

Table S1. Soil physical and chemical characteristics in eight plots of a 70-year-old abandoned quarry (Plots A-E: quarry floor, F-H: quarry top), a recently decommissioned reference quarry (Q1), and an urban forest reference site (UF). Study sites are located in Jefferson City, Missouri, USA. Values represent the mean and standard deviation (SD) of 20 measurements per plot. BulkD – bulk density in g cm<sup>-3</sup>; Silt/Clay, Sand and Gravel represent particle size distribution in %; element concentrations are in mg per kg of dry soil.

Plot	Q1	A	B	C	D	E	F	G	H	UF
BulkD	2.18	1.65	1.36	1.37	1.29	1.09	1.02	1.11	1.05	1.13
SD	0.57	0.09	0.17	0.23	0.17	0.15	0.18	0.19	0.18	0.14
Silt/Clay	13	4	7	4	3	3	14	14	12	19
SD	9	1	3	1	1	5	5	3	3	4
Sand	29	28	34	35	35	32	52	56	60	66
SD	10	4	6	8	7	10	13	11	9	6
Gravel	58	68	59	61	62	66	34	29	29	15
SD	17	4	9	9	8	15	18	12	11	8
pH	8.8	7.9	7.9	7.9	7.8	7.7	6.2	6.8	7.2	6.5
SD	0.3	0.2	0.1	0.1	0.1	0.1	0.5	0.4	0.3	0.3
Al	94	158	390	164	151	315	518	368	353	501
SD	34	67	132	101	93	61	81	82	65	50
B	0.09	2.71	4.04	4.49	1.21	0.92	2.04	3.02	1.62	0.09
SD	0.39	3.56	2.51	2.62	2.08	1.63	2.71	2.58	2.15	0.35
Ca	2462	1972	2474	3075	2952	3633	1623	1952	2398	1460
SD	227	159	194	626	320	660	616	594	448	458
Cu	1.1	3.2	3.6	3.7	2.8	5.1	2.0	4.0	4.0	3.4
SD	0.3	0.9	0.8	1.4	0.9	1.5	0.6	2.5	1.6	0.9
Fe	55	178	247	151	168	119	153	117	125	249
SD	12	32	56	38	49	32	39	30	33	31
K	47	82	154	139	149	382	144	194	185	197
SD	9	28	45	54	32	108	48	41	33	44
Mg	915	704	782	777	761	835	406	314	532	317
SD	107	45	70	156	84	69	108	57	83	46
Mn	42	37	67	66	92	85	256	131	176	143
SD	12	9	23	24	27	21	128	46	53	25
Na	40	33	53	52	68	66	47	42	56	21
SD	17	6	8	30	25	21	22	17	24	15
P	3	8	26	16	6	61	4	13	10	49
SD	1	2	16	6	2	30	2	13	10	29
Zn	2	7	22	55	33	17	8	23	14	18
SD	1	3	11	70	18	11	4	20	5	12

**Table S2.** Microclimate in eight plots of a 70-year-old abandoned quarry (Plots A-E: quarry floor, F-H: quarry top), a recently decommissioned reference quarry (Q1), and an urban forest reference site (UF). Study sites are located in Jefferson City, Missouri, USA. Values are based on daily data (with each data point representing the mean of 24 hourly values) collected from 1 May – 30 September 2011. Rs – shortwave solar radiation, Rh – relative humidity, Ta – air temperature, VWC – volumetric soil water content, Ts – soil temperature, EC – soil electric conductivity.

