

**Table S1.** Final model results and statistics for all main text models. Sample sizes are given as number of observations with number of studies in parentheses. Log-likelihood ratio tests (LRT) and p values in comparison to intercept-only null models are provided. Total model variance ( $\sigma^2$ ), total unexplained heterogeneity ( $I^2$ ) and  $R^2$  are provided. Note that some models had extremely low heterogeneity (particularly Root Biomass), leading to  $R^2$  of 100%. We thus calculated an alternative  $R^{2*}$ , which is the proportion of total variance in  $y$  explained by moderator (see Methods). Contrasts between factors (e.g., nativeness levels) are provided along with 95% confidence intervals, degrees of freedom, and p-values.

|                               | N articles<br>(n observations)           | Random effect   | Comparison to<br>intercept-only<br>(LRT, p) | Contrast±95%CIs                                  | Total<br>variance                                   | Unexplained<br>heterogeneity                 | Explained<br>variance            |
|-------------------------------|--|---|---|--|---|--|----------------------------------|
| Ecosystem - Bare Ground       |  |   |   |  |   |  |                                  |
| Africa<br>Comparison          | Intact Africa=5(3),<br>Introduced=34(20) | ~1   Citation /<br>Observation ID                                     | 0.72, 0.398                                 | 0.53±[-0.76,1.82], df=21,21,<br>t=0.85, p=0.404  | $\sigma^2_{null}=0.85$ ,<br>$\sigma^2_{model}=0.82$ | $I^2_{null}=89.37$ , $I^2_{model}$<br>=88.78 | $R^2=3.75$ , $R^{2*}$<br>=0.09   |
| Herbivore<br>nativeness       | Native=42(16),<br>Introduced=34(20)      | ~1   Citation /<br>Observation ID                                     | 3.06, 0.08                                  | 0.45±[0.93,-0.03], df=33,74,<br>t=-1.85, p=0.068 | $\sigma^2_{null}=0.62$ ,<br>$\sigma^2_{model}=0.52$ | $I^2_{null}=86.3$ , $I^2_{model}=83.92$      | $R^2=8.78$ , $R^{2*}$<br>=0.27   |
| Invasive                      | Native=42(16),<br>Invasive=22(13)        | ~1   Citation /<br>Observation ID                                     | 1.93, 0.165                                 | 0.34±[0.81,-0.13], df=26,62,<br>t=-1.46, p=0.149 | $\sigma^2_{null}=0.42$ ,<br>$\sigma^2_{model}=0.36$ | $I^2_{null}=81.91$ , $I^2_{model}=79.18$     | $R^2=6.89$ , $R^{2*}$<br>=0.12   |
| Ecosystem - CO2 Respiration   |  |   |   |  |   |  |                                  |
| Herbivore<br>nativeness       | Native=70(7),<br>Introduced=5(3)         | ~1   Citation /<br>Observation ID,<br>~Time Series  <br>Experiment ID | 0.87, 0.35                                  | -0.66±[0.95,-2.28], df=8,8,<br>t=0.95, p=0.372   | $\sigma^2_{null}<0.01$ ,<br>$\sigma^2_{model}<0.01$ | $I^2_{null}<0.01$ , $I^2_{model}<0.01$       | $R^2=1.36$ , $R^{2*}$<br>=0.39   |
| Invasive                      | Native=70(7),<br>Invasive=5(3)           | ~1   Citation /<br>Observation ID,<br>~Time Series  <br>Experiment ID | 0.87, 0.35                                  | -0.66±[0.95,-2.28], df=8,8,<br>t=0.95, p=0.372   | $\sigma^2_{null}<0.01$ ,<br>$\sigma^2_{model}<0.01$ | $I^2_{null}<0.01$ , $I^2_{model}<0.01$       | $R^2=1.36$ , $R^{2*}$<br>=0.39   |
| Ecosystem - Dead Vegetation   |  |   |   |  |   |  |                                  |
| Herbivore<br>nativeness       | Native=152(33),<br>Introduced=47(17)     | ~1   Citation / Species<br>ID / Observation ID                        | 3.47, 0.062                                 | -0.35±[0.02,-0.71], df=48,48,<br>t=1.89, p=0.064 | $\sigma^2_{null}=0.4$ ,<br>$\sigma^2_{model}=0.37$  | $I^2_{null}=73.3$ , $I^2_{model}=71.58$      | $R^2=5.47$ , $R^{2*}$<br>=2.23   |
| Invasive                      | Native=152(33),<br>Invasive=17(8)        | ~1   Citation / Species<br>ID / Observation ID                        | 2.02, 0.155                                 | -0.35±[0.14,-0.85], df=39,39,<br>t=1.44, p=0.158 | $\sigma^2_{null}=0.39$ ,<br>$\sigma^2_{model}=0.37$ | $I^2_{null}=73.49$ , $I^2_{model}$<br>=72.04 | $R^2=2.95$ , $R^{2*}$<br>=1.59   |
