Supplemental Tables and Figures

Table S1. Species found in each sampling campaign (Su – summer, Sp – spring) in studied watersheds (WS3, WS7, WS10, WS13) at the Fernow Experimental Forest, West Virginia, USA. Numbers represent the count of plots (out of 72 possible) in which the species were present. *parasitic herb, #non-native, $annual species, ($)annual or perennial species.

Species	Authority	Common name	Su 2018	Sp 2019	Su 2019
Tree seedlings					
Acer pensylvanicum	L.	Striped maple	47	42	33
Acer rubrum	L.	Red maple	63	57	64
Acer saccharinum	L.	Silver maple	1	1	
Acer saccharum	Marsh.	Sugar maple	19	17	22
Betula lenta	L.	Black birch	10	6	9
Carya cordiformis	Wang.	Bitternut hickory	1	2	3
Castanea dentata	Marsh.	Chestnut	2	1	5
Fagus grandifolia	Ehrh.	American beech	3	4	1
Fraxinus americana	L.	White ash	18	18	17
Ilex montana	Torr. & Gray ex Gray	Mountain holly	2	2	2
Liriodendron tulipifera	L.	Tulip-poplar	13	42	12
Magnolia acuminata	L.	Cucumber magnolia	18	13	19
Magnolia fraseri	Walt.	Mountain magnolia	2	3	3
Nyssa sylvatica	Marsh.	Blackgum	1	6	
Ostrya virginiana	Mill.	Ironwood	9	9	
Prunus serotina	Ehrh.	Wild black cherry	41	37	43
Quercus alba	L.	White oak	4	1	
Quercus montana	Willd.	Chestnut oak	3	2	
Quercus rubra	L.	Red oak	32	31	32
Quercus velutina	Lam.	Black oak		1	
Robinia pseudoacacia	L.	Black locust		1	
Sassafras albidum	Nutt.	Sassafras	3	9	1
Ulmus rubra	Muhl.	Slippery elm			5
Shrubs/Vines					
Berberis thunbergii#	DC.	Japanese barberry			2
Cornus alternifolia	L. f.	Alternate-leaved dogwood	2	2	1
Dioscorea quaternata	Walt. J.F. Gmel.	Four-leaved wild yam	21	11	11
Hamamelis virginiana	L.	Witch-hazel	4	3	3
Kalmia latifolia	L.	Mountain laurel	1	1	1
Lindera benzoin	L.	Spicebush	3		
Menziesia pilosa	Michx. ex Lam	Minnie-bush	3	3	3
Parthenocissus quinquefolia	L.	Virginia creeper	1	1	1
Rhododendron calendulaceum	Michx.	Flame azalea	3		
Rosa multiflora#	Thunb. ex Murr.	Multiflora rose	2	2	4
Rubus spp.	L.	Blackberry	48	49	51
Sambucus spp.	L.	Elderberry	1		
Smilax rotundifolia	L.	Common greenbrier	50	51	47
Vaccinium pallidum	Ait.	Upland low blueberry	4	3	3
Viburnum acerifolium	L.	Maple-leaf viburnum	6	6	6
Vitis spp.	L.	Grape		3	

Table S1 continued.

