

THE MONITORING AVIAN PRODUCTIVITY AND SURVIVORSHIP (MAPS) PROGRAM 1999, 2000, AND 2001 REPORT¹

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Abstract. Herein we summarize results of the Monitoring Avian Productivity and Survivorship (MAPS) Program during 1999-2001, a period in which MAPS grew from 475 stations in 1998 to 498 stations in 2001. We found alternating increases and decreases in regional annual indices of adult population size, with significant decreases in the Northwest and South-central regions and non-significant increases in the remaining five regions in 1999; a significant increase in the South-central region and decreases of varying significance in the other six regions in 2000; and significant decreases in the Southwest and South-central regions and increases in four of the five remaining regions in 2001. Productivity (i.e., reproductive index, defined as young/adult) tended to follow the opposite pattern, with significant decreases in five of the seven regions and non-significant increases in the South-central and Southeast regions in 1999; and increases in five of the seven regions and non-significant decreases in the North-central and South-central regions in 2000. Productivity, however, increased further in 2001, with increases in five regions (significant in the South-central and Alaska/Boreal Canada regions) and non-significant decreases in the Northwest and Northeast regions. These generally alternating, out-of-phase patterns in productivity and population size suggest that (a) increased productivity leads to increased population sizes the following year through increased recruitment, and (b) increased population sizes, coupled with a higher proportion of younger, inexperienced breeders, may suppress productivity through increased competition for resources. That these patterns were not consistent in all regions in all years suggests that density-independent factors may also drive productivity and that other factors besides productivity (e.g., survival of young and adults) may also drive year-to-year changes in population size. We estimated regional annual adult survival (ϕ) and recapture probabilities and proportions of residents among newly captured adults using 1992-2001 data pooled from all stations operated for at least four consecutive years and modified Cormack-Jolly-Seber capture-mark-recapture analyses, which included both between- and within-year transient models. The mean number of stations per region contributing data for a species (68) and mean number of species per region for which survival rates could be estimated (59) were 39% and 34% greater, respectively, in the 10-yr (1992-2001), than in the 7-yr (1992-1998), data set. The increased number of years and stations in the data continued to increase precision: the mean number of species with $CV(\phi) < 30\%$, $< 20\%$, and $< 10\%$ increased by 35%, 57%, and 100%, respectively, using the 10- rather than the 7-yr data set. As in previous years, mean regional annual survival probabilities decreased with increasing latitude. For six of the seven regions, both the number and proportion of species for which time-dependence in survival was detected in the 10-yr data set was less than in the 7-yr data set, suggesting that survival varied less during the last three years (1999-2001) than during the previous seven (1992-1998). Finally, in each region, mean survival for species for which it was adequately estimated tended to be highest over the five

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years 1992-1996, lower over the seven years 1992-1998, and lowest over the 10 years 1992-2001, suggesting that a negative trend in survival among North American landbirds may have occurred over those ten years. We will test this hypothesis in future analyses by modeling survival as a linear function of year.

Key words: MAPS Program, constant-effort mist netting and banding, landbird demographics, North America, population trends, productivity indices, survival rates.

INFORME ANUAL DE 1999, 2000 Y 2001 DEL PROGRAMA MAPS (MAPEO DE PRODUCTIVIDAD Y SOBREVIVENCIA DE AVES)

