

Supplementary Information

Table S1. Mean percent cover (± 1 SE) of native plants, non-native plants, and substrate variables in the lower stratum (≤ 1 m) in reference and removal areas, during the spring and summer of 2010 and 2011, at six mixed-hardwood forests in central Indiana. For each taxon/substrate variable, mean values were calculated by pooling data across all six study sites ($n = 72$ sample plots for each species in a given treatment type, year, and season).

Species	Reference				Removal			
	2010		2011		2010		2011	
	Spring	Summer	Spring	Summer	Spring	Summer	Spring	Summer
Native Plants								
Ferns								
ebony spleenwort (<i>Asplenium platyneuron</i>)	0.08 $\pm$ 0.04	0.10 $\pm$ 0.05	0.10 $\pm$ 0.05	0.10 $\pm$ 0.05	---	0.02 $\pm$ 0.02	0.01 $\pm$ 0.01	0.01 $\pm$ 0.01
cutleaf grapefern (<i>Botrychium dissectum</i>)	0.05 $\pm$ 0.03	0.14 $\pm$ 0.05	0.13 $\pm$ 0.05	0.15 $\pm$ 0.05	---	---	---	---
rattlesnake fern (<i>Botrychium virginianum</i>)	0.03 $\pm$ 0.02	0.14 $\pm$ 0.06	0.11 $\pm$ 0.05	0.11 $\pm$ 0.05	0.16 $\pm$ 0.07	0.23 $\pm$ 0.08	0.38 $\pm$ 0.11	0.35 $\pm$ 0.10
bladderfern (<i>Cystopteris</i> spp.)	---	---	0.02 $\pm$ 0.02	0.02 $\pm$ 0.02	---	---	---	---
Forbs								
white baneberry (<i>Actaea pachypoda</i>)	--	---	---	---	---	---	0.03 $\pm$ 0.02	0.03 $\pm$ 0.02

white snakeroot (<i>Ageratina altissima</i> var. <i>altissima</i>)	0.92 ± 0.20	1.90 ± 0.38	1.58 ± 0.35	1.91 ± 0.38	1.04 ± 0.25	2.31 ± 0.50	1.40 ± 0.26	2.42 ± 0.35
tall hairy agrimony (<i>Agrimonia gryposepala</i>)	0.09 ± 0.06	0.18 ± 0.08	0.15 ± 0.07	0.18 ± 0.08	0.03 ± 0.02	0.11 ± 0.06	0.06 ± 0.03	0.09 ± 0.04
harvestlice (<i>Agrimonia parviflora</i>)	0.04 ± 0.03	0.10 ± 0.07	0.04 ± 0.03	0.07 ± 0.05	---	---	---	---
beaked agrimony (<i>Agrimonia rostellata</i>)	---	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	---	---	0.02 ± 0.01	0.01 ± 0.01
meadow garlic (<i>Allium canadense</i>)	0.27 ± 0.13	---	0.27 ± 0.13	0.02 ± 0.02	0.38 ± 0.25	---	0.39 ± 0.25	0.05 ± 0.05
ramp/narrowleaf wild leek (<i>Allium tricoccum/burdickii</i>)	---	---	---	---	0.17 ± 0.12	---	0.37 ± 0.25	0.01 ± 0.01
great ragweed (<i>Ambrosia trifida</i>)	---	---	---	---	---	---	0.04 ± 0.03	0.03 ± 0.02
smooth rockcress (<i>Arabis laevigata</i> .)	---	---	---	---	---	---	0.01 ± 0.01	0.01 ± 0.01
green dragon (<i>Arisaema dracontium</i>)	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	---	---	0.02 ± 0.02	---
Jack in the pulpit	0.96 ± 0.23	0.83 ± 0.22	1.01 ± 0.22	0.40 ± 0.11	0.49 ± 0.17	0.40 ± 0.13	0.99 ± 0.33	0.28 ± 0.09

<i>(Arisaema triphyllum)</i>								
beggarticks <i>(Bidens spp.)</i>	---	---	---	---	---	0.02 ± 0.02	---	---
smallspike false nettle <i>(Boehmeria cylindrica)</i>	0.10 ± 0.10	0.15 ± 0.11	0.13 ± 0.11	0.13 ± 0.11	---	0.04 ± 0.03	0.01 ± 0.01	0.07 ± 0.05
American bellflower <i>(Campanulastrum americanum)</i>	---	---	---	---	---	0.04 ± 0.03	0.06 ± 0.05	0.06 ± 0.05
cutleaf toothwort <i>(Cardamine concatenata)</i>	0.30 ± 0.09	---	0.31 ± 0.09	---	0.17 ± 0.06	---	0.33 ± 0.10	---
limestone/bulbous bittercress <i>(Cardamine douglassii/bulbosa)</i>	0.11 ± 0.06	---	0.11 ± 0.06	---	0.04 ± 0.03	---	0.18 ± 0.07	---
broadleaf enchanter's nightshade <i>(Circaea lutetiana ssp. canadensis)</i>	0.48 ± 0.13	0.58 ± 0.14	0.54 ± 0.14	0.57 ± 0.14	0.49 ± 0.15	0.67 ± 0.19	0.69 ± 0.18	0.86 ± 0.28
Virginia springbeauty <i>(Claytonia virginica)</i>	0.37 ± 0.08	---	0.33 ± 0.06	---	0.14 ± 0.04	---	0.86 ± 0.13	---
American cancer-root <i>(Conopholis americana)</i>	---	---	---	---	0.01 ± 0.01	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02
Canadian honewort <i>(Cryptotaenia canadensis)</i>	0.24 ± 0.06	0.86 ± 0.17	0.45 ± 0.10	0.69 ± 0.15	0.07 ± 0.03	0.63 ± 0.17	0.77 ± 0.19	0.97 ± 0.21