		A	B	C	D	E	F	G	H	UF	Q1
Rs, W m <sup>-2</sup>	Mean	120.0	123.4	30.4	11.4	19.5	30.9	36.7	28.8	28.2	221.5
	Median	130.2	140.3	30.6	12.1	20.9	32.7	38.6	30.0	30.9	234.7
	Min	10.8	12.3	1.1	0.3	1.3	2.7	3.4	2.2	3.0	23.3
	Max	200.0	204.5	99.3	26.9	42.0	106.8	71.2	82.2	71.2	339.1
	SD	48.4	50.6	17.4	5.2	8.0	14.2	15.7	13.0	11.6	80.1
Ta, °C	Mean	21.9	21.9	21.8	21.0	22.1	22.4	22.8	23.0	22.2	23.6
	Median	22.7	22.9	22.8	22.1	23.0	23.6	24.1	24.3	23.2	25.0
	Min	9.1	9.2	8.9	8.7	8.8	9.0	8.9	9.2	8.9	9.4
	Max	31.6	31.7	31.4	30.1	32.0	32.8	33.3	33.4	32.2	34.2
	SD	5.5	5.5	5.4	5.2	5.6	5.7	5.8	5.7	5.5	5.9
Rh, %	Mean	84.0	84.0	83.5	85.7	80.4	77.9	76.7	76.2	80.3	71.4
	Median	83.8	83.8	83.6	86.6	80.0	77.2	77.0	74.7	80.3	70.4
	Min	63.4	63.4	55.3	57.2	55.0	49.0	49.0	48.8	51.8	46.4
	Max	98.2	98.2	98.0	98.6	97.4	97.4	97.5	96.4	97.5	90.2
	SD	7.4	7.4	8.3	7.8	8.6	9.8	10.3	9.6	9.5	9.0
VWC, m <sup>3</sup> m <sup>-3</sup>	Mean	0.21	0.29	0.15	0.21	0.24	0.20	0.16	0.19	0.25	0.15
	Median	0.19	0.28	0.14	0.19	0.21	0.20	0.09	0.18	0.23	0.14
	Min	0.08	0.13	0.06	0.13	0.17	0.08	0.03	0.12	0.11	0.08
	Max	0.38	0.42	0.27	0.40	0.40	0.37	0.43	0.33	0.43	0.24
	SD	0.08	0.09	0.06	0.06	0.07	0.08	0.14	0.06	0.10	0.05
Ts, °C	Mean	21.7	21.5	20.8	19.5	21.7	20.9	22.2	22.1	21.2	26.7
	Median	23.0	22.6	21.5	20.3	22.8	21.9	22.7	23.0	22.2	26.9
	Min	12.9	12.8	11.7	10.4	11.5	11.3	11.8	12.0	11.8	11.3
	Max	27.7	26.4	28.1	25.4	28.6	28.2	30.8	29.2	28.2	38.0
	SD	3.7	3.5	3.9	3.7	4.3	4.2	4.6	4.3	4.1	6.4
EC, mS m <sup>-1</sup>	Mean	8.2	33.5	3.9	9.8	22.8	4.6	3.4	8.0	6.8	3.8
	Median	6.0	33.4	2.0	8.1	17.0	4.5	0.4	6.3	7.5	3.6
	Min	1.0	0.4	0.0	2.0	5.5	0.3	0.0	2.5	1.3	0.0
	Max	20.4	68.6	14.4	33.1	51.7	9.6	13.2	18.2	13.2	9.9
	SD	5.9	22.3	4.3	6.5	14.2	2.9	4.7	4.8	3.6	2.4

Table S3. Species cover (dm<sup>2</sup> m<sup>-2</sup>, %) in each study plot: Q1 – recently decommissioned quarry, A–E – quarry floor and F–H – quarry top of a quarry abandoned 70 years ago, and UF – urban forest in Jefferson City, Missouri, USA. Highlighted fields denote the three species <1 m in height with the greatest cover in each plot. Nomenclature is from Steyermark's Flora of Missouri; common names are from the Flora of North America if they were not given in the Flora or Missouri. C is the Coefficient of Conservatism; an asterisk with a value of 0 for C indicates an exotic species.