| Ecosystem - Growth Rates      |  |   |   |  |   |  |                                  |
| Africa<br>Comparison          | Intact Africa=35(5),<br>Introduced=20(5) | ~1   Citation /<br>Observation ID                                     | 2.62, 0.105                                 | 0.62±[0.125], df=8,8, t=2.29,<br>p=0.051         | $\sigma^2_{null}=0.29$ ,<br>$\sigma^2_{model}=0.15$ | $I^2_{null}=59.34$ , $I^2_{model}$<br>=43.23 | $R^2=37.36$ , $R^{2*}$<br>=16.58 |
| Herbivore<br>nativeness       | Native=129(13),<br>Introduced=20(5)      | ~1   Citation /<br>Observation ID                                     | 3.11, 0.078                                 | 0.49±[1,-0.03], df=16,16,<br>t=-2.02, p=0.061    | $\sigma^2_{null}=0.31$ ,<br>$\sigma^2_{model}=0.26$ | $I^2_{null}=70.52$ , $I^2_{model}$<br>=66.31 | $R^2=9.65$ , $R^{2*}$<br>=5.84   |
| Ecosystem - Litter Cover      |  |   |   |  |   |  |                                  |
| Herbivore<br>nativeness       | Native=91(28),<br>Introduced=38(15)      | ~1   Citation / Species<br>ID / Observation ID                        | 3.12, 0.077                                 | -0.4±[0.05,-0.85], df=41,41,<br>t=1.81, p=0.078  | $\sigma^2_{null}=0.5$ ,<br>$\sigma^2_{model}=0.45$  | $I^2_{null}=79.34$ , $I^2_{model}$<br>=77.37 | $R^2=7.01$ , $R^{2*}$<br>=2.97   |
| Invasive                      | Native=91(28),<br>Invasive=9(6)          | ~1   Citation / Species<br>ID / Observation ID                        | 1.76, 0.184                                 | -0.43±[0.22,-1.08], df=32,32,<br>t=1.36, p=0.184 | $\sigma^2_{null}=0.5$ ,<br>$\sigma^2_{model}=0.46$  | $I^2_{null}=80.69$ , $I^2_{model}$<br>=78.89 | $R^2=3.23$ , $R^{2*}=2$          |
| Ecosystem - Microbe Abundance |  |   |   |  |   |  |                                  |
| Herbivore<br>nativeness       | Native=29(7),<br>Introduced=24(4)        | ~1   Citation /<br>Observation ID                                     | 0.19, 0.664                                 | -0.18±[0.72,-1.08], df=9,9,<br>t=0.44, p=0.668   | $\sigma^2_{null}=0.39$ ,<br>$\sigma^2_{model}=0.37$ | $I^2_{null}=69.53$ , $I^2_{model}$<br>=68.38 | $R^2=2.08$ , $R^{2*}$<br>=1.63   |
| Invasive                      | Native=29(7),<br>Invasive=22(3)          | ~1   Citation /<br>Observation ID                                     | 0.08, 0.773                                 | -0.13±[0.92,-1.19], df=8,8,<br>t=0.29, p=0.777   | $\sigma^2_{null}=0.44$ ,<br>$\sigma^2_{model}=0.42$ | $I^2_{null}=71.75$ , $I^2_{model}=71.01$     | $R^2=1.05$ , $R^{2*}$<br>=0.93   |
| Ecosystem - Root Biomass      |  |   |   |  |   |  |                                  |
| Herbivore<br>nativeness       | Native=39(7),<br>Introduced=12(3)        | ~1   Citation /<br>Observation ID                                     | 1.52, 0.218                                 | -0.14±[0.12,-0.41], df=8,8,<br>t=1.23, p=0.253   | $\sigma^2_{null}<0.01$ ,<br>$\sigma^2_{model}<0.01$ | $I^2_{null}<0.01$ , $I^2_{model}<0.01$       | $R^2=100$ , $R^{2*}$<br>=1.24    |

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|                                 | N articles<br>(n observations)          | Random effect                     | Comparison to<br>intercept-only<br>(LRT, p) | Contrast±95%CI                                   | Total<br>variance                                   | Unexplained<br>heterogeneity             | Explained<br>variance         |
|---------------------------------|---|-----------------------------------|---|--|---|--|-------------------------------|
| Invasive                        | Native=39(7),<br>Invasive=12(3)         | ~1   Citation /<br>Observation ID | 1.52, 0.218                                 | -0.14±[0.12,-0.41], df=8,8,<br>t=1.23, p=0.253   | $\sigma^2_{null}<0.01$ ,<br>$\sigma^2_{model}<0.01$ | $I^2_{null}<0.01$ , $I^2_{model}<0.01$   | $R^2=100$ , $R^2_{*}=1.24$    |
| Ecosystem - Soil C:N            |   |                                   |   |  |   |  |                               |
