Supplemental Material for:

Evidence of widespread movements from breeding to molting grounds by North American landbirds

Peter Pyle*, James F. Saracco, and David F. DeSante

*Corresponding author: Peter Pyle, ppyle@birdpop.org

This PDF file includes:

Supplemental Material Appendices A to C: statistical analysis details including model code
Supplemental Material Figures S1 to S2
Supplemental Material Table S1
Caption for database S1
Literature Cited for Supplemental Material

Other Supplemental Materials for this manuscript includes the following:

Database S1:
MAPS-Molt_Dataset.csv
Metadata for MAPS-Molt analysis.doc
As zipped archive located at:
http://www.birdpop.org/docs/misc/MAPSMolt_analysis.zip

Appendix A

Statistical analysis details on probability that breeding birds were also captured molting. Models were implemented using Bayesian methods in JAGS (Plummer 2003) from the R statistical software (R Core Team 2015) using the R package "jagsUI" (Kellner 2015). We provide model code below. We assigned vague normal priors of Norm (0, 1000) to mean parameters and hyperparameters and U (0, 10) to standard deviations. We obtained posterior distributions by sampling full conditional distributions using Markov chain Monte Carlo (MCMC) methods (Gilks et al. 1996). Posteriors were based on 20,000 iterations of three chains after discarding the first 10,000 iterations and thinning by three. We assessed models with a χ^2 goodness-of-fit test and Bayesian p-values that compared deviations of the data from model predictions to randomly generated data sets derived from the estimated model parameter values. These tests suggested adequate fit for both regions (Bayesian p = 0.569 for the West and p = 0.668 for the East).

Model code for hierarchical generalized linear mixed model to assess probability of a bird caught in breeding condition being recaptured on a different occasion in molting condition, using JAGS (Plummer 2003):

```
model{

# priors and constraints

for (i in 1:nspec){
a0[i] ~ dnorm(mu.spec, tau.spec) # random species intercepts
a1[i] ~ dnorm(mu.doy, tau.doy)
}

mu.spec ~ dnorm(0, 0.01)
tau.spec <- 1/(sigma.spec*sigma.spec)
sigma.spec ~ dunif(0,10)
mu.doy ~ dnorm(0,0.01)
tau.doy <- 1/(sigma.doy*sigma.doy)
sigma.doy ~ dunif(0,10)
b ~ dnorm(0, 0.01)
g ~ dnorm(0, 0.01)

# likelihood
for (i in 1:nind){
m[i] ~ dbern(pmolt[i])
logit(pmolt[i]) <- a0[spec[i]] + a1[spec[i]]*doy[i]
+ b*lat[i] + g*Ncaps[i]

# calculate goodness-of-fit statistic using data
predicted[i] <- pmolt[i]
res.m[i] <- pow(pow(m[i],0.5)-pow(predicted[i],0.5),2)
# calculate goodness-of-fit statistic using new predicted data
m.rep[i] ~ dbern(pmolt[i])
res.m.rep[i] <- pow(pow(m.rep[i], 0.5)-pow(predicted[i],0.5),2)
}

fit <- sum(res.m[])          # test statistic for data
fit.rep <- sum(res.m.rep[])  # test statistic for new predicted data
test <- step(fit.rep - fit)  # Test whether new data set more extreme
bpvalue <- mean(test)    # Bayesian p-value
}
```

Appendix B

Statistical analysis details on probability that molting birds were also captured breeding. As in the breeding probability analysis above (Supplemental Material Appendix A), we implemented Bayesian methods in JAGS (Plummer 2003) from the R statistical software (R Core Team 2015) using the R package "jagsUI" (Kellner 2015) and similarly assigned vague normal priors, we obtained posterior distributions using Markov chain Monte Carlo (MCMC) methods (Gilks et al. 1996) based on 20,000 iterations of three chains after discarding the first 10,000 iterations and thinning by three, and we assessed models with a χ2 goodness-of-fit test and Bayesian p-values that compared deviations of the data from model predictions to randomly generated data sets derived from the estimated model parameter values. We provide model code below. These tests suggested adequate fit for both regions (Bayesian $p = 0.493$ for the West and $p = 0.480$ for the East).

   Model code for hierarchical generalized linear mixed model to assess probability of a bird caught in molting condition being captured on a different occasion in breeding condition, using JAGS (*35*).

```
model{

# priors and constraints

for (i in 1:nspec){
b0[i] ~ dnorm(mu.spec, tau.spec) # random species intercepts
}

mu.spec ~ dnorm(0, 0.01)
tau.spec <- 1/(sigma.spec*sigma.spec)
sigma.spec ~ dunif(0,10)

# likelihood
for (i in 1:nind){
br[i] ~ dbern(pbreed[i])
logit(pbreed[i]) <- b0[spec[i]]

# calculate goodness-of-fit statistic using data
predicted[i] <- pbreed[i]
res.br[i] <- pow(pow(br[i],0.5)-pow(predicted[i],0.5),2)
# calculate goodness-of-fit statistic using new predicted data
br.rep[i] ~ dbern(pbreed[i])
res.br.rep[i] <- pow(pow(br.rep[i], 0.5)-pow(predicted[i],0.5),2)
}

fit <- sum(res.br[])          # test statistic for data
fit.rep <- sum(res.br.rep[])   # test statistic for new predicted data
test <- step(fit.rep - fit)   # Test whether new data set more extreme
```

```
bpvalue <- mean(test)     # Bayesian p-value
}
```

Appendix C

Statistical analysis details on spatial movement patterns between breeding and molting sites. We assigned vague normal priors of U (0,1) to p_0 and Gamma (0.1, 0.1) to the spatial precision parameter $1/\sigma^2$. For the maximum day-of-year covariate in the molt probability model, we used a prior of Norm (0, 1000). We obtained posterior distributions by sampling full conditional distributions using Markov chain Monte Carlo (MCMC) methods (Gilks et al. 1996), as implemented in WinBUGS (Lun et al. 2000). Posteriors were based on 20,000 iterations of three chains after discarding the first 10,000 iterations and thinning by five. Models were run using the "R2WinBUGS" package (Sturtz et al. 2005) in program R (R Core Team 2015). We provide model code below.