Species	Author	Common Name	C	Q1	A	B	C	D	E	F	G	H	UF
<b>Herb Layer &lt; 1 m height</b>													
<i>Acalypha virginica</i>	L.	Virginia mercury	2			0.06			0.10			0.08	
<i>Acer negundo</i>	L.	Boxelder	1				0.02		0.001				
<i>Ageratina altissima</i>	(L.) King & H. Rob	White snakeroot	2				1.26	0.08					
<i>Ambrosia artemisiifolia</i>	L.	Common ragweed	0	0.10	0.48	0.03							
<i>Anagallis arvensis</i>	L.	Scarlet pimpernel	0*	0.04									
<i>Anemone virginiana</i>	L.	Tall anemone	4			0.05			0.15				
<i>Apocynum cannabinum</i>	L.	Prairie dogbane	3		1.00								
<i>Campsis radicans</i>	(L.) Seem.	Trumpet creeper	3						0.05				
<i>Carex albicans</i> var. <i>albicans</i>	Willd. Ex Spreng.	Whitetinge sedge	10							0.20	4.05		
<i>Carex blanda</i>	Dewey	Common woodland sedge	3		0.20	1.77	0.03	0.05			0.15	0.10	
<i>Carex glaucoidea</i>	Tuck. Ex Olney	Blue sedge	4		0.13								
<i>Carex muehlenbergii</i> var. <i>enervis</i>	Schkuhr ex Willdenow	Muhlenberg's sedge	5						0.27		0.53		0.15
<i>Carya ovata</i>	(Mill.) K. Koch.	Shagbark hickory	4						0.001		0.50		
<i>Carya texana</i>	Buckley	Black hickory	5										1.50
<i>Catalpa speciosa</i>	Warder ex Engelm	Hardy catalpa	2					0.20					
<i>Celtis occidentalis</i>	L.	Hackberry	4			0.83	0.63	1.00	0.73				
<i>Celtis tenuifolia</i>	Nutt.	Dwarf hackberry	4		0.14		0.68		0.11	0.001	0.17	0.41	0.25
<i>Cercis canadensis</i>	L.	Redbud	3		1.05	0.17	0.54	0.70	1.31			0.001	
<i>Cirsium altissimum</i>	(L.) Mill.	Tall thistle	4		0.40								
<i>Cornus florida</i>	L.	Flowering dogwood	3						0.10				

<i>Croton capitatus</i>	Michx.	Hogwort	0	0.11	0.02								
<i>Cyperus echinatus</i>	(L.) A.W. Wood	Hedgehog club rush	3		1.09								
<i>Dactylis glomerata</i>	L.	Orchard grass	0*	0.15	0.13								
<i>Daucus carota</i>	L.	Queen Anne's lace	0*	0.004	0.72	0.17							
<i>Desmodium paniculatum</i>	(L.) DC.	Panicked tick trefoil	3		<b>22.35</b>	<b>11.05</b>	0.03		0.75			0.15	
<i>Digitaria ischaemum</i>	(Shreb.) Schreb. Ex Muhl.	Smooth crab grass	0*	<b>0.17</b>									
<i>Elymus virginicus</i>	L.	Virginia wild rye	4		0.001						0.26	0.48	
<i>Erechtites hieracifolia</i>	(L.) Raf. Ex DC.	Fireweed	2										0.01
<i>Euonymus alatus</i>	(Thunb.) Siebold	Winged wahoo	0*				0.003	0.70					
<i>Euonymus fortunei</i>	(Turcz.) Hand. Mazz.	Wintercreeper	0*		0.001	0.05	0.85	1.12	2.11	0.001	0.05	0.08	0.10
<i>Euphorbia maculata</i>	L.	Nodding spurge	0	0.09									
<i>Festuca arundinacea</i>	Schreb.	Tall fescue	0*		<b>21.63</b>	<b>59.35</b>	0.001	0.001	0.03				0.08
<i>Fraxinus americana</i>	L.	White ash	3				0.65	<b>5.83</b>	0.58	<b>3.23</b>	3.73	1.60	<b>3.17</b>
<i>Galium circaezans</i>	Michx.	Wild licorice	4		0.04		0.07		0.68			0.21	
<i>Geleditsia triacanthos</i>	L.	Honey locust	2					0.003					
<i>Geum canadense</i>	Jacq.	White avens	2		0.02	0.23	1.00		1.03				0.004
<i>Helianthus hirsutus</i>	Raf.	Hairy sunflower	4			0.15					0.15		
<i>Juncus tenuis</i> var. <i>tenuis</i>	Willd.	Path rush	0						0.20		0.50		
<i>Juniperus virginiana</i>	L.	Eastern redcedar	2	0.002	1.49		0.04		0.40	0.001	<b>9.45</b>	<b>4.25</b>	
<i>Kummerowia stipulacea</i>	(Maxim.) Mankino	Korean clover	0*	0.08	2.06								
<i>Lactuca canadensis</i>	L.	Wild lettuce	2		0.17								
<i>Lespedeza frutescens</i>	(L.) Hornem.	Prairie bush clover	7								1.70		
<i>Ligustrum obtusifolium</i>	Siebold & Zucc.	Border privet	0*		0.18	0.01	2.15	<b>4.27</b>	2.40	0.001	0.65	<b>4.58</b>	0.66
<i>Lonicera japonica</i>	Thunb.	Japanese honeysuckle	0*		<b>13.40</b>	<b>3.48</b>	<b>3.81</b>	1.83	<b>6.98</b>	<b>0.48</b>	2.53	0.65	<b>22.15</b>
<i>Lonicera mackii</i>	(Rupr.) Herder	Amur honeysuckle	0*		0.30		<b>17.31</b>	<b>8.88</b>	<b>34.45</b>		<b>5.43</b>	<b>20.25</b>	<b>5.25</b>
<i>Lonicera x bella</i>	Zabel	Bell's honeysuckle	0*						<b>8.00</b>	<b>50.70</b>	<b>4.65</b>	0.80	
<i>Medicago lupulina</i>	L.	Black medick	0*	0.01	0.38	0.001			0.003				

