SUPPLEMENTARY ELECTRONIC MATERIAL (APPENDIX 3)

ARDEOLA 72 (1)

REVIEW

A SYSTEMATIC REVIEW OF TRENDS AND METHODOLOGIES IN RESEARCH ON THE EFFECTS OF WILDFIRES ON THE AVIFAUNA IN TEMPERATE FORESTS

REVISIÓN SISTEMÁTICA DE LAS TENDENCIAS Y METODOLOGÍAS EN LA INVESTIGACIÓN SOBRE LOS EFECTOS DE LOS INCENDIOS FORESTALES EN LA AVIFAUNA EN BOSQUES TEMPLADOS

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TABLE C1

This table provides a summary of pertinent information extracted from the reviewed documents pertaining to research focused on forest fires and their impacts on temperate forests, with birds serving as indicators of fire effects. Inclusion and exclusion criteria were utilised to select relevant studies. The methodological details are presented based on the content of the respective scientific articles. The primary findings are synthesised to offer an overview of the literature under review.

[Esta tabla resume la información relevante de los documentos revisados de la línea de investigación sobre incendios forestales que afectaron a bosques templados y utilizaron aves como indicadores de los efectos del fuego. Los criterios de inclusión y exclusión se aplicaron para seleccionar los estudios pertinentes. La descripción metodológica de cada estudio se describe a como lo informa el contenido de cada artículo científico. Los resultados principales se resumen para proporcionar una visión general de la literatura revisada.]

Title	Authors	Survey Method.	Statistical analyses	Burn/Fire Severity	Experimental method

Nest site selection and nest survival of Black-backed Woodpeckers after wildfire	Stillman, AN; Siegel, RB; Wilkerson, RL; Johnson, M; Howell, CA; Tingley, MW	Calls	Nest Site Selection. Nest Survival Model with Bayesian fit.	L-H	A
Effects of wildfire on endemic breeding birds in a *Pinus canariensis* forest of Tenerife, Canary Islands	Garcia-Del-Rey, Eduardo; Otto, Ruediger; Fernández-Palacios, Jose María; Gil Munoz, Pascual; Gil, Luis	LT	Spearman's rank correlation test. Moran's I index. Regression trees.	L-M-H	A
Pyrodiversity promotes avian diversity over the decade following forest fire **	Tingley, MW; Ruiz-Gutierrez, V; Wilkerson, RL; Howell, CA; Siegel, RB	PC	Multi-species hierarchical occupancy model.	U-L-M-H	A-C
Interacting and non-linear avian responses to mixed-severity wildfire and time since fire	Taillie, PJ; Burnet, RD; Roberts, LJ; Campos, BR; Peterson, MN; Moorman, CE	PC	Hierarchical distance sampling models. AIC	L-M-H	A-C

Bird community responses to vegetation heterogeneity following non-direct regeneration of Mediterranean forests after fire	Zozaya, EL; Brotons, L; Vallecillo, S	LT	Principal Components Analysis. Redundancy Analysis. Detrended Correspondence Analysis. Monte-Carlo permutation test. Generalized linear models. Generalized linear mixed models. Conservation Index.	None	A
Aridity influences the recovery of vegetation and shrubland birds after wildfire	Puig-Girones, R; Brotons, L; Pons, P	LT	Generalized linear mixed models. Minimum adequate model. AIC	None	A-C
Avian species richness in a frequently burned ecosystem: a link between pyrodiversity and biodiversity	Jorge, MH; Conner, LM; Garrison, EP; Cherry, MJ	P	Hierarchical Bayesian multispecies site occupancy models. Markov chain Monte Carlo. deviance information criterion	None	A
A seven-year study of the response of woodland birds to a large-scale wildfire and the role of proximity to unburnt habitat	Murphy, MJ; Jones, HA; Koen, T	2ha - 20min	Chi-squared goodness-of-fit tests. Linear mixedeffects model. ANOVA. Tukey's HSD. Kolmogorov–Smirnov tests. nonmetric multidimensional scaling. PERMANOVA. Kulczynski dissimilarity. Chi-squared. Indicator species analysis. Linear mixed-effect models.	None	A-C

