

## APPENDIX 1

**Table S1.** Mean values for six morphometric traits measured for 43 bird species observed in mixed species flocks in and around Cajas National Park, Ecuador. The five functional traits used for analyses were calculated from the morphometric traits.

Common Name	Scientific Name	Body Mass (g)	Total Culmen Length (mm)	Beak Width (mm)	Primaries Length (mm)	Secondaries Length (mm)	Tail Length (mm)	Tarsus Length (mm)
Azara's Spinetail	<i>Synallaxis azarae</i>	16.6	15.0	5.9	58.5	53.8	75.4	22.8
Black Flowerpiercer	<i>Diglossa humeralis</i>	22.9	20.8	4.1	62.6	50.1	54.9	19.7
Black-capped Tyrannulet	<i>Phyllomyias nigrocapillus</i>	9.1	9.6	3.5	60.9	49.0	48.0	16.5
Black-crested Warbler	<i>Myiothlypis nigrocristata</i>	13.0	15.0	6.7	59.8	53.9	61.3	22.9
Blackish Tapaculo	<i>Scytalopus latrans</i>	18.6	13.9	4.3	55.6	53.5	45.8	22.5
Blue-and-black Tanager	<i>Tangara vassorii</i>	18.1	11.4	6.3	73.9	59.0	51.0	18.4
Blue-backed Conebill	<i>Conirostrum sitticolor</i>	12.6	11.3	3.2	70.1	55.3	52.8	16.3
Brown-backed Chat-Tyrant	<i>Ochthoeca fumicolor</i>	14.9	4.1	4.9	81.6	70.2	72.4	21.1
Buff-breasted Mountain-Tanager	<i>Dubusia taeniata</i>	40.0	20.4	7.2	88.5	74.4	80.8	25.1
Chestnut-crowned Antpitta	<i>Grallaria ruficapilla</i>	75.3	29.8	7.6	109.1	93.7	60.7	47.6
Cinereous Conebill	<i>Conirostrum cinereum</i>	10.7	12.5	4.8	61.0	50.9	49.4	18.4
Cinnamon Flycatcher	<i>Pyrrhomyias cinnamomeus</i>	10.1	12.9	9.1	67.5	50.0	58.0	14.9
Crowned Chat-Tyrant	<i>Ochthoeca frontalis</i>	11.1	11.9	6.1	63.3	56.2	52.6	20.7
Flammulated Treehunter	<i>Thripadectes flammulatus</i>	56.8	29.8	5.9	93.3	77.7	106.0	27.1
Great Thrush	<i>Turdus fuscater</i>	145.0	30.3	8.5	156.0	133.7	104.6	43.5
Grey-breasted Mountain-Toucan	<i>Andigena hypoglauca</i>	312.8	95.3	27.1	188.2	171.5	162.8	30.3
Masked Flowerpiercer	<i>Diglossa cyanea</i>	17.4	17.7	4.3	69.1	60.9	61.0	22.3
Masked Trogon	<i>Trogon personatus</i>	63.4	21.2	8.1	123.7	80.0	150.0	11.5
Mountain Trogon	<i>Troglodytes</i>	12.3	15.5	5.1	48.7	42.2	33.2	18.4



Yellow-breasted Brushfinch	<i>Atlapetes latinuchus</i>	30.0	16.9	8.3	75.1	67.7	83.7	28.0
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**Table S2.** Taxonomic index for 43 bird species observed in mixed species flocks in and around Cajas National Park, Ecuador.