Species	Authority	Common name	Su 2018	Sp 2019	Su 2019
Herbs					
Actaea racemosa	L.	Black cohosh	1	1	
Anemone spp.	L.	Anemone	6	8	8
Arisaema triphyllum	L.	Jack-in-the-pulpit	13	10	5
Asarum canadense	L.	Wild ginger			1
Boehmeria cylindrica	L.	False nettle		4	
*Conopholis americana**	L.	Cancerroot	2		1
Cypripedium acaule	Ait.	Pinky lady's slipper	3	3	2
*Epifagus virginiana**	L.	Beechdrops		1	1
Eurybia divaricata	L.	White wood aster	19	16	14
Galium aparine$	L.	Common bedstraw		5	
Galium asprellum	Michx.	Rough bedstraw	1		5
Galium lanceolatum	Torr.	Lanceleaf wild liquorice	2		
Galium triflorum	Michx.	Sweet-scented bedstraw	1		
Gaultheria procumbens	L.	Teaberry		1	
Goodyera pubescens	Willd.	Downy rattlesnake plantain	3	3	3
Laportea canadensis	L.	Wood nettle	8	5	10
Maianthemum racemosum	L.	False Solomon's seal	1	2	
Medeola virginiana	L.	Indian cucumber root	19	19	20
Mitchella repens	L.	Partridge berry	3	3	3
*Monotropa uniflora**	L.	Indian pipe	1		
Osmorhiza claytonii	Michx.	Hairy sweet cicely	5	5	4
Polygonatum biflorum	Walt.	Great Solomon's seal	8	11	21
Polygonum virginianum($)	L.	Virginia knotweed	8	8	8
Prenanthes altissima	L.	Tall white lettuce		4	3
Prosartes lanuginosa	Michx.	Yellow fairybells	29	25	27
Smilax herbacea	L.	Carrion flower	4	12	18
Stellaria pubera	Michx.	Great chickweed	34	37	37
Trillium erectum	L.	Ill-scented trillium		3	
Trillium spp.	L.	Trillium	2		2
Uvularia perfoliata	L.	Mealy bellwort		8	12
Uvularia sessilifolia	L.	Sessile-leaved bellwort		1	
Viola spp.	L.	Violet	56	61	62
Graminoids		Grasses and sedges	8	10	13
Ferns					
Athyrium filix-femina	L.	Lady fern	5	2	2
Dennstaedtia punctilobula	Michx.	Hay-scented fern	24	23	27
Dryopteris intermedia	Muhl. Ex Willd.	Intermediate shield fern	25	27	23
Polystichum acrostichoides	Michx.	Christmas fern	30	31	29
Thelypteris noveboracensis	L.	New York Fern	19	20	17

Table S2. Proportion of the total number of species in different plant types at the watershed (WS) level at the Fernow Experimental Forest, West Virginia, USA.

	WS3	WS7	WS13	WS10	Avg
Relative species numbers					
Ferns	16.7	10.2	7.0	11.1	11.2
Herbs	33.3	44.9	34.9	38.9	38.0
Shrubs/vines	16.7	14.3	20.9	11.1	15.7
Tree seedlings	33.3	30.6	37.2	38.9	35.0

Table S3a. Results of the statistical analyses (repeated measures ANOVA) of differences in herb-layer indices between watersheds (WS) at the Fernow Experimental Forest, West Virginia, USA, in the **summers of 2018 and 2019**. P-values are shown for full and reduced models. The final models selected for this study have the lower AIC value (shown in bold) in the comparison between full and reduced model. Continuous predictor variables are explained in Figure 7. Bold font - P ≤ 0.1, underlined bold font - P ≤ 0.05; blue- negative correlation, pink- positive correlation.