<i>Melilotus</i> spp. ( <i>albus</i> or <i>officinale</i> )	Mill.	(White or yellow) sweet clover	0*	0.05	0.003								
<i>Monarda bradburiana</i>	Beck	Wild bergamot	4						4.23	0.64			
<i>Nyssa sylvatica</i>	Marsh.	Black gum	5		0.60	0.10			0.15	0.10			
<i>Oenothera biennis</i>	L.	Common evening primrose	0	0.05									
<i>Oxalis stricta</i>	L.	Yellow wood sorrel	0										
<i>Panicum capillare</i>	L.	Common witchgrass	0	0.10									
<i>Panicum flexile</i>	(Gatt.) Scribn.	Wiry witchgrass	3	0.23									
<i>Panicum linearifolium</i>	Scribn.	Linear-leaved panicgrass	7						0.38	0.15			
<i>Parthenocissus quinquefolia</i>	(L.) Planch.	Virginia creeper	3	0.35	0.05	0.002	0.18	0.64	0.001	0.18	0.002	0.85	
<i>Plantago lanceolata</i>	L.	English plantain	0*					0.03					
<i>Plantago rugelii</i>	Decne.	Rugel's plantain	1					0.35	1.55	0.30			
<i>Populus deltoides</i>	Marsh.	Eastern cottonwood	2	0.03									
<i>Prunus mahaleb</i>	L.	Perfumed cherry	0*		0.09								
<i>Prunus virginiana</i> var. <i>virginiana</i>	L.	Eastern chokecherry	3	0.73						0.20			
<i>Quercus imbricaria</i>	Michx.	Shingle oak	3									0.15	
<i>Quercus rubra</i>	L.	Red oak	5				0.30						
<i>Quercus stellata</i>	Wangenh.	Post oak	4								0.45		
<i>Rhamnus cathartica</i>	L.	Common buckthorn	0*					0.03					
<i>Ribes missouriense</i>	Nutt.	Missouri gooseberry	3		0.53	3.30						0.25	
<i>Rosa multiflora</i>	Thunb.	Multiflora rose	0*			0.05	0.08						
<i>Rubus trivialis</i>	Willd.	Dewberry	2									1.25	
<i>Rudbeckia fulgida</i>	Aiton	Orange coneflower	7					0.05		0.10			
<i>Rudbeckia hirta</i>	L.	Black-eyed Susan	1	0.01									
<i>Rudbeckia triloba</i> var. <i>triloba</i>	L.	Brown-eyed Susan	4	0.31	0.23	0.11	0.51						
<i>Ruellia humilis</i>	Nutt.	Hairy ruellia	3							0.17			
<i>Salix nigra</i>	Marsh.	Black willow	2			0.05		0.001					
<i>Sanicula canadense</i>	L.	Canadian black snakeroot	3			0.10							