Spatial model code for modeling probability of a captured bird breeding (all months) or molting (July, August) using WinBUGS (*40, 41*).

```
model {

p0 ~ dunif(0,1) # probability of molting or breeding
lp0 <- log(p0/(1-p0))
# b ~ dnorm(0, 0.01) # for molt model

for(j in 1:sumNumNeigh) { weights[j] <- 1} # CAR model
tau ~ dgamma(.1,.1)
sd <- 1/pow(tau, 0.5)
u[1:ngrid] ~ car.normal(adj[], weights[], num[], tau)

for(i in 1:nind){
logit(p[i]) <- lp0  + u[gridid[i]] # + b*doy[i] # for molt
model
y[i] ~ dbern(p[i])
}
}
```

Figure S1

A Black Phoebe
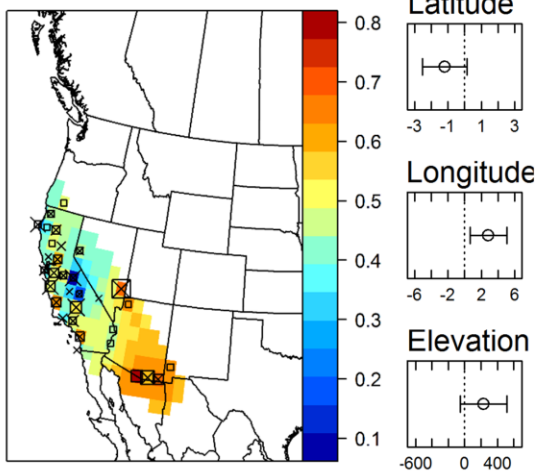
Latitude

Longitude

Elevation

B Ash-throated Flycatcher

Latitude

Longitude

Elevation

C Warbling Vireo

Latitude

Longitude

Elevation

D Steller's Jay

Latitude

Longitude

Elevation

E Mountain Chickadee
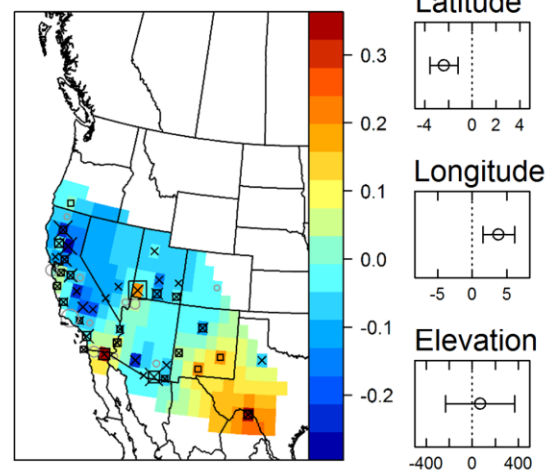
Latitude
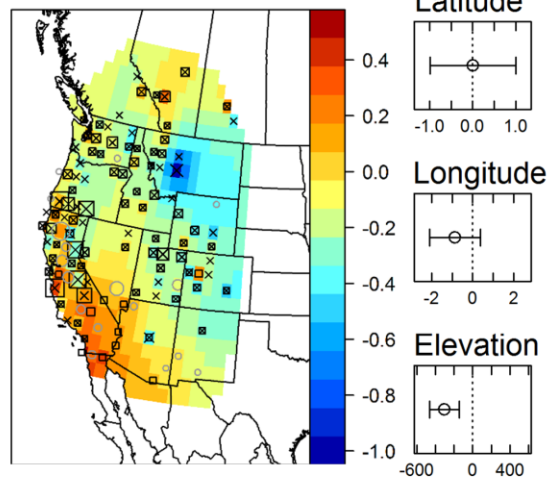
Longitude

Elevation
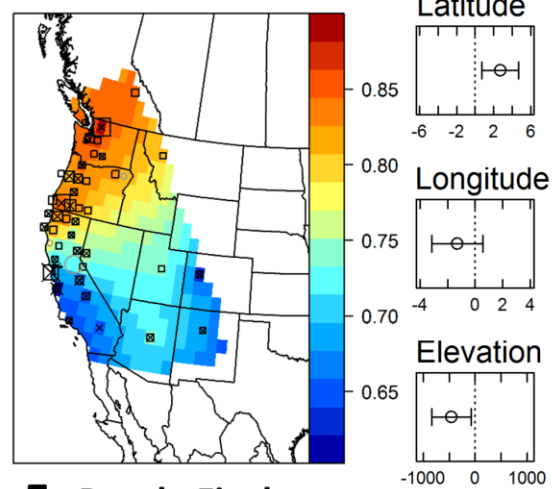
F Purple Finch
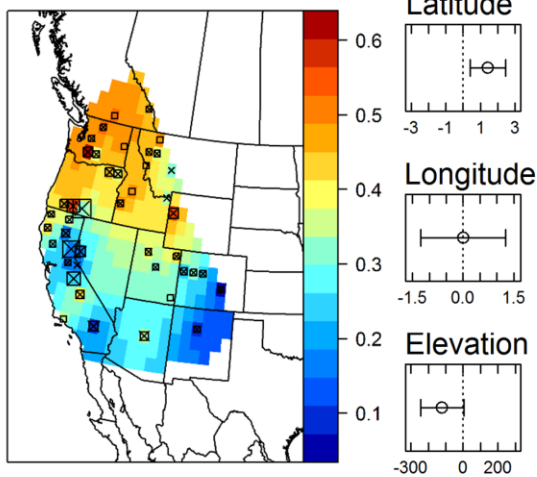
Latitude

Longitude

Elevation

Figure S1 (cont.)

