<u> </u>	L	1			
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PROFIL	E:	701-110-1									% SLO	E: <2%										
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	ld Silt Loarn					VEGETATION: Continuous com / conventional tillage											
					Fine, s	mectic, mas	ic Aridic	Argiustoll			PARENT MATERIAL: Calcarious loss											
EPIPED	ON:	Mollic									COUNTY: Texas County, Oklahoma											
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	o Resea	ch and	Extentio	n Center	, Good	well, Ok	lahoma			
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		1/11/2001		COREI	ENGTH (cm):		113								
SAMPL	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	ton		CORE	DIAMETER (cm):										
Jamie Patton																						
Horizon	Lower				Coalings	Can	-	x018	Eff	6	ncentrations		Boundary									
	depth (cm)	(moiet)	Clase	% Clay	% OF	Color	Amount	Size	Grade	Size	Shape	Туре		Amount	_		Туре	Ami	Size	Diat		
Aρ	17	10YR 3/2	SiL	26	0				2	<u>M</u>	Sbk		Fŗ	1 1	F					A		
			ļ	<u> </u>					2	M/F	Sbk			-						ļ		
BIA	39	10YR 3/2	SICI	32	0				2	C/M	Abk	Argilians	Fr	1	F					D		
			<u> </u>	Ļ	ļ				2	M/F	Abk			1					-	<u> </u>		
Bt	57	10YR 3/3	CL	28	0				2	M	Pr	Argillans	Fr	1	F					A		
									2	M/F	Pr			_	 		L			i		
Bik1	77	10YR 4/4	L	23	0		ļ;		2	C/M	Pr	Argillans	Fr	< 1	F	vs	Ca	<1	VF	D		
L							[· · ·		2	M/F	Pr									<u> </u>		
Btk2	100	10YR 4/6	Ľ	25	0				2	C/M	Pr	Argillans	Fr	< 1	F	vs	Ca	< 1	M/F	G		
<u> </u>									3	M/F	Pr			-	-					┣		
Btk3	100+	10YR 4/6	L L	25	0				2	C/M	Pr	Argilians	Fr	<1	F	vs	Ca	.<1	VF	1		
<u> </u>			<u> </u>				<u> </u>		3	M/F	Pr		<u> </u>	<u> </u>		┣──-	┝	—		┣—		
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PROFIL	E:	701-202-1								_	% SLO	PE: <2%										
марре	D PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loam					VEGET	ATION: Continu	ious com	/ conve	ntional t	illage						
					Fine, s	mectic, mes	iic Aridiic	Argiustoli			PARENT MATERIAL: Calcarious loass											
EPIPED	ON:	Mollic									COUNTY: Texas County, Oklahoma											
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCATION: Panhandie Research and Extention Center, Goodwell, Oklahoma											
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		6/18/2002		CORE LENGTH (cm): 120											
SAMPL	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE DIAMETER (em):											
		Jamie Patton																				
Horizon	Lower	Matrix color	ą	ieid Texture	_	Redox Features				Structure	Coatings		Con	Roota		EH	Concentrati		005	Soundar		
	depth (cm)	(moist)	Class	% Clay	% CF	Color	Amount	Size	Grade	Size	Shape	Туре		Amount	Sze		Type .	Ant	Size	Dist		
Ap	13	10YR 3/1	Sil,	25	0				2	M	Sbk		VFr	<1	VF			_		D		
									2	F	Sbk											
AB	42	10YR 3/2	SICI	27	0				2	C/M	Sbk	Argillans	Fr	<1	VF					G		
									2	M/F	Sbk											
BA	65	10YR 3/2	СL	28	0				2	C/M	Pr	Argillans	Fr	<1	VF					A		
									2	M/F	Pr											
Btk1	89	10YR 4/4	L	24	0				3	С	Pr	Argillans	Fr	<1	VF	м	Са	<1	VF	G		
									3	C/M	Sbk											
Đtk2	89+	10YR 5/4	L	25	0		_		3	С	٩r	Argillans	Fr	<1	VF	м	Ca	<1	M/F			
									3	M/F	Pr				l		L					
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PROFILE	51	701-203-1									% SLO	PE: <2%											
MAPPED	PROFILE	CLASSIFICA	TION:		Richfie	ld Silt Loam					VEGETATION: Continuous com / conventional tillage												
					Fine, s	mectic, mes	iic Aridiic	Argiustoll			PARENT MATERIAL: Calcarious loess												
EPIPEDO	DN:	Mollic									COUNTY: Texas County, Oklahoma												
SUBSUR	RFACE HO	RIZONS/FEAT	LOCATION: Panhandle Research and Extention Center, Goodwell, Oklahoma																				
DATE S	AMPLED:	10	CORE LENGTH (cm): 121																				
SAMPLE	SAMPLED BY: Jason Parton DESCRIBED BY: Jamie Patton												CORE DIAMETER (cm):										
Jamie Patton																							
Harizen	Lower Matrix color Field Texture Redox Features Structure						Structure		Coatings	Con	Pro Pro	ots	Eff	Concenti		ons	Boundary						
	depth (cm)	(moist)	Class	% Clay	¥ OF	Color	Amount	Size	Grade	Size	Shape	Туре		Amount	Size		Typ	Amt	Size	Diat			
Ap	13	10YR 2/2	SIL	26	0		ļ		3	F.	Sbk		Fr	3	F					A			
									2	F	Gr												
BA1	27	10YR 3/2	Sil,	26	0		J		2	С/М	Sbk		Fr	3	F					D			
				<u> </u>					2	M/F	Sbk						· ·			—			
BA2	49	10YR 3/2	SiL	25	0				2	C/M	Sbk	Argillans	Fr	2	F					D			
								-	2	M/F	Sbk									<u> </u>			
Bw1	69	10YR 3/4	L	25	0				2	C	Pr	Argilians	Fr	2	F					A			
					<u> </u>				2	M/F	Pr			<u> </u>					-				
B₩2	87	10YR 4/4	L	23	0		 		2	<u>M</u>	Pr Pr	Argillans	Fr	יו	F	s	I I	i		D			
									2	F			-	+			┝──	<u> </u>		h			
В₩З	99	10YR 4/4	L	23	0		·}		2	F M	Pr Sbk	Argillans	Fr	11	F	vs	1			D			
							<u> </u>		2	<u> </u>			<u> </u>	┢	F	1.0	0.	-	F/VF	—			
Bk	99+	10YR 4/3	SIL	23	0		<u> </u>		2	M	Pr Pr	Argillans	Fr	1		vs	Ca	2	[F/VF	1			
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PROFIL	8:	701-204-1									% SLO	PE: <2%											
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loan	1				VEGETATION: Continuous com / conventional tillage												
					Fine, s	mectic, me	sic Aridic	Argiustoli			PARENT MATERIAL: Calcarious loss												
EPIPED	ON:	Mollic									COUNTY: Texas County, Oklahoma												
รบธรม	AFACE HO	RIZONS/FEAT	LOCATION: Panhandle Research and Extention Center, Goodwell, Oklahoma																				
DATE S	AMPLED:	10	CORE LENGTH (cm): 120																				
SAMPL	SAMPLED BY: Jason Parton DESCRIBED BY: Jamia Patton												CORE DIAMETER (em):										
	Jamie Patton																			_			
Horizon	on Lower Malvix color Field Texture Redox Feel									Structure		Coatings	Con	Roots		Ett	6	oncentrati	ene	Boundary			
	depth (cm)	(moint)	Ciasa	% Clay	% CF	Cotor	Amount	Size	Grade	Siz.	Shape	Туре		Amount	Sz.		Туре	Ant	Sze	Diat			
Ap	10	10YR 2/2	SiL	25	0				2	C/M	Sbk		Fr	< 1	VF		1			D			
							<u> </u>		2	M/F	Sbk						<u> </u>						
AB	37	10YR 2/2	SICL	27	0				2	M	Pr	Argilians	Fr	<1	V/VF		1			D			
								<u> </u>	2	M	Sbk						<u> </u>			ļ			
Bw1	69	10YR 3/2	CL	28	0		<u> </u>		1	C/M	Pr	Argillans	Fr	<1	VF	M				A			
									1	м	Pr			┢	<u> </u>								
Bk1	98	10YR 4/3	L	26	0			L	2	C/M	Pr	Argillans	Fr	< 1	VF	м	Ca	<1	VF	A			
								<u> </u>	2	м	Pr	· · · · · · · · · · · · · · · · · · ·		ļ	-		L	ļ					
Bw2	98+	10YR 4/4	L	25	0			ļ	2	C/M	Pr	Argillans	Fr	<1	VF		1		1 ·				
ļ							<u> </u>	I	2	м	Pr	L		1	<u> </u>	L		_	-	1			
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PROFIL	E:	701-205-1									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	ld Silt Loan	<u>-</u>				VEGET	ATION: Continu	ious corn	/ conve	ntional I	filage				
					Fine, s	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	DN:	Mollic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Cambio						LOCAT	ION: Panhand	e Reseau	ch and	Extentio	n Cente	, Good	well, Q	dahoma	
DATE S	AMPLED:	10	/2/2000			DATE DES	SCRIBED		1/4/2001		CORE	LENGTH (cm):		119						
SAMPLI	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton															_			
Horizon	Lower	Matrix color	۶	ield Textur		R	edox Feeture	4		Structure		Coatings	Gon	Re	iota	84	6	encentrat	0.03	Bounder
	depth (cm)	(moint)	Cians	K Clay	* CF	Color	Amount	Şize	Grade	Size	Shepe	Туре		Amount	Size	· · ·	Тура	Atat	Size	Dist
Ар	20	10YR 3/2	SiL	24	0				1	F	Sbk		Fr	2	F					D
									1	F	Sbk									ł
Α	48	10YR 2/2	SiL	24	0				1	F	Sbk	Argillans	Fr	2	F					G
									2	F	Gr									1
Bw1	70	10YR 3/3	L	22	0				1	м	Pr	Argillans	Fr	2	F		—	1		G
									1	F	Pr						1			1
Bw2	87	10YR 4/4	L	21	0				1	м	Pr	Argillans	Fr	< 1	F					A
									1	F	Pr					1			i	
BC	87+	10YR 4/6	L	19	0				2	M	Pr		Fr	<1	VF	٧s	Г ^с			
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 | T MATERIAL: | Calcario
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 | Y: Texas Co | unty, Oki
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| FACE HO | RIZONS/FEAT | URES: | | Argillic |
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 | ION: Panhand | e Reseau
 | ch and | Extention | n Center
 | Good | well, Ok | lahoma | |
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| AMPLED: | 10 | /2/2000 | | | DATE DES
 | CRIBED | | 1/11/2001 | | CORE
 | ENGTH (om): |
 | 113 | | | |
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 | | |
| D BY: | Jason Parton | | | | DESCRIBE
 | D BY: | Jamie Pal | tion | | CORE
 | DIAMETER (cm): |
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 | | |
| | Jamie Patton | | | |
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| Lower | Matrix color | F | leid Texture | , | . Au
 | dox Feature | a | | Structure |
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| depth (cm) | (moist) | Class | % Clay | % CF | Color
 | Amount | Size | Grede | Size | Shape
 | Туре |
 | Amount | Size | | | |
 | Туре | Amt | Size | Dist |
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| 14 | 10YR 3/2 | CL | 27 | 0 |
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| 37 | 10YR 3/3 | CL | 31 | 0 |
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| 57 | 10YB 3/3 | CI | 31 | 0 |
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| 108 | 10YR 5/6 | CL | 27 | 0 | 1
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Lower
depth (cm)
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57
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103 | PROFILE CLASSIFICA INC. 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SAMPLI		Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton								L			-							
Horizon	Lower	Matrix color	f	ield Texture		R	Structure		Coatings	Con	- 84	ota	EĦ	0	oncentral	ons	Boundary			
	depth (cm)	(moint)	Ciass	% Clay	% OF	Color	Amount	Size	Grade	Size	Shape	Туре		Amount	Şize		Type	Amt	Sq.	Diat
Ар	10	10YR 3/2	SIL	23	0				2	M/F	Sbk	Argillans	Fr	З	F					Α.
					<u> </u>				3	VF	Sbk			-						
AB	36	10YR 3/2	SIL	23	0		·		3	<u>M</u>	Abk	Argillans	Fr	2	F					D
	-			<u> </u>	 		ļ		3	F	Abk									<u> </u>
BA	53	10YR 3/3	SiL	26	0		ļ		<u> </u>	F	Pr	Argillans	Fr	2	F	1				A
			L				<u> </u>	· · ·	1	VF	Pr									<u> </u>
Bt	65	10YR 3/4	SICL	29	0	ļ			2	F	Pr	Argillans	Fr	2	F	vs				A
				_			-		2	VF	Pr		_		<u> </u>	<u> </u>	-	<u> </u>		<u> </u>
Btk	65+	10YR 4/6	SICL	33	0		. 		2	F	Pr	Argillans	Fr	1	F	vs	Ca	4	м	
			<u> </u>	<u> </u>	<u> </u>		<u>}.</u>	ļ	2	F	Abk		<u> </u>	↓		 	┣	<u> </u>	<u> </u>	┣───
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PROFILI	<u> </u>	701-209-1									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loan	1				VEGET	ATION: Continu	ious corr	/ conve	ntional 1	illage				
					Fine, s	mectic, me	sic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	us loess						
EPIPEDO	DN:	Mollic						-			COUNT	Y: Texas Co	unty, Ok	lahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	ie Resea	rch and I	Extentio	n Center	Good	woil, Ol	dahoma	
DATE S	AMPLED:	10	12/2000			DATE DES	CRIBED		1/11/2001		CORE	LENGTH (cm):		122						
SAMPLE	D BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton													-	-				
Hotizon	Lower	Matuta color	F	e)d Texture		R	Nox Feature	•		Studum		Coalings	Can	R.	ols	Eff	0	ncentrati	ons	Sound
	depth (cm)	(moint)	Ciass	% Clay	% CF	Color	Amount	Size	Grade	Size	Shapa	Туре		Amount	Sig.		Туре	Amt	9ize	Diet
Ap	17	10YR 3/2	SICL	30	0				2	м	Sbk		Fr	3	F					Ā
									2	F	Abk	L.								
AB	34	10YR 3/3	SICL	33	0				2	М	Pr	Argillans	Fr	2	F					D
									2	F	Sbk		1							
BtA	57	10YR 3/3	SICL	35	0				2	М	Pr	Argillans	Fr	mour	F					A
		·							2	F	Pr									
Bt	69	10YR 4/3	SICL	36	0				2	M/F	Pr	Argillans	Fr	<1	F/VF	S/VS				A
									2	F	Pr		1		Í	ł				
Btik1	91	10YR 4/4	SICL	32	0				2	M	Pr	Argilians	Fr	<1	VF	VS	Ca	3	M/F	A
									2	M/F	Pr		1		ł			Į	í	
Btk2	109	10YR 4/6	L	27	0				2	М	Pr	Argillans	Fr	<1	VF	VS	Ca	<1	F/VF	G
									2	F	Pr]						Į	
Btk3	109+	10YR 4/6	CL	30	0				3	M/F	Pr	Argillans	Fr	<1	VF	٧s	Ca	<1	VF	
				ł	{				3	F	Sbk		1	1				1	1	1
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PROFILE											% SLO			~~~~						
		701-211-1																		
MAPPEC	PROFILE	CLASSIFICA	TION:			ld Silt Loam		_			VEGET		ous corn		ntional t	illage				
					Fine, s	mectic, me	ic Andic	Argiustoll			PAREN	T MATERIAL:	Calcario	is loess			_			
EPIPEDO	DN:	Mollic									COUNT	Y: Texas Co	unty, Oki	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and I	Extentio	n Center	, Good	well, Oi	iahoma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED	1	0/11/2001		CORE	ENGTH (cm):		122						
SAMPLE	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower .	Halfx color	۶	enuixeT biel		Ra	dox Feature	,		Structure		Coatings	Con	- Ro	ols	Eff	C	incentrati	0A5	Boundary
	depth (cm)	(mobst)	Class	% Clay	% CF	Colar -	Amount	Siz•	Grøde	9ize	Shape	Туре		Amount	Siz+		Туре	Avnt	Sz.	Dist
Ар	17	10YR 3/2	SIL	26	0				2	M/F	Pr		Fr	3	M/F					A
									2	F	Sbk									
ABt	31	10YR 3/3	SIL	26	0				2	M/F	Pr		Fr	з	M/F					D
							1		2	F	Abk			1						
Bt1	47	10YR 3/3	CL	32	0	1	1		2	M/F	Pr	Argillans	Fr	2	F	1				D
					I .				2	F	Abk									
Bw1	59	10YR 3/4	L	27	0		1		1	M/C	Pr	Argillans	Fr	1	F	vs				A
					1		1		1	M/F	Pr					ļ	1			
Bw2	70	10YR 4/4	L	27	l o		1		2	M/C	Pr	Argillans	Fr	11	F	vs	1			D
									2	M/F	Pr		1							
Bk1	93	10YR 4/6	L	26	0	<u> </u>	1	<u> </u>	2	м	Pr	Argilians	Fr	<1	F	vs	Ca	<1	F/VF	A
									2	F	Pr		1			1				
Bk2	103	10YR 5/4	SIL	24	0				3	M/F	Pr	Argillans	Fr	< 1	VF	VS	Ca	2	M/F	A
				1	l				з	F	Sbk		1					1		
Bk3	103+	10YR 4/6	L	23	0	I	T		3	M/F	Pr	Argillans	Fr	< 1	VF	м	Ca	< 1	FNF	
				1	1		T	1	3	F	Sbk	[1		1				

PROFIL	E:	701-212-1						······			% SLO	PE: <2%		_						
MAPPE	D PROFILE	CLASSIFICA	TION:		Aichtie	id Silt Loan	1		100		VEGET	ATION: Continu	ous com	/ conve	ntional t	illage				
					Fine, s	mectic, me	sic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	is loess						
EPIPED	ON:	Mollic									COUNT	'Y: Texas Co	unty, Okl	ahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and I	Extentio	n Center	Good	weil, O)	dahoma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		1/5/2001		CORE	LENGTH (cm):		122						
SAMPL	ED BY:	Jason Parton				DESCRIBI	D BY:	Jamie Pa	tton		CORE	DIAMETER (om):								
		Jamie Patton																		
Hortzen	Lower	Mairix color	۶	ield Texture	-	P,	dox Feature		Structure		Coatings	Con	- 80	cts 🛛	EN	C	oncentrați	ohe	Boundary	
	depth (cm)	(moist)	Class	% Clay	% CF	Cotor	Amount	Size	Grede	Size	Shepe	Type		Amount	Size		Туре	Amt	Size	Dau
Ap	12	10YR 3/3	SIL	23	0				2	F	Sbk		Fr	. 5	F					A
							<u> </u>		2	F	Gr				_		\square			
ABt	26	10YR 3/3	SiL	25	0			 	3	<u>M</u>	Abk		Fr	3	F					D
				-		<u> </u>	4	<u> </u>	2	F	Abk									<u> </u>
Bt1	54	10YR 3/3	SICL	27	0			<u> </u>	2	M F	Pr Sbk	Argilians	Fr	3	F					A
		10YR 4/4	0101				-		2	<u> </u>	Pr			2	F	vs			-	D
Bw1	61	10YH 4/4	SiCL	29	0	 	+	 	2	M F	Pr	Argillans	Fr	2	F	vs				
Bw2	72	10YR 4/4	CL	33	0		+	<u> </u>	2	M/F	Pr	Argillans	Fr	+	VF	vs		-		
Dw2	12	1011, 4/4		33	ľ			+	2	F	Pr	Algillaris	· · ·	1	V F	v 3		[1	1
Bk	103	10YB 4/4	L.	25	0		<u> </u>		2	M/F	Pr	Argilians	Fr	<1	VF	vs	Са	4	M/F	A
			۲ I	1.	ľ		+		2	F	Pr				ļ					
Btk	103+	10YR 4/4	SICL	27	0	t	1		2	м	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	F	<u> </u>
						·	1	1	2	M/F	Sbk	·····	1					1		
	1			1	1	1	T		1	1			<u>г</u>				1	1		
					Į.		1	1	1		1	1	1					1		

PROFIL		701-301-1	_								% SLO	PE: <2%			_					_
MAPPER	PROFILE	CLASSIFICA	TION:		Richlie	kd Silt Loan	,	_					ous com	/ conve	ntional t	illana				
						mectic, me		Arciustal	· · · ·	_			Calcario			in a current of the				
EPIPEDO	ON:	Mollic			1 110, 2	1100001 1110		rugiusion			COUNT				<u>.</u>					
SUBSU	FACE NO	RIZONS/FEAT	URES		Argillic						LOCAT			_	Extension	Cantos	Cont		dahama	
	AMPLED:		V2/2000		_	DATE DES			6/15/2001	_		LENGTH (cm):	6 710504	129	2,40,100	s Creation	, 0000	NOIL OF	uarioma	
SAMPLE		Jason Parton	102000			DESCRIBI						DIAMETER (cm):		129						
01001		Jamie Patton				DESCRIPT		Jaino ra			CORE	DIAME IER (cm):			· · ·					
Horizon	Lower	Matrix color	-	ield Texture			dox Feature		r – T	Structure	<u> </u>	Coatings	Can		2015	Fit		ncentral		Boundary
	dapih (cm)	(moist)	Clana	% Clay	¥ CF	Color	Amount	Size	Grada	Size	Shape	Type	Çan	Amount			Type	Am	Size	Diant
Ap	10	10YR 2/2	SiL	26	0				2	M	Sbk	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Fr	<1	F/VF	_		Ain		G
· · ·		1011122		1	ľ				2	M/F	Sbk			` '			·			, u
ABt	39	10YR 2/2	SICL	29					1	M	Pr	Argillans	Fr	11	F/VF					G
					ľ				2	F	Pr			1						ŭ
Bt	57	10YR 3/2	SICL	29	0					СМ	Pr	Argilians	Fr	1.1	F/VF	-			_	A
					L.				1	M/F	Pr	- rugenin		L.,	1.1.1				1	
Bk1	83	10YR 4/3	L	26	0				1	C/M	Pr	Argiilans	Fr	<1	VF	vs	Ca	<1	FIVE	D
			-	1			+		1 1	M/F	Pr			1 ···						- T
Bk2	83+	10YR 4/4	SL	24	0				2	C	Pr	Argillans	Fr	0		s	Ca	< 1	VF	
				<u> </u>			1		2	C/M	Pr			Ĩ						
			<u> </u>		-			-	-					+	<u></u>		F			
									+		<u>†</u>		1							
			<u> </u>	+	†—			·	t		<u> </u>	<u> </u>		+						
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					1		+		+	+	t	t	1						1	
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PROFIL	E:	701-302-1									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	ki Silt Loam					VEGET	ATION: Continu	ous com	/ conve	ntional ti	llage				
					Fine, s	mectic, mas	sic Aridic .	Argiustoli			PAREN	IT MATERIAL:	Calcarjou	is looss						
EPIPED		Mollic									COUNT	Texas Co	unty, Oki	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	NON: Panhand	e Resear	ch and	Extention	n Center	Good	vell, O	dahoma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		5/28/2002		CORE	LENGTH (cm):		120						
SAMPLE		Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton	_						1									_		
Monizon	Lower	Matrix color	-	ield Texture	· · ·		dox Feature	·	Structure		Coatings	Can	R	2013	E#		incentrati		Soundary	
	depth (cm)	(moist)	Ciasa	% Ciay	% CF	Color	Amount	Siz.	Grada	Sue	Shape	Туре		Amount			Туре	Ami	Sze	Det
Ap	9	10YR 3/2	SiL	18	0		·		2	F	Sbk		Fr	< 1	F/VF	1				A
<u> </u>		1010 010							2	F/VF	Gr		<u> </u>	<u> </u>	5.0.0					
A	29	10YR 3/2	SIL	21	0				2	M/F	Sbk Sbk		Fr	<1	F/VF					D
Bt1	54	10YB 3/3	SIL	25			+		2	M/F	Pr	Arglilans	Fr	<1	F/VF					A
BU	3 4	10111-3/3	SIL	25	0				2	M/F	Pr	Algulatis	- 1	1°'	1					1 ^
B12	63	10YB 4/3	SICL	28	0		+		2	M/F	Pr	Argillans	Fr	< 1	VF	vs				D
		10111-4/3	GIGE	20	ľ			<u> </u>	2	F	Pr	Alginaria		[`'		10			1	ľ
Btk	83	10YB 4/4	1	24	0		1		2	C/M	Pr	Argillans	Fr	1	VF	s	Ca	< 1	VF	G
			-	- · ·	Ľ.		1		2	M/F	Pr					_				
Bk	93+	10YR 4/4	L	18	0		1		2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	< 1	VF	<u> </u>
				1	1		1		2	M/F	Pr	Γ	1							1
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PROFI	.E:	701-303-1									% SLO	PE: < 2 %								
MAPP	D PROFIL	CLASSIFICA	TION:		Richfie	ikd Silt Loam					VEGET	ATION: Continu	ous com	/ conve	ntional t	illago	•			
					Fine, s	mectic, mes	ic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	us loess			_			
EPIPEI	DON:	Mollic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSL	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	10N: Panhand	e Resea	ch and	Extention	n Center	, Good	veli, Oi	lahoma	
DATE	SAMPLED:	10	/2/2000		_	DATE DES	CRIBED		5/29/2002		CORE	LENGTH (cm):		120						
SAMP	ED BY:	Jason Parton			_	DESCRIBE	D BY:	Jamie Pa	ton		CORE	DIAMETER (cm):								
		Jamie Patton			_										_				_	
Horizon	Lown	Matriz color	F	ield Texture		Re	dox Feature			Structure		Costings	Con	A	oots	E4	Ce	ncentreti	6718	Baundary
	depth (cm)	(mpbal)	Class	% City	% CF	Calor	Amount	Siza	Grade	Size	Shape	Туре		Amount			Туре	Ant	Size	Dian
Ap	10	10YR 2/2	Si⊥	18	0				2	M/F	Sbk		Fr	< 1	F/VF					D
		L							2	٧F	Gr		_				_		_	
ABt	33	10YR 2/2	SIL	23	0				3	C/M	Abk		FI	< 1	VF					D
					L	L			2	M/F	Abk									
BII	52	10YR 3/3	SiL	25	0	L	ļ		. 2	C	Pr	Argillans	Fi	<1	VF					D
									2	M	Pr			L	<u> </u>					
Bt2	68	10YR 3/3	SICL	27	10	·			2	C/M	Pr	Argillans	Fì	< 1	VF					 ^
		<u> </u>		<u> </u>	ļ	<u> </u>	Ì		2	М	Abk			⊢		<u> </u>	ļ			┣—
Bik1	85	10YR 4/3	SICL	27	0			 	2	0	Pr	Argillans	FI	<1	VF	vs	Ca	<1	F/VF	D
L.	1	<u> </u>	<u> </u>		<u> </u>		<u> </u>		2	м	Pr			-	<u> </u>	<u> </u>	ļ			┣
Bik2	100	10YR 4/4	SIL	22	0				ļ1	C C	Pr	Argillans	FI	<1	VF	s	Ca	.1	M/F	D
					 		<u> </u>	1		M	Pr		<u> </u>	⊢		L	_			┣—
BC	100+	10YR 4/4	SiL	16	0			 	2	C.	Pr	Argillans	Я	< 1	VF	s	Са	< 1	VF	1
	_	1	I	<u> </u>	<u> </u>	Į	 	ļ	2	M	Pr		<u> </u>	4		<u> </u>			<u> </u>	┣
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		L		1	ļ		1	1	I	<u> </u>		I			1	L		1		1

PROFIL	E:	701-304-1									% SLO	PE: < 2 %								
MAPPE	D PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loan	1				VEGET	ATION: Continu	JOUS COT	/ conve	ntional t	illage				
					Fine, s	mectic, me	sic Aridic	Argiustoil			PAREN	T MATERIAL:	Calcario	us koess						
EPIPED	ON:	Mollic									COUNT	Y: Texas Co	unty, Ok	lahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Arcillic						LOCAT				Extentio	n Cente	. Good	weil. Ol	dahoma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		5/28/2002		CORE	LENGTH (cm):		84			,			
SAMPL	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton			DIAMETER (cm):					-			
		Jamie Patton															-			
Horizan	Lower	Metrix color	F	leid Texture		8	dox Feature	1		Structure		Coatings	Cen	8	iola	EĦ	6	oncentrati	00.5	Boundar
	depth (cm)	(moiat)	Class	% Clay	% OF	Celor	Aneunt	Size	Grade	Sze	Shape	Type		Amount	Size		Туря	Ant	Size	Dist
Ap	23	10YR 3/2	SiL	24	0				2	C/M	Pr		Fr	<1	VF					D
•									2	M	Sbk		1							-
ABt	33	10YR 3/2	SiL	24	0				2	c	Pr	Argillans	Fr	<1	VF		-			D
				-					2	M	Pr		1							-
Bw1	50	10YB 3/2	SiL	25	0					C/M	Pr	Argillans	Fr	<1	VF		+			D
					-		1		1 1	M/F	Pr		1					'		1 -
Btk	65	10YB 4/3	CL	28	0			-	2	C	Pr	Araillans	Fr	<1	VF	s	Ca	<1	M	A
					-				2	M	Pr		1	1 ° °	1	- I				1
BC	65+	10YR 4/4	i	24	0				2	С	Pr	Argillans	Fr	<1	VF	s	Ca	< 1	VF	
			-	-	1 - 1				2	M	Pr		1	1	1			ļ	1	
				-			<u> </u>						1		1	1				
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PROFILE	E:	701-306-1									% SLO	PE: <2%								
MAPPEL	PROFILE	CLASSIFICA	TION:		Richfie	ld Silt Loam					VEGET	ATION: Continu	ous corn	/ conve	ntional t	llage				
					Fine, s	mectic, mes	ic Aridic	Argiustoli			PAREN	IT MATERIAL:	Calcariou	us loess						
EPIPEDO	DN:	Mollic									COUNT	TY: Texas Co	unty, Okł	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic				_		LOCAT	NON: Panhand	e Resear	ch and	Extentio	n Center	, Good	well, Oi	dahoma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		5/29/2002		CORE	LENGTH (cm):	1	120						
SAMPLE	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):		_						
		Jamie Patton																		
Harizon	Lawer	Matria color	f	ieki Texture	_	Re	dox Feature	16		Structure		Ceatings	Con	R	eloc	Eff	o	oncentrati	ons .	Boundary
·	depth (cm)	(molat)	Ciass	% Clay	% CF	Celor	Amount	Size	Orede	Size	Shape	Туре		Amount	Size		Тура	Ant	Size	Dist
Ap	25	10YR 2/2	SiL	25	0				C/M	Sbk		Fr	< 1	VF					Α	
									_2	M/F	Sbk									
BtA	56	10YR 3/2	SICL	29	0				1	M	Pr	Argillans	Fr	< 1	F/VF					D
				l					1	M/F	Pr									1 1
Bt	74	10YR 3/3	CL	30	0	_			1	С	Pr	Argillans	Fr	<1	F/VF					Α
									1	M	Pr									
Btk	91	10YR 4/2	CL	28	0				1	С	Pr	Argillans	Fr	<1	VF	Μ	Ca	<1	VF	A
1							1		1	M	Pr			1			1			
Bk	91+	10YR 4/2	L	26	0				2	C	Pr	Argilians	Fr	<1	VF	S	Ca	1	M/F	\square
	1							· · · · · ·	2	M	Pr	[1			ł		
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PROFIL	E:	701-308-1									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	ld Silt Loarr	1				VEGET	ATION: Continu	ous com	/ conve	ntional t	Riage				
					Fine, s	mectic, me	sic Aridic	Argiustoil			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	DN:	Mollic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSU	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	10N: Penhand	e Resea	rch and I	Extentio	n Cente	r, Good	well, Oi	dahoma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		5/29/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Harizon	Lower	Metrix color	F	ield Texture		Be	dox Feature	Structure		Coalings	Gen	Ro	ols	EH	6	ncentrali	ena	Boundary		
	depth (cm)	(moist)	Class	% Clay	% CF	Color	Amount	Size	Grade	Size	Shepe	Туре		Amount	Size		Type	Amt	Sige	Dist
Ap	17	10YR 3/2	SiL.	21	0				3	C/M	Sbk		FI	<1	VF					D
									3	M/F	Sbk							_		
AB	43	10YR 3/2	SIL	21	0				2	M	Abk	Argilians	Fr	<1	VF					D
									2	M/F	Abk									
BA	60	10YR 3/3	SIL	24	0				1	M	Pr	Argillans	Fr	<1	VF		1			D
									2	M/F	Abk									<u> </u>
Bt	71	10YR 4/4	SIL	25	0				2	C/M	Pr	Argillans	Fr	<1	VF	s				A
_				İ.,					2	M/F	Sbk			-			<u> </u>		L	
Bk	100	10YR 4/4	SiL	23	0	L			2	C/M	Pr	Argillans	Fr	< 1	VF	s	Ca	2	M	A
							<u> </u>		2	M/F	Pr				L		_		<u> </u>	<u> </u>
СВ	100+	10YR 4/4	SiL	21	0		ļ		3	<u>c</u>	Sbk	Argillans	Fr	< 1	VF	s	Ca	<1	м	
		-							3	M/F	Sbk				<u> </u>		1			
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	t				1		4		1	1	1		1	1			1		1	

PROFIL	E:	701-310-1									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	ld Silt Loan	<u>n</u>				VEGET	ATION: Continu	ious com	/ conve	ntional	tillage				
					Fine, s	mectic, me	sic Aridăc	Argiustoll			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unty, Ok	lahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	TION: Panhand	le Reseat	rch and	Extentio	n Cente	, Good	well, O	dahorna	
DATE S	AMPLED:	10	2/2000			DATE DES	SCRIBED		5/29/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jason Parton				DESCRIBE	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Herizon	Lower	Matrix color	F	inid Texture		Pa	edox Feature			Structure		Coatings	Con	R	ecta .	EH	0	oncentrati	ens	Boundar
	depth (cm)	(moist)	Class	% Clay	% CF	Celor	Amount	Size	Grade	Sa•	Shape	Type		Amount	9ize		Туре	Amt	Size	Det
Ар	21	10YR 3/2	SICL	28	0				2	С	Sbk	Argillans	Fr	< 1	VF				1	D
									2	M/F	Sbk									
AB	44	10YR 3/2	SICL	29	0				1	C/M	Pr	Arglilans	Fr	< 1	F					A
									1	M	Pr									
BA	57	10YR 3/3	SICL	34	0				1	M	Pr	Argillans	Fr	<1	VF	м				D
									1	M	Abk			1						
Bk	89	10YR 4/3	SICL	31	0		<u> </u>		1	С	Pr	Argilians	Fr	<1	VF	VS	Са	1	C/M	D
									1	M	Pr			1						
CBk	89+	10YR 4/4	L	24	0				2	С	Pr	Argillans	Fr	< 1	VF	s	Ca	1	C/M	
							ļ		2	м	Pr							ļ		
						[1				I	1	1					
												L					1			L
									L		1	<u> </u>	1		1		1			
		L	L						<u> </u>	1	1	L	L				1		1	1
									1			1						1		
			1	1	1		1			1	1			1	1	1	1	1		1

PROFIL	E:	701-311-1		_							% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richlie	d Silt Loan					VEGET	ATION: Continu	ous com	/ conve	ntional ti	ilage				
					Fine, s	mectic, mes	ic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	is loess						
EPIPED	ON:	Mollic									COUNT	Texas Co	unty, Ok	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argitlic						LOCAT	ION: Panhandi	e Resea	ch and	Extentio	n Center	, Good	weil, Oł	dahoma	
DATE 6	AMPLED:	10	x/2/2000			DATE DES	CRIBED		5/29/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	tton		CORE	DIAMETER (cm);								
L		Jamie Patton																		
Hentzon												Costings	Cen	R	iota 🛛	EM	c	ncentrati	ons	Boundary
L	depth (cm)	(moist)	Çlass	* Ctay	X OF	Calor	Amount	Size	Grade	Size	Shapa	Туре		Amount	Size		Туре	Amt	Size	Diat
Ар	12	10YR 3/2	SiL	20	0				2	M/F	Sbk		Fr	<1	F/VF					D
L				1.1					2	F/VF	Gr			1						
A	30	10YR 3/2	SiL	20	0				2	M	Sbk	Argillans	Fr	1	F/VF					D
									2	F	Sbk									
BtA	55	10YR 3/3	SICL	27	0		L		2	M/F	Abk	Argillans	Fr	<1	VF					Α
						L	I		2	F	Abk									
Btk1	67	10YR 3/4	SICL	31	0				2	м	Pr	Argillans	Fr	<1	VF	s	Са	< 1	M	Α
			<u> </u>					1	2	M	Abk									
Btk2	88	10YR 4/6	SICL	28	0				2	M	Pr	Argillans	Fr	<1	VF	vs	Са	2	м	Ä
L									2	M/F	Pr									
Btk3	114	10YR 4/4	SiL	25	0	L	<u></u>		2	M	Pr	Argillans	Fr	< 1	VF	s	Ca	<1	M/F	G
									2	M/F	Pr									
СВ	114+	10YR 4/4	SiL	18	0	L	L		3	м	Sbk	Argillans	Fr	< 1	VF	s	Ca	< 1	F/VF	
						1			3	M/F	Sbk	1			1	L	I			
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PROFILI	E:	701-312-1									% SLO	PE: <2%								
		CLASSIFICA	TION:		Richfie	ld Silt Loam					VEGET		ous com	/ conve	ntional t	llage	•			
					Fine, s	mectic, mes	ic Aridic	Argiustoll			PAREN		Calcario		_					
EPIPED	DN:	Mollic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argittic						LOCAT	ION: Panhand	e Resea	ch and i	Extentio	n Center	r, Good	weli, Ok	lahoma	
DATE S.	AMPLED:	t	/2/2000			DATE DES	CRIBED		5/29/2002		CORE	LENGTH (cm):		120						
SAMPLE	ED BY:	Jason Parton				DESCRIBE	D BY:	Jamie Pa	ton		CORE	DIAMETER (cm):								
		Jamie Patton											_							
Harizon	Lower	Matrix colar	F	iald Texture		Pa	dox Feetur	13		Structure		Coatings	Con	R4	sota	Ett	G	oncentratio	ons	Boundary
L	depth (cm)	(moist)	Class	% Cley	% OF	Coler	Amount	Size	Grede	Size	Shape	Туре		Amount	Size		Туре	Amz	Size	Dat
Ap	8	10YR 2/2	SfL	25	0				2	М	Sbk		Fr	<1	VF	1				Α
									2	F	Sbk									
AB	36	10YR 2/2	SICL	27	0				2	С	Pr	Argillans	Fr	<1	VF					D
									2	M	Sbk									
Bt	61	10YR 3/3	CL	30	0		l		1	C/M	Pr	Argillans	Fr	< 1	VF					Α
									1	M	Pr									
Bk	82	10YR 4/4	CL	27	0				2	С	Pr	Argillans	Fr	< 1	VF	S	Са	<1	VF	D
									2	м	Pr									
BkC	82+	10YR 4/4	L	24	0				2	С	Pr	Argillans	Fr	< 1	VF	s	Ca	<1	F	
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Appendix 1-7. Soil Core Descriptions for Experiment 702, Oklahoma Panhandle Research and Extension Center, Goodwell, Oklahoma

PROFIL	E:	702-112									% SLO	PE: <2 %								<u> </u>
MAPPE	D PROFILI	E CLASSIFIC	TION:		Richtle	id Sill Loam					VEGET	ATION: Continu	ous forag	0						
					Fine, s	mecto, mes	olbhAold	Arglustol			PARE	IT MATERIAL:	Calcarlo	z [0983						
EPIPED	ON:	Molilio									COUN	TY: Texpas Co	uniy, Okla	homa						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Cambi	ç					LOCAT	ION: Panhandi	ie Resear	ch and I	Extentior	<u>C</u> enter,	Goodwe	0, Oklał	юта	
DATE S	AMPLED:	1	0/2/2000			DATE DES	SCRIBE	<u> </u>	1/11/2001		CORE	LENGTH (cm):		112						
SAMPL		Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton											_		_		_			
Horizon	Lower	Mairizcolor		iekt Texture 1		A	dox Feelure		I	Stucture		Contings	Con		ota	EĦ	Co	ncentratio	na :	Boundary
	dapth (cm)	(moist)	Cines	% Clay	% CF	Color	Amount	Size	Grede	Size	Shepe	Туре		Amount	Size .		Туре	Ant	Size	Dist
Ap	14	10YR 2/2	SiL	25	0		ļ	L	2	M	Sbk		Fr	3	F					D
			_	<u> </u>					2	F	Sbk									
BA	49	10YF 3/3	SICL	28	0		L	Ļ	2	M	Pr	Argillans	Fr	1	F					D
				<u> </u>			<u> </u>		2	M/F	Sbk			Į					<u> </u>	L
Bw1	69	10 YR 4/3	a	28	0	ļ		<u> </u>	1	C/M	Pr	Argillans	Fr	< 1	F/VF				1	A
							<u> </u>		1	м	Abk			ļ					—	L
Bw2	98	10YR 4/6	L	26	0			 	2	C	Pr	Argillans	Fr	< 1	F/VF		1			D
			<u> </u>	<u> </u>					2	м	Pr		<u> </u>	_	_				<u> </u>	<u> </u>
BC	98+	10YR 4/4	L	26	0				2	c	Pr	Argillans	Fr	<1	VF	s	Ca	<1	M/F	
			-	<u> </u>	-			 	2	M	Pr		ļ	_						
				·			ł								1				l	
		<u> </u>					1		<u> </u>	<u> </u>		<u> </u>	┣──	_			 		┝──	┣
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	I					l	1	1	<u>i </u>	1		L			<u> </u>		L	<u>i </u>	1	