| Herbivore<br>nativeness         | Native=19(9),<br>Introduced=11(5)       | ~1   Citation /<br>Observation ID | 0.13, 0.721                                 | 0.09±[0.62,-0.44], df=12,12,<br>t=-0.36, p=0.725 | $\sigma^2_{null}=0.11$ ,<br>$\sigma^2_{model}=0.11$ | $I^2_{null}=37.27$ , $I^2_{model}=36.51$ | $R^2=1.69$ , $R^2_{*}=0.4$    |
| Ecosystem - Soil Compaction     |   |                                   |   |  |   |  |                               |
| Herbivore<br>nativeness         | Native=32(9),<br>Introduced=17(7)       | ~1   Citation /<br>Observation ID | 0.24, 0.625                                 | 0.16±[0.87,-0.54], df=14,14,<br>t=-0.49, p=0.632 | $\sigma^2_{null}=0.36$ ,<br>$\sigma^2_{model}=0.36$ | $I^2_{null}=68.69$ , $I^2_{model}=68.44$ | $R^2=1.66$ , $R^2_{*}=0.71$   |
| Invasive                        | Native=32(9),<br>Invasive=11(4)         | ~1   Citation /<br>Observation ID | 0.63, 0.426                                 | -0.23±[0.37,-0.83], df=11,11,<br>t=0.83, p=0.423 | $\sigma^2_{null}=0.18$ ,<br>$\sigma^2_{model}=0.16$ | $I^2_{null}=53.07$ , $I^2_{model}=49.91$ | $R^2=5.89$ , $R^2_{*}=2.59$   |
| Ecosystem - Soil K              |   |                                   |   |  |   |  |                               |
| Herbivore<br>nativeness         | Native=26(9),<br>Introduced=9(4)        | ~1   Citation /<br>Observation ID | 0.13, 0.717                                 | 0.1±[0.71,-0.51], df=11,11,<br>t=-0.36, p=0.724  | $\sigma^2_{null}=0.39$ ,<br>$\sigma^2_{model}=0.38$ | $I^2_{null}=77.51$ , $I^2_{model}=77.03$ | $R^2=0.51$ , $R^2_{*}=0.36$   |
| Ecosystem - Soil Labile N       |   |                                   |   |  |   |  |                               |
| Herbivore<br>nativeness         | Native=94(18),<br>Introduced=22(4)      | ~1   Citation /<br>Observation ID | 0.74, 0.389                                 | 0.16±[0.55,-0.22], df=20,20,<br>t=-0.9, p=0.381  | $\sigma^2_{null}=0.12$ ,<br>$\sigma^2_{model}=0.11$ | $I^2_{null}=62.42$ , $I^2_{model}=60.47$ | $R^2=3.61$ , $R^2_{*}=0.67$   |
| Ecosystem - Soil Mg             |   |                                   |   |  |   |  |                               |
| Africa<br>Comparison            | Intact Africa=12(3),<br>Introduced=8(4) | ~1   Citation /<br>Observation ID | 5.5, 0.019                                  | -0.72±[-1.41,-0.03], df=5,5,<br>t=-2.68, p=0.044 | $\sigma^2_{null}=0.34$ ,<br>$\sigma^2_{model}=0.22$ | $I^2_{null}=77.35$ , $I^2_{model}=68.79$ | $R^2=36.98$ , $R^2_{*}=27.85$ |
| Herbivore<br>nativeness         | Native=30(10),<br>Introduced=8(4)       | ~1   Citation /<br>Observation ID | 3.27, 0.07                                  | -0.56±[0.09,-1.21], df=12,12,<br>t=1.89, p=0.084 | $\sigma^2_{null}=0.37$ ,<br>$\sigma^2_{model}=0.32$ | $I^2_{null}=74.84$ , $I^2_{model}=71.25$ | $R^2=14.4$ , $R^2_{*}=9.32$   |
| Ecosystem - Soil Moisture       |   |                                   |   |  |   |  |                               |
| Herbivore<br>nativeness         | Native=47(15),<br>Introduced=22(8)      | ~1   Citation /<br>Observation ID | 0.97, 0.324                                 | 0.36±[1.1,-0.39], df=21,21,<br>t=-1, p=0.331     | $\sigma^2_{null}=0.89$ ,<br>$\sigma^2_{model}=0.86$ | $I^2_{null}=84.5$ , $I^2_{model}=83.8$   | $R^2=3.14$ , $R^2_{*}=2.04$   |
| Invasive                        | Native=47(15),<br>Invasive=13(4)        | ~1   Citation /<br>Observation ID | 0.05, 0.829                                 | 0.1±[1.07,-0.87], df=17,17,<br>t=-0.22, p=0.831  | $\sigma^2_{null}=0.89$ ,<br>$\sigma^2_{model}=0.89$ | $I^2_{null}=84.01$ , $I^2_{model}=83.85$ | $R^2=0.19$ , $R^2_{*}=0.12$   |
| Ecosystem - Soil Organic C      |   |                                   |   |  |   |  |                               |
| Herbivore<br>nativeness         | Native=30(10),<br>Introduced=30(4)      | ~1   Citation /<br>Observation ID | 0.01, 0.908                                 | 0.03±[0.57,-0.51], df=12,12,<br>t=-0.11, p=0.91  | $\sigma^2_{null}=0.17$ ,<br>$\sigma^2_{model}=0.17$ | $I^2_{null}=60.16$ , $I^2_{model}=59.85$ | $R^2=0.12$ , $R^2_{*}=0.03$   |