false mermaidweed (<i>Floerkea proserpinacoides</i>)	0.15 ± 0.08	---	0.12 ± 0.07	---	---	---	0.14 ± 0.11	---
stickywilly (<i>Galium aparine</i>)	0.43 ± 0.14	0.32 ± 0.08	0.43 ± 0.14	0.36 ± 0.10	0.28 ± 0.08	0.24 ± 0.06	0.67 ± 0.16	0.58 ± 0.15
rough bedstraw (<i>Galium asprellum</i>)	---	0.02 ± 0.02	---	---	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02
shining bedstraw (<i>Galium concinnum</i>)	---	---	---	---	0.05 ± 0.05	0.07 ± 0.05	0.06 ± 0.05	0.06 ± 0.05
lanceleaf wild licorice (<i>Galium lanceolatum</i>)	0.06 ± 0.04	0.15 ± 0.05	0.13 ± 0.05	0.13 ± 0.05	0.04 ± 0.03	0.11 ± 0.06	0.13 ± 0.06	0.18 ± 0.11
fragrant bedstraw (<i>Galium triflorum</i>)	0.08 ± 0.04	0.08 ± 0.04	0.08 ± 0.04	0.08 ± 0.04	0.06 ± 0.03	0.11 ± 0.06	0.10 ± 0.05	0.27 ± 0.12
spotted geranium (<i>Geranium maculatum</i>)	0.64 ± 0.28	0.64 ± 0.28	0.64 ± 0.28	0.69 ± 0.30	0.17 ± 0.12	0.12 ± 0.07	0.42 ± 0.27	0.28 ± 0.15
avens (<i>Geum</i> spp.)	0.21 ± 0.11	0.55 ± 0.16	0.31 ± 0.12	0.50 ± 0.15	0.31 ± 0.09	0.64 ± 0.15	1.24 ± 0.26	1.17 ± 0.23
beggarslice (<i>Hackelia virginiana</i>)	---	0.02 ± 0.02	0.02 ± 0.02	0.05 ± 0.05	---	0.02 ± 0.02	0.15 ± 0.11	0.47 ± 0.16
eastern waterleaf	0.10 ± 0.07	0.10 ± 0.07	0.10 ± 0.07	0.08 ± 0.05	0.06 ± 0.05	0.06 ± 0.05	0.15 ± 0.08	0.13 ± 0.07

<i>(Hydrophyllum virginianum)</i>								
jewelweed/pale touch-me-not <i>(Impatiens capensis/pallida)</i>	1.22 ± 0.54	0.78 ± 0.27	1.20 ± 0.54	1.08 ± 0.30	0.35 ± 0.14	0.38 ± 0.15	0.89 ± 0.24	2.01 ± 1.19
Canadian woodnettle <i>(Laportea canadensis)</i>	0.20 ± 0.12	0.83 ± 0.43	0.31 ± 0.16	0.83 ± 0.43	0.07 ± 0.05	0.31 ± 0.25	0.17 ± 0.12	0.75 ± 0.54
feathery false lily of the valley <i>(Maianthemum racemosum</i> ssp. <i>racemosum)</i>	0.04 ± 0.03	0.04 ± 0.03	0.05 ± 0.03	0.06 ± 0.04	0.02 ± 0.02	0.02 ± 0.02	0.13 ± 0.05	0.13 ± 0.05
twoleaf miterwort <i>(Mitella diphylla)</i>	---	0.01 ± 0.01	---	---	---	---	---	---
spring forget-me-not <i>(Myosotis verna.)</i>	0.01 ± 0.01	---	0.01 ± 0.01	0.01 ± 0.01	---	---	0.01 ± 0.01	---
Clayton's/longstyle sweetroot <i>(Osmorhiza</i> <i>claytonia/longistylis)</i>	0.94 ± 0.20	0.76 ± 0.16	0.90 ± 0.18	1.01 ± 0.20	0.60 ± 0.12	0.60 ± 0.11	1.77 ± 0.27	1.92 ± 0.27
woodsorrel <i>(Oxalis spp.)</i>	---	0.03 ± 0.02	---	0.01 ± 0.01	0.04 ± 0.03	0.09 ± 0.06	0.06 ± 0.03	0.13 ± 0.06
roundleaf ragwort <i>(Packera obovata)</i>	0.60 ± 0.30	0.41 ± 0.19	0.47 ± 0.21	0.47 ± 0.21	0.26 ± 0.24	0.31 ± 0.25	0.38 ± 0.26	0.38 ± 0.26
wild blue phlox <i>(Phlox divaricata)</i>	---	0.01 ± 0.01	0.01 ± 0.01	0.02 ± 0.02	---	---	0.02 ± 0.02	0.11 ± 0.06

