Table S1

Soil physical characteristics and root densities for grasslands, clusters, and groves. Each value is a mean, where the number of samples is: grasslands = 200, clusters = 41, and groves = 79. Data are extracted from previous publications [19,53] at this study area.

Soil Depth (cm)	pH	Soil Bulk Density (g cm^{-3})	Particle Size Distribution			Fine Root Density (kg m^{-3})	Total Root Density (kg m^{-3})
			Sand (%)	Silt (%)	Clay (%)		
Grasslands							
0-5	7.34	1.34	76.4	10.8	12.8	3.5	3.8
5-15	7.21	1.44	74.5	10.1	15.4	2.2	2.2
15-30	7.17	1.41	71.5	10.7	17.8	1.4	1.9
30-50	7.30	1.46	67.2	11.1	21.7	1.0	1.0
50-80	7.54	1.52	62.9	12.2	25.0	0.5	0.5
80-120	7.74	1.62	55.8	14.1	30.1	0.3	0.3
Clusters							
0-5	7.34	1.10	75.4	11.1	13.5	10.1	21.3
5-15	7.34	1.29	74.1	10.7	15.2	5.4	16.6
15-30	7.35	1.36	71.4	11.1	17.5	2.7	11.0
30-50	7.46	1.43	67.8	11.3	20.9	1.8	3.1
50-80	7.65	1.49	63.0	12.2	24.9	0.9	2.0
80-120	7.79	1.59	55.8	14.0	30.6	0.6	0.8
Groves							
0-5	7.39	1.06	75.0	11.8	13.2	10.2	16.0
5-15	7.48	1.31	73.3	11.2	15.5	5.8	11.8
15-30	7.54	1.37	70.4	11.7	17.9	3.1	10.6
30-50	7.64	1.43	68.1	11.9	20.0	1.9	4.0
50-80	7.74	1.47	64.9	12.2	22.9	1.1	4.2
80-120	7.82	1.59	59.0	13.5	27.6	0.8	1.5

Table S2

$\delta^{13}C$ values (‰ vs. V-PDB) of leaf and fine root tissues of dominant plant species across the 160 m × 100 m landscape in a subtropical savanna ecosystem. For each woody species, approximately equal amounts of leaves from three individuals were collected to make a composite sample; then, fine roots were excavated from surface soils after confirming their linkages to the selected three individuals and mixed to create a composite sample. The same sampling method was applied to forbs and grasses, but more than three individuals were sampled for each species in order to meet the mass requirements for elemental and isotopic analyses. Number of woody plant species = 15, forbs = 9, and grasses = 13.

Species name	**$\delta^{13}C$ values (‰)**	
	Leaf tissue	**Fine root tissue**
Woody plant species		
Bernardia myricifolia	-27.1	-26.1
Celtis pallida	-30.9	-30.0
Condalia hookeri	-30.4	-28.5
Diospyros texana	-29.0	-25.9
Foresteria angustifolia	-29.5	-26.5
Karwinskia humboldtiana	-28.7	-27.0
Lycium berlandieri	-28.1	-27.1
Mahonia trifoliolata	-26.2	-25.7
Schaefferia cuneifolia	-29.5	-27.5
Zanthoxylum fagara	-28.7	-27.9
Coleogyne ramosissima	-28.2	-27.5
Salvia ballotiflora	-30.2	-27.6
Acacia greggii	-28.7	-26.4
Acacia schaffneri	-29.9	-28.3
Prosopis glandulosa	-27.8	-25.6
Forbs		
Croton texensis	-29.6	-27.8
Wedelia texana	-29.8	-27.6
Aphanostephus riddellii	-30.7	-27.9
Ambrosia confertiflora	-29.5	-27.5
Parthenium hysterophorus	-30.0	-28.3
Palafoxia callosa	-28.6	-27.5
Amphiachyris amoena	-28.6	-27.5
Thymophylla pentachaeta	-28.9	-27.9
Xanthisma texanum	-29.3	-26.9
Grasses		
Tridens albescens	-13.9	-14.4
Setaria texana	-13.0	-12.7
Bothriochloa ischaemum	-11.6	-12.4
Aristida purpurea	-12.4	-12.5
Cenchrus ciliaris	-11.8	-12.2

Heteropogon contortus	-12.5	-11.6
Chloris cucullata	-14.4	-12.7
Eragrostis secundiflora	-12.3	-12.4
Paspalum setaceum	-12.5	-11.2
Sporobolus neglectus	-13.8	-12.5
Bouteloua rigidiseta	-14.3	-13.8
Bouteloua trifida	-14.2	-13.3
Panicum hallii	-13.0	-13.2

Table S3

Descriptive statistics for all soil $\delta^{13}C$ values (‰ vs. V-PDB) across the 160 m × 100 m landscape within each depth increment. Number of samples, n = 320.