PROFIL	E:	702-113									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Alchfei	d Silt Loam					VEGET	ATION: Continu	parol zuo	0						
					Fine, sr	necic, mes	lo Aridio /	Arolustoli			PAREN	T MATERIAL:	Calcarlo	is icess						
EPIPED	ON:	Moliic									COUNT	Texas Co	unty, Okie	thoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argilic						LOCAT	ION: Panhand	le Resear	ch and 8	Xtentior	n Center,	Goodwe	li, Okiat	noma	_
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBEL		6/12/2001		CORE	LENGTH (cm):		89						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton		-									_					-		_
Horaon	Lower	Mainacolor	F	ield Teature		B	ciox Feelute			Structure		Contings	Con	P.	ote	Eff	Col	nc en tra So	10.8	Bounde
	depth (cm)	(moiat)	Ciers	% Clay	₩ CF	Color	Amount	Size	Grede	3 àta	Shepe	Тури		Amount	Size		Туре	Amt	Size	Dist
Αp	13	10YH 3/2	SiL	23	0				2	м	Abk		Fr	2	π					D
									2	M/F	Abk									
BA	37	10YR 3/2	SiL	26	0				2	M/F	Abk	Argillans	Fr	2	F					D
				l					2	F/VF	Abk									
BtA	56	10YR 3/2	SICL	29	0				2	M	Pr	Argillans	Fr	<1	VF				1	A
									2	M/F	Abk								L	
Btk1	75	10YR 4/3	SICL	31	0				2	м	Pr	Argillans	Fr	< 1	٧F	s	Ca	<1	VF	A
									2	F/VF	Pr		<u> </u>							
Bik2	75+	10YR 4/4	SiCL	33	0				2	C/M	Pr	Argillans	Fr	< 1	٧F	٧S	Ca	1	м	
									2	M/F	Pr									1.1
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PROFIL	F:	702-114									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	id Slit Loam					VEGET	ATION: Continu	ous forag	e						
					Fine, si	necto, mes	ic Atidic.	Argiustoli			PAREN	IT MATERIAL:	Calcarlou	s loess						
EPIPED		Mollic									COUNT	TY: Texas Co	unity, Okla	homa						
SUBSU	RFACEHO	RIZONSFEA	TURES:		Arpillic						LOCAT	ION: Panhand	e Resear	ch and I	Extentio	n Center,	Goodwe	li, Oklai	noma	
DATE S	AMPLED:	10	12/2000			DATE DES	CRIBEL		6/18/2001		CORE	LENGTH (cm):		85						
SAMPL	D BY:	Jason Parton				DESCRIBI	ED BY:	Jamie Pe	tton		CORE	DIAMETER (cm):								
		Jamle Patton															_			
Horizon	Lower	Mabiacolor	F	Field Tenture		A.	dox Feature			Structure		Coetings	Con	Re	iota 🛛	er 🛛	Co	icentratio	65	Boundary
	depth (cm)	(moint)	Class	% Clay	N CF	Color	Amount	Size	Grede	Su+	Shape	Туре		Amount	Str.		Туре	Amt	Site	Dist
Αp	22	10YR 3/2	SiL	24	0				2	M	Sbk		Fr	2	F					A
					i				2	M/F	Sbk									
BA	42	10YR 3/2	SiL	26	0				2	M/F	Pr	Argillans	Fr	2	F					A
									2	M/F	Sbk									
Btk1	54	10YR 4/4	SiCL	32	0				2	M/F	Pr	Argillans	Fr	2	F	м	Ca	<1	VF	G
									2	M/F	Sbk									
Btk2	54+	10YR 4/4	SICL	32	0			L	2	M/F	Pr	Argillans	Fr	2	F	s	Ca	<1	M/F	1
									2	M/F	Sbk			<u> </u>						
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PROFIL	E:	702-115									% SLO	PE: <2%								
MAPPE	PROFIL	E CLASSIFICA	TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ious lorag	6						
					Fine, si	nectio, mes	alo Aridio.	Argiustoli			PAREN	T MATERIAL:	Calcarlo	us loess						
EPIPED	QN:	Mollio				_					COUNT	TY: Texas Co	uniy, Okla	ahoma						
SUBSU	RFACE H	RIZONS/FEA	TURES		Argillic						LOCAT	ION: Panhand	le Aesear	ch and E	xtentior	Center,	Goodwe	oli, Oklat	noma	
DATE S.	AMPLED:	10	0/2/2000			DATE DE	SCRIBED	:	6/18/2001		CORE	LENGTH (cm):		101						
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	itton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Herizon	Lower	Matrixcolor	F	Reld Texture		R	dox Feelure			Structure		Coalings	Con	Ro	ots	E۲	C.	heenteatio	93	Bounde
	depth (cm)	(moist)	Ciasa	% Cisy	% CF	Color	Amount	3ize	Grede	Size	Shepa	Туря		Amount	Size		Туре	Amt	Size	Dist
Ap	23	10YR 3/2	SiL	24	0				2	м	Abk		Fr	1	F					D
									2	M/F	Abk									
BA	42	10YR 3/2	SICL	28	0				2	м	Pr	Argillans	Fr	<1	F/VF					A
									2	M/F	Abk							· .		
Btk1	60	10YR 3/4	SICL	32	0				2	M	Pr	Argillans	Fr	<1	F/VF	м	Ca	< 1	м	A
									2	M/F	Abk						i			
Btk2	91	10YR 4/4	SiCL	34	0				2	м	Pr	Argillans	Fr	<1	F/VF	VS	Ca	1	м	A
									2	F	Abk							ł		
Btk3	91+	10YR 4/4	SiL	30	0			L	2	м	Pr	Argillans	Fr	<1	F/VF	s	Ca	<1	м	
									2	F	Pr									
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PROFIL	E:	702-116									% SLO	PE: ≺2%								
MAPPE	D PROFILE	CLASSIFIC	TION:		Richfiel	d Silt Loam					VEGET		ous forag	8						
					Fine, st	mectic, mes	lo Aridio	Arciustoli					Calcarlo	_						
EPIPED	ON:	Molilo									COUNT									
		RIZONS/FEA	TURES		Argilio						LOCAT				Mention	Center	Goodwe	ii Oklat	nma	
DATE S	AMPLED:	10	/2/2000		_	DATE DES	CRIBE		6/13/2002		CORE	LENGTH (cm):		100					-	
SAMPLI		Jason Parton				DESCRIBI						DIAMETER (cm):								
		Jamle Patton																		
Hodaon	Lower	Matrixcolor	F	ield Texture		A.	dox Feeture		I	Skucture		Costings	Con	Bo	eta	E#	C.0	Acentratio	-0.3	Boundary
	depth (cm)	(moist)	Ciess	* Chay	% CF	Color	Amount	Siz.	Quade	Size	Shepe	Type		Amount	Size		Туре	Amt	Size	Dist
Ap	22	10YR 3/2	SiL	24	0				2	M	Sbk		Fr	1	F					D
									2	F/VF	Sbk									
BA	48	10YR 3/2	SiL	26	0		1		2	м	Sbk	Argillans	Fr	<1	F					D
									2	F	Sbk									
Bt	71	10YR 3/3	SICL	29	0				2	м	Pr	Argillans	Fr	<1	F					A
	1 1								2	M/F	Abk									
Btk	71+	10YR 4/4	SiCL	29	0				2	C/M	Pr	Argillans	Fr	<1	F	S	Ca	<1	м	
									2	C/M	Pr									
				1									· · · ·		Γ					
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PROFIL	E:	702-121									% SLO	PE: <2%								
MAPPE	PROFILE		TION:		Richtel	d Silt Loam					VEGET	ATION: Continu	ous iorag	e						
					Fine, sr	nectic, mes	lo Aridio.	Arglusto®			PAREN	T MATERIAL:	Calcarlo	s loess						
EPIPED	ON:	Mollic									COUNT	Y: Texas Co	unty, Okia	homa						
SUBSU	RFACE HO	RIZONSIFEA	TURES:		Argilijo						LOCAT	ION: Parhand	e Resear	ch and §	Stantion	Center,	Goodwe	1, Oklař	oma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBET		6/15/2002		CORE	LENGTH (cm):		115						
SAMPL		Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Herizon	lower	Matriceolor	F F	iekd Texture		Be	dox Feature			Structure		Contings	Çon	R	otr	E#	Cot	centratio	ns I	Bounda
	depth (cm)	(moist)	Chas	* Chay	% CF	Color	Amount	Size	Grede	Bize	Shape	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	15	10YB 2/2	SIL	25	0		<u> </u>		2	C/M	Sbk		Fr	2	M/F					D
· •	·~			-			1		2	M/F	Sbk									1
AB	29	10YR 2/2	SICL	27	0				2	C/M	Pr	Argillans	Fr	2	F					D
~									2	M/F	Pr			-						1
Bw	52	10YB 3/2	SICL	28	0			<u> </u>	2	C/M	Pr	Argillans	Fr	1	F					D
2	-			1			1	1	2	M/F	Sbk									
Bt	69	10YR 3/3	SICL	31	0				1	С/М	Pr	Argillans	Fr	1	F					A
									1	M/F	Pr		1							
Bk1	81	10YB 4/4	CL.	29	0			1	1	M/F	Pr	Argilians	Fr	< 1	F	s	Ca	< 1	VF	D
									1	M/F	Pr									
Bk2	110	10YB 4/4	CL	27	0		1		2	c	Pr	Argillans	Fr	<1	F	VS	Ca	1	M/F	D
/								T	2	м	Pr		1							
Bk3	110+	10YB 4/4	L	25	0		1		2	С	Pr	Argillans	Fr	<1	F/VF	s	Ca	<1	VF	Г
							1	1	2	м	Pr		1	1			1	1		1
	1				1		1	1	1				Ī					1	<u> </u>	T
	1		1	1	1		†	1	1	1			1	1	1		l	1		

PROFIL	E:	702-123									% SLC	₩E: ≺2%/					_			
MAPPE	D PROFIL	E CLASSIFICA	TION:		Richfiel	id Silt Loam)				VEGET	TATION: Continu	ous foraç	le						
					Fine, s	mectic, mes	sic Aridic	Arglustos			PARE	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUN	TY: Texas Co	unty, Old	ahoma						
SUBSU	RFACEN	ORIZONS/FEA	TURES:		Argilic						LOCAT	ION: Panhand	e Resea	rch and I	Extention	n Center,	Goodwe	ell, Oklai	noma	
DATE S	AMPLED:	10	0/2/2000			DATE DES	SCRIBE	<u> </u>	6/13/2002		CORE	LENGTH (cm):		102					_	
SAMPLE	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton				-														
Notiton	Lower	Matriacolor		ield Texture	· · · ·	R	dox Feature			Sinclure		Coatings	Con	R	ots	EN	Co	ncentretio	ព៖	Boundary
	dəpth (em)	(moist)	Class	% Ciay	% CF	Color	Amount	Sa.	Orecle	Size	Shepe	Туре		Amount	Size		Тура	Amt	Size	Dist
Aφ	17	10YR 3/2	SiL	22	0		ļ		2	C/M	Sbk		Fi	1	F					D
		_		<u> </u>			Į		2	M/F	Sbk		_		_					
AB	31	10YR 3/2	SiL	20	0				2	M.	Pr	Argillans	F۱	<1	F					D
							ļ		2	M/F	Sbk									1
Bt	55	10YR 3/3	SICL	28	0				1	м	Pr	Argillans	Fr	<1	F					A
							<u> </u>		1	F	Sbk			_						
Btk1	68	10YR 4/3	SICL	31	0			 	2	м	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	A
									2	F	Pr			_	_			ļ		<u> </u>
Btk2	84	10YR 4/4	SiL	26	0		<u> </u>		2	C/M	Pr	Argillans	Fr	< 1	VF	٧S	Ca	1	м	G
		10YR 4/4	SiL	-				l	2	M/F	Pr			-	-			-		<u> </u>
BKC	84+	10YH 4/4	SIL	25	0		┨		3	C/M	Pr	Argillans	Fr	< 1	VF	s	Ca	<1	м	
			-		\vdash	<u> </u>			2	M/F	Pr	<u> </u>	<u> </u>		┝	<u> </u>	—	—	<u> </u>	–
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PROFIL	E:	702-124									% SLO	PE: <2 %								
MAPPE	D PROFILI		TION:		Richte	id Silt Loan					VEGET	ATION: Continu	ous forag	e						
					Fine, si	necto, mes	ic Arldic.	Arglustell			PAREN	T MATERIAL:	Calcario	Las loess						
EPIPED	ON:	Molic						_			COUNT	TY: Texas Co	unty, Okla	anona						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillic						LOCAT	ION: Penhand	e Resear	ich and E	Netro	n Center,	Goodwe	ili, Okla	homa	
DATE S	AMPLED:	10	22000			DATE DE	CRIBEL		6/13/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton	_																	_
Honigon	Lower	Mubircolor	F	ield Texture		8	doxFeature			Structure		Coatings	Con	P.,	ala	E#	60	ncentrasi	0.54	Sounder
	depth (cm)	(moizt)	Cinas	W Ciay	% CF	Color	Amount	324	Grade	Site	Shape	Туре		Amount	Site		Type	Amt	Size	Dist
Aр	17	10YR 3/2	SiL	19	0				2	М	Pr		Fr	<1	F					D
									2	M/F	Sbk									
AB	46	10YR 3/2	SiL	21	0				2	М	Pr	Argillans	Fr	<1	F					A
_									2	M/F	Sbk		·							
Bikt	65	10YR 4/2	SICL	32	0				2	м	Pr	Argillans	Fr	<1	F	S	C	< 1	м	A
									2	F	Pr									
Btk2	97	10YR 4/4	SiCL	34	0				2	М	Pr	Argillans	Fr	<1	VF	VS	Ca	<1	F/VF	D
									2	F	Pr					Ì				1
Bt	97+	10YR 4/6	SiCL	34	0				2	C/M	Pr	Argillans	Fr	<1	VF	VS				
									2	M/F	Pr									
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PROFIL	E:	702-125									% SLC	₩E: <2%								
MAPPE	D PROFILI	E CLASSIFICA	TION:		Richfiel	Id Silt Loam					VEGET	TATION: Continu	ous forag	Ð						
					Fine, se	mecto, mes	lo Aridic	Argiustol			PARE	T MATERIAL:	Calcarlo	us loess			-			
EPIPED	ON:	Molilo									COUN	TY: Texas Co	unty, Okli	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillic						LOCA	TION: Parhand	e Resear	ch and	Extentio	n Center	Goodwa	ell, Oklai	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBE		6/15/2002		CORE	LENGTH (cm):		94						
SAMPLI		Jason Parton				DESCRIB	ED BY;	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Pation					_				L		_							
Herbon	Lower	Matrix Color		Seld Texture		B	dox Feature		L	Structure		Coetings	Con	P	400	61		ncentratio	6 3	Boundary
<u> </u>	dapih (cm)	(moiat)	Cinos	% Clay	% CF	Color	Amount	Size	Grede	Size	Shee	Туре		Amount	<u> </u>		Type	Amt	Size	Dist
Αp	31	10YR 2/2	SiL	26	0				2	C/M	Pr		Fr	2	M/F					G
┣									2	M/F	Sbk			<u> </u>						
Bt1	52	10YR 3/3	SICL	30	0		 	·	2	C/M M/F	Pr.	Argillans	Fr	2	M/F					D
			-				-	<u> </u>	2		Pr			 .				┞		<u> </u>
B12	64	10YR 3/4	SICL	31	0				<u> </u>	M/F	Abk Abk	Argillans	Fr	1	M/F					A
Bk1	76	10YH 4/4	SiCL	29	0		+			M/F	Pr	Argillans	Fr		M/F	S/M	Ca	2	м	A
BK	/°	101114/4	3102	20			+		<u> </u>	F	Abk	Arginaris	F1	1'	" "	3/m	Ca.	1 ²	"	^
Bk2	76+	10YB 4/4	SiCL	29	0		†			M/F	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	VF	
1	/	10111-44	0.01	-	ľ		1			F	Pr	749		<u> </u>	1		1		[
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<u> </u>	†		1		1		1	· · · · ·	1	1	1			1	1	<u> </u>		1	1	1 –
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PROFIL	E:	702-126									% SLO	PE: <2%								
MAPPE	D PROFIL	E CLASSIFIC	ATION:		Richfie	d Silt Loam					VEGET	ATION: Continu	ous iorag	9						
					Fine, si	mecăc, mes	ic Aridic	Argiustol			PARE	IT MATERIAL:	Calcarlo	us loess						
EPIPED	ON:	Molilo							_		COUN	TY: Texas Co	unty, Oki	shoma						_
SUBSU	RFACE H	ORIZONS/FEA	TURES		Argillio						LOCAT	ION: Panhand	le Resea	ch and I	Extention	n Center	Goodwi	eil, Oklai	homa	
DATE S	AMPLED:	1	0/2/2000			DATE DES	SCRIBED	:	6/15/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pe	tten		CORE	DIAMETER (cm):								
		Jamle Patton																		
Hotizon	Lower	Mabizcolo:	۶	ield Texture		Be	dox Feeture			Structure		Coatings	Con	Re	óts	Er	ŝ	ncentretio	dar.	Bounder
	depði (cm)	(moist)	Class	% Clay	s, CF	Color	Amount	Size	Grede	Size	Shape	Тура		Amount	Size		Туре	Amt	Size	Dist
Ap	12	10YR 2/2	SiL	24	0				2	М	Sbk		Fr	2	F					D
									2	F	Sbk									
AB	31	10YR 2/2	SiL.	25	0				2	M	Pr	Argillans	Fr	1	F					A
									2	M/F	Sbk									
BA	55	10YR 3/2	SICL	27	0				2	M	Pr	Argillans	Fr	1	٧F					D
									2	F	Pr									
Bt	98	10YR 3/2	SICL	29	0				2	C/M	Pr	Argillans	Fr	<1	VF					D
									2	M/F	Pr									
Bw	114	10YR 4/3	SiL	25	0				2	C/M	Pr	Argillans	Fr	<1	VF					A
_									2	M/F	Pr						İ 🗌			
Bk	114+	10YR 4/4	SiL	25	0				2	c	Pr	Argillans	Fr	<1	٧F	м	Ca	< 1	٧F	
									2	м	Pr									
	1													Γ						
																		I		
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PROFIL	E:	702-132									% SLO	PE: <2%								
MAPPEI	PROFILI	E CLASSIFICA	TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ous forag	e						
				_	Fine, sr	nacto, mes	ic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcarlo	us loess	:					
EPIPED	ON:	Mollic									COUNT	Texas Co	unty, Okle	ahoma						
SUBSU	RFACE H	RIZONS/FEA	TURES:		Argifilo						LOCAT	ION: Panhand	e Resear	oh and	Extention	Center,	Goodwa	il, Oklal	юта	
DATE S	AMPLED:	10	0/2/2000			DATE DES	SCRIBE		6/11/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamie Pation																		
Horizon	Lower	Matrixcolor	۶	ieki Texture		Ba	doxFeature			Structure		Contings	Con	В	oots .	Eff	C.	ncentratio	6 .3	Bounde
	depith (cm)	(moint)	Ciass	% Clay	% CF	Color	Amount	Size	Grede	Size	Shepe	Туре		Amount	Siz•		Туре	Amt	Size	Dist
Ap	19	10YR 3/2	SiL	24	0				2	м	Pr		Fr	<1	F/VF					A
									2	M/F	Sbk									
A	32	10YR 3/2	SiL	25	0				2	м	Pr	Argillans	Fr	<1	F/VF					D
									2	F	Sbk									1
Bt	53	10YR 3/3	SiCL	29	0				1	м	Pr	Argillans	Fr	<1	F/VF					D
									2	M/F	Pr			1						
Bw	69	10YR 3/3	SiL	26	0				1	М	Pr	Argillans	Fr	< 1	F/VF					A
_									2	M/F	Pr									
Bki	87	10YR 4/3	SiL	26	0				2	M/C	Pr	Argillans	Fr	< 1	F/VF	м	Ca	<1	٧F	G
									2	M/F	Pr							1		
Bk2	87+	10YR 4/4	L	23	0				2	M/C	Pr	Argillans	Fi	<1	F/VF	٧S	Ca	< 1	VF	Γ
									2	M/F	Pr			1						
															T					Γ
														1						
															1					
							1	1		1	1		1	1	1		1	1	1	1

PROFIL	E:	702-134									% SLO	PE: <2%								
MAPPE	D PROFILI	CLASSIFIC/	TION:		Richfiel	d Slit Loam					VEGET	ATION: Continu	ous forag	e						
					Fine, st	nectic, mes	ic Aridic.	Arctustol			PAREN	T MATERIAL:	Calcaricu	s loess						
EPIPED	ON:	Mollic									COUN	TY: Texas Co	unty, Okie	anona						
SUBSU	RFACE H	RIZONS/FEA	TURES:		Argillo						LOCAT	ION: Penhand	e Resear	ch and I	Extentio	n Center,	Goodwa	oli, Oklai	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBED	: 1	0/12/2002		CORE	LENGTH (cm):		105						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Pation																		
Hexaon	Lower	Matrixcolor	,	ield Texture		Be	dox Feature			Structure		Coalings	Con	P.	eta	Eff	Co	ncentratio	-	Bounder
	depth (cm)	(moist)	Class	% Ckey	% CF	Color	Amount	Size	Grede	Size	Shepe	ĩyae		Amount	Size		Туре	Amt	Size	Dist
Ap	15	10YR 3/2	SiL	24	0				2	M/F	Sbk		FI	1	F					Α
									2	F	Gr									
Bt1	41	10YR 3/3	SICL	28	0				2	М	Pr	Argillans	٦Ï	<1	VF					D
									2	M/F	Sbk									
B12	53	10YR 3/3	SICL	28	0				2	м	Pr	Argillans	F	<1	VF					A
									2	M/F	Abk									
Bik1	89	10YR 4/4	SiCL	30	0				2	C/M	Pr	Argillans	Fr	<1	VF	٧s	Ca	<1	м	G
									2	M/F	Pr								·	
Btk2	89+	10YR 4/6	SICL	32	0				2	C/M	Pr	Argillans	Fr	<1	٧F	٧S	Ca	<1	м	
									2	M/F	Pr									
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Kannesis Araginesis Kannesis Contratuce forage Kannesis Araginesis Kannesis Araginesis Kannesis Araginesis Kannesis Araginesis Aragines Araginesis Araginesis Aragines Araginesis Aragines Arag	PROFILI	E .	702-135										₩PE; <2%				_				
File State SAMPLED BY: Molic South State Sample			· · · · ·			Richfie	id Silt Loan	<u></u>			~			inus foraci	A						
SUBSURFACE HORIZONS/FEATURES: Argilio LOCATION: Patranda Research and Extendion Condensition Condensition <td></td> <td></td> <td></td> <td></td> <td></td> <td>Fine, s</td> <td>mectic, me</td> <td>sic Aridio</td> <td>Argiustoll</td> <td></td>						Fine, s	mectic, me	sic Aridio	Argiustoll												
DATE SAMPLED: 10/2/2000 DATE DESCRIBEC 67 storoz CORE LENGTH (mr): 99 SAMPLED BY: Jacon Parton DESCRIBED BY: Jamie Patton CORE LINGTH (mr): 99 Jamie Patton Jamie Patton DESCRIBED BY: Jamie Patton CORE LINGTH (mr): 99 Jamie Patton Jamie Patton Core / store Core / store Core / store Store	EPIPED	ON:	Mailio								_	COUN	TY: Texas Co	ounty, Oiki	shoma						
DESCRIBED BY: Jamie Pation CORE DIANETER (cm): USECRIBED BY: Jamie Pation Cone Mount Bite Pation Social State	SUBSU	RFACE HO	ORIZONS/FEA	TURES	<u>.</u>	Argillic	,					LOCA	TION: Penhand	le Resear	ch and	Extension	n Center,	Goodw	oil, Okla	homa	
Jamie Pation Verifiend Larrie Pation Field Traderr Redor Features Disk. Configure Gain figure Gain figure Gain figure Figure Concentration figure Size Size Concentration figure Size Size Figure Concentration figure Size Size Figure Figure Monosoft figure Size Disk				0/2/2000			·····					CORE	LENGTH (cm):		99		_				
Northern Legen (and) Northernet (multip) Field Tender Reduct Feature Structure Coatign Site Coatign Site Coatign Annual Coatign Site Coatign Annual Reduct Feature Structure Coatign Site Coatign Annual Reduct Feature Structure Coatign Site Coatign Annual Coatign Site Reduct Feature Structure Coatign Site Coatign Annual Coatign Site Coatign Annual Coatign Site Reduct Feature Structure Type Annual Structure Type Annual Structure Structure Type Annual Structure Type Annua	SAMPLE					_	DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):				-				
stype (model) Class % Car % Car Amount Size Grade Size Size Size Size Type Amount Size Owner Ap 14 10YR 3/3 SiL 22 0													·		.						
Ap 14 10'F 3/2 SiL 22 0 2 M Sbk	Herizen			_	1	· · ·		1						Con	<u> </u>		EH		<u> </u>	T	
A 42 10YR 3/3 SiL 25 0 2 C/M Sbk Argillane Fr <1 VF D Bt 59 10YR 3/3 SiCL 33 0 2 M/F Sbk Fr <1	An		<u> </u>		-	_	Color	Amount	. Size				Туре		Amount			Туре	Amt	Sige	<u> </u>
A 42 10YR 3/3 SiL 25 0 2 C/M Sbk Argillans Fr <1 VF I D Bt 59 10YR 3/3 SiCL 33 0 2 M/F Sbk Fr <1	~	14	10111 3/2	SIL	<i>"</i>	ľ					_	*		•	1 ¹	۲.					0
Bt 59 10YR 3/3 SiCL 33 0 2 M/F Shk A Bt 73 10YR 3/3 SiCL 31 0 2 M/F Akk Fr <1	Α	42	10YR 3/3	SiL	25	6			<u> </u>			· · · ·	Argillans	Fr		VE		-		-	n
2 M/F Abk N <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>7 u gallou lo</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td> </td> <td>l -</td>													7 u gallou lo	1							l -
Bik1 73 10YR 3/3 SiCL 31 0 2 M Pr Argillans Fr <1 VF S Ca <1 VF A Bik2 73+ 10YR 4/3 SICL 31 0 2 M Pr Argillans Fr <1	Bt	59	10YH 3/3	SICL	33	0				2	м	Pr	Argillans	Fr	<1	VF		İ 🗌			A
2 F Abk Blk2 73+ 10YF 4/3 SICL 31 0 2 M Pr Argillane Fr <1										2	M/F	Abk									
B162 73+ 10YR 4/3 SICL 31 0 2 M Pr Argillans Fr <1 VF VS Ca 1 M	Btk1	73	10YR 3/3	SiCL	31	0				2	м	Pr	Argillans	Fr	< 1	VF	s	Ca	<1	VF	Α
					L	<u> </u>		1		2	F	Abk		ļ							
	Btk2	73+	10YR 4/3	SICL	31	0						-	Argillans	Fr	< 1	VF	٧S	Ca	1	м	1
					<u> </u>	<u> </u>	 			2	F	Abk						<u> </u>	-	-	
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PROFIL	E:	702-136									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ous forag	9						
					Fine, sr	nectic, mes	lo Aridio.	Argiustoll			PAREN	T MATERIAL:	Calcariou	a ioess						
EPIPED	ON:	Mollic									COUNT	Y: Texas Co	uniy, Okia	homa						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhandi	e Resear	ch and E	xtentior	Center,	Goodwa	li, Oklat	noma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBEC		6/13/2002		CORE	LENGTH (cm):		120		_				
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton															-			
Horizon	Lowar	Matrixcolor	F	ield Texture		. A	dox Feeture			Structure		Coatings	Con	Ro	otz	Ef.	Co	centratio	ð.	Boundar
	depth (cm)	(moiat)	Ciasa	% Chay	% CF	Çelor	Amount	Size	Grede	Size	Shape	Туре		Amount	Size		Туре	Amt	Size	Dist
Ар	10	10YR 2/2	SiL	24	0				2	М	Sbk		Fr	4	VF					D
									2	M/F	Sbk									
Α	25	10YR 2/3	SiL	24	0				3	М	Pr	Argillans	Fi	4	٧F					D
									2	M/F	Sbk									
Bw	49	10YR 3/2	SiL	26	0				2	м	Pr	Argillans	Fr	4	VF					D
									2	F	Pr						_			1
Bt	73	10YR 3/2	SiCL	29	0				2	м	Pr	Argilians	Fr	<1	VF					A
									1	7	Abk									ł.
Btk	93	10YR 4/4	SiCL	31	0		ļ		2	C/M	Pr	Argillans	Fr	<1	VF	٧s	Ca	1	м	D
									2	M/F	Pr									
Bk	93+	10YR 4/6	L	24	0				2	C/M	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	M/F	
									2	M/F	Pr								1	
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PROFILI	e:	702-137									% SLO	PE: <2%								
MAPPEL	PROFILE	CLASSIFICA	TION:		Richtel	d Silt Loan				1	VEGET	ATION: Continu	ous forag	9						
		_			Fine, si	necto, mes	ic Arldic.	RotzulgrA			PAREN	T MATERIAL:	Calcarto	zseol a						
EPIPED	ON:	Mollic									ÇOUNT	Y: Texas Co	unty, Okia	shoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and E	Intention	Center,	Goodwe	ll, Oklat	ioma	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBE		6/13/2002		CORE	ENGTH (cm):		120						
SAMPLE	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		COREI	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Matrixcolor	F	ield Texture		, Pa	ndox Feedure	13		Structure		Coelings	Con	Ro	ota	2	Col	ncentratio	71	Bounder
	depth (cm)	(mois¢	Ciase	% Cley	% CF	Color	Amount	Size	Grede	Size	Shape	Тури		Amount	Size		Туре	Amt	Siz+	Dist
Ap	13	10YR 3/2	SiL	22	0				2	M/F	Abk		Fi	<1	F					D
									2	F	Abk									
A	27	10YR 3/2	SiL	21	0				2	М	Pr	Argillans	Fì	<1	VF					D
									2	M/F	Pt									1
A	41	10YR 3/2	SiL	25	0				2	M	Pr	Argillans	Fr	<1	VF					A
									2	F	Pr									
Blk	57	10YR 4/4	SICL	27	0				2	M	Pr	Argillans	Fr	<1	VF	VS	Ca	<1	М	A
									2	F	Abk									
?	70	10YR 3/2	SiL	18	0				2	M	Abk	Argillans	FI	<1	VF					A
									2	M/F	Abk		1							
?	93	10YR 4/6	SiL	25	0				3	С	Pr	Argillans	FI	<1	٧F	٧S	Ca	<1	м	A
							<u> </u>		3	м	Pr]							
?	102	10YR 4/6	SiL	21	0		I		3	С	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	F	A
		10YR 3/2							3	M	Pr						I	1.		
?	102+	10YR 4/6	SiL	25	0				3	c	Pr	Argillans	FI	<1	VF	s	Ca	<1	м	T
				1			1		3	M	Pr		1	1			1	1		1

**Below 57 cm is backfill??

PROFIL	E:	702-141									% SLC	PE: <2%			_				_	
MAPPE			TION:		Richfiel	d Silt Loam							ious forag	18						
					Fine, si	necto, mes	le Aridie.	Argiustoil				T MATERIAL:					_			
EPIPED	ON:	Mollic									COUN									
SUBSU	RFACE H	ORIZONS/FEA	TURES:		Arglilic						LOCAT	ION: Panhand	le Resea	rch and §	xtention	n Center,	Goodwe	il, Oklai	noma	
DATE S	AMPLED:	10	0/2/2000			DATE DES	CRIBE		6/13/2002		CORE	LENGTH (cm);		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tion		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower	Matrixcolor		ield Texture		Re	dox Feature			Structure		Coatings	Con	Ro	ota	Eff	S	ncentraSo	-0.2	Boundary
	ciepts (cm)	(moi=0	Class	* Ciay	% CF	Color	Amount	Size	Grade	Size	Shepe	Туре		Amount	Site		Тура	Amt	Size	Dist
Ap	13	10YR 2/2	SiL	23	0				2	м	Pr		Fr	1	VF					D
									2	F	Sbk						L			
A	33	10YR 2/2	SiL	24	0			L	2	M	Pr	Argillans	Fr	<1	VF					D
									2	M/F	Sbk									
Bt1	69	10 YR 3/2	SiCL	27	0		ļ		1	С/М	Pr	Argillans	Fr	<1	VF					A
				ļ	<u> </u>		ļ		1	M/F	Pr						L			İ
Bw	88	10YR 4/3	SiL	25	0	· · · · · ·	 		2	M	Pr	Argillans	Fr	<1	VF					D
			<u> </u>	ļ					2	F	Pr		ļ	1		L			ļ	L
Bk1	110	10YR 4/4	L	23	0		ļ		2	c	Pr	Argillans	Fr	< 1	VF	s	Ca	1	м	D
			_					<u> </u>	2	<u>M</u>	Pr		<u> </u>	1	· · · ·	<u> </u>	<u> </u>	<u> </u>		┣—
Bk2	110+	10YR 4/4	L	25	0	ļ	ļ		. 2	c	Pr	Argillans	Fr	<1	VF	м	Ca	<1	м	
					<u> </u>		ļ		2	<u>M</u>	Pr		I	4		 			_	—
							ł				 		4	1		ł	1		1	
			—		┣—				 	<u> </u>		<u> </u>	┣──	+	<u> </u>		<u> </u>	-		—
							+		 	<u> </u>	+		1				1		1	1
L	1	L		1	L		1	L		L	1				L	1	L.,	1	1	1

PROFIL	E:	702-143									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Flichsel	d Silt Loam			-		VEGET	ATION: Constru	ous forag	Ð						
					Fine, sr	nectic, mes	ic Aridic.	Argiustoli			PAREN	IT MATERIAL:	Calcario	us loess						-
EPIPED	ON:	Molito									COUNT	TY: Texas Co	unty, Okla	ahoma		-				
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillio						LOCAT	ION: Panhand	e Resear	ch and E	Mentior	. Center,	Goodwe	li, Okiał	noma	
DATE S	AMPLED:	10	1/2/2000			DATE DES	SCRIBED		6/13/2002		COREI	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		COREI	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Matrixcolor	F	ield Texture	,	Br	dox Feeture			Stucture		Coalings	Con	Ro	ota	EN	C.	ncentretio	n#	Bounde
	depth (cm)	(maist)	Class	W Chay	K CF	Color	Amount	Size	Grade	Size	Shape	Туре	· ·	Amount	Size		Тура	Amt	Size	Dist
Ap	18	10YR 3/2	SICL	27	ō				2	M/F	Sbk		Fr	<1	F					D
									2	F	Sbk									1
A	44	10YR 3/2	SICL	29	0				2	C/M	Sbk	Argillans	Fr	1	F					A
									1	M/F	Sbk									
Bt1	61	10YB 3/3	SICL	31	0				1	C/M	Pr	Argillans	Fr	<1	F					Ā
							1		1	M/F	Pr		1	1						
Btk1	72	10YR 3/3	SICL	31	0		1	· · · · ·	1	C/M	Pr	Argillans	Fr	<1	F	м	Ca	<1	м	A
	1]			1		t	M/F	Pr		1		l .					
Bk1	86	10YB 4/4	CL	29	0		1	· · · · ·	2	C/M	Pr	Argillans	Fr	<1	F	vs	Ca	1	м	Ā
							1		2	M/F	Pr		1		ļ	i i			Į	
Bk2	99	10YR 4/4	а	27	0			<u> </u>	1	м	Pr	Argillains	Fr	<1	F	s	Ca	<1	M/F	D
							1		1	M/F	Pr		1			1		1		1
Bk3	99+	10YR 4/4	L	25	0		1	r	3	C/M	Pr	Argillans	Fr	T		s	Ca	<1	M/F	Π-
					1		1	[2	M/F	Pr	· · · · · · · · · · · · · · · · · · ·	1		1	l I			ļ	1
					1									T				1		T
				1			1	1	t	1	1		1	1	1	1		1	1	1

PROFIL	E:	702-144									% SLO	PE: <2%								
MAPPET	PROFILI	CLASSIFICA	TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ious forag	9						
		-			Fine, si	necto, mes	lo Aridio.	Argiustoli			PAREN	T MATERIAL:	Calcario	rs loess		-				
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	uniy, Okla	homa						
SUESU	RFACE HO	RIZONS/FEA	TURES:		Argillio						LOCAT	ION: Panhand	le Resear	ch and B	xtentior	Center,	Goodwe	di, Okia	homa	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		6/15/2002		CORE	LENGTH (cm):		93						
SAMPLE	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton															4			
Horizon	Lower	Matrixcolor	Б	ield Tenture		Re	dox Feature	ia i		Structure		Coatings	Con	Ro	ota	Eff	C.	ncentratio	100	Bounds
	depth (cm)	(moist)	Ciass	% Clay	% CF	Color	Amount	Size	Grede	Size	Sheps	Туре		Amount	Site		Туре	Ant	Size	Dist
Ap	24	10YR 3/2	SiL	26	0				2	M/C	Sbk.		Fr	3	M/F					G
					1				2	M/F	Sbk		1							I I
Bt1	37	10YR 3/2	SICL	30	0				1	м	Pr	Argillans	Fr	1	F					G
									2	F	Pr		1						ł	1
Bt2	56	10YR 3/3	SICL	35	0				2	м	Pr	Argillans	Fr	<1	F					A
									2	м	Sbk		1	1			1			1
Btk	56+	10YR 4/4	SICL	35	0				2	M	Pr	Argillans	Fr	<1	F	٧S	Ca	3	С/М	
									2	м	Sbk		1					I	ł	1
																				Γ
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									1	1							1		1	1
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	1						<u> </u>		t	+			1	1		1	1		1	

PROFIL	E.	702-146									% SLO	PE: <2%								
	····	E CLASSIFIC	TION		Diabila	ld Silt Loam														• • • • • •
MACT L		E DEAGON 107	11011.	_									ious forag			· · · · -				
					Fine, si	mecto, mes	le Aridie.	Arglustol					Calcario							
EPIPED		Molilo									COUNT	TY: Texas Co	unty, Okla	ahoma						
SUBSU	RFACE H	DRIZONS/FEA	TURES:		Argião						LOCAT	ION: Panhand	e Resear	ch and i	xtentio	n Center,	Goodwe	il, Okiał	noma	
DATE S	AMPLED:	10	2/2000			DATE DES	CRIBEL		6/15/2002		CORE	LENGTH (cm):		84						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Matrixcolor	. F	ield Texture	.]	R.	dox Feeture			Structure		Contings	Çon	Pro	eto	EN	C.	hcentratio	o s	Boundary
	depth (cm)	(moist)	Class	¶≼ Ciavy	% CF	Color	Amount	Site	Grede	Size.	Shepe	Турн		Amount	Size		Type	Ami	Size	Dist
Ap	17	10YR 3/1	SiL	23	0				2	м	Sbk		Fr	7	F					D
				1					2	۶	Sbk									_
A	48	10YR 3/2	SiL	24	0				2	с	Sbk	Argillans	Fr	4	F					D
									2	м	Sbk									-
Bk1	71	10YR 3/3	SiL	26	0				1	м	Pr	Argillans	Fr	3	F	VS/S	Ca	<1	VF	A
	1								2	F	Pr						1			
Bk2	84	10YB 4/3	L	24	0				2	c	Pr		Fr	<1	VF	V\$/S	Ca	1	F	
			-						2	M	Pr		1	L.,	· · ·	10/0	l va	1	· ·	
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				I				1	1			I						1		

PROFIL	E:	702-147									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	çısrol avo	9						
					Fine, st	nectic, mes	ic Aridic	Arglustoli			PAREN	T MATERIAL:	Calcarlo	a ioess						
EPIPED	ON:	Mallic									COUNT	Y: Texas Co	unty, Okla	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and E	xtention	Center,	Goodwa	I, Oklai	ioma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBEL		6/15/2002		CORE	LENGTH (cm):		120		_				
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton														_				
Horizon	Lower	Marixcolor	F	ield Texture		84	doxFeeture			Structure		Coatings	Çon	, Ac	ota	8 #	Co	menzelio	ne	Boundary
	depth (cm)	(moiat)	Class	* Clay	¥ CF	Color	Amount	Size	Grede	Size	Sheps	Type		Amount	Size		Туре	Ant	Size	Dist
Ap	25	10YR 3/2	SiL	23	0				2	_M	Sbk		Fr	1	F					D
								<u> </u>	2	F	Sbk		_							<u> </u>
Α	49	10YR 3/2	SiL	26	0		L		2	М	Pr	Argillans	Fr	1	F					D
									2	F	Sbk								_	
Bt	65	10YR 3/3	SICL	31	0				2	м	Pr	Argillans	Fr	<1	VF					A
				<u> </u>			 		2	F	Abk		<u> </u>	—			L			<u> </u>
Btk1	90	10YR 4/4	SICL	30	0			ļ	2	C/M	Pr	Argillans	Fr	< 1	٧F	٧S	Ca	<1	VF	G
				<u> </u>				ļ	2	M/F	Pr			I			L			
Btk2	90+	10YR 4/4	SICL	27	0	L	Ļ	ļ	2	C/M	<u>Pr</u>	Argillans	Fr	<1	VF	s	Ca	<1	F	
	L			<u> </u>				<u> </u>	2	M/F	Pr		<u> </u>	-			L	ļ	ļ	∔
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PROFIL	E:	702-212									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richtel	d Slit Loam					VEGET	ATION: Continu	ous forag	0						
					Fine, st	nectic, mes	lo Aridio	Argiustell			PAREN	T MATERIAL:	Calcario	s loess						
EPIPED	ON:	Motile		-							COUNT	TY: Texas Co	unty, Okla	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES		Argillic						LOCAT	ION: Panhandi	e Resear	ch and I	Extention	Center,	Goodwe	li, Okiai	noma	
DATE S	AMPLED:	10	12/2000			DATE DES	CRIBE		6/15/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	ttorn		CORE	DIAMETER (cm);								
		Jamie Patton														_				
Norizon	Lower	Matricolor		ield Tenture		Re	dox Feeture	·		Structure		Coalings	Con		ota	EX	Co	icentratio	a 1	Bounde
	depth (cm)	(moist)	Ciess	% Clay	% CF	Coior	Amount	Sige	Gaudie	Size	Shepe	Туре		Amount	Size		Тура	Amt	Sine	Dist
Aρ	20	10YR 2/2	SICL	27	0				2	C/M	Pr		Fr	1	F/VF					D
									2	M/F	Abk									
Α	47	10YR 2/2	SICL	28	0				2	C/M	Pr	Argillans	Fr	1	F/VF					D
									2	м	Sbk									
Bt	65	10YR 3/3	SiCL	28	0				1	c	Pr	Argillans	Fr	1	F/VF					1 A
									1	м	Pr						· · · ·			
Btk1	92	10YR 4/3	SICL	28	0				1	С	Pr	Argiilans	Fr	< 1	VF	s	Ca	<1	м	G
				L					1	м	Pr									
Btk2	92+	10YR 4/4	SiL	25	0		<u> </u>		2	C C	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	Ł
	1		L	L					1	м	Pr									
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		L	1											1					1	-
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			1	1										1	1	1	1			1

PROFIL	E:	702-213									% SLO	PE: <2%								
MAPPE	D PROFIL	E CLASSIFIC	ATION:		Richfiel	id Silt Loam	n				VEGET	ATION: Conitru	ious forag	10						
					Fine, si	mecto, mes	sio Aridio	Argiustoli			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mallio									COUNT	TY: Texas Co	unity, Oki	ahoma						
SUBSU	RFACE H	ORIZONS/FEA	TURES		Argillio						LOCAT	ION: Panhand	le Resea	roh and B	Stention	Center	Goodwe	ii. Okial	homa	
DATE S	AMPLED:	1	0/2/2000			DATE DES	SCRIBED		6/15/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Pation																		
Horizon	Lower	Matrixcolor		ieki Texture		R.	ndoz Feature	•		Structure		Coalings	Con	Ro	ota	EN	Ç.	ncentratio	n #	Boundary
	depth (cm)	(moiat)	Ciasa	% Ciay	★ CF	Celor	Amount	Size	Grade	Size	Shape	Тура		Amount	Size		Туре	Amt	Size	Dist
Ap	33	10YR 2/2	SiCL	25	0				2	M	Sbk	Argillans	Fr	<1	VF			. 1		D
			_						2	F	Sbk			L						
Bt	60	10YR 3/2	SICL	30	0		ļ		1	м	Abk	Argillans	Fr	<1	VF					D
			· · ·						1	F	Abk		L							
Bw	69	10YR 3/3	a	28	0		ļ		1	M	Pr	Argillans	Fr	<1	VF					A
				· · ·			ļ		1_1_	M/F	Abk			Į			—			L
Bk1	90	10YR 4/3	L	26	0			ļ	1	<u> </u>	Pr	Argillans	Fr	<1	VF	м	Ca	<1	м	D
			<u> </u>						1	M	Pr		L	_			I			_
Bk2	90+	10YR 4/4	L L	26	0	ļ			2	c	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	1
			<u> </u>				<u> </u>	 	2	м	Pr		<u> </u>	-		_		L		
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		L	1	<u> </u>	1			I	1					1			1		1	J

PROFIL	E:	702-215									% SLO	PE: <2%								
MAPPEI	PROFIL	CLASSIFIC	TION:		Richfiel	id Silt Loam					VEGET	ATION: Continu	ous forag	6						
					Fine, sr	nectic, mes	ic Aridic.	Argiustoli			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Moliic									COUNT	TY: Texas Co	unty, Okla	ahoma						
SUBSU	RFACE HO	HIZONS/FEA	TURES:	· ·	Argillic						LOCAT	ION: Panhandi	e Resear	ch and E	xtentior	Center.	Goodwa	II, Okial	юта	
DATE S.	AMPLED:	10	3/2/2000			DATE DES	CRIBED		6/13/2002		CORE	LENGTH (cm):		120						
SAMPLE	DBY:	Jason Parton				DESCRIBI	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton											_							
Horizon	Lower	Matrixcolor		Seld Texture		R.	dox Feeture			Skuchuse		Conlings	Con	A .	olz	Er 🛛	Ce	ic en tra lic	n3	Bounde
	depth (cm)	(moist)	Ciaza	% Ciay	% CF	Color	Amount	3ize	Gead+	Size	Shepe	739+		Amount	Size		Туре	Amt	Size	Dist
Ap	16	10YR 2/2	SiL	23	0				2	M	Sbk		Fr	1	F					D
									2	F	Sbk									1
BA	34	10YR 3/2	SiL	25	0		L		2	м	Pr	Argillans	Fr	<1	VF					D
									2	M/F	Sbk			L						
Bt	56	10YR 3/3	SICL	33	0				11	M/F	Pr	Argillans	Fr	<1	VF					A
									1	F	Pr									
Btk1	64	10YR 4/3	SiCL	30	0				2	M	Pr	Argillans	Fr	< 1	VF.	VS	Ca	<1	٧F	A
				ļ					2	F	Pr									
Btk2	92	10YR 4/4	SICL	28	0				2	C/M	Pr	Argillans	Fr	<1	VF	٧S	Ca	1	м	A
									2	M/F	Pr			<u> </u>						ļ
Bk1	101	10YR 4/4	L	23	0	L	I	L	2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	G
	I		ļ	ļ			L		2	M/F	Pr		ļ	I		L	I		ļ	1
Bk2	101+	10YR 4/4	L	23	0	L	L	L	2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	
			I	<u> </u>			1		2	M/F	Pr		L		Ļ				L	
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PROFIL	E:	702-216									% SLC	PE: <2%								
MAPPE	D PROFILI	E CLASSIFIC	TION:		Richfie	id Silt Loam					VEGET	ATION: Contru	ous foraç	e						
					Firme, st	mectic, mea	ilo Arldic	Argiustol			PARE	IT MATERIAL:	Calcarlo	us loess						
EPIPED	ON:	Moillo									COUN	TY: Texas Co	unty, Okl	ahoma						
SUBSU	RFACE H	ORIZONS/FEA	TURES:		Argillio						LOCAT	NON: Penhand	e Resea	rch and i	conerx3	n Center,	Goodwe	ië, Okial	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DE	BCRIBED		6/14/2002		CORE	LENGTH (cm):		107						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm);								
		Jamle Patton																		
Horizon	Lower	Matrixcolor	F	ield Tenture		P.	dox Feature			Structure		Contings	Con	R	ots	EN	co	ncentraSo		Bounder
	depth (cm)	(moist)	Class	% Clay	% CF	Color	Amount	Size	Grede	Size	Shepe	Туре		Arnount	Side		Туре	Ami	Size	Dist
Αp	13	10YR 2/2	SiL	18	0				2	М	Sbk		Fr	<1	VF					D
								l	2	F	Sbk									ļ
AB	39	10YR 2/2	SiL	22	0				2	м	Pr	Argillans	Fr	<1	VF					D
									2	M/F	Abk									
Bt	69	10YR 3/3	SICL	30	0				1	м	Pr	Argillans	Fr	<1	VF					A
									1	F	Pr									
Btk1	90	10YR 4/3	SICL	31	0				2	C/M	Pr	Argillans	Fr	<1	٧F	м	Ca	<1	F	G
									1	M/F	Pr								Ì	
Btk2	90+	10YR 4/3	SiL	23	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	
									2	M/F	Pr									
										L										T
	I																			
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	Г																			1
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PROFIL	E:	702-217									% SLO	PE: <2%								
MAPPE	PROFIL	E CLASSIFIC	TION:		Richitel	d Silt Loan	:				VEGET	ATION: Continu	ious forag	18						
					Fine, st	nectic, me	sic Aridic.	Argiustoli			PARE	T MATERIAL:	Calcarlo	us loess						
EPIPED	ON:	Moille									COUNT	TY: Texas Co	sunty, Okl	shoma						
SUBSU	RFACE H	RIZONS/FEA	TURES		Argillo						LOCAT	ION: Panhand	le Resea	ch and i	Extention	n Center,	Goodwe	il, Okia	homa	
DATE S	AMPLED:	1	0/2/2000			DATE DE	SCRIBED	_	6/18/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jason Parton				DESCRIB	ÊD BY:	Jamie Pe	llon		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Metrixcolor	. F	ield Texture		R	idox Feeture	,		Structure		Coatings	Con		iota	٤×	c.	ncentrațio	- tr	Bounder
	depth (cm)	(moist)	Ciens	* Ciay	% CF	Color	Amount	Size	Grede	Size	Shepe	Туре		Amount	Size.		7394	Amt	Size	Diat
Áρ	18	10YR 2/2	SICL	27	0				2	M/F	Pr		Fr	. 3	VF					A
									2	F	Sbk									ł
AB	28	10YR 2/2	SICL	29	0				1	C/M	Pr	Argillans	Fi	2	VF					A
								_	1	M/F	Pr									1
Bt1	53	10YR 3/2	SICL	34	0				2	M/F	Pr	Argillans	Fr	2	VF					D
									2	F	Pr		1							
Bt2	62	10YR 3/3	SiCL	32	0				2	M	Pr	Argillans	Fr	1	VF					A
									2	M	Abk		1.]			
Bk1	71	10YR 4/3	SiCL	30	0				2	М	Pr	Argillans	Fr	<1	VF	М	Ca	<1	м	A
									2	М	Abk]					ł		
Bk2	71+	10YR 4/4	a	28	0				2	C	Pr	Argillans	Fr	<1	VF	s	Ca	1	м	
									2	M/F	Pr			ľ				1		
			1	ł																
																		1		
		· ·					1			1			1			1	1		1	1