Fire legacies in eastern ponderosa pine forests	Roberts, CP; Donovan, VM; Wonkka, CL; Powell, LA; Allen, CR; Angeler, DG; Wedin, DA; Twidwell, D	PC	General Linear Models. Canonical correspondence analysis. PERMANOVA.	U-L-M-H	A-C
Refuges for birds in fire-prone landscapes: The influence of fire severity and fire history on the distribution of forest birds	Robinson, NM; Leonard, SWJ; Bennett, AF; Clarke, MF	PC	ANOVA	(a) unburnt, no evidence of fire in either the understorey or canopy; (b) ground burnt, understorey mostly burnt but canopy unburnt; (c) crown scorch, understorey burnt and canopy scorched, and; (d) crown burnt, both understorey and canopy burnt.	A-C
Avian response to fire in pine-oak forests of Great Smoky Mountains National Park following decades of fire suppression	Rose, ET; Simons, TR	PC	single-season occupancy models. AIC	L-H	A-C

Short-term changes in summer and winter resident bird communities following a high severity wildfire in a southern USA mixed pine/hardwood forest	Brown, DJ; Ferrato, JR; White, CJ; Mali, I; Forstner, MRJ; Simpson, TR	PC	Linear mixed-effects models. multivariate analyses redundancy analysis. univariate analyses.	H	BACI
Seed colour and post-fire bird predation in a Mediterranean pine forest	Saracino, A; D'Alessandro, CM; Borghetti, M	PC	t-test. ANOVA.	Light grey ash, Very dark grey ash and Pale brown sand	A
Temporal shifts in floristic and avian diversity in Mediterranean pine forest ecosystems under different fire pressure: The island of Zakynthos as a case study	Poirazidis, K; Chaideftou, E; Martinis, A; Bontzorlos, V; Galani, P; Kalivas, D	PC	Shannon index. Evenness index. Jaccard similarity index. ANOVA. LSD test. Detrended Correspondence Analysis. Redundancy Analysis.	None	A-C
Differential landscape use by forest owls two years after a mixed-severity wildfire	Duchac, LS; Lesmeister, DB; Dugger, KM; Davis, RJ	ARU	single-season occupancy models. AIC.	L-M-H	A-C
Citril finches during the winter: patterns of distribution, the role of pines and implications for the conservation of the species	Borras, A; Senar, JC; Alba-Sánchez, F; López-Sáez, JA; Cabrera, J; Colome, X; Cabrera, T	Calls-MN	Discriminant analysis and maximum entropy modelling. Species distribution models.	None	B-A

Assessing the relative use of clearcuts, burned stands, and wetlands as breeding habitat for two declining aerial insectivores in the boreal forest	Farrell, CE; Wilson, S; Mitchell, G	ARU	Single season site occupancy models. AIC.	None	A
Relationships Between Wildfire Burn Severity, Cavity-Nesting Bird Assemblages, and Habitat in an Eastern Ponderosa Pine Forest	Keele, EC; Donovan, VM; Roberts, CP; Nodskov, SM; Wonkka, CL; Allen, CR; Powell, LA; Wedin, DA; Angeler, DG; Twidwell, D	PC	Linear regressions. Redundancy Analysis. Variance inflation factors.	U-L-M-H	A-C
Effect of Forest Fires on the Avifauna of the Northern Amur Region	V. A. Kolbin	LT	Density	None	A
A review of tree-scale foraging ecology of insectivorous bark-foraging woodpeckers in North America	Ruby L. Hammond. Tad C. Theimer				
Relative avian mobility linked to use of fire-affected resources in forested landscapes	Franklin, MJM; Major, RE; Bedward, M; Bradstock, RA	ARU	Bayesian multispecies occupancy model. Single hierarchical model. Markov Chain Monte Carlo.	None	A-C

Abundance and habitat relationships of breeding birds in the Sky Islands and adjacent Sierra Madre Occidental of northwest Mexico	Flesch, AD; Sánchez, CG; Amarillas, JV	LT-PC	Distance-sampling methods with covariates. Habitat-model. AIC	U-H	A
Projected effects of climate change on boreal bird community accentuated by anthropogenic disturbances in western boreal forest, Canada	Cadieux, P; Boulanger, Y; Cyr, D; Taylor, AR; Price, DT; Solymos, P; Stralberg, D; Chen, H; Brecka, A; Tremblay, JA	PC	Poisson generalized linear models with a logarithmic link.QPAD approach (E[Y] = Q × P × A × D where perceptibility [Q], availability [P], area [A] and density [D]	None	A
Avian relationships with wildfire at two dry forest locations with different historical fire regimes	Latif, QS; Sanderlin, JS; Saab, VA; Block, WM; Dudley, JG	PC	multispecies occupancy models. Detection. Comparison 95% Bayesian credible intervals.	U-L-M-H	A-C
Collapse, reorganization, and regime identity: breaking down past management paradigms in a forest-grassland ecotone	Donovan, VM; Roberts, CP; Wonkka, CL; Uden, DR; Angeler, DG; Allen, CR; Wedin, DA; Drijber, RA; Twidwell, D	PC	Redundancy Analysis with Hellinger transformation. Multiple-comparisons PERMANOVA.	U-L-H	A-C
Harvesting interacts with climate change to affect future habitat quality of a focal species in eastern Canada's boreal forest	Tremblay, JA; Boulanger, Y; Cyr, D; Taylor, AR; Price, DT; St-Laurent, MH	References		none	A-C