| Invasive                        | Native=30(10),<br>Invasive=26(3)        | ~1   Citation /<br>Observation ID | 0.08, 0.776                                 | 0.08±[0.72,-0.56], df=11,11,<br>t=-0.29, p=0.781 | $\sigma^2_{null}=0.17$ ,<br>$\sigma^2_{model}=0.17$ | $I^2_{null}=61.03$ , $I^2_{model}=60.57$ | $R^2=1.02$ , $R^2_{*}=0.26$   |
| Ecosystem - Soil Organic Matter |   |                                   |   |  |   |  |                               |
| Herbivore<br>nativeness         | Native=22(12),<br>Introduced=16(5)      | ~1   Citation /<br>Observation ID | 0.04, 0.841                                 | 0.06±[0.71,-0.58], df=15,15,<br>t=-0.2, p=0.844  | $\sigma^2_{null}=0.32$ ,<br>$\sigma^2_{model}=0.32$ | $I^2_{null}=69.22$ , $I^2_{model}=68.85$ | $R^2=0.29$ , $R^2_{*}<0.01$   |
| Ecosystem - Soil Respiration    |   |                                   |   |  |   |  |                               |

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|                                       | N articles<br>(n observations)            | Random effect                                  | Comparison to<br>intercept-only<br>(LRT, p) | Contrast±95%CIs                                   | Total<br>variance                                   | Unexplained<br>heterogeneity                 | Explained<br>variance          |
|---------------------------------------|---|--|---|---|---|--|--------------------------------|
| Herbivore<br>nativeness               | Native=107(8),<br>Introduced=10(4)        | ~1   Citation / Species<br>ID / Observation ID | 1.64, 0.201                                 | -0.49±[0.33,-1.31], df=10,10,<br>t=1.33, p=0.213  | $\sigma^2_{null}=0.6$ ,<br>$\sigma^2_{model}=0.54$  | $I^2_{null}=68.88$ , $I^2_{model}$<br>=66.11 | $R^2=3.37$ , $R^2$<br>*=0.4    |
| Invasive                              | Native=107(8),<br>Invasive=10(4)          | ~1   Citation / Species<br>ID / Observation ID | 1.64, 0.201                                 | -0.49±[0.33,-1.31], df=10,10,<br>t=1.33, p=0.213  | $\sigma^2_{null}=0.6$ ,<br>$\sigma^2_{model}=0.54$  | $I^2_{null}=68.88$ , $I^2_{model}$<br>=66.11 | $R^2=3.37$ , $R^2$<br>*=0.4    |
| Ecosystem - Soil Total C              |   |  |   |   |   |  |                                |
| Africa<br>Comparison                  | Intact Africa=30(6),<br>Introduced=13(9)  | ~1   Citation / Species<br>ID / Observation ID | 0.02, 0.888                                 | 0.04±[-0.54,0.61], df=13,13,<br>t=0.14, p=0.89    | $\sigma^2_{null}=0.26$ ,<br>$\sigma^2_{model}=0.25$ | $I^2_{null}=73.97$ , $I^2_{model}$<br>=73.93 | $R^2=0.12$ , $R^2$<br>*=0.03   |
| Herbivore<br>nativeness               | Native=119(28),<br>Introduced=13(9)       | ~1   Citation / Species<br>ID / Observation ID | 0.01, 0.919                                 | -0.02±[0.39,-0.44], df=34,130,<br>t=0.1, p=0.919  | $\sigma^2_{null}=0.21$ ,<br>$\sigma^2_{model}=0.21$ | $I^2_{null}=61.69$ , $I^2_{model}$<br>=61.68 | $R^2=0.02$ , $R^{2*}$<br><0.01 |
| Invasive                              | Native=119(28),<br>Invasive=7(5)          | ~1   Citation / Species<br>ID / Observation ID | <0.01, 0.958                                | 0.01±[0.57,-0.54], df=30,124,<br>t=-0.05, p=0.958 | $\sigma^2_{null}=0.23$ ,<br>$\sigma^2_{model}=0.23$ | $I^2_{null}=64.01$ , $I^2_{model}$<br>=64.01 | $R^2<0.01$ , $R^{2*}$<br><0.01 |
| Ecosystem - Soil Total Ca             |   |  |   |   |   |  |                                |
| Africa<br>Comparison                  | Intact Africa=12(3),<br>Introduced=10(4)  | ~1   Citation /<br>Observation ID              | 1.51, 0.219                                 | -0.38±[-1.17,0.4], df=5,5,<br>t=-1.26, p=0.265    | $\sigma^2_{null}=0.42$ ,<br>$\sigma^2_{model}=0.38$ | $I^2_{null}=81.06$ , $I^2_{model}$<br>=79.23 | $R^2=9.21$ , $R^2$<br>*=6.52   |
| Herbivore<br>nativeness               | Native=30(10),<br>Introduced=10(4)        | ~1   Citation /<br>Observation ID              | 2.73, 0.099                                 | -0.42±[0.12,-0.96], df=12,12,<br>t=1.69, p=0.118  | $\sigma^2_{null}=0.37$ ,<br>$\sigma^2_{model}=0.33$ | $I^2_{null}=75.09$ , $I^2_{model}$<br>=72.68 | $R^2=9.18$ , $R^2$<br>*=5.83   |
