

Supplementary material

Appendix 1

Projected change in incidence due to shifts in habitat for 147 bird species within the eastern United States, with information on guild assignment, percent of eastern U.S. currently occupied and model fit, note unclassified* were originally grouped as urban species by Peterjohn and Sauer (1993).

Species	Breeding	Habitat	EastUS%	r ²	Hadhi Incidence (% change)	AVG3hi Incidence (% change)	AVG3lo Incidence (% change)	PCMlo Incidence (% change)
Common loon	Migrant	Wetland	11	0.66	-88.5	-88.9	-67.3	-60.3
Mallard	Partial migrant	Wetland	67.7	0.61	-39.5	-34.6	-28.9	-26.3
Bluewinged teal	Migrant	Wetland	25.6	0.6	16.3	36.2	-4.3	-24.6
Canada goose	Partial migrant	Wetland	51.7	0.35	-54.1	-48.5	-31.4	-21.2
White ibis	Partial migrant	Wetland	12.7	0.6	279.6	218.9	94.8	67.9
American bittern	Migrant	Wetland	21.6	0.49	-43.5	-40.4	-38.5	-46.2
Great blue heron	Partial migrant	Wetland	99.3	0.47	22	20.9	15.1	9.2
Great egret	Partial migrant	Wetland	37.6	0.6	204.9	183.3	106.6	66.4
Snowy egret	Partial migrant	Wetland	17.5	0.43	303.1	254.3	132.1	77.8
Little blue heron	Partial migrant	Wetland	34.8	0.65	190.7	171.6	101	63.8
Cattle egret	Migrant	Wetland	36.8	0.83	157.8	138.5	85.1	57.4
Green heron	Migrant	Wetland	95	0.51	28	25.8	17.7	14.1
Yellowcrowned nightheron	Partial migrant	Wetland	22.7	0.44	306.4	256.5	129.5	87.1
Sora	Migrant	Wetland	14.4	0.62	8.7	37.8	-22.4	-47
American coot	Migrant	Wetland	14.7	0.48	43.2	78.8	-0.7	-29.7
Common snipe	Migrant	Wetland	21.7	0.63	-74.6	-75	-62.7	-60.6
Spotted sandpiper	Migrant	Wetland	30	0.27	-64.3	-58.4	-42	-37.7
Killdeer	Short distance	Unclassified	100	0.54	-0.2	1.5	0.8	0.4
Gray partridge	Resident	Unclassified	12.9	0.73	24.8	55.9	-2.9	-22
Northern bobwhite	Resident	Shrubland	81.9	0.88	35.6	33.3	24.3	18.3
Ruffed grouse	Resident	Forest	20.2	0.4	-55.7	-56.4	-36	-31.2
Ringnecked pheasant	Resident	Grassland	48.6	0.82	-17.3	-12.3	-7.4	-10.7
Rock dove	Resident	Unclassified*	99.6	0.52	-27.3	-20.7	-12.6	-8.1
Mourning dove	Short distance	Unclassified*	100	0.59	1.3	1.4	1.6	1.6
Common grounddove	Resident	Shrubland	16.7	0.79	278	225.2	111.3	70.6
Turkey vulture	Short distance	Unclassified	83.6	0.61	43.5	39.4	24.3	19.1
Black vulture	Resident	Unclassified	44.6	0.61	96.1	72.6	38.7	24.2
Mississippi kite	Neotropical	Unclassified	23	0.59	364.9	299.5	127.3	62.3
Northern harrier	Short distance	Grassland	28.3	0.47	-27.3	-16.3	-39.5	-44.1
Redtailed hawk	Short distance	Unclassified	98.4	0.48	11.2	12.3	7.7	4.7