Fire regimes shape biodiversity: responses of avian guilds to burned forests in Andean temperate ecosystems of southern Chile	Novoa, FJ; Altamirano, TA; Bonacic, C; Martin, K; Ibarra, JT	PC	One way ANOVA. Tukey test. Multinomial Poisson models. AIC. Generalized linear mixed models	H	A-C
Long-term Changes in Bird Communities after Wildfires in the Central Brazilian Amazon	Mestre, LAM; Cochrane, MA; Barlow, J	MN	sample-based rarefaction curves. Analysis of Similarity. Means ACE, CHAO1, JACK1 and BOOTSTRAP. Multidimensional scaling Bray-Curtis similarity index. ANOSIM. non-parametric 2-Sample Permutation Tests.	None	B-A
Influence of residual forest patches on post-fire bird diversity patterns in jack pine-dominated ecosystems of northern Lower Michigan	Cullinane-Anthony, BL; Seefelt, NE; Corace, RG; Kashian, DM; Gehring, TM	PC	Basic Comparison. Shannon's diversity index. Non-metric Multidimensional Scaling.	None	A-C
Avifaunal responses to fire in southwestern montane forests along a burn severity gradient	Kotliar, NB; Kennedy, PL; Ferree, K	LT-PC	Distance analysis. Detection probabilities. Density estimates (log-normal confidence intervals). Three-way ANOVA, PROC GLM. PROC GLM. Fisher's LSD test. Communitiy similarity.	U-L-M-H	BACI / A-C

Timing of migration and patterns of winter settlement by Henslow's Sparrows	Johnson, EI; DiMiceli, JK; Stouffer, PC	PC	Cormack—Jolly—Seber Model. AIC. ANOVA. Tukey-Kramer test. Pearson chi-squared tests	None	A-C
Differences in bird communities in postfire silvicultural practices stands within pine forest of South Korea	Lee, EJ; Lee, WS; Son, SH; Rhim, SJ	LT	ANOVA. Shanon Index. Simpson's Diveristy Index. Bonferroni test.	None	A-C
Changes in bird abundance after wildfire: Importance of fire severity and time since fire	Smucker, KM; Hutto, RL; Steele, BM	LT-PC	Means and Standar Deviation comparison. index of abundance. Relative abundances. linear mixed model. type III sums-of-squares F test.	L-M-H	BACI
Yellow Rail (*Coturnicops noveboracensis*) Occupancy in the Context of Fire in Mississippi and Alabama, USA	Morris, KM; Woodrey, MS; Hereford, SG; Soehren, EC; Conkling, TJ; Rush, SA	P	Markov chain Monte Carlo. Occupancy Model	None	A-C
Thirty years of post-fire succession in a southern boreal forest bird community	Haney, A; Apfelbaum, S; Burris, JM	LT	Shannon-Weiner index.	None	BACI

Breeding bird community composition in different successional vegetation in the montane coniferous forests zone of Taiwan	Ding, TS; Liao, HC; Yuan, HW	PC	cluster analysis. Detrended Correspondence Analysis. ANOVA. Regression analyses	None	A
Influence of Fire and Water Regimes on Pineland Bird Assemblages	Lloyd, JD; Slater, GL	PC	Canonical correspondence analysis. Euclidean distances. Permutation test.	None	A-C
Evaluating food availability and nest predation risk as sources of bias in aural bird surveys	Robertson, BA; Hutto, RL; Fontaine, JJ	PC	ANOVA. Logistic-exposure model with a binomial response distribution. 2goodness-of-fit tes. ANCOVA. ANOVA. Tukey's LSD test.	L-M-H	A
Opposing Responses of Bird Functional Diversity to Vegetation Structural Diversity in Wet and Dry Forest	Sitters, H; York, A; Swan, M; Christie, F; Di Stefano, J	LT-PC	linear mixed models. AIC. Shannon’s diversity index. Basic comparison.	None	A
Seed predation by birds shortly after a wildfire in a Corsican pine forest	Thibault, JC; Prodon, R	P	t-test. Logistic regression models.AIC. Pearson correlation on log-transformed data.	None	A
Interactive Effects of Vegetation Structure and Composition Describe Bird Habitat Associations in Mixed Broadleaf-Conifer Forest	Seavy, NE; Alexander, JD	PC	Habitat models. AIC.	L-M-H	A-C