	Cover		Richness, S		Diversity, H		Evenness, J	
	Full model	Reduced model	Full model	Reduced model	Full model	Reduced model	Full model	Reduced model
WS3 vs WS7								
AIC	**505**	525	324	**317**	76.5	**43**	-34	**-81**
Watershed (WS)	0.57	0.98	**<u><.0001</u>**	**<u><.0001</u>**	**<u>0.001</u>**	**<u><.0001</u>**	0.11	**<u>0.02</u>**
Maple (M)	0.69	0.33	0.89	0.88	0.99	0.91	0.80	0.59
WS × M	0.12	**<u>0.03</u>**	**<u>0.01</u>**	**<u>0.001</u>**	0.19	**0.09**	0.99	0.90
Slope	1.00		**<u>0.03</u>**	**<u>0.01</u>**	**<u>0.01</u>**	**<u>0.004</u>**	0.04	**<u>0.03</u>**
Aspect code	0.76		0.14	**<u>0.04</u>**	**0.10**	**<u>0.02</u>**	0.15	**<u>0.02</u>**
Distance to stream	0.43		**<u>0.05</u>**	**<u>0.01</u>**	**<u>0.03</u>**	**<u>0.01</u>**	**0.09**	**<u>0.05</u>**
DBH	0.85		0.68		0.40	0.32	0.15	**0.07**
Large neighbor DBH	**0.05**	**0.02**	0.84		0.89		0.73	
Canopy cover	0.13	**0.06**	0.51		0.20	0.15	**0.03**	**<u>0.02</u>**
Large neighbor myc.	0.44		0.86		0.96		0.87	
Leaf area index	**0.08**	**0.05**	0.44		0.61		0.77	
BA of ECM trees	0.36	0.85	0.38	**<u>0.05</u>**	0.68		1.00	
BA of AM trees	0.15	**<u>0.02</u>**	0.62		0.64		0.72	
WS7 vs WS13								
AIC	**472**	475	**344**	347	76	**62**	-29	**-70**
Watershed (WS)	**<u>0.01</u>**	**<u><.0001</u>**	0.33	0.35	**0.06**	**<u>0.01</u>**	**<u>0.04</u>**	**<u>0.02</u>**
Maple (M)	0.42	0.60	0.67	0.45	0.57	0.68	0.27	0.31
WS × M	**0.07**	**<u>0.02</u>**	0.29	0.22	0.77	0.83	0.70	0.56
Slope	0.71		0.15	**0.09**	0.40	0.30	0.98	
Aspect code	0.51		0.18	**0.08**	0.90		0.35	0.14
Distance to stream	0.58		0.95		0.76		0.53	
DBH	0.62		0.33	0.31	0.14	**0.09**	0.10	0.101
Large neighbor DBH	0.91		0.26	0.12	0.16	**0.10**	0.27	0.63
Canopy cover	0.46		**0.08**	**<u>0.03</u>**	0.51		0.87	
Large neighbor myc.	0.31	0.26	0.97		0.86		0.83	
Leaf area index	0.22	0.31	0.26	0.17	0.69		0.14	**0.07**
BA of ECM trees	0.40	0.13	0.26	0.10	0.26	0.10	0.49	
BA of AM trees	0.99		0.62		0.15	0.09	0.12	0.26
WS10 vs WS13								
AIC	470	**462**	338	**329**	84	**55**	-28	**-56**
Watershed (WS)	0.56	0.22	0.58	0.62	0.17	0.20	0.12	**0.08**
Maple (M)	0.35	0.18	0.30	0.13	0.46	0.32	0.70	0.47
WS × M	0.20	**0.10**	0.72	0.48	0.42	0.47	0.14	**0.09**
Slope	0.81		0.91		0.33	0.33	0.15	0.13
Aspect code	0.15	**0.09**	0.85		0.15	0.11	**<u>0.02</u>**	**<u>0.01</u>**
Distance to stream	0.31	0.19	0.93		0.20	0.29	**<u>0.05</u>**	**<u>0.03</u>**
DBH	0.67		0.47	0.28	0.14	**0.09**	**<u>0.05</u>**	**<u>0.03</u>**
Large neighbor DBH	0.66		0.67		0.62		0.71	
Canopy cover	0.30	0.40	0.70		0.42	0.20	0.14	0.13
Large neighbor myc.	0.32	0.64	0.95		0.56		0.35	0.24
Leaf area index	0.56		0.29	0.40	0.78		0.66	
BA of ECM trees	0.51		0.59		0.70		0.89	0.49
BA of AM trees	0.63		0.62		0.73		0.41	

Table S3b. Results of the statistical analyses (repeated measures ANOVA) of differences in herb-layer indices between watersheds (WS) at the Fernow Experimental Forest, West Virginia, USA, in the **spring of 2019**. P-values are shown for full and reduced models. The final models selected for this study have the lower AIC value (shown in bold) in the comparison between full and reduced model. Continuous predictor variables are explained in Figure 7. Bold font P ≤ 0.1, underlined bold font P ≤ 0.05; blue- negative correlation, pink- positive correlation

