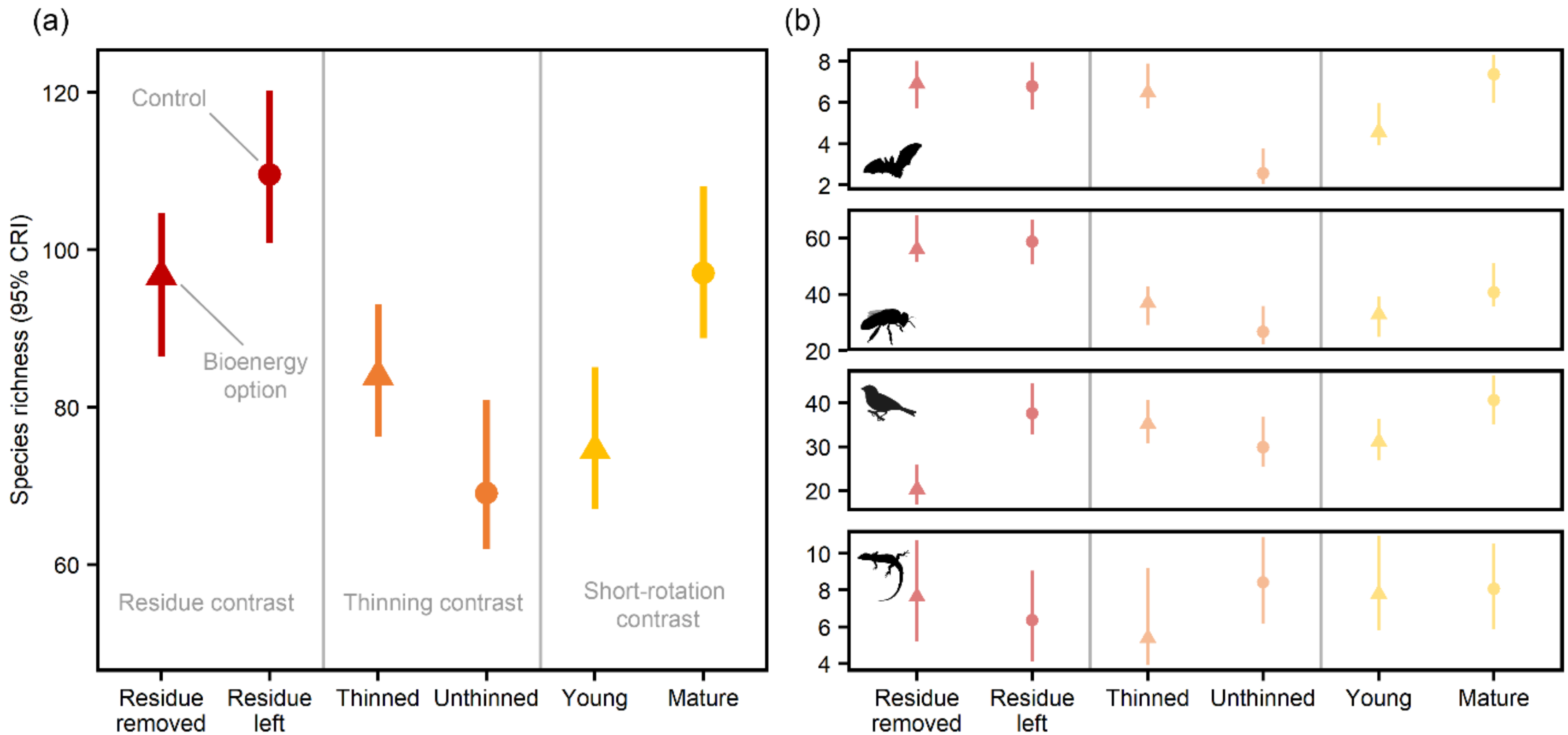
Appendix S1. Distribution of the six land-use types across three ownerships (non-industrial private, industrial timber, and local/state/federal).

Land-use type	Non-industrial private	Industrial timber	Local/state/federal
Clear cut, residue removed	8	2	1
Clear cut, residue left	2	6	2
Thinned	6	2	4
Unthinned	5	4	3
Young	2	4	5
Mature	2	7	4