Redshouldered hawk	Short distance	Forest	56	0.61	76.7	59.9	35.5	27.5
Broadwinged hawk	Neotropical	Forest	52.8	0.46	19.5	-3.5	2	1.2
American kestrel	Short distance	Unclassified	78.4	0.54	-24.8	-18.8	-14.9	-9.6
Great horned owl	Resident	Unclassified	88.6	0.35	40.3	37.8	23.1	19.8
Yellowbilled cuckoo	Neotropical	Forest	96	0.83	21.8	20.7	15.8	12.6
Blackbilled cuckoo	Neotropical	Forest	56.7	0.65	-69.8	-58.8	-35.4	-23.4
Downy woodpecker	Resident	Forest	98	0.43	-14.1	-11.4	-5.2	-2
Yellowbellied sapsucker	Short distance	Forest	19.5	0.76	-77.9	-77.2	-58.2	-47.6
Pileated woodpecker	Resident	Forest	73.6	0.66	5.9	2.5	3.6	5.6
Redheaded woodpecker	Short distance	Unclassified	87.1	0.76	9.3	10.9	9.3	6.6
Redbellied woodpecker	Resident	Forest	84.2	0.83	17	14.3	14.3	12.6
Chuckwills widow	Neotropical	Forest	50.6	0.67	78.9	69.8	43.9	31.7
Whippoorwill	Neotropical	Forest	49.8	0.42	30.6	36	17.4	10.5
Common nighthawk	Neotropical	Unclassified	68.3	0.65	109.9	101.6	57.3	32.3
Chimney swift	Neotropical	Unclassified*	99.5	0.51	-13.4	-11.2	-3.5	0.9
Rubythroated hummingbird	Neotropical	Forest	77.2	0.43	28.7	27.4	17	16.1
Scissortailed flycatcher	Neotropical	Unclassified	25.3	0.5	295.7	286.9	162.5	100.7
Eastern kingbird	Neotropical	Unclassified	95.1	0.59	-19.5	-17.8	-7.4	-4.7
Eastern phoebe	Short distance	Unclassified	83.6	0.53	8.6	15.3	13.7	11.1
Eastern woodpewee	Neotropical	Forest	87.4	0.51	-12	-10.6	-2.4	0.2
Acadian flycatcher	Neotropical	Forest	52.8	0.49	45.5	38.8	25.3	18.5
Willow flycatcher	Neotropical	Shrubland	36.8	0.41	-62	-49.3	-23.5	-11.5
Least flycatcher	Neotropical	Forest	28.1	0.67	-65.9	-59.9	-45.9	-37.3
Horned lark	Short distance	Grassland	55.6	0.73	13.3	21.1	11.3	2.8
Blue jay	Short distance	Unclassified*	96.3	0.57	-24.6	-22.8	-11.7	-8.1
American crow	Short distance	Unclassified	97.5	0.54	-24.7	-22.6	-11.2	-7.6
Fish crow	Short distance	Unclassified	28.6	0.59	50.3	31.4	20.8	11.8
European starling	Short distance	Unclassified*	100	0.38	-18.9	-16.1	-8	-4.3
Bobolink	Neotropical	Grassland	44.5	0.83	-79.8	-73.5	-48	-32.8
Brownheaded cowbird	Short distance	Unclassified	99.6	0.5	-5.6	-4	-1.4	-0.8
Yellowheaded blackbird	Neotropical	wetland	19.1	0.72	40.6	69.4	4.4	-24
Eastern meadowlark	Short distance	Grassland	95.5	0.63	0.5	-2.2	3.9	5.6
Orchard oriole	Neotropical	Unclassified	85.1	0.78	-13.8	-10.9	-3.8	-1.9
Baltimore oriole	Neotropical	Unclassified	78.4	0.84	-26.7	-18.9	-10.6	-8.1
Brewers blackbird	Short distance	Unclassified	16.5	0.67	-26	-9.1	-37.9	-50.1
Evening grosbeak	Short distance	Forest	8.3	0.69	-93.9	-94.1	-83.4	-73.3
Purple finch	Short distance	Shrubland	20.2	0.83	-78.8	-76.4	-58.1	-42.7
House finch	Short distance	Unclassified*	42.8	0.81	-29.3	-19.9	-19.2	-10.1
American goldfinch	Short distance	Shrubland	81.7	0.89	-55.4	-48.1	-26.6	-15.3
Vesper sparrow	Short distance	Grassland	48.4	0.73	-80.2	-73.8	-48.9	-35.2
Savannah sparrow	Short distance	Grassland	42.1	0.78	-90.6	-85.8	-59.1	-41.8
Grasshopper sparrow	Neotropical	Grassland	81.9	0.58	-7.7	-2.3	-3.8	-4.1
Whitethroated sparrow	Short distance	Shrubland	16	0.88	-73.9	-72.2	-57.4	-46
Chipping sparrow	Neotropical	Unclassified*	89.4	0.8	-36.6	-33.4	-19.7	-11.7
Claycolored sparrow	Neotropical	Shrubland	15.5	0.8	-50.5	-35.7	-50.1	-60.1
Field sparrow	Short distance	Shrubland	93.8	0.69	-9.9	-7.3	-1	3
Dark eyed junco	Short distance	Forest	16.1	0.67	-78.8	-76.8	-59.4	-48.5
Bachmans sparrow	Short distance	Forest	21.7	0.51	193.8	148.3	80.3	55.1
Song sparrow	Short distance	Shrubland	67.5	0.92	-76.4	-70	-45.8	-27.4