FIGURE S1. Spatial (latitude and longitude) and elevational variation in breeding vs. molting landbirds for 12 western North American species showing probabilities indicating molt migration (Figures 4, 6, and 7) and evidence for such shifts. See caption to Figure 8 for details.
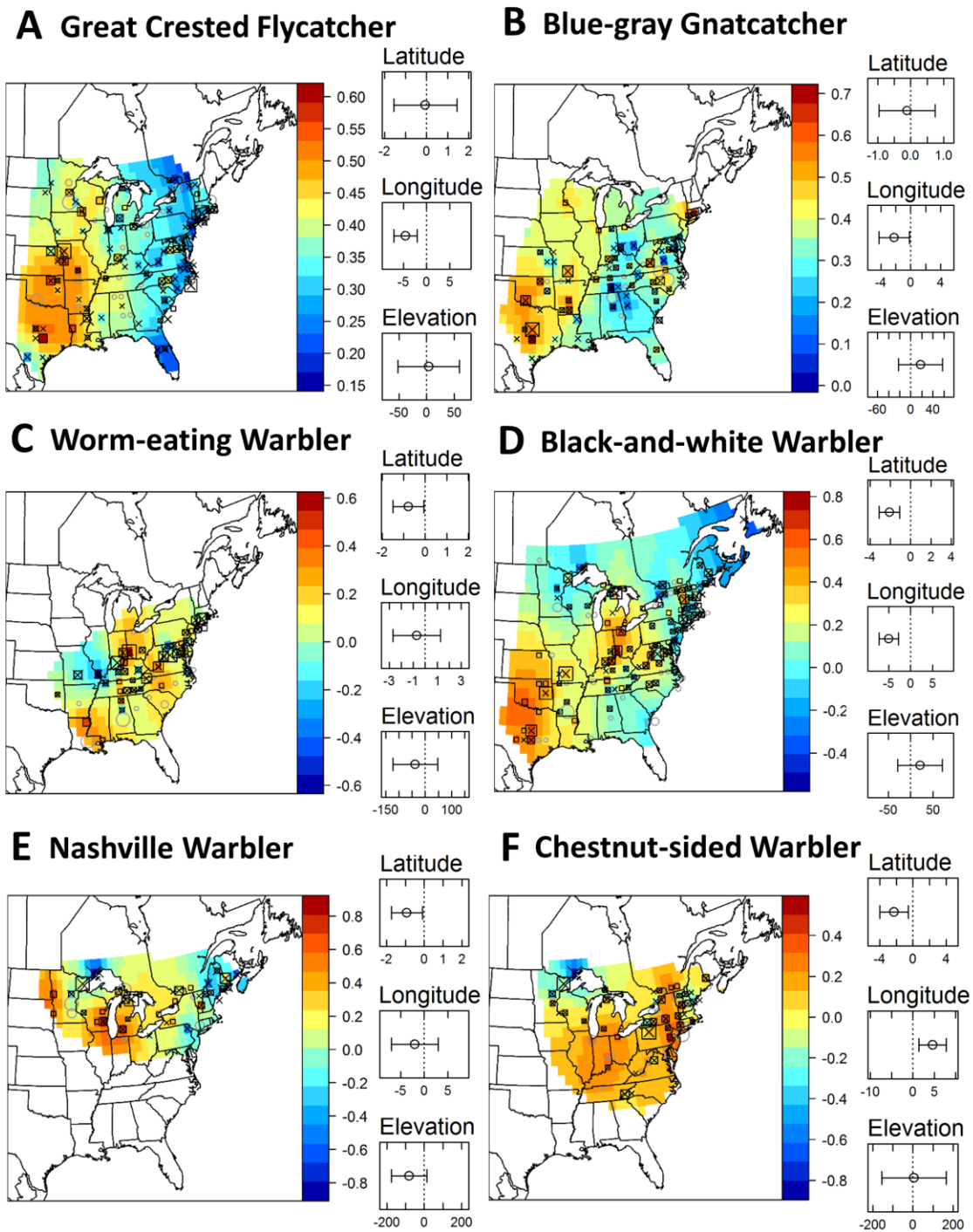
FIGURE S2. Spatial (latitude and longitude) and elevational variation in breeding vs. molting landbirds for six eastern North American species showing probabilities indicating molt migration (Figures 4, 6, and 7) and evidence for such shifts. See caption to Figure 8 for details.

Caption to Data Table

Data used for this analysis are included in the file MAPS-Molt_Dataset.csv. Records for 532,230 individuals are included and marked if they were considered breeding at the station overall (BREED) or according to our restricted criteria requiring a recapture ≥ 10 days from the original capture (BREEDR), if they were considered molting at the station (MOLT), and the number of times the individual was captured (NCAPS). Data from this file is summarized in Table S1. The data file can be downloaded from http://www.birdpop.org/docs/misc/MAPSMolt_analysis.zip.