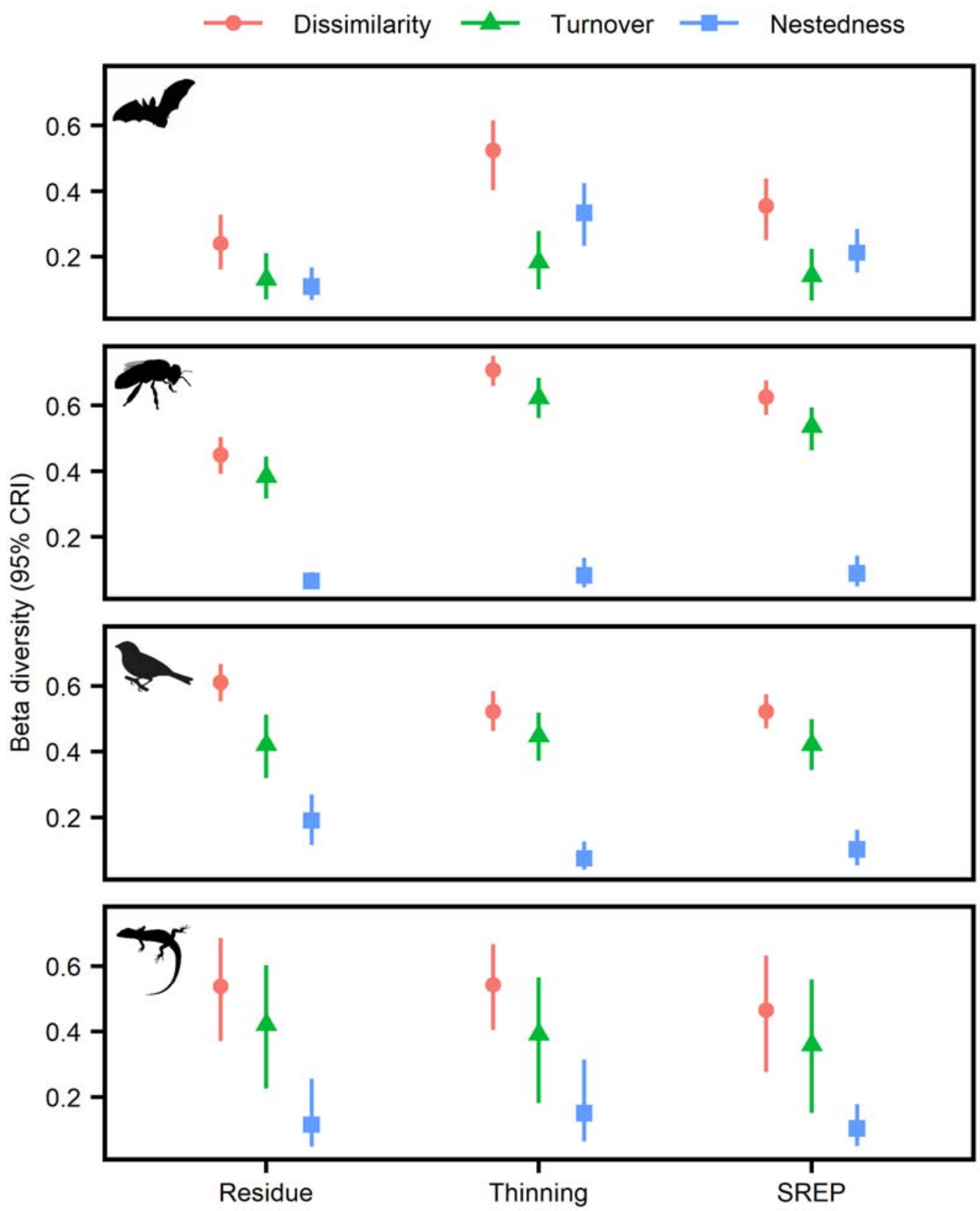
Appendix S2. Occupancy and detection covariate structures for multi-species occupancy models. A separate model was fitted to data from each taxon.

Taxa	Occupancy	Detection	Reference
Bats	$logit(\psi_{ik}) = \beta1_k landuse_i + region_{ik} + site_{ik}$	$logit(p_{ik}) = \alpha0_k + \alpha1_k date_i + \alpha2_k date_i^2 + site_{ik}$	Ober et al. (2020)
Bees	$logit(\psi_{ik}) = \beta1_k landuse_i + region_{ik} + site_{ik}$	$logit(p_{ijk}) = \alpha0_k + \alpha1_k date_i + \alpha2_k date_i^2 + \alpha3_k trapMethod_i + site_{ik}$	Loy et al. (2020)
Birds	$logit(\psi_{ik}) = \beta1_k landuse_i + region_{ik} + site_{ik}$	$logit(p_{ijk}) = \alpha0_k + \alpha1_k date_i + \alpha2_k date_i^2 + \alpha3_k timeOfDay_{ij} + site_{ik}$	Gottlieb et al. (2017)
Reptiles	$logit(\psi_{ik}) = \beta1_k landuse_i + region_{ik} + site_{ik}$	$logit(p_{ik}) = \alpha0_k + site_{ik}$	Jones et al. (2020)