lopseed (<i>Phryma leptostachya</i>)	0.03 ± 0.02	0.19 ± 0.07	0.11 ± 0.04	0.14 ± 0.05	0.03 ± 0.02	0.24 ± 0.08	0.10 ± 0.03	0.29 ± 0.07
American pokeweed (<i>Phytolacca americana</i>)	0.02 ± 0.02	0.05 ± 0.05	0.02 ± 0.02	0.05 ± 0.05	0.07 ± 0.05	0.26 ± 0.15	0.35 ± 0.25	0.54 ± 0.27
clearweed (<i>Pilea pumila</i>)	0.63 ± 0.18	1.03 ± 0.30	0.69 ± 0.17	1.07 ± 0.30	0.97 ± 0.53	2.19 ± 0.80	0.67 ± 0.28	6.44 ± 2.20
blackseed plantain (<i>Plantago rugelii</i>)	---	---	---	---	0.04 ± 0.03	0.10 ± 0.07	0.04 ± 0.03	0.06 ± 0.04
mayapple (<i>Podophyllum peltatum</i>)	4.10 ± 1.34	0.20 ± 0.09	3.94 ± 1.33	0.36 ± 0.13	1.28 ± 0.36	---	2.77 ± 0.73	0.82 ± 0.28
smooth Solomon's seal (<i>Polygonatum biflorum</i>)	0.03 ± 0.02	0.01 ± 0.01	0.01 ± 0.01	---	0.06 ± 0.04	0.06 ± 0.04	0.10 ± 0.06	0.08 ± 0.04
hairy Solomon's seal (<i>Polygonatum pubescens</i>)	0.01 ± 0.01	0.01 ± 0.01	0.01 ± 0.01	0.01 ± 0.01	---	---	---	---
jumpseed (<i>Polygonum virginianum</i>)	1.31 ± 0.27	3.06 ± 0.52	1.92 ± 0.36	2.53 ± 0.45	2.01 ± 0.45	3.56 ± 0.60	2.30 ± 0.42	3.94 ± 0.60
cinquefoil (<i>Potentilla</i> spp.)	---	---	---	---	---	---	0.01 ± 0.01	0.01 ± 0.01
rattlesnakeroot (<i>Prenanthes</i> spp.)	0.12 ± 0.07	0.08 ± 0.04	0.14 ± 0.07	0.06 ± 0.03	0.49 ± 0.18	0.51 ± 0.18	0.72 ± 0.22	0.67 ± 0.22

spiderwort (<i>Tradescantia</i> sp.)	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05	---	---	---	---
bloody butcher (<i>Trillium recurvatum</i>)	0.27 ± 0.08	---	0.28 ± 0.08	---	0.17 ± 0.07	---	0.39 ± 0.10	---
California nettle (<i>Urtica dioica</i> L. ssp. <i>gracilis</i>)	---	0.05 ± 0.05	---	---	0.02 ± 0.02	0.16 ± 0.11	0.05 ± 0.03	0.03 ± 0.02
wingstem (<i>Verbesina alternifolia</i>)	---	0.02 ± 0.02	0.02 ± 0.02	0.05 ± 0.05	0.05 ± 0.05	0.10 ± 0.10	0.05 ± 0.05	0.13 ± 0.11
downy yellow violet (<i>Viola pubescens</i>)	0.04 ± 0.03	0.04 ± 0.03	0.04 ± 0.03	0.04 ± 0.03	0.20 ± 0.08	0.26 ± 0.09	0.38 ± 0.11	0.40 ± 0.12
common blue violet (<i>Viola sororia</i>)	0.44 ± 0.11	0.62 ± 0.13	0.52 ± 0.11	0.69 ± 0.14	0.59 ± 0.13	0.74 ± 0.14	1.13 ± 0.20	1.24 ± 0.21
striped cream violet (<i>Viola striata</i>)	0.31 ± 0.15	0.37 ± 0.16	0.26 ± 0.12	0.29 ± 0.13	---	0.02 ± 0.02	0.17 ± 0.11	0.19 ± 0.12
Grasses								
bearded shorthusk (<i>Brachyelytrum erectum</i>)	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	---	---	---	---
sweet woodreed (<i>Cinna arundinacea</i>)	0.19 ± 0.10	0.24 ± 0.13	0.22 ± 0.10	0.22 ± 0.10	0.02 ± 0.02	0.07 ± 0.05	0.02 ± 0.02	0.02 ± 0.02