Family	Common Name	Scientific Name	
Corvidae	Turquoise Jay	<i>Cyanolyca turcosa</i>	
Cotingidae	Red-crested Cotinga	<i>Ampelion rubrocristatus</i>	
Furnariidae	Azara's Spinetail	<i>Synallaxis azarae</i>	
	Flammulated Treehunter	<i>Thripadectes flammulatus</i>	
	Mouse-colored Thistletail	<i>Schizoeaca griseomurina</i>	
	Pearled Treerunner	<i>Margarornis squamiger</i>	
	Streaked Tuftedcheek	<i>Pseudocolaptes boissonneautii</i>	
	White-browed Spinetail	<i>Hellmayrea gularis</i>	
Grallariidae	Chestnut-crowned Antpitta	<i>Grallaria ruficapilla</i>	
Parulidae	Black-crested Warbler	<i>Myiothlypis nigrocristata</i>	
	Russet-crowned Warbler	<i>Myiothlypis coronata</i>	
	Spectacled Redstart	<i>Myioborus melanocephalus</i>	
Passerellidae	Rufous-collared Sparrow	<i>Zonotrichia capensis</i>	
	White-browed Brushfinch	<i>Arremon torquatus</i>	
	White-winged Brushfinch	<i>Atlapetes leucopterus</i>	
	Yellow-breasted Brushfinch	<i>Atlapetes latinuchus</i>	
Ramphastidae	Grey-breasted Mountain-Toucan	<i>Andigena hypoglauca</i>	
Rhinocryptidae	Blackish Tapaculo	<i>Scytalopus latrans</i>	
Thraupidae	Black Flowerpiercer	<i>Diglossa humeralis</i>	
	Blue-and-black Tanager	<i>Tangara vassorii</i>	
	Blue-backed Conebill	<i>Conirostrum sitticolor</i>	
	Buff-breasted Mountain-Tanager	<i>Dubusia taeniata</i>	
	Cinereous Conebill	<i>Conirostrum cinereum</i>	
	Masked Flowerpiercer	<i>Diglossa cyanea</i>	
	Plain-colored Seedeater	<i>Catamenia inornata</i>	
	Plushcap	<i>Catamblyrhynchus diadema</i>	
	Scarlet-bellied Mountain-Tanager	<i>Anisognathus igniventris</i>	
	Superciliaried Hemispingus	<i>Hemispingus superciliaris</i>	
	Troglodytidae	Mountain Wren	<i>Troglodytes solstitialis</i>
		Sedge Wren	<i>Cistothorus platensis</i>
	Trogonidae	Masked Trogon	<i>Trogon personatus</i>
Turdidae	Great Thrush	<i>Turdus fuscater</i>	
Tyrannidae	Black-capped Tyrannulet	<i>Phyllomyias nigrocapillus</i>	
	Brown-backed Chat-Tyrant	<i>Ochthoeca fumicolor</i>	
	Cinnamon Flycatcher	<i>Pyrrhomyias cinnamomeus</i>	
	Crowned Chat-Tyrant	<i>Ochthoeca frontalis</i>	
	Rufous-breasted Chat-Tyrant	<i>Ochthoeca rufipectoralis</i>	
	Slaty-backed Chat-Tyrant	<i>Ochthoeca cinnamomeiventris</i>	
	Tawny-rumped Tyrannulet	<i>Phyllomyias uropygialis</i>	

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Tufted Tit-tyrant	<i>Anairetes parulus</i>
White-banded Tyrannulet	<i>Mecocerculus stictopterus</i>
White-crested Elaenia	<i>Elaenia albiceps</i>
Yellow-bellied Chat-Tyrant	<i>Ochthoeca diadema</i>

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**Table S3.** Species scores calculated from a canonical correspondence analysis (CCA) for all species occurring in five or more mixed species flocks from three habitat types in and around Cajas National Park, Ecuador. To improve the distribution of the abundances of the different species, abundance data was log transformed.