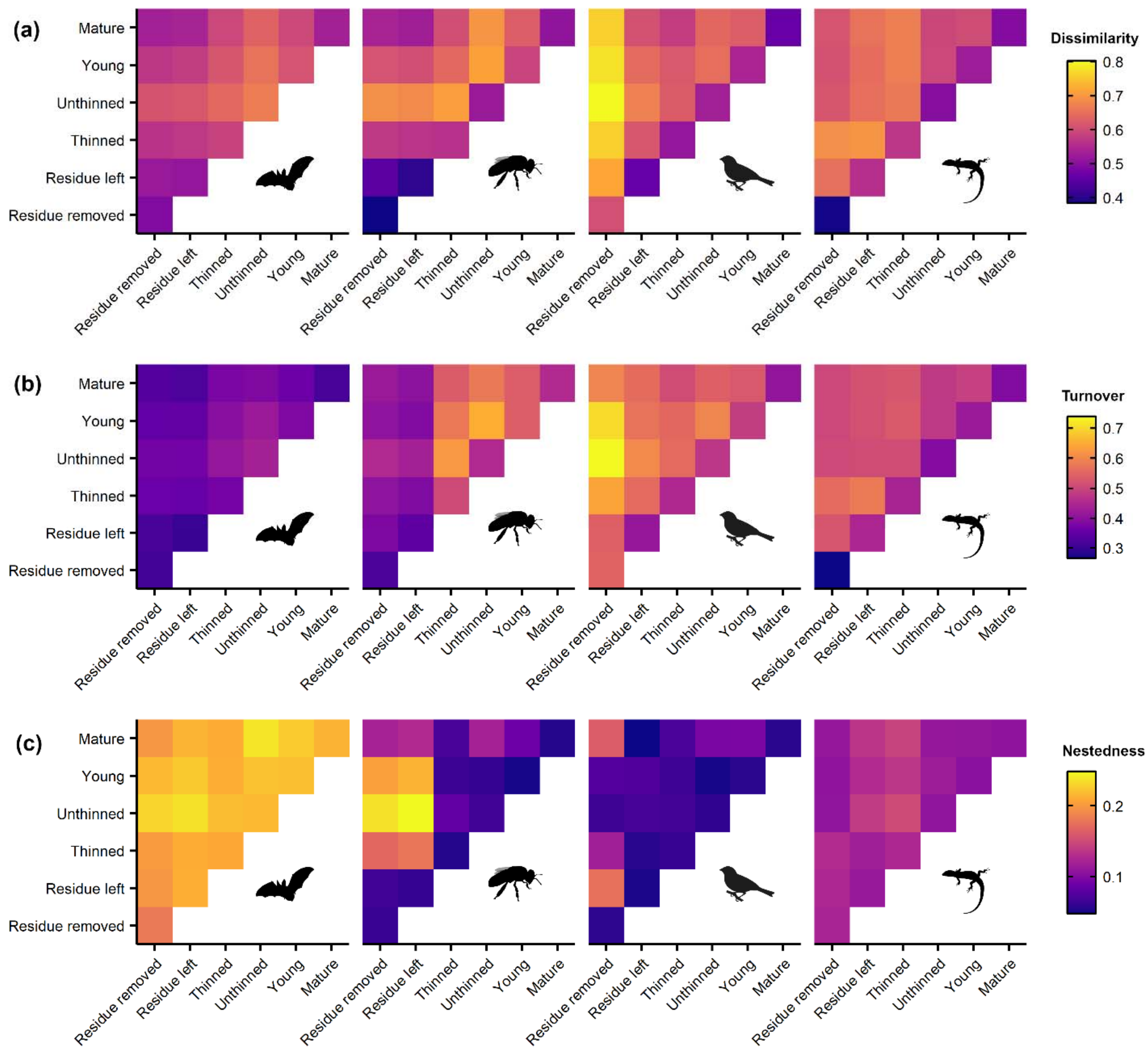
Notes: the subscript 'k' refers to species, such that effects (e.g., β1) varied by species; the subscript 'i' refers to each site-visit combination, this is the structure that allows us to relax the closure assumption of occupancy models. 'date' refers to the Julian date of the visit.