Bosc's panicgrass (<i>Dichanthelium boscii</i>)	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.09 ± 0.06	0.08 ± 0.04	0.10 ± 0.06	0.22 ± 0.12
hairy wildrye (<i>Elymus villosus</i>)	---	---	---	---	---	---	---	0.05 ± 0.05
nodding fescue (<i>Festuca subverticillata</i>)	0.15 ± 0.05	0.20 ± 0.07	0.16 ± 0.05	0.19 ± 0.07	0.29 ± 0.09	0.40 ± 0.11	0.36 ± 0.09	0.41 ± 0.12
whitegrass (<i>Leersia virginica</i>)	0.19 ± 0.06	0.35 ± 0.11	0.22 ± 0.07	0.29 ± 0.10	0.13 ± 0.11	0.19 ± 0.11	0.12 ± 0.06	0.13 ± 0.06
woodland bluegrass (<i>Poa sylvestris</i>)	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	---	---	---	---
Sedges								
eastern woodland/broad looseflower/spreading sedge (<i>Carex blanda/laxiflora/laxiculmis</i>)	0.13 ± 0.05	0.13 ± 0.05	0.13 ± 0.05	0.16 ± 0.07	0.42 ± 0.25	0.79 ± 0.28	0.73 ± 0.27	0.84 ± 0.28
pubescent sedge (<i>Carex hirtifolia</i>)	---	---	---	---	0.07 ± 0.05	0.07 ± 0.05	0.10 ± 0.07	0.10 ± 0.07
eastern star sedge (<i>Carex radiata</i>)	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.05 ± 0.05	---	---	0.02 ± 0.02	0.02 ± 0.02

Vines								
trumpet creeper (<i>Campsis radicans</i>)	---	0.05 ± 0.05	0.02 ± 0.02	0.05 ± 0.05	---	0.06 ± 0.04	0.04 ± 0.02	0.07 ± 0.05
wild yam (<i>Dioscorea villosa</i>)	---	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05	---	0.02 ± 0.02	0.01 ± 0.01	0.01 ± 0.01
wild cucumber (<i>Echinocystis lobata</i>)	0.05 ± 0.05	0.05 ± 0.05	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.01 ± 0.01	0.01 ± 0.01
common moonseed (<i>Menispermum canadense</i>)	0.02 ± 0.02	0.09 ± 0.06	0.06 ± 0.05	0.04 ± 0.03	0.02 ± 0.02	0.05 ± 0.05	---	---
Virginia creeper (<i>Parthenocissus quinquefolia</i>)	1.25 ± 0.19	1.67 ± 0.23	1.27 ± 0.19	1.71 ± 0.24	1.54 ± 0.24	2.11 ± 0.28	1.81 ± 0.24	3.98 ± 0.45
climbing false buckwheat (<i>Polygonum scandens</i>)	0.05 ± 0.05	0.05 ± 0.05	0.06 ± 0.05	0.06 ± 0.05	---	---	0.01 ± 0.01	0.01 ± 0.01
bristly dewberry (<i>Rubus hispidus</i>)	---	0.03 ± 0.02	0.03 ± 0.02	0.03 ± 0.02	---	0.02 ± 0.02	0.01 ± 0.01	0.01 ± 0.01
bristly greenbrier (<i>Smilax tamnoides</i>)	0.06 ± 0.04	0.13 ± 0.06	0.11 ± 0.05	0.15 ± 0.07	0.09 ± 0.06	0.24 ± 0.08	0.22 ± 0.07	0.34 ± 0.09
eastern poison ivy (<i>Toxicodendron radicans</i>)	0.38 ± 0.10	0.73 ± 0.17	0.50 ± 0.11	0.86 ± 0.21	0.65 ± 0.27	1.58 ± 0.41	0.94 ± 0.29	1.53 ± 0.33

grape (<i>Vitis</i> spp.)	0.17 ± 0.12	0.22 ± 0.12	0.22 ± 0.12	0.17 ± 0.11	0.04 ± 0.03	0.07 ± 0.05	0.18 ± 0.07	0.70 ± 0.27
Trees and Shrubs								
boxelder (<i>Acer negundo</i>)	---	---	0.02 ± 0.02	0.02 ± 0.02	---	---	0.01 ± 0.01	0.01 ± 0.01
red maple (<i>Acer rubrum</i>)	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05	0.01 ± 0.01	0.01 ± 0.01	0.01 ± 0.01	---
sugar maple (<i>Acer saccharum</i>)	0.29 ± 0.13	0.39 ± 0.16	0.39 ± 0.16	0.39 ± 0.16	0.04 ± 0.03	0.07 ± 0.05	0.06 ± 0.04	0.10 ± 0.05
serviceberry (<i>Amelanchier</i> spp.)	---	---	---	---	---	0.02 ± 0.02	0.02 ± 0.02	0.01 ± 0.01
pawpaw (<i>Asimina triloba</i>)	0.02 ± 0.02	0.10 ± 0.10	0.02 ± 0.02	0.05 ± 0.05	0.07 ± 0.05	0.19 ± 0.11	0.12 ± 0.06	0.40 ± 0.26
American hornbeam (<i>Carpinus caroliniana</i>)	---	---	---	---	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10
bitternut hickory (<i>Carya cordiformis</i>)	0.02 ± 0.02	0.22 ± 0.09	0.21 ± 0.09	0.23 ± 0.09	0.10 ± 0.05	0.31 ± 0.13	0.16 ± 0.07	0.19 ± 0.08
shagbark hickory (<i>Carya ovata</i>)	0.03 ± 0.02	0.18 ± 0.08	0.18 ± 0.08	0.18 ± 0.08	0.02 ± 0.02	0.05 ± 0.05	0.03 ± 0.02	0.03 ± 0.02
hackberry (<i>Celtis occidentalis</i>)	0.08 ± 0.03	0.33 ± 0.08	0.27 ± 0.07	0.24 ± 0.07	0.05 ± 0.03	0.23 ± 0.07	0.17 ± 0.05	0.25 ± 0.08