Literature Cited for Supplemental Material

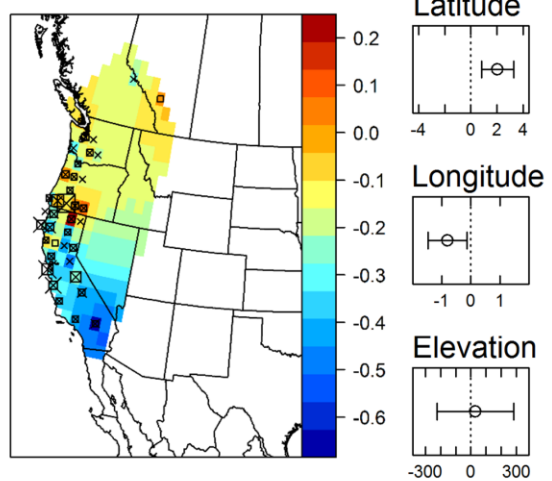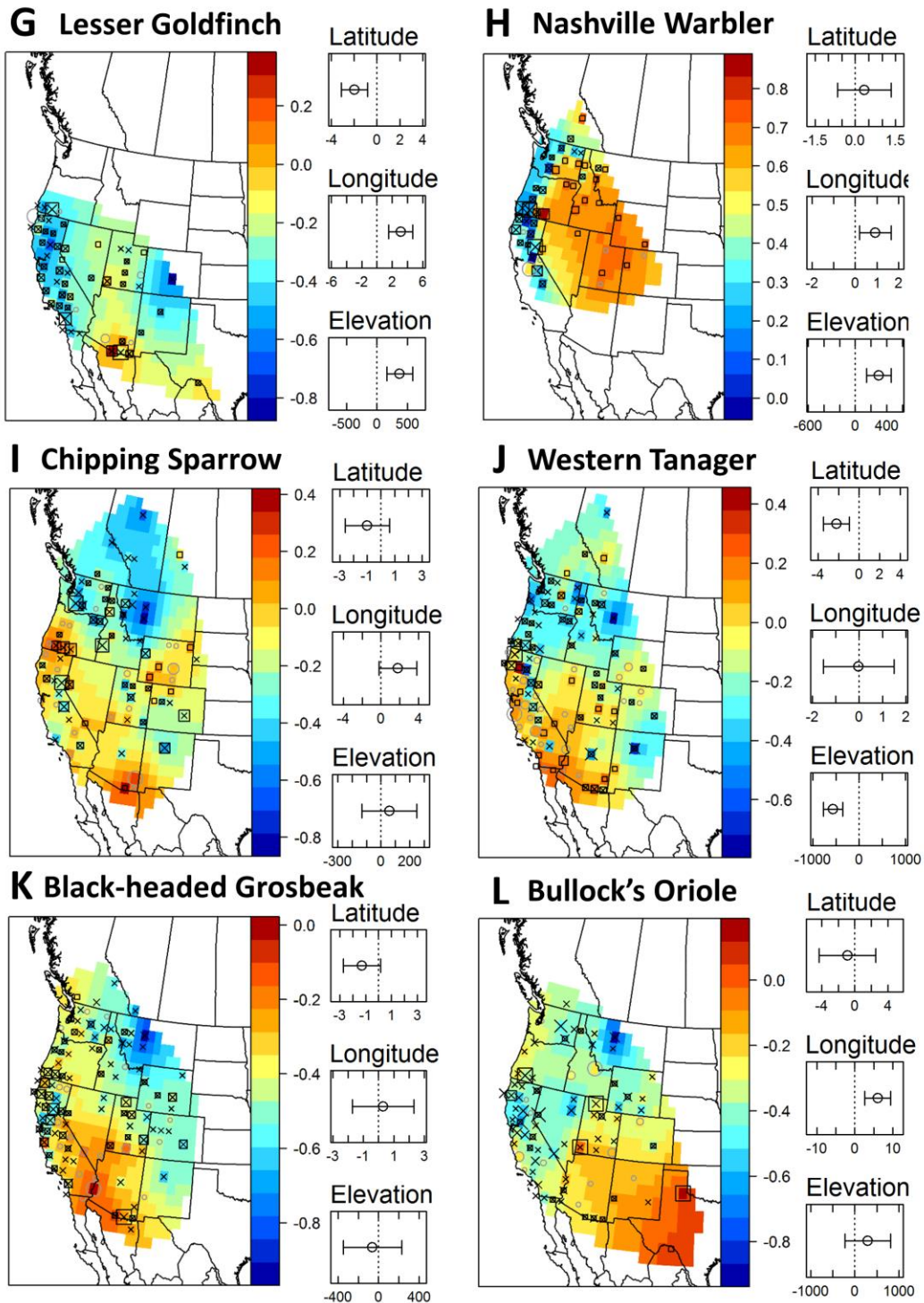Besag, J., J. York, and A. Mollie (1991). Bayesian image restoration, with two applications in spatial statistics. Annals of the Institute of Statistical Mathematics 43:1–59.

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R Core Team (2015). R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. http://www.R-project.org/

Sturtz, S., U. Ligges, and A. Gelman (2005). R2WinBUGS: A package for running WinBUGS from R. Journal of Statistical Software 12:1–16.

Table S1

Summary of data set used in analyses and available in Database S1.. Common and scientific names and four-letter alpha codes (Pyle and DeSante 2017) for 140 species included in analyses, 91 species in western North America (**A**) and 80 species in eastern North America (**B**). We summarize number of individual adult landbirds captured overall, individuals captured in breeding condition (Breed), individuals captured in breeding condition and at least twice > 10 days apart (BreedR), individuals in molting condition (Molt), and the number of stations at which individuals overall and in each of these conditions were captured. Probabilities that breeding birds molted were estimated from the samples indicated under BreedR and Molt, probabilities that molting birds also bred at a station were estimated using the samples indicated under Molt and Breed, and the spatial analyses indicating molt movements used all individuals and stations.