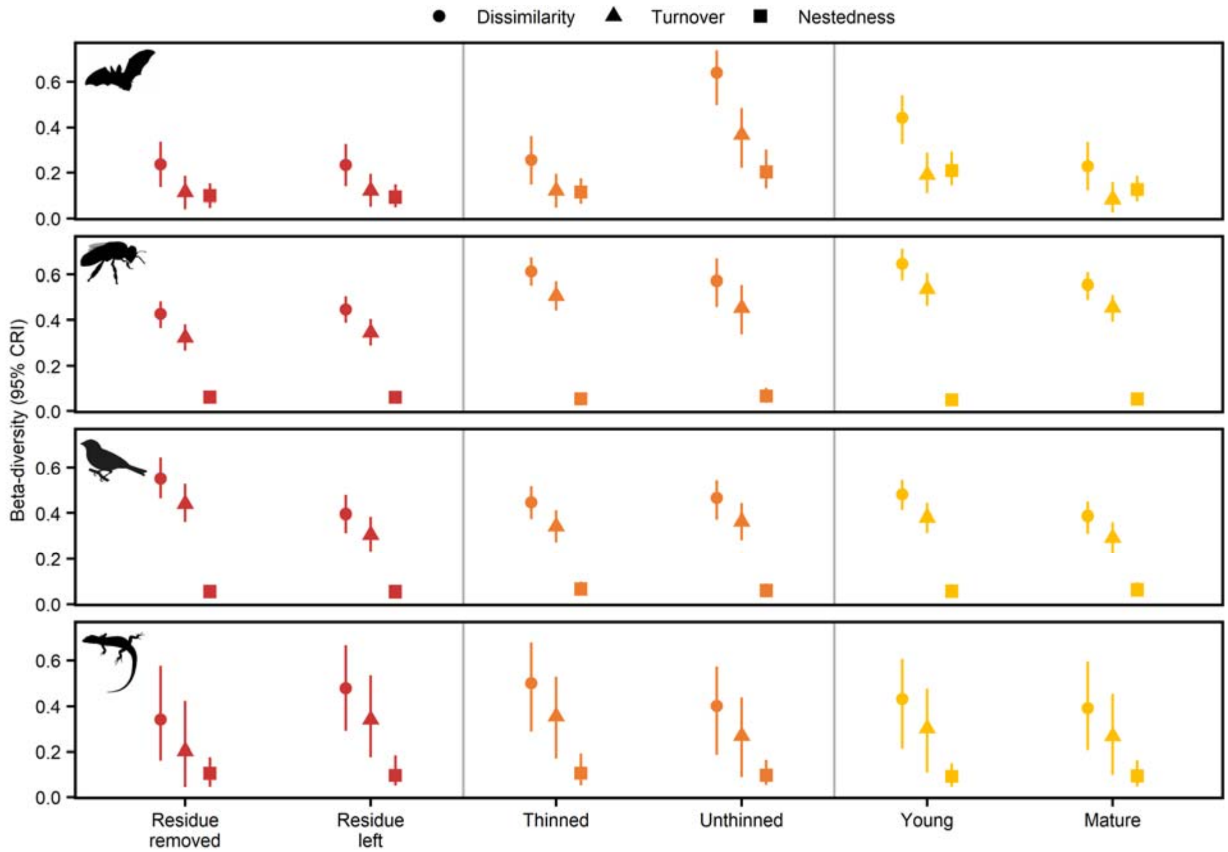
Appendix S3. Alpha-diversity across the six sampled land uses. Across all sites, we detected 10 bat species, 119 bee species, 79 bird species, and 16 reptile species. Alpha-diversity varied across the six managed forest types in our resource extraction gradient for (a) all taxa pooled and (b) individual taxa. When taxa were pooled (a), the highest alpha-diversity occurred in recently clearcut stands with residues left (109.6 species, 95% Bayesian credible interval CRI = [100.9, 120.2]), primarily driven by high bee richness. The lowest alpha-diversity occurred in unthinned mid-rotation stands (69.1 species, 95% CRI [62.0 – 80.9]). Alpha-diversity patterns for bats, bees, and birds tended to follow similar patterns across land uses, whereas reptiles tended to show opposite patterns between ‘bioenergy option’ and ‘control’ land uses (b). Land uses characteristic of bioenergy resource extraction (‘bioenergy option’) are denoted by triangles, and land uses characteristic of typical or pre-management forest conditions (‘control’) are denoted by circles. The grey vertical lines visually delineate the land uses in *a priori* bioenergy contrasts. Points represent posterior modes and lines represent 95% Bayesian credible intervals (CRI). Color scheme corresponds with Figure 2 in the main text.



Appendix S4. Beta-diversity components (total Jaccard dissimilarity, Jaccard turnover, and Jaccard nestedness) for pairwise bioenergy contrasts. Points represent posterior modes and lines represent 95% Bayesian credible intervals (CRI). Residue = residue removal; SREP = Short-rotation energy plantation.



Appendix S5. Average beta-diversity and beta-diversity components for pairwise land-use comparisons across bats, bees, birds, and reptiles. Panel (a) shows the mean Jaccard dissimilarity; panel (b) shows the mean Jaccard turnover; panel (c) shows the mean Jaccard nestedness. In most cases, the Jaccard turnover (b) makes up most of the total dissimilarity (a). Note that the color ramps for each panel are not on the same scale.



Appendix S6. Beta-diversity components (total Jaccard dissimilarity, Jaccard turnover, and Jaccard nestedness) within each of the six land use types. Points represent posterior modes and lines represent 95% Bayesian credible intervals (CRI). Color scheme corresponds with Figure 2 in the main text.