eastern redbud (<i>Cercis canadensis</i>)	---	---	---	---	---	---	---	0.01 ± 0.01
flowering dogwood (<i>Cornus florida</i>)	0.04 ± 0.02	0.08 ± 0.05	0.06 ± 0.03	0.06 ± 0.03	0.01 ± 0.01	0.16 ± 0.11	0.04 ± 0.02	0.08 ± 0.05
other dogwood (<i>Cornus</i> spp.)	---	---	---	---	---	---	---	0.02 ± 0.02
American hazelnut (<i>Corylus americana</i>)	---	---	---	---	---	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02
hawthorn (<i>Crataegus</i> spp.)	0.05 ± 0.03	0.07 ± 0.03	0.07 ± 0.03	0.07 ± 0.03	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.01 ± 0.01
white/green ash (<i>Fraxinus</i> <i>americana/pennsylvanica</i>)	1.12 ± 0.32	2.29 ± 0.47	1.67 ± 0.36	1.91 ± 0.37	1.73 ± 0.46	2.47 ± 0.51	1.71 ± 0.36	2.38 ± 0.49
honeylocust (<i>Gleditsia triacanthos</i>)	---	0.01 ± 0.01	---	---	---	0.02 ± 0.01	0.03 ± 0.01	0.01 ± 0.01
northern spicebush (<i>Lindera benzoin</i>)	0.47 ± 0.27	0.54 ± 0.27	0.53 ± 0.27	0.52 ± 0.27	0.48 ± 0.26	0.61 ± 0.28	0.38 ± 0.14	0.83 ± 0.22
tuliptree (<i>Liriodendron tulipifera</i>)	0.01 ± 0.01	0.08 ± 0.04	0.05 ± 0.03	0.05 ± 0.03	---	---	---	0.44 ± 0.11

blackgum (<i>Nyssa sylvatica</i>)	---	---	---	---	0.04 ± 0.03	0.12 ± 0.07	0.06 ± 0.04	0.26 ± 0.13
hophornbeam (<i>Ostrya virginiana</i>)	---	---	---	---	---	---	---	0.01 ± 0.01
black cherry (<i>Prunus serotina</i>)	0.17 ± 0.05	0.28 ± 0.08	0.25 ± 0.07	0.31 ± 0.09	0.15 ± 0.11	0.27 ± 0.13	0.83 ± 0.22	1.15 ± 0.20
white oak (<i>Quercus alba</i>)	---	---	---	---	---	0.01 ± 0.01	0.01 ± 0.01	0.01 ± 0.01
chinkapin oak (<i>Quercus muehlenbergii</i>)	---	---	---	---	0.01 ± 0.01	0.06 ± 0.05	0.03 ± 0.02	0.06 ± 0.05
northern red oak (<i>Quercus rubra</i>)	---	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.05 ± 0.03	0.06 ± 0.03	0.04 ± 0.02	0.05 ± 0.03
currant (<i>Ribes</i> spp.)	0.15 ± 0.11	0.21 ± 0.15	0.15 ± 0.11	0.21 ± 0.15	0.22 ± 0.13	0.22 ± 0.13	0.24 ± 0.13	0.38 ± 0.17
black locust (<i>Robinia pseudoacacia</i>)	---	---	---	---	---	---	0.14 ± 0.11	0.14 ± 0.11
Allegheny blackberry (<i>Rubus allegheniensis</i>)	0.07 ± 0.05	0.12 ± 0.07	0.09 ± 0.06	0.10 ± 0.07	0.02 ± 0.02	0.04 ± 0.03	0.05 ± 0.05	0.05 ± 0.05
black raspberry (<i>Rubus occidentalis</i>)	---	---	---	---	0.01 ± 0.01	0.08 ± 0.05	0.07 ± 0.05	0.16 ± 0.08