COMMON NAME	SCIENTIFIC NAME	CODE	STATUS	IND. ADULT BIRDS CAPTURED				MAPS STATIONS			
				Total	Breed	BreedR	Molt	Total	Breed	BreedR	Molt
A. Western North America											
Red-naped Sapsucker	*Sphyrapicus nuchalis*	RNSA	Breed	1141	478	195	341	95	75	52	71
Red-breasted Sapsucker	*Sphyrapicus ruber*	RBSA	Breed	1483	591	241	452	103	81	54	75
Nuttall's Woodpecker	*Picoides nuttallii*	NUWO	Resident	634	314	112	240	68	54	35	58
Downy Woodpecker	*Picoides pubescens*	DOWO	Resident	1633	687	166	479	243	181	77	156
Hairy Woodpecker	*Picoides villosus*	HAWO	Resident	792	246	67	318	187	123	51	136
Northern Flicker	*Colaptes auratus*	NOFL	Breed	868	247	37	305	211	125	27	124
Western Wood-Pewee	*Contopus sordidulus*	WEWP	Nonbreed	3542	729	270	94	246	137	85	56
Willow Flycatcher	*Empidonax traillii*	WIFL	Nonbreed	4100	546	202	74	251	107	42	39
Least Flycatcher	*Empidonax minimus*	LEFL	Nonbreed	1841	529	183	55	52	25	19	18
Hammond's Flycatcher	*Empidonax hammondii*	HAFL	Breed	2462	495	166	451	198	86	54	92
Dusky Flycatcher	*Empidonax oberholseri*	DUFL	Nonbreed	5058	904	322	313	205	102	49	77
Pacific-slope Flycatcher	*Empidonax difficilis*	PSFL	Nonbreed	4688	604	164	60	220	103	54	37
Cordilleran Flycatcher	*Empidonax occidentalis*	COFL	Nonbreed	582	106	20	11	68	31	13	8
Black Phoebe	*Sayornis nigricans*	BLPH	Breed	664	112	24	166	96	50	15	52
Ash-throated Flycatcher	*Myiarchus cinerascens*	ATFL	Nonbreed	2105	318	61	73	131	76	34	36
Bell's Vireo	*Vireo bellii*	BEVI	Breed	561	220	75	135	24	20	14	15
Hutton's Vireo	*Vireo huttoni*	HUVI	Breed	435	146	36	98	87	55	19	43
Cassin's Vireo	*Vireo cassinii*	CAVI	Breed	1311	272	33	585	156	68	16	92
Warbling Vireo	*Vireo gilvus*	WAVI	Nonbreed	10560	2891	992	494	353	236	136	136
Red-eyed Vireo	*Vireo olivaceus*	REVI	Nonbreed	484	195	59	32	50	30	13	11
Steller's Jay	*Cyanocitta stelleri*	STJA	Breed	678	99	20	283	145	52	7	100
Tree Swallow	*Tachycineta bicolor*	TRES	Nonbreed	1052	679	121	10	89	75	18	2
Violet-green Swallow	*Tachycineta thalassina*	VGSW	Nonbreed	388	203	31	12	41	29	8	8
Black-capped Chickadee	*Poecile atricapillus*	BCCH	Resident	2481	797	233	1102	137	119	79	122

COMMON NAME	SCIENTIFIC NAME	CODE	STATUS	IND. ADULT BIRDS CAPTURED				MAPS STATIONS			
				Total	Breed	BreedR	Molt	Total	Breed	BreedR	Molt
Mountain Chickadee	*Poecile gambeli*	MOCH	Breed	2202	944	216	472	117	98	52	88
Chestnut-backed Chickadee	*Poecile rufescens*	CBCH	Resident	2264	863	164	517	109	97	53	80
Oak Titmouse	*Baeolophus inornatus*	OATI	Resident	541	186	54	268	53	43	24	38
Bushtit	*Psaltriparus minimus*	BUSH	Resident	3984	722	147	1673	186	130	65	138
Brown Creeper	*Certhia americana*	BRCR	Breed	1325	644	119	147	148	116	55	64
House Wren	*Troglodytes aedon*	HOWR	Breed	5181	2574	825	448	216	167	97	108
Pacific Wren	*Troglodytes pacificus*	PAWR	Breed	1510	874	321	63	86	70	40	26
Bewick's Wren	*Thryomanes bewickii*	BEWR	Resident	3910	1474	607	792	185	160	125	133
Golden-crowned Kinglet	*Regulus satrapa*	GCKI	Breed	1576	831	159	183	109	102	42	53
Ruby-crowned Kinglet	*Regulus calendula*	RCKI	Breed	1292	510	100	120	102	46	19	28
Wrentit	*Chamaea fasciata*	WREN	Resident	3727	2173	957	1161	105	100	82	74
Western Bluebird	*Sialia mexicana*	WEBL	Resident	253	167	40	67	37	32	17	19
Veery	*Catharus fuscescens*	VEER	Breed	529	353	155	74	33	25	18	14
Swainson's Thrush	*Catharus ustulatus*	SWTH	Breed	20133	9318	4473	953	336	248	142	153
Hermit Thrush	*Catharus guttatus*	HETH	Breed	2031	1154	308	161	188	118	55	61
American Robin	*Turdus migratorius*	AMRO	Breed	10329	7608	1447	1227	330	323	213	212
Varied Thrush	*Ixoreus naevius*	VATH	Breed	414	238	48	9	46	40	17	8
Gray Catbird	*Dumetella carolinensis*	GRCA	Breed	3183	1650	561	278	74	48	33	35
California Thrasher	*Toxostoma redivivum*	CATH	Resident	250	103	33	114	37	34	18	27
Cedar Waxwing	*Bombycilla cedrorum*	CEDW	Nonbreed	4008	1185	146	54	130	90	30	16
House Finch	*Haemorhous mexicanus*	HOFI	Breed	3243	1496	71	679	155	126	31	91
Purple Finch	*Haemorhous purpureus*	PUFI	Breed	6042	3219	541	396	136	119	45	65
Cassin's Finch	*Haemorhous cassinii*	CAFI	Breed	1252	710	44	142	90	71	20	33
Pine Siskin	*Spinus pinus*	PISI	Nonbreed	4508	2429	118	191	155	135	31	62
Lesser Goldfinch	*Spinus psaltria*	LEGO	Nonbreed	3143	1787	103	263	150	131	44	67
American Goldfinch	*Spinus tristis*	AMGO	Breed	5314	2577	495	239	148	126	55	61
Ovenbird	*Seiurus aurocapilla*	OVEN	Nonbreed	323	142	23	48	44	17	5	12
Northern Waterthrush	*Parkesia noveboracensis*	NOWA	Breed	459	197	48	91	59	21	9	12
Orange-crowned Warbler	*Oreothlypis celata*	OCWA	Nonbreed	8304	3100	483	1920	297	210	78	158
Lucy's Warbler	*Oreothlypis luciae*	LUWA	Nonbreed	1161	578	93	259	26	23	13	19
Nashville Warbler	*Oreothlypis ruficapilla*	NAWA	Breed	2424	1211	105	499	173	107	24	90
Virginia's Warbler	*Oreothlypis virginiae*	VIWA	Breed	934	488	83	235	44	33	8	22
MacGillivray's Warbler	*Geothlypis tolmiei*	MGWA	Breed	12459	7454	2916	1476	320	201	128	140
Common Yellowthroat	*Geothlypis trichas*	COYE	Breed	8202	4946	1668	904	216	170	99	94
American Redstart	*Setophaga ruticilla*	AMRE	Breed	1372	719	218	268	74	36	19	29
Yellow Warbler	*Setophaga petechia*	YEWA	Breed	15723	7005	2687	2001	302	208	140	151