| Ecosystem - Soil Total N              |   |  |   |   |   |  |                                |
| Africa<br>Comparison                  | Intact Africa=47(9),<br>Introduced=19(10) | ~1   Citation /<br>Observation ID              | 1.26, 0.262                                 | 0.24±[-0.2,0.68], df=17,17,<br>t=1.13, p=0.273    | $\sigma^2_{null}=0.4$ ,<br>$\sigma^2_{model}=0.38$  | $I^2_{null}=71.39$ , $I^2_{model}$<br>=70.24 | $R^2=3$ , $R^{2*}=1.09$        |
| Herbivore<br>nativeness               | Native=173(38),<br>Introduced=19(10)      | ~1   Citation /<br>Observation ID              | 0.2, 0.655                                  | 0.08±[0.44,-0.28], df=45,190,<br>t=-0.45, p=0.654 | $\sigma^2_{null}=0.26$ ,<br>$\sigma^2_{model}=0.26$ | $I^2_{null}=60.02$ , $I^2_{model}$<br>=59.88 | $R^2=0.23$ , $R^2$<br>*=0.05   |
| Invasive                              | Native=173(38),<br>Invasive=13(7)         | ~1   Citation /<br>Observation ID              | 0.33, 0.563                                 | 0.13±[0.56,-0.31], df=42,184,<br>t=-0.58, p=0.561 | $\sigma^2_{null}=0.24$ ,<br>$\sigma^2_{model}=0.23$ | $I^2_{null}=56.98$ , $I^2_{model}$<br>=56.76 | $R^2=0.46$ , $R^2$<br>*=0.09   |
| Ecosystem - Soil Total P              |   |  |   |   |   |  |                                |
| Africa<br>Comparison                  | Intact Africa=46(9),<br>Introduced=13(6)  | ~1   Citation /<br>Observation ID              | 0.64, 0.423                                 | -0.19±[-0.66,0.28], df=13,13,<br>t=-0.85, p=0.409 | $\sigma^2_{null}=0.22$ ,<br>$\sigma^2_{model}=0.21$ | $I^2_{null}=62.01$ , $I^2_{model}$<br>=60.38 | $R^2=2.74$ , $R^2$<br>*=1.12   |
| Herbivore<br>nativeness               | Native=60(14),<br>Introduced=13(6)        | ~1   Citation /<br>Observation ID              | 1.06, 0.304                                 | -0.26±[0.25,-0.78], df=18,18,<br>t=1.07, p=0.301  | $\sigma^2_{null}=0.27$ ,<br>$\sigma^2_{model}=0.25$ | $I^2_{null}=65.57$ , $I^2_{model}$<br>=63.83 | $R^2=3.89$ , $R^2$<br>*=1.7    |
| Ecosystem - Soil pH                   |   |  |   |   |   |  |                                |
| Africa<br>Comparison                  | Intact Africa=13(4),<br>Introduced=14(6)  | ~1   Citation /<br>Observation ID              | 0.61, 0.436                                 | 0.21±[-0.41,0.84], df=8,8,<br>t=0.78, p=0.455     | $\sigma^2_{null}=0.33$ ,<br>$\sigma^2_{model}=0.32$ | $I^2_{null}=70.94$ , $I^2_{model}$<br>=69.68 | $R^2=3.59$ , $R^2$<br>*=0.15   |
| Herbivore<br>nativeness               | Native=48(14),<br>Introduced=14(6)        | ~1   Citation /<br>Observation ID              | 0.23, 0.635                                 | 0.25±[1.36,-0.86], df=18,18,<br>t=-0.48, p=0.639  | $\sigma^2_{null}=1.36$ ,<br>$\sigma^2_{model}=1.34$ | $I^2_{null}=88.7$ , $I^2_{model}=88.44$      | $R^2=0.83$ , $R^2$<br>*=0.22   |
| Invertebrates - Detritivore Abundance |   |  |   |   |   |  |                                |
| Herbivore<br>nativeness               | Native=116(17),<br>Introduced=16(4)       | ~1   Citation /<br>Observation ID              | 2.71, 0.1                                   | 0.96±[2.17,-0.26], df=19,19,<br>t=-1.65, p=0.116  | $\sigma^2_{null}=0.96$ ,<br>$\sigma^2_{model}=0.93$ | $I^2_{null}=88.4$ , $I^2_{model}=88.02$      | $R^2=9.49$ , $R^2$<br>*=10.23  |

**Table S1.** Final model results and statistics for all main text models. Sample sizes are given as number of observations with number of studies in parentheses. Log-likelihood ratio tests (LRT) and p values in comparison to intercept-only null models are provided. Total model variance ( $\sigma^2$ ), total unexplained heterogeneity ( $I^2$ ) and  $R^2$  are provided. Note that some models had extremely low heterogeneity (particularly Root Biomass), leading to  $R^2$  of 100%. We thus calculated an alternative  $R^{2*}$ , which is the proportion of total variance in  $y$  explained by moderator (see Methods). Contrasts between factors (e.g., nativeness levels) are provided along with 95% confidence intervals, degrees of freedom, and p-values.

