Supplementary data

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| Table S1: Relevant characteristics of selected birds. \*\* Atlantic Forest Endemic; Sensitivity = Level of Sensitivity to changes in the environment and T=Territorial, M=Middle stratum, U=Understory according to Stotz et al. (1996). |
| Species (common name) | **Feeding** | **Sensitivity** | **Habitat and additional information** | **References** |
| *Crypturellus obsoletus* (Brown Tinamou) | Omnivore  | Low | T; Forest edge or second growth. Populations can decrease by hunting effect  | Cabot 1992; Sick 1997  |
| *Sittasomus griseicapillus*(Olivaceous Woodcreeper) | Insectivore | Low | M-U; Interior and edge of mature forest, and less often in second growth and tree plantation. Home range between 3.5ha (Costa Rica) and 9ha (Peru)  | Powell 1979; Pierpont 1986; Marantz et al. 2003  |
| *Xiphorhynchus fuscus \*\** (Lesser Woodcreeper)  | Insectivore | High | U; Interior of mature forest or old second growth. Home range size ~6ha; Can cross open areas up to 150m. | Marantz et al. 2003; Boscolo et al. 2008  |
|  *Automolus leucophthalmus* *\*\** (White-eyed Foliage-gleaner) | Insectivore | Median | U; Frequently in tall second growth forest.  | Sick 1997 |
| *Pyriglena leucoptera* \*\* (White-shouldered Fire-eye) | Insectivore  | Median | U; Forest light-gaps and mature second-growth; Can use tree plantations. Home range size 15.4ha; Can cross open areas up to 60m. | Sick 1997; Uezu et al. 2005; Hansbauer et al. 2008 |
| *Thamnophilus caerulescens* (Variable Antshrike) | Insectivore | Low | M; Frequently in forest edge and patches of thickets, often observed in highly degraded areas. May cross open areas up to 60m.  | Zimmer & Isler 2003; Uezu et al. 2005; Awade & Metzger 2008 |
| *Schiffornis virescens* \*\* (Greenish Mouner) | Omnivore | High | M; Gallery forest and mature secondary woodland. Tends to disappear in small and understory and isolated forest fragments.  | Snow 2004. |
| *Chiroxiphia caudata* \*\*(Swallow-tailed Manakin) | Omnivore | Low | M-U; Humid forest, secondary woodland and edges. It was observed using eucalyptus plantation areas to disperse between forest fragments. Home range ~8 ha and can cross open areas up to 130m. | Dario & Almeida 2000; Snow 2004; Uezu et al. 2005; Hansbauer et al. 2008 |
| *Habia rubica*(Red-crowned Ant-tanager) | Omnivore | High | M-U; Occurs almost exclusively in forest interior and tall second growth. Home range ~5ha (Central America) | Sick 1997; Hilty 2011. |
|  *Basileuterus culicivorus* (Golden-crowned Warbler) | Insectivore | Median | U; Forest edge and second growth, sometimes in the coffee plantations. Can cross open areas up to 50m.  | Awade & Metzger 2008; Curson 2010 |
|  *Myiothlypis leucoblephara* \*\* (White-browed Warbler)  | Insectivore | Median | U; Gallery forest and sometimes in second-growth with dense understory. Capacity to cross open areas up to 100m.  | Uezu et al. 2005; Curson, 2010 |

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| Table S2: Fragment characteristics and bird species present. ID: identification for forest fragment ordered by percentage of matrix. Matrix: index of matrix type pasture or eucalyptus; Forest: percentage of forest in the landscape; Connectivity: 1 connected or 0 not connected; Area: size of the forest fragment in hectares. Bc (*Basileuterus culicivorus*);  Tc (*Thamnophilus caerulescens*); Ml (*Myiothypis leucoblepharus*); Xf (*Xiphorhynchus fuscus*); Pl (*Pyriglena leucoptera*); Cc (*Chiroxiphia caudata*); Co (*Crypturellus obsoletus*); Sg (*Sittasomus griseicapillus*); Al (*Automolus leucophthalmus*); Sv *(Schiffornis virescens)* and Hr (*Habia rubica).* Total spp – Species richness in forest fragment. |