COMMON NAME	SCIENTIFIC NAME	CODE	STATUS	IND. ADULT BIRDS CAPTURED				MAPS STATIONS			
				Total	**Breed**	**BreedR**	**Molt**	**Total**	**Breed**	**BreedR**	**Molt**
Yellow-rumped Warbler	*Setophaga coronata*	YRWA	Breed	6666	3948	557	842	214	151	84	103
Black-throated Gray Warbler	*Setophaga nigrescens*	BTYW	Breed	427	201	30	68	91	51	15	31
Townsend's Warbler	*Setophaga townsendi*	TOWA	Breed	1815	812	153	272	127	43	18	35
Hermit Warbler	*Setophaga occidentalis*	HEWA	Breed	2079	1041	78	426	90	56	18	50
Wilson's Warbler	*Cardellina pusilla*	WIWA	Breed	19684	5638	1850	1499	347	197	94	143
Yellow-breasted Chat	*Icteria virens*	YBCH	Breed	4439	2254	1033	455	142	102	73	63
Green-tailed Towhee	*Pipilo chlorurus*	GTTO	Breed	716	467	108	100	90	48	16	20
Spotted Towhee	*Pipilo maculatus*	SPTO	Breed	6022	4632	1281	828	227	219	166	149
Rufous-crowned Sparrow	*Aimophila ruficeps*	RCSP	Breed	326	204	52	36	32	30	17	14
Canyon Towhee	*Melozone fusca*	CANT	Resident	150	94	26	17	12	11	8	6
California Towhee	*Melozone crissalis*	CALT	Resident	1276	764	203	398	83	78	48	50
Abert's Towhee	*Melozone aberti*	ABTO	Resident	372	198	49	41	16	16	12	13
Chipping Sparrow	*Spizella passerina*	CHSP	Nonbreed	2582	1447	211	156	179	127	43	66
Clay-colored Sparrow	*Spizella pallida*	CCSP	Breed	443	297	31	37	19	14	7	5
Savannah Sparrow	*Passerculus sandwichensis*	SAVS	Breed	618	384	87	61	39	25	9	20
Fox Sparrow	*Passerella iliaca*	FOSP	Breed	1192	902	263	96	88	67	35	25
Song Sparrow	*Melospiza melodia*	SOSP	Breed	18595	14188	5646	2099	316	309	254	204
Lincoln's Sparrow	*Melospiza lincolnii*	LISP	Breed	4423	3247	1522	560	148	97	69	69
White-throated Sparrow	*Zonotrichia albicollis*	WTSP	Breed	414	289	89	16	22	11	7	6
White-crowned Sparrow	*Zonotrichia leucophrys*	WCSP	Breed	1661	1087	376	286	129	59	32	36
Dark-eyed Junco	*Junco hyemalis*	DEJU	Breed	10255	7429	2626	1421	193	176	138	135
Summer Tanager	*Piranga rubra*	SUTA	Breed	535	252	120	135	27	19	18	18
Western Tanager	*Piranga ludoviciana*	WETA	Nonbreed	5283	1792	162	260	317	201	57	98
Northern Cardinal	*Cardinalis cardinalis*	NOCA	Resident	286	119	50	27	13	12	12	9
Black-headed Grosbeak	*Pheucticus melanocephalus*	BHGR	Nonbreed	8437	3779	882	161	334	263	161	75
Blue Grosbeak	*Passerina caerulea*	BLGR	Nonbreed	1103	458	75	25	74	57	23	10
Lazuli Bunting	*Passerina amoena*	LAZB	Nonbreed	4043	2039	314	292	239	179	60	79
Varied Bunting	*Passerina versicolor*	VABU	Nonbreed	303	88	25	2	10	8	6	2
Painted Bunting	*Passerina ciris*	PABU	Nonbreed	3620	2056	485	108	75	67	44	20
Red-winged Blackbird	*Agelaius phoeniceus*	RWBL	Breed	2511	1104	107	175	107	88	21	29
Bullock's Oriole	*Icterus bullockii*	BUOR	Nonbreed	3122	1352	262	32	173	137	63	25
TOTAL Western North America				**306446**	**146599**	**43159**	**35506**	**496**	**489**	**460**	**432**