PROFIL	:	702-223									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loan	1				VEGET	ATION: Continu	ous ierag	9						
					Fine, sr	necto, mes	sic Aridio	Argiustoli			PAREN	T MATERIAL:	Calcarlo	as loess						
EPIPED	ON:	Mollic									COUNT	Texas Co	unty, Oki	shoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	e Resea	ch and E	Extentior	n Center,	Goodwa	il, Okia)	noma	
DATE S.	AMPLED:	10	/2/2000			DATE DE	SCRIBE		6/12/2002		CORE	LENGTH (cm):		120						
SAMPLE	DBY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tion		CORE	DIAMETER (cm):								
		Jamle Patton															-			
Horidaoth	Lower	Matrixcolor	,	Seld Texture		. A	ndox Feature			Structure		Coefings	Con	Re	x01s	6 #	Co:	ncentratio	61	Bounday
	elepth (cm)	(moizi)	Cinza	% Chay	% CF	Color	Amount	Size	Grede	Size	Shepe	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	15	10YR 3/2	SiL	24	0				2	М	Sbk		Fr	<1	F					D
									2	M/F	Abk									
Α	29	10YR 3/2	SiL	24	0		ł		2	м	Sbk		Fr	<1	F					D
									2	M/F	Abk									
BA	60	10YR 3/3	SiL	26	0				2	M	Pr	Argillans	Fr	<1	F					D
									2	м	Abk									
Bw	76	10YR 3/4	SICL	28	0				1	C/M	Pr	Argillans	Fr	<1	F					A
				l					2	M/F	Pr									
Bk1	93	10YR 4/4	SiL	24	0				1	C/M	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	G
									2	M/F	Pr						İ			
Bk2	93+	10YR 4/4	L	26	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	
									2	M	Pr							ł		1
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PROFIL	E:	702-224									% SLO	PE: <2%								
MAPPE		E CLASSIFIC	ATION:		Richfie	id Silt Loam	1				VEGET	ATION: Continu	ous foraç	9	_					
					Fine, si	mectic, mes	de Arídio.	Arglustol			PAREN	T MATERIAL:	Calcarlo	us loess						
EPIPED	ON:	Molilo									COUN	TY: Texas Co	uniy, Okl	ahoma						
SUBSU	RFACEHO	RIZONS/FEA	TURES:		Arglillo						LOCAT	NON: Parhand	e Resea	rch and B	Extension	Center	Goodwe	il, Oklai	homa	
DATE S	AMPLED:	1(0/2/2000			DATE DE	SCRIBED		6/15/2002		CORE	LENGTH (cm):		119						
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pe	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Mariana	Lower	Matrixcolor	F	Field Texture		Re	dox Feebure			Structure		Coatings	Con	Re	ote	M	Co	ncentretic		Bounda
	depih (cm)	(moist)	Ciass	% Ciay	% CF	Coior	Amount	Size	Grade	Size	Shape	Туре		Amount	Size		Туре	Ant	Site	Dist
Ap	16	10YR 2/2	SICL	27	0				2	C/M	Sbk		Fr	5	F					A
									2	F	Sbk									
Bw	44	10YR 3/2	SICL	30	0				2	C/M	Pr	Argillans	Fr	3	F					D
									2	М	Pr									Í.,
Bw	64	10YR 3/3	SICL	28	0				1	M	Pr	Argillans	Fr	2	F					A
									1	M/F	Abk					i				
Bkt	77	10YR 3/4	а	28	0				2	C/M	Pr	Argillans	Fr	1	F	s	Ca	<1	VF	A
		-							2	M/F	Pr									
Bk2	94	10YR 4/6	L	26	0		÷		2	C/M	Pr	Argillans	Fr	<1	F/VF	s	Ca	1	C/M	A
									1	M/F	Pr			1						
Bk3	94+	10YR 4/6	L	24	0				2	C/M	Pr	Argillans	Fr	<1	F/VF	S	Ca	1	M/F	
									2	M	Pr									
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PROFIL	E:	702-225				_					% SLO	PE: ≺2%		,	-		_			
MAPPE	D PROFIL		TION:		Richfiel	id Silt Loam	1						ious forag	10			·			
					Fine, st	mectic, met	sic Aridic	Arglusion			PAREN		Calcarlo		;					
EPIPED	ON:	Моню									COUN	TY: Texas Co	ounty, Oki	ahoma			-			
SUBSU	RFACE H	ORIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	le Resea	rch and	Extention	Center	Goodwi	il, Okla	homa	
DATE S	AMPLED:	. 10	0/2/2000			DATE DE	SCRIBE		6/15/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	itton		CORE	DIAMETER (cm):								
		Jamle Patton							_											
Horizon	Lower	Maintecolor	F	Seld Texture		R	ndox Feetur			Structure		Continus	Con	R	xots .	. 84	ŝ	ncentratio	-na	Bounder
	depih (cm)	(moist)	Class	% Ciay	% CF	Color	Amount	Size	Grede	Size	Shape	Тура		Amount	Siza		Туре	Amt	Siz+	Dist
Ap	20	10YR 2/2	SĩL	24	0		L		2	м	Sbk		Fr	2	F					D
									2	F	Sbk									
Bw	41	10YR 3/2	SĩL	26	0				2	М	Pr	Argillans	Fr	1	F					D
									2	F	Pr									
Ðt	67	10 YR 3/3	SICL	28	0				1	м	Pr	Argillans	Fr	1	VF					A
									1	M/F	Abk			1						1
Bk1	87	10YR 4/4	Ľ	26	0		<u> </u>		1	c	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F	A
							1		1	м	Pr									
Bk2	87+	10YR 4/4	L.	25	0		ļ		1	c	Pr	Argillans	Fr	<1	F/VF	s	Ca	1	м	
									1	м	Pr						I			
				1			ļ	L	I		L						l			1
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PROFIL	E:	702-226									% SLO	PE: <2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loam	1				VEGET	ATION: Continu	ous forag	e						
					Fine, sr	nectic, mes	ic Aridic.	Argiustoli			PAREN	T MATERIAL:	Calcarlos	zzeol z						
EPIPED	ON:	Moilic									COUNT	TY: Texas Co	unty, Okle	homa						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Arçillic						LOCAT	ION: Panhand	e Resear	ch and E	xtention	Center,	Goodwe	4, Oklah	юпа	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBEL		6/11/2002		CORE	LENGTH (cm):		105						
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamis Patton																		
Horizon	Lower	Hatixcolor	F	ield Texture		R	dox Feature			Structure		Continga	Con	R	ols	E#	Co.	ncentratio	93	Bounde
	depth (cm)	(moinț)	Ciasz	% Clay	% CF	Color	Amount	Size	Grede	Size	Shape	Туре		Amount	Size		Туре	Ami	Sizo	Dist
Ap	19	10YR 3/3	SiL	24	0				2	C/M	Sbk		Fi	1	F					D
									2	M/F	Sbk									
AB	45	10YR 3/2	SiL	26	0				2	м	Pr	Argillans	Fr	<1	F					D
									2	F	Pr									
Bt1	58	10YR 3/3	SICL	29	0				2	м	Pr	Argillans	Fr	4	F/VF					D
									2	F	Abk									
Bt2	69	10YR 3/4	SICL	30	0		T i		2	M	Pr	Argillans	Fr	<1	F/VF					A
	I								2	F	Pr								[
Btk	84	10YR 4/4	SICL	32	0				2	C/M	Pr	Argillans	Fr	<1	F/VF	VS	Ca	<1	м	G
									2	M/F	Pr		1					i i		
Bk	84+	10YR 4/6	Ĺ	26	0		T		2	C/M	Pr	Argillans	Fr	<1	F/VF	٧s	Ca.	<1	м	Γ
								· · · · ·	2	M/F	Pr		1							
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PROFIL	ŧ:	702-227									% SLO	PE: <2%								
MAPPEI	PROFILE	CLASSIFIC	TION:		Richile	d Slit Loam					VEGET	ATION: Conlinu	ous torag	9						
					Fine, sr	nectic, mes	ic Aridic.	Arglustell			PAREN	T MATERIAL:	Caicariou	s loess						
EPIPED	ON:	Mellio					-				COUNT	TY: Texas Co	unty, Okia	ihoma						
SUBSU	RFACEHO	RIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhandi	e Resear	ch and I	Extention	Center,	Goodwe	a, Oklai	noma	
DATE S	AMPLED:	10	12/2000			DATE DES	CRIBE		6/12/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm);								
		Jamle Patton																		
Hariteen	Lower	Mairixcolor	F	ieki Texture		Be	dox Feeture)3		Structure		Coatings	Con	R	iota 🛛	EX	Con	ncentratio	A B	Boundar
	depth (cm)	(moiaț)	Class	% Clay	% CF	Color	Amount	Size	Grede	Size	Shepe	Тура		Amount	Size		Type	Amt	Size	Dist
Ap	16	10YR 3/3	SiL	24	0				2	М	Sbk		Fr	1	F					D
									2	F	Sbk									
AB1	26	10YR 3/2	SiL	25	0				2	м	Pr		Fr	<1	VF					D
									2	F	\$bk									
AB2	45	10YR 3/2	SICL	27	0				2	M	Pr	Argillans	Fr	<1	VF					D
									2	F	Sbk									
Bt1	60	10YR 3/3	SICL	34	0				2	м	Pr	Argilians	Fr	<1	VF					A
									1	F	Abk									
Btk1	67	10YR 4/3	SICL	36	0				2	м	Pr	Argillans	Fr	<1	VF	м	Ca	<1	٧F	A
									1	F	Abk									1.
Btk2	86	10YR 4/3	SICL	33	0				2	м	Pr	Argillans	Fr	<1	VF	VS	Ca	1	м	A
									1	F	Pr		· ·							
Bk1	99	10YR 4/6	L	26	0				2	M	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	м	G
	1								2	F	Pr							۱.,		
Bk2	99+	10YR 4/4	SiL	26	0				2	C/M	Pr	Argillans	Fi	<1	VF	VS	Ca	<1	٧F	Γ
				1			T		2	M/F	Pr		1	1	ł			1.	ł	1

PROFIL	e.	702-231				·······					% SLO	PE: <2%								· · ·]
		E CLASSIFIC			Clabe-	d Silt Loam						ATION: Continu	our for-							
MAPPE		E CLASSIFICI													·····	·				
·					Fine, si	nectic, mes	CARGIO,	Argitistoli					Calcarlo							
EPIPED		Maillo									COUN									
		ORIZONS/FEA			Argillic						LOCAT		e Resea		Stensor	n Center,	Goodwe	di, Oklai	noma	
	AMPLED:		0/2/2000			DATE DES			6/13/2002			LENGTH (cm):		120						
SAMPL		Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
	_	Jamie Patton														_				
Horizon	Lower	Matrixcolor	, ,	ield Texture		8	dox Feature	•		Structure		Coelings	Con	8.	ots	EH	€0	ncentratio	n i	Boundary
	depth (cm)	(moist)	Class	% Ciny	%, CF	Color	Amount	Sue	Grade	Size	Shape	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	18	10YR 3/2	SiL	24	0				2	м	Sbk		Fr	<1	F					D,
									2	M/F	Sbk									
AB	45	10YR 3/3	SiL	24	0				2	М	Pr	Argillans	Fr	<1	VF		1			D
									2	M/F	Abk									
Bt1	60	10YR 3/3	SICL	30	0				2	м	Pr	Argillans	Fr	<1	VF					A
									2	F	Pr									
Btk	77	10YR 4/3	SiCL	28	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	M/F	D
							1		2	M/F	Pr						<u>ا</u>			1
Bk	77+	10YR 4/4	SiL	26	0				2	С/М	Pr	Argillans	Fr	<1	٧F	s	Ca	<1	M/F	
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			1 m	L		<u> </u>				1	1		1		<u>ا</u>	1		1	1	1

PROFILI	E:	702-232									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ous forag	0						
					Fine, sr	nectic, mes	lo Aridic	Argiustoli			PAREN	T MATERIAL:	Calcarlou	us loess						
EPIPED	ON:	Molilo									COUNT	TY: Texas Co	uniy, Okla	ahoma		_				
SUBSU	RFACE HO	RIZONSIFEA	TURES:		Arglillo						LOCAT	ION: Panhandi	e Resear	ch and i	Extention	Center,	Goodwe	ii, Okla	homa	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBE		6/12/2002		CORE	LENGTH (cm):		120						
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Mairizcolor	F	iaki Tastura		Be	dox Penture			Structure		Contings	Con	P	ota	EX	C.	ncentratio	104	Bounde
	depth (cm)	(moist)	Cieza	% Clay	* CF	Color	Amount	9izə	Grade	Size	Shape	Type		Amount	Size		Туре	Amt	Size	Dist
Ap	18	10YR 2/2	SiL	22	0				2	M/F	Abk		Fi	2	F					A
									2	F/VF	Abk			I						
A	39	10YR 2/2	SiL	24	0				2	M	Pr	Argillans	Fr	<1	F/VF					D
				ł					2	M/F	Abk							ľ.		
Bt	67	10YR 3/2	SiCL	32	0				2	М	Pr	Argillans	Fr	<1	F/VF					A
									2	M/F	Abk									
Btk1	83	10YR 4/3	SICL	32	0				2	C/M	Pr	Argillans	Fr	<1	F/VF	м	Ca	<1	F/VF	A
									2	M/F	Pr									
Btk2	102	10YR 4/4	SiCL	30	0				2	C/M	Pr	Argillans	Fr	<1	VF	S	Ca	1	M	A
									2	м	Pr									1
Bk	102+	10YR 4/4	SiL	23	0				2	C/M	Pr	Argilians	Fr	1	VF	s	Ca	<1	M/F	
									2	М	Pr							i		
														1						
														T						
							1						1	1	t		1		!	

PROFILI	i.	702-234									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFIC/	TION:		Richtei	d Silt Loam					VEGET	ATION: Continu	ous forag	0						
					Fine, sr	nectic, mes	lo Aridio.	Argiustoll			PAREN	T MATERIAL:	Calcation	s icess						
EPIPED	ON:	Molito									COUNT	TY: Texas Co	uniy, Okla	thoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES;		Argillic						LOCAT	ION: Panhend	e Resear	ch and I	Extension	Center,	Goodwe	ii, Oklai	noma	-
DATE S.	AMPLED:	10	/2/2000			DATE DES	SCRIBEL		6/15/2002		CORE	LENGTH (cm):		120						
SAMPL	DBY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
-		Jamie Patton																		
Horizon	Lower	Matriacolor	F	ield Texture	,	R	dox Feeture			Stucture		Costings	Con	- Ak	iota	EX	Ço	ncentratio	0 4	Bounde
	depth (cm)	(moizt)	Class	% Cley	% CF	Color	Amount	Size	Greede	300	Shape	Туре		Ameunt	Size		Туре	Amt	Size	Dist
Ap	11	10YR 2/2	SiL	25	0				1	C/M	Sbk		Fr	<1	M/F					A
									1	M/F	Sbk									
AB	25	10YR 3/2	SICL	28	0				2	м	Pr		Fr	3	M/F			-		D
					1				2	M/F	Sbk									
BtA	54	10YR 3/2	SICL	32	0				1	C/M	Pr	Argillans	Fr	1	F/VF					D
									1	M	Sbk									
Bw	76	10YR 3/3	d	28	0				1	C/M	Pr	Argillans	Fr	1	F/VF					A
									1	M/F	Pr		I							
Bk1	85	10YR 4/3	L	25	0				2	C/M	Pr	Argillans	Fr	<1	F/VF	vs	Ca	<1	VF	A
								· · · · · · · · · · · · · · · · · · ·	2	M/F	Pr		1							
Bk2	104	10YR 4/4	L	25	0				2	C/M	Pr	Argillans	Fr	<1	VF	VS	Ca	3	M/F	A
									2	M/F	Pr									
Bk3	104+	10YR 4/4	L	24	0		[2	С/М	Pr	Argillans	Fr	<1	VF	s	Ca	1	VF	T
									2	M/F	Pr		1						l	
							Ţ												<u> </u>	Г
							1	1	1	1			1	1				ł		1

PROFIL	F.	702-235									% SLC	PE: <2%		_						
		E CLASSIFIC	TION:		Pichie	ld Silt Loam		<u> </u>				ATION: Continu	ous forac	e						
					Fine, st	mectic, mes	to Aridic.	Argiustoli					Calcario	_						
EPIPED	ON:	Mollic									COUN	TY: Texas Co	unty, Okl	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argiille						LOCAT	ION: Panhand	e Resea	ch and	Extentior	Center	Goodwe	ili, Okla	noma	
DATE S	AMPLED:	10	0/2/2000			DATE DES	CRIBEL		8/15/2002		CORE	LENGTH (cm):		120						
SAMPLI	JRFACE HORIZONS/FEATURES: Argillic SAMPLED: 10/2/2000 DATE DESCRIBE(6/15/200 ED BY: Jason Parton DESCRIBED BY; Jamie Patton Jamie Patton Jamie Patton DESCRIBED BY; Jamie Patton Jamie Patton DESCRIBEC 10/2 Lever Metricoter Find Toker Redor Fastyres 1 20 10/YR 3/1 SiL 26 0 2 2 53 10/YR 3/2 SiCL 27 0 2 2 73 10/YR 3/3 SiCL 28 0 1 1										CORE	DIAMETER (cm):								
		Jamie Patton															_			
Horizon	Lower	Metrixcolor	F	ield Texture	-	Be	dox Feeture			Structure		Coatings	Con	R	oota	E#	C.	ncentralic	n *	Boundary
						Color	Amount	3ize		Size	Shepe -	Type		Amount			Туре	Amt	Size	Dist
Ap	20	10YR 3/1	SiL	26	0					M	Sbk		Fr	2	F/VF				1	G
			0.01							F	Sbk		-	-			_			<u> </u>
AB	53	10YH 3/2	SICL	27	l °					C/M M/F	Pr Pr	Argillans	Fr	1	VF					D
Bw	70	1078 0/0	SICI	20					<u> </u>	M	Pr	Argillans	Fr	$\frac{1}{1}$	VF				\vdash	A
DW .	/3	10115 3/3	3102	2°	ľ				┢╌╬╌	F	Pr	Arginans	"	1 '	1			ł		1 ^
Bk	73+	10YB 4/3	L	25	0				2	Ċ	Pr	Argiilans	Fr	4	VF	s	Ca	2	СЛМ	<u> </u>
	/ *		1 -		ľ		1		2	M	Pr	74 gillou lo	l ''	<u> </u>		Ť	—	1	,	
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i													L				L .	t		

PROFILI	E:	702-242									% SLO	PE: <2%				_				_
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ous lorag	e						
					Fine, sr	nectic, mes	ic Aridic.	Arglusteli			PAREN	T MATERIAL:	Calcariou	s loess						
EPIPED	ON:	Maillo									COUNT	Trice Texas Co	uniy, Okla	homa						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argittic		_				LOCAT	ION: Panhandi	e Resear	ch and f	Extention	Center.	Goodwe	li, Oklat	noma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBED		6/12/2002		COREI	LENGTH (cm):		120						
SAMPLE	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
•		Jamle Patton					_							_						
Horizon	Lower	Metrixcolor	۶	ield Texture		Re	ciox Feedure	1		Structure		Coatings	Con	R		Eff	ŝ	icentratio	n3 .	Bounde
	depth (cm)	(triom)	Class	* Chy	TK CF	Çolar	Amount	Sise	Grade	Size	Shape	Type		Amount	Size		Туре	Ant	Size	Dist
Ap	14	10YR 3/2	SiL	24	0				2	C/M	Sbk		Fr	<1	F/VF					D
				<u> </u>					2	M/F	Sbk						· .			
Α	37	10YR 3/2	SiL	26	0				2	C/M	Sbk	Argilians	Fr	<1	F/VF					D
									2	M/F	Sbk						· · ·			
AB	49	10YR 3/3	SICL	28	0				2	M	Abk	Argillans	Fr	<1	F/VF					D
									2	F	Abk									
BtA	67	10YR 3/3	SiCL	31	0				2	м	Pr	Argillans	Fr	<1	F/VF					A
									2	M	Abk									
Btk1	77	10YR 3/4	SICL	33	0				2	м	Pr	Argillans	Fr	<1	F/VF	м	Ca	<1	VF	A
							1		1	M/F	Abk .									
Btk2	99	10YR 4/3	SICL	33	0				2	M	Pr	Argillans	Fr	<1	F/VF	S	Ca	1	м	A
	l								1	M/F	Abk			1					İ	
Bk1	114	10YR 4/4	SiL	26	0				2	C/M	Pr	Argillans	Fr	<1	F/VF	s	Ca	<1	F	G
				1			1		2	м	Abk				ł., .			ł		1
Bk2	114+	10YR 4/6	SiL	26	0				2	C/M	Pr	Argillans	Fr	<1	F/VF	s	Ca	<1	VF	T
				1			<u> </u>		2	м	Abk		1				1	1		1

PROFIL	E:	702-243									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richtie	d Slit Loam					VEGET	ATION: Continu	ious forag	0						
					Fine, st	mectic, mes	te Aridic.	Argiustell			PAREN	T MATERIAL:	Calcario	zseol zu						
EPIPED	ON:	Moliic									COUNT	TY: Texas Co	uniy, Okla	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	le Resear	ch and I	xtentior	Center	Goodwe	II, Oklai	noma	
DATE S	AMPLED:	10	/2/2000			DATE DE	CRIBEC		6/11/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tion		CORE	DIAMETER (cm):								
		Jamle Patton					_													
Harison	Lower	Hatrixcolor	F	iaid Texture		Be	dox Feature			Stucture		Coatings	Con	R	ola	EH	Co	ncentratio	n a	Boundar
_	depth (cm)	(moist)	Ciana	% Clay	% CF	Color	Amount	Size	Orada	Sige	Shape	Туре		Amount	Size		Type	Amt	Size	Dist
Αp	15	10YR 3/2	SįL	25	0				2	M	Sbk.		Fr	<1	VF					D
									2	M/F	Sbk									
A	39	10YR 3/2	SICL	27	0				2	M	Pr	Argillans	Fr	<1	VF					D
									2	M/F	Abk									
Bti	69	10YR 3/3	SICL	32	0				1	М	Pr	Argillans	Fr	<1	VF					A
									2	F	Pr									
Bk1	92	10YR 4/4	SICL	28	0		l	L	2	M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	G
									2	F	Pr									
Bk2	92+	10YR 4/4	÷ ۲	25	0				2	C/M	Pr	Argillans	FI	<1	VF	S	Ca	<1	F	
									2	м	Pr			<u> </u>						<u> </u>
								L	<u> </u>					1						
													<u> </u>	L						
	·												1	E			1	1	1	
						L							I							
																		1		1
										1									1	1

PROFIL		702-244									% SLO									
MAPPEI	D PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loan					VEGET	ATION: Continu	ious forag	e		_				
		_			Fine, sr	necijo, met	ic Artdic,	Argiustoli			PAREN	T MATERIAL:	Calcarto	us loess						
EPIPED	ON:	МоЖс								_	COUNT	Y: Texas Co	unty, Okla	ahoma						_
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillo						LOCAT	ION: Penhand	le Resear	ch and I	Extentior	Center,	Goodwe	il, Oklał	ота	
DATE S	AMPLED:	10	2/2000			DATE DE	BCRIBED		6/11/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jason Parlon				DESCRIB	ED BY:	Jamle Pa	lion		CORE	DIAMETER (cm):						1		
-		Jamle Patton																		
Horizon	Lower	Matrixcolor	5	ield Teature	,	B	dox Feeture			Structure		Continge	Con	8	sote	E#	Co	centratio	na	Bounde
	depăt (cm)	(moiaț)	Ciars	% Clay	% CF	Color	Amount	Size	Grede	Size	Shepe	Туре		Amount	Size		Туре	Amt	Size	Dist
Aр	15	10YR 2/2	SiL	23	0				2	м	Sbk		Fr	2	F/VF					D
									2	F/VF	Sbk				. 1					
A	37	10YR 2/2	SiL	25	0				2	М	Abk	Argillans	Fr	2	F/VF					D
									2	F	Abk									L
Bt1	71	10YR 3/3	SICL	33	0				1	C/M	Pr	Argillans	Fr	1	F/VF					A
									1	м	Abk									
Bk1	102	10YR 4/4	SICL	28	0				2	c	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	G
									2	M	Pr			1			ļ			1
Bk2	102+	10YR 4/4	SICL	28	0				1	c	Pr	Argilians	Fr	<1	VF	м	Ca	<1	F	
									1	м	Pr									┶
														1				1	1	
										1				1_		<u> </u>		L	L	┶
									L				1					{	1	
	1									<u> </u>				<u> </u>	L				1	
														1						1
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PROFIL	E:	702-245									% SLC	PE: <2%								
MAPPET	PROFIL	E CLASSIFIC	TION:		Alchãe	d SiR Loam					VEGET	ATION: Continu	icus forag	0						
					Fine, si	mectic, mes	ic Anole.	Arglustol			PARE	T MATERIAL:	Calcarlo	us loess						
EPIPED	ON:	Mollic									COUN	TY: Texas Co	unty, Okla	ahoma						
SUBSU	RFACE HO	RIZONSAFEA	TURES:		Argilisc						LOCAT	ION: Panhand	le Resear	ch and I	Xtentio	n Center,	Goodwe	ll, Oklal	noma	
DATE S	AMPLED:	10	1/2/2000			DATE DES	SCRIBE		6/13/2002		CORE	LENGTH (cm):		120						
SAMPLE		Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
_		Jamle Patton																		
Herizon	Lower	Matrixtolor	ŕ	ield Tenture		Re	dox Feeture		L	Stucture		Coalings	Çon	R		EK	<u>6</u>	ncentratio		Boundary
	depītin (am)	(moiaŭ	Class	% Clay	% CF	Celor	Amount	Size	Orada	Siz+	Shepe	Туре	<u> </u>	Amount	Size		Type	Amt	Size	Dist
Aр	17	10YR 3/2	SiL	19	0		ļ		2	C/M	Sbk		F	<1	VF				ĺ	D
_	L			<u> </u>					2	M/F	Sbk		ļ	<u> </u>	<u> </u>				<u> </u>	ļ
BA	40	10YR 3/3	SiL	25	0				3	C/M	Pr	Argillans	F	<1	VF				Í	D
								<u> </u>	3	M/F	Pr		ļ				· · ·		<u> </u>	<u> </u>
Bt	60	10YR 3/3	SICL	32	0				1	M	Pr	Argillans	Fr	<1	VF		1			A
				1			ļ			F.	Pr			┣		<u> </u>		ļ	┝──	┣—
Bik1	70	10YR 4/3	SICL	32	0		 	ļ	1	M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	VF	A
			ļ	<u> </u>			1	<u> </u>	2	F	Pr_		 				<u> </u>	<u> </u>	ļ	┣—
Bbb2	88	10YR 4/4	SICL	30	0			{	2	C/M	Pr	Argillans	Fr	<1	VF.	٧S	Ca	1	м	A
						<u> </u>	+		2	M/F	Pr			╂	<u> </u>				<u> </u>	—
Bk	88+	10YR 4/4	L	21	٥				3	c	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F	1
			<u> </u>			ļ	┝──		3	м	Pr	 		+			 	<u> </u>	──	—
						ļ		ļ	}	 		ļ	4			1			1	
	 	L						<u> </u>	ł		ļ				_	┝	 		┣—	—
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			L	I		L	1	1	1			L	1			I	1		1	

PROFIL	B:	702-246									% SLO	PE: <2%								
MAPPE	PROFIL	CLASSIFICA	TION:		Richte	d Slit Loan					VEGET	ATION: Continu	ous lorag	0		·				
	_		_		Fine, st	mectic, mes	lo Aridio,	Argiusto1			PAREN	T MATERIAL:	Calcarlo	s loess						
EPIPED	ON:	Molito									COUNT	TY: Texas Co	unty, Okla	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Arglillo				_		LOCAT	ION: Panhand	e Resear	ch and E	- tention	n Center,	Good#e	li, Okial	homa	
DATE S	AMPLED:	1(0/2/2000			DATE DE	SCRIBE		6/13/2002		CORE	LENGTH (cm):		120						
SAMPL	DBY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Mairiacolor	F	ield Testure		8	doxFeeture	<u>.</u>		Stucture		Contings	Con	Ro.	ota	Ef	C	centratio		Boundary
	depth (cm)	(moist)	Class	% Chay	16 CF	Cator	Amount	Sia.	Qtecla	Size	Shape	Туре		Amount	Size		Тур+	Ami	Size	Dist
Ap	12	10YR 3/2	SiL	24	0				2	C/M	Sbk	Argillans	Fr	<1	VF					D
									2	M/F	Sbk									
AB	27	10YR 3/2	SiL	26	0				2	м	Pr	Argillans	Fr	<1	VF					D
									2	F	Pr								<u> </u>	
BA	42	10YR 3/2	SiCL	28	0				2	M	Pr	Argillans	Fr	<1	F					D
									1	F	Sbk									
Bt	64	10YR 3/3	SICL	31	0				1	м	Pr	Argillans	Fr	<1	F				[A
				L					1	F	Pr				L			·	ļ	<u> </u>
Bki	101	10YR 4/4	сL.	28	0				1	c	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	G
							ļ	L	1	M	Pr	L							<u> </u>	
Bk2	101+	10YR 4/3	L	25	٥		ļ		2	С	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	
								L	2	м	Pr	L			L			I	ļ	
			1	[]	1		I	ļ	L	Ļ	L		1	1	1				1	1
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	1						1		I	I				1	1					

PROFIL	E:	702-311									% SLO	PE: <2%								
MAPPE	PROFIL	E CLASSIFIC	ATION:		Richte	d Slit Loar	1				VEGET	ATION: Continu	ous loraç	9						
					Fine, s	nectic, mes	ic Aridic.	Arglustell			PAREN	T MATERIAL:	Caicario	us loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	uniy, Okl	ahoma						
SUBSU	RFACE H	RIZONSFEA	TURES	:	Argillic						LOCAT	ION: Panhand	e Resea	rch and f	Extension	n Center,	Goodwe	il, Oklat	noma	
DATE S	AMPLED:	1	0/2/2000			DATE DE	SCRIBEC		6/13/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	liton		CORE	DIAMETER (cm):								
		Jamie Patton						_	-											
Hotigan	Lower	Matixcolor	5	Field Testure		Re	dox Feature	1		Structure		Coatings	Con		ola	E#	co	ncentratio	59	Boundar
	depth (cm)	(moist)	Ciass	n: Cieγ	* CF	Color	Amount	Size	Greder	Size	Shape	Туре		Amount	Size		Type -	Amt	Size	Dist
Ap	24	10YR 3/2	SiL	23	0				2	М	Abk		Fi	<1	VF				_	D
									2	F	Abk									i.
ABt	40	10YR 3/2	SiCL	28	0				2	C/M	Abk	Argillans	Fr	<1	VF					D
									2	M/F	Abk									
BIA	65	10YR 3/3	SICL	28	0				1	м	Pr	Argillans	Fr	<1	VF					A
									1	F	Pr									<u> </u>
Btk1	75	10YR 3/4	SICL	27	0		L		1	м	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	F	A
<u>.</u>				1					1	F	Pr									
Blk2	90	10YR 4/4	SiCL	31	0	·			2	C/M	Pr	Argillans	Fr	<1	VF	vs	Ca	1	м	A
				1					2	M/F	Pr			_						
Bk	90+	10YR 4/4	L	23	0	L		ļ	2	C/M	Pr	Argillans	F	<1	VF	s	Ca	<1	F	ł
								L	2	M/F	Pr			ł			I			
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									ļ	<u> </u>				1	Ļ	<u> </u>	.		L	_
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			L	<u> </u>								1								

PROFIL	i <u>:</u>	702-312									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richsel	d Slit Loan					VEGET	ATION: Continu	ous forag	0						
					Fine, st	nectic, mes	ic Aridio	Argiustol			PAREN	T MATERIAL:	Calcario	s lõess						
EPIPED	ON:	Molito									COUNT	TY: Texas Co	unty, Okia	shoma						
SUBSU	RFACE HO	HIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	ie Resear	oh and 8	Extention	Oenter,	Goodwe	li, Oklai	noma	_
DATE S	AMPLED:	10	12/2000			DATE DE	SCRIBED		6/13/2002		CORE	LENGTH (cm):		120						
SAMPLE	DBY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Herbon	Lower	Matrixcolor	F	ield Texture		ße	idox Feature			Structure		Coalings	Con	Po	ota	EN .	Ce	ncentratio	ns	Bounde
	depth (cm)	(moist)	Cleas	% Ciay	% CF	Celor	Amount	Site	Grede	Size	Shape	Туре		Amount	Sae		Туре	Ami	Siz.	Dist
Ap	20	10YR 3/2	SiL	22	0				2	м	Abk		Fr	<1	F					D
									2	F	Abk									
AB	40	10YR 3/2	ŞiL	25	0				2	м	Pr	Argillans	FI	<1	F					D
									2	7	Abk									
Bt	60	10YR 3/3	SICL	27	0				1	м	Pr	Argillans	Fr	<1	F					A
									1	F	Pr									
Bik1	70	10YR 4/3	SiCL	33	0				1	м	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	VF	Α
									1	F	Pr									ł.
Blk2	88	10YR 4/4	SICL	31	0				2	м	Pr	Argillans	Fr	<1	VF	VS	Ca	1	м	A
				1					2	F	Pr			· .						
Btic3	105	10YR 4/4	SiCL	31	0				2	м	Pr	Argillans	Fr	<1	٧F	s	Ca	<1	м	G
									2	F	Pr			1					ł	1
CBk	105+	10YR 4/4	SiL	26	0				3	C	Pr	Argillans	Fi	<1	VF	s	Ca	<1	M/F	1
									3	C/M	Pr			1						
							1									I —		[
	1				1		T		1				1	1	1	1	1		1	ł

PROFIL	E:	702-313									% SLO	PE: <2%								
MAPPE	PROFILI	CLASSIFIC/	TION:		Richfie	id Silt Loan	1				VEGE1	ATION: Continu	ious forag	8						_
					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcarlo	us loess						
EPIPED	ON:	Mollic									COUN	TY: Texas Co	unty, Oki	shoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:	:	Argillo						LOCAT	ION: Panhand	e Resear	ch and E	xtention	n Center,	Goodwe	ill, Oklai	noma	
DATE S	AMPLED:	10	12/2000			DATE DE	SCRIBED		6/13/2002		CORE	LENGTH (cm):		120						
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tten		CORE	DIAMETER (cm):								_
		Jamle Patton																		
Herbon	Lower	Hatrixcolor	۴	ield Teature		B	ndox Feelure			Structure		Coalings	Con	Ro	ota	£K.	Co	nc entradio	84	Bounde
	depth (cm)	(moist)	Ciase	% Clay	% CF	Color	Arrount	Size	Grade	Size	Shepe	Туре		Amount	Size		Type	Amt	Size	Dist
Ap	21	10YR 3/2	SiL,	20	0				2	C/M	Sbk		Fi	<1	F					D
	. 1								2	M/F	Sbk									
Abt	40	10YR 3/2	SiL	25	0				2	C/M	Sbk	Argillans	FI	<1	F					D
							T		2	M/F	Sbk									
Bt	64	10YR 3/3	SICL	31	0				1	м	Pr	Argillans	Fr	<1	F					A
									1	F	Pr									
Biki	75	10YR 4/3	SiCL	33	0				2	м	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	VF	A
									2	F	Pr									
Btk2	87	10YR 4/4	SiL	26	0				2	м	Pr	Argillans	Fr	4	VF	s	Ca	1	м	A
				<u>i</u>					2	F	Pr									
Btk3	101	10YR 4/4	SIL	25	0				2	м	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	F	G
							1		2	F	Pr					<u> </u>				
Bk	101+	10YR 4/4	SiL	18	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F	
								_	2	M/F	Pr			1				L	1	
														T						T
	1		1	1			1						1	1		ł	1	1.		1

PROFIL	E:	702-316									% SLO	PE: <2%								
MAPPE	D PROFIL	E CLASSIFIC	ATION:		Richfiel	d Sill Loan	1				VEGET	ATION: Continu	ous forag	18						
					Fine, st	mectic, mes	ic Aridic.	Argiustoil			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unty, Okl	ahoma						
SUBSU	RFACE H	ORIZONS/FEA	TURES	:	Argillic						LOCAT				Stensor	Center	Goodwe	il. Okla	homa	
DATE S	AMPLED:	11	0/2/2000			DATE DE	SCRIBE		6/13/2002		CORE	LENGTH (cm);		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	itton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Herizon	Lower	Matrixcolor	. p	field Texture		P.	dox Feeture	4		Structure		Costings	Con	60	eta .	EN	C.	ncentratio		Bounder
	depth (cm)	(moist)	Class	TI City	* CF	Color	Amount	Size	Onecle	Size	Shape	Туре		Amount	Size		Type	Ami	Size	Dist
Ap	11	10YR 3/2	SiL	22	0		Î	_	2	M/F	Abk		Fr	<1	VF					D
									2	F/VF	Abk				1					
A	27	10YR 3/2	SiL	20	0				2	M/F	Pr	Argillans	Fr	4	VF					D
				1					2	F	Abk						l			
AB	44	10YR 3/2	SiL	25	0				2	M/F	Pr	Argillans	Fr	4	VF		1			D
									2	F/VF	Abk									
Bt1	62	10YR 3/3	SiCL	29	0				1	м	Pr	Argillans	Fr	<1	VF					D
									1	F	Pr						1	f i		
Bt2	79	10YR 3/4	SiCL	31	0				2	M	Pr	Argillans	Fr	<1	VF		F C			A
									1	F	Pr		1							
Bk1	101	10YR 4/4	SiL	25	0				2	C/M	Pr	Argillans	Fi	<1	VF	S	Ca	<1	F	G
									2	M/F	Pr									
Bk2	101+	10YB 4/4	SiL	23	0				3	C/M	Pr	Argillans	Fi	<1	VF	S	Ca	<1	м	
				1					3	M/F	Pr				t					
														I						
	1		1				1			T			1	1		[1.	1		1

PROFIL	E:	702-317									% SLO	PE: <2%								
MAPPE	D PROFILI	CLASSIFICA	TION:		Richfiel	id Slit Loam					VEGET		ous forag	8			_			
		_			Fine, si	nectic, mes	lo Aridio.	Argiustoli			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUN	TY: Texas Co	unty, Okl	shoma						
SUBSU	RFACE H	RIZONS/FEA	TURES		Argillic						LOCAT	ION: Penhand	e Resea	ch and E	xtention	n Center	Goodwe	il, Oklal	юпа	
DATE S	AMPLED:	10	12/2000			DATE DES	CRIBE		6/26/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tion		CORE	DIAMETER (cm):						-		
_		Jamle Patton					_													_
Herizon	Lower	Mebiz color	,	ield Testure		В	dox Peetute		1	Stucture		Coalings	Con	Ro	ota	EK	c.	ncentratio	na	Boundary
	depth (om)	(moizt)	Ciass	x Clay	₩ CF	Color	Amount	Size	Qred +	Size	Shape	Туре		Amount	Size		Турн	Amt	Size	Dist
Ap	20	10YR 2/2	SiL	23	0				2	М	Sbk		Fr	<1	٧F					G
									2	M/F	Sbk									
A	37	10YR 3/2	SiL	25	0				2	C/M	Sbk	Argillans	Fr	<1	٧F					D
_				<u> </u>					2	М	Sbk			}						
Btt	68	10YR 3/2	a.	32	0				1	М	Pr	Argillans	Fr	<1	٧F		[``			D
							1		1	M/F	Pr									
Bt2	80	10YR 4/3	а	29	0				1	м	Pr	Argillans	Fr	<1	٧F				Í	A
				<u>i</u>					1	M/F	Pt									
Bk	80+	10YR 4/4	L	26	0				2	C	Pr	Argillans	Fr	<1	٧F	s	Ca	<1	VF	
								1	2	C/M	Pr								i	
				_				I	L	L										
				1			1													
								L		I			Į					1		
							1													
				1								l		1		l		1		1
	1		1	1 · ·	1	l	1	1	1	1	1		1	1		L	1		1	1

PROFIL	ŧ:	702-321									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loam					VEGET	ATION: Contru	ous forag	e						
_					Fine, st	nectic, mes	oibhA oit	Arglustoli			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Moillo									COUNT	Y: Texas Oc	unty, Oki	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argišio						LOCAT	ION: Panhand	e Resea	rch and E	Extention	n Center	, Goodwe	il, Okial	homa	
DATE S.	AMPLED:	10	0/2/2000			DATE DE	SCRIBE		8/26/2002		CORE	LENGTH (cm);		120						
SAMPLE	D 8Y:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	itton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Herizon	Lower	Unitizcolor	۶	ield Testure	_	B	dox Feature	24		Stucture		Costings	Con	L Po	ota	Eff	∞	ncentratio	A 1	Bounda
	depth (cm)	(moist)	Ciars	% Clay	% CF	Coior	Amount	Size	Grede	Size	Shape	Type		Amount	9i x +		Тура	Ant	Size	Dist
Ap	27	10YR 2/2	SiL	25	0				2	м	Pr	Argilians	Fr	1	F					D
									2	F	Pr									
Bti	67	10YR 3/2	SICL	30	0				1	м	Pr	Argillans	Fr	1	F					A
			1						1	Ŀ.	Pr									
812	79	10YR 4/2	SICL	29	0				1	м	Pr	Argillans	Fr	<1	٧F					A
									1	ㅋ	Pr									<u>i</u>
Bk1	88	10YR 4/4	SICL	27	0				1	C	Pr	Argilians	Fr	<1	٧F	м	Ca	1	F	A
									· 1	м	Pr									
Bk2	88+	10YR 4/4	L	23	0		·		1	С	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	1
									1	м	Pr						·			
				1															1	
															_	I			1	1
													L		1	L	1		1	
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PROFIL	E:	702-322									% SLO	PE: <2%						-	-	
MAPPEI	PROFILI		TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ous forag	0						
					Fine, st	mectic, mes	alc Aridic,	Argiustoll			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unity, Okla	homa						
SUBSU	RFACE HO	HIZONS/FEA	TURES:	:	Argilico						LOCAT	ION: Panhand	e Resear	ch and E	xtention	Center,	Goodwe	il, Oklai	noma	
DATE S	AMPLED:	10	0/2/2000			DATE DES	SCRIBED		6/26/2002		CORE	LENGTH (cm):		120						
SAMPLI	DBY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
	_	Jamie Patton																		
Herizon	Lower	Metrixcolor	,	Field Texture		Be	idox Feeture	1		Structure		Contings	Con	Po	ota	Er	Ce	ncentratio	67	Bounda
	depth (cm)	(moiet)	Ciass	% Clay	N CF	Color	Amount	Site	Grade	Size	Shepe	Туре		Amount	Size		Type	Amt	Size	Dist
Αp	9	10YR 2/2	SiL	23	0				2	M/F	Pr		Fr	1	VF					D
						_			2	F	Pr									
A	29	10YR 2/2	SiL	23	0				2	M	Pr	Argillans	Fr	1	VF					Þ
					1				_ 2	M/F	Pr									
BA	44	10YR 3/2	SiL	26	0				2	C	Pr	Argillans	Fr	1	VF					A
									2	М	Pr									
Btk1	60	10YR 3/2	SICL	29	0				1	M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	A
									1	F	Pr									
Btk2	68	10YR 4/3	SICL	29	0				1	м	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	A
									1	F	Pr							1		
Btk3	82	10YR 4/3	SICL	27	0				1	M/F	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	A
				·			1		1	F	Pr							1		
Bk1	108	10YR 4/4	L	25	0	L	L		1	C/M	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	G
									1	F	Pr									
Bk2	108+	10YR 4/3	L	23	0			L	2	C	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	1
									2	M	Pr	1	1				1	1		