Lincolns sparrow	Neotropical	Grassland	6.9	0.44	-100	-100	-92.7	-84
Swamp sparrow	Short distance	wetland	34.5	0.61	-55.4	-44.6	-35.7	-29.7
Eastern towhee	Short distance	Shrubland	82.9	0.77	-22.6	-21.2	-11.1	-3.5
Northern cardinal	Resident	Shrubland	93	0.86	4.4	3	6.3	7.2
Rosebreasted grosbeak	Neotropical	Forest	50.4	0.88	-52.5	-41.9	-22	-12.7
Blue grosbeak	Neotropical	Shrubland	70.1	0.82	35.7	34.6	24	17.2
Indigo bunting	Neotropical	Shrubland	95.5	0.79	-21.4	-17.8	-8	-2.6
Painted bunting	Neotropical	Shrubland	31.5	0.84	236.5	210.3	118.8	77.2
Dickcissel	Neotropical	Grassland	71.3	0.84	35.2	35.7	27.1	17.5
Summer tanager	Neotropical	Forest	59.3	0.84	42.7	35.9	25.2	21.4
Purple martin	Neotropical	Unclassified*	97.1	0.58	18.6	15.6	11.7	9.2
Cliff swallow	Neotropical	Unclassified	64.7	0.61	22.5	20.3	4.9	-3.9
Barn swallow	Neotropical	Unclassified	99.4	0.67	-12.6	-9.6	-3.2	-1.7
Tree swallow	Short distance	Unclassified	45.2	0.88	-74.6	-66.7	-48.7	-36.1
Bank swallow	Neotropical	Unclassified	46.2	0.46	-60.4	-51.7	-33.3	-25.7
Cedar waxwing	Short distance	Unclassified	56.3	0.82	-81	-72.8	-48.2	-31.5
Loggerhead shrike	Short distance	Unclassified	67.7	0.78	74.2	69.8	45.7	28.6
Redeyed vireo	Neotropical	Forest	90.7	0.76	-18.1	-17	-10.5	-5.3
Warbling vireo	Neotropical	Forest	67.9	0.7	-28.3	-21.1	-13.8	-9.7
Yellowthroated vireo	Neotropical	Forest	79.3	0.45	-8.1	-9.5	-3.9	1.6
Blueheaded vireo	Neotropical	Forest	20.6	0.69	-62.8	-61.8	-50.3	-40.6
Whiteeyed vireo	Neotropical	Shrubland	60.7	0.85	25.7	18.6	12.9	12.9
Blackandwhite warbler	Neotropical	Forest	53.8	0.74	10.7	6.5	6.9	8.5
Prothonotary warbler	Neotropical	Shrubland	39.6	0.61	44.1	32	20.4	20.3
Wormeating warbler	Neotropical	Forest	34	0.32	37.3	23.7	16.2	15.9
Bluewinged warbler	Neotropical	Shrubland	34	0.56	-22.2	-22.4	-18.6	-7.5
Goldenwinged warbler	Neotropical	Shrubland	18	0.55	-45.6	-46.9	-35.7	-28.3
Nashville warbler	Neotropical	Shrubland	15.2	0.83	-80.4	-79.3	-62.9	-50.6
Northern parula	Neotropical	Forest	63.6	0.58	20.9	18.1	11.2	10
Yellow warbler	Neotropical	Shrubland	66.8	0.8	-74.9	-68.4	-43	-26.3
Blackthroated blue warbler	Neotropical	Forest	13.2	0.69	-53.9	-54.1	-40	-29.9
Yellowrumped warbler	Short distance	Forest	15.3	0.82	-81	-79	-62.6	-50.4
Magnolia warbler	Neotropical	Forest	15.6	0.7	-81.1	-80.2	-66.5	-54.8
Cerulean warbler	Neotropical	Forest	18.4	0.45	22.7	18.3	-10.7	-3.5
Blackburnian warbler	Neotropical	Forest	17.3	0.66	-76.2	-75.4	-62.8	-50.9
Yellowthroated warbler	Neotropical	Forest	43.6	0.45	55.9	38.2	21.5	23.7
Blackthroated green warbler	Neotropical	Forest	20.1	0.73	-68.4	-68	-52.2	-39.5
Pine warbler	Short distance	Forest	55.9	0.74	6.8	-1.2	1.7	3
Prairie warbler	Neotropical	Shrubland	52	0.65	-16.2	-19.4	-9.2	-1.6
Ovenbird	Neotropical	Forest	53.2	0.83	-45.1	-43.3	-31.2	-21.9
Northern waterthrush	Neotropical	Forest	15.5	0.57	-79.1	-78.4	-65.7	-55.7
Kentucky warbler	Neotropical	Forest	49	0.67	42.7	36.7	26.2	24.5
Mourning warbler	Neotropical	Shrubland	18.1	0.73	-81.9	-81.9	-67	-54.1
Common yellowthroat	Neotropical	Shrubland	92.8	0.78	-36.8	-34.6	-17.6	-9.9
Yellowbreasted chat	Neotropical	Shrubland	61.5	0.89	12.7	10.7	10	11.5
Hooded carbler	Neotropical	Forest	42.7	0.58	-1	-10.2	-0.9	6.6
Canada carbler	Neotropical	Forest	16.2	0.66	-77.9	-78	-63.8	-50.8
American redstart	Neotropical	Forest	55.2	0.73	-42.5	-41.9	-30.7	-20.5
House sparrow	Resident	Unclassified*	100	0.39	-5	-2.9	-0.2	0.1