|  | N articles<br>(n observations)             | Random effect   | Comparison to<br>intercept-only<br>(LRT, p) | Contrast±95%CIs                                  | Total<br>variance                                   | Unexplained<br>heterogeneity             | Explained<br>variance        |
|--|--|---|---|--|---|--|------------------------------|
| Invasive                               | Native=116(17),<br>Invasive=11(3)          | ~1   Citation /<br>Observation ID                               | 3.22, 0.073                                 | 1.25±[2.72,-0.21], df=18,18,<br>t=-1.8, p=0.089  | $\sigma^2_{null}=1.08$ ,<br>$\sigma^2_{model}=1.05$ | $I^2_{null}=89.8$ , $I^2_{model}=89.45$  | $R^2=10.66$ , $R^{2*}=12.77$ |
| Invertebrates - Herbivore Abundance    |  |   |   |  |   |  |                              |
| Africa<br>Comparison                   | Intact Africa=6(3),<br>Introduced=35(5)    | ~1   Citation /<br>Observation ID                               | 1.12, 0.29                                  | 0.38±[-0.45,1.21], df=6,6,<br>t=1.11, p=0.308    | $\sigma^2_{null}=0.21$ ,<br>$\sigma^2_{model}=0.15$ | $I^2_{null}=50.59$ , $I^2_{model}=42.32$ | $R^2=10.53$ , $R^{2*}=6.02$  |
| Herbivore<br>nativeness                | Native=148(20),<br>Introduced=35(5)        | ~1   Citation /<br>Observation ID                               | 1.03, 0.31                                  | 0.33±[0.98,-0.33], df=23,23,<br>t=-1.02, p=0.317 | $\sigma^2_{null}=0.41$ ,<br>$\sigma^2_{model}=0.39$ | $I^2_{null}=75.9$ , $I^2_{model}=75.2$   | $R^2=4.05$ , $R^{2*}=2.87$   |
| Invertebrates - Invertebrate Abundance |  |   |   |  |   |  |                              |
| Africa<br>Comparison                   | Intact Africa=39(9),<br>Introduced=124(14) | ~1   Citation /<br>Observation ID                               | 0.81, 0.367                                 | 0.17±[-0.22,0.55], df=21,21,<br>t=0.91, p=0.375  | $\sigma^2_{null}=0.15$ ,<br>$\sigma^2_{model}=0.14$ | $I^2_{null}=61.22$ , $I^2_{model}=60.11$ | $R^2=3.41$ , $R^{2*}=0.55$   |
| Herbivore<br>nativeness                | Native=511(45),<br>Introduced=124(14)      | ~1   Citation / Species<br>ID / Observation ID                  | 0.81, 0.367                                 | 0.18±[0.56,-0.21], df=57,57,<br>t=-0.91, p=0.368 | $\sigma^2_{null}=0.41$ ,<br>$\sigma^2_{model}=0.4$  | $I^2_{null}=80.54$ , $I^2_{model}=80.29$ | $R^2=1.19$ , $R^{2*}=0.68$   |
| Invasive                               | Native=511(45),<br>Invasive=57(9)          | ~1   Citation / Species<br>ID / Observation ID                  | 0.34, 0.559                                 | 0.14±[0.61,-0.33], df=52,52,<br>t=-0.59, p=0.561 | $\sigma^2_{null}=0.43$ ,<br>$\sigma^2_{model}=0.43$ | $I^2_{null}=82.29$ , $I^2_{model}=82.18$ | $R^2=0.4$ , $R^{2*}=0.23$    |
| Invertebrates - Invertebrate Diversity |  |   |   |  |   |  |                              |
| Africa<br>Comparison                   | Intact Africa=15(3),<br>Introduced=49(7)   | ~1   Citation / Species<br>ID / Observation ID                  | 0.01, 0.941                                 | 0.01±[-0.34,0.37], df=8,8,<br>t=0.07, p=0.943    | $\sigma^2_{null}=0.06$ ,<br>$\sigma^2_{model}=0.06$ | $I^2_{null}=36.85$ , $I^2_{model}=36.61$ | $R^2=0.04$ , $R^{2*}=0.01$   |
| Herbivore<br>nativeness                | Native=111(19),<br>Introduced=49(7)        | ~1   Citation /<br>Observation ID                               | 0.38, 0.536                                 | 0.21±[0.9,-0.48], df=24,24,<br>t=-0.62, p=0.541  | $\sigma^2_{null}=0.52$ ,<br>$\sigma^2_{model}=0.52$ | $I^2_{null}=84.76$ , $I^2_{model}=84.59$ | $R^2=1.74$ , $R^{2*}=0.83$   |