Resumen. Presentamos un sumario de los resultados del programa MAPS durante los años 1999 y 2000, periodo en el que MAPS creció de 475 estaciones en 1998 a 498 en 2001. Encontramos aumentos y declives alternados en los índices anuales de tamaño poblacional adulto, con declives significativos en las regiones noroeste y centro-sur, y aumentos no significativos en las cinco regiones restantes en 1999; un aumento significativo en la región centro-sur y declives de significatividad variable en el suroeste y centro-sur y aumentos en cuatro de las cinco regiones restantes en 2001. La productividad (el índice reproductivo definido como la proporción de juveniles a adultos) tendió a mostrar el patrón opuesto, con declives significativos en cinco de las seis regiones y aumentos no significativos en el centro-sur y el sureste en 1999; y aumentos en cinco de las siete regiones y declives no significativos en el centro-norte y centro-sur en 2000. Sin embargo, la productividad siguió aumentando en 2001, con aumentos en cinco regiones (significativos en las regiones centro-sur y la de Alaska/Canadá Boreal) y declives no significativos en el noroeste y noreste. Estos patrones generalmente alternantes y desfasados en productividad y tamaño poblacional sugieren que (a) el aumento de productividad conlleva un aumento en tamaño poblacional el siguiente año mediante un aumento del reclutamiento, y (b) aumentos en el tamaño poblacional, junto una mayor proporción de reproductores jóvenes sin experiencia, puede reducir la productividad mediante una mayor competición por recursos. Que estos patrones no sean similares en todas las regiones en todos los años sugiere que factores denso-independientes pueden también afectar la productividad, y que otros factores además de la productividad (por ejemplo sobrevivencia de juveniles y adultos) pueden generar cambios anuales en tamaño poblacional. Estimamos la tasa anual de sobrevivencia (ϕ) y la probabilidad de recaptura en adultos, y la proporción de residentes en las capturas de adultos nuevos utilizando datos de 1992 a 2001 de todas las estaciones operadas al menos por cuatro años consecutivos y análisis de captura-marcaje-recaptura de Cormack-Jolly-Seber que incluyen modelos de transehantes intra e interanuales. El número promedio de estaciones por región que contribuyó datos para una especie (68) y el promedio de especies para las que se pudo estimar tasas de sobrevivencia (59) fueron 39% y 34% mayores, respectivamente, al utilizar 10 años de datos (1992-2001) que al utilizar 7 años (1992-1998). El aumento en el número de años y estaciones continuó aumentando la precisión: el número promedio de especies con CV (ϕ) <30%, <20%, y <10% aumentó en un 35%, 57%, y 100%, respectivamente, utilizando 10 años en lugar de 7. Como en años anteriores, las probabilidades de sobrevivencia regionales promedio declinaron al aumentar la latitud. En seis de las siete regiones, tanto el número como la proporción de especies en las que se detectó dependencia temporal en su sobrevivencia usando 10 años fue menor que usando 7 años, lo que sugiere que la sobrevivencia varió menos en los últimos tres años (1999-2001) que en los siete anteriores (1992-1998). Por último, en cada región, la sobrevivencia promedio en especies para las que se estimó adecuadamente tendió a ser más alta de 1992 a 1996, más baja entre 1992 y 1998, y más baja aun entre 1992 y 2001, lo que sugiere una tendencia negativa en sobrevivencia en aves de bosque en Norte América en esta década. Probaremos esta hipótesis en el futuro modelando sobrevivencia como función lineal con año.

Palabras clave: programa MAPS, anillamiento y redeo de esfuerzo constante, demografía de aves terrestres, Norte América, tendencias poblacionales, índices de productividad, tasas de sobrevivencia.

INTRODUCTION

The Monitoring Avian Productivity and Survivorship (MAPS) Program is a continent-wide, cooperative network of nearly 500 constant-effort mist-netting stations operated annually during the breeding season (May to August; DeSante et al. 1995, DeSante and O'Grady 2000). MAPS, which was patterned to a large extent after the British Constant Effort Sites scheme (Baillie et al. 1986; Peach et al. 1996, 1998), was established by The Institute for Bird Populations (IBP) in 1989 to provide for the large-scale, long-term collection of demographic data on North American landbirds at multiple spatial scales. MAPS now provides indices and estimates of vital rates for over 130 species.

MAPS is organized to fulfill monitoring, research, and management goals. Monitoring goals are to provide, for over 130 target species:

- indices of adult population size and post-fledging productivity from the numbers of young and adult birds captured; and
- estimates of adult population size, adult survival rate, proportion of residents among newly captured adults, recruitment rate into the adult population, and population growth rate from Cormack-Jolly-Seber (CJS) analyses of capture-mark-recapture (CMR) data on adult birds.

Research goals are to describe:

- temporal and spatial patterns in these demographic indices and estimates at multiple spatial scales; and
- relationships between these patterns and ecological characteristics of the target species, population trends of the target species, station-specific and landscape-scale habitat characteristics, and spatially-explicit weather variables.