PROFIL	E:	702-325									% SLO	PE: <2%								
MAPPE	D PROFILI	E CLASSIFIC	TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ous forag	9						
					Fine, sr	necto, mes	lc Aridic,	Argiustoff			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUNT	Texas Co	unty, Okl	ahoma						
SUBSU	RFACE H	RIZONS/FEA	TURES:		Argitiko						LOCAT	ION: Panhand	e Resea	rch and i	Extension	Center	Goodwa	li, Oklal	homa	
DATE S	AMPLED:	1(0/2/2000			DATE DE	SCRIBED		6/26/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		_
Horizon	Lower	Matrixealor	F	ield Teature		R	dox Feature			Structure		Coefings	Con	R	ota .	55	_ ∞	ncentratio		Bounde
	depth (cm)	(moist)	Ciase	% Clay	* CF	Color	Amount	Size	Onede	Siza	Shepe	Туре		Amount	Site		Тур	Amt	Siz+	Dist
Ap	14	10YA 2/2	SiL	23	0		1		2	M	Pr	Argillans	Fr	<1	VF					D
									2	F	Sbk									I
Α	43	10YR 2/2	SiL	25	0				2	м	Pr	Argillans	Fr	1	F/VF		1			D
									2	F	Sbk								ļ	
Bt	70	10YR 3/3	SICL	28	0				1	м	Pr	Argillans	Fr	2	F/VF			1	i	A
									1	F	Pr			1						
Bk1	99	10YR 4/4	L	23	0		1		2	с	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	G
									_2	м	Pr								1	
Bk2	99+	10YR 4/3	L	24	0				2	c	Pr	Argillans	Fr	<1	VF	м	Ca	<1	м	Ŀ
		_							2	M	Pr									
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PROFIL	E:	702-327									% SLO	PE: <2%								
MAPPEI	PROFILI	CLASSIFICA	TION:		Richfiel	ld Silt Loan					VEGET	ATION: Continu	ous forag	8						
					Fine, st	mectic, met	ic Aridic.	Argiustoli			PAREN	T MATERIAL:	Calcado	s loess						
EPIPED	ON:	Mollic									COUNT	Texas Co	uniy, Okla	ihoma						
SUBSU	RFACE H	RIZONS/FEA	TURES:		Arglilio						LOCAT	ION: Panhand	e Resear	ch and i	Extention	n Center,	Goodwa	li, Okiał	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBED		6/26/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jeson Perton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm):								
		Jamte Patton																		
Horizon	Lower	Matrixcolor		ield Testure		. Pi	doxFeature		I	Structure		Coalings	Con	- PA	ota	Eff	~	ne entratio	74	Bounder
	depth (cm)	(moiet)	Ciess	% Clay	% CF	Color	Amount	Size	Grede	Size	Shape	Туре		Amount	Size		Туре	Ant	Size	Dist
Ap	10	10YR 2/2	SiL	25	0				2	M.	Pr.	Argillans	Fr	<1	F					D
									2	F	Gr			Ĺ						
Α	41	10YR 3/2	SiL	25	0				2	M	Pr	Argillans	Fr	<1	F					A
									2	M	Sbk									
Bw1	72	10YA 3/3	L	26	0				1	м	Pr	Argillans	Fr	<1	٠F					D
				1					1	F	Pr			1						
Bw2	86	10YA 4/4	L	25	0		-		1	м	Pr	Argillans	Fr	<1	VF					A
									1	F	Pr								_	
Bk1	107	10YA 4/3	L	23	0				2	С	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	A
									2	м	Pr									
Bk2	107+	10YR 4/4	L	23	0		L		2	с	Pr	Argillans	Fr	<1	VF	м	Ca	1	M/F	
						İ			2	Μ	Pr		L	1	ļ				ļ	
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														1	1		1		[1
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PROFIL	E:	702-331							-		% SLC	PE: ≺2%								
MAPPE	PROFIL	E CLASSIFICA	TION:		Richte	id Silt Loam					VEGET	ATION: Continu	ous loraç	e						-
				_	Fine, st	mectic, mes	lo Aridio.	Argiustoli			PARE	T MATERIAL:	Celcarlo	us loess						
EPIPED	ON:	Mollic									COUN	TY: Texas Co	unty, Okl	ahoma						
SUBSU	RFACE H	RIZONS/FEA	TURES:		Argiillo						LOCAT	NON: Panhand	e Resea	ch and I	Xentior	Center	Goodwa	il, Oklai	noma	
DATE S	AMPLED:	10	12/2000			DATE DE	SCRIBED		6/13/2002		CORE	LENGTH (cm);		120						
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																	-	
Horizon	Lower	Matrixcolor	н	ieki Texture		R	dox Feature	1		Structure		Costings	Con	8	ete	E#	C.	ncentratio	ດເ	Bounder
	depth (cm)	(moist)	Class	% Ciny	% CF	Color	Amount	Size	Oracio	Size	Shape	Туре		Amount	Size		Туре	Amt	Sau	Diet
Αp	18	10YR 2/2	SiL	23	0				2	M/F	Pr		Fi	<1	VF					D
									2	M/F	Abk									
A	39	10YR 3/2	SïL	23	0				2	M/F	Pr	Argillans	Fr	<1	VF					D
									2	M/F	Sbk									
Bt	61	10YR 3/3	SiCL	30	0				1	M/F	Pr	Argillans	Fr	<1	VF					A
									-1	F	Pr									
Btk1	77	10YR 4/3	SICL	29	0				1	M/F	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F	A
									2	F	Pr			ł						
Btk2	93	10YR 4/4	SICL	27	0				2	C/M	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	M/F	A
									2	M/F	Pr					1	<u>i</u>			1
Bk1	117	10YR 4/4	SiL	.22	0				2	C/M	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	VF	G
									2	M/F	Pr									
Bk2	117+	10RY 4/6	SiL	20	0				2	c	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	
					1.				2	M	Pr			1						
					1		_	L												
										1		[1	1	1		1	1		1

PROFIL	E:	702-333									% SLO	PE: <2%								
MAPPE	PROFILI		TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ous forag	e						
		_			Fine, sr	nəcüc, mes	ic Aridio.	Arglustofi			PAREN	T MATERIAL:	Celcario	ls loess						
EPIPED	ON:	Moliic									COUNT	TY: Texas Co	unty, Okla	homa						
SUBSU	RFACE H	RIZONSFEA	TURES:	:	Argillic						LOCAT	ION: Panhand	e Aesear	ch and §	Mentior	Center,	Goodwa	I, Okiał	юта	
DATE S	AMPLED:	10	/2/2000	_		DATE DES	CRIBED		6/13/2002		CORE	LENGTH (cm):		120						
SAMPL	DBY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	ttort		CORE	DIAMETER (cm):								
		Jamle Patton																		
Herizon	Lower	Matrixcolor	۶	ield Texture		R.	dox Feature	n		Structure		Costings	Con	P.	ots	EX	C.	centratio	ne	Soundary
	depth (cm)	(moiat)	Çinsə	% Clay	% CF	Color	Amount	Size	Grede	Size	Shepe	Туре		Amount	Size		Туре	Amt	3äe	Dist
Aρ	16	10YR 3/2	SiL	23	0				2	м	Sbk		Fr	1	F					D
				1					2	F	Sbk									
A	37	10YR 3/2	SICL	27	0				2	м	Sbk	Argillans	Fr	1	F					D
							1	[2	F	Sbk									
Bt	67	10YR 3/3	SICL	35	0		L	L	1	м	Pr	Argillans	Fr	<1	VF					A
				Į	I				2	F	Pr									<u> </u>
Btk1	80	10YR 4/3	SiCL	35	0			L	1	M	Pr	Argillans	Fr	<1	VF	M	Ca	<1	٧F	A
							L		1	F	Pr									
Btk2	111	10YR 4/4	SiCL	28	0				2	M	Pr	Argillans	Fr	<1	VF	٧s	Ca	<1	м	A
									2	M/F	Pr			ļ						<u> </u>
Bk1	111+	10YR 4/4	SiL	26	0		ļ		2	C/M	Pr	Argiilans	Fr	<1	VF	s	Ca	<1	VF	
								<u> </u>	2	M/F	Pr	L	Ļ	Į	<u> </u>	I	 	ļ		╞
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PROFIL	:	702-334									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Slit Loam					VEGET	ATION: Continu	ous lorag	8						
					Fine, sr	necto, mes	ic Aridic	Arglustoli			PAREN	T MATERIAL:	Calcarlor	s loess						
EPIPED	DN:	Mollic		_							COUNT	TY: Texas Co	unty, Okie	homa						
SUBSU	RFACE HO	HIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhandi	e Resear	ch and [xtentior	n Center,	Goodwa	ii, Okiał	homa	
DATE S.	AMPLED:	10	1/2/2000			DATE DES	CRIBE		6/13/2002		CORE	LENGTH (cm):		120						
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton															-			
Horizon	Lower	Helrizcolor	F	ield Texture		84	doxFeature	n		Structure		Contings	Con		ota	EK	Co	ncentratio	-	Bounda
	depth (cm)	(moiat)	Ciase	* Citry	W CF	Color	Amount	Siza	() mad a	304	Shape	Туре		Ampunt	3ite .		Тура	Amt	Site	Diet
Αp	18	10YR 2/2	SiL.	25	0				2	м	Sbk		Fr	<1	м				÷	D
									2	M/F	Gr									
AB	37	10YR 3/2	SIÇL,	28	0				2	M/F	Sbk	Argilians	Fr	2	F					D
							{		2	F	Gr									
Bt	64	10YR 4/2	SICL	31	0				1	м	Pr	Argillans	Fr	1	F/VF					A
									1	F	Pr									
Bk1	74	10YR 4/2	SiL	28	0				1	м	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	A
_									1	F	Pr									
Bk2	82	10YR 4/3	Ľ	26	0				1	C/M	Pr	Argillans	Fr	<1	VF	VS	Ca	2	м	A
									1	M/F	Pr									
Bk3	82+	10YR 4/3	L	24	0				2	C	Pr	Argillans	Fr	<1	VF	м	Ca	<1	м	
									2	M	Pr						1	1		
																				T
									[1			
														Γ						T
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PROFIL	E:	702-335									% SLC	PE: ≺2%								
MAPPE	PROFIL		ATION:		Richtei	id Silt Loam					VEGET	ATION: Continu	ious forag	e						
					Fine, st	necto, mes	ic Aridic.	Argiustol			PARE		Calcarlo							
EPIPED	ON:	Mollic									COUN	TY: Texas Co	unty, Oki	ahoma						
SUBSU	RFACE H	DRIZONS/FEA	TURES	:	Argililo						LOCAT	ION: Panhand	le Resear	ch and £	xtentior	n Center,	Goodwa	di, Oklal	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DES	SCRIBED		6/13/2002		CORE	LENGTH (cm):		120						
SAMPL	DBY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	itton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Hertson	Lower	Matrixcolor	F	ield Texture		Re	dox Feature			Structure		Coatings	Con	Ro	ols	EH	Co	ncentratio		Bounder
	depth (cm)	(moist)	Class	% Clay	% CF	Color	Athouat	Siza	Grede	3he	Shape	Туре		Amount	Size		Туре	Ant	Size	Dist
Ap	20	10YR 3/2	SICL	27	0				2	м	Sbk	Argillans	Fr	<1	F					D
									2	F	Sbk									
AB	40	10YR 3/3	SICL	29	0				2	M	Pr	Argillans	Fr	<1	F					D
									2	м	Sbk									
BA	47	10YR 3/3	SICL	31	0				1	м	Pr	Argilians	Fr	<1	F					D
									1	F	Pr									
Bw	75	10YR 3/3	SICL	28	.0		L		1	м	Pr	Argillans	Fr	<1	F					A
									1	F	Pr								1	
Bki	111	10YR 4/4	L	25	0				2	c	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	G
									2	м	Pr						L			
Bk2	111+	10YR 4/4	L	21	0		L	L	2	<u> </u>	Pr	Argilians	Fr	<1	VF	s	Ca	<1	VF	
						L		1	2	M	Pr				L					
				1			L	L	L	L	ļ	l		1 -		1		[
	<u> </u>		L	L		L			I	ļ	ļ	L.:	ļ	.	1		L	L		1
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	l		1	L			ł		I	1	I	I	I	1	1	ł	1			

PROFIL	E:	702-337									% SLO	PE: <2%								
MAPPE	PROFILE	E CLASSIFICA	TION:		Richfiel	d Silt Loam					VEGET	ATION: Continu	ous forag	9						
		-			Fine, sr	necto, mes	lo Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	a loess						
EPIPED	ON:	Moliic									COUNT	TY: Texas Co	unty, Okla	ahoma						
SUBSU	RFACE HO	ORIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and a	Extention	Center,	Goodwe	il, Oklei	юла	
DATE S	AMPLED:	10	2/2000			DATE DES	CRIBE		6/13/2002		CORE	LENGTH (cm):		120						
SAMPLE	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Matrizcolor	F	inki Textura		Re	dox Feature			Structure		Coatings	Con	P.	eto	EĦ	Cor	centebo	as .	Bound
	depth (cm)	(moist)	Class	% Clay	% CF	Color	Amount	Size	Grede	Size ·	Shape	Тур+		Amount	Size		Туре	Ami	Size	Dist
Ap	18	10YR 2/2	SiL	25	0				2	м	Pr	Argillans	Fr	2	F					D
									2	M/F	Sbk									
AB	41	10YR 3/2	SICL	27	0				2	м	Pr	Argillans	Fr	2	F					D
				<u> </u>					2	м	Sbk									
Bt1	62	10YR 3/2	SiCL	32	0				1	м	Pr	Argillans	Fr	2	F					D
									1	F	Pr									
Bt2	76	10YR 3/3	a	30	0				1	M	Pr	Argillans	Fr	<1	F					D
									1	F	Pr						L		L	
Bw	88	10YR 4/3	L.	26	0				2	c	Pr	Argillans	Fr	<1	VF		1	1	Ì	A
				ł					2	М	Pr									<u> </u>
Bk1	112	10YR 4/3	L	26	0				2	С	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	G
							L	L	2	м	Pr		<u> </u>							L
Bk2	112+	10YR 4/4	L	24	0				2	c	Pr	Argilians	Fr	<1	٧F	м	Ca	<1	VF	
	<u>i</u> .		I		1				2	м	Pr									
							1	1			1			1						1
	1	l.	1	ł								1	1	1	1		1		1	

PROFIL	E:	702-342									% SLO	₽E: <2%								
MAPPE	PROFILI	CLASSIFICA	TION:		Richile	id Slit Loan	1				VEGET	ATION: Continu	ous forag	9						
					Fine, st	mectic, me	sic Aridic	Arglustoli			PAREN	T MATERIAL:	Calcario	zeeol a						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unty, Okla	ahoma						
SUBSU	RFACEHO	RIZONS/FEA	TURES:		Arallic						LOCAT	10N: Panhandi	e Resear	ch and E	xtentior	n Center,	Goodwe	II, Oklai	homa	_
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBED		6/13/2002		CORE	LENGTH (cm):		120						
SAMPLI	DBY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton										1.0								
Horizon	Lower	Matrixcolor	F	ield Texture		В	dox Feeture	· · · · ·	Structure		Contings	Con	Ro	ete	E#	ŝ	nc entretio	NR	Bound	
	depth (cm)	(moisQ	Cinas	% Ciny	≭ CF	Color	Amount	Size	Grede	Size	Shepe	Туре		Amount	Size		Тура	Ant	Size	Dist
Ap	17	10YR 2/2	SiL	23	0				2	м	Abk		Fi	1	F					D
									2	F	Abk									
BA	36	10YR 3/2	SiCL,	27	0				2	м	Pr	Argillans	Fr	<1	F					D
									2	F	Abk									
Bt	60	10YR 3/2	SICL	31	0				2	M	Pr	Argillans	Fr	<1	F					A
									2	F	Pr									
Blk1	70	10YR 3/2	SiCL	33	0				2	M	Pr	Argillans	Fr	<1	F	٧s	Ca	1	VF	D
									2	F	Pr									
Btk2	85	10YR 4/3	SICL	27	0				2	C/M	Pr	Argillans	Fr	<1	٧F	٧S	Ca	<1	м	D
									2	M/F	Pr				Ĺ					
Bk	103	10YR 4/4	SiL	23	0				3	C/M	Pr	Argillans	Fi	<1	VF	vs	Ca	<1	м	G
									_2	M/F	Pr								1	
BkC	103+	10YR 4/4	SiL	25	0		1		3	C/M	Pr	Argillans	Fi	<1	VF	VS	Ca	<1	F	1
									3	M/F	Abk		Í	1						ł
					1															
				1									1	1	1	1	ł			1

PROFIL	E:	702-343									% SLC	PE: <2%								
MAPPE		E CLASSIFIC	ATION:	_	Richie	id Silt Loam					VEGET	ATION: Continu	ious foraç	10						
					Fine, s	mectic, mes	io Aridio	Argiustoli			PAREP	IT MATERIAL:	Caicarlo	us icess						
EPIPED	ON:	Mollic									COUN	TY: Texas Co	ounty, Oki	ahoma						
SUBSU	RFACE H	RIZONS/FEA	TURES		Argillic						LOCAT	ION: Panhand	le Resea	rch and I	Extension	Center	Goodwi	il, Okia	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DE	CRIBES		6/14/2002		CORE	LENGTH (cm):		120			1			
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tten		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Matrixcolor	. F	ieki Testure		Re	dox Feature	•		Structure		Coetings	Con	B	xota	EK	C.	ncentratio	711	Soundar
	depth (cm)	(moizi)	Ciass	% Ciay	* CF	Color	Amount	Size	Quede	Size	Shape	Тури		Amount	Size		Тура	Amt	Size	Dist
Ap	15	10YR 3/3	SiL	17	0				2	M	Sbk		Fi	2	F					A
									2	F	Sbk									i
BA	31	10YR 3/3	SiL	20	0				2	C/M	Pr	Argillans	Fi	<1	F/VF					D
									2	M/F	Abk		1	1					ļ	
Bt	58	10 YR 3/3	SiCL	32	0				2	M	Pr	Argillans	Fr	<1	F/VF					A
			L						2	F	Pr						1			
Btk1	74	10YR 4/3	SiCL	30	0				2	C/M	Pr	Argillans	Fr	<1	F/VF	s	Ca	<1	F/VF	A
									2	M/F	Pr									1
Btk2	74+	10YR 4/4	SICL	27	0				2	СМ	Pr	Argillans	Fr	<1	F/VF	VS	Ca	<1	м	
									2	M/F	Pr									1
							[Г			Γ			
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														1			T	1		
	1						1			1			1	1					1	

PROFIL	E:	702-344									% SLO	PE: <2 %								
MAPPE	PROFILI	E CLASSIFICA	TION:		Richte	d Slit Loam					VEGET	ATION: Continu	ous forag	e						
					Fine, si	mectic, mes	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcarlo	s loess						
EPIPED	ON:	Mollic									COUNT	Texas Co	unty, Oki	ahoma						-
SUBSU	RFACE H	ORIZONS/FEA	TURES:		Arg⊞c						LOCAT	ION: Panhand	e Resea	ch and §	xtention	n Cernter,	Goodwe	ell, Oklai	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBE		6/14/2002		CORE	LENGTH (cm):		120						
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Haripan	Lower	Metrix color	;	ield Texture		Pe	idox Feeture			Structure		Contings	Con	Re	o(s	EX	Co	nceninatio	ini i	Boundary
	depth (cm)	(moist)	Class	% Clay	% CF	Color	Amount	Size	Greate	3ize	Shape	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	25	10YR 2/2	SiL	24	0		[2	м	Sbk		Fì	1	VF					D
_									2	F/VF	Sbk	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -								
BA	44	10YR 3/2	SICL	27	0				2	F	Pr	Argillans	Fr	<1	VF	_				D
									2	F	Abk									í
Bt	66	10YR 3/3	SICL	31	0				1	M	Pr	Argillans	Fr	<1	VF					A
									1	F	Pr									
Btk	94	10YR 4/4	SiCL	28	0				2	C/M	Pr	Argillans	Fr	<1	VF	VS	Ca	<1	м	A
									2	M/F	Pr									
Bk	94+	10YR 4/4	L	23	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Св	<1	F/VF	
									3	M/F	Pr									I
	I																			
																				1
			L															1	1	
																		1		
				1	1			1							1	1	1	1	1	

PROFIL	E:	702-345									% SLC	₩PE: <2%								
MAPPE	D PROFILI	E CLASSIFIC	TION:		Richlie	id Slit Loam					VEGET	ATION: Continu	cus forag	9						
					Fine, s	mecto, mes	io Aridio	Arolustoli			PARE	T MATERIAL:	Calcario	us icess						
EPIPED	ON:	Мовс									COUN	TY: Texas Co	unty, Okia	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES		Argillic						LOCAT	ION: Panhand	e Resear	ch and	Extention	n Center,	Goodwe	il, Okiat	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBE		6/14/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		-
Horizon	Lower	Matrizcolor	F	ieki Texture	_	Re	dox Feature			Structure		Coalings	Con	B	eta .	Eff	Co	ncentratio	6 9	Bounde
_	depth (cm)	(moist)	Ciasy	•% Clay	* CF	Color	Amount	Size	Gnede	Size	Shape	Туре		Amount	3a.		Турч	Amt	Size	Dist
Ap	13	10YR 3/2	SiL	24	0				2	м	Pr		Fr	3	M/F					D
									2	۴	Sbk									
A	40	10YA 3/2	SiL	25	0				2	М	Pr	Argillans	Fr	3	M/F					D
									2	M/F	Sbk									1
Bt	70	10YR 4/3	SICL	31	0				1	М	Pr	Argillans	Fr	2	F					A
									1	F	Pr									
Bk1	88	10YR 4/4	SICL	27	0				1	М	Pr	Argilians	Ft	<1	F/VF	s	Ca	<1	VF	D
									1	F	Pr							l		
Bk2	88+	10YR 4/4	L	25	0				2	C	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	
									2	М	Pr									
																				1
																	1			
					ĺ															1
		Γ																		
	1			1	1		1	1			1		1		1	1	1		1	1

PROFIL	E:	702-412									% SLC	₽E: <2%								
MAPPE	D PROFIL	E CLASSIFIC	ATION:	_	Richfle	id Sill Loam					VEGET	ATION: Continu	ous forag	0						
					Fine, s	mectic, mes	alc Aridic	Arglustoli			PARE	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollio									COUN	TY: Texas Co	unty, Oki	ahoma						
SUBSU	RFACE H	OR ZONS/FEA	TURES	:	Argillic						LOCAT	ION: Panhand	e Reseat	rch and	Extentio	n Center	, Goodw	ell, Okia	homa	
DATE S	AMPLED:	te	0/2/2000			DATE DES	SCRIBED		6/11/2002		CORE	LENGTH (cm):		82						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horison	Lower	Matricolor	,	Field Texture		84	dox Feeture	13		Structure		Coatings	Con	в	xota	EK	C 0	ncentratio	an s	Boundary
	depth (cm)	(moizți	Class	% Ciay	* CF	Color	Amount	Size	Onde	Site	Shepe	Туре		Amount	Siz+		Туре	Ant	Size	Dist
Ap	16	10YR 3/2	SiL	26	0				2	м	Sbk		Fr	1	F					D
									2	F	Sbk]			
Bw	40	10YR 3/3	SICL	29	0				2	м	Pr	Argilians	Fr	1	F					D
									2	F	Abk									ļ
Bt	65	10YR 3/3	SICL	31	0				2	C/M	Pr	Argillans	Fr	<1	F/VF					A
									2	M/F	Abk								_	L
Btk	65+	10YR 4/3	SiCL	32	0				2	C/M	Pr	Argillans	Fr	<1	F/VF	s	Ca	<1	٧F	
									2	M/F	Abk								l I	
														1				1		
															1			1		
				1										T						
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PROFIL	E:	702-414									% SLO	PE: <2%								
MAPPE	D PROFILI	CLASSIFIC	TION:		Richiel	d Silt Loam					VEGET	ATION: Continu	ous forag	e						
					Fine, st	nectic, mes	le Aridio,	Argiustoli		_	PAREN	T MATERIAL:	Calcarlo	us ioess						
EPIPED	ON:	Molio									COUN	TV: Texas Co	unty, Okia	ahoma						
SUBSU	RFACE HO	ORIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	e Resear	ich and l	Extention	Center	Goodwe	eli, Okiai	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBE		6/11/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY;	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Metrixcolor	F	iald Testura		84	doxFeature			Structure		Coatings	Con	Be	ota	EK	C.	ncentratio	201	Bounda
	depth (cm)	(moist)	Class	% Chy	% CF	Calor	Amount	Size	Grede	Size	Shepe	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	18	10YR 3/2	SiL	25	0				2	м	Pr	Argillans	Fr	3	F					D
	1								2	M/F	Sbk									
Bw	40	10YR 3/3	SICL	29	0				1	м	Pr	Argillans	Fr	2	F/VF				1	D
									1	F	Pr									
Btt	61	10YR 4/3	SiCL	33	0				1	М	Pr	Argillans	Fr	2	F/VF		I T			A
									1	F	Pr			1					<u>i</u>	1
Bt2	68	10YR 4/3	SICL	31	0				1	м	Pr	Argillans	Fr	1	F/VF					A
									1	F	Pr			1					Ĺ	
Bk1	79	10YR 4/4	SiCL	28	0				2	М	Pr	Argillans	Fr	<1	F/VF	s	Ca	3	м	A
									2	M	Abk									
Bk2	94	10YR 4/4	SiL	26	0				2	С	Pr	Argillans	Fr	<1	F/VF	м	Ca	<1	м	G
									2	м	Abk									
Bk3	94+	10YR 4/4	L	24	0				2	C	Pr	Argillans	Fr	<1	F/VF	м	Ca	<1	м	1
							{		2	м	Sbk									
										T .				Γ			1			I
	1		1	I					T				1	1	1	1	1			1

PROFIL	E:	702-415									% SLO	PE; <2%								
MAPPE	PROFILI	CLASSIFICA	TION:		Richile	ld Silt Loan	1				VEGET	ATION: Contin	cus foraç	0	_					
					Fine, s	mectic, mes	sic Aridic.	Argiustoli			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Molilo									COUNT	TY: Texas C	ounty, Okla	ahoma						
SUBSU	RFACE H	RIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	le Resea	ch and !	Extentior	Center	Goodwe	ii, Okial	homa	
DATE S	AMPLED:	11)/2/2000			DATE DE	SCRIBE		6/11/2002		CORE	LENGTH (cm):		80						
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pá	tion		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower	Matrizcolor	F	ield Texture		R	edox Feeture	4		Structure		Contings	Con	В	No Is	€Ħ	C+	ncentratio	***	Bounda
	depth (cm)	(moist)	Class	% Chay	* CF	Calor	Amount	Siz•	Grada	Size	Shepe	Туре		Amount	Size		Туре	Am	Size	Dist
Ap	18	10YR 2/2	SiL	26	0				2	С	Sbk	Argillans	Fr	3	F					D
									2	м	Sbk									
Α	37	10YR 3/2	SiL	26	0				2	C	Sbk	Argillans	Fr	1	F/VF					D
									2	М	Sbk		1	1						
Bt	61	10YR 3/3	SiCL	30	0		[]		1	М	Pr	Argillans	Fr	<1	F/VF					A
									1	M/F	Pr			1			<u>i</u>			
Bk	61+	10YR 4/4	SiL	25	0				2	С	Pr	Argillans	Fr	<1	F/VF	м	Ca	<1	м	
									2	М	Pr		ł	1						
																		1		
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PROFIL	E;	702-416									% SLC	PE: <2%		·						
MAPPE	D PROFIL	E CLASSIFIC	ATION:		Richte	d Silt Loan					VEGET	ATION: Continu	ious forag	le						
				_	Fine, st	mectic, mes	ic Aridic	Argiustoli			PARE	T MATERIAL:	Calcarlo	us loess						
EPIPED	ON:	Molilo									COUN	TY: Texas Co	junty, Oki	ahoma						
SUBSU	RFACE H	ORIZONS/FEA	TURES:	:	Argillo						LOCAT	ION: Panhand	le Reseat	rch and I	Extention	n Center	Goodw	ell, Okla	homa	
DATE S	AMPLED:	1	0/2/2000			DATE DE	SCRIBET		6/11/2002		CORE	LENGTH (cm):		86				_		
SAMPL	ÉD BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	atten		CORE	DIAMETER (cm):								
		Jamle Patton						,								-				
Horizon	Lower	Mairixcolor	. ,	Field Texture		R	dox Feature	na	1	Structure		Coetings	Con	, R	eta	E¥	<u>م</u>	rcentre5c		Boundary
	depth (cm)	(maist)	Class	w Chy	* CF	Color	Amount	Size	Grade	3120	Shape	Туре		Amount	Size		Туре	Amt	Size	Dist
Αp	20	10YR 2/2	SICL	25	0				2	м	Sbk	Argillans	Fr	3	F					D
									2	M/F	Sbk		I							
B₩	42	10YR 3/2	SICL	27	0				2	м	Pr	Argillans	Fr	2	F				·	D
					1				2	м	Abk									
Blk	70	10YR 3/2	SICL	31	0				1	м	Pr	Argillans	Fr	-3	F	s	Ca	<1	м	A
									1	F	Pr									
Bt	70+	10YR 4/3	SICL	29	0				11	¢	Pr	Argillans	Fr	<1	VF					
									1	M	Pr								1	
											Ι									
					I															
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PROFIL	E:	702-417									% SLO	PE: <2%							-	
MAPPE	PROFILE		TION:	•	Richfiel	d Slit Loam					VEGET	ATION: Continu	içus foraç	0						
					Fine, sr	nectic, mes	c Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	us loess						_
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unty, Oki	ahoma						_
SUBSU	RFACE HO	RIZONSFEA	TURES:		Argilito						LOCAT	ION: Panhand	le Reseat	rch and i	Extention	n Center	Goodwe	il, Okial	noma	
DATE S	AMPLED:	10	12/2000			DATE DES	CRIBE		6/11/2002		CORE	LENGTH (cm):	-	. 120						
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tion		CORE	DIAMETER (cm):						_		
		Jamle Patton																		
Horizon	Lower	Mairizcolor	۶	ield Texture		- Br	dox Feeture	**		Siructure		Coatings	Con	В	ota	E۳	C.	ncentratio	-Da	Boundar
	depth (cm)	(mois0	Class	% Clay	% CF	Color	Amount	Size	Grade	Size	Shape	Тур+		Amount	Stre		Тур+	Amt	Size	Dist
Ap	13	10YR 3/2	SiL	25	0				2	M	Sbk		Fr	2	F					D
									2	F	Sbk								L	
AB	39	10YR 3/2	SICL	29	0				1	С	Pr	Argillans	Fr	2	F					П
									1	М	Sbk								Ĺ	
Bt	68	10YR 3/3	a	30	0				1	M	Pr	Argillans	Fr	2	F					A
									1	F	Pr								Ĺ	
Bw	85	10YR 4/3	CL.	27	0				Ť	M	Pr	Argillans	Fr	<1	VF					D
									1	M/F	Pr		I							
Bk	85+	10YR 4/4	L	25	0				1	C	Pr	Argilians	Fr	<1	VF	м	Ca	<1	VF	
									1	м	Pr]							
																<u> </u>				
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														1				1		
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na nd Extent 20	ntion Cente	er, Goodw	/eli, Okla	ihoma	
nd Extent 20	intion Cente	er, Goodw	/eli, Okla	ihoma	
20	nton Cente	er, Goody	veli, Okia	homa	
Beats				_	
Beats					
	Eff	0	oncentret	ions	Bounda
ownt Size	izo	Type	Ant	Size	Dist
1 F	F		1	1.	D
1 VF	/F				A
			-		<u> </u>
:1 VF	/F S	Ca	<1	VF	A
(1 VF	/F VS	Ca	1	[M	A
					1
:1 VF	/F S	Ca	<1	М	D
_					<u> </u>
:1 VF	/F VS	6 Ca	<1	F	
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	_	<u> </u>	1	1	4
				1	1
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PROFIL	E:	702-424									% SLO	PE: <2%								
MAPPE	D PROFILI	E CLASSIFIC	TION:		Richfiel	d Sill Loam	1				VEGET	ATION: Continu	ous forag	e						
					Fine, st	nectic, met	sic Aridic.	Argiustoli			PAREN	T MATERIAL:	Calcarlo	aseol au						
EPIPED	ON:	Mollic									COUNT	Texas Co	unty, Oki	ahoma	-					
SUBSU	RFACE H	ORIZONS/FEA	TURES:	_	Argililo	_					LOCAT	ION: Panhand	e Resea	ch and I	Extention	Center.	Goodwe	ill, Oklai	noma	
DATE S	AMPLED:	1:	0/2/2000			DATE DE	SCRIBED		6/13/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parlon				DESCRIB	ED BY:	Jamie Pe	tton		CORE	DIAMETER (cm):								_
		Jamle Patton																		
Horizon	Lower	Matrixcolor	, ,	ield Teature		B	dox Feeture	· · · · -		Structure		Costings	Con	R	ote	EK	C.	ncentratio	n t -	Bounder
	depth (cm)	(moist)	Cinss	% Chry	* CF	Color	Amount	Size	Grade	\$izo	Shape	Туре		Arcount	Size		Туре	Amt	Size	Dist
Ap	19	10YR 2/2	SiL	24	0		ļ		2	M/F	Pr		Fr	1	F					D
				<u> </u>			<u> </u>		2	F	Pr									
AB	46	10YR 3/2	SiL	26	0		ļ		2	м	Pr	Argiilans	Ft	<1	VF			· '		D
			ļ				ļ	L	2	M/F	Abk			_						
Bt1	65	10YR 3/3	SiCL	31	0			ļ	1	м	Pr	Argilians	Fi -	<1	٧F		L	ļ		D
			l	 			-		1	F	Pr			⊢			<u> </u>	<u> </u>		<u> </u>
Bt2	76	10YR 4/3	SICL	33	0			ļ	2	M	Pr	Argillans	Fi	<1	VF		Į			A
			—						2	F	Pr						<u> </u>		<u> </u>	—
Bk	101	10 YR 3/4	SiL	26	0		 		2	C/M	Pr	Argilians	Fr	4	VF	SI	Ça	<1	VF	G
	<u> </u>				ļ		—		2	M/F	Pr		<u> </u>	-	 			-	 	┣—
CB	101+	10YR 4/4	L	26	0				3	C/M	Pr	Argillans	Fi	<1	VF	м	Ca	<1	VF	
					—		+		3	M/F	Pr			+	<u> </u>	ļ				—
		1		1			┿	 	ł	<u> </u>	ļ		1				1			
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PROFIL	E:	702-425									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richtel	d Silt Loam					VEGET	ATION: Continu	ous forag	e						
					Fine, sr	nectic, mes	ic Aridic.	Argiustoll			PAREN	T MATERIAL:	Calcarlo	s loess						
EPIPED	ON:	Mollic									COUNT	Texas Co	unty, Okla	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argilic						LOCAT	ION: Panhandi	e Resear	ch and I	Extention	Center	Goodwe	II, Oklat	noma	
DATE S	AMPLED:	10	/2/2000			DATE DES	CRIBEI		6/13/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Hatriccolor	F	Reid Texture		8.	dox Feeture	4		Structure		Coatings	Con	R	ela	EX	Co	ncentratio	A 5	Bounded
	depth (cm)	(moist)	Cleas	% Clay	% CF	Color	Amount	Size	Grade	Size	Shape	Type		Amount	. Site		Туре	Amt	Size	Dist
Αp	21	10YR 2/2	SiL	23	0				2	м	Sbk		Fr	3	F					D
					i				2	F	Sbk									
BA	39	10YR 3/2	SICL	27	0				2	м	Pr	Argillans	Fr	1	F/VF				-	D
									2	M/F	Sbk			1			<u> </u>			
Bt	61	10YR 3/3	SICL	32	0				1	м	Pr	Argillans	Fr	1	F/VF					A
									1	F	Pr									1
Btk	87	10YR 4/3	SiCL	29	0				2	М	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	G
									2	F	Sbk									
Bk	87+	10YR 4/4	SĩL	24	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	
									2	M/F	Pr									l .
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PROFIL	:	702-426									% SLO	PE: <2%			_					
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loam	۱				VEGET	ATION: Continu	ous ferag	e						
					Fine, st	nectic, me	lc Arldic.	Arglusto			PAREN	T MATERIAL:	Calcario	s loess						
EPIPED	ON:	Мойс									COUNT	Y: Texas Co	uniy, Okla	ihome						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillo						LOCAT	ION: Panhand	le Resear	ch and l	Extention	Center,	Goodwe	ili, Oklal	homa	
DATE S	AMPLED:	10	12/2000			DATE DE	SCRIBE		6/14/2002		CORE	LENGTH (cm):		86						
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Multiscolor	,	ield Texture		A.	dox Feeture			Structure		Coatings	Con	Be	ola	E#	C.	nc en tratic	nta	Boundar
	depth (cm)	(moist)	Class	% Clay	¥ CF	Color	Amount	Size	Grade	Size	Shepe	Туре		Amount	Size		Туре	Ama	Size	Dist
Ap	12	10YR 3/2	SiL	18	0				2	M	Pr		Fr	2	F					D
									2	F/VF	Sbk									
AB	28	10YR 3/4	SiL	18	0				2	М	Pr	Argillans	Fr	1	F					D
									2	F/VF	Sbk									
Bt	71	10YR 4/2	SICL	25	0		I		1	м	Pr	Argillans	Fi	<1	F/VF			Í.		A
									1	F	Abk								L	
Bik	71+	10YR 4/3	SICL	31	0				2	M	Pr	Argillans	Fr	<1	F/VF	٧s	Ca	<1	м	
									2	F	Pr		<u> </u>							
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				1					1	1			1	1		1	1	1	1	1

PROFIL	E:	702-427									% SLO	PE: <2%								
MAPPE	PROFILI	E CLASSIFICA	TION:		Richte	Id SR(Loam					VEGET	ATION: Continu	ious foraç	18						
					Fine, si	meçtiç, mes	ic Aridic.	Arglustoli			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unty, Oki	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES		Argillic						LOCAT	ION: Panhand	le Reseat	oh and I	Extentio	n Center	Goodwe	ell, Okia	homa	
DATE S	AMPLED:	10	0/2/2000		_	DATE DES	SCRIBEL		6/14/2002		CORE	LENGTH (cm):		99						
SAMPL	DBY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	Ron		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Matrixcolor	P	ield Texture		R	dox Faature	,		Structure		Coatings	Con	R	xota	Eff	C.	ncentratio	in a	Bound
	depth (cm)	(moist)	Class	% Chry	% CF	Color	Amount	Size	Greefe	Size	Shepe	Type		Amount	Size		Type	Amt	Size	Dist
Āφ	18	10YR 2/2	Sil	26	0				2	C/M	Pr	Argillans	Fr	<1	M/F					D
									2	M/F	Sbk									
Bt	44	10YR 2/2	SICL	30	0				2	M	Pr	Argillans	Fr	1	M/F					Â
									2	F	Abk									
Btk	73	10YR 3/3	SICL	33	0				1	м	Pr	Argillans	Fi	<1	F/VF	м	Ca	<1	M/F	D
									1	F	Abk									
Bk	73+	10YR 3/2	SiCL	28	0				1	М	Pr	Argillans	Fr	<1	F/VF	s	Ca	<1	M/F	
									1	F	Abk						1			
														1				1	Γ	1
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																				1
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PROFIL	E:	702-432									% SLO	PE: <2%								
MAPPE	PROFIL		TION:		Richte	d Silt Loam					VEGET	ATION: Continu	ous forag	8						
					Fine, st	necilo, mes	ic Andic.	Angiustoš			PAREN	T MATERIAL:	Calcarlo	z loess						
EPIPED	ON:	Moliic									COUN	TY: Texas Co	unty, Okla	ahoma						
SUBSU	RFACEHO	HIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhandi	e Resear	ch and E	otentior	Oenter,	Goodwe	II, Oklal	noma	
DATE S	AMPLED:	10	12/2000	_		DATE DES	SCRIBE		6/4/2002		CORE	LENGTH (cm):		120						
SAMPLI	DBY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	Ron		CORE	DIAMETER (cm):								
		Jamle Patton																		
Herizon	Lower	Matriccolor	۶	ield Teature		В.	doxFeebure	n		Structure		Contings	Con	L #	ote	EM	Co	centratio		Boundary
	depth (cm)	(moiat)	Class	w Clay	* CF	Color	Amount	Size	Grede	Size	Shap e	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	14	10YR 3/2	SiL	18	0		1		2	M	Sbk		Fr	<1	VF					D
		_		<u> </u>					2	F	Sbk									L
Bt1	38	10YR 3/2	SICL	31	0		ļ		2	м	Pr	Argillans	Fr	<1	VF					D
									2	F	Pr							_		
B12	61	10YR 3/4	SICL	33	D		ļ		2	м	Pr	Argillans	Fr	<1	VF				1	A
									1	F	Abk									
Bik1	75	10YR 3/4	SICL	28	0		ļ	ļ	1	м	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	A
						·		ļ	1_1_	F	Pr							L		
Btk2	91	10YR 4/4	SICL	27	0				2	M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	м	A
				_					2	F	Pr									
Bk	91+	10YR 4/4	Si∟	16	0				2	C/M	Pr	Argilians	Fr	<1	VF	м	Ca	<1	F/VF	
				<u> </u>				<u> </u>	2	M/F	Pr			_	L			<u> </u>		
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PROFIL	E:	702-433									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFIC	TION:		Richfie	Id Silt Loam					VEGET	ATION: Continu	ous foraç	10	-					
		_			Fine, s	mecăc, mes	lc Andic.	Argiustol			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON;	Мошо									COUNT	TY: Texas Co	unty, Okla	ahoma						
SUBSU	RFACE HO	HIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and s	xtentor	n Center,	Goodwe	li, Okiał	юта	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBEL		6/4/2002		CORE	LENGTH (cm):		120						
SAMPLI	DBY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton												_	_					_
Activity	Lower	Metrocolor	F	ield Testure		A.	dox Feature		L	Bruchure		Coefings	Con	Pro	ota	EX	Co	ncentratio		Boundary
	depth (cm)	(moist)	Class	% Clay	% CF	Color	Annount	Size	Grade	Sitta	Shape .	Туре		Amount	Size		Туре	Ami	Size	Dist
Ap	18	10YR 2/2	SiL	23	0		I		2	м	Sbk	Argillans	Fr	<1	VF			1		D
_									2	M/F	Gr									
A	32	10YR 3/2	ŞiL	25	0				2	c	Sbk	Argillans	Fr	<1	VF					D
									2	М	Sbk									
Bit	67	10YR 3/2	SICL	31	0				1	M	Pr	Argillans	Fr	<1	VF					A
						·				M	Abk		_							<u> </u>
Bt2	80	10YR 3/3	CL	28	0				2	c	Pr	Argillans	Fr	<1	VF					A
									2	м	Pr		_						<u> </u>	
Bk1	102	10YR 4/3	L	26	0	L			2	c	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	G
									2	M	Pr				L		1			
Bk2	102+	10YR 4/4	L L	26	0		L		2	C C	Pr	Argillans	Fr	<1	VF	м	Ca	<1	м	
							<u> </u>	L	2	м	Pr		1				ļ	I	ļ	1
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PROFIL	E:	702-434	_								% SLC	¥PE; <2%								
MAPPE	D PROFILI	E CLASSIFICA	TION:		Bichfie	id Silt Loam	ı.				VEGET	TATION: Continu	ouis forag	6						
					Fine, s	mectic, mea	ic Aridic	Argiustoli			PARE	NT MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollio									COUN	TY: Texas Co	unty, Okli	ahoma						
SUBSU	RFACE H	ORIZONS/FEA	TURES:		Argillic						LOCAT	TION: Perhand	e Resear	ch and I	Extentio	n Center,	, Goodwe	ali, Oklai	home	
DATE S	AMPLED:	10	12/2000			DATE DES	CRIBE		6/4/2002		CORE	LENGTH (cm):		89						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pe	llion		CORE	DIAMETER (cm):		_						
		Jamle Pation			_															
Horizon	Lower	Maturcolo/	. 5	ield Texture		R	doxFealure	-		Structure		Coatings	Con	Re	iota	Eff	\$	ncentratio	ona -	Boundary
	depti (cm)	(moist)	Chas	¥s Clay	S CF	Color	Amount	Size	Grade	3ine	Shape	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	10	10YR 2/2	SiL	24	0				2	м	Sbk		Fr	2	VF			ľ		D
									2	F	Sbk									
AB	30	10YR 2/2	SiL	26	0				2	м	Pr	Argillans	Fr	1	VF					D
									2	М	Sbk									
Bt1	45	10YR 3/2	SICL	29	0		<u> </u>		1	M	Pr	Argillans	Fr	<1	VF					D
									1	м	Abk									
Bl2	65	10YR 3/3	SICL	30	0		ļ	<u> </u>	2	м	Pr	Argillans	Fr	<1	VF	I				D
									2	F	Pr			L						
Bt3	82	10YR 4/3	а	27	0		ļ	L	2	C/M	Pr	Argillans	Fr	<1	VF		1	Í.		A
							<u> </u>		2	M/F	Pr									1
Bt4	82+	10YR 4/4	L	26	0		ļ		2	M	Pr	Argillans	Fr	<1	VF	м				1
	<u> </u>		<u> </u>		—	<u> </u>	L	Į	2	м	Sbk		<u> </u>	_	ļ	L				∔
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			┞	<u> </u>	<u> </u>	<u> </u>	L		ļ		<u> </u>	L	L					1		_
				1	1		 	 	Į	ļ	<u> </u>	L	1	1		I		1		
		L		<u> </u>		1		L	ł	1	<u>i</u>	L	L	1		1				1

PROFIL	E:	702-435									% SLO	PE: <2 %								
MARPYEE PROFILE CLASSIFICATION: Richfeld Sill Loam VEGETATION: Contructs forage Fine, smooto, mesto, Aridio Argueiolit PARENT MATERIAL: Caloarious forage EPIPEDON: Molic COUNTY: Toos Courty, Ckahoma SUBSURFACE HORIZONS/FEATURES: Argille COUNTY: Toos Courty, Ckahoma COUNTY: Toos Courty, Ckahoma COUNTY: Toos Courty, Ckahoma SAMPLED: 100/2000 DATE DESCRIBED 6/142002 CONE LENGTH (cm): 120 SAMPLED BY: Jason Parton Concentration Center, Goodwell, Ckiahoma Jartie Patton Concentration Buoder Interview Patton Concentration Buoder Argille Concentration Buoder Jartie Patton Concentration Buoder Jartie Patton Concentration Buoder Argint Battoric Concentration Buoder Jartie Patton Concentr																				
					Fine, s	mecto, me	sic Aridic.	Argiustoli			PAREN	IT MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unty, Oki	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Argillic						LOCAT	ION: Panhand	ie Resear	ich and E	Extention	n Center,	Goodwe	li, Okial	homa	
DATE S.	AMPLED:	10	12/2000			DATE DE	SCRIBEI		6/14/2002		CORE	LENGTH (cm):		120						
SAMPLE	DBY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Herizon	Lower	Habiacolor	ę	ield Teature		В	ndox Feeture	1		Stuckure		Coatings	Con	Pio	otu	Eff	c.		101	Bounde
	depēt (cm)	(moist)	Class	% Clay	% CF	Color	Amount	Size	Grede	Siz.e	Shepe	Туре		Amount	Site		Туре	Amt	Size	Dint
Aρ	9	10YR 2/2	SiL	17	0				2	М	Sbk		Fr	<1	VF					D
									2	F	Sbk									
BA	36	10YR 3/2	SiL	18	0				2	М	Pr	Argillans	Fr	<1	VF					D
									2	M/F	Sbk									
Bł	59	10YR 3/3	SiCL	28	0				2	м	Pr	Argillans	Fr	<1	VF					A
									2	M/F	Abk									
B6k1	89	10YR 4/3	SICL	33	0				2	М	Pr	Argiilans	Fr	<1	VF	٧s	Ca	<1	м	A
									2	M/F	Abk							l		
Btk2	90	10YR 4/4	SiL	28	0				2	M	Pr	Argillans	Fr	<1	VF	VS	Ca	1	м	A
									2	м	Abk			1						
Btk3	116	10YR 4/4	SiL	25	0				2	C/M	Pr	Argillans	Fi	<1	VF	S	Ca	<1	F	G
									2	M/F	Pr									
Bk	116+	10YR 4/6	SiL	15	0				2	C/M	Pr	Argillans	Fi	<1	VF	м	Ça	<1	F	
					1				2	M/F	Pr							l		1
														1					[_	
				1			1		I							1	1	1	1	1