American black/red elderberry (<i>Sambucus nigra</i> ssp. <i>canadensis</i> / <i>Sambucus</i> <i>racemosa</i>)	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	---	---	0.02 ± 0.02	0.04 ± 0.03
sassafras (<i>Sassafras albidum</i> [Nutt.] Nees)	0.11 ± 0.06	0.56 ± 0.13	0.42 ± 0.11	0.44 ± 0.11	0.04 ± 0.03	0.44 ± 0.12	0.16 ± 0.06	0.71 ± 0.16
American basswood (<i>Tilia americana</i>)	---	---	---	---	---	0.05 ± 0.05	---	---
American elm/slippy elm (<i>Ulmus Americana/rubra</i>)	0.10 ± 0.06	0.13 ± 0.06	0.11 ± 0.06	0.11 ± 0.06	0.07 ± 0.04	0.22 ± 0.06	0.22 ± 0.05	0.31 ± 0.07
blackhaw (<i>Viburnum prunifolium</i>)	0.02 ± 0.02	0.03 ± 0.02	0.03 ± 0.02	0.04 ± 0.03	---	---	---	---
southern arrowwood (<i>Viburnum recognitum</i>)	0.01 ± 0.01	0.01 ± 0.01	---	---	0.56 ± 0.29	0.56 ± 0.29	0.57 ± 0.29	0.49 ± 0.27
Non-native Plants								
Forbs								
garlic mustard (<i>Alliaria petiolata</i>)	0.40 ± 0.15	0.39 ± 0.13	0.47 ± 0.14	0.65 ± 0.17	0.95 ± 0.31	0.66 ± 0.17	1.99 ± 0.44	2.72 ± 0.67
wild garlic (<i>Allium vineale</i>)	0.07 ± 0.04	---	0.07 ± 0.04	0.01 ± 0.01	0.02 ± 0.02	---	0.05 ± 0.05	0.05 ± 0.05

lesser burdock (<i>Arctium minus</i>)	---	---	---	---	0.02 ± 0.02	0.05 ± 0.05	0.05 ± 0.05	0.10 ± 0.10
Caraway (<i>Carum carvi</i>)	0.01 ± 0.01	0.01 ± 0.01	0.01 ± 0.01	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.06 ± 0.03	0.04 ± 0.02
Queen Anne's lace (<i>Daucus carota</i>)	---	---	---	---	---	---	0.02 ± 0.02	0.02 ± 0.02
ground ivy (<i>Glechoma hederacea</i>)	0.02 ± 0.02	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05	0.01 ± 0.01	---	0.01 ± 0.01	0.01 ± 0.01
purple deadnettle (<i>Lamium purpureum</i>)	---	---	0.01 ± 0.01	0.01 ± 0.01	---	---	0.01 ± 0.01	---
spotted ladysthumb (<i>Polygonum persicaria</i>)	0.04 ± 0.03	0.21 ± 0.11	0.10 ± 0.04	0.28 ± 0.13	0.01 ± 0.01	0.42 ± 0.17	0.14 ± 0.05	0.49 ± 0.17
common chickweed (<i>Stellaria media</i>)	---	---	---	---	---	---	0.02 ± 0.02	---
common dandelion (<i>Taraxacum officinale</i>)	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	---	---	---	---
clover (<i>Trifolium</i> spp.)	---	---	---	---	---	---	0.01 ± 0.01	0.01 ± 0.01

Grasses

Kentucky bluegrass (<i>Poa pratensis</i>)	0.02 ± 0.02	0.02 ± 0.02	0.01 ± 0.01	0.01 ± 0.01	---	---	---	---
Vines								
Oriental bittersweet (<i>Celastrus orbiculatus</i>)	---	---	---	---	---	0.05 ± 0.05	0.05 ± 0.05	0.07 ± 0.05
winter creeper (<i>Euonymus fortunei</i>)	---	---	---	---	0.02 ± 0.02	0.04 ± 0.03	0.03 ± 0.02	0.01 ± 0.01
Japanese honeysuckle (<i>Lonicera japonica</i>)	0.33 ± 0.12	0.33 ± 0.12	0.33 ± 0.12	0.44 ± 0.17	0.07 ± 0.05	0.10 ± 0.06	0.07 ± 0.04	0.17 ± 0.11
Shrubs								
Japanese barberry (<i>Berberis thunbergii</i>)	---	---	---	---	0.24 ± 0.24	0.24 ± 0.24	0.10 ± 0.10	0.11 ± 0.10
autumn olive (<i>Elaeagnus umbellata</i>)	0.35 ± 0.25	0.38 ± 0.25	0.38 ± 0.25	0.38 ± 0.25	0.15 ± 0.07	0.32 ± 0.14	0.16 ± 0.07	0.19 ± 0.08
Burningbush (<i>Euonymus alatus</i>)	---	---	---	---	---	0.02 ± 0.02	0.03 ± 0.02	0.05 ± 0.03
Amur honeysuckle (<i>Lonicera maackii</i>)	8.63 ± 1.50	8.92 ± 1.49	8.93 ± 1.49	9.28 ± 1.48	16.72 ± 2.00	17.51 ± 1.99	1.61 ± 0.17	2.80 ± 0.32
multiflora rose	3.04 ± 1.26	2.65 ± 1.05	2.97 ± 1.25	3.04 ± 1.26	1.60 ± 0.63	1.76 ± 0.64	1.44 ± 0.56	1.54 ± 0.56

(Rosa multiflora)