Management goals are to use these patterns and relationships, at the appropriate spatial scales, to:

- determine the proximate demographic cause(s) of population change;
- formulate management actions and conservation strategies to reverse population declines and maintain stable or increasing populations; and
- evaluate the effectiveness of the management actions and conservation strategies implemented.

Baillie (1990) was among the first to argue that monitoring vital rates (primary demo-

graphic parameters such as productivity and survivorship) must be a component of any successful integrated avian monitoring scheme. DeSante (1995), DeSante and Rosenberg (1998), and DeSante et al. (2005a) extended these ideas by arguing that effective avian management must be based on vital rates as well as population sizes and trends. They reasoned that, because of source-sink dynamics (Pulliam 1988, Donovan et al. 1995) and evolutionary and ecological traps (Schlaepfer et al. 2002), abundance metrics and the trends derived from them may not always accurately reflect habitat quality (Van Horne 1983). Furthermore, populations of migratory species could be limited by processes acting at times other than those when abundance is measured, thus further obscuring the link between abundance and habitat quality (Marra et al. 1998). Indeed, a recent survey of studies that compared both avian population density and reproductive success between two or more plots, habitats, or landscapes, found that, although density and per capita reproduction were often positively correlated, about 30% of studies showed exceptions in which higher density plots had lower per capita reproduction (Bock and Jones 2004).

Other advantages for basing management on vital rates accrue from the fact that environmental stressors and management actions affect vital rates directly and usually without the time lags that often occur with population size (Temple and Wiens 1989, DeSante and George 1994). Moreover, vital rates provide crucial information about the stage of the life cycle at which population change is being effected (DeSante 1992). This information is particularly important for migratory birds that winter in tropical latitudes, because it can determine whether management actions should be directed toward a species' temperate breeding grounds, tropical wintering grounds, or both. Finally, demographic rate estimates can be incorporated into predictive population models to assess potential effects of a variety of land use or climate factors (Noon and Sauer 1992). Thus, demographic monitoring not only complements abundance monitoring, but also provides more timely and insightful information for management and conservation applications.

In this report we present MAPS results from

1999, 2000, and 2001 using data from 467, 474, and 484 stations, respectively. For all species with adequate data (and for all species pooled), we compare, in a constant-effort manner, the regional indices of adult population size and post-fledging productivity obtained each year with the analogous indices obtained during the immediately preceding year. We then present regional estimates of time-constant annual adult apparent survival probability, recapture probability, and proportion of residents among newly captured adults, along with estimates of the extent of time-dependence in these parameters, from a total of 479 stations operated for four or more consecutive years during the 10-yr (1992-2001) period.

METHODS

The overall design of MAPS and the general field methods are described in DeSante et al. (1996, 1998) and discussed in some detail in DeSante et al. (2004a). Detailed, standardized methods and instructions for the establishment and operation of MAPS stations are provided by DeSante et al. (2004b). Briefly, MAPS stations were established in 20-ha study areas at locations where long-term mist netting was practical and permissible. In general, the locations of MAPS stations were chosen by the station operators (often according to a hypothesis-driven strategy) and not by a probability-based sampling design, although elements of a random sampling strategy were sometimes employed. Operators generally adhered to MAPS site-selection criteria (DeSante et al. 2004b), but some aspects of site selection were dictated by logistical concerns.

DATA COLLECTION

Normally, 10 permanent net sites (sometimes more, rarely fewer) were distributed uniformly throughout the central eight hectares of each 20-ha study area, but were placed at specific locations where birds could be captured most efficiently. One mist net (typically 12-m in length, with 30-mm mesh) was erected at each net site and the type and location of all nets were kept constant for the duration of the study (both within and between years). Typically, nets were operated for 6 hr d⁻¹ (sometimes less, rarely more), beginning at local sunrise, for one day

per 10-d period (rarely more), and for 6 to 10 consecutive 10-d periods beginning between May 1 and June 10 (later at more northerly latitudes and higher altitudes) and continuing through August 8. To facilitate constant-effort comparisons of data, nets were opened, checked, and closed in the same order on all days of operation.