PROFIL	E:	702-436	-								% SLO	PE: <2%								
		E CLASSIFICA	TION:		Richitel	d Sili Loam	۱				VEGET	ATION: Continu	ous forag	e .						
					Fine, st	nectic, mes	ic Arldic.	Arciustol			PAREN	T MATERIAL:	Calcariou	us loess						
EPIPED	ON:	Moliic									COUNT	TY: Texas Co	unity, Okla	ahoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:	t	Argiliio						LOCAT	ION: Panhand	e Resear	ch and E	Extention	o Center,	Goodwa	il, Oklal	юта	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBED		6/14/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Pation	_																	
Horizon	Lower	Matrixcolor	F	Teld Teature		B	idox Feature			Structure		Coatings	Con	Ro	ots	E#	Co.	ncentratio	n #	Boundary
	depih (cm)	(terom)	Cinas	% Ciay	% CF	Color	Arpount	Size	Grede	Sige	Shepe	Txp+		Amount	Siz.		Туре	Amt	Size	Dist
Ap	11	10YR 2/2	SiL	23	0				2	М	Sbk		Fr	<1	VF					D
									2	M/F	Sbk									
BA	29	10YR 3/2	SiL	25	0				2	C/M	Sbk	Argillans	Fr	<1	VF					D
									2	M/F	Sbk									<u> </u>
Bt	52	10YR 3/2	SiCL	35	0	· · · · ·	L		2	M	Pr	Argillans	Fr	<1	VF					A
									2	M/F	Pr			ļ				i		ļ
Bloc	94	10YR 4/3	SiCL	30	0	L			2	c	Pr 1	Argillans	Fr	<1	VF	vs	Ca	1	м	D
				L					_ 3	c	Sbk									
Bk	94+	10YR 4/4	L	26	0		ļ		3	c	Pr	Argillans	Fr	<1	VF	vs	Ca	1	м	
				ļ					3	M	Pr				I		<u> </u>	<u> </u>		
									L	ļ						1				1
			_					ļ	<u> </u>	l	ļ	L		_	ļ	<u> </u>	I	<u> </u>	ļ	
				1			+	ļ		Į			1	1	Ι.	1		1		1
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				<u> </u>			1			1		L	ł			1	1	1		

PROFIL	E:	702-441									% SLO	PE: <2 %								
MAPPE	PROFIL	E CLASSIFIC	TION:		Richfiel	d Slit Loan	1				VEGET	ATION: Contru	ous forag	9						
					Flne, si	necto, mes	slo Artidio /	Anglustoli			PAREN	IT MATERIAL:	Calcarlo	us loess						
EPIPED	ON:	Mo∭c									COUNT	TY: Texas Oc	uniy, Oki	ahoma						
ຮບສຣບ	AFACE H	ORIZONS/FEA	TURES		Argillic						LOCAT	ION: Panhand	isezeR ei	ch and I	xtention	n Center,	Goodwe	oli, Oklai	homa	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBEL		6/14/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower	Matrixeolor	,	Field Texture		R	ndox Feature			Stucture		Contings	Con	Re	iota	Eff	Co	ncentretic	ins.	Bound
	depth (cm)	(moist)	Class	% Clay	% CF	Color	Amount	Size	Grade	Size	Shepe	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	15	10YR 2/2	SiL	24	0				2	M	Abk		Fr	<1	F					D
-									2	F	Abk									
Bt	45	10YH 3/3	SICL	31	0				2	M/F	Pr	Argillans	Fr	<1	F					A
									2	M/F	Abk									1
Btk1	60	10YH 4/3	SICL	33	0				2	м	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	м	D
				1					2	M/F	Abk									<u> </u>
Blk2	91	10YR 4/3	SICL	35	0				2	C/M	Pr	Argillane	Fr	<1	VF	VS	Ca	1	м	A
					1				2	м	Abk		1	I						1
B6k3	111	10YR 4/4	SICL	28	0				2	C/M	Pr	Argilians	Fr	<1	VF	VS	Ca	<1	м	G
									2	M/F	Pr								i	I
Bk	111+	10YR 4/4	SiL	26	0				2	C/M	Pr	Argillans	Fr	<1	VF	Vs	Ca	<1	F	Г
									2	M/F	Pr			1		í				
				T										T		1	1	1		T
				I]	l		ł				
													1	T	1					T
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PROFIL	E:	702-443									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richile	d Slit Loam					VEGET	ATION: Continu	ous forag	e						
					Fine, si	necăc, mes	olbhA oi	Argiustoli			PAREN	T MATERIAL:	Calcarlo	s icess						
EPIPED	ON:	Moillo									COUNT	TY: Texas Co	unty, Okla	homa						
SUBSU	RFACEHO	RIZONS/FEA	TURES:		Argillo						LOCAT	ION: Penhand	e Resear	ch and E	xtentio	n Center	Goodwe	il, Oklai	noma	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBE		6/14/2002		CORE	LENGTH (cm):		98						
SAMPLI	DBY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm):								
		Jamle Patton																		
Herigen	Lower	Hebizcolor	. F	ield Tenture		R	ciox Feeture	1		Skucture		Coefings	Con		ola	Ef	C.	nc entradio	ha .	Boundary
	depth (cm)	(moist)	Cines	* Ciny	₩ ¢F	Color	Amount	Size	Grade	Site	Shape	Туре		Amount	Jize		Туре	Ant	Size	Dist
Ap	9	10YR 2/2	SiL	19	0				2	м	Sbk		Fi	3	F					D
			L						2	F/VF	Sbk									
AB	32	10YR 2/2	SiL	20	0				2	C/M	Pr	Argillans	Fi	<1	VF		1			Ð
_									2	M/F	Pr									
Bt1	53	10YR 3/2	SICL	27	0				1	М	Pr	Argillans	Fr	<1	VF					D
									2	F	Pr						L			
B12	82	10YR 3/4	SiCL	35	0				1	M	Pr_	Argillans	Fr	<1	VF					A
									1	F	Pr									
Btk	82+	10YR 4/3	SICL	31	0		l		2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	
									2	C/M	Pr									
							1	L		<u> </u>										
					<u> </u>															
	I											L					1		1	
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									L							1				1
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PROFIL	E:	702-444								1	% SLO	PE: <2%								
MAPPE	D PROFIL	CLASSIFICA	TION:		Richtel	d Sill Loam					VEGET	ATION: Continu	ous forag	e.						
					Fine, sr	nectic, mes	lo Aridic.	Arglusio			PAREN	T MATERIAL:	Calcarlou	s loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Oc	uniy, Okle	thoma						
SUBSU	RFACEHO	RIZONS/FEA	TURES:		Argilic						LOCAT	ION: Panhand	e Resear	ch and I	Extention	n Center,	Goodwa	ll, Okial	home	
DATE S	AMPLED:	10	1/2/2000			DATE DES	CRIBE		6/14/2002		CORE	LENGTH (cm):		82						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):								
		Jamle Pation				_						_								
Herizon	Lower	Marizcolor		ield Texture	·	8	doxFeeture	11		Stucture		Contings	Con		eta	EĦ	Ç.	ncentratio	na	Boundary
	depth (cm)	(moist)	Ciana	% Clay	N CF	Color	Amount	3ize	Grada	Sige	Shepe	Туре		Amount	Size		Туре	Amt	Size	Dist
Αp	19	10YR 3/2	SiL	25	0				2	м	Sbk.		Fr	3	F					D
									2	F	Gr									
BA	44	10YR 3/2	SiCL	29	0				2	C/M	Pr	Argillans	Fr	1	F					D
									2	M/F	Sbk									
Bt	68	10YR 3/2	SICL	34	0			1	1	C/M	Pr	Argillans	Fr	1	F					A
									1	M/F	Pr							I		
Btk	68+	10YR 4/3	SICL	32	0			1	1	C/M	Pr	Argillans	Fr	<1	F/VF	s	Ca	<1	VF	
									1	M/F	Pr									
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PROFIL	E:	702-445									% SLO	PE: <2%								
MAPPE	PROFILI	E CLASSIFICA	ATION:		Richfiel	d Silt Loan					VEGET	ATION: Continu	Jous foraç	ie .						
					Fine, st	necto, mes	lc Aridic.	Argiustoli			PAREN	IT MATERIAL:	Calcarlo	aseol au						
EPIPED	ON:	Molific									COUNT	TY: Texas Co	ounty, Oki	ahoma						
SUBSU	RFACE H	ORIZONS/FEA	TURES	:	Argillo						LOCAT	NON: Panhand	le Resea	ch and I	Extension	Center,	Goodwe	di, Okial	oma	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBED		6/14/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tion		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	Lower	Matrixcolor	F	Teld Testure		B	ndox Feeture			Structure		Coefings	Con	R	ols .	Eff	C.0	ncentre5o	a s .	Boundary
	depth (cm)	(moist)	Ciess	* Chy	% CF	Color	Amount	Size	Grade	Size	Shape	Туре	1	Amount	Size		Туре	Ant	Size	Dist
Ap	14	10YR 3/2	SiL	26	0				2	C/M	Sbk		Fr	1	F					Ď
									2	M/F	Sbk		1							ł
AB	30	10YR 3/2	SICL	27	0				2	M/F	Abk	Argillans	Fr	<1	F					P
									2	F/VF	Abk		1							
BA	39	10YR 3/3	SiCL	28	0				1	M/F	Abk	Argillans	Fr	<1	F		ļ			A
		Fight Fight CATION: Fichtfield Sill Loam VEGETATION: Contribute frage File File County Celearize items Molie COUNTY: Texas County, Celearing: Celearize items Molie COUNTY: Texas County, Celearing: Celearize items Oniz/CONS/FEATURES: Argilio COUNTY: Texas County, Celearing: Celearing: Jacon Parton DATE DESCRIBED BY: Jamie Patton CORE LINANT (em): 120 Jacon Parton DESCRIBED BY: Jamie Patton Control (em): 120 Matricelr Field Terrein: Recent atoms Bit Owner Control (em): 120 Jacon Patton Describer Count (em): 120 Concentrations Texe Texe Matricelr Recent atoms Bit Describer Control (em): Texe Texe Jacon Patton Recent atoms Bit Describer Control (em): 120 Jacon Patton Recent atoms Bit Describer Control (fm): 120 Concentra																		
Bt	56	10YR 4/2	SICL	30	0				1	M	Pr	Argillans	Fr	<1	VF					A
									1	F	Pr		1				l			
Bik1	76	10YR 4/3	SICL	32	0				1	м	Pr	Argillans	Fr	<1	VF	VS	Ca	2	м	A
									1	F	Pr		1			[ŧ.	1
Btk2	94	10YR 4/4	SiCL	30	0				2	C	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	G
									2	M	Pr		1		ł					
Bk	94+	10YR 5/4	SiCL	28	0				2	C	Pr	Argillans	Fr	<1	VF	м	Ca	<1	м	Г
									2	M	Pr]		Ι.	I		1		
					LCCATION: Partnende Research and Extention Center, Goodwell, Oklahoma DATE DESCRIBET 6/1-4/2002 CORE LENGTH (cm): 120 DESCRIBED BY: Jamie Patton CORE DATE DESCRIBE Part. CORE DATE TO COME DATE DESCRIBED BY: Jamie Patton CORE DATE TO COME DATE DESCRIBED BY: Jamie Patton CORE DATE TO COME DATE TO COME DATE DESCRIBED BY: Jamie Patton CORE DATE TO COME DATE TO COME DATE TO COME DATE TO COME DATE TO COME DATE TO COME DATE DESCRIBED BY: Jamie Patton CORE DATE TO COME DATE															
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PROFIL	E:	702-447								1	% SLO	PE: <2%								
MAPPEL	PROFILE	CLASSIFICA	TION:		Richfiel	d Sill Loam	1				VEGET	ATION: Continu	ous forag	8						
					Fine, sr	nectic, mes	ic Aridic.	Argiustoli			PAREN	T MATERIAL:	Calcario	a loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unty, Okla	ihoma						
SUBSU	RFACE HO	RIZONS/FEA	TURES:		Arollic						LOCAT	ION: Panhand	e Aesear	- ch and E	Extention	n Center,	Goodwe	il, Okial	noma	
DATE S.	AMPLED:	10	/2/2000			DATE DE	SCRIBE		6/14/2002		CORE	LENGTH (cm):		120						
SAMPLE	D BY:	Jason Parton		_	_	DESCRIB	ED BY:	Jamle Pa	tton		CORE	DIAMETER (cm):					_			
		Jamle Patton																		
Horizon	Lower	Multiscolor	F	ield Testure		Re	dox Feature			Sinucture		Coabings	Con	Ro	8	Eff	Co.	ncentratio	n.	Beunda
	depಈ (ಭಗಗ)	(moist)	Class	% Ciay	% CF	Color	Amount	Sige	Grada	Size	Shepe	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	13	10YR 3/2	SiL	16	0				2	M/F	Sbk		Fr	4	F					D
									2	F/VF	Sbk									
A	35	10YR 2/2	SiL	14	0				2	м	Pr	Argillans	Fr	<1	VF					D
									2	M/F	Sbk									
Bt	66	10YR 3/3	SICL	32	0				1	M	Pr	Argillans	Fr	<1	٧F					A
				[•	1	F	Pr									
Btk1	79	10YR 3/3	SICL	29	0				1	M	Pr	Argillans	Fr	<1	٧F	М	Ca	<1	F	D
									1	F	Pr									
Btk2	109	10YR 4/4	SiCL	29	0				2	С/М	Pr	Argillans	Fi	<1	VF	٧S	Ca	<1	F	A
									2	M/F	Pr							ł		1
Btk3	109+	10YR 5/2	SICL	31	0				2	C/M	Pr	Argillans	Fr	<1	VF	S	Ca	<1	F	
									2	M/F	Pr									
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Appendix 1-8. Soil Core Descriptions for Experiment 703B, Oklahoma Panhandle Research and Extension Center, Goodwell, Oklahoma

PROFIL	E:	703B-101									% SLO	PE: <2%					· · · ·			
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loar	n				VEGET	ATION: Com-	vheat-fai	ow rotat	ion					
					Fine, s	mectic, me	esic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	DN:	Mollic									COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argilisc						LOCAT	TION: Panhand	o Resea	ch and	Extentio	n Cente	, Goodw	reil, Oki	ahoma	
DATE S	AMPLED:	16	¥2/2000			DATE DE	SCRIBE		6/4/2002		CORE	LENGTH (cm):		120			· .			
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton ···	• • • •	CORE	DIAMETER (cm):								
		Jamie Patton																		
Harigon	Lower	Matrix color	,	ield Texture		я	edax Featur	*7		Structure		Coatinge	Cen	Ro	ota	EN	Ce	ncentratio	103	Boundary
	depth (cm)	(moiati)	Class	X City	% CF	Celor	Amount	Sze	Greda	9ize	Shape	Туре		Amount	Size		Туре	Ant	Size	Dise
Ap	17	10YR 3/2	SICL	28 ·	0		L		2	М	Sbk		Fr	<1	VF					D
									2	F/VF	Sbk									
8A	46	10YR 3/2	SICL	38	0		ļ		2	C/M	Abk	Argillans	Fr	<1	VF					A
									2	M/F	Abk			1						
Bik	70	10YR 4/2	SICL	33	0		L		2	<u>M</u>	Abk	Argilians	Fr	<1	VF	м	Ca	<1	м	D
			<u> </u>	<u> </u>			L	<u> </u>	2	F	Abk							1		
Bkt	85	10YR 5/3	SiL	24	0		 		2	M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	VF	G
		·						<u> </u>	2	M	Sbk			L	<u> </u>			L		L
Bk2	115	10YR 4/6	SiL	20	0		L		2	M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	G
			·	<u> </u>		<u> </u>		<u> </u>	2	M/F	Abk						1			L
8k3	115+	10YR 4/6	SIL	18	0	ļ	 		3	M	Pr	Argilians	Fr	<1	VF	м	Ca	<1	VF	
				Ļ				L	2	M/F	Abk				_		L	L	<u> </u>	
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			L	I		 	<u> </u>			<u> </u>	1	L				L_	<u> </u>	<u> </u>		_
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			<u> </u>	1	1.	1	1	1	L	1	1.	1				l			1	L

PROFIL	E:	703B-102	_								% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richlie	ld Silt Loan	n				VEGET	ATION: Com-	wheat-fal	ow rotal	ion		_			
					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	DN:	Molfic									COUNT	Y: Texas Co	unty, Oid	ahoma						
SUBSU	AFACE HO	RIZONS/FEAT	URES:		Argilitic						LOCAT	10N: Panhand	le Reseau	ch and i	Extentio	n Center	, Goodw	ell, Okla	shoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBE		5/30/2002		CORE	LENGTH (cm):		120			_			
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton															_			
Morizoe	Lower	Matrix color	F	ield Texture		8	edex Featur	**		Structure		Coatings	Con	R:	5	Eff	Co	ncentratio	71	Bounda
	dapth (cm)	(noint)	Class	% Clay	* 07	Color	Amount	Size	Grada	Siz.	Shepe	Тура		Amount	Size		Туре	Amt	Size	Diet
Ар	10	10YR 3/2	SIL	24	0		L		2	F	Gr		Fr	<1	VF					D
							1		2	VF	Gr									
ÐA	28	10YR 3/2	SICL	27	0		L		2	м	Abk		Fr	<1	VF					D
							1	<u> </u>	2	F	Abk									<u> </u>
Bt	52	10YR 3/3	SICL	34	0	L	L	l	2	C/M	Abk	Argillans	Fr	<1	VF					A
						L	L	I	2	M/F	Abk		L							
Bik	74	10YR 4/2	SiCL	20	D		L		2	C/M	Pr	Argilians	Fr	<1	VF	м	Ca	<1	м	D
						L			2	M/F	Abk		L							
Bk	98	10YR 4/4	SIL	26	D		_	L	2	C/M	Pr	Argillans	Fr	<1	VF	vs	Са	<1	M/F	D
						1			2	M/F	Abk									1
BkC	88+	10YR 4/6	SIL	20	0		1		3	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F/VF	1
									2	M/F	Pr			1				i.		
						L			1	l			1	1		1	1		ļ	
							1		1		l		1					1		1
	1		1	1]		1			L	I				I		<u> </u>	I	1

PROFIL	E)	7038-103								1	% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richlie	id Silt Loan	n				VEGE7	ATION: Corn-	wheat-fail	ow rotal	lion					
-					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	is loess						
EPIPED	DN:	Molisc									COUNT	Texas Co	unty, Okl	ahoma						
SUBSU	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	NON: Panhand	e Resear	ch and	Extentio	n Cente	, Goodw	ell, Okla	ahoma	
DATE S	AMPLED:	10	w2/2000			DATE DE	SCRIBE		5/30/2002		CORE	LENGTH (cm):		120			_			
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamle Pa	tion		CORE	DIAMETER (cm):					_			
		Jamie Patton																		
Harizan	Lower	Matrix color	F	ieki Testus		R	edoz Faatur	n		Structure		Coatings	Con	<u></u>	eK 5	EK	Co	ncentratio		Boundary
	dapth (cm)	(mpint)	Glass	% Clay	* CF	Color	Amount	Size	Grade	Size	Shepe	Туре		Amount	Size		Туре	Amt	See	Dian
Ap	16	10YR 3/2	SICL	28	C		1		2	M/F	Sbk		Fr	<1	VF					D
				-			1		2	F/VF	Sbk								L	L
BIA	47	10YR 3/2	SICL	. 37	0				2	M	Abk	Argillans	Fr	<1	VF					A
							L	1	2	M/F	Abk									
B	57	10YR 4/3	SICL	36	0			l	2	M	Abk	Argillans	Fr	<1	VF	м				A
							L		2	M/F	Abk						L.,,	_		
Bk1	79	10YR 4/3	SICL	27	C		ļ		2	м	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	M/F	A
								· ·	2 .	F	Pr						<u> </u>			L
Bk2	99	10YR 4/6	SiL	25	0				2	C/M	Pr	Argillans	FI	<1	VF	s	Ca	<1	VF	G
							L	1	2	M/F	Pr									<u> </u>
CB	99+	10YR 4/4	SiL	25	0				3	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	1
							<u> </u>	<u> </u>	3	M	Abk			<u> </u>	I	L	┣—	<u> </u>	<u> </u>	∔
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PROFIL	E:	703B-104	_								% SLO	PE: <2%								
MAPPE	D PROFILE	CLASSIFICA	TION:		Richfie	ld Silt Loar	n				VEGET	ATION: Corn-	wheat-fal	low rota	tion					
			·		Fine, s	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	us loese						
EPIPED	ON:	Mollic						_			COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	NON: Panhand	le Resea	ch and	Extentio	n Center	, Goodw	eli, Okl	ahoma	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBED		1/5/2000		CORE	LENGTH (cm):		116						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Harigan	Lower	Metrix color		ield Texture		. P	edox Feature			Structure		Coatings	Сол	R	xota	Eff	Co	ntenitatio	ina .	Bounde
	dapth (em)	(moian)	Class	% Chey	% CF	Color	Amount	Size	Grade	Size	Shape	Тура		Amount	Size		Туре	Ami	Sige	Diar
Ap	10	10YR 3/2	SICL	30	0				2	М	Sbk		Fr	2	VF					A
									2	F	Sbk									_
Α	24	10YR 3/2	SICL	30	0				2	M	Sbk	Argilians	Fr	1	VF					D
									2	F	Sbk									
Bt1	41	10YR 3/3	SICL	34	0		L		2	M	Abk	Argillans	Fr	1	VF					A
									2	F	Abk									
Bt2	55	10YR 4/6	SICL	31	0		ļ		2	M/F	Pr	Argilians	Fr	<1	VF	٧S				A
							ļ		2	F_	Pr									
Bk1	83	10YR 4/4	SICL	30	0				2	F	Pr	Argilians	FI.	<1	VF	vs	Ca	3	M/F	D
									2	F	Abk				I					
Bk2	92	10YR 4/6	CL	28	0				2	F	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	F/VF	D
			L						2	F	Pr			<u> </u>				1		
Bk3	92+	7.5YR 4/6	CL	27	0				2	M/F	Pr	Argiilans	F	<1	VF	s	Ca	<1	F/VF	1
									2	F	Pr						L	<u> </u>		
	l .					L	L		L	L	1						ł			
									1	ł			1	1						

PROFILI	E:	7038-105									% SLO	PE:< 2 %									
MAPPE	PROFILE	CLASSIFICA	TION:		Richtie	ld Silt Loan	1				VEGET	ATION: Corn-v	vheat-fall	ow rotat	ion -						
					Fine, s	mectic, me	sic Aridic	Argiustoli			PARENT MATERIAL: Calcarious losss										
EPIPED	DN:	Mollic									COUNT	Y: Texas Co	unty, Old	ahoma							
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	non: Panhandi	e Resear	ch and I	Extentio	n Center	Goodw	eli, Okta	homa		
DATE S	AMPLED:	10	2/2000			DATE DE	SCRIBEL		6/14/2002		CORE	LENGTH (cm);		105							
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (em):									
		Jamie Patton		_										_							
Morigon	Lawer	Matrix color	F	ield Texture		в	dox Feetur			Structure		Costings	Con	Pro	eta	6#	Concentrations			Soundar	
	depth (cm)	(meist)	Class	% Citey	% CF	Color	Ampunt	Size	Grade	Size	Shape	Туре		Ampunt	Size		Туре	Amt	Size	Dist	
Ap	15	10YR 3/2	SICL	32	0				2	M	Pr		Fr	<1	VF					D	
									2	M/F	Abk										
BtA	30	10YR 3/3	SICL	37	0				2	M	Pr	Argillans	Fl	<1	VF		. '			A	
								L	2	F	Pr									L	
Bik	51	10YR 4/3	SICL	38	0		L		2	М	Pr	Argillans	Fi	<1	VF	vs	Ca	<1	м	A	
									2	M/F	Pr	·	L								
Bk1	64	10YR 4/3	SiL	24	0		ļ		2	M	Pr	Argilians	Fr	<1	VF	s	Ca	<1	VF	D	
								<u> </u>	2	F	Pr									_	
Bk2	82	10YR 4/6	SIL	18	0		ļ		2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	G	
									2	M/F	Pr					<u> </u>	I	ļ			
Bk3	82+	10YR 4/6	s	10	0		<u> </u>		2	C/M	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF		
							ļ		2	M/F	Pr								ļ	┢──	
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PROFILE		7038-106									% SLO	PE: <2%								
MAPPEL	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loan	<u>`</u>				VEGET	ATION: Com-	vheat-fail	ow rotat	ion					
					Fine, st	nectic, me	sic Arjelic	Argiustol			PARENT MATERIAL: Calcarious losss									
EPIPED	DN:	Moilic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	TON: Panhand	e Reseat	ch and I	Extentio	n Center	Goodw	ell, Okia	ahoma	
DATE S.	AMPLED:		/2/2000			DATE DE	SCRIBED	6/4/02/20	00		CORE	LENGTH (cm):		120						_
SAMPL	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
-		Jamie Patton																		_
Hartzen	Lower	Mairia color	F	jeld Taxlum		a	edox Feature	13		Structure		Coatings	Gán	Roots		5#	Co	Concentrations		Bounda
	depth (cm)	(moint)	Ciasa	% Clay	% CF	Color	Antount	Size	Orade	Size	Shep	Туре		Amount	Site		Туре	Amt	9ize	Dist
Ap	9	10YR 3/2	Sil	26	0				2	м	Sbk		Fr	Δ	VF					A
							Ţ		2	F	Sbk		-							
BtA	39	10YR 3/2	SICL	32	0				2	М	Pr	Argilians	Fr	<1	VF					A
									2	M	Abk									1
Bikt	55	10YR 5/2	SICL	35	0				2	М	Pr	Argillans	Fr	<1	VF	S	Ca	4	VF	A
							Γ		2	M/F	Abk									
Bik2	73	10YR 5/2	SICL	34	0				2	м	Pr	Argillans	Fr	<1	VF	VS	Ca	<1	M/F	A
									2	M/F	Abk									1
Bk1	90	10YR 4/6	SiL	26	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	M/F	G
									2	M/F	Abk									
Bk2	90+	10YR 4/6	SIL	20	0				2	C/M	Pr	Argillans	Fr	<1	VF	м	Са	4	VF	
,									2	M/F	Abk							l I		
														T	-					T
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PROFIL	E:	703B-107									% SLO									
MAPPE	D PROFILE	CLASSIFICA	TION:		Richfie	ki Silt Loar	n				VEGET	ATION: Com-	wheat-fal	low rota	lion					
					Fine, s	mectic, me	isic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Moilic									COUNT	TY: Texas Co	untv. Ok	tahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT				Extentio	n Cente	. Goody	ell. Ok	ahoma	
DATE S	AMPLED:	- 14	0/2/2000			DATE DE	SCRIBE		6/4/2002		CORE	LENGTH (cm);		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton														_				
Horizon	Lower	Matrix color	F	iald Texture	,	В	adox Featur			Structure		Coatings	Con	Ra	ola	EH	¢	incentrati	575 B	Boundar
	depih (cm)	(meist)	Class	% Clay	* CF	Color	Amount	Size	Grade	Size	Shape	Туре		Ameunt	Size		Туре	Ami	Sce	Dim
Ap	12	10YR 3/2	SIL	23	0				3	M	Abk		Fr	<1	VF					A
									2	F	Abk									
A	40	10YR 3/2	SIL	25	0				2	м	Pr	Argillans	Fr	<1	VF			· · · · ·		A
									2	F	Pr									1
Btk1	53	10YR 3/3	SICL	33	0				2	м	Pr	Argillans	Fr	<1	VF	s	Ca	<1	FNF	D
						_			2	F	Abk									
Bk1	83	10YR 4/4	SHL.	26	0				2	M/F	Abk	Argillans	Fr	<1	VF	VS	Ca	<1	M/F	G
							}		2	F	Abk					1				
Bk2	116	10YR 4/4	SIL	22	0				2	F	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F/VF	A
									2	F	Abk			Ĺ						
Bk3	116+	10YR 3/4	SiL	24	0				2	F	Pr	Argillans	Fr	<1	VF	VSI	Ca	<1	VF	
									1	F	Abk					[1	
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PROFILI	:	7038-108					_				% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	ld Silt Loan	n				VEGET	ATION: Corn-	wheat fal	ow rotat	ion					
					Fine, st	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	ıs loess						
EPIPED	DN:	Mollic									COUNT	Texas Co	unty, Ok	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resea	ch and I	Extentio	n Center	, Goodw	eli, Oki	ahoma	
DATE S	AMPLED:	10	2/2000			DATE DE	SCRIBED		6/4/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm):								
		Jamie Patton																		
Herizon	Loren	Matrix optor	F	ield Texture		я	edox Feetur	1 1		Structure		Coatings	Con	B₀	ols	EH	Co	ncentrati	2	Bounda
	depth (cm)	(moiat)	Class	% Cley	% CF	Color	Amount	Siz+	Grade	Size	Shape	Туре		Ameunt	Size		Туре	Ami	Size	Diat
Ap	14	10YR 3/2	SIL	26	0				2	M	Sbk		Fr	<1	VF					Ā
									2	F/VF	Sbk				.					
BtA	42	10YR 3/2	SICL	34	0				2	M/F	Pr	Argillans	Fr	<1	VF					A
	1								2	F/VF	Abk								}	I.
Btk1	55	10YR 3/3	SICL	38	0				2	M/F	Pr	Argiilans	Fr	<1	VF	м	Ca	<1	VF	D
]	2	F	Abk									
Bk1	77	10YR 4/4	SICL	27	0				2	М	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	F/VF	D
									2	F	Abk						, i			
Bk2	91	10YR 4/4	SIL	24	0				2	м	Pr	Argilians	Fr	<1	VF	٧s	Са	<1	F	A
									2	F	Abk						İ			
Bk3?	97	10YR 3/2	SiL	23	0				2	М	Sbk	Argilians	Fr	<1	VF	SI	Ca	<1	VF	A
									3	M	Sbk			L		L				1
Bk4	97+	10YR 4/4	SiL	23	0				2	м	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	
								1	2	F	Pr							}	ļ	
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PROFIL	E:	703B-109									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	ki Silt Loan	1				VEGET	ATION: Corn-	wheat-fai	ow rota	tion					
					Fine, s	mectic, me	sic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	ıs ioess						
EPIPED	DN:	Mallic									COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	TURES;		Argillic						LOCA	TION: Panhand	le Reseau	ch and	Extentio	n Center	, Goodw	eli, Okia	ahoma	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBED		1/11/2001		CORE	LENGTH (cm):		122						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm):								
		Jamie Patton																		
Harigton	Lower	Mattria color	Ģ	lield Texture		R	idox Feature			Structure		Costings	Сел	P	xte	Eð	C0	ncentratio	na	Boundary
	depth (cm)	(moint)	Ciess	% Clay	% CF	Color	Amount	Sige	Grade	Size	Shape	Туре		Amount	9iqe		Туре	Amt	Size	Dist
Ap	12	10YR 3/2	SICL	34	0				3	C/M	Abk		Fr	<1	VF					D
				ł					2	M/F	Abk			f -						
AB	39	10YR 3/2	SICL	36	0				2	м	Pr	Argillans	Fr	<1	VF					A
			ľ	·					2	M/F	Abk						÷			
Bk1	60	10YR 4/3	SICL	35	0				2	C/M	Pr	Argiilans	Fr	<1	VF	vs	Са	1	м	D
									2	M/F	Abk									1
Bk2	79	10YR 4/6	SIL	26	0				2	м	Pr	Argillans	Fr	<1	VF	vs	Са	<1	VF	G
-									2	M/F	Pr									
Bk3	106	10YR 4/6	L	24	0				2	C/M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	VF	G
									2	M/F	Pr		1		ł			l l		
Bk4	106+	10YR 4/6	L.	24	ō				2	C/M	Pr	Argillans	Fr	<1	VF	vs	Са	<1	VF	
			1	_					3	M/F	Pr		1							
										1			t –	t	<u> </u>		<u> </u>	<u> </u>		t –
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			t	-									t	1	t					t T
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PROFIL	<u>.</u>	703B-110									% SLO	PE: <2%								
марры	PROFILE	CLASSIFICA	TION:		Richtie	id Sill Loan	n				VEGET	ATION: Com-	vheat-fal	low rotal	tion					
					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	ra joeza						_
EPIPED	DN:	Mollic									COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSU	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resea	rch and	Extentio	n Center	, Goodw	ell, Okli	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBEL		1/11/2001		CORE	LENGTH (cm):		107						
SAMPLI	D BY:	Jason Parlon				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Herizon	Lower	Matrix color	۶	ield Texture		В	edox Feeture	n		Structure		Coatings	Con	R	dis	£#	Co	centratio	D 8	Bounda
	depth (cm)	(mbist)	Class	% Clay	N CF	Color	Amount	Size	Grada	9iz.	Shape	Туре		Amount	9iqe		Туре	Am:	Size	Diari
Ap	7	10YR 3/3	SICL	34	0				2	м	Sbk		Fr	<1	VF					D
									2	F	Sbk									
AB	20	10YR 3/2	SICL	35	0				3	M	Abk		Fr	<1	VF					D
									з	F	Abk									L
BA	35	10YR 3/3	SICL	37	0				2	M/F	Pr	Argillans	Fr	<1	VF					A
				•					2	F	Pr									
Bw	43	10YR 5/3	SICL	35	0		L		3	M/F	Pr	Argillans	Fr	<1	VF	٧S				D
									3	F	Pr									
Bk1	66	10YR 5/3	SICL	33	0				2	C/M	Pr	Argillans	Fr	<1	VF	٧S	Са	1	м	D
									2	M/F	Pr			1					L	<u> </u>
Bk2	90	10YR 5/4	CL	34	0	ļ	Į		2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	G
				-		L		<u> </u>	3	M/F	Pr			_					 	
Bk3	90+	10YR 4/4	CL	33	0		ļ		2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	
			L	ļ	<u> </u>				2	M/F	Pr			1	<u> </u>				1	1
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_								<u> </u>		1		[1	1	1	1	I	

PROFILI	E;	703B-111									% SLO	PE: <2%								
MAPPEI	PROFILE	CLASSIFICA	TION:		Richtie	ld Silt Loan	١				VEGET	ATION: Com-	wheat-fall	ow rotal	ion					
					Fine, si	mectic, me	sic Aridic	Argiustoil			PAREN	T MATERIAL:	Calcariou	is loess						
EPIPEDO	DN:	Mollic									COUNT	TY: Texas Co	unty, Okł	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic]	LOCAT	ION: Panhand	e Resear	ch and I	Extentio	n Cente	, Goodw	eli, Okla	ahoma	
DATE S.	AMPLED:	10	12/2000			DATE DES	SCRIBED		1/11/2001		CORE	LENGTH (om);		104						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Pation			_	<u></u>														
Horizon	Lower	Matrix color		ield Texture		Pr	dox Feetur	r	L	Structure		Coalings	Can	R:	ote	EĦ	0	ncantratio	ine .	Boundary
	depth (cm)	(moiart)	Ciasa	% City	% CF	Color	Amount	Size	Grade	Size	Shape	Туре		Amount	Size		Тура	Amt	9iz+	Dist
Ap	12	10YR 3/2	SICL	34	0				3	c	Abk		Fr	<1	VF					D
									3	M/F	Sbk									
AB	29	10YR 3/2	SICL	38	0		L		2	C/M	Pr		Fr	<1	VF			1		A
									2	MF	Pr									
Bkt	34	10YR 3/4	SICL	36	0		l		2	C/M	Pr	Argilians	Fr	.<1	VF	s	Ca	<1	M/F	D
									2	M/F	Pr				_	L				
Bk2	55	10YR 5/3	SICL	34	0		L		2	C/M	Pr	Argiilans	Fr	<1	VF	vs	Ca	1	м	A
									3	M/F	Pr				L	I			<u> </u>	
Bk3	70	10YR 5/4	SICL	36	0				2	C/M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	VF	A
							<u> </u>	ļ	3	M	Abk									1
BC	70+	10YR 4/6	CL	32	0				2	M	Pr	Argilians	Fr	<1	VF	s	Ça	<1	VF	Ι.
									3	M	Sbk								L	
							L		ļ]		1		
				L	-			L				<u> </u>		ļ		1	ļ		L	\bot
	1								L	L		L							1	
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PROFILI	E;	703B-112									% SLO	PE: <2%								
MAPPED	PROFILE	CLASSIFICA	TION:		Richfiel	ki Silt Loar	n				VEGET	ATION: Corn-	vheat-fai	ow rotal	ion					
					Fine, s	neclic, me	sic Aridic	Argiustoll			PAREN	IT MATERIAL:	Calcario	rs loess						
EPIPEDO	DN:	Mollic									COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSUR	AFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	NON: Panhand	e Resea	rch and	Extentio	n Cente	, Goodw	eli, Oki	ahoma	
DATE S	AMPLED:	10	V2/2000			DATE DE	SCRIBED		1/11/2001		CORE	LENGTH (cm);		125						
SAMPLE	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Loperat	Maline color	F	aid Tegun		A	edox Featur			Structure		Costings	Con		ou	EN	C.	acentratic	M 18	Boundary
	depth (cm)	(meian)	Class	% Clay	% OF	Celor	Amount	Ske	Grada	Siza	Shape	Туре		Amount	Size		Туре	Amt	Size	Diat
Ap	17	10YR 3/2	SICL	28	0		L		2	M	Sbk		Fr	<1	VF					A
				1					2	F	Sbk									
AB	41	10YR 3/3	SICL	33	0				2	M	Sbk	Argillans	Fr	<1	VF					A
									2	F	Sbk									
Bw	52	10YR 4/4	SICL	29	0				2	F	Abk	Argillans	Fr	<1	VF	S				A
									2	۴	Abk									
Bk1	73	10YR 5/3	SIL	23	0				2	м	Abk	Argillans	Fr	<1	VF	٧S	Ca	3	M/F	Α
					{				2	M/F	Abk									1
Bk2	96	10YR 4/6	SIL	26	0				2	F	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	F	D
									2	F	Sbk									
Bk3	96+	7.5YR 4/6	SICL	29	0				2	м	Pr	Arglilans	Fr	<1	VF	s	Ca	<1	VF	1
									2	F	Pr			1						
												1		T		I				
									Γ									<u> </u>	I	
									I							1	1	1		1
	1												· ·							

PROFIL	E:	7038-113									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richlie	td Silt Loan	n				VEGET	ATION: Corn-	vheat-fail	ow rota	tion					
					Fine, s	mectic, me	sic Aridsc	Argustol			PAREN	T MATERIAL:	Calcariou	is looss						
EPIPED	DN:	Mollic									COUNT	Texas Co	unty, Okl	ahoma						
SUBSU	IFACE HO	RIZONS/FEAT	VRES:		Argillic						LOCAT	NON: Penhand	e Resear	ch and	Extentio	n Center	. Goodw	eli, Okh	ahoma	
DATE S	AMPLED:	1	2/2000			DATE DE	SCRIBE		1/11/2001	· ·	CORE	LENGTH (om):		110						
SAMPL	_	Jason Parton				DESCRIB	ED 8Y:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Maniation	Lower	Harit's color	· _ ·	Field Texture	_	R	edox Featur		L	Structure		Coatings	Con	В	oota	E#	Co	ncentratio	ana a	Boundary
	depth (unt)	(moint)	Ciazo	N-Clay	% OF	Color	Amount	9i2.•	Grade	37.	Shape	Туре		Amasont	-		Туре	Amt	Se.	Dist
Ap	12	10YR 3/2	SICL	27	0				1	м	Gr		Fr	<1	F/VF					A
				<u> </u>			<u> </u>		1	F	Gr									
BtA	33	10YR 3/3	SICL	36	¢				1_1_	M	Pr	Argilians	Fr	<1	F/VF				[A
				L	_				1	м	Abk									_
Bik	41	10YR 3/3	SICL	34	0		ļ		L1	M	Pr	Argilians	Fr	<1	F/VF	s	Ca	<1	VF	D
				<u> </u>			<u> </u>		1	м	Abk									
Bk1	58	10YR 4/3	SICL	32	0		ļ	 	1	M	Pr	Arglillans	·Fr	<1	VF	vs	Ca	<1	C/M	D
							Ļ		2	M/F	Abk			<u>ا</u>			L	L	L	L
Bk2	89	10YR 4/6	SICL	27	0		ļ		2	C/M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	F/VF	D
				<u> </u>				L	2	м	Pr			1		L		ļ	<u> </u>	ļ
Bk3	89+	10YR 5/6	L	25	0		L		2	C/M	Pr	Argilians	Fr	<1	VF	м	Ca	<1	F/VE	
				<u> </u>		<u> </u>			2	M	Pr			<u> </u>					<u> </u>	<u> </u>
							 		ļ	L							Į –	1	1	
	L		L	<u> </u>		<u> </u>		1	<u> </u>			l		I		L		Į	L	
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PROFILE	i:	703B-114									% SLO	PE: <2%								
MAPPED	PROFILE	CLASSIFICA	TION:		Richfie	d Silt Loan	۱				VEGET	ATION: Com-	wheat-fall	ow rota	tion					
					Fine, s	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcariou	e loose						
EPIPEDO	DN:	Moião									COUNT	Y: Texas Co	unty, Oki	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argilic						LOCAT	10N; Panhand	le Resear	ch and	Extentio	n Center	, Goodw	ell, Okli	ahoma	
DATE 5	AMPLED:	10	2/2000			DATE DE	SCRIBED	:	5/30/2002		CORE	LENGTH (cm):		120						
SAMPLE	ED BY:	Jason Parlon				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower	Matro color	F	iski Teztun		A	ndox Featur	n		Structure		Coatings	Con	8	oots	Eff	Co	nsentratio	ns.	Boundary
	depth (cm)	(moiet)	Class	X. Ciey	* 0*	Color	Anosent	Siz+	Grade	Size	Shape	Туре		Amount	_		Тура	Anni	Size	Dist
Ap	10	10YR 3/2	SIL	23	0				2	M/F	Gr		Fr	<1	F/VF					D
							L		2	F/VF	Gr									
81A1	32	10YR 3/2	SICL	28	0		 	l	2	M/F	Abk		Fr	<1	F/VF					D
									2	F	Abk									·
BtA2	40	10YR 3/2	SICL	28	0			ļ	2	м	Abk	Argillans	Fr	1	F/VF			ł		A
								ļ	2	F	Abk									
Bik1	50	10YR 4/3	SICL	30	0	ļ	ļ		2	<u>M</u>	Abk	Argillans	Fr	<1	VF		1	1		A
			_						2	F	Abk			<u> </u>						L
Bk1	66	10YR 4/4	SIL	25	0		ļ		2	M/F	Sbk	Argillans	Fr	<1	VF	s	Ca	<1	м	A
								ļ	2	F	Sbk			<u> </u>	<u> </u>		ļ	ļ		┢
Btk2	82	10YR 5/3	SICL	27	<u>'0</u>	ļ	ļ	 	3	M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	F/VF	D
						<u> </u>			2	M/F	Sbk		L						L	┢
Bk2	91	10YR 4/4	SiL	25	0		 		2	M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F/VF	D
						L	L	L	2	M/F	Pr		L	 	<u></u>		L		1	<u> </u>
Bk3	91+	10YR 4/6	SIL	23	0	l	ļ		2	C/M	Pr	Argillans	Fr	<1	VF	м	Ça	<1	F/VF	1
				1		I	· ·		2	м	Pr						l			

PROFIL	b	7038-201									% SLO	PE: <2%								
MAPPEL	PROFILE	CLASSIFICA	TION:		Richfie	d Silt Loan	n -				VEGET	ATION: Com-	wheat-tail	ow rola	lion					
					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	is loess						
EPIPEDO	ON:	Mollic									COUNT	Y: Texas Co	unty, Okl	ahoma						
SUBSUF	FACE HO	RIZONS/FEAT	URES:		Argilic						LOCAT	ION: Panhand	e Resear	ch and	Extentio	n Cente	, Goodw	i, Okla	ahoma	
DATE S.	AMPLED:	10	/2/2000			DATE DE	SCRIBED		5/30/2002		CORE	LENGTH (cm):		120						
SAMPL	D BY:	Jason Parton			_	DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (om):								
		Jamie Patton			_													_		
Horizon	Lower	Matrix codor	F	als Texture		8	edox Featur	M		Structure		Costings	Con	R	2011	EĦ	Co	centratio	n i	Bounda
	depth (cm)	(moian)	Cua	% Clay	% CF	Color	Amount	Size	Grøde	Size	Shape	Туре		Amount	Sige		Тура	Am	Sae	Disc
Ap	14	10YR 3/2	SICL	27	0				2	M	Abk		Fr	<1	VF					D
									2	F	Abk									
BA	29	10YR 3/2	SICL	. 28	0			l	2	м	Pr		Fr	<1	VF					D
									2	F	Abk						·			
Bt1	46	10YR 3/3	SICL	33	0				2	М	Pr	Argilians	Fr	<1	VF					A
_									2	F	Abk									
Bt2	56	10YR 4/3	Şil	25	0				2	C/M	Pr	Argillans	Fr	<1	VF					A
		_							2	M/F	Pr									
Bk1	81	10YR 5/3	SIL	20	0				2	M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F/VF	A
									2	М	Abk				1					
Bk2	95	10YR 4/6	SIL	23	0				3	м	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	D
									2	M/F	Pr									
Bk3	95+	10YR 4/4	SIL	23	0	1			2	C/M	Pr	Argilians	Fr	<1	VF	м	Ca	<1	VF	
_					1			_	2	м	Pr		L	I	1		I			
									1						T		Γ		•	
		•			1		1		T	[1	1			1			