COMMON NAME	SCIENTIFIC NAME	CODE	STATUS	IND. ADULT BIRDS CAPTURED				MAPS STATIONS			
				Total	**Breed**	**BreedR**	**Molt**	**Total**	**Breed**	**BreedR**	**Molt**
B. Eastern North America											
Red-bellied Woodpecker	*Melanerpes carolinus*	RBWO	Resident	726	240	24	130	193	112	21	79
Yellow-bellied Sapsucker	*Sphyrapicus varius*	YBSA	Breed	330	151	31	33	54	43	18	17
Downy Woodpecker	*Picoides pubescens*	DOWO	Resident	2917	779	150	824	384	245	78	259
Hairy Woodpecker	*Picoides villosus*	HAWO	Resident	809	185	30	333	253	109	23	169
Eastern Wood-Pewee	*Contopus virens*	EAWP	Nonbreed	1540	333	75	51	262	145	50	40
Acadian Flycatcher	*Empidonax virescens*	ACFL	Breed	5526	943	293	378	244	146	80	102
Alder Flycatcher	*Empidonax alnorum*	ALFL	Nonbreed	624	191	59	1	27	15	11	1
Eastern Phoebe	*Sayornis phoebe*	EAPH	Breed	811	191	27	87	174	82	18	52
Great Crested Flycatcher	*Myiarchus crinitus*	GCFL	Breed	1231	289	21	80	254	140	17	53
White-eyed Vireo	*Vireo griseus*	WEVI	Breed	7193	3428	1286	890	227	190	146	129
Bell's Vireo	*Vireo bellii*	BEVI	Breed	542	158	53	131	25	18	8	14
Warbling Vireo	*Vireo gilvus*	WAVI	Breed	358	145	21	54	61	36	12	20
Red-eyed Vireo	*Vireo olivaceus*	REVI	Nonbreed	8508	3823	792	429	396	317	170	146
Blue Jay	*Cyanocitta cristata*	BLJA	Breed	1781	390	33	394	303	166	24	164
Carolina Chickadee	*Poecile carolinensis*	CACH	Resident	2841	861	104	820	237	182	53	167
Black-capped Chickadee	*Poecile atricapillus*	BCCH	Resident	3995	1541	331	1398	211	183	101	164
Tufted Titmouse	*Baeolophus bicolor*	TUTI	Resident	4095	1129	233	1104	302	240	116	220
Black-crested Titmouse	*Baeolophus atricristatus*	BCTI	Resident	437	110	22	164	28	21	10	24
House Wren	*Troglodytes aedon*	HOWR	Breed	2249	1353	361	59	114	94	54	37
Carolina Wren	*Thryothorus ludovicianus*	CARW	Resident	7332	2478	1044	679	301	260	200	156
Bewick's Wren	*Thryomanes bewickii*	BEWR	Resident	709	247	79	111	40	30	21	25
Blue-gray Gnatcatcher	*Polioptila caerulea*	BGGN	Breed	1193	450	41	239	178	125	24	74
Eastern Bluebird	*Sialia sialis*	EABL	Breed	477	283	46	29	112	80	18	18
Veery	*Catharus fuscescens*	VEER	Breed	4036	2724	958	275	215	144	90	73
Swainson's Thrush	*Catharus ustulatus*	SWTH	Breed	1951	556	140	56	272	114	20	35
Hermit Thrush	*Catharus guttatus*	HETH	Breed	923	722	235	34	97	92	44	22
Wood Thrush	*Hylocichla mustelina*	WOTH	Breed	9200	6415	2012	386	302	281	195	124
American Robin	*Turdus migratorius*	AMRO	Breed	5727	4225	539	674	272	253	127	131
Gray Catbird	*Dumetella carolinensis*	GRCA	Breed	19115	10159	3388	854	331	261	180	158
Brown Thrasher	*Toxostoma rufum*	BRTH	Breed	1438	783	115	195	216	167	50	85
Long-billed Thrasher	*Toxostoma longirostre*	LBTH	Resident	316	195	36	41	7	7	6	6
Northern Mockingbird	*Mimus polyglottos*	NOMO	Nonbreed	522	213	23	22	48	36	10	14
Cedar Waxwing	*Bombycilla cedrorum*	CEDW	Nonbreed	3433	926	42	34	172	112	22	11
American Goldfinch	*Spinus tristis*	AMGO	Breed	9380	2699	496	285	272	214	86	73
Ovenbird	*Seiurus aurocapilla*	OVEN	Breed	7446	4605	1071	918	360	273	165	190