|  ID | **Matrix** | **Forest\_%** | **Connec** | **Area (hectares)** | **Bc** | **Tc** | **Ml** | **Xf** | **Pl** | **Cc** | **Co** | **Sg** | **Al** | **Sv** | **Hr** | ***Total spp*** |
| SFF01 | 0.824 | 16.8 | 0 | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 9 |
| SFF02 | 0.735 | 22.5 | 0 | 9 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 6 |
| SFF03 | 0.590 | 15.0 | 0 | 5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 7 |
| SFF04 | 0.381 | 21.4 | 0 | 5 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 6 |
| SFF05 | 0.289 | 26.9 | 0 | 8 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 6 |
| SFF06 | 0.256 | 7.7 | 0 | 5 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 5 |
| SFF07 | 0.223 | 33.4 | 1 | 5 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 5 |
| SFF08 | 0.141 | 51.8 | 1 | 8 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 7 |
| SFF09 | 0.136 | 24.6 | 0 | 7 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 8 |
| SFF10 | 0.109 | 22.9 | 0 | 8 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| SFF11 | 0.101 | 34.0 | 0 | 5 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 6 |
| SFF12 | 0.053 | 31.5 | 0 | 6 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 6 |
| SFF13 | -0.016 | 38.9 | 1 | 8 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 7 |
| SFF14 | -0.056 | 11.7 | 1 | 7 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 5 |
| SFF15 | -0.125 | 46.3 | 1 | 4 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| SFF16 | -0.164 | 18.0 | 0 | 9 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 7 |
| SFF17 | -0.183 | 13.9 | 0 | 4 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 5 |
| SFF18 | -0.192 | 17.1 | 1 | 7 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 7 |
| SFF19 | -0.216 | 47.0 | 0 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 |
| SFF20 | -0.243 | 41.8 | 0 | 7 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| SFF21 | -0.299 | 36.0 | 0 | 5 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| SFF22 | -0.377 | 32.9 | 0 | 4 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| SFF23 | -0.458 | 26.2 | 0 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| SFF24 | -0.467 | 21.2 | 0 | 4 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| SFF25 | -0.479 | 22.3 | 1 | 5 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 6 |
| SFF26 | -0.508 | 14.3 | 0 | 6 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 5 |
| SFF27 | -0.570 | 38.8 | 1 | 5 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 |
| SFF28 | -0.584 | 25.7 | 1 | 5 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 5 |
| SFF29 | -0.720 | 10.2 | 1 | 8 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 |
| SFF30 | -0.772 | 9.3 | 0 | 8 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 4 |
|  |  |  |  | **Total** | **30** | **25** | **22** | **15** | **15** | **15** | **12** | **12** | **10** | **0** | **0** |  |

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| **Table S3:** Models and variables used in analyses. area – size of fragment; connec – connectivity; forest\_% – percent forest in the buffer of 500 m; matrix – proportion of matrix in the landscape. |
| **Model** | **Variables** |
| mod00 | Null |
| mod01 | area |
| mod02 | connec |
| mod03 | forest\_% |
| mod04 | matrix |
| mod05 | area + connec |
| mod06 | area + forest\_% |
| mod07 | area + matrix |
| mod08 | connec + forest\_% |
| mod09 | connec + matrix |
| mod10 | forest\_%+ matrix |
| mod11 | area + connec + forest\_% |
| mod12 | area + connec + matrix |
| mod13 | matrix + connec + forest\_% |
| mod14 | matrix + area + forest\_% |
| mod15 | area \* connec |
| mod16 | area \* forest\_% |
| mod17 | area \* matrix |
| mod18 | connec \* forest\_% |
| mod19 | connec \* matrix |
| mod20 | forest\_%\* matrix |