Substrate Variables

bare soil	15.58 ± 2.34	17.75 ± 2.61	14.74 ± 2.20	14.97 ± 2.19	13.58 ± 2.09	15.11 ± 2.03	10.08 ± 1.89	8.36 ± 1.46
coarse woody debris	5.22 ± 1.50	5.22 ± 1.50	5.08 ± 1.49	5.27 ± 1.50	3.04 ± 0.99	3.32 ± 1.08	3.19 ± 0.99	3.44 ± 1.01
dead leaves/dead herbaceous stems	35.05 ± 2.98	30.00 ± 2.95	36.65 ± 3.01	31.63 ± 2.83	27.82 ± 3.02	22.17 ± 2.87	26.69 ± 3.08	19.41 ± 2.80
fine woody debris	7.89 ± 0.75	8.33 ± 0.85	8.08 ± 0.78	8.33 ± 0.78	8.56 ± 0.79	8.93 ± 1.01	10.58 ± 0.94	12.48 ± 1.56

Table S2. Mean percent cover (± 1 SE) of native and non-native vines, trees, and shrubs in the upper stratum (1.01–5 m) in reference and removal areas, during the spring and summer of 2010 and 2011, at six mixed-hardwood forests in central Indiana. For each taxon, mean values were calculated by pooling data across all six study sites ($n = 72$ sample plots for each species in a given treatment type, year, and season).

Species	Reference				Removal			
	2010		2011		2010		2011	
	Spring	Summer	Spring	Summer	Spring	Summer	Spring	Summer
Native Plants								
Vines								
Virginia creeper (<i>Parthenocissus quinquefolia</i>)	---	0.12 $\pm$ 0.07	0.07 $\pm$ 0.05	0.07 $\pm$ 0.05	---	0.05 $\pm$ 0.05	---	---
eastern poison ivy (<i>Toxicodendron radicans</i>)	0.15 $\pm$ 0.11	0.15 $\pm$ 0.11	0.11 $\pm$ 0.10	0.15 $\pm$ 0.11	0.07 $\pm$ 0.05	0.15 $\pm$ 0.11	---	0.10 $\pm$ 0.07
grape (<i>Vitis</i> spp.)	---	---	---	---	0.06 $\pm$ 0.04	0.17 $\pm$ 0.12	0.05 $\pm$ 0.08	0.07 $\pm$ 0.04
Trees and Shrubs								
boxelder (<i>Acer negundo</i>)	0.05 $\pm$ 0.05	0.10 $\pm$ 0.10	0.10 $\pm$ 0.10	0.10 $\pm$ 0.10	0.87 $\pm$ 0.87	0.87 $\pm$ 0.87	0.87 $\pm$ 0.87	0.87 $\pm$ 0.87
red maple (<i>Acer rubrum</i>)	0.34 $\pm$ 0.25	0.40 $\pm$ 0.27	0.40 $\pm$ 0.27	0.40 $\pm$ 0.27	---	---	---	---
silver maple (<i>Acer saccharinum</i>)	0.10 $\pm$ 0.10	0.24 $\pm$ 0.24	0.24 $\pm$ 0.24	0.24 $\pm$ 0.24	---	---	---	---

sugar maple (<i>Acer saccharum</i>)	0.35 ± 0.26	0.35 ± 0.26	0.35 ± 0.26	0.35 ± 0.26	0.70 ± 0.31	1.09 ± 0.45	0.32 ± 0.76	0.78 ± 0.32
Pawpaw (<i>Asimina triloba</i>)	---	---	---	---	0.26 ± 0.15	0.50 ± 0.28	0.27 ± 0.42	0.64 ± 0.36
American hornbeam (<i>Carpinus caroliniana</i>)	---	---	---	---	0.07 ± 0.05	0.10 ± 0.07	0.07 ± 0.10	0.10 ± 0.07
mockernut hickory (<i>Carya alba</i> .)	---	---	---	---	0.05 ± 0.05	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10
bitternut hickory (<i>Carya cordiformis</i>)	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10	0.08 ± 0.04	0.44 ± 0.27	0.12 ± 0.19	0.33 ± 0.25
pignut/red hickory (<i>Carya glabra/ovalis</i>)	0.05 ± 0.05	0.10 ± 0.10	0.05 ± 0.05	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10
shagbark hickory (<i>Carya ovata</i>)	0.26 ± 0.15	0.31 ± 0.16	0.31 ± 0.16	0.25 ± 0.13	---	---	---	---
common hackberry (<i>Celtis occidentalis</i>)	0.67 ± 0.53	1.02 ± 0.87	0.40 ± 0.27	0.67 ± 0.53	0.85 ± 0.43	1.13 ± 0.62	0.42 ± 0.80	0.85 ± 0.42
eastern redbud (<i>Cercis canadensis</i>)	0.40 ± 0.27	0.80 ± 0.38	0.66 ± 0.31	0.80 ± 0.38	0.05 ± 0.05	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10
flowering dogwood (<i>Cornus florida</i>)	0.31 ± 0.18	0.64 ± 0.36	0.64 ± 0.36	0.64 ± 0.36	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10