PROFILI	:	7038-202									% SLO	PE: <2%								
MAPPEL	PROFILE	CLASSIFICA	TION:		Richfie	d Silt Loan	ŋ				VEGET	ATION: Corn-	wheat-fal	low rotat	ion					
		-			Fine, s	mectic, me	sic Aridic	Argiustoil			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	DN:	Mollic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	le Reseau	ch and	Extentio	n Center	Goodw	ell, Okla	ahoma	
DATE S.	AMPLED:	10	/2/2000			DATE DE	SCRIBEL		6/10/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Herizon	Loner I	Matrix color	F	leki Textum		P.	edox Feetura	n	—	Structure		Costings	Can	R	cia.	E۳	Co	ncentratio	m	Bounda
	depth (cm)	(moist)	đ	% Cley	% CF	Calor	Amount	Siz#	Grøde	9izo	Shep4	Тура		Amount	Sze		Туре	Amt	Size	Dian
Ap	17	10YR 3/2	SIL	26	0				2	C/M	Abk		Fr	<1	٧F					D
									2	M/F	Abk			1						
BtA	38	10YR 3/2	SICL	30	0				1	М	Pt .	Argillans	Fr	<1	٧F					Α
			·						2	F	Abk									
Btk	55	10YR 4/3	SICL	30	0				2	м	Pr	Argillans	Fr	<1	VF	м	Са	<1	٧F	A
				•					2	F	Abk		L							
Bk1	75	10YR 4/4	SICL	25	0				2	M	Pr	Argillans	Fr	<1	VF	٧S	Са	1	м	A
				{					2	F	Abk									1
Bk2	84	10YR 4/6	SiL	23	0				2	C/M	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	VF	G
									2	MF	Pr									1
Bk3	84+	10YR 4/4	SIL	23	0		L		3	C/M	Pr	Argilians	Fr	<1	VF	s	Ca	<1	VF	
									2	M/F	Pr				I		i			
									L											
				I	L											L				
				1 -					1		L	L		1	_		1			
	1			t			1		1					1	{			1		1

PR	OFILE	:	703B-203									% SLO	PE; <2%								
MA	PPED	PROFILE	CLASSIFICA	TION:		Richfiel	d Sill Loan	n				VEGET	ATION: Corn-1	wheat-lail	ow rotat	ion					
						Fine, sr	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	ts loess						
EP	IPEDO	M:	Mollic		_							COUNT	Y: Texas Co	unty, Ok	ahoma						
su	BSUR	FACE HO	RIZONS/FEAT	URES:		Argiilic						LOCAT	ION: Penhand	e Resear	ch and i	Extentio	n Center	Goodw	ell, Okla	ahoma	
DA	TE S/	MPLED:	10	2/2000			DATE DE	SCRIBED		5/30/2002		CORE	LENGTH (cm):		122				_		
SA	MPLE	_	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm):								
L			Jamie Patton							_					<u>.</u>			_			
но	rtzon	Lower	Maina color		ield Texture	· · · ·		adox Featur			Structure		Costings	Con		ota	EĦ		rcentratio		Boundary
		depth (cm)	(molat)	Class	% Clay	% CF	Golor	Amount	Size	Grade	9iza	Shape	Турө	_	Amount	S4.0		Туре	Ant	Siz.	Dist
1 4	۱p	12	10YR 3/2	SICL	27	0		 		2	M	Sbk		Fr	<1	VF					A
					· · · ·					2	M/F	Sbk			<u> </u>						<u> </u>
B	ltA	35	10YR 3/2	SICL	34	0		<u> </u>		2	M	Pr	Argillans	FI.	<1	VF					A
				-			—	-		2	F	Pr							<u> </u>		 .
1	Bt	57	10YR 3/3	CL	37	0		<u> </u>		2	M F	Pr Abk	Argillans	Fr	<1	VF	s		ł		A
			10YB 4/3	SICL	35		I		<u> </u>	2	C/M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	м	
1.6	tk1	78	10YH 4/3	SICL	35	0		 	 -	2	M/F	Abk	Argillaris	Fr	<1	VF	V5		<1	l M	1 ^
		106	10YR 5/3	SiL	25	0		<u>+</u>	 	2	C/M	Pr	Argilians	Fr	<1	VF	s	Ca	<1	VF	A
1	sk1	106	1011 5/3	SIL	25	Ů		<u>+</u>		2	M/F	Abk	Arguians		1	VC.	1	~~] "	l ^
F	ik2	106+	10YR 4/6	SiL	23	0		+	<u> </u>	3	C/M	Pr	Argillans	Fr	4	VF	vs	Са	<1	FNF	
1 °	NR2	1007	10111.4/0	0.2	20	ľ		<u>+</u>		3	M/F	Abk	Prigadata	1		1	1.0	1 ""	1.		1
										Ť	1		l	t	1	 	t –	<u> </u>	t—		1
								<u>†</u>		t				1			ļ	1	1		1
\vdash						1	1	1			1			<u> </u>	1 -	t	t –	—	1	1	t
1								†			1		t	1				1		1	1

PROFIL	E:	703B-204						_			% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richtie	ld Silt Loan	n				VEGET	ATION: Corn-	wheat-tal	ow rotal	ion					
					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	IT MATERIAL:	Calcario	us loess						
EPIPED	DN:	Mollic									COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES;		Argillic						LOCAT	NON: Panhand	le Resea	ch and i	Extentio	n Center	, Goodw	ell, Okla	thoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBED		8/4/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pat	ton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Harlzon	Lower	Marrix color	F	ield Texture	_	R	edox Feetun	н		Structure		Costings	Cen	R	eta.	Ett	Ca	ncentratio	A S	Boundary
	depth (cm)	(moint)	Ciese	% Ciay	% CF	Color	Amount	Size	Grede	San	Shape	Туре		Amount	Size		Тура	Amt	Size	Dian
Ap	20	10YR 3/2	SICL	27	0				2	М	Abk		Fr	<1	VF					A
									2	F	Abk									
BIA1	31	10YR 3/2	SICL	36	0		1		1	м	Pr		Fr	<1	VF					A
									2	۴	Pr									L
BtA2	46	10YR 3/2	SICL	38	0				2	М	Pr	Argillans	Fr	<1	VF					D
									2	M/F	Pr									
Btk	74	10YR 3/3	SICL	35	0				2	М	Abk	Argillans	Fr	<1	VF	٧S	Ca	<1	м	D
									2	M/F	Abk				1					
Bk1	97	10YR 4/4	SiL	23	0				2	M	Pr	Argilians	Fr	<1	VF	S	Ca	<1	VF	G
							T		2	M/F	Pr	[1							
Bk2	97+	10YR 4/6	SIL	26	0				2	M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	
							1		3	F	Abk		1		1			ì		1
								ł			T T		ł							
							1	1	1		1	T	1	1				1		
	t						1			<u> </u>	r			1						Γ
			1			[1	1	1	1	1	T	1	1			1	1		1

PROFILI	E: .	703B-205									% SL.01	PE: < 2 %								
MAPPET	PROFILE	CLASSIFICA	TION:		Richlie	ld Silt Loan	n				VEGET	ATION: Corn-1	vheat-fal	ow rotat	lion					
-					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	DN:	Mollic									COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	10N: Panhand	e Resea	ch and i	Extentio	n Center	, Goodw	eil, Okl	ahoma	
DATE S	AMPLED:	- 10	0/2/2000			DATE DE	SCRIBED		5/30/2002		CORE	LENGTH (cm):		120						
SAMPLE	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (om):								
		Jamie Patton													_					
Kerigan	3	Mauria color		wid Textur		А	edex Featur	99		Structure		Coatings	Çan	Rø	idu 🛛	EK	Ce	ncentretic	ina	Bounda
	depth (cm)	(neisn)	Ċises	% Clay	% CF	Çolor	Amount	Site	Grade	Size	Shape	Туре		Amount	Size		Турн	Ami	Su.	Dert
Ap	10	10YR 3/2	SiL	25	0				3	М	Pr		Fr	<1	VF					D
									2	M/F	Sbk									
BtA	32	10YR 3/2	SICL	30	0		1		2	M	Pr	Argillans	FI	<1	VF					A
					1				2	M/F	Pr									
Bt	45	10YR 3/3	SICL	32	0	l			2	M	Pr	Argillans	Fr	<1	VF	S				A
				<u> </u>					2_	F	Pr									
Bk1	58	10YR 5/3	SIL	24	0	L	1		2	M	Pr	Argillans	Fr	<1	VF	vs	Са	<1	м	A
									2	F	Abk									
Bk2	69	10YR 5/4	SiL	23	0	ļ	ļ		2	M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	VF	D
					1		[2	F	Abk								·	
Bk3	93	10YR 4/4	SIL	23	0		ļ	l	2	СЛМ	Pr	Argilians	Fr	<1	VF	vs	Ca	<1	VF	G
							<u> </u>		2	M/F	Pr			ļ						L
Bk4	93+	10YR 4/4	SIL	21	0	L		l	2	C/M	Pr	Argillans	Fr	<1	VF	м	Ca	<1	F/VF	1
						I		L	2	M/F	Pr	L						L	L	1
			1		1	L	<u> </u>		ļ	ļ		L	1			[· ·			1
					1	I	1		I	1			I			Ι	I		1	

PROFILI	E:	703B-206									% SLO	PE: < 2 %								
MAPPEI	PROFILE	CLASSIFICA	TION:		Richlie	ki Silt Loan	n				VEGET	ATION: Corn-	wheat-fail	ow rota	ion					
					Fine, s	mechic, me	sic Aridic	Argiustoil			PAREN	T MATERIAL:	Calcario	is looss						
EPIPEDO	ON:	Mollic									COUNT	Y: Texas Co	unty, Okl	ahoma					-	
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and I	Extentio	n Center	, Goodw	eli, Okla	ahoma	_
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBE		5/30/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower :	Marinta color	F	leid Texture		8	adox Featur			Structure		Ceatings	Con	R	ata .	E#	Ç.	ncentratio	103	Bounda
	depth (cm)	(moint)	Ciaa	X. Clay	%, CF	Color	Amount	Size	Grede	Size	Shepe	Тура		Amount	9ize		Туре	Amt	Size	Dist
Ар	23	10YR 3/2	SiL	25	0		 		2	M	Abk		Fr	<1	VF					D
									2	M/F	Abk									
BIA	34	10YR 3/2	SICL	32	0		ļ	l	1	M	Pr	Argillans	FI	<1	VF					A
									2	M/F	Abk									L
Bk1	51	10YR 3/3	SICL	28	0	J		ļ	2	M	Pr	Argilians	Fr	<1	VF	SI	Ca	<1	M/F	D
							<u> </u>		2	M/F	Abk			Ļ		I			I	_
Bk2	64	10YR 5/3	SIL	26	0	·	ļ		2	M	Pr	Argillans	Fr	<1	VF	s	Са	<1	M/F	D
									2	M/F	Abk			L		L	I			┢
Bk3	85	10YR 5/4	SIL	23	0		.	Į	2	C/M	Pr	Argilians	Fr	<1	VF	VS	Са	<1	VF	G
				ļ	I			<u> </u>	2	F	Pr			Ļ	<u> </u>	<u> </u>	Ļ	L		_
Bk4	101	10YR 4/6	SiL	19	0		 			C/M	Pr	Argilians	Fr	<1	VF	s	Са	<1	VF	G
							ļ	L	2	F	Pr			Ļ	ļ	I		<u> </u>	<u> </u>	┢
Bk5	101+	7.5YR 4/6	SIL	21	0		 	 	2	C/M	Pr	Argillans	Fr	1	V V	s	Ca	<1	F/VF	1
			<u> </u>					ļ	2	F	Pr							<u> </u>	<u> </u>	┢
	1					ļ	ļ		.	ļ		L		1	I I			l	1	1
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PROFIL	8	7038-207									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loar	n				VEGET	ATION: Corn-	wheat-fail	ow rota	tion					
					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	is loess						
EPIPEDO	XN:	Mollic									COUNT	Texas Co	unty, Oid	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	non: Panhand	e Resea	ch and	Extention	Center	Goodw	eil, Okl	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBED		1/5/2001		CORE	LENGTH (om):		122						
SAMPLE	D 8Y:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton	_																	
Horizon	Lower	Martria coller	,	aid Texture			edox Featur	**		Structure		Coatings	Con	В	erta	٤Ħ	Co	ncentratio	303	Boundary
	depth (cm)	(moint)	Class	* C49	% CF	Calor	Amount	Size	Grade	Size	Shape	Туре		Amount	Size		Туря	Ant	Size	Diaπ
Ap	11	10YR 2/2	SICL	31	0		L		3	F	Abk	Argilians	Fr	<1	VF					A
								ļ	3	F	Sbk									
AB	37	10YR 3/2	SICL	33	0				3	M/F	Sbk	Argillans	Fr	<1	VF					A
									3	F	Sbk]						
BA	48	10YR 3/4	SICL	33	0				2	M/F	Abk	Argilians	Fr	<1	FNF	S				D
									2	F	Abk									
Bk1	71	10YR 5/3	SiL	23	0				2	M/F	Pr	Argillans	Fr	<1	VF	vs	Са	<1	F/VF	G
					<u> </u>				2	F	Pr			Ł	1.				1	
Bk2	93	10YR 4/4	SiL	24	0				2	M/F	Abk	Argillans	Fr	<1	VF	vs	Ca	<1	VF	G
					L				2	F	Abk						1			L
BC1	104	10YR 4/4	SiL	24	0				3	M/F	Pr		Fr	<1	VF	vs	Са			G
								}	2	F	Abk							ł		
BC2	104+	7.5YR 4/6	SIL	23	0		L		3	M/F	Pr		Fr	<1	VF	S/M	Ca	<1	F	
						ł]	2	F	Abk			1						
																			<u> </u>	
				1	ł		T	1	T	1	Ι	I	ł			1	ł	1	1	1

PROFIL	E:	703B-208									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	ld Silt Loan	,				VEGET	ATION: Corn-	vheat-fal	ow rolal	ion					
					Fine, st	mectic, me	sic Aridic	Argiustoil			PAREN	T MATERIAL:	Calcario	us looss						
EPIPED	ON:	Mollic			_						COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	NON: Panhand	e Resear	ch and l	Extentio	n Center	, Goodw	eli, Oida	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBED		6/10/2002		CORE	LENGTH (cm):	·	120						
SAMPL	ED BY:	Jason Parton				DESCRIBI	ED BY:	Jamie Pa	Iton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Norizon	Lawar	Metrix color		ield Texture		Pe	dox Feetur			Structure		Costings	Can	Ro	ola 🛛	Eff	Çe	ncentratio	na .	Boundary
	depth (cm)	(maint)	Clase	% Clay	% CF	Color	Amount	Size	Grade	Size	Shape	Тура		Amount	Size		Туре	Arm	Sae	Dist
Aр	10	10YR 3/2	SIL	26	0				2	F	Pr		Fr	<1	VF					D
	I							L	2	F	Abk									
ABt	40	10YR 3/2	SICL	29	0		ļ		2	M/F	Pr		Fr	<1	VF					A
				·			<u>i</u>	<u> </u>	2	F	Abk									
Btk1	56	10YR 3/3	SICL	34	0				2	M/F	Pr	Arglilans	Fr	<1	VF	٧S	Ca	<1	VF	A
					-				2	F	Pr		<u> </u>							∔
Btk2	80	10YR 5/3	SICL	26	0			l	2	M/F	Pr	Argilians	Fr	<1	VF	vs	Са	1	м	A
	L						<u> </u>	<u> </u>	2	F	Abk		· · ·	<u> </u>			L		ļ	₊
Bk1	99	10YR 4/4	SICL	24	0		 	Į	2	M/F	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	G
						Į	<u> </u>	ļ	2	F	Pr			<u> </u>		<u> </u>		<u> </u>		╄
Bk2	99+	7.5YR 4/4	SICL	23	0				3	C/M	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	1
		L			<u> </u>				3	M/F	Pr	 		_	┝──		 	<u> </u>	┣	┿
	1				1		<u> </u>		 	·	Į	 		1						
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PROFILI	E:	7038-209									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	kt Silt Loan	n				VEGET	ATION: Corn-)	vheat-fail	ow rotal	ion					
					Fine, si	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	is loess						
EPIPED	ON:	Mollic									COUNT	Y: Texas Co	unty, Oid	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and	Extentio	n Center	Goodw	ell, Okla	homa	
DATE S.	AMPLED:	50	2/2000			DATE DE	SCRIBED		1/5/2001		CORE	LENGTH (cm):		117						
SAMPLE	D BY:	Jason Parton				DÉSCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horson	Lower	Matria color	,	ield Texture		B	odox Featur	13		Structure		Coelings	Con	Re	ota	En	Co	ncentratio		Boundar
	depth (cm)	(moiat)	Class	% Clay	N OF	Color	Amount	Sz.	Grade	Size	Shape	Тура		Amount	Size		Туре	Amt	Size	Dissi
Ap	11	10YR 3/2	SICL	27	0		L		2	M/F	Sbk		Fr	1	VF					A
									2	F	Sbk									L
Α	28	10YR 3/3	SICL	28	0		 		2	MF	Sbk		Fr	<1	VF					G
									2	F	Sbk									
AB	38	10YR 3/4	SICL	29	0	L			2	F_	Sbk	Argillans	Fr	<1	VF					A
								<u> </u>	2	F	Sbk									
BA	50	10YR 3/4	SICL	32	0		↓	ļ	2	M	Pr	Argillans	Fr	<1	VF	S/M				D
					1		ļ	<u> </u>	2	F	Pr			L						L
Bk1	69	10YR 5/3	SICL	30	0		ļ	ļ	2	M	Pr	Argillans	Fr	<1	VF	vs	Ca	з	M/F	G
					ļ	1	<u> </u>	<u> </u>	2	F.	Pr								L	<u> </u>
Bk2	82	10YR 4/6	SICL	27	0		f		2	M	Pr	Argillans	VFr	<1	VF	vs	Св	<1	F	G
					1		<u> </u>	<u> </u>	2	F	Pr				ļ			·	L	I
Bk3	104	10YR 4/4	SiL	25	0		_		2	M	Pr	Argillans	Fr	<1	VF	vs	Са	1	VF	G
					L	L	1	<u> </u>	2	F	Sbk	L	L	 	<u> </u>		L			_
Bk4	104+	7.5YR 4/6	SIL	22	0	ļ	_	Į	2	M	Pr	L	Fr	<1	VF	vs	Ca	1	VF	1
					<u> </u>	I			2	F.	Sbk	l	L	1	1			1	l	1

PROFIL	E:	703B-210									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loan	n				VEGET	ATION: Com-	wheat-fai	low rotal	ion					
					Fine, s	mectic, me	sic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	us koess						
EPIPED	ON:	Mollic									COUNT	Y: Texas Co	unty, Oid	ahoma						
SUBSUA	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and	Extentio	n Center	, Goodw	eli, Old	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBEL		6/10/2002		CORE	LENGTH (cm);		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower	Metrix color	5	ield Texture		. 8	adox Feature	1		Structure		Coatings	Con	R	ets .	En	Co	ncentratio		Boundary
	depth (cm)	(moin)	Class	% Clay	* CF	Color	Amount	Szo	Grade	Size	Shape	Туре		Amount	Sae		Туре	Am;	9ize	Diat
Ap	13	10YR 3/2	SiL	26	0				2	м	Pr		Fr	4	VF					D
									2	M/F	Abk								1.0	
ABt	40	10YR 3/2	SICL	33	0				2	M/F	Pr		Fr	<1	VF					A
									2	F	Pr									
Btk1	63	10YR 5/3	SICL	28	0				2	М	Pr	Argillans	Fr	<1	٧F	vs	Ca	<1	м	A
									2	F	Pr					I				
Btk2	77	10YR 5/2	SICL	27	0				2	M/F	Pr	Argiilans	Fr	<1	VF	s	Ca	<1	VF	D
	i						1		2	F	Abk			ł						L
Bk1	98	10YR 5/4	SIL	25	0				2	C/M	Pr	Argillans	Fr	<1	VF	S	Ca	<1	VF	G
							I		2	M/F	Pr									
Bk2	98+	7.5YR 4/4	SIL	25	0		I		3	C/M	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	
		·							3	M/F	Pr									
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PROFIL	E:	703B-211									% SLO	PE: <2%								
MAPPE	D PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loan	n				VEGET	ATION: Corn-	wheat-fai	low rota	tion					
					Fine, s	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mollic								1	COUNT	TY: Texas Co	unty, Ok	lahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES;		Argillic						LOCAT	TON: Panhand	le Resea	rch and	Extentio	n Cente	r, Goodw	rell, Okla	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBEL		6/10/2002		CORE	LENGTH (cm):		120			÷			
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	Iton			DIAMETER (cm):								
		Jamie Patton								·										
Horizon	(crimer	Maleix cotor	F	ield Texturn		B	edox Feeture	n		Structure		Coatings	Cen	Be	oris -	EH	C.	ncentratio	ins.	Bounder
	depth (cm)	(moint)	Class	% Clay	¥.CF	Calor	Amount	Size	Grade	St.	Shape	Туре		Amount	Size		Туре	Amt	Size	Diarl
Ap	13	10YR 3/2	SIL	25	0				2	М	Sbk		Fr	<1	VF					D
				ļ				******	2	F/VF	Sbk						1			
AB	23	10YR 3/2	SICL	29	0				2	F	Pr	Argillans	Fr	<1	VF					G
									2	VF/F	Abk						1			
BtA	49	10YR 3/2	SICL	32	0				2	М	Pr	Argilians	Fr	<1	VF		1			A
	1								2	M/F	Abk									
Bk1	83	10YR 4/3	SICL	27	0				2	C/M	Pr	Argillans	Fr	4	VF	s	Ca	<1	M	D
							1		2	M/F	Pr		1					1		
Bk2	83+	10YR 4/6	SIL	24	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	
							1		2	M/F	Pr		1			ł	1	1	ļ	
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PROFIL	E:	703B-212									% SLO	PE: < 2 %								-
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	id Sil! Loan	۹				VEGET	ATION: Corn-	vheat-fali	ow rotal	tion					
					Fine, s	mectic, me	sic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Moilic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and	Extentio	n Cente	Goodw	eli, Okia	ahoma	
DATE S.	AMPLED:	10	/2/2000			DATE DE	SCRIBE		6/8/2002		CORE	LENGTH (cm):		105						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	ton		CORE	DIAMETER (cm):								
L		Jamie Patton																		
Hanizon	Lower	Metrix color	F	ield Texture		8	dox Featur			Structure		Coatings	Con	84	oh	E#	C0	ncentratio	n ı	Boundary
_	depth (cm)	(maint)	Class	% Clay	% CF	Çolar	Amount	Si2•	Grade	9iz.	Shape	Туре		Amount	Size		Тур∙	Ant	Size	Diet
Ap	9	10YR 3/2	SIL	26	0				2	M	Sbk		Fr	<1	VF					D
									2	F	Sbk									
ABt	35	10YR 3/2	SĮC	41	0		ļ		1	M	Pr	Argillans	FI	<1	VF					A .
									1	M/F	Pr									
Btk	56	10YR 4/3	SICL	30	0				2	M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	м	D
									2	M/F	Pr			 		l	ļ			
Bk1	69	10YR 4/4	SICL	27	0	ļ	 		2	M/F	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	D
					-	 			2	F	Abk	L		L			<u> </u>	ļ		┝
Bk2	80	10YR 4/4	SIL	26	0	ļ			2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	G
			 .		<u> </u>	L	<u> </u>		2	M/F	Pr			_		<u> </u>	_	<u> </u>		╞
Bk3	80+	7.5YR 4/4	SIL	26	0	ļ	 		2	C/M	Pr	Argilians	Fr	<1	VF	s	Ca	<1	VF	1
—	<u> </u>	L		ļ		<u> </u>	<u> </u>	<u> </u>	2	M/F	Pr			 	1	 	┥	ļ		
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PROFIL	E:	703B-213							Y		% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	ki Silt Loan	n				VEGET	ATION: Corn-	whoat-fail	ow rota	tion					
					Fine, s	mectic, me	sic Aridic	Argiustoli			PAREN	T MATERIAL:	Calcario	is loess						
EPIPED	ON:	Mollic									COUNT	Texas Co	unty, Okl	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCA	ION: Panhand	e Resear	ch and	Extentio	n Cente	, Goodw	ell, Okl	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBED	:	6/4/2002		CORE	LENGTH (cm):		120						
SAMPLI		Jason Parton				DESCRIB	ED BY:	Jamie Pa	ton		CORE	DIAMETER (om):								
		Jamie Patton															_			_
Horizon	Lower	Matrix color		leki Textura			doz Feelun			Siructure		Costings	Con		eta .	Eff		ncentretix		Boundary
	depth (cm)	(moint)	Clens	% Clay	¥ CF	Color	Amount	9ize	Grade	Size	Shape	Туре		Amount	Size	-	Туре	Amt	Size	Dien
Ap	12	10YR 3/2	SIL	26	0				2	M	Sbk		Fr	<1	VF					A
				<u> </u>			<u> </u>		2	F	Sbk									
BtA	41	10YR 3/2	SICL	38	0		ļ		1	M	Pr	Argillans	Fr	<1	VF					A
				<u> </u>					2	M/F	Abk						_		_	
Btk	64	10YR 4/3	SICL	29	0		ļ		2	M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	M/F	D
									2	M/F	Abk							<u> </u>		
Bkt	76	10YR 4/4	SiL	25	0		ļ			M	Pr	Argillans	Fr	<1	VF	٧S	Са	<1	M/F	D
_					<u> </u>		-	 	1	F	Abk			<u> </u>			-	<u> </u>		
Bk2	101	10YR 4/6	SiL	20	0		+	 	2	M	Pr	Argilians	Fr	<1	VF	vs	Ca	<1	VF	G
		-					ļ		2	M	Abk								1 1/5	╂──
Bk3	101+	7.5YR 4/6	SiL	23	10				2	M	Pr	Argilians	Fr	<1	VF	SI	Ca	<1	VF	1
		L							2	M/F	Abk		· · ·	–		1		+		
									 	<u> </u>	 	 	1			1				1
		┣━━━━	<u> </u>		—	<u> </u>		<u> </u>				<u> </u>		–			ł			<u> </u>
	1					}	<u>+</u>		+							1		1		1
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PROFIL	E:	703B-214									% SLO	PE: < 2 %								
MAPPEI	PROFILE	CLASSIFICA	TION:		Richtie	id Silt Loar	n				VEGET	ATION: Corn-1	wheat-fail	ow rotal	tion			-		
					Fine, s	mectic, me	sic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	is loess						
EPIPED	ON:	Mollic									COUNT	TY: Texas Co	unty, Okl	ahoma						
SUBSU	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	NON: Panhand	e Reseau	rch and l	Extentio	n Center	, Goodw	ell, Okli	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBE		6/4/2002		CORE	LENGTH (cm):		120						
SAMPLE	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton													_					
Horizon	Lawer	Metrix color	F	Teld Texture		8	dox Featur			Structure		Coatings	Con	Pe	ota	Eff	Co	tcentratio	na	Boundary
	depth (cm)	(moiet)	Class	% Clay	N. CF	Color	Amount	Size	Grada	Siz•	Sheps	Туре		Amount	Size		Туре	Amt	Size	Diat
Ap	10	10YR 3/2	SIL	26	0				2	м	Sbk		Fr	<1	VF					D
		·							2	F/VF	Gr									
BIA	35	10YR 3/2	SICL	36	0		ļ	l	2	M	Pr		Fr	<1	VF					G
									2	M/F	Pr							•		
Bt	49	10YR 3/3	SICL	31	0				1	M	Pr	Argillans	Fr	<1	VF					A
								L	_1	M/F	Pr									
Bk1	65	10YR 4/4	SICL	28	0		<u> </u>		2	м	Pr	Argillans	Fr	<1	VF	s	Ca	<1	м	D
									2	F	Abk									
Bk2	82	10YR 4/4	SIL	25	0	.	L		2	C/M	Pr	Argillans	Fr	<1	VF	s	Са	<1	M/F	D
							<u> </u>		2	M/F	Pr						L			
Bk3	82+	10YR 4/6	SiL	23	0				2	M	Pr	Argillans	Fr	<1	VF	м	Ca	<1	F/VF	ł
					1				2	F	Pr				·					<u> </u>
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PROFIL	E:	703B-301									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loan	۱				VEGET	ATION: Com-	wheat-fail	ow rotat	ion					
					Fine, st	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	s loess						
EPIPED	DIN:	Molfic									COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSU	AFACE HO	RIZONS/FEAT	URES;		Argillic						LOCAT	10N: Panhand	e Resear	ch and i	Extentio	n Center	, Goodw	eli, Okla	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBED		6/4/2002		CORE	LENGTH (cm):		114						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tion		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower	Matria color	E	ield Texture		R	dox Featur			Structure		Coatings	Cen	Re	ola 🛛	EH	Co	ncentratio	ens	Boundary
	depth (cm)	(moint)	Ciasa	% Cłay	% CF	Calor	Amount	Size	Grøde	Siza	Shape	Туре		Ameunt	Size		Туре	Amt	Size	Dist
Ap	11	10YR 3/2	SICL	36	0				2	C/M	Sbk		Fr	<1	VF					A I
									2	м	Sbk									
AB	36	10YR 3/2	SICL	36	0				1	M	Pr		Fr	<1	VF					A
									2	M/F	Pr									
BA	63	10YR 3/3	SICL	33	0				2	M	Sbk	Argillans	Fr	<1	VF	м	Са	<1	VF	A
								I	2	F	Sbk									ļ
Bk1	82	10YR 4/3	SIL	26	0		ļ		3	M	Pr	Argillans	Fr	<1	VF	vs	Ca	<1	M/F	D
								<u> </u>	2	M/F	Sbk			_				Į		┝──
Bk2	95	10YR 4/4	SiL	20	0		ļ		2	M	Pr	Argilians	Fr	<1	VF	vs	Ca	<1	VF	G
	L						1	1	2	F	Abk			Ļ		· ·			<u> </u>	∔
Bk3	95+	7.5YR 4/6	SIL	20	0				2	M	Pr	Argilians	Fr	<1	VF	м	Св	<1	VF	1
					ļ		I—	<u> </u>	3	F	Abk	L	I	 		<u> </u>	I	 	<u> </u>	_
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		L		<u> </u>	<u> </u>	I	└──	ļ	I	l		ļ	L			Į	ļ	-	-	—
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		703B-302									% SLO	PE: <2%								
PROFIL				_			_													
MAPPEI	PROFILE	CLASSIFICA	TION:			id Silt Loar							wheat-fal							
					Fine, s	mectic, ma	sic Aridic	Argiustoil					Calcario							
EPIPED	DN:	Mollic		· · · · · -							COUN	TY: Texas Co	unty, Ok	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCA	TION: Panhand	e Resea	ch and	Extentio	n Center	, Goodw	ell, Okla	ahoma	
DATE S	AMPLED:	10	v2/2000			DATE DE	SCRIBED	<u> </u>	6/4/2002		CORE	LENGTH (cm):		120						
SAMPLI	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	lton		CORE	DIAMETER (om):								
		Jamie Patton		_																
Harlzon		Matrix color	F F	wid Texture		R	edox Feetur	 m		Structure		Coatings	Сол	Be	icta	EØ	Ce	ncentrație	nş	Boundar
	depth (cm)	(moist)	Class	% Ciay	% CF	Color	Amount	9ize	Grade	Size	Shape	Тура		Amount	Sue		Туре	Amt	Sae	Dan
Ар	13	10YR 3/2	SICL	32	0		<u> </u>		2	м	Abk		Fr	<1	VF					A
· 7									2	F	Abk									
AB	34	10YR 3/2	SICL	33	0				2	м	Abk		Fr	<1	VF					A
				1					2	F	Abk									
BIA	56	10YR 3/3	SICL	39	0		1		2	м	Pr	Argillans	Fr	21	VF	Si	Ca	<1	VF	D
0 In	~	10.110.0	0.01	1	Ĭ				2	M/F	Abk			1 .						-
Bk1	75	10YR 3/4	SICL	28	0		1		2	M	Pr	Argillans	Fr	<1	VF	٧S	Са	<1	м	D
DK I	13	101110/4			ľ				2	M/F	Pr	Aigman		1 ° '	j • · ·		.			1
Bk2	108	10YR 4/4	SIL	26	0			<u> </u>	2	M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	G
BKZ	108	101114/4	31	20			+		2	M/F	Pr			` '	VF.	l °	~	-	•	l °
-	100	7.5YR 4/6	SIL	21	0				2	C/M	Pr	Amillono	Fr	1	VF	s	Ca	<1	VF	+
Bk3	10B+	/,5YH 4/6	SIL	21	0		+		• ••••			Argillans	r.	1		°	Ca.	<1		
	<u> </u>		I	 		—		<u> </u>	2	M/F	Pr			╉──		 		-	├	+
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PROFIL	E:	703B-303									% SLO	PE: < 2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richlie	ld Silt Loar	<u>ה</u>				VEGET	ATION: Corn-	wheat-fal	iow rota	tion					
					Fine, s	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	us loess						
EPIPED	ON:	Mallic									COUN	TY: Texas Co	unty, Ok	lahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	TION: Panhand	e Resea	rch and	Extentio	n Center	Goodw	ell. Okl	aboma	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBEL		6/4/2002		CORE	LENGTH (em):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton							-											
Harizan	7.000	Mairix color	F	ield Textur		R	adox Feature	4		Structure		Coalings	Don	Ro	651	EĦ	Co	ncentratio	oha	Bound
	depth (cm)	(moiat)	Ciana	% City	%.CF	Color	Amount	Size	Grada	Sz.	Shape	Туре		Amount	Size		Туре	Ami	Size	Diel
Ap	17	10YR 3/2	SIL	25	0				2	M/F	Gr		Fr	<1	VF					D
									2	FNF	Gr									Į
BtA	46	10YR 3/2	SICL	32	0				2	M	Pr	Argillans	Fr	<1	VF					A
									2	M/F	Abk									
Bt	59	10YR 4/3	SICL	36	0				2	М	Pr	Argillans	Fr	<1	VF					D
									2	F	Abk									
Bk1	70	10YR 4/3	SICL	28	0				2	C/M	Sbk	Argillans	Fr	<1	VF	м	Ċв	<1	F/VF	D
									2	M/F	Sbk									
Bk2	91	10YR 4/4	SIL	24	0				3	М	Pr	Argilians	Fr	<1	VF	s	Ca	<1	VF	G
							1		2	M/F	Abk									
Bk3	107	10YR 4/4	SiL	24	0		L		3	М	Pr	Argillans	Fr	<1	VF	٧S	Ca	<1	VF	G
									3	M/F	Abk									
Bk4	107+	10YR 4/6	SIL	22	0		1		3	M	Pr	Argillans	Fr	<1	VF	м	Ca	<1	VF	
					1				3	M/F	Abk		l					1		[
										1										1
	۱ I				1		T			1			1	1		1	1	1		

PROFIL	E:	7038-304									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richlie	ld Silt Loan	n				VEGET	ATION: Com-	wheat-fall	ow rotal	tion					
					Fine, s	mectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	is looss						
EPIPED	DN:	Moilic									COUNT	Y: Texas Co	unty, Old	ahoma						
SUBSU	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and	Extentio	n Center	, Goodw	eil, Okia	ahoma	_
DATE S	AMPLED:	11	/2/2000			DATE DE	SCRIBED		6/4/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lawer	Metrix color	F	and Texture	,	В	ndox Featur			Structure		Coatings	Con	R	acta .	Eff	Co	ncentratic	-	Boundary
	depth (cm)	(moint)	Ciesa	% Clay	% CF	Calor	Amount	Size	Grede	82.	Shepe	Туре		Amount	Size		Туре	Ami	Se•	Diat
Ap	8	10YR 3/2	SICL	30	0		L		З	м	Abk	Argilians	Fr	1	VF					D
									3	F	Abk									
AB	33	10YR 3/2	SICL	32	0				2	M	Abk	Argillans	Fr	<1	VF					A
									2	F	Abk									
BA	40	10YR 3/3	SICL	28	0				2	F	Sbk	Argillans	Fr	<1	VF					D
									2	F	Sbk									
Bw1	58	10YR 4/3	SICL	28	0				2	M/F	Abk	Argillans	Fr	<1	VF	٧s				G
									2	F	Abk									
Bw2	81	10YR 4/4	SIL	25	0				2	С	Pr	Argilians	Fr	<1	VF	٧S	Ca	<1	VF	G
									2	M/F	Pr									
Bw3	100	10YR 4/4	SIL	22	0				2	М	Pr	Argillans	Fr	<1	VF	S				G
							_		2	F	Pr				1					
CB	100+	7.5YR 4/4	SiL	23	0				3	м	Sbk	Argiilans	Fr	<1	VF	s				
							1		2	M/F	Sbk							1	1	
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PROFIL	E:	703B-305									% SLO	PE: < 2 %								
MAPPE	D PROFILE	CLASSIFICA	TION:		Richfie	id Siit Loan	n				VEGET	ATION: Com-	wheat-fal	ow rota	ion			_		
					Fine, s	mectic, me	sic Aridic	Argiustoil			PAREN	T MATERIAL:	Calcario	is looss						
EPIPED	ON:	Mallic				_					COUNT	Y: Texas Co	unty, Ok	ahoma						
รบธรม	RFACE HO	RIZONS/FEAT	URES:		Atgillic						LOCAT	NON: Panhand	le Reseau	ch and	Extentio	n Cente	, Goodw	eil, Okl	ahoma	
DATE S	AMPLED:	10	2/2000			DATE DE	SCRIBED		6/4/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamle Patton																		
Horizon	1.000	Mastria color	F	aid Texture		R R	edox Featur			Structure		Coatings	Cox	R	ota	En	Co	ncentratic	163	Boundar
	depth (cm)	(mobr)	Ciasa	% Clay	% OF	Color	Amount	Sz.	Grede	Size	Shape	Туре		Amount	Sze		Туре	Amit	Si2+	Diat
Ap	10	10YR 3/2	SiL	26	0				2	м	Sbk		Fr	<1	٧F		1.			D
									2	F	Sbk		· .							
BIA1	26	10YR 3/2	SICL	35	0				2	м	Pr		Fr	<1	VF					D
1									2	F	Pr									
BIA2	43	10YR 3/2	SICL	33	0		1		2	M	Pr	Argillans	Fr	<1	VF					A
									2	F	Pr									
Blk	62	10YR 3/2	SICL	32	0				2	М	Pr	Argilians	Fr	<1	VF	м	Ca	<1	M/F	D
									2	M/F	Abk									
Bki	79	10YR 4/3	SiL	25	0]		2	м	Pr	Argilians	Fr	<1	VF	s	Св	<1	M/F	D
									2	M/F	Abk									
Bk2	98	10YR 5/4	SIL	21	0				2	м	Pr	Argiilans	Fr	<1	VF	s	Ca	<1	VF	G
·									2	M/F	Abk									
Bk3	98+	7.5YR 4/6	SIL	19	0				2	C/M	Pr	Argilians	Fr	<1	VF	м	Ca	<1	VF	
									2	M/F	Pr			l				L	1	
			1.1											1					1	
				1	1		1	1		[I	I I	1					1

PROFIL	E:	703B-306									% SLO	PE: <2%			-					
MAPPEI	D PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loan	n				VEGET	ATION: Corn-1	wheat-fall	ow rota	tion					
					Fine, s	mectic, me	sic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	us koess						
EPIPED	ON:	Mollic						_			COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSU	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	le Resear	rch and	Extentio	n Center	, Goodw	eli, Oki	ahoma	
DATE S	AMPLED:	10	x/2/2000			DATE DE	SCRIBED		11/1/2001		CORE	LENGTH (cm):		122						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower	Mastix color	۳.	iald Texture		A	edox Feature	2		Structure		Coatings	Con	R	rota .	EH	Co	ncentratio	ms	Boundary
	depth (cm)	(meat)	Ciase	% Citry	% CF	Celor	Amount	Size	Gtade	Siza	Shape	Туре		Amount	Size		Тура	Amt	Size	ры
Ap	11	10YR 3/2	SICL	30	0				3	М	Abk		Fr	<1	VF					A
									3	F	Abk									
BA1	33	10YR 3/3	SICL	33	0				2	М	Pr	Argillans	Fr	<1	VF					D
									2	F	Pr									
BIA .	42	10YR 3/3	SICL	35	0			_	2	М	Pr	Arglilans	Fr	<1	VF					A
					I				2	F	Pr									
BkA	50	10YR 3/3	SICL	33	0				2	F	Pr	Argillans	Fr	<1	VF	м	Ca	<1	F/VF	D
									2	F	Abk									
Bk1	57	10YR 4/3	SICL	30	D				2	м	Sbk	Argillans	Fr	<1	VF	VS	Ca	<1	VE	A
	I								2	F	Sbk			1						
Bk2	70	10YR 5/3	SICL	29	0				2	M/F	Abk	Argillans	Fr	<1	VF	vs	5 Ca <1 VF 5 Ca <1 VF		VF	D
									2	F	Abk		1				S Ca <1 VI S Ca <1 VI			
BkC	82	10YR 4/4	SICL	27	0				3	M	Pr	Argilians	Fr	<1	VF	vs	5 Ca <1 VF 5 Ca <1 VF 5 Ca <1 VF 5 Ca <1 VF		VF	G
								1	3	F	Pr			<u> </u>	<u> </u>		S Ca <1 VF S Ca <1 VF S Ca <1 VF S Ca <1 VF			
CB1	95	10YR 4/4	L	25	0		1		3	C/M	Pr	Argillans	Fr	<1	VF	s				G
				I		<u> </u>	1	1	3	M/F	Pr				L		I	I		
CB2	95+	10YR 4/6	L	25	0	ļ	L	l	3	C/M	Pr	Argillans	Fr	<1	VF	s			1	
							}		3	M/F	Pr							1		1