<i>Setaria faberi</i>	R.A.W. Herrm.	Nodding foxtail	0*	0.16									
<i>Sideroxylon lanuginosum</i>	Michx.	Gum bumelia	5				0.65	0.48	0.23		0.10		0.15
<i>Smilax hispida</i>	Muhl. ex Torr.	Bristly greenbriar	3				0.10		0.15			0.20	
<i>Solidago ulmifolia</i> var. <i>ulmifolia</i>	Muhl. Ex. Willd.	Elm-leaved goldenrod	4		0.27	2.87		0.16	0.90		3.10	2.11	
<i>Spiranthes lacera</i>	(Raf.) Raf.	Slender ladies' tresses	6								0.001		
<i>Symphoricarpos orbiculatus</i>	Moench.	Coralberry	1										2.23
<i>Symphyotrichum laeve</i>	(L.) Á. Löve & D. Löve	Smooth aster	7								0.77	0.91	
<i>Symphyotrichum patens</i>	(Aiton) G.L. Nesom	Spreading aster	5								0.25		
<i>Symphyotrichum urophyllum</i>	(Lindley ex de Candolle) G. L. Nesom	Arrowleaf aster	4								1.53		
<i>Symphyotrichum anomalum</i>	(Engelm. ex Torr. & A. Gray) G.L. Nesom	Manyray aster	6								0.93		
<i>Taraxacum officinale</i>	F.H. Wigg	Common dandelion	0*	0.001	0.02	0.003	0.03		0.08				
<i>Toxicodendron radicans</i>	(L.) Kuntze	Poison ivy	1		2.41	0.23	4.28	1.05	2.10	0.15	0.33	0.48	0.90
<i>Trifolium repens</i>	L.	White clover	0*		0.44	0.10							
<i>Ulmus americana</i>	L.	American elm	4									0.30	
<i>Ulmus rubra</i>	Muhl.	Slippery elm	3		0.10								
<i>Verbena stricta</i>	Vent.	Hoary vervain	3										
<i>Viburnum rufidulum</i>	Raf.	Southern black haw	4									0.78	0.13
<i>Viola sororia</i>	Willd.	Common violet	2		0.25				0.001				
<i>Vitis aestivalis</i>	Michx.	Summer grape	5					0.01	0.13	0.001		0.03	0.02
<b>Woody Understory 1m &lt; height ≤ 2m<sup>+</sup></b>													
<i>Carya ovata</i>	(Mill.) K. Koch.	Shagbark hickory	4				0.1			1	1.55	0.25	0.3
<i>Carya texana</i>	Buckley	Black hickory	5										1.5
<i>Celtis occidentalis</i>	L.	Hackberry	4					0.4					

<i>Celtis tenuifolia</i>	Nutt.	Dwarf hackberry	4	1					
<i>Cercis canadensis</i>	L.	Redbud	3	1.5					
<i>Fraxinus americana</i>	L.	White ash	3	0.25	2.05		1.6	0.5	0.4
<i>Lonicera x bella</i>		Bell's honeysuckle	0*			8.25	17.1	0.9	
<i>Juniperus virginiana</i>	L.	Eastern redcedar	2	0.5				4.5	2.95
<i>Ligustrum obtusifolium</i>	Siebold & Zucc.	Border privet	0						7.35
<i>Lonicera maackii</i>	(Rupr.) Herder	Amur honeysuckle	0	12.5	5.35	11.5		1.25	12.15
<i>Quercus muehlenbergii</i>	Engelm.	Chinkapin oak	5				0.75		
<i>Ribes missouriense</i>	Nutt.	Missouri gooseberry	3		0.5				
<i>Toxicodendron radicans</i>	(L.) Kuntze	Poison ivy	1	0.1					
<i>Ulmus americana</i>	L.	American elm	4						1.3
<i>Rhamnus cathartica</i>		Common buckthorn	0			0.75			

# All species also occurred below 1 m height, except for chinkapin oak.