Seed preferences of wintering Henslow's sparrows	Dimiceli, JK; Stouffer, PC; Johnson, EI; Leonardi, C; Moser, EB	MN	Logistic generalized linear mixed model. unadjusted test of least significant differences. Chi square. Bonferroni.	None	A
The importance of disturbance and forest structure to bird abundance in the Black Hills	Matseur, EA; Millspaugh, JJ; Thompson, FR; Dickerson, BE; Rumble, MA	PC	3-level hierarchical time-removal models. AIC.	We categorized wildfire as burned 1–2, 3, 4–5, and 6–10 yr ago	A
Influence of season and frequency of fire on Henslow's sparrows (*Ammodramus henslowii*) wintering on Gulf Coast pitcher plant bogs	Tucker, JW; Robinson, WD	LT	two-factor ANOVA. (Shapiro-Wilk test). Univariate ANOVA. (Mann-Whitney U-tests and Spearman's rank correlation). Occupancy models. AIC. and Spearman's rank correlation).	None	A
Hairy Woodpecker winter roost characteristics in burned ponderosa pine forest	Covert-Bratland, KA; Theimer, TC; Block, WM	RT	Basic comparison. Wilcoxon signed ranks test. Mann-Whitney tests. Rayleigh's test. Home Range.	U-M-H	A-C
Winter abundance of and habitat use by Henslow's Sparrows in Louisiana	Carrie, NR; Wagner, RO; Moore, KR; Sparks, JC; Keith, EL; Melder, CA	LT	Habitat models. (Univariate logistic regression). AIC.	None	A

Forest bird diversity in Mediterranean areas affected by wildfires: a multi-scale approach	Herrando, S; Brotons, L	PC	Principal Component Analysis. Backward step-wise multiple regression.	None	A
Fire severity affects mixed broadleaf-conifer forest bird communities: Results for 9 years following fire	Stephens, JL; Ausprey, IJ; Seavy, NE; Alexander, JD	PC	Nonmetric multidimensional scaling. Generalized linear models with Poisson distribution. AIC.	L-M-H	BACI
Normalized burn ratios link fire severity with patterns of avian occurrence	Rose, ET; Simons, TR; Klein, R; McKerrow, AJ	PC	Kendall's tau-b correlation coefficient. species occurrence models. Occupancy models. AIC.	UL-LM-MH-H	A
The role of frugivorous birds and bats in the colonization of cloud forest plant species hi burned areas in western Mexico	Rost, J; Jardel-Peláez, EJ; Bas, JM; Pons, P; Loera, J; Vargas-Jaramillo, S; Santana, E	PC-MN	Generalized Linear Models. Likelihood ratio tests, with chi–square tests in the case of Poisson–distributed models and F–tests in the case of quasipoisson models.	None	A
Nest Site Selection and Reproductive Success of Red-cockaded Woodpeckers in Ocala National Forest	Ramirez, EM; Ober, HK	Clusters	AIC	None	B-A
A comparison of vertebrate assemblages at gopher tortoise burrows and stump holes in the longleaf pine ecosystem	Murphy, CM; Smith, LL; O'Brien, JJ; Castleberry, SB	Camera trails	non-metric multidimensional scaling (Bray-Curtis dissimilarity index). Analysis of Similarities. Similarity Percentages. occupancy modeling. AIC.	None	B-A

Age structure of Black-backed Woodpecker populations in burned forests **	Siegel, RB; Tingley, MW; Wilkerson, RL; Howell, CA; Johnson, M; Pyle, P	RT	Generalized linear mixed models	None	B-A

Survey Method: PC = point-counts; LT = line transect; P = Plot; MN = Mist-Nets; ARU = Autonomous Recording Units; Broadcast of pre-recorded calls= Calls; Radiotelemetry = RT.
Burn/Fire Severity: U = Unburned; L = Low; M = Moderate/Middle/Intermediate; H = High; VH = Very High.
Experimental method: A = After; A-C = After-Control; B = Before; B-C = Before-Control; B-A = Before-After; O = Other; BACI = Before-After-Control-Impact.