PROFILI	E:	703B-307									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	d Sill Loan	n				VEGET	ATION: Corn-1	wheat-tai	ow rotat	ion					
					Fine, s	nectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	is loess						
EPIPED	DN:	Moilic									COUNT	Y: Texas Co	unty, Ok	ahoma						
SUBSUF	FACE HO	AIZONS/FEAT	URES:		Argillic						LOCAT	ION: Panhand	e Resear	ch and I	Extentio	n Center	Goodw	eli, Oida	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBE		6/3/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		_
Horizon	Lanner	Metra color	۴.	ald Texture	_	R	edox Featur			erutura		Coatings	Con	Re	8	Eff	Co	ncentratio	ina	Boundar
	depth (cm)	(theat)	Class	% Clay	% CF	Color	Amount	Size	Glade	Siz•	Shape	Туре		Amount	Sze		Туре	Amt	Size	Diet
Ap	19	10YR 3/2	SICL	30	0				2	M	Sbk		Fr	1	VF					D
									2	F	Sbk									
BIA1	41	10YR 3/2	SICL	35	0				2	М	Sbk	Argilians	Fr	<1	VF					A
									2	M	Sbk									
Btk	56	10YR 3/3	SICL	35	0				2	М	Pr	Argillans	Fr	<1	VF	S/M	Ca	<1	M/F	A
									2	M/F	Abk								_	1
Bk1	71	10YR 4/4	SIL	22	0			[· · · -	2	м	Pr	Argillans	Fr	<1	VF	VS	Ca	<1	M/F	D
							Τ]	3	M/F	Sbk			İ						
Bk2	102	10YR 4/4	SIL	21	0				2	м	Abk	Argillans	Fr	<1	VF	м	Са	<1	VF	G
							T]	2	M/F	Abk									1
Bk3	102+	10YR 4/6	SIL	18	0				2	м	Abk	Argillans	Fr	<1	VF	M	Ca	<1	VF	1
]	2	M/F	Abk									
										<u> </u>				Γ					I	—
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MAPPEI	PROFILE	CLASSIFICA	TION:		Richfie	d Silt Loan	<u> </u>				VEGET	ATION: Com-v	vheat-fal	ow rotat	ion					
					Fine, s	nectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	is loess						
EPIPED	ON:	Mollic									COUNT	Y: Texas Co	unty, Oid	ahoma						
SUBSU	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	10N: Panhand	e Resea	ch and I	Extentio	n Cente	, Goodw	ell, Okla	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DES	SCRIBEC		1/5/2001		CORE	LENGTH (cm):		108						
SAMPLI	D BY:	Jason Parton				DESCRIBI	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lawer	Malifia color	F	ield Textur	,	Re	dox Feetur			Structure		Costings	Con	Ro	ota	E#	Co	ncentretio		Bounda
	depth (cm)	(moiet)	Casa	% Clay	* OF	Color	Amount	Siz.	Grade	Size	Shape	Түрө		Amount	Size		Туре	Amt	See	Dist
Ap	10	10YR 3/2	SICL	36	0				з	F	Sbk		Fr	<1	VF					Α
									2	FNF	Gr									
AB	34	10YR 3/2	SICL	36	0				2	M	Abk	Arglilans	Fr	<1	VF					Α
									2	F	Abk									
BkA	53	10YR 3/4	SICL	35	0				2	М	Abk	Argillans	Fr	<1	VF	s	Ca	1	M/F	A
									2	M/F	Abk									L
Bk1	73	10YR 4/3	SICL	28	D				2	C/M	Pr	Argillans	Fr	<1	VF	vs	Ca	з	м	A
									2	M/F	Pr									
Bk2	95	7,5YR 4/6	SiL	25	0				2	M	Pr	Argilians	Fr	<1	VF	s	Са	<1	F/VF	D
	1						1		2	F	Pr						L		L	L.,
Bk3	95+	7.5YR 4/6	SIL	25	0				2	M	Abk	Argillans	Fr	<1	VF	s	Ca	<1	F/VF	ł.
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MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	ki Silt Loan	D				VEGET		wheat-tail	ow total	tion					
					Fine, s	mectic, me	sic Aridic	Argiustoli		_			Calcario							
EPIPED	ON:	Mollic						_			COUNT		unty, Ok	ahoma						
SUBSU	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	TION: Panhand	e Resear	ch and	Extentio	n Center	, Goodw	eli, Okl	ahoma	
DATE S	AMPLED:	10	x2/2000			DATE DE	SCRIBED	_	8/4/2002		CORE	LENGTH (cm):		120						
SAMPL	ED BY:	Jason Parton			_	DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (cm):								
		Jamie Patton																		
Horizon	Lower	Matrix color	F	ield Texture		В	edox Festur	8		Structure		Coatings	Con	Be	iota 🔤	88	Co	ncentralic	ina)	Boundary
	depth (cm)	(maint)	Class	% Clay	N CF	Color	Amount	Size	Grede	Size	Shape	Type		Amount	Size		Туре	Amt	Size	Dian
Ap	12	10YA 3/2	SICL	34	0				2	м	Abk		Fr	<1	VF					A
								_	2	F	Abk									
AB	35	10YA 3/2	SICL	35	0				2	м	Pr	Argillans	Fr	<1	VF					A
							i	_	2	۶	Abk									
BkA	44	10YR 3/3	SICL	39	0				2	М	Pr	Argillans	Fr	<1	VF	SI	Ca	<1	F	D
				·					2	F	Pr									
Bk1	65	10YR 5/3	SiL	26	0				3	M	Sbk	Argillans	Fr	<1	VF	vs	Ca	<1	M/F	D
									3	M/F	Sbk									
Bk2	81	10YR 5/3	SIL	24	0		L		2	м	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	G
			_						2	M/F	Abk									
Bk3	81+	10YR 4/6	SIL	22	0		1		2	M	Pr	Argilians	Fr	<1	VF	s	Ca	<1	VF	1
				1					3	M/F	Sbk									
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PROFILI	B:	703B-310	_								% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	d Silt Loan	n				VEGET	ATION: Com-	wheat-fail	ow total	ion				_	
	_				Fine, s	mectic, me	sic Aridic	Argiustoil			PAREN	T MATERIAL:	Calcario	rs koess						
EPIPED	ON:	Mollic									COUNT	Texas Co	unty, Ok	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	NON: Panhand	e Resear	ch and i	Extentio	n Center	, Goodw	eli, Okia	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBED		1/4/2001		CORE	LENGTH (cm):		113						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (om):								
		Jamie Patton																		
Haritan	Lateret	Martvix color	F	ield Texture		Pe	edox Featur	**		Structure		Coalings	Con	R	eta	EĦ	Ce	ncentratio	-	Bounder
	depth (cm)	(moist)	Class	% Clay	X CF	Color	Amount	Size	Grede	Size	Shape	Тура		Amount	Size		Туре	Amt	Site	Diat
Ap	13	10YR 3/2	SICL	28	0				2	M	Sbk		Fr	2	F					A
									3	F	Sbk	_								
BA	43	10YR 3/4	SICL	30	0				3	м	Pr	Argillans	Fr	2	F					D
									2	F	Abk									
Bw	52	10YR 4/3	SIL	26	0				2	F.	Pr	Argilians	Fr	2	F	VS	Ca			A
							1	1	2	F	Abk	· ·					L			
Bk	77	10YR 5/4	SIL	23	0		_		2	F	Pr	Argillans	Fr	2	F	VS	Са	2	M/F	D
								<u> </u>	2	VF	Pr									
Bk2	91	10YR 4/6	SiL	24	0				2	M/F	Pr	Argilians	Fr	1	VF	٧S	Ca	<1	F	I A
									3	F	Abk									
Ab	103	10YR 3/4	SIL	26	0		<u> </u>		3	F	Sbk		Fr	1 1	VF	SI	ł	1	ł	ΙA.
									_2	F	Gr			1						
BC	103+	7.5YR 4/6	SIL	22	0				2	F	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F	1
									3	VF	Pr			I						
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PROFILE	÷	703B-311									% SLO	PE: <2%								
MAPPEL	PROFILE	CLASSIFICA	TION:		Richfiel	ld Silt Loan	n				VEGET	ATION: Com-	wheat-fall	ow rota	tion					
					Fine, s	mectic, me	sic Aridic	Argiustol			PAREN	T MATERIAL:	Calcario	is koess						
EPIPEDO	ON:	Mollic									COUNT	TY: Texas Co	unty, Ok	ahoma						
SUBSUR	FACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	TION: Panhand	le Resear	ch and	Extentio	n Cente	, Goodw	ell, Okla	ahoma	
DATE S.	AMPLED:	10	/2/2000			DATE DE	SCRIBED		6/4/2002		CORE	LENGTH (cm):		120			_			
SAMPLE	D BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pa	tton		CORE	DIAMETER (om):								
		Jamie Patton												_						
Karigan	Lower	Matrix color	۶	and Texture		я	adox Feature			Structure		Coatings	Con	R	xta	Eff	5	ncentratio	na	Boundary
	depth (cm)	(moint)	Ciam	% Clay	%.CF	Color	Amount	Size	Grede	Size	Shupe	Туре		Amount	Size		Туре	An:	Size	Dian
Ap	4	10YR 3/2	SICL	30	0				1	F	Gr		Fr	∠	VF					D
									1	VF	Gr									
AB	20	10YR 3/2	SICL	32	0		1		2	M/F	Sbk	Argillans	Fr	<1	VF					D
1								_	2	F_	Sbk			1						
BłA	52	10YR 3/3	SICL	35	0				3	м	Sbk	Argilians	Fr	<1	VF					A
								_	2	M/F	Sbk									
Bk	66	10YR 4/3	SICL	28	0				3	М	Abk	Argillans	Fr	<1	VF	٧s	Ca	~ 1	M/F	D
									2	M/F	Abk									
BkC1	90	10YR 4/4	SIL	25	0				3	M	Abk	Argillans	Fr	<1	VF	S	Ca	<1	F/VF	G
									3	M/F	Abk									1
BkC2	90+	10YR 4/6	SiL	23	0		1		3	м	Abk	Argilians	Fr	<1	VF	м	Са	<1	VF	
·									3	M/F	Abk			I		i				
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PROFIL	E:	703B-312									% SLO	PE: <2%								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfie	id Silt Loan	•				VEGET	ATION: Com-	wheat-fall	ow rotal	ion					
					Fine, s	mectic, me	sia Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	esecí el						
EPIPED	ON:	Mollic									COUNT	Y: Texas Co	unty, Okl	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	10N: Panhand	e Resear	ch and l	Ixtentio	n Center	, Goodw	ell, Okla	ahoma	
DATE S	AMPLED:	10	0/2/2000			DATE DE	SCRIBEL		6/4/2002		CORE	LENGTH (cm):		120						
SAMPLI	ED BY:	Jason Parton				DESCRIBI	ED BY:	Jamie Pat	tion		CORE	DIAMETER (cm):								
_		Jamie Patton		_																
Horizon	Lamer	Matrix color	F	iekt Testure		R	idox Feature	13		Structure		Coatings	Gan	Re	6 3	EH	Ca	ncentratio	ins:	Bounda
	dapth (cm)	(moist)	Citess	% Clay	%.CF	Celer	Amount	94+	Grade	Siza	Shape	Туре		Amount	Size		Тура	Amt	Siz.	Dian
Ap	16	10YR 3/2	SICL	29	0				2	M	Abk		Fr	<1	VF					D
		· · · ·							2	F	Abk									
AB	37	10YR 3/2	SICL	32	0				2	м	Pr		Fr	<1	VF					A
							[]		2	M	Abk									
Bk1	63	10YR 5/3	SICL	27	0				1	М	Pr	Argillans	Fr	<1	VF	VS	Ca	<1	M	D
							Γ		2	F	Pr									
Bk2	72	10YR 4/4	SIL	23	0				1	M	Pr	Argilians	Fr	<1	VF	S	Ca	<1	м	D
									2	F	Pr									
Bk3	99	10YR 4/4	SIL	20	0				2	C/M	Pr	Argillans	Fr	<1	VF	S	Ca	<1	M/F	G
									2	F	Pr								· ·	
Bk4	99+	10YR 4/6	SIL	26	0				2	C/M	Pr	Argillans	Fr	<1	VF	М	Са	<1	VF	
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PROFIL	E:	703B-313									% SLO	PE: < 2 %								
MAPPE	PROFILE	CLASSIFICA	TION:		Richfiel	d Silt Loan	<u>ו</u>				VEGET	ATION: Corn-	wheat-fall	ow rotal	ion					
					Fine, sr	nectic, me	sic Aridic	Argiustoll			PAREN	T MATERIAL:	Calcario	is losss						
EPIPED	ON:	Mollic									COUNT	'Y: Texas Co	unty, Oid	ahoma						
SUBSUR	RFACE HO	RIZONS/FEAT	URES:		Argillic						LOCAT	10N: Panhand	e Resear	ch and	Extentio	n Center	, Goodw	eli, Oki	ahoma	
DATE S	AMPLED:	10	/2/2000			DATE DE	SCRIBED		1/4/2001		CORE	LENGTH (cm):		124						
SAMPLI	ED BY:	Jason Parton				DESCRIB	ED BY:	Jamie Pal	tton		CORE	DIAMETER (om):								
		Jamie Patton																		
Horizon	Lower	Mains color	F	leid Texture		A	dox Feetur	-		Structure		Coatings	Cen	Re	eta .	EH	Co	ncentretic	ina 🗌	Bounder
	depth (cm)	(moint)	Class	% Citay	% CF	Color	Amount	Siz•	Grade	Size	Shepe	Туре		Amount	Size		Туре	Amt	Size	Dist
Ap	13	10YR 3/2	SIL	25	0				2	F	Sbk		Fr	1	VF					A
							ł		2	F	Gr									
AB	43	10YR 3/3	SICL	29	0				2	M/F	Abk	Argillans	Fr	<1	VF					D
									2	F	Abk									
Bk1	64	10YR 4/3	SICL	27	0				2	F	Pr	Argilians	Fr	<1	VF	٧s	Ca	<1	F/M	A
									2	VF	Pr									
Bk2	89	10YR 5/6	SIL	25	0				2	M/F	Pr	Argillans	Fr	<1	VF	VS	Са	1	M/F	D
				Ĺ					2	F	Pr									1
Bk3	106	10YR 4/6	L	25	0				3	F	Pr	Argilians	Fr	<1	VF	s	Са	<1	F	G
									2	F	Abk									
CBk	106+	10YR 4/4	L	23	0				3	F	Pr	Argillans	Fr	<1	VF	s	Ca	<1	F	
									2	F	Abk				l		ļ			
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PROFILE	5	703B-314								1	% SLO	PE: <2%								
		CLASSIFICA	TION:		Richfie	ld Silt Loan							wheat-fall	ow rolei	ion	·				· · · · · ·
						mectic, me		Annivetolt					Calcario							
EPIPEDO	- AL	Mollic			1 110, 31	110000, 1110		Auguator			COUNT								_	
		RIZONS/FEAT	1106e.		Aratilic						LOCAT						Cand			
	AMPLED:		V2/2000		<u> </u>	DATE DE			6/4/2002				e nesea			in Center	, GOODW	en, Oki	atoma	
			222000	• •								LENGTH (cm):		120					. <u> </u>	
SAMPLE		Jason Parton Jamie Patton				DESCRIB	ED BY:	Jamié Pa	tion		CORE	DIAMETER (cm):						_		
														r –				_		
Honizon	Lower	Martrix color		leid Texture			idox Featur			Sinucture		Coatings	Cen	Re		Eff		ncentralie		Boundary
	depth (cm)	(móint)	Class	% Ciay	% CF	Color	Amount	Size	Grede	Size	Shape	Туре		Amount	Size		Туре	Ann	Size	Dian
Ap	· 15	10YR 3/2	SICL	28	0				2	M	Pr		Fr	<1	VF					D
						l			2	M/F	Abk								—	
AB	38	10YR 3/2	SICL	31	0				2	M	Pr		Fr	<1	VF					A
							ļ	<u> </u>	2	F	Pr									1
Btk	51	10YR 4/3	SICL	34	0				2	C/M	Pr	Argillans	Fr	<1	VF	S	Ca	<1	F	D
									2	M/F	Abk								L	
Bk1	70	10YR 5/3	SiL	26	0		L	1	3	C/M	Pr	Argillans	Fr	<1	VF	VS	Ca	<1	м	D
									2	M/F	Sbk									
Bk2	93	10YR 4/4	SIL	24	0				2	C/M	Pr	Argillans	Fr	<1	VF	s	Ca	<1	VF	G
]	2	M/F	Abk									
Bk3	93+	10YR 4/4	SIL	21	0				2	C/M	Pr	Argilians	Fr	<1	VF	м	Ca	<1	VF	
							1	1	3	M/F	Pr						1	1		1
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Appendix 1-9. Water infiltration results for Experiments 701 and 703B

Average 10, 20 and 30-minute water infiltration rates by N-source and rate for

N-Source	Rate	· · ·	Average Infiltration Rate	8
		10 minute	20 minute	30 minute
	kg N ha ⁻¹		mL minute ⁻¹	
Swine				
	168	168ab	222abc	68a
	504	66a	79c	114a
Beef				
	168	205ab	99bc	45a
	504	281b	333abc	288b
AA				
	168	177ab	207abc	129a
	504	184ab	177bc	116a
Control				
	0	132ab	83c	57a

Experiment 701.

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

Average 10, 20, and 30 minute infiltration rates by N-source and rate for Experiment

703B.

N-Source	Rate		Average Infiltration Rates	S
		10 minute	20 minute	30 minute
			mL minute ⁻¹	
Sprinkle			<u> </u>	
	0.5x	103a	97ab	56a
	1x	159a	124ab	82a
	2x	111a	73ab	33a
Surface				
	0.5x	283a	206a	221b
	1x	124a	58ab	41a
	2x	147a	53b	35a
AA				
	1x	123a	130ab	91a
	2x	99a	80ab	77a
Control				
	0	98a	72ab	75a
Tillage				
	0	50a	59b	36a

† Within each property, values displaying the same letter are not significantly different (p-value < 0.05) as determined by analysis of variance.

Predictor Variable	Beta	p-value
Intercept	230.51421	
Depth of mollic color	4.24264	0.0279
Surface bulk density	-318.74823	0.0497
Surface organic carbon	0.15354	0.0359

Regression coefficients for 10-minute infiltration rates in Experiment 701

Regression coefficients for 20-minute infiltration rates in Experiment 701

Predictor Variable	Beta	p-value	
Intercept	-507.67141		
Water stable aggregates	-3.19373	0.0586	
Clay	16.85113	0.0427	
Surface organic carbon	0.31997	0.0004	

Regression coefficient for 30-minute infiltration rates in Experiment 701

Predictor Variable	Beta	p-value	
Intercept	-141.07487		
Surface organic carbon	0.24091	0.0006	

Predictor Variable	Beta	p-value
Intercept	-275.96814	
Depth to argillans	-4.39162	0.0323
Sand	33.52239	0.0128

Regression coefficients for 10-minute infiltration rates in Experiment 703B

Regression coefficients for 20-minute infiltration rates in Experiment 703B

Predictor Variable	Beta	p-value
Intercept	-53.41070	
Depth of mollic color	-2.44312	00487
Sand	17.77340	0.0370

Average infiltration rates for swine effluent treatments under conventional and

continuous forage management systems

Experiment	Rate	Infiltration Rates			
		10 minute	20 minute	30 minute	
. <u></u>	kg N ha ⁻¹		mL minute ⁻¹		
701					
Continuous	168	168	222	68	
	504	66	79	114	
Corn	0	132	83	57	
703B	0.5x sprinkle	103	97	56	
	2x sprinkle	111	73	33	
No-till Corn-	0.5 x surface	283	206	221	
Wheat-Fallow	2x surface	147	53	35	
	. 0	98	72	75	

Regression coefficient for 10-minute infiltration rate in swine effluent amended plots

 Predictor Variable	Beta	p-value	
Intercept	271.76283		
Depth to argillans	-6.37477	0.0157	

across experiments

CHAPTER II

A Mixed Methods Evaluation of the Computer Applet Soil Temperature Changes

with Depth and Time as an Undergraduate Teaching Tool

EXECUTIVE SUMMARY

Little is known about the effectiveness of web-based learning techniques in introductory soil science courses or the ability of web-based software to teach undergraduates about abstract ideas and concepts behind soil physical phenomenon. To overcome this gap in knowledge, this research used a mixed methods approach to evaluate the effectiveness of the web-based computer applet Soil Temperature Changes with Depth and Time to: (1) quantify the effects of the computer applet on student acquisition, comprehension and retention of course materials related to soil temperature as compared to the control, (2) document student perceptions of the assigned soil temperature learning materials and (3) determine the perceived effect on student knowledge. A nonrandomized control group, pretest-posttest design was used to quantify changes in student knowledge and comprehension after the completion of a soil temperature laboratory using either an applet (treatment) or published figures (control) during two semesters of sophomore-level soil science course (spring and fall 2002). During the spring semester, the treatment (applet) group scored significantly higher on the posttest than the control (figures). However in the fall, scores were not significantly different. Nevertheless, during both semesters students who used the applet more strongly agreed to liking their instructional method and to use more of their instructional method in class. This suggests the soil temperature applet is potentially as good or better than traditional teaching methods in promoting undergraduates' understanding of soil temperature phenomenon when used in an introductory soil science course at a large, mid-western land-grant university.

INTRODUCTION

Providing students with needed information and teaching them to apply that information to real-world problems is becoming increasingly difficult for today's educators, as mounting time, monetary, and personnel constraints limit available teaching resources. In the past decade, faculty student contact hours have increased while education budgets have decreased (AAUP, 2000). Currently, it is not uncommon in large universities for introductory courses with enrollments greater than 100 to be taught by one instructor. To facilitate teaching large numbers of students, many courses are taught using a traditional, professor-centered, lecture format. However, research has shown that lecture-based pedagogy often leads to poor student attendance, a lack of motivation, and poor exam performance (Riffell and Sibley, 2003). To overcome these monetary, time, and educational limitations, educators are turning to technology as a means to supplement and/or replace traditional teaching methods (Riffell and Sibley, 2003).

The effect of computer-assisted instruction (CAI) on student achievement as compared to traditional instruction methods is highly variable. It has been found that CAI via the web helps students learn by allowing them to work at their own pace (O'Connell, 2001) and convenience (King and Hildreth, 2001), improves attention and focus, and comprehension of course materials and concepts (Riffell and Sibley, 2003).

Carver et al. (1991) found that students who used CAI to learn microbiology and antimicrobial agents scored significantly higher on an initial posttest and a posttest given six months post-course than those students who did not use CAI. The authors contributed improved student scores to CAI's computer/user interaction, self-paced lessons, generated graphics, and self-assessment quizzes.

Similarly, Abbott (1993) found that the use of computer-based assignments in an undergraduate finance course helped students grasp conceptual theories by allowing for experimentation, viewing of instantaneous effects of variable alterations, and evaluation of concepts in broader, more integrated terms by overcoming difficulties with equations.

In contrast, Livergood's (1994) study of computer-based multimedia systems in undergraduate education found the addition of computer-based learning did not improve test scores. Similarly, Janda (1992) found that students taught by traditional methods in an undergraduate political science course scored higher on the final examination than the students instructed via multimedia- or computer-enhanced methods. However, students taught by all three methods reported significant increases in personal knowledge of course materials.

Additionally, Brown (1996) reported students in an engineering workshop perceived computer-based delivery as more interesting, effective, and efficient than lecture-based delivery, but significantly less useful than more traditional methods such as tutor and student-based activities.

Educational research pertaining to undergraduate soil science instruction is lacking, and so, little is known about the effectiveness of using CAI techniques in introductory soil science courses or the ability of web-based software to teach students about complicated and abstract concepts of soil physical phenomenon. Therefore, this research used a mixed method approach to evaluate the effectiveness of a web-based computer applet, *Soil Temperature Changes with Depth and Time,* to enhance introductory soil science students' understanding of soil temperature phenomenon as compared to a traditional teaching method.

The objectives of this study were to: (1) quantify the effects of the computer applet, *Soil Temperature Changes with Depth and Time,* on student acquisition, comprehension, and retention of soil temperature course materials as compared to more

traditional methods, (2) document student perceptions of assigned soil temperature learning materials and (3) determine the perceived effect on student knowledge.

Unlike previous CAI research, which often targeted semester-long, multi-topic, and/or multi-program educational interventions, this research focused on documenting and comparing the ability of a single computer applet and set of published figures to enhance undergraduate students' understanding of the fundamentals of soil temperature phenomenon over one, 2-hour laboratory period. The specificity of the time frame and educational materials evaluated, as well as the soil science focus of this research make it unique in the agri-science research realm.

MATERIALS AND METHODS

Context

The applet was evaluated during the 2002 spring and fall semesters utilizing students enrolled in a sophomore-level, introductory soil science course, during the targeted semesters.

Course Description

The course was a 4-credit, sophomore-level, introductory soil science course offered through the Department of Plant and Soil Sciences. Students enrolled in the course attended three, 50-minute lectures, and an assigned two-hour lab each week.

Importance of Soil Temperature in Undergraduate Instruction

Understanding soil temperature variation within the soil profile is key to understanding many soil properties, as soil temperature affects the rate of both biological and chemical processes. Fluctuations in soil temperature have direct implications on our daily lives, not only in agriculture (i.e. influencing planting dates and fertilizer and pesticide applications), but also in everyday activities (i.e. determining depth of foundation placement for homes and geothermal heating and cooling). Therefore, it is important that introductory soil science students gain a basic understanding of soil temperature variations with depth and time.

Typically, annual fluctuations of average soil temperature with depth are described using sinusodial functions similar to those outlined by Hillel (1982), Marshall and Holmes (1988), and Wu and Nofziger (1999). However, these mathematical functions are often too difficult and too abstract for use in introductory soil science

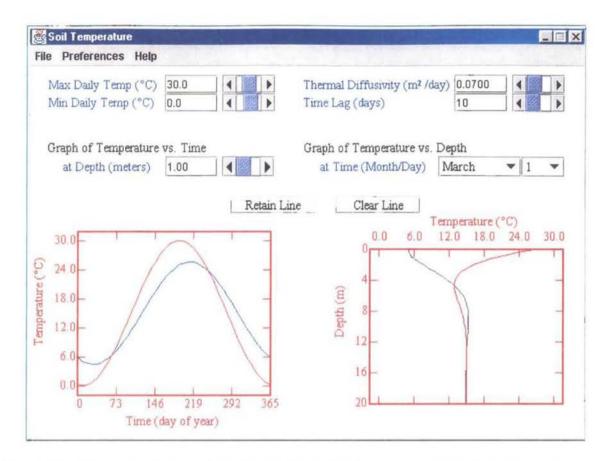
courses. Prior to the applet, interactive educational tools have not been available for use in teaching complex and important soil phenomenon such as soil temperature fluxes.

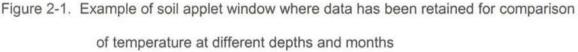
Overview of Computer Applet

The computer applet, *Soil Temperature Changes with Depth and Time*, was developed by Drs. David Nofziger and Jinquan Wu to model average soil temperature changes with soil depth by day. The applet allows students to view and compare average soil temperatures with depth at different air temperatures and soil thermal properties (Figure 2-1). The applet is written in Java Script, executed in Java WebStart, and is available to the public via the Internet at

http://soilphysics.okstate.edu/toolkit/index.html .

The applet contains four variables: minimum air temperature (°C), maximum air temperature (°C), soil diffusivity (m² day⁻¹), and time lag (day). Variables are altered using the keyboard or scroll arrows. Soil temperatures are displayed in two graphs: one depicting soil temperature at a chosen depth, (time on the X-axis, soil temperature on the Y-axis) and soil temperature at a chosen time, (soil temperature on the X-axis, soil profile depth on the Y-axis).





Research Design

A nonrandomized treatment-control group, pretest-posttest design was used to evaluate the applet's effect on student learning. This design is the most widely used quasi-experimental design in educational research (Ary et al., 2002), as classes cannot be reorganized to achieve randomization.

Students were assigned to treatment and control groups based upon laboratory sections. Both semester laboratory sections one, six, and seven comprised the control group (figures) and laboratory sections two, three, four, and five comprised the treatment group (applet). Educational materials and corresponding laboratory exercises were

administered during the laboratory portion of the course and the pretest and posttests were administered during the lecture portion.

A 10-question, multiple-choice pretest was given to all students during the fourth week of the 2002 spring semester and first week of the 2002 fall semester. Approximately eight weeks into both semesters, students completed a soil temperature laboratory exercise using either the applet (treatment) or static soil temperature figures by Fluker (1958) and Brady and Weil (2002) (control). All laboratory sections were taught by the researcher to reduce instructional variability. The first posttest was administered the Friday immediately following completion of the soil temperature laboratory exercise and the second posttest was completed during the last week of class. Both posttests contained questions identical to the pretest. All pretests, posttests, and laboratory exercises were retained by the researcher and not returned to the students.

In addition to the first posttest, students completed a 13-question Likert-type survey with open-ended questions about their satisfaction with the instructional medium used (applet or figures).

Data Analyses

Pretest, posttest, and survey data were analyzed using a split-plot design in SAS via PROC MIXED (SAS Institute, 2002). Backward-stepwise regression was performed to determine correlation between student demographics, perceptions, and achievement and research test scores using PROC REG (SELECTION = BACKWARD) in SAS.

Analysis of write-in data included the identification of themes which were calculated by frequency statistics.

RESULTS AND DISCUSSION

Of the 110 and 108 students enrolled in the course during the 2002 spring and fall semesters, 105 (95%) and 98 (91%) signed human subjects consent forms, respectively. Only subjects who completed the laboratory exercise and at least two tests were included in the study. Therefore, 89 of the 105 (85%) spring respondents and 88 of the 98 (90%) fall respondents provided enough data to be included in the study.

Demographics

Overall, study participants were approximately 22 years in age, 43% female, classified as juniors or seniors, and enrolled in an area of study within the college of agriculture. Student demographics for the targeted two semesters were typical for students previously enrolled in the course and student composition was similar to other introductory soil science courses nationwide.

Pre- and Posttest Scores

Test scores for spring and fall showed a significant improvement in test scores from pretest to posttest one for both educational materials (Table 2-1).

Spring students who used the applet (SpAPP) realized a 150% increase (4 points) in test scores from pre- to posttest, while students who used figures (SpFIG) realized a 104% (2 points) gain. In the fall, increases in test scores were not as dramatic as in the spring, with students using the applets (FaAPP) realizing a gain of 25% (1 point) pre to posttest and students who used figures (FaFIG) realizing a 57% (2 points) gain.

			Pretest			Posttes	st One	p-value	
		n	Score	Std Error	n	Score	Std Error		
Spring							· ·		
	Applet	48	2.7	0.3	50	6.7	0.3	<0.0001	
	Figures	39	2.8	0.3	39	5.7	0.3	<0.0001	
		þ	-value	0.7177	p.	value	0.0097		
Fall									
	Applet	47	4.0	0.2	40	5.0	0.2	0.0003	
	Figures	39	3.6	0.2	33	5.6	0.3	<0.0001	
,	<u></u> _	p	-value	0.2345	p	-value	0.0580		

Table 2-1. Comparison of spring pre- and posttest scores within educational materials

Reasons behind the distinct differences in the knowledge improvement between spring and fall semesters for both educational materials are unclear. One could hypothesize that lower percentages of knowledge gain were possibly due to fall students' increased background knowledge of soil temperature measured by higher pretest scores, as students with a greater understanding of the materials prior to instruction could not realize as large of improvement in scores as those who scored lower on the pretest due to a ceiling effect imposed by the limited number of questions on the testing instrument. However, even though fall students' posttest scores were significantly higher than spring students', the fall students failed to achieve as high of posttest one scores as the previous semester. This suggests the ceiling effect did not significantly impair student achievement. Alternatively, the depressed improvement in fall scores from pre- to posttest was thought to be due to differences in student educational and motivational qualities, as the primary variable different between the two semesters was the students themselves. SpAPP posttest one scores were significantly greater than SpFIG (Table 2-1). These higher scores are possibly attributable to the interactive, visual nature of the applet. In their posttest surveys, SpAPP students commented their ability to visualize the data with the applet and their gratification of instantly seeing changes in the graphs when inputs were altered. Specific comments included (Student ID, Survey Question):

The fact that you could see and compare the changes on the actual graphs made it much easier to understand. (78, Q14)

The graphs help to put concepts into visual interpretations. (43, Q14)

There was no significant difference between the posttest one scores between FaAPP and FaFIG groups, suggesting that for these students the educational materials are equally suited for the instruction of soil temperature phenomenon.

Conflicting results between improvements in test scores between semesters was not surprising, as each semester the sample population consisted of different students with different learning styles and educational motivations, preferences, and abilities. This tremendous diversity in and among students was likely to result in large variability in test scores from semester to semester even when other research variables were held constant. In addition, non-randomized group assignment may have played a role in differing improvements between semesters, as internal validity may have been compromised due to differential selection.

During the spring, student scores did not change significantly from posttest one to posttest two for SpAPP or SpFIG (Table 2-2), suggesting that both teaching materials promoted student retention of soil temperature information.

		Posttest One				Posttest Two		
		n	Score	Std Error	n	Score	Std Error	
Spring							· · · ·	
	Applet	46	6.7	0.3	50	6.2	0.3	0.0968
	Figures	38	5.7	0.3	39	5.4	0.3	0.3665
					p∙	value	0.0409	
Fall								
	Applet	40	5.0	0.2	49	5.5	0.2	0.0416
	Figures	33	5.6	0.3	39	5.6	0.2	0.9614
	*		· · ·		p	-value	0.7016	

Table 2-2. Comparison of spring posttest one and two scores by treatment

FaAPP students realized a significant increase in test scores from posttest one to posttest two (Table 2-3). Reasons for the increase in scores is uncertain, as soil temperature course materials were not revisited within the course after posttest one and the increase was not observed in FaFIG student scores. It was possible that FaAPP students revisited course materials prior to posttest two, but this was highly unlikely due to the large time gap (approximately 8 weeks) between tests.

Similar to posttest one, SpAPP students scored significantly higher on posttest two than SpFIG students (Table 2-2). However there was no significant difference in scores between the FaAPP and FaFIG students on posttest two, even with FaAPP students increase in scores on posttest two.

Backward-stepwise regression of 2002 spring data showed the combination of educational material, pretest score, and attitudes towards the complexity of the educational material and perceived enhancement of understanding (survey questions 1, 7, and 11) were the best predictor of student achievement on posttest one (p-value <0.0001, $R^2 = 0.3565$), suggesting these factors were most influential on student

success with soil temperature course materials (Table 2-3). Gender, year in school, time used to complete the laboratory exercise, laboratory exercise score, and survey questions 2, 3, 4, 5, 6, 8, 9, 10, 12, and 13 in combination with the other variables had little bearing on posttest one scores.

Table 2-3. Regression coefficients for spring posttest one scores.

Parameter	Beta	p-value
Intercept	2.91877	
Educational Material		
(Applet = 0, Figures = 1)	0.89903	0.0061
Pretest Score	0.24557	0.0216
Survey Question 1	-0.78206	0.0064
Survey Question 7	0.36973	0.0228
Survey Question 11	0.60162	0.0027

Posttest one scores were positively correlated, with educational material utilized (applet or figures) pretest achievement and students' aggreeance with the statements: "I could have completed the laboratory exercise on my own" (survey question 7) and "applet (figures) are too complex to use in an introductory soil science course" (survey question 11). Spring posttest one scores were negatively correlated with the statement: "the exercise enhanced my understanding of soil temperature phenomenon" (survey question 1).

The negative correlation between survey question 1 and posttest one scores suggests that student opinions of the teaching effectiveness of employed instructional materials were inversely related to actual test scores, meaning students who did not believe the instructional material enhanced their understanding of the course concepts scored better on posttest one and visa versa. This implies that student perceptions of a

material's instructional effectiveness are not reflective of the actual effectiveness of that material to improve learning.

Due to the contradictory nature of posttest results from 2002 spring and fall semesters, no definitive statements can be made as to which instructional materials best promote student learning. However, one might expect over the long-term, that the utilization of the applet to complete laboratory assignments will provide students with a comparable or even enhanced understanding of targeted soil temperature phenomenon, particularly if the students and instructor are interested and enjoy using technology in the classroom.

Selected Likert-Type Survey Scores

Both semesters, students who used the applet and figures agreed that the educational materials enhanced their understanding of soil temperature (Table 2-4).

		Response in percent								
		n	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			
Spring	· · · · · · · · · · · · · · · · · · ·			·· · ·						
	Applet	46	0	0	14	57*	29			
	Figures	38	0	0	8	64*	28			
Fall										
	Applet	38	3	0	3	55*	39			
	Figures	32	0	0	6	75*	19			

Table 2-4. Spring survey responses pertaining to understanding/learning by treatment

* Indicates median response

SpAPP and FaAPP students who used the applet more strongly agreed with liking the educational material they used than SpFIG and FaFIG students (Table 2-5). In addition, SpAPP and FaAPP students more strongly agreed they would like to use more of their educational material in class (Table 2-6).

		÷	#4 Liked usin	g the applet/1	figures				
		Response in percent							
		n	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
Spring									
	Applet	46	0	0	6	62*	32		
	Figures	38	0	21	15	53*	. 11		
Fall									
	Applet	38	0	5	0	32	63*		
	Figures	31	0	10	29	51*	10		

Table 2-5. Survey responses pertaining to satisfaction by treatment

Indicates median response

Table 2-6. Survey responses pertaining to use of materials by treatment

		#12 V					
		n	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Spring	1						
	Applet	46	0	0	24	48*	28
	Figures	38	3	18	54*	18	7
Fall							
	Applet	37	0	5	14	54*	27
	Figures	32	0	25	44*	19	13

Indicates median response

SpAPP students cited the applet's ease of use (36%), visual nature (19%), and ability to enhance understanding of soil temperature phenomenon (17%), as to what they "liked the most about using the applet" (Table 2-7). Specific comments included:

It allowed me to see comparisons of different temps at different depths, and that made understanding easier. (23, Q14)

I could use it to test my own theories. I could play and test different characteristics. (89, Q14)

SpFIG students were appreciative of the figures' visual nature (30%), but were less likely than the SpAPP students to cite the material's ease of use (16%) or enhanced understanding of soil temperature phenomenon (13%) (Table 2-7). SpFIG students cited the following as specific points they liked:

I learned easily because of visual aid of figures offers easy comparison and understanding. (27, Q14)

They were easy to follow. It was all right in front of you so you could follow it. (38, Q14)

Something to look at. I like visuals. (82, Q14)

Fall student comments were similar to those in the spring. Again, FaAPP

students praised its ease of use (46%) and visual nature (33%) (Table 2-7).

It was different and provided interaction and visual. (105, Q14)

It was easier to see changes and I'm a more visual learner. (162, Q14)

It was easy to use and presented the information in a format that was easy to understand. (191, Q14) Table 2-7. Student responses to "What did you like most about using the

	-	n	Ease of Use	Enhanced Understanding	Provided a Visual	Reduced Lab Time	Other	Nothing
Spring								
	Applet	47	17 (36%)	8 (17%)	9 (19%)	3 (7%)	9 (19%)	1 (2%)
	Figures	37	6 (16%)	5 (13%)	11 (30%)	1 (3%)	13 (35%)	1 (3%)
Fall								
	Applet	37	17 (46%)	0 (0%)	12 (33%)	6 (16%)	2 (5%)	0 (0%)
	Figures	27	10 (37%)	5 (18.5%)	7 (26%)	0 (0%)	5 (18.5%)	0 (0%)

applet/figures...?" grouped by category

FaFIG students seemed very satisfied with the figures, as they commented on their ease of use (37%), visual nature (26%) and ability to enhance understanding (18.5%) (Table 2-7).

It was understandable because there was something to go back to, to look at and understand. (166, Q14)

I am a visual learner. The graphs help me visualize concepts. (167, Q14) I think figures allow us to understand what we are being told. (194, Q14)

During both semesters, students who used the applet more strongly agreed to the materials' ease of use than those who had used the figures (Table 2-8). However, both the applet and figures groups overwhelming believed the educational materials were simple to use.

In addition, both semesters a majority of the students disagreed that the educational materials were too complex for use in an introductory soil science course (Table 2-9).

		Response in percent						
		n	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Spring						<u> </u>	······································	
	Applet	46	0	0	8	46*	46	
	Figures	38	.0	10	15	57*	18	
Fall								
	Applet	40	0	0	0	53*	47	
	Figures	33	0	4	4	84*	8	

Table 2-8. Survey responses pertaining to ease of use by treatment

Indicates median response

Table 2-9. Survey responses pertaining to complexity of educational materials by

	#11 Δpr	hat/Ei	nures too con	onley for intro	ductory se		.	
	#11 Applet/Figures too complex for introductory soil science Response in percent							
		n	Strongly	Disagree	Neutral	Agree	Strongly	
<u> </u>	Disagree Agree							
Spring								
	Applet	46	26	52*	14	6	2	
	Figures	38	18	54*	20	5	3	
Fall	· .							
	Applet	40	24	57*	6	8	5	
	Figures	33	15	59*	22	0	4	

* Indicates median response

CONCLUSIONS

Results of this study indicated the applet provided students with a comparable or enhanced understanding of targeted soil temperature phenomenon as compared to more traditional teaching materials. SpAPP students scored significantly higher on the posttests when compared to SpFIG students. These results are similar to those of Carver et al. (1991) who found that microbiology students who used CAI scored significantly higher on an initial posttest and a posttest given six months later than those students who did not.

However, FaAPP student scores were not significantly different than FaFIG students. These results were similar to Livergood (1994) and Janda (1992) who found that computer-based undergraduate course materials did not improve test scores over more traditional methods. Further exploration of student motivation, past educational experience, technological experience, and perceptions of the course is needed to more fully explain the differences in student achievement between semesters.

Nevertheless, during both semesters the students who completed the laboratory exercise using the applet more strongly agreed with liking the educational materials, and more strongly agreed they would like to use more of their educational materials in the course than those students who used the figures. In addition, the interactivity and instantaneous results generated by the applet appealed to students, and resulted in high student satisfaction with the applet's ability to improve their understanding of soil temperature phenomenon. Students consistently commented they enjoyed the visual nature of the applet and its ease of use. In addition, it was observed that the applet ignited students' interest in the course materials and motivated them to not only complete their laboratory assignment, but to explore the course materials more in depth through additional experimentation with the input variables.

The applet's creators, Nofziger and Wu (2000) believed the applet could be used to introduce and illustrate concepts that would not normally be included in an undergraduate course and enhance student understanding of important concepts. The results of this research support these claims, as the applet groups scored as well or better on posttest assessments than students using more traditional, static figures.

The success of the applet, *Soil Temperature Changes with Depth and Time*, to enhance introductory soil science students' understanding of soil phenomenon, as documented in this research, is a promising first step in the movement to incorporate technology into agricultural science education. It is believed applets have the potential to foster greater student understanding of course materials by not only providing students with an effective teaching medium, but by also sparking students' interest in the materials through the simplistic, interactive, and visual presentation of complex phenomenon and systems. Soil science educators should strongly consider the incorporation of applets or similar technologies into their course materials to not only improve student learning, but stimulate student interest and higher order learning.

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Appendix 2-1. Human Subjects Review Forms: Approval, Modification,

Continuance

Oklahoma State University Institutional Review Board

Protocol Expires: 1/5/2004

Date : Monday, January 06, 2003

IRB Application No AG0228

Proposal Title: EVALUATION OF SOIL PHYSICS COMPUTER APPLETS AS UNDERGRADUATE TEACHING TOOLS

Principal Investigator(s) :

Jamie Patton 368 Ag Hall Stillwater, OK 74078 Jeffory Hattey 368 Ag Hall Stillwater, OK 74078

Reviewed and Processed as: Exempt

Continuation

Approval Status Recommended by Reviewer(s) : Approved

Signature

Monday, January 05, 2003 Date

Carol Olson, Director of University Research Complian

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

Oklahoma State University Institutional Review Board

Protocol Expires: 2/4/03

Date : Thursday, April 18, 2002

IRB Application No: AG0228

Proposal Title:

EVALUATION OF SOIL PHYSICS COMPUTER APPLETS AS UNDERGRADUATE TEACHING TOOLS

Principal Investigator(s) :

Jamie Patton 368 Ag Hall Stillwater, OK 74078 Jeffory Hattey 368 Ag Hall Stillwater, OK 74078

Reviewed and Processed as: Exempt

a Status Recommended by Reviewer(s): Approved

Modification

Please note that the protocol expires on the Tostowing date which is the year from the date of the approval of the original protocol:

Protocol Expires: 2/4/03

Signature :

Thursday, April 18, 2002 Date

Carol Olson, Director of University Research Compliance

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

Oklahoma State University Institutional Review Board

Protocol Expires: 2/4/03

Date: Tuesday, February 05, 2002

IRB Application No AG0228

Proposal Title: EVALUATION OF SOIL PHYSICS COMPUTER APPLETS AS UNDERGRADUATE TEACHING TOOLS

Principal Investigator(s):

Jamie Patton 368 Ag Hall Stillwater, OK 74078 Jeffory Hattey 368 Ag Hall Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI:

Your IRB application referenced above has been a expiration date indicated above. It is the judgme who may be asked to participate in this stude manner consistent with the IRB requireme se calendar year. Please make note of the newers that the rights and welfare of individuals needed, and that the research will be conducted in a uned in section 45 CFR 46.

As Principal Investigator, it is your me

any to do the following:

- 1. Conduct this study examples to the research protocol must be submittee to propriate signatures for IRB approval.
- 2. Submit a request sub
- 3. Report any a warse events to the IRB Chair promptly. Adverse events are those which are
- unanticipated and impact the subjects during the course of this research; and
- 4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 203 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerety.

arol Olson, Chair

Carol Olson, Chair Institutional Review Board

Appendix 2-2. Participant Consent Form

CONSENT FORM—Computer Applet Study

I am **consenting to participate** in a research study entitled <u>Evaluation of Soil Physics Computer</u> <u>Applets as Undergraduate Teaching Tools</u> by Jamie J. Patton, Graduate Teaching Assistant. This study is designed to evaluate two computer applets for their effectiveness and improvement as teaching tools in undergraduate soil science courses, and to record your experiences with the one of these computer applets.

During my participation in this study while I am enrolled in SOIL _____:

- I will be asked to fill out several questionnaires and complete a homework assignment during my weekly laboratory section. While completing the assignment, I will be observed and interviewed by Ms. Patton about my perceptions of the applet.
- I understand that Ms. Patton will have access to my grades in the course as a potential measure of the effectiveness of the applets. This data will be held in the strictest confidence and will only be reported as group data.
- I understand that my responses will include my name, so that Ms. Patton can track personal changes in knowledge over the semester. Upon my completion of all research materials, my name will be removed from all documents held in Ms. Patton's possession and assigned a number that cannot be correlated with me. Again, this data will be held in the strictest confidence and will only be reported as group data.
- I understand that my participation is voluntary and that I may withdraw from the study at anytime with no penalty.
- > I understand that there will be **no harmful effects** by participating in this study.

Thank you for your participation!

Signature

Birthdate

Date

Fold and tear off below this line for contact information

If you have any questions regarding this study please contact the following people:

Jamie J. Patton, Primary Investigator Department of Plant and Soil Sciences 165 Agricultural Hall Stillwater, OK 74078 (405) 744-7903 jamiejp@mail.pss.okstate.edu Sharon Bacher, IRB Executive Secretary Office of University Research Compliance 203 Whitehurst Stillwater, OK 74078 (405) 744-5700 Appendix 2-3. Test and Likert-Type Survey

Soil Temperature Pre (Post)-test

Please write your answer in the blank provided on the left.