	0-5 cm	5-15 cm	15-30 cm	30-50 cm	50-80 cm	80-120 cm
Mean	-22.0	-19.4	-16.8	-16.1	-16.2	-17.3
Median	-21.7	-18.9	-16.3	-15.7	-16.1	-17.2
Minimum	-27.3	-24.7	-21.6	-21.6	-20.2	-23.0
Maximum	-17.7	-15.7	-14.3	-13.7	-14.1	-15.1
Standard deviation	2.2	2.0	1.5	1.3	1.0	1.0
Standard error	0.1	0.1	0.1	0.1	0.1	0.1
Coefficient of variation	-9.78	-10.13	-9.19	-8.20	-6.06	-5.57
Skewness	-0.31	-0.55	-0.88	-1.38	-0.69	-1.17
Range	9.6	8.9	7.3	7.9	6.1	7.9

Figure S1

Root densities (kg m^{-3}) within landscape elements to a depth of 1 m. Number of samples: grassland = 200, cluster = 41, and grove = 79. Mid-points of each soil depth increment (e.g. 2.5 cm for 0-5 cm soil depth increment) were used to fit the exponential models.

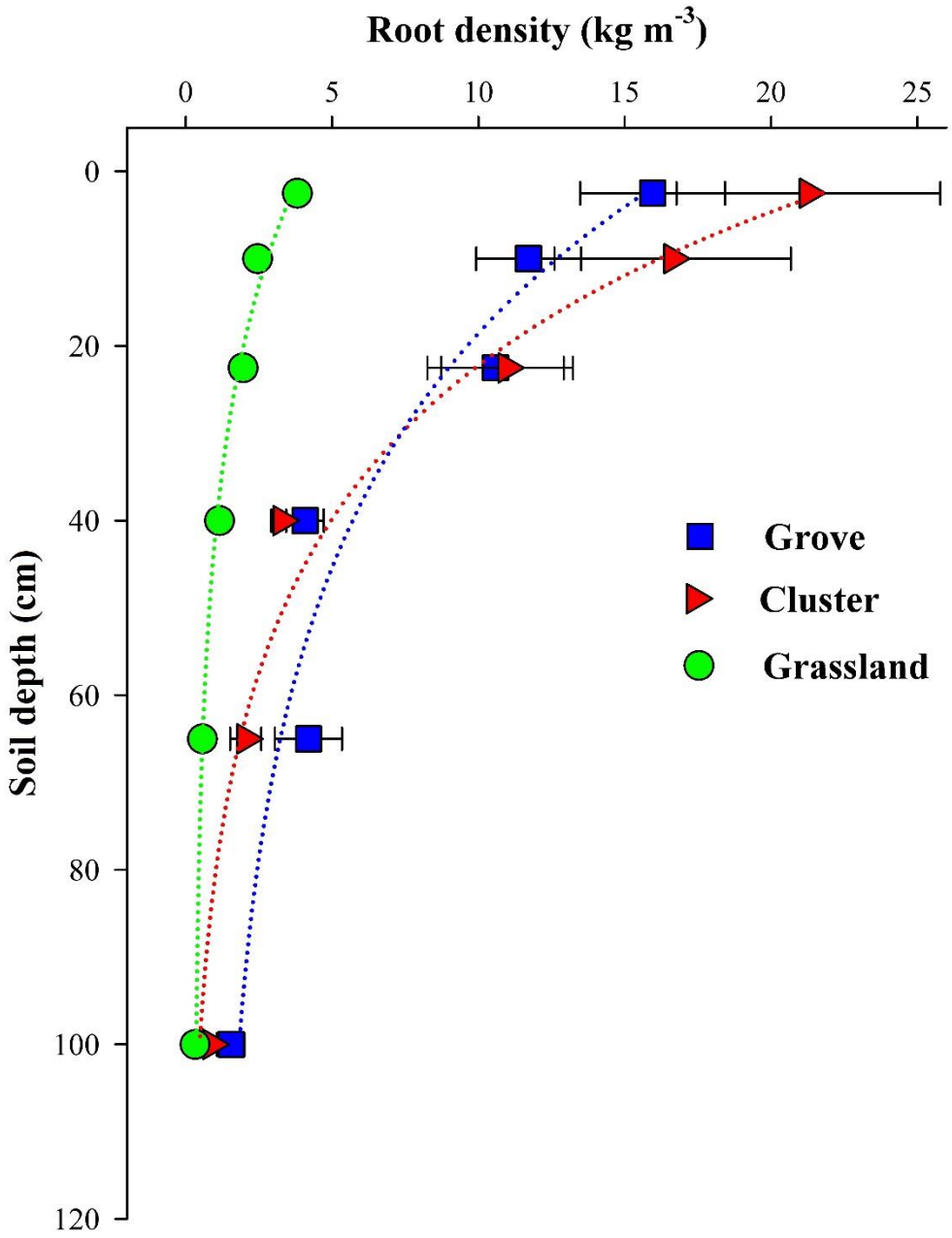

Figure S2

Relationships between soil $\delta^{13}C$ (‰ vs. V-PDB) and root density (kg C m^{-3}, log_{10}-transformed) throughout the soil profile. Number of samples: grassland = 200, cluster = 41, and grove = 79. Note that scales are different.