| Invasive                               | Native=111(19),<br>Invasive=6(3)           | ~1   Citation /<br>Observation ID                               | 0.01, 0.904                                 | -0.06±[0.95,-1.07], df=20,20,<br>t=0.12, p=0.905 | $\sigma^2_{null}=0.61$ ,<br>$\sigma^2_{model}=0.61$ | $I^2_{null}=87.58$ , $I^2_{model}=87.58$ | $R^2=0.03$ , $R^{2*}=0.01$   |
| Invertebrates - Predator Abundance     |  |   |   |  |   |  |                              |
| Africa<br>Comparison                   | Intact Africa=9(3),<br>Introduced=18(6)    | ~1   Citation / Species<br>ID / Observation ID,<br>~1   site_id | 0.33, 0.567                                 | 0.13±[-0.29,0.56], df=7,7,<br>t=0.73, p=0.487    | $\sigma^2_{null}=0.04$ ,<br>$\sigma^2_{model}=0.02$ | $I^2_{null}=22.06$ , $I^2_{model}=11.31$ | $R^2=18.32$ , $R^{2*}=0.22$  |
| Herbivore<br>nativeness                | Native=108(18),<br>Introduced=18(6)        | ~1   Citation /<br>Observation ID                               | 1.18, 0.278                                 | 0.2±[0.55,-0.15], df=22,22,<br>t=-1.19, p=0.246  | $\sigma^2_{null}=0.09$ ,<br>$\sigma^2_{model}=0.07$ | $I^2_{null}=38.36$ , $I^2_{model}=34.41$ | $R^2=6.36$ , $R^{2*}=0.66$   |
| Vertebrates - Bird Abundance           |  |   |   |  |   |  |                              |
| Herbivore<br>nativeness                | Native=92(9),<br>Introduced=23(4)          | ~1   Citation / Species<br>ID / Observation ID                  | 1.07, 0.301                                 | -0.25±[0.28,-0.77], df=11,11,<br>t=1.04, p=0.319 | $\sigma^2_{null}=0.35$ ,<br>$\sigma^2_{model}=0.34$ | $I^2_{null}=85.6$ , $I^2_{model}=85.35$  | $R^2=2.84$ , $R^{2*}=1.78$   |
| Invasive                               | Native=92(9),<br>Invasive=19(3)            | ~1   Citation / Species<br>ID / Observation ID                  | 0.6, 0.44                                   | -0.22±[0.41,-0.85], df=10,10,<br>t=0.78, p=0.455 | $\sigma^2_{null}=0.35$ ,<br>$\sigma^2_{model}=0.35$ | $I^2_{null}=85.91$ , $I^2_{model}=85.84$ | $R^2=1.91$ , $R^{2*}=1.23$   |
| Vertebrates - Bird Diversity           |  |   |   |  |   |  |                              |
| Herbivore<br>nativeness                | Native=39(7),<br>Introduced=18(3)          | ~1   Citation /<br>Observation ID                               | 1.67, 0.196                                 | -0.13±[0.09,-0.36], df=8,8,<br>t=1.37, p=0.209   | $\sigma^2_{null}=0.07$ ,<br>$\sigma^2_{model}=0.06$ | $I^2_{null}=69.76$ , $I^2_{model}=66.78$ | $R^2=6.43$ , $R^{2*}=1.1$    |
| Vertebrates - Mammal Abundance         |  |   |   |  |   |  |                              |
| Africa<br>Comparison                   | Intact Africa=115(5),<br>Introduced=27(5)  | ~1   Citation /<br>Observation ID                               | 1.61, 0.205                                 | 0.55±[-0.41,1.51], df=8,8,<br>t=1.32, p=0.224    | $\sigma^2_{null}=0.49$ ,<br>$\sigma^2_{model}=0.42$ | $I^2_{null}=71.05$ , $I^2_{model}=67.67$ | $R^2=10$ , $R^{2*}=3.64$     |

**Table S1.** Final model results and statistics for all main text models. Sample sizes are given as number of observations with number of studies in parentheses. Log-likelihood ratio tests (LRT) and p values in comparison to intercept-only null models are provided. Total model variance ( $\sigma^2$ ), total unexplained heterogeneity ( $I^2$ ) and  $R^2$  are provided. Note that some some models had extremely low heterogeneity (particularly Root Biomass), leading to  $R^2$  of 100%. We thus calculated an alternative  $R^{2*}$ , which is the proportion of total variance in  $y$  explained by moderator (see Methods). Contrasts between factors (e.g., nativeness levels) are provided along with 95% confidence intervals, degrees of freedom, and p-values.