Common Name	Scientific Name	CCA1	CCA2
Azara's Spinetail	<i>Synallaxis azarae</i>	-0.29	0.29
Black Flowerpiercer	<i>Diglossa humeralis</i>	-0.18	-0.10
Black-capped Tyrannulet	<i>Phyllomyias nigrocapillus</i>	-0.12	-0.28
Black-crested Warbler	<i>Myiothlypis nigrocristata</i>	0.07	-0.20
Blue-and-black Tanager	<i>Tangara vassorii</i>	-0.03	-0.17
Blue-backed Conebill	<i>Conirostrum sitticolor</i>	0.65	0.83
Brown-backed Chat-Tyrant	<i>Ochthoeca fumicolor</i>	0.66	-0.14
Buff-breasted Mountain Tanager	<i>Dubusia taeniata</i>	0.22	-0.17
Cinereous Conebill	<i>Conirostrum cinereum</i>	0.29	-0.13
Cinnamon Flycatcher	<i>Pyrrhomyias cinnamomeus</i>	0.29	0.68
Crowned Chat-Tyrant	<i>Ochthoeca frontalis</i>	0.66	-0.10
Flammulated Treehunter	<i>Thripadectes flammulatus</i>	0.31	-0.22
Great Thrush	<i>Turdus fuscater</i>	-0.11	0.07
Masked Flowerpiercer	<i>Diglossa cyanea</i>	-0.20	-0.06
Pearled Treerunner	<i>Margarornis squamiger</i>	0.29	0.06
Plushcap	<i>Catamblyrhynchus diadema</i>	-0.63	-0.07
Rufous-breasted Chat-Tyrant	<i>Ochthoeca rufipectoralis</i>	0.66	-0.64
Rufous-collared Sparrow	<i>Zonotrichia capensis</i>	0.38	1.14
Russet-crowned Warbler	<i>Myiothlypis coronata</i>	-0.19	-0.23
Scarlet-bellied Mountain Tanager	<i>Anisognathus igniventris</i>	0.32	-0.21
Sedge Wren	<i>Cistothorus platensis</i>	-0.26	0.75
Spectacled Redstart	<i>Myioborus melanocephalus</i>	-0.06	0.13
Streaked Tuftedcheek	<i>Pseudocolaptes boissonneautii</i>	0.40	-0.24
Superciliaried Hemispingus	<i>Hemispingus superciliaris</i>	-0.01	-0.08
Tawny-rumped Tyrannulet	<i>Phyllomyias uropygialis</i>	-0.15	-0.42
Turquoise Jay	<i>Cyanolyca turcosa</i>	0.21	-0.26
White-banded Tyrannulet	<i>Mecocerculus stictopterus</i>	0.66	0.18
White-browed Spinetail	<i>Hellmayrea gularis</i>	-0.95	0.27
White-crested Elaenia	<i>Elaenia albiceps</i>	-0.36	0.69

**Table S4.** Post-hoc pairwise differences, estimated by least square means, for standardized effects sizes (SES) of functional diversity and functional uniqueness of mixed species flocks from three habitat types in and around Cajas National Park, Ecuador. The functional richness of flocks showed no significant differences among habitat types and is not included. *P*-values of less than 0.05 were used to determine significant differences.