other dogwood (<i>Cornus</i> spp.)	---	---	---	---	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10
hawthorn (<i>Crataegus</i> spp.)	0.15 ± 0.11	0.15 ± 0.11	0.15 ± 0.11	0.15 ± 0.11	0.15 ± 0.11	0.21 ± 0.15	0.11 ± 0.15	0.15 ± 0.11
American beech (<i>Fagus grandifolia</i>)	0.45 ± 0.28	0.59 ± 0.35	0.45 ± 0.28	0.45 ± 0.28	0.55 ± 0.29	0.66 ± 0.31	0.28 ± 0.50	0.65 ± 0.31
white/green ash (<i>Fraxinus Americana/pennsylvanica</i>)	0.76 ± 0.32	0.94 ± 0.34	0.74 ± 0.25	0.94 ± 0.34	0.63 ± 0.22	0.71 ± 0.23	0.18 ± 0.45	0.71 ± 0.23
black walnut (<i>Juglans nigra</i>)	---	---	---	---	---	0.05 ± 0.05	0.02 ± 0.02	0.05 ± 0.05
northern spicebush (<i>Lindera benzoin</i>)	2.09 ± 1.22	2.28 ± 1.24	2.15 ± 1.23	2.15 ± 1.23	1.45 ± 0.66	1.78 ± 0.81	0.49 ± 1.17	1.78 ± 0.81
Tuliptree (<i>Liriodendron tulipifera</i>)	0.10 ± 0.07	0.45 ± 0.28	0.40 ± 0.27	0.45 ± 0.28	0.05 ± 0.05	0.23 ± 0.15	0.15 ± 0.23	0.23 ± 0.15
osage orange (<i>Maclura pomifera</i>)	---	---	---	---	---	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10
red mulberry (<i>Morus rubra</i>)	---	---	---	---	---	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05
blackgum (<i>Nyssa sylvatica</i>)	---	---	---	---	1.10 ± 0.62	1.18 ± 0.62	0.43 ± 0.88	1.18 ± 0.62

American sycamore (<i>Platanus occidentalis</i>)	---	0.02 ± 0.02	0.05 ± 0.05	0.05 ± 0.05	---	---	---	---
black cherry (<i>Prunus serotina</i>)	0.53 ± 0.34	0.66 ± 0.36	0.66 ± 0.36	0.66 ± 0.36	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10	---
white oak (<i>Quercus alba</i>)	---	---	---	---	0.29 ± 0.25	0.49 ± 0.34	0.26 ± 0.35	0.35 ± 0.26
chinkapin oak (<i>Quercus muehlenbergii</i>)	---	---	---	---	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05	0.10 ± 0.10
northern red oak (<i>Quercus rubra</i>)	---	---	---	---	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10	0.10 ± 0.10
currant (<i>Ribes</i> spp.)	---	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02	0.11 ± 0.10	0.13 ± 0.11	---	0.13 ± 0.11
Allegheny blackberry (<i>Rubus allegheniensis</i>)	---	0.02 ± 0.02	0.02 ± 0.02	0.05 ± 0.05	---	---	---	---
sassafras (<i>Sassafras albidum</i>)	0.51 ± 0.34	0.58 ± 0.35	0.58 ± 0.35	0.58 ± 0.35	---	0.02 ± 0.02	0.02 ± 0.02	0.02 ± 0.02
American/slippy elm (<i>Ulmus Americana/rubra</i>)	1.96 ± 0.71	2.83 ± 0.97	1.86 ± 0.56	2.85 ± 0.97	1.42 ± 0.50	1.74 ± 0.55	0.55 ± 1.76	1.76 ± 0.51
blackhaw (<i>Viburnum prunifolium</i>)	0.56 ± 0.30	0.56 ± 0.30	0.56 ± 0.30	0.56 ± 0.30	---	---	---	---

southern arrowwood (<i>Viburnum recognitum</i>)	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05	0.05 ± 0.05	0.07 ± 0.05	0.13 ± 0.11	0.10 ± 0.10	0.13 ± 0.11
Non-native Plants								
Vines								
Japanese honeysuckle (<i>Lonicera japonica</i>)	---	---	---	---	0.05 ± 0.05	0.05 ± 0.05	---	---
Shrubs								
autumn olive (<i>Elaeagnus umbellata</i>)	0.44 ± 0.27	0.47 ± 0.27	0.41 ± 0.26	0.41 ± 0.26	0.66 ± 0.36	0.69 ± 0.36	0.05 ± 0.05	---
Amur honeysuckle (<i>Lonicera maackii</i>)	34.26 ± 3.87	35.99 ± 4.00	34.32 ± 4.04	36.04 ± 3.99	39.56 ± 3.70	41.28 ± 3.65	---	---
multiflora rose (<i>Rosa multiflora</i>)	0.83 ± 0.43	0.72 ± 0.37	0.85 ± 0.43	0.85 ± 0.43	0.39 ± 0.26	0.41 ± 0.26	---	0.33 ± 0.25