	Cover		Richness, S		Diversity, H		Evenness, J	
	Full model	Reduced model	Full model	Reduced model	Full model	Reduced model	Full model	Reduced model
WS3 vs WS7								
AIC	195	**190**	178	**171**	87	**58**	40	**-0.9**
Watershed (WS)	**_0.01_**	**_0.01_**	**_0.004_**	**_0.001_**	**_0.02_**	**_0.001_**	0.40	0.31
Maple (M)	0.76	0.76	0.27	0.33	0.54	0.37	0.88	0.81
WS × M	0.66	0.67	0.59	0.48	0.55	0.52	0.84	0.82
Slope	**0.07**	**0.06**	**0.11**	**_0.02_**	**_0.03_**	**_0.03_**	0.12	**0.08**
Aspect code	0.28	0.26	0.40	0.65	0.20	**_0.04_**	0.44	0.35
Distance to stream	**_0.02_**	**_0.01_**	**_0.02_**	**_0.00_**	**0.10**	**_0.04_**	0.76	
DBH	0.91		0.53		0.34	0.25	0.49	
Large neighbor DBH	0.42	0.35	0.96		0.75		0.46	
Canopy cover	0.17	0.14	0.40	0.38	**_0.05_**	**_0.04_**	**_0.03_**	**_0.04_**
Large neighbor myc.	0.20	0.09	0.96		0.60		0.37	0.17
Leaf area index	**0.04**	**0.03**	0.13	**0.03**	0.57		0.67	
BA of ECM trees	0.92		0.63		0.60		0.75	
BA of AM trees	0.27	0.20	0.84		0.53		0.21	**0.08**
WS7 vs WS13								
AIC	**207**	208	**189**	200	93	**62**	43	**-6.2**
Watershed (WS)	0.22	**_0.003_**	0.21	**_0.02_**	**0.11**	**_0.004_**	0.19	0.11
Maple (M)	0.11	**0.09**	0.55	0.27	0.41	0.25	0.44	0.27
WS × M	0.59	0.44	0.12	**_0.05_**	0.21	**0.08**	0.61	0.23
Slope	0.45		0.43	0.64	0.68		0.76	
Aspect code	0.35	0.66	0.63		0.70		0.86	
Distance to stream	0.85		0.60		0.64		0.96	
DBH	0.20	**_0.05_**	0.45	0.29	0.78		0.39	0.19
Large neighbor DBH	0.95		0.35	0.38	0.24	0.11	0.42	0.83
Canopy cover	0.74		0.64		0.89		0.99	
Large neighbor myc.	0.75		0.85		0.90		0.76	
Leaf area index	0.43	0.52	0.53		0.74		0.91	
BA of ECM trees	0.81		0.58		0.22	**0.10**	0.25	0.34
BA of AM trees	0.82		0.40	0.57	0.35	0.11	0.59	
WS10 vs WS13								
AIC	209	**206**	195	**187**	100	**66.5**	47	**23.4**
Watershed (WS)	0.57	0.51	0.99	0.90	0.49	0.62	0.22	0.13
Maple (M)	0.19	0.11	0.26	**0.08**	0.36	0.18	0.52	0.52
WS × M	0.31	0.24	0.32	0.16	0.35	0.18	0.69	0.67
Slope	0.88		0.68		0.22	0.16	0.20	0.22
Aspect code	0.20	0.13	0.87		0.31	0.34	**0.07**	**_0.05_**
Distance to stream	0.32	0.19	0.67		0.61		0.23	0.20
DBH	0.91		0.84		0.95		0.99	
Large neighbor DBH	0.56		0.61		0.36	0.61	0.32	0.22
Canopy cover	0.53		0.73		0.72		0.51	
Large neighbor myc.	0.79		0.94		0.76		0.94	
Leaf area index	0.96		0.48		0.64		0.87	
BA of ECM trees	0.73		0.66		0.43		0.34	0.16
BA of AM trees	0.37	0.58	0.88		0.65		0.42	0.40

Table S4. ANOVA results testing the effect of watershed (WS), plot-center maple species (M) and their interaction (WS×M) for 22 individual herb-layer species found at the Fernow Experimental Forest, West Virginia, USA. The Benjamini-Hochberg method was applied to account for the familywise error rate. ANOVA P-values smaller than the Benjamini-Hochberg critical value (BH FDR.1) (in bold font) indicate that the discoveries are not false-positives (based on an assumed false discovery rate (FDR) of 0.1). Results are truncated at ANOVA P-values <0.1.