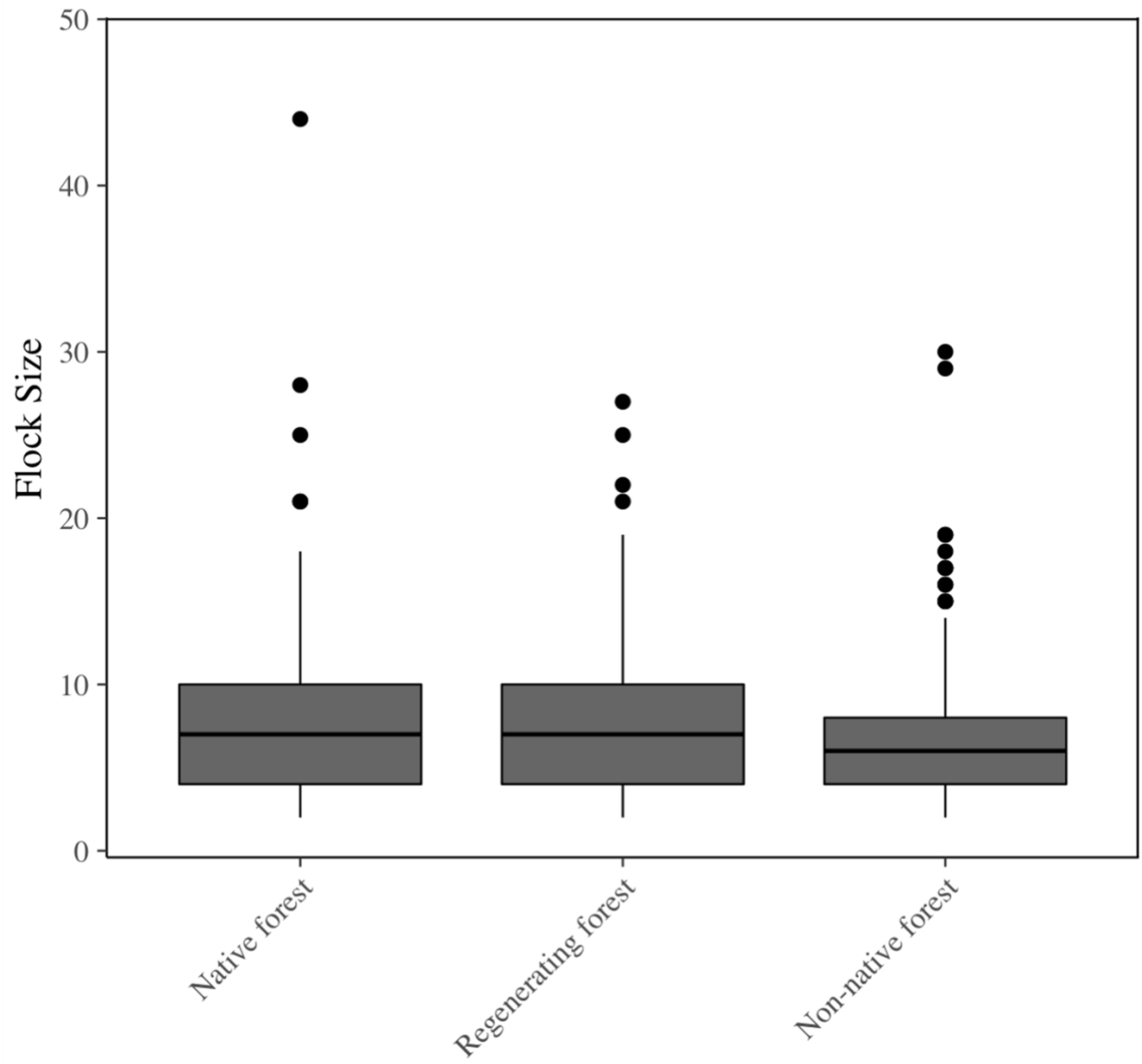
Response Variable	Habitat Pairs	Estimate	Standard Error	df	<i>t</i> -value	<i>P</i> -value
SES functional diversity	Regenerating forest - native forest	0.20	0.08	48.5	2.27	0.02
	Regenerating forest - non-native forest	0.24	0.09	41.9	2.82	<0.01
	Native forest - non-native forest	0.06	0.08	38.5	0.65	0.51
SES functional uniqueness	Regenerating forest - native forest	0.19	0.08	48.5	2.26	0.02
	Regenerating forest - non-native forest	0.25	0.08	41.9	2.83	<0.01
	Native forest - non-native forest	0.05	0.08	38.5	0.64	0.52

**Table S5.** Post-hoc pairwise differences, estimated by least square means, for the community weighted means (CWMs) for four of five functional traits of mixed species flocks from three habitat types in and around Cajas National Park, Ecuador. The fifth functional trait (hand-wing index, HWI) showed no significant differences in flocks among habitat types and is not included. *P*-values of less than 0.05 were used to determine significant differences.

Response Variable	Habitat Pairs	Estimate	Standard Error	df	<i>t</i> -value	<i>P</i> -value
Body mass	Regenerating forest - native forest	-0.03	0.02	49.10	-1.36	0.17
	Regenerating forest - non-native forest	0.04	0.02	47.20	1.99	0.05
	Native forest - non-native forest	0.08	0.02	45.80	3.07	<0.01
Bill index	Regenerating forest - native forest	0.00	0.01	48.50	-0.55	0.58
	Regenerating forest - non-native forest	0.01	0.01	44.90	1.97	0.05
	Native forest - non-native forest	0.02	0.01	42.90	2.55	0.01
Tail index	Regenerating forest - native forest	0.19	0.09	49.70	1.96	0.05
	Regenerating forest - non-native forest	-0.02	0.10	49.00	-0.27	0.78
	Native forest - non-native forest	-0.21	0.09	48.00	-2.21	0.03
Tarsus index	Regenerating forest - native forest	0.03	0.02	49.50	1.66	0.04
	Regenerating forest - non-native forest	-0.03	0.03	48.60	-1.18	0.23
	Native forest - non-native forest	-0.07	0.03	47.60	-2.53	0.02



**Figure S1.** Comparisons of the size of mixed species flocks from three habitat types in and around Cajas National Park, Ecuador.



**Figure S2.** Distribution of the species richness of mixed species flocks from three habitat types in and around Cajas National Park, Ecuador.