COMMON NAME	SCIENTIFIC NAME	CODE	STATUS	IND. ADULT BIRDS CAPTURED				MAPS STATIONS			
				Total	Breed	BreedR	Molt	Total	Breed	BreedR	Molt
Worm-eating Warbler	*Helmitheros vermivorum*	WEWA	Breed	1844	642	115	173	146	94	32	64
Louisiana Waterthrush	*Parkesia motacilla*	LOWA	Breed	1531	556	149	306	164	100	47	80
Northern Waterthrush	*Parkesia noveboracensis*	NOWA	Breed	886	153	29	76	154	46	9	31
Blue-winged Warbler	*Vermivora cyanoptera*	BWWA	Breed	1898	1066	249	293	109	90	38	48
Black-and-white Warbler	*Mniotilta varia*	BAWW	Breed	2358	917	182	633	267	165	68	149
Prothonotary Warbler	*Protonotaria citrea*	PROW	Breed	1996	925	199	219	92	76	46	43
Swainson's Warbler	*Limnothlypis swainsonii*	SWWA	Breed	545	375	141	52	40	34	25	20
Nashville Warbler	*Oreothlypis ruficapilla*	NAWA	Breed	930	503	57	142	89	54	27	32
Mourning Warbler	*Geothlypis philadelphia*	MOWA	Breed	772	287	85	47	157	46	18	12
Kentucky Warbler	*Geothlypis formosa*	KEWA	Breed	4393	2698	957	482	161	135	102	87
Common Yellowthroat	*Geothlypis trichas*	COYE	Breed	11461	7025	2398	776	371	314	214	142
Hooded Warbler	*Setophaga citrina*	HOWA	Breed	3441	2221	730	306	180	143	87	78
American Redstart	*Setophaga ruticilla*	AMRE	Breed	5035	2326	574	1192	248	146	70	113
Northern Parula	*Setophaga americana*	NOPA	Breed	795	467	41	84	116	82	19	38
Magnolia Warbler	*Setophaga magnolia*	MAWA	Breed	1498	582	180	115	178	62	27	31
Yellow Warbler	*Setophaga petechia*	YEWA	Breed	5048	2808	764	816	142	104	65	74
Chestnut-sided Warbler	*Setophaga pensylvanica*	CSWA	Breed	1665	1019	344	193	123	69	44	46
Blackpoll Warbler	*Setophaga striata*	BLPW	Breed	341	100	33	27	57	11	7	9
Black-throated Blue Warbler	*Setophaga caerulescens*	BTBW	Breed	517	233	50	68	100	40	15	19
Pine Warbler	*Setophaga pinus*	PIWA	Breed	385	245	26	32	72	57	14	20
Yellow-rumped Warbler	*Setophaga coronata*	YRWA	Breed	873	466	87	78	79	59	22	23
Prairie Warbler	*Setophaga discolor*	PRAW	Breed	1285	883	223	203	71	53	31	37
Black-thr. Green Warbler	*Setophaga virens*	BTNW	Breed	838	497	119	79	82	55	23	27
Canada Warbler	*Cardellina canadensis*	CAWA	Breed	891	228	34	142	173	51	10	31
Yellow-breasted Chat	*Icteria virens*	YBCH	Breed	4008	2513	827	270	149	121	76	61
Olive Sparrow	*Arremonops rufivirgatus*	OLSP	Resident	341	243	100	58	8	8	6	5
Eastern Towhee	*Pipilo erythrophthalmus*	EATO	Breed	1902	1519	382	78	227	215	116	45
Rufous-crowned Sparrow	*Aimophila ruficeps*	RCSP	Breed	164	125	41	12	15	15	7	9
Chipping Sparrow	*Spizella passerina*	CHSP	Nonbreed	931	620	101	22	124	105	31	13
Field Sparrow	*Spizella pusilla*	FISP	Nonbreed	3545	2681	720	70	149	139	92	35
Grasshopper Sparrow	*Ammodramus savannarum*	GRSP	Nonbreed	1125	786	178	22	35	28	19	12
Song Sparrow	*Melospiza melodia*	SOSP	Breed	5594	4035	1319	162	176	160	108	64
Swamp Sparrow	*Melospiza georgiana*	SWSP	Breed	958	641	190	43	80	57	20	16
White-throated Sparrow	*Zonotrichia albicollis*	WTSP	Breed	1722	1198	363	79	105	65	46	32
Dark-eyed Junco	*Junco hyemalis*	DEJU	Breed	602	439	123	40	42	38	27	17
Summer Tanager	*Piranga rubra*	SUTA	Breed	1415	946	138	156	168	149	64	70

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				Total	Breed	BreedR	Molt	Total	Breed	BreedR	Molt
Scarlet Tanager	*Piranga olivacea*	SCTA	Breed	1261	772	69	141	190	158	37	70
Northern Cardinal	*Cardinalis cardinalis*	NOCA	Resident	13795	5779	1893	1079	395	365	277	219
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	RBGR	Breed	1583	914	108	209	158	121	35	59
Indigo Bunting	*Passerina cyanea*	INBU	Nonbreed	9126	6010	1549	188	327	290	192	71
Dickcissel	*Spiza americana*	DICK	Nonbreed	1398	839	66	32	43	38	16	11
Bobolink	*Dolichonyx oryzivorus*	BOBO	Breed	669	296	37	48	21	19	14	15
Red-winged Blackbird	*Agelaius phoeniceus*	RWBL	Breed	2539	1077	68	51	136	113	29	21
Orchard Oriole	*Icterus spurius*	OROR	Nonbreed	837	327	50	20	98	62	15	16
Baltimore Oriole	*Icterus galbula*	BAOR	Breed	1332	579	70	153	154	105	23	56
TOTAL Eastern North America				**225784**	**113481**	**30369**	**21659**	**509**	**507**	**496**	**473**
TOTAL NORTH AMERICA				**532230**	**260080**	**73528**	**57165**	**936**	**934**	**915**	**887**