1. In Stillwater, Oklahoma generally the subsoil temperature at a depth of $\underline{4}$ meters is:

- a. Warmer in April than in December.
- b. Cooler in April than in December.
- c. Approximately the same in April and December.
- d. Soil temperature does not fluctuate at this depth.
- e. Don't know
- 2. If an area is not influenced by the heat coming from molten earth materials, one would expect the temperature of the soil at a depth of <u>10 to 14 meters</u> to:
 - a. Fluctuate more in temperate areas than in tropical areas.
 - b. Fluctuate more in tropical areas than in temperate areas.
 - c. Fluctuate approximately with seasonal changes in temperature.
 - d. Soil temperature does not fluctuate at this depth.
 - e. Don't know
- 3. Surface soil temperature is <u>most</u> affected by:
 - a. Air temperature.
 - b. Soil water content.
 - c. Solar radiation.
 - d. Thermal diffusivity.
 - e. Don't know
- 4. Stillwater, Oklahoma subsoils (soils between 2 and 6 m) would be:
 - a. Cooler in November than in April.
 - b. Warmer in November than in April.
 - c. About the same in November and April.
 - d. Soil temperature does not fluctuate at these depths.
 - e. Don't know
- 5. One would expect the <u>greatest</u> variations in soil temperature to be:
 - a. At a depth of 1 cm.
 - b. At a depth of 10 cm.
 - c. At the depth of tillage.
 - d. At the depth of the subsoil water table.
 - e. Don't know

- 6. One would expect soil temperatures at <u>0 to 0.5 meters</u> to vary <u>more</u> in Stillwater, Oklahoma than in:
 - a. Toronto, Canada.
 - b. Duluth, Minnesota.
 - c. Kansas City, Missouri.
 - d. Houston, Texas.
 - e. Don't know
- 7. In Stillwater, Oklahoma where the yearly average minimum and maximum temperatures are <u>-4 and 35 degrees Celsius</u>, we would expect the <u>winter</u> soil temperature at a depth of <u>20 meters</u> to be approximately:
 - a. 24 to 26 degrees C.
 - b. 15 to 17 degrees C.
 - c. 6 to 8 degrees C.
 - d. 0 to 2 degrees C.
 - e. Don't know
- 8. If the thermal diffusivity of a soil <u>doubled</u>, we would expect the seasonal variation in soil temperature in the subsoil (2 to 6 meters) to:
 - a. Double.
 - b. Increase, but not double.
 - c. Decrease.
 - d. Stay about the same.
 - e. Don't know
- 9. If the thermal diffusivity of a soil <u>decreased by half</u>, we would expect the seasonal variation in soil temperature at the surface (0 meters) to:
 - a. Increase slightly.
 - b. Decrease slightly, but not decrease by half.
 - c. Decrease by half.
 - d. Stay about the same.
 - e. Don't know
- 10. If Soil A had a thermal diffusivity of 0.08 and Soil B had a thermal diffusivity of 0.24, then the <u>August</u> subsoil temperature at <u>4 m</u> would be
 - a. Warmer in Soil A.
 - b. Warmer in Soil B.
 - c. Be the similar in Soil A and Soil B.
 - d. Soil temperature does not fluctuate at this depth.
 - e. Don't know

COMPUTER APPLET For the following questions, please mark an X in the box that best corresponds with your response.	Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
	Stroi		2		

	Using the computer applet to complete the laboratory exercise enhanced my understanding of soil temperature phenomenon.				
2	The computer applet was easy to use.				
3	I understood the graphs generated by the applet.	n m	Res		
4	I liked using the computer applet to complete my lab exercise.				
5	I wish I was in the group that used figures from the book to complete the lab exercise.				
6	I asked Jamie several questions (3 or more) because I was confused how to use the applet.				
	I feel I could have completed the lab assignment on my own with no explanation of the applet.				
8	After using the applet, I better understand how climate affects temperatures within the soil.				
9	temperatures within the soil.				
10	After using the applet, I better understand how soil temperatures vary with depth over the course of the year.				
11	I think the soil temperature applet is too complex to use in an introductory soil science course.			174 2	
12	I would like to use more computer applets in soils lab.				
13	I believe I learned more about soil temperature by using the applet than I would have by completing a more typical SOIL 2124 lab exercise on temperature.				

Please answer the following questions in the space provided. You may use the back of this sheet if needed.

14 What did you like most about using the computer applet to complete the lab exercise? Please be specific.

15 What did you like least about using the computer applet to complete the lab exercise? Please be specific.

16 What suggestions would you give to improve the applet itself?

17 Other comments.

Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
				Str

BRADY AND FLUKER FIGURES For the following questions, please mark an X in the box that best corresponds with your response.

1	Using the figures to complete the laboratory exercise enhanced my understanding of soil temperature phenomenon.				
2	The figures were easy to use.				
3	I understood all the figures used to complete the exercise.	2	5.11		
4	I liked using the figures to complete my lab exercise.				
5	I wish I was in the group that used the computer applet to complete the lab exercise.				
6	I asked Jamie several questions (3 or more) because I was confused how to use the figures.				
7	I feel I could have completed the lab assignment on my own with no explanation of the figures.				
8	After using the figures, I better understand how climate affects temperatures within the soil.				
9	After using the figures, I better understand how thermal diffusivity affects temperatures within the soil.			-	
10	After using the figures, I better understand how soil temperatures vary with depth over the course of the year.				
1	I think the figures are too complex to use in an introductory soil science course.			Gen/	
12	I would like to use more data from published research in soils lab.				
13	I believe I learned more about soil temperature by using the figures than I would have by completing a more typical SOIL 2124 lab exercise on temperature.				

Please answer the following questions in the space provided. You may use the back of this sheet if needed.

14

What did you like most about using the figures to complete the lab exercise? Please be specific.

15

What did you like least about using the figures to complete the lab exercise? Please be specific.

16 Other comments.

Appendix 2-4. Laboratory Write-up, Applet, and Figures Exercises

Soil Temperature

Soil temperature significantly affects the biological and chemical properties of the soil. At soil temperatures at or approaching 0 degrees C, biological activities and chemical processes are negligible. Above 0 degrees C, chemical and biological reaction rates typically double for every 10 degree Celsius increase in soil temperature. These fluctuations in soil temperature have a dramatic impact on mineral weathering, soil formation, organic matter decomposition and chemical and pesticide degradation.

Soil temperature fluctuates annually and daily affected mainly by variations in air temperature and solar radiation. However, many factors influence soil temperature including: the intensity and distribution of precipitation; duration of moisture states and snow cover; daily and monthly fluctuations in air temperature; the kind, amount, and persistence of vegetation; kinds of organic deposits; soil color; aspect and gradient of slope; elevation; and ground water. The temperature of the soil profile with depth is also affected by the soil's thermal diffusivity. Thermal diffusivity can be described as the change in soil temperature resulting from a given quantity of heat flowing for a given time through a known volume of soil. More simply, thermal diffusivity is the product of how well a soil conducts heat and the ability of that soil to store heat. In most cases, soil thermal diffusivity can be considered a function of porosity, water content, and clay content.

Changes in soil profile temperature are a result of the absorption and loss of heat from the soil surface. In general, the soil transmits heat downward into the profile when the temperature near the surface is higher than the temperature in the soil below and transmits heat upward when the temperature is warmer within the profile than at the surface. Soil profile temperatures also follow seasonal cycles. Often the temperatures of the subsoil lag behind those near the surface, as the seasonal and daily temperature cycles decrease in amplitude as soil depth increases. Seasonal cycles in soil temperature are more evident and are experienced to greater extent if seasonal air temperature differences are highly pronounced. This is why soil temperatures with depth fluctuate little near the equator and fluctuate greatly in the middle and high latitudes.

Differences in soil temperature dramatically affect the biotic ecosystem of the soil. Because microorganisms have no internal control for their body temperature, they are highly susceptible to dramatic changes in soil temperature. We find that most microorganisms thrive at soil temperatures between 10 and 50 degrees C, with 30 to 40 degrees C being the optimum range for growth. However, many microorganisms can thrive in harsh soil temperatures. In general, microrganisms can be grouped into three categories based on their response to soil temperatures: psychrophiles, mesophiles, and thermophiles. Psychrophilic microorganisms are capable of growing below 20 °C. Mesophiles, which include most normal human flora and pathogens, grow between 10 - 50 °C. Thermophiles, which are an important group for organic composting, grow above 40 °C and hyperthermophiles grow above 100 °C.

Knowledge of soil temperature is also important in understanding soil-plant relationships, because like microbes, plants often grow best in the range of soil temperatures for which they are best adapted. Below soil temperatures of approximately 5°C, growth of roots of most plants is negligible. Also many plants have minimum temperatures for germination. This means that seeds will not begin to grow until the soil temperature meets or exceeds their minimum temperature requirement. For most vegetables this minimum germination temperature is between 10 and 20 degrees C. High soil temperatures can also be detrimental to seeds, as many have upper limits of soil temperatures around 30 to 40 degrees C. Even when seeds do germinate in a high temperature soil, the seedlings may die from the heat.

Soil Temperature Laboratory Assignment

This lab is designed to enhance your understanding of season soil temperature changes with depth through the use of a simplified soil temperature computer model.

The objectives of this lab are for you to:

- 1. Observe that soil temperature distribution throughout the soil profile.
- 2. Observe monthly in soil temperatures with depth.
- 3. Discover seasonal patterns of heating and cooling with soil depth.
- 4. Understand the impact of changes of air temperature on soil temperature.

Go to <u>http://kami.pss.okstate.edu/dln</u> to access the applet modeling soil temperature changes with depth and time or if possible, double click on the soil temperature icon on the desktop.

Soil Temperature Laboratory Assignment

This lab is designed to enhance your understanding of season soil temperature changes with depth through the use of graphs and figures from soil temperature research.

The objectives of this lab are for you to:

- 1. Observe that soil temperature distribution throughout the soil profile.
- 2. Observe monthly in soil temperatures with depth.
- 3. Discover seasonal patterns of heating and cooling with soil depth.
- 4. Understand the impact of changes of air temperature on soil temperature

Fluker Figures

Fluker, B.J. 1958. Soil Temperatures. Soil Science 86: 35-46

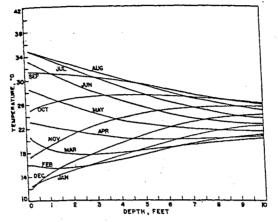
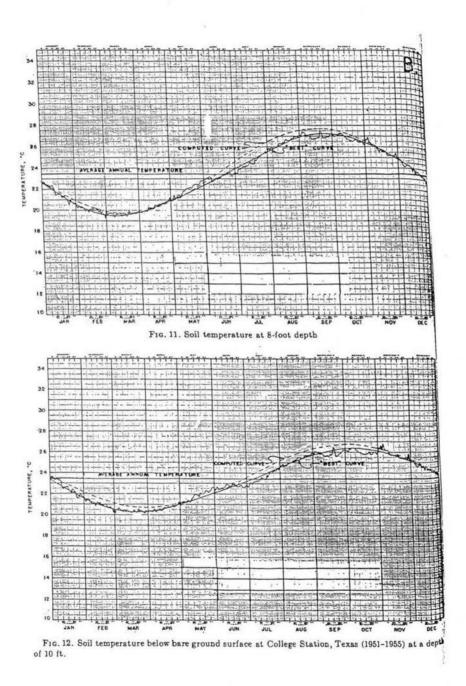
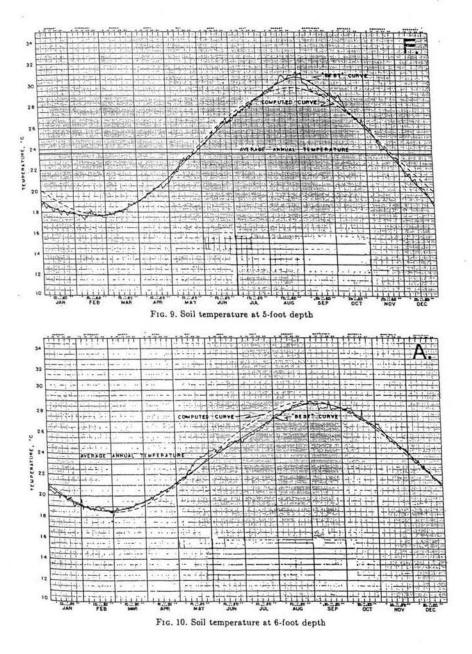


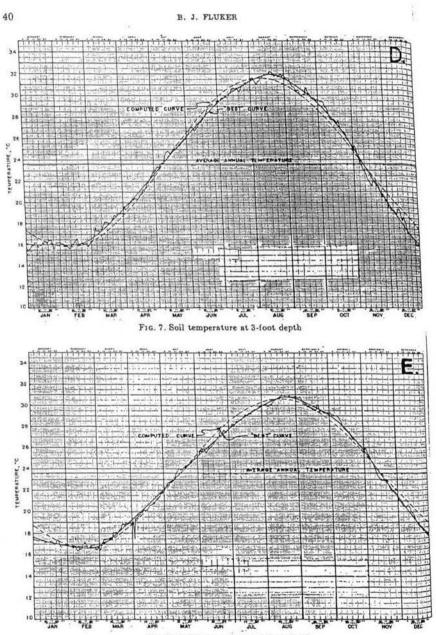
FIG. 13. Soil temperature gradients

d Depth below ground suriace	θ _{max.} Max. avg. temp.	θ _{min.} Min. avg. temp.	θ _{avg.} Average annual temp.	Ad Annual temp. Amplitude	la Time lag
	°C.	°С.	°C.	°C.	days
Air	30.0	10.5	20.8	9.8	0
2 in.	35.2	11.1	24.1	12.1	0
fl.					
1	33.9	13.9	23.9	10.0	5
2	32.9	15.0	23.8	9.0	15
3	31.9	16.0	23.6	8.0	22
4	30.8	16.6	23.6	7.1	32
5	30.7	17.6	23.6	6.6	39
6	28.7	18.5	23.5	5.1	47
8	27.1	19.5	23.4	3.8	62
10 ·	26.3	20.3	23.4	3.0	74

TABLE 1Summary of soil temperatures









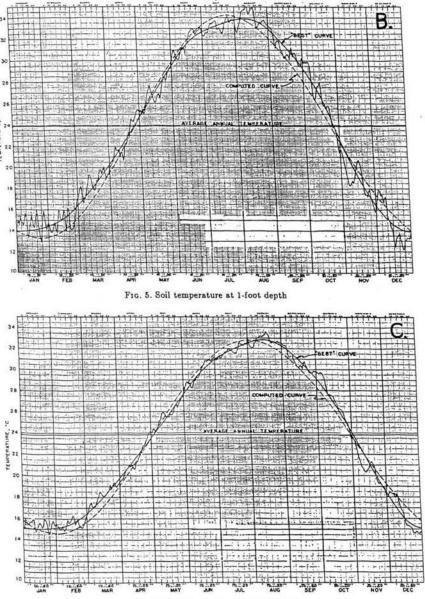


FIG. 6. Soil temperature at 2-foot depth

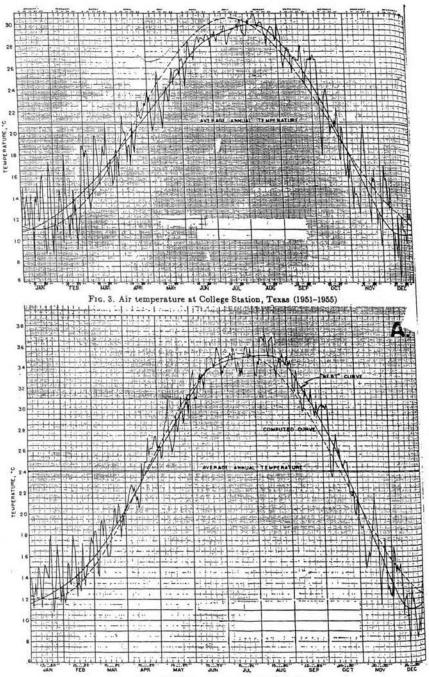
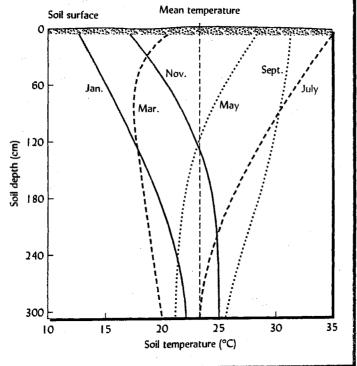
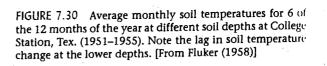


FIG. 4. Soil temperature at 2-inch depth

Brady and Weil Figures 7.30 and 7.31

Brady, N.C. and R.R. Weil. 2002. The Nature and Properties of Soils. Prentice Hall Publishers. Upper Saddle River, NJ





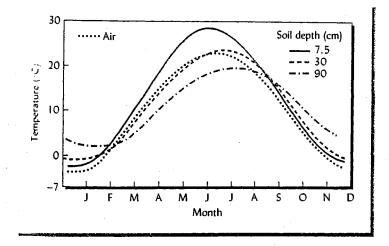
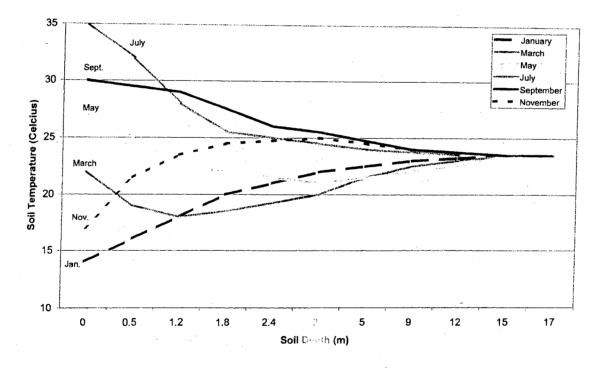


FIGURE 7.31Average monthly air and soil temperaturesat Lincoln, Methadistic aska (12 years). Note that the 7.5-cm soillayer is constructed by warmer than the air above and thatthe 90-cm sector sector is cooler in spring and summer, butwarmer in thatoff and winter, than surface soil.

Modified Fluker Figure

Jamie J. Patton and Fluker, B.J. 1958. Soil Temperatures. Soil Science 86: 35-46



Average Monthly Soil Temperatures by Depth in College Station, Texas (Adapted from Flucker, 1958)

Changes in Soil Temperature with Depth and Time

Using the Figures 7.30 and 7.31 from Brady and Weil (2002), the original and modified figures from Fluker (1958), answer the following questions.

- 1. Using all the graphs given, at what soil depth (cm) do you think the most the variability in soil temperature occurs?
 - a. Draw a graph showing the temperature at this depth over the year. Please put time on the x-axis and temperature on the y-axis.
 - b. Why do you think soil temperature is so variable at this depth?
- 2. Air temperatures during the spring and fall in College Station, Texas are very similar. Using Fluker (1958) or Figure 7.30 from Brady and Weil (2002), compare the soil temperatures by depth between March and November.
 - a. How do the soil temperature profiles differ with depth?
 - b. How do you explain this difference in temperature with depth between the months in question?
- 3. Using the modified Fluker figure and Figure 7.30 in Brady and Weil (2002) compare soil temperatures with depth in College Station between November and July.
 - a. In which month is the surface temperature warmer? What factor(s) are responsible for this difference in temperature?
 - b. In which month is soil at depth of 8 meters warmer? What factor(s) are responsible for this difference in temperature?
- 4. Thermal diffusivity can be described as the change in soil temperature resulting from a given quantity of heat flowing for a given time through a known volume of soil. More simply, thermal diffusivity is the product of how well a soil conducts heat and the ability of that soil to store heat. Changes in soil temperature with depth and time in relation to thermal diffusivity can be expressed using the following simplified equation:

$$\frac{\Delta T (depth and time)}{\Delta time} = D_h * \frac{\Delta^2 T (depth and time)}{\Delta depth^2}$$

Where T is the soil temperature and Dh is the thermal diffusivity. Realize thermal diffusivity is a positive number.

- a. Using the above equation, would soil temperature variation at a depth of 2 meters increase or decrease with increasing thermal diffusivity? At 4 meters? How did you arrive at this answer?
- b. What effect would doubling the thermal diffusivity have on soil surface (0 meters) temperature variability? How did you arrive at this answer?
- c. Draw a graph showing the soil temperature at depth in May and October with the same soil temperature lines as in Fluker and hypothetical lines for temperature where the thermal diffusivity of the soils were doubled. Please put temperature on the x-axis and depth on the y-axis.
- d. Does <u>doubling</u> thermal diffusivity increase or decrease the rate at which soils warm up and cool down?
- e. What would you expect to happen to the rate of soil temperature change if we tripled the thermal diffusivity?
- 5. Using the modified Fluker figure, at approximately what depth does soil temperature not change over the course of a year?
 - a. What is the soil temperature at this point?
 - b. How does the soil temperature at this point relate to climate, knowing that the yearly minimum and maximum air temperatures for College Station, Texas are 5 and 40 degrees Celsius, respectively?
 - c. Why do you think soil temperature does not change at this depth?
- 6. In Lincoln, Nebraska the yearly maximum and minimum air temperatures are 30 and 15 degrees C, respectively. The yearly minimum and maximum temperatures for College Station, Texas are 5 and 40 degrees Celsius, respectively. Using Figures 7.30 and 7.31 from Brady and Weil answer the following questions pertaining to Lincoln and College Station.
 - a. Which location do you think has a greater variation in surface (0 to 7.5 cm) soil temperature over the year? What factor(s) accounts for this greater variation?

- b. If the soils in Lincoln were identical in texture and moisture to those in College Station, at approximately what depth do you think the soil temperature in Lincoln does not change over the course of a year? Why did you pick this depth?
- c. What do you think is the soil temperature at this point? How did decide on that temperature?
- d. Using your newfound knowledge about soil temperature changes with depth, can you name a current household technology based on this soil property?

Changes in Soil Temperature with Depth and Time

The yearly average minimum and maximum temperatures for Stillwater, Oklahoma are -4 and 35 degrees Celsius, respectively. Using this information answer the following questions.

Use the presets for time lag and thermal diffusivity until question 4.

- 1. Using the applet, at what soil depth (cm) does the most the variability in soil temperature occur in Stillwater?
 - a. Draw a graph showing the temperature at this depth over the year. Please put time on the x-axis and temperature on the y-axis.
 - b. Why do you think soil temperature is so variable at this depth?
- 2. Air temperatures in Stillwater during the spring and fall are very similar. Compare the soil temperatures by depth between April 1 and October 1. (Select April 1st and select retain line. Then plot October 1st.)
 - a. How do the temperature profiles differ with depth?
 - b. How do you explain this difference in temperature with depth between the months in question?
- 3. Clear your old lines and plot Stillwater soil temperatures with depth for February 1st and August 1st.
 - a. In which month is the surface temperature warmer? What factor(s) are responsible for this difference in temperature?
 - b. In which month is soil at depth of 8 meters warmer? What factor(s) are responsible for this difference in temperature?
- 4. Thermal diffusivity can be described as the change in soil temperature resulting from a given quantity of heat flowing for a given time through a known volume of soil. More simply, thermal diffusivity is the product of how well a soil conducts heat and the ability of that soil to store heat. Changes in soil temperature with depth and time in relation to thermal diffusivity can be expressed using the following simplified equation:

$$\frac{\Delta T (depth and time)}{\Delta time} = D_h * \frac{\Delta^2 T (depth and time)}{\Delta depth^2}$$

Where T is the soil temperature and Dh is the thermal diffusivity. Realize thermal diffusivity is a positive number.

- a. Double the thermal diffusivity (change diffusivity to 0.1400) and compare soil temperature variability between the original and doubled thermal diffusivities. Does soil temperature variation at a depth of 2 meters increase or decrease with increasing thermal diffusivity? At 4 meters?
- b. What effect did doubling the diffusivity have on soil surface (0 meters) temperature variability? What is the reasoning behind this effect?
- c. Draw a graph showing the soil temperature at depth in May and October with diffusivities of 0.0700 and 0.1400. Please put temperature on the x-axis and depth on the y-axis.
- d. What would you expect to happen to the rate of soil temperature change if we tripled the thermal diffusivity?
- 5. In Stillwater, at approximately what depth does soil temperature not change over the course of a year?
 - a. What is the soil temperature at this point?
 - b. How does the soil temperature at this point relate to climate, knowing the yearly minimum and maximum air temperatures Stillwater?
 - c. Why do you think soil temperature not change at this depth?
- 6. In Minneapolis, Minnesota the yearly maximum and minimum air temperatures are 38 and -35 degrees C, respectively. Plot the soil temperature for Minneapolis, Minnesota and Stillwater, Oklahoma.
 - a. Which location has a greater variation in soil temperature over the year? What factor(s) accounts for this greater variation?
 - b. At approximately what depth does soil temperature in Minneapolis not change over the course of a year?
 - c. What is the soil temperature at this point?

- d. How does this information compare to the Oklahoma data?
- e. By comparing the two locations, what can you infer about soil temperature changes by depth in various environments?
- f. How could you test your inference?
- g. Run this test. What did you discover?
- h. Using your newfound knowledge about soil temperature changes with depth, can you name a current household technology based on this soil property?

Appendix 2-5. Survey Results Not Included in Text

Spring student responses to "What did you like least about using the applet/figures...?"

	Reading or n Confusion with Graphs		Increased Difficulty		Using Computers	Other	Nothing	
Applet	42	14 (33%)	2 (5%)	4 (10%)	6 (14%)	1 (2%)	15 (36%)	
Figures	31	19 (61%)	2 (6.5%)	0 (0%)	0 (0%)	8 (26%)	2 (6.5%)	

grouped by category

Fall student Responses to "What did you like least about using the applet/figures...?"

	n	Reading or Confusion with Graphs	Increased Lab Time	Difficulty	Using Computers	Other	Nothing
Applet	34	8 (23%)	6 (18%)	0 (0%)	5 (15%)	5 (15%)	10 (29%)
Figures	25	11 (44%)	2 (8%)	1 (4%)	0 (0%)	8 (32%)	3 (12%)

grouped by category

Spring survey responses pertaining to questions asked by treatment

			ked several qu Applet/Figure		#7 Completion without Explanation of Applet/Figures			
n Me		Mean	Std Error	p-value	Mean	Std Error	p-value	
Applet	46	3.30	0.12	0.7079	3.54	0.12	0.8962	
Figure	38	3.23	0.14		3.56	0.14		

Interpretation of Mean 1 = strongly agree 2 = agree 3 = neutral 4 = disagree 5 = strongly disagree

			ked several qu Applet/Figure		#7 Completion without Explanation of Applet/Figures			
	n	Mean	Std Error	p-value	Mean	Std Error	p-value	
Applet	40	3.29	0.14	0.0994	3.86	0.15	0.1729	
Figure	33	2.94	0.16		3.53	0.16		

Fall survey responses pertaining to questions asked by treatment

Interpretation of Mean 1 = strongly agree 2 = agree 3 = neutral 4 = disagree 5 = strongly disagree

Fall survey responses pertaining to graph comprehension by treatment

#3 Unc	#3 Understood the graphs given/generated by the applet								
	n	Mean	Std Error	p-value					
Applet	40	1.89	0.14	0.0664					
Figure	33	2.29	0.16						

Interpretation of Mean 1 = strongly agree 2 = agree 3 = neutral 4 = disagree 5 = strongly disagree

Time needed by spring students to complete the laboratory exercise by treatment

	n	Mean	Ra	nge	Std Error	p-value	
		Minutes	Min	Max			
Applet	46	57.8	42	77	1.6	0.2384	· .
Figures	38	54.8	29	80	1.9		

	n	Mean	Ra	nge	Std Error	p-value	
		Minutes	Min	Max			
Apple	et 40	58.2	37	120	3.5	0.0905	
Figur	es 33	67.2	35	142	3.9		

Time needed by fall students to complete the laboratory exercise by treatment

Spring survey responses pertaining to understanding/learning by treatment

		#1 Aj	oplet/Figures I Understand		#13 Learned more with Applet/Figures than in Traditional Lab			
	n	Mean	Std Error	p-value	Mean	Std Error	p-value	
Applet	46	1.86	0.12	0.7372	2.06	0.12	0.0042	
Figure	38	1.79	0.14		2.59	0.14		

Interpretation of Mean 1 = strongly agree 2 = agree 3 = neutral 4 = disagree 5 = strongly disagree

Fall survey responses pertaining to understanding/learning by treatment

		#1 Ap	oplet/Figures I Understand		#13 Learned more with Applet/Figures than in Tradition Lab				
	n	Mean	Std Error	p-value	Mean	Std Error	p-value		
Applet	40	1.71	0.14	0.4411	2.05	0.16	0.0920		
Figure	33	1.88	0.16		2.42	0.16			

Interpretation of Mean 1 = strongly agree 2 = agree 3 = neutral 4 = disagree 5 = strongly disagree

Spring survey responses pertaining to specific soil temperature phenomenon by

		treatr	nent							
		und	8 Enhar derstanc te and s		#9 Enhanced understanding of thermal diffusivity and soil temp			#10 Enhanced understanding of soil temp. with depth and time		
	n	Mean	Std Error	p-value	Mean	Std Error	p-value	Mean	Std Error	p-value
Applet	46	1.76	0.12	0.8503	1.94	0.12	0.3085	1.82	0.12	0.8874
Figure	38	1.79	0.14		2.12	0.14		1.85	0.14	

Interpretation of Mean 1 = strongly agree 2 = agree 3 = neutral 4 = disagree 5 = strongly disagree

Fall survey responses pertaining to specific soil temperature phenomenon by treatment

		#8 Enhanced understanding of climate and soil temp.		underst	#9 Enhanced understanding of thermal diffusivity and soil temp			#10 Enhanced understanding of soil temp. with depth and time		
	n	Mean	Std Error	p-value	Mean	Std Error	p-value	Mean	Std Error	p-value
Applet	40	1.89	0.15	0.7205	1.92	0.15	0.1629	1.92	0.15	0.7112
Figure	33	1.97	0.16		2.22	0.16		1.84	0.16	

Interpretation of Mean 1 = strongly agree 2 = agree 3 = neutral 4 = disagree 5 = strongly disagree

Appendix 2-6. Student responses to Survey question 14

What did you like most about using the applet (figures) to complete the laboratory exercise? Please be specific.

Spring Applet

- 3: Nothing.
- 4: Graphs made it very clear what was going on.
- 6: Not much writing and math involved.
- 8: Too see the differences from Oklahoma to Minnesota.
- 10: It was easy to use and fast to see the changes. The color helped also, to see the differences between two variables.
- 11: It was easy to use, didn't take very long and more enjoyable than doing equations.
- 12: It was somewhat easy.
- 14: Saved time.
- 21: Graphs.
- 22: The ability to change the variables and immediately see the results.
- 23: It allowed me to see comparisons of different temps at different depths, and that made understanding easier.
- 24: When you change the temps or diffusivity the graphs changed showing you the differences.
- 26: Fast, convenient, accurate.
- 28: Being able to type in the numbers and having the computer do the work.
- 30: Easy to understand.
- 31: It was easy to figure out and caters to different learning styles.
- 32: The graphs, very easy to read and understand.
- 33: It was simple to use and understand.
- 36: It gave a visual representation of the data instantly. It was quick and easy to use.
- 37: It was easy to see and read.
- 42: Any situation was possible to enter and graph.
- 43: The graphs help to put concepts into visual interpretations.

- 46: It was not complex and time consuming.
- 48: It was short and had an easy to follow layout.
- 50: Not as many calculations. Probably a lot easier.
- 51: It made the lab a little easier to understand by having a graph in front of me that I could use
- 52: Time and visualization.
- 53: It was easy to use, you could compare the graphs over several months.
- 55: It was easier to read the graphs.
- 59: I just like using computers. Our typical labs take forever, and then I'm rushed to findings answering the questions to the point I don't learn anything.
- 62: You could put graphs next to one another and compare them.
- 63: It was self-explanatory with the sheet.
- 68: You could watch the changes happen as you made them.
- 71: The charts were easy to manipulate and were not subject to human error in calculating as an experiment done in lab may have been. It instantaneously gave us information so we could understand thermal diffusivity.
- 72: The graphs really helped me get an understanding.
- 73: Ease of use and being able to compare statistics on one graph.
- 74: That all the information input was on one central page (screen) the entire time.
- 76: Graphs are easy to read and alter.
- 77: It was easy to understand and fast.
- 78: The fact that you could see and compare the changes on the actual graphs made it much easier to understand.
- 81: I enjoyed the immediate data that was given by the computer model.
- 83: You could punch in your own data and see what happens with like the temp.
- 89: I could use it to test my own theories. I could play and test different characteristics.
- 94: It was easy to use.
- 95: Ease of operation.

- All you had to do was put in the information and the computer did the rest. 96:
- 97: We could see how the graphs changed.

There were figures of all the depths of the soil.

Spring Figures

1:

2:

7:

9:

They were easy to understand. The visual use of the graphs. The figures are well labeled. 13: Felt like I had hands-on experience. 16: Easy to use. 18: It allowed us to reason a bit. I encourages us to think. 19: They were fairly simplistic and easy to read. 25: The guickness of being able to flip back and forth between the figures. 27: I learned easily because of visual aid of figures offers easy comparison and understanding. 29: The graph made it easier to visualize the change in temp. It's easy to find the figures I need. 34: They were easy to follow. It was all right in front of you so you could follow it. 38: 39: Easy to interpret. 41: I learn better when I can see it. The figures really helped. I didn't really like it. I learn better doing a lab. 44: The Fluker module was easy to understand that it was varied in the old and modified 45: Fluker figures. It allowed me to see what I was doing and understand the temps of different depth. 47: We didn't use the computers, so I can't compare. 49: 54: They were easy to use. 56: I like being able to see what it is someone is trying to explain.

- 57: After deciphering the figures they made it easier to understand and complete the assignment.
- 58: It gave something visual to reinforce theory.
- 61: Using the modified Fluker figure.
- 65: It was fun. Exciting and enriching, a nourishing experiment.
- 67: They were easy to understand and comprehend.
- 69: After figuring them out they were understandable.
- 70: Easy to understand, very useful in answering the problems.
- 75: Visual stats to use gave an understandable definition.
- 79: They were readily understandable. The charts and tables were easy to read.
- 82: Something to look at. I like visuals.
- 85: To understand thermal diffusivity.
- 86: Having a visual in front of me.
- 87: Presented it in different ways.
- 88: I liked some of the figures because I could visualize the effects of temperature change in the soil. I think the modified figures were the most understandable.
- 90: Some of the questions were easy to answer, while others were difficult.
- 93: They were right in front of me. I could flip between them as much as I wanted.

Fall Applet

- 99: It was very easy to understand. The program is also easy to use.
- 101: Applet was easy to use. Allowed lab to be done fairly quickly.
- 103: It was relatively simple and a good visual.
- 105: It was different and provided interaction and visual.
- 110: I feel that teachers drag on about things I already know. With the applet if I had a question I could ask. It saves time.
- 115: The ability to quickly compare different aspects of soil temp, diffusivity, and climate effects.

- 118: I liked the visual aid it provided and the ease at calculating numbers.
- 119: Easier than reading a chalkboard.
- 123: Visual learning. Able to see the effects on the graphs.
- 124: I liked it because I was able to see the graphs and changes that occurred.
- 126: It didn't take very long and I didn't have to do much work.
- 127: It was easy to use. I didn't have to thumb through my textbook for a long time.
- 137: Didn't have to make the graphs by hand easy to compare 2 graphs.
- 138: Not being in lab class.
- 146: The graphs that were used.
- 154: You could see the variation by the live graph.
- 157: It was very easy to understand.
- 162: It was easier to see changes and I'm a more visual learner.
- 163: It was quick.
- 171: It was hands on.
- 173: The straightforwardness of the procedures and the ease of reading the results.
- 175: It was all visual.
- 176: Because I can see it, helps me imagine.
- 177: It was easy and we could see how temp change as we graphed it.
- 178: It was easy to read and understand.
- 180: It was easy to use.
- 182: It was user friendly.
- 184: The graphs were very easy to read.
- 186: It was simple, quick and easy.
- 187: It wasn't very complicated and it explained quite a bit.
- 188: Easy to use.
- 191: It was easy to use and presented the information in a format that was easy to understand.
- 192: I am more a visual learner...seeing the graphs helped me.

- 193: Because it was more visual. You could see the changes by just changing the number or the amount.
- 195: It was a quick way to get results.
- 196: Easy and fun.
- 205: It was easy to understand and to run the program.

Fall Figures

- 98: They give a visual picture.
- 111: They were easy to use.
- 117: Give you something to help explain the information.
- 120: The information provided was very in-depth and helped answer the questions.
- 121: Listening to Jamie say Fluker.
- 122: The ones where it was very clear which soil had a greater temp.
- 125: They were all similar and fairly easy to use.
- 129: It was not difficult to interpret the data on the graphs. It also gave me a mental image of soil temperature fluctuation with depth.
- 134: It showed me how temp fluctuates at different time of year.
- 139: They were fairly easy to figure out.
- 141: Find out the temp at different depths
- 142: Jamie's help. The answers were included in the figure if we looked hard.
- 147: The name of the graphs.
- 148: Graphs make things easier for me to understand.
- 149: Easy to use.
- 158: It was a visual that provided examples.
- 166: It was understandable because there was something to go back to, to look at and understand.
- 167: I am a visual learner. The graphs help me visualize concepts.

- 168: The graphs were easy to interpret and easy to reference when needed. I am used to using such graphs for analysis.
- 170: Seeing the different temp variations throughout.
- 179: They were easy to read and understand.
- 189: I understand how to use graphs.
- 190: They were very understandable.
- 194: I think figures allow us to understand what we are being told.
- 197: The information was very in-depth and easy to read.

201: Very clear and easy to read.

202: To explain or describe how figures are and why they are the same or different is a good practice.

What did you like least about using the applet (figures) to complete the laboratory exercise? Please be specific.

Spring Applet

- 83: A little confusing just using colors to indicated different lines.
- 14: All of it was good.
- 10: Didn't come with its own directions. If Jamie had not given detailed explanation like she did, I may have been confused about certain things.
- 50: Graphs were sometimes hard to read.
- 36: Having to answer so many questions.
- 77: Having to hit the retain line button.
- 53: I can't think of anything.
- 71: I can't think of anything.
- 59: I don't like being slowed down by a partner lacking computer know-how.
- 66: I felt rushed. I needed something to keep so I could study and retain it.
- 81: I felt that it was difficult to understand how to use the applet. Better instruction was needed.
- 95: I had no problems.
- 43: I was not sure about my interpretations. I am sure with practice however I would improve

4: Initially, not knowing what is telling me is frustrating, but once I knew that it helped.

- 11: It was a little boring.
- 37: It was kinda confusing at first, but once you knew what you were doing it was easier.
- 24: Kind of hard to understand some things since I haven't read it before or really knew what thermal diffusivity was.
- 8: Messing with the graphs.
- 33: N/A
- 52: N/A
- 73: N/A

- 26: No instruction prior to use.
- 22: No prior knowledge of system.
- 12: Not completely self explanatory.
- 78: Not used to the program.
- 30: Nothing
- 46: Nothing
- 51: Nothing I disliked.
- 3: Nothing.
- 6: Nothing.
- 42: Nothing.
- 68: Nothing.
- 76: Nothing.
- 96: Nothing.
- 31: Soil temperature isn't exciting.
- 97: Sometimes it's difficult to use the computer.
- 32: The fact that we couldn't take the temperature below -30 degrees C.
- 74: The graphs were confusing and I didn't understand the relationships of what was being input and the result of the graphs.
- 55: The graphs were difficult to understand.
- 62: The labeling of the graphs.
- 89: The mouse on the computer sucked.
- 72: When I was plugging in the numbers I didn't know where to put them most of the time.

Spring Figures

- 70: A few of them needed to be put on different axis to understand.
- 58: Graphs were not explained well.
- 65: Having to cross reference the charts.
- 13: Having to read.

- 93: I can't say I didn't like anything about them.
- 90: I didn't like reading the graphs.
- 41: I don't like labs in general but I enjoyed this exercise.
- 44: I just didn't like using them at all.
- 86: I think there could have been fewer charts and could have answered questions.
- 47: I wish that Jamie could have went into more detail when explaining diffusivity.
- 38: It was very time consuming.
- 18: Jamie's figures were great, but some of the others were horrid!!
- 34: Not sure the value.
- 1: One graph was illustrate horizontally when it would have been easier to understand it vertically.
- 45: Some figures might be complex and not able to understand it.
- 9: Some of the figures are confusing to read.
- 27: Some of the figures were not that well organized thus extra time was needed to interpret.
- 79: Some of the tables were too similar in comparison to others.
- 56: Some of them were hard to tell which month was which.
- 19: Some were printed kind of small and when the data lines crossed each other they become harder to follow.
- 29: The axis and depth confused me. There were too many lines.
- 57: The figures were very hard to understand and decipher what to use from them.
- 49: The Fluker figures were hard to understand compared to Brady.
- 75: The lack of instruction on use of chart.
- 39: The values on the axis was hard to correlate to line on graph precisely.
- 67: There were too many different graphs with the some info. Didn't know which was best to use.
- 69: They took some figuring out.
- 88: They were confusing at some points during the exercise. The first Fluker figures were hard to understand at first.

189

- 82: They were kinda confusing.
- 87: Too many figures.
- 16: Too many graphs. Only needed two of them
- 85: Warming and cooling graph.

Fall Applet

- 146: At first, the information given was confusing.
- 101: Generated easy to understand graphs quickly.
- 138: Had to understand.
- 126: Having to switch rooms.
- 163: I am too kinesthetic to get information from a computer. I need to see results to understand a concept.
- 127: I didn't like the scale on the graphs much. It made it hard to pinpoint certain temperatures.
- 154: I enjoyed everything.
- 184: I hate computers.
- 191: I really didn't dislike anything.
- 115: I wanted more time to work the applet and imprint the affects of the various soil factors.
- 182: It made calculations by hand not necessary.
- 175: It took a few minutes to learn.
- 178: It took a lot of time.
- 204: It was fun to use the technology.
- 171: My partner.
- 105: N/A
- 118: None.
- 196: Not good with computer.
- 180: Nothing really.
- 177: Nothing, it explained a lot.

- 162: Nothing.
- 176: Nothing.
- 192: Nothing.
- 205: Nothing.
- 187: Some of the figures were hard to comprehend.
- 119: Takes more time that regular class.
- 173: The closeness of the computers to each other.
- 103: The graph did not match my learning process. I would like to see it turned over x-y axis.
- 137: The graphs were hard to understand at first.
- 186: The graphs were too small on the program.
- 124: The least was that I continued not to retain the lines or do something that was a minor mistake. Therefore, it took us longer to complete the lab.
- 193: The line on the graphs were not labeled when you were comparing dates.
- 195: The method step taken to get accurate results.
- 110: The program was very crude.
- 188: The time it took.
- 157: Waiting on my partner.

Fall Figures

- 170: A little confusing at times.
- 202: Graphs and letters were small.
- 197: Having to regraph graphs.
- 147: I could visualize the data using the figures.
- 166: I took a little bit to figure all them out. You had to think a little bit to understand them.
- 111: I was kind of confusing.
- 168: I would like to be able to take the exercise home after being introduced to the concepts to be able to study it in a more quiet environment.
- 141: It was for a grade.

- 167: Just take me awhile to figure out measurements.
- 189: Kinda hard.
- 194: N/A
- 120: Recreating the graphs was the worst part.
- 139: Regraphing 50,000,000 times
- 149: Some were complicated.
- 98: Some were more difficult than others.
- 190: That I couldn't find which figure.
- 142: The graphs were overwhelming.
- 122: The huge graph was somewhat complicated but it was probably me.
- 148: There was too much excess irrelevant info.
- 158: There were a lot of figures.
- 121: There were lots of questions in that lab.
- 125: They were too numerous and the pages were a pain in the rear to flip back and forth.
- 129: To be honest, there wasn't anything I didn't like about them.
- 134: Wasn't sure which one to use for which question.
- 201: Would have been easier to read lines if they were in color rather than different lines.

Appendix 2-8. Student responses to Survey question 16

What suggestions would you give to improve the applet itself?

Spring Applet

?

- 77:
- 26: An upgraded version that is more exciting.
- 50: Easier graphs.
- 24: Explain what program does and show an example first.
- 10: Give more specific directions. Everything else was great.
- 74: Have a better explanation of the set-up.
- 36: Have none.
- 43: Help column.
- 71: I don't have any.
- 11: I don't have any improvement suggestions, overall it was a good program.
- 31: I like it the way it is.
- 59: I thought the interface was cluttered, and not very interesting.
- 53: If you could retain more lines on the graph.
- 62: Improve the labeling of the graphs.
- 52: Label the lines on the graph so that you don't have to remember what the colors are.
- 4: Labels on the graph lines so I don't get them confused.
- 78: larger viewing area or be able to maximize specific graphs to full screen.
- 83: Looks good, no improvement.
- 42: Make more and different kinds of graphs to even better illustrate temperature effects.
- 8: More background info on what to do.
- 81: More of a person friendly program.
- 55: More sure you are using the right graph for the question.
- 33: N/A
- 73: N/A
- 14: No suggestions.
- 76: No suggestions.
- 95: None
- 48: None I can think of.
- 51: None that I can think of.
- 68: None.
- 3: Nothing
- 30: Nothing
- 97: Nothing special.
- 89: Only larger graphs.
- 96: Stay with it.

22: Use it more often.

Fall

Fall Applet	
175:	A instruction page on the computer.
195:	Be able to freeze results and compare with others. Label lines so we can see what graph
	line corresponds with each setting.
146:	Be more specific with graph info.
127:	Give the graphs a more precise scale.
182:	I liked it.
162:	It was good.
204:	Just understanding how it works.
173:	Keep others quiet.
176:	More various data of different climates.
105:	N/A
186:	N/A
187:	N/A
101:	No suggestions.
124:	No suggestionsI thought it was great.
118:	None
126:	None
180:	None
184:	None
192:	None
196:	None
178:	None .
119:	None, worked pretty good.
115:	None.
154:	None.
171:	None.
191:	None.
177:	Nothing great job.
205:	Nothing.
163:	The program was neat but I just don't understand soils enough to jump on a computer
	and learn something new.
110:	Update the software.
193:	When comparing described what has happened.
	105
	195

Other comments

Spring Applet

- 6: The applet was cool. All the info was all figured out and graphed already.
- 12: With a little help from Jamie I better understood the applet
- 23: I enjoyed using the applet.
- 63: Good overall lab.
- 54: I enjoyed this lab and understood the concept taught better than I would otherwise.
- 10: I enjoyed this lab.
- 24: Jamie is a lot of help by thoroughly explaining things when you have a question.
- 71: N/A
- 62: N/A
- 54: None.
- 4: None.

Spring Figures

- 13: It was fun and fast!
- 34: Need more time!
- 67: Overall very helpful.
- 82: Needed more explanation.
- 86: None.

Fall Applet

- 103: The lab was a relief.
- 157: Very helpful.
- 182: A lecture beforehand would make the lab better.
- 162: I would like to do it for 2 labs instead of just 1.
- 204: It was fun.
- 105: No.

186: None.

101: None.

124: Nope.

118: Soils 2124 is my favorite class. It is challenging enough to make me attend class.

Fall Figures

120: I liked this exercise.

- 133: Didn't really like the graphs.
- 168: I feel the graphs are an excellent learning tool but I don't feel I learned and retained a lot of the concepts in the lab period. But this is not because of the graphs, but the limited time.

170: Less complex.

202: None.



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Dissertation: CHANGES IN SOIL PHYSICAL PROPERTIES RESULTING FROM SWINE EFFLUENT AMENDMENTS TO A CALCAREOUS SILT LOAM AND MIXED METHODS EVALUATION OF THE COMPUTER APPLET SOIL TEMPERATURE CHANGES WITH DEPTH AND TIME AS AN UNDERGRADUATE TEACHING TOOL

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