Each bird captured was marked with a uniquely-numbered aluminum leg band provided by the Biological Resources Division of the U.S. Geological Survey (in Canada, the Canadian Wildlife Service). Band number, capture status, species, age, sex, ageing and sexing criteria, date, time, station, and net number were recorded for all birds captured, including recaptures. The times of opening and closing the nets and the beginning of each net run were recorded each day so that effort could be calculated for each 10-d period and standardized between years. The breeding (summer residency) status of each species recorded at the station was determined by the station operator using methods similar to those employed in breeding bird atlas projects.

DATA ENTRY AND VERIFICATION

Computer data entry and proofing were conducted by MAPS operators or, in cases where operators were unable to enter their own data, by John W. Shipman of Zoological Data Processing, Socorro, NM (entry) and by IBP staff biologists (proofing). After proofing, data were run through verification routines that: (1) checked the validity and ranges of all data; (2) screened each banding record by comparing the species, age, and sex determinations to the ageing and sexing criteria used; (3) screened banding data for inconsistent species, age, or sex determinations for all records of each band number; and (4) screened banding, effort, and breeding status data for inconsistencies. These routines were conducted by IBP biologists or, increasingly in recent years, by the MAPS operators themselves through the use of MAPSPROG, a user-friendly Visual dBASE data entry/import, verification/editing, and error-tracking program that operates on a Windows platform (Froehlich et al. 2004).

DATA ANALYSES

Methods of data analysis, as described in

DeSante and Burton (1994), DeSante et al. (1998), and DeSante and O'Grady (2000), were further discussed in DeSante et al. (2004a), and are briefly summarized here. We divided North America (north of Mexico) into eight major regions based on biogeographical and meteorological considerations: Northwest, Southwest, North-central, South-central, Northeast, Southeast, Alaska, and Boreal Canada (see maps in DeSante et al. 1993a, DeSante and Burton 1994). These regions were delineated along lines consistent with the physiographic strata established in conjunction with the North American Breeding Bird Survey (Robbins et al. 1986). Because few stations were established in the Boreal Canada region, we pooled data from that region and the Alaska region into a single Alaska/Boreal Canada region.

Throughout the text, we use an alpha level of $P < 0.05$ to indicate statistical significance. We use $P < 0.01$ to indicate highly significant differences or relationships. In Tables 1-3, we also identify species for which between-year differences were nearly significant at $0.05 \leq P < 0.10$. In expressing variation around the mean, we use $\pm$ the standard deviation (Std. Dev.). Finally, for a number of analyses we compare results between two time periods. When we refer to the 10-yr period, this is 1992-2001; the 7-yr period referred to includes 1992-1998.

Population size and productivity indices — The numbers of individual adult birds of each species captured each year, pooled over all stations within each region that were located within the breeding range of the species, were used as annual indices of adult population size for the species in the region. Similarly, for each species in each region, the pooled numbers of individual young birds divided by the pooled numbers of individual adult birds ("reproductive index") were used as annual regional indices of post-fledging productivity. The use of reproductive index (young/adult), rather than "productivity index," defined as the proportion of young in the catch (young/[young+adult]), represents a departure from previous usage and provides an index more in line with other commonly-used measures of reproductive success. Data from a given station in a given year were included in population size and productivity analyses if the station was operated

in at least five 10-d periods that year; at least three of these periods had to occur during the earlier part of the season (the adult superperiod, when adult birds predominate in the catch) and at least two had to occur during the later part of the season (the young superperiod, when young birds predominate in the catch). Definitions of the adult and young superperiods for each starting period are presented in DeSante et al. (2004b).

Year-to-year changes in the number of adult and young birds were calculated using net-opening and -closing times and net-run times on a net-by-net and period-by-period basis to exclude captures that occurred in a given net in a given period in one year at a time when that net was not operated in that period in the other year. This allowed captures during the two years to be compared in a rigorous, constant-effort manner. We inferred the statistical significance of annual changes in the regional indices of adult population size and productivity for each species from confidence intervals calculated from the standard errors of the mean percentage changes. Changes were considered significant if confidence intervals did not include zero. Formulae for these standard errors and confidence intervals are given in Peach et al. (1996) and were derived from those given in Cochran (1977). We also inferred, by means of binomial tests, the statistical significance of regional changes in adult population size and productivity indices from the proportion of target species that increased or decreased in each region. We included species in these regional population size and productivity analyses for which adults were captured at two or more stations in the region and for which at least 50 aged individuals were captured at all stations pooled in either of the two years being compared.