|                                      | N articles<br>(n observations)            | Random effect   | Comparison to<br>intercept-only<br>(LRT, p) | Contrast±95%CIs                                  | Total<br>variance                                   | Unexplained<br>heterogeneity                 | Explained<br>variance           |
|--------------------------------------|---|---|---|--|---|--|---------------------------------|
| Herbivore<br>nativeness              | Native=151(14),<br>Introduced=27(5)       | ~1   Citation /<br>Observation ID,<br>~Time Series  <br>Experiment ID | 0.67, 0.414                                 | 0.28±[0.98,-0.43], df=17,17,<br>t=-0.82, p=0.422 | $\sigma^2_{null}=0.3$ ,<br>$\sigma^2_{model}=0.29$  | $I^2_{null}=76.72$ , $I^2_{model}$<br>=76.06 | $R^2=2.73$ , $R^{2*}$<br>=0.84  |
| Invasive                             | Native=151(14),<br>Invasive=24(4)         | ~1   Citation /<br>Observation ID,<br>~Time Series  <br>Experiment ID | 0.68, 0.409                                 | 0.31±[1.11,-0.48], df=16,16,<br>t=-0.83, p=0.418 | $\sigma^2_{null}=0.33$ ,<br>$\sigma^2_{model}=0.31$ | $I^2_{null}=78.2$ , $I^2_{model}=77.5$       | $R^2=3.04$ , $R^{2*}$<br>=0.99  |
| Vertebrates - Small Mammal Abundance |   |   |   |  |   |  |                                 |
| Africa<br>Comparison                 | Intact Africa=115(5),<br>Introduced=27(5) | ~1   Citation /<br>Observation ID                                     | 1.61, 0.205                                 | 0.55±[-0.41,1.51], df=8,8,<br>t=1.32, p=0.224    | $\sigma^2_{null}=0.49$ ,<br>$\sigma^2_{model}=0.42$ | $I^2_{null}=71.05$ , $I^2_{model}=67.67$     | $R^2=10$ , $R^{2*}=3.64$        |
| Herbivore<br>nativeness              | Native=137(11),<br>Introduced=27(5)       | ~1   Citation /<br>Observation ID                                     | 1.94, 0.163                                 | 0.46±[1.15,-0.23], df=14,14,<br>t=-1.42, p=0.177 | $\sigma^2_{null}=0.3$ ,<br>$\sigma^2_{model}=0.26$  | $I^2_{null}=72.52$ , $I^2_{model}$<br>=69.94 | $R^2=9.96$ , $R^{2*}$<br>=2.48  |
| Invasive                             | Native=137(11),<br>Invasive=24(4)         | ~1   Citation /<br>Observation ID                                     | 1.8, 0.179                                  | 0.5±[1.28,-0.29], df=13,13,<br>t=-1.37, p=0.194  | $\sigma^2_{null}=0.32$ ,<br>$\sigma^2_{model}=0.28$ | $I^2_{null}=74.3$ , $I^2_{model}=71.83$      | $R^2=10$ , $R^{2*}=2.66$        |
| Vertebrates - Vertebrate Abundance   |   |   |   |  |   |  |                                 |
| Africa<br>Comparison                 | Intact Africa=121(9),<br>Introduced=54(9) | ~1   Citation / Species<br>ID / Observation ID                        | <0.01, 0.956                                | 0.02±[-0.59,0.62], df=16,16,<br>t=0.06, p=0.952  | $\sigma^2_{null}=0.58$ ,<br>$\sigma^2_{model}=0.58$ | $I^2_{null}=80.19$ , $I^2_{model}$<br>=79.87 | $R^2=0.01$ , $R^{2*}$<br>=0.01  |
| Herbivore<br>nativeness              | Native=251(27),<br>Introduced=54(9)       | ~1   Citation / Species<br>ID / Observation ID                        | 2.19, 0.138                                 | -0.28±[0.08,-0.64], df=34,34,<br>t=1.57, p=0.126 | $\sigma^2_{null}=0.39$ ,<br>$\sigma^2_{model}=0.38$ | $I^2_{null}=83.95$ , $I^2_{model}$<br>=83.47 | $R^2=2.94$ , $R^{2*}$<br>=1.05  |
| Invasive                             | Native=251(27),<br>Invasive=47(7)         | ~1   Citation / Species<br>ID / Observation ID                        | 1.93, 0.164                                 | -0.29±[0.11,-0.69], df=32,32,<br>t=1.48, p=0.15  | $\sigma^2_{null}=0.4$ ,<br>$\sigma^2_{model}=0.39$  | $I^2_{null}=84.39$ , $I^2_{model}$<br>=83.96 | $R^2=2.81$ , $R^{2*}$<br>=1.02  |
| Vertebrates - Vertebrate Diversity   |   |   |   |  |   |  |                                 |
| Africa<br>Comparison                 | Intact Africa=14(3),<br>Introduced=24(4)  | ~1   Citation /<br>Observation ID                                     | 1.86, 0.173                                 | -0.29±[-0.85,0.26], df=5,5,<br>t=-1.37, p=0.228  | $\sigma^2_{null}=0.25$ ,<br>$\sigma^2_{model}=0.23$ | $I^2_{null}=80.9$ , $I^2_{model}=79.1$       | $R^2=8.24$ , $R^{2*}$<br>=1.2   |
| Herbivore<br>nativeness              | Native=57(11),<br>Introduced=24(4)        | ~1   Citation /<br>Observation ID                                     | 3.28, 0.07                                  | -0.17±[0.02,-0.36], df=13,13,<br>t=1.88, p=0.083 | $\sigma^2_{null}=0.06$ ,<br>$\sigma^2_{model}=0.05$ | $I^2_{null}=61.01$ , $I^2_{model}=55.91$     | $R^2=10.74$ , $R^{2*}$<br>=0.61 |
| Invasive                             | Native=57(11),<br>Invasive=20(3)          | ~1   Citation /<br>Observation ID                                     | 3.32, 0.068                                 | -0.17±[0.01,-0.35], df=12,12,<br>t=2.05, p=0.063 | $\sigma^2_{null}=0.03$ ,<br>$\sigma^2_{model}=0.02$ | $I^2_{null}=46.1$ , $I^2_{model}=38.71$      | $R^2=19.33$ , $R^{2*}$<br>=0.58 |