| Species	Effect	NumDF	DenDF	FValue	ProbF	Rank	BH FDR.1
WS3 vs WS7							
Violets	WS	1	24	32.48	**0.0001**	1	0.001818
New York fern	WS×M	1	5	33.74	**0.0021**	2	0.003636
Jack-in-the-pulpit	WS	1	5	25.85	**0.0038**	3	0.005455
Sweet birch	WS	1	4	16.62	0.0151	4	0.007273
Yellow fairybells	WS	1	11	7.62	0.0185	5	0.009091
Yellow fairybells	M	1	11	7.26	0.0209	6	0.010909
Red Maple	M	1	25	5.63	0.0257	7	0.012727
Star chickweed	WS	1	18	5.55	0.03	8	0.014545
Sweet birch	M	1	4	6.45	0.064	9	0.016364
New York fern	WS	1	5	5.61	0.0641	10	0.018182
Blackberry	WS	1	29	3.6	0.0676	11	0.02
Violets	WS×M	1	24	3.42	0.0769	12	0.021818
White ash	WS	1	3	5.76	0.0959	13	0.023636
WS7 vs WS13							
Red maple	M	1	27	16.73	**0.0003**	1	0.001724
Yellow fairybells	WS	1	20	8.7	0.0079	2	0.003448
star chickweed	WS	1	19	8.52	0.0088	3	0.005172
New York fern	WS×M	1	6	13.29	0.0108	4	0.006897
Yellow fairybells	M	1	20	6.94	0.0159	5	0.008621
Jack-in-the-pulpit	WS	1	5	8.27	0.0347	6	0.010345
Red oak	WS	1	10	5.77	0.0372	7	0.012069
WS10 vs WS13							
Red maple	M	1	30	16.28	**0.0003**	1	0.001852
Red oak	WS	1	20	5.57	0.0285	2	0.003704
Tulip-poplar	WS×M	1	8	4.45	0.0678	3	0.005556
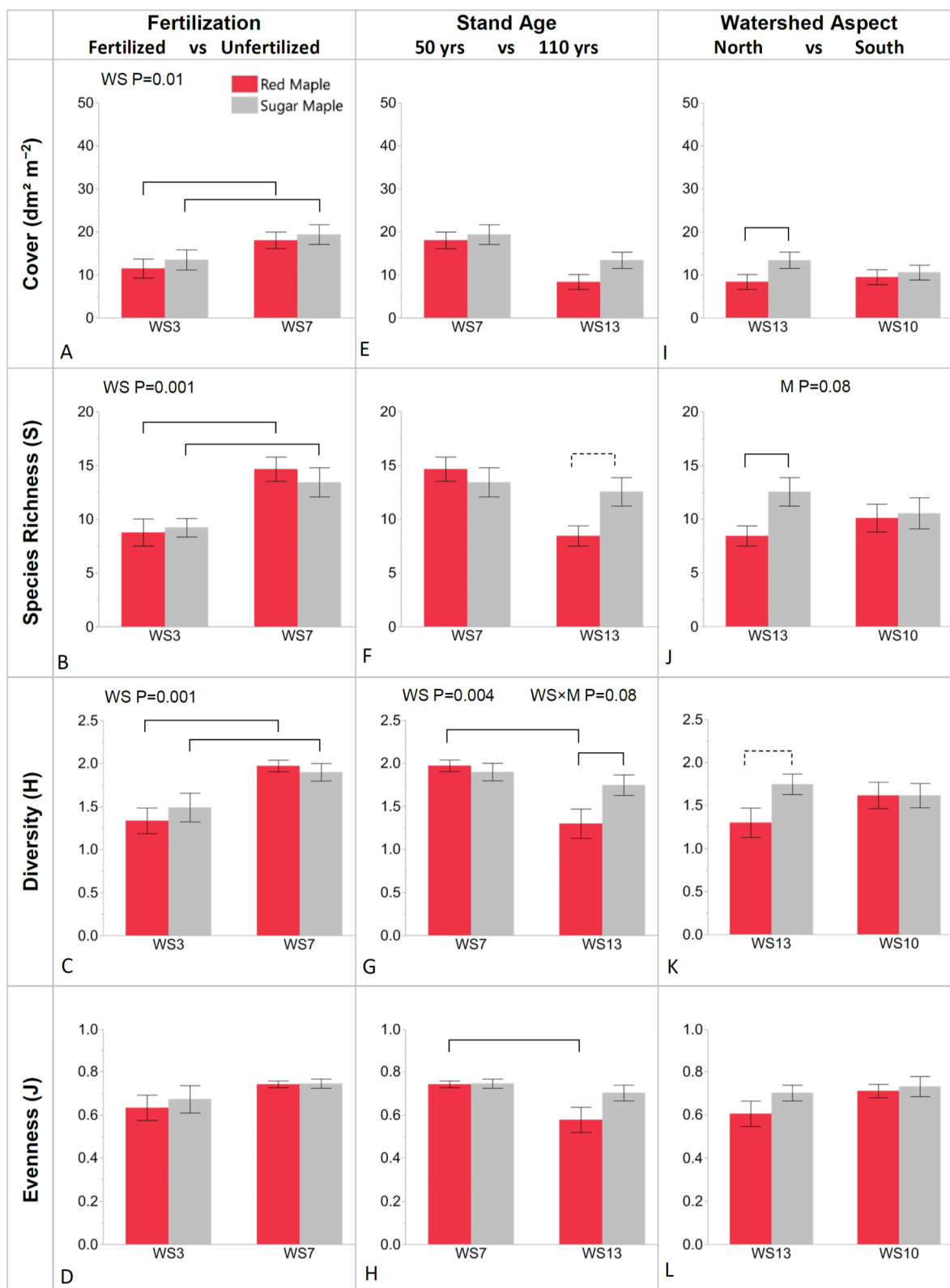
Figure S1. Spring 2019 plot-level herb-layer indices in red maple and sugar maple (M) plots in each of the studied watersheds (WS) at the Fernow Experimental Forest, West Virginia, USA.