| mod21 | area \* connec \* forest\_% |
| mod22 | area \* connec \* matrix |
| mod23 | matrix \* connec \* forest\_% |
| mod24 | matrix \* area \* forest\_% |
| mod25 | area + connec + forest\_%+ matrix |
| mod26 | area \* connec \* forest\_%\* matrix |

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| **Table S4:** Species occupancy models on standardized data according to Akaike’s criterion for small samples (AICc). The first model for each species best explains its presence in the patches. The Δi (delta) relative difference to the lower value of AICc; wAIC (weight) - chance that the model is selected. Relative Importance of the variables, given through of the sum of the weight of the model where the variable appears. |
| **Specie** | **Model** | **pseudor2** | **AIC** | **AICc** | **Delta** | **exp** | **weight** | **evidence** | **Variable** | **Variable weight** |
| *Thamnophilus caerulescens* | md00 | 1.11E-16 | 29.034 | 29.478 | 0 | 1 | 0.197 | 1 | area | 0.535 |
| md01 | 0.090 | 28.601 | 29.524 | 0.045 | 0.978 | 0.192 | 1.023 | matrix | 0.274 |
| md07 | 0.117 | 29.858 | 31.458 | 1.980 | 0.372 | 0.073 | 2.691 | forest\_% | 0.260 |
|  |  |  |  |  |  |  |  | connect | 0.247 |
| *Myiothlypis leucoblephara* | md04 | 0.093 | 35.567 | 36.490 | 0 | 1 | 0.156 | 1 |   |   |
| md10 | 0.157 | 35.339 | 36.939 | 0.449 | 0.799 | 0.124 | 1.251 | matrix | 0.658 |
| md00 | 0.000 | 36.795 | 37.239 | 0.749 | 0.688 | 0.107 | 1.454 | forest\_% | 0.422 |
| md13 | 0.215 | 35.323 | 37.823 | 1.333 | 0.514 | 0.080 | 1.947 | connect | 0.349 |
| md09 | 0.126 | 36.397 | 37.997 | 1.507 | 0.471 | 0.073 | 2.124 | area | 0.227 |
| md03 | 0.044 | 37.261 | 38.184 | 1.694 | 0.429 | 0.067 | 2.332 |   |   |
| md19 | 0.200 | 35.830 | 38.330 | 1.840 | 0.399 | 0.062 | 2.509 |   |   |
| *Xiphorhynchus fuscus* | md00 | 0.000 | 43.590 | 44.030 | 0 | 1 | 0.200 | 1 | connect | 0.359 |
| md04 | 0.028 | 44.410 | 45.340 | 1.300 | 0.500 | 0.100 | 1.919 | forest\_% | 0.332 |
| md18 | 0.151 | 43.320 | 45.820 | 1.780 | 0.400 | 0.100 | 2.439 | matrix | 0.331 |
| md02 | 0.014 | 44.990 | 45.910 | 1.880 | 0.400 | 0.100 | 2.554 | area | 0.259 |
| *Pyriglena leucoptera* | md00 | 0.000 | 43.589 | 44.033 | 0 | 1 | 0.167 | 1 | matrix | 0.480 |
| md04 | 0.059 | 43.114 | 44.037 | 0.003 | 0.998 | 0.167 | 1.002 | area | 0.394 |
| md01 | 0.043 | 43.800 | 44.723 | 0.689 | 0.708 | 0.119 | 1.412 | forest\_% | 0.251 |
| md07 | 0.094 | 43.676 | 45.276 | 1.243 | 0.537 | 0.090 | 1.862 | connect | 0.228 |
| *Chiroxiphia caudata* |  |  |  |  |  |  |  |  | matrix | 0.994 |
| md04 | 0.302 | 33.045 | 33.968 | 0 | 1 | 0.300 | 1 | forest\_% | 0.466 |
| md10 | 0.359 | 32.644 | 34.244 | 0.276 | 0.871 | 0.261 | 1.148 | connect | 0.211 |
|  |  |  |  |  |  |  |  | area | 0.196 |
| *Crypturellus obsoletus* | md02 | 0.062 | 41.890 | 42.820 | 0 | 1 | 0.184 | 1 | connect | 0.562 |
| md00 | 2.22E-16 | 42.380 | 42.830 | 0.007 | 1 | 0.183 | 1.004 | area | 0.320 |
| md22 | 0.522 | 35.300 | 44.300 | 1.484 | 0.500 | 0.087 | 2.100 | matrix | 0.317 |
|   |   |   |   |   |   |   |   | forest\_% | 0.221 |
| *Sittasomus griseicapillus* | md20 | 0.247 | 38.400 | 40.900 | 0 | 1 | 0.185 | 1 | matrix | 0.755 |
| md17 | 0.239 | 38.710 | 41.210 | 0.314 | 0.900 | 0.158 | 1.170 | forest\_% | 0.438 |
| md04 | 0.095 | 40.560 | 41.480 | 0.586 | 0.700 | 0.138 | 1.341 | area | 0.358 |
| md10 | 0.133 | 41.000 | 42.600 | 1.706 | 0.400 | 0.079 | 2.346 | connect | 0.167 |
| md00 | -2.22E-16 | 42.380 | 42.830 | 1.930 | 0.400 | 0.070 | 2.625 |   |  |
| *Automolus leucophthalmus* |  |  |  |  |  |  |  |  | matrix | 0.581 |
| md04 | 0.086 | 38.900 | 39.830 | 0 | 1 | 0.200 | 1 | connect | 0.320 |
| md00 | -2.22E-16 | 40.190 | 40.640 | 0.810 | 0.700 | 0.200 | 1.498 | forest\_% | 0.229 |
|   |   |   |   |   |   |   |   | area | 0.221 |