Northern mockingbird	Resident	Unclassified*	81.2	0.86	33.1	29.4	20.3	16.3
Gray catbird	Neotropical	Shrubland	89.4	0.79	-51.5	-45.6	-26	-14.6
Brown thrasher	Short distance	Shrubland	95.6	0.66	-32.8	-29.4	-17.4	-11.7
Carolina wren	Resident	Shrubland	65.6	0.92	12.3	6.7	5.1	6.7
House wren	Neotropical	Shrubland	66.8	0.89	-63.7	-53	-28.1	-18.3
Winter wren	Short distance	Forest	14	0.83	-81	-81.2	-66.3	-51.3
Sedge wren	Short distance	Grassland	23.7	0.73	-31.9	-15.4	-30.7	-37.8
Brown creeper	Short distance	Forest	14.2	0.57	-59.6	-57.9	-45.3	-36.3
Whitebreasted nuthatch	Resident	Forest	83.5	0.64	-10.8	-2.9	3	4.2
Redbreasted nuthatch	Short distance	Forest	16.5	0.82	-79.9	-78.1	-59.6	-47.5
Brownheaded nuthatch	Resident	Forest	26.6	0.77	29.2	10.5	7.4	7.2
Tufted titmouse	Resident	Forest	78.2	0.87	7.6	7.4	8	8.9
Blackcapped chickadee	Resident	Forest	52.5	0.87	-44.4	-33.1	-14.6	-7.8
Bluegray gnatcatcher	Neotropical	Forest	74.9	0.69	20.6	18.9	15.7	14.6
Wood thrush	Neotropical	Forest	77.2	0.81	-23.9	-23.6	-13.8	-5.7
Veery	Neotropical	Forest	28.3	0.88	-77.3	-74.1	-53.3	-38.2
Swainsons thrush	Neotropical	Forest	8.7	0.66	-97.7	-97.6	-89.2	-79.2
Hermit thrush	Short distance	Forest	17.6	0.83	-85.6	-84.1	-67.9	-52.4
American robin	Short distance	Unclassified*	93.3	0.89	-33.3	-27.3	-13.8	-8