Survival rate estimates — We calculated maximum-likelihood estimates and standard errors for annual adult apparent survival probabilities (ϕ) and recapture probabilities (p) for all species in each region for which adequate data were obtained. These survival estimates are termed apparent survival because permanent emigration from the station is not distinguishable from actual mortality. We used Cormack-Jolly-Seber (CJS) capture-mark-recapture (CMR) analyses (Clobert et al. 1987,

Pollock et al. 1990, Lebreton et al. 1992) that incorporated a between-year transient model (Pradel et al. 1997), as well as an ad-hoc length-of-stay within-year transient model (Nott and DeSante 2002, Hines et al. 2003). These transient models also permit estimation of τ (the proportion of residents among those newly captured adults that were not recaptured seven or more days later during their first year of capture), and provide apparent survival rate estimates that are unbiased with respect to transient individuals (Pradel et al. 1997, Hines et al. 2003).

Parameter estimates were calculated from the capture histories of all adult birds captured at all stations in the region at which the species was a regular or usual breeder (i.e., attempted to breed during more than half of the years the station was operated). Data from a given station were included in survivorship analyses if the station was operated for at least four consecutive years during the 10-yr period, and was operated during each of those four or more years for at least three periods during the adult superperiod (see above). Stations within 1 km of each other were merged into a single "super-station" and the data from those stations were pooled prior to creating capture histories of individual birds. This prevented individuals whose home range encompassed parts of both stations from being treated as two different individuals. We included species in these survivorship analyses for which an average of at least 2.5 individual adult birds were captured during each of the 10 years (at least 25 year-unique individuals) from all stations pooled, and for which there were at least two returns (between-year recaptures) from all stations pooled. This is a substantially more relaxed criterion than was used in the previous annual report (an average of at least seven individual adult birds during each of the seven years for a total of at least 49 year-unique individuals; DeSante and O'Grady 2000). We considered survival probability to be "adequately estimated" for species for which: (1) ϕ was based on at least five returns over the 10 years; (2) τ (the estimate of the proportion of residents among those newly captured adults that were not recaptured seven or more days later during their first year of capture) was < 1.00 ; (3) $SE(\phi) < 0.20$; and (4) $CV(\phi) < 30\%$.

We modeled all eight combinations of time-dependence (and -independence) for each of the

three parameters (survival probability - ϕ , recapture probability - p , proportion of residents - τ) contained in the transient model using TMSURVIV (Hines et al. 2003), a version of the computer program SURVIV (White 1983) modified by J. E. Hines. We used the Akaike Information Criterion (QAIC_C) to select the appropriate models for each species such that the selected model was the one with the lowest QAIC_C (Burnham and Anderson 1992). We considered models having QAIC_C values within two QAIC_C units of each other to be equivalent models. QAIC_C was calculated as:

$$-2(\log\text{-likelihood}) \\ + 2(\text{number of estimable parameters})$$

with corrections for small sample sizes and over-dispersion of data.

We further estimated the relative likelihood of each of the eight models using QAIC_C weights (w_i ; Burnham and Anderson 1998). Statistical support for time-dependence in survival and recapture probabilities and in proportion of residents among newly captured adults was assessed by summing the w_i for all models in which time-dependence in the parameter of interest occurred. This method of multi-model inference enabled us to use the entire set of eight models to judge the importance of time-dependence, rather than basing conclusions on a single best-fit model. A w_i value > 0.5 indicates strong support for time-dependence in the given parameter, while $0.50 \geq w_i > 0.25$ suggests some support for time-dependence in that parameter.

RESULTS

NUMBER AND DISTRIBUTION OF STATIONS

A total of 481 MAPS stations was operated during 1999, a 1.3% increase over the 475 in operation during 1998. Of these, 49 (10.2%) were new while 432 were in operation during a previous year. A total of 90.1% of the stations in operation in 1998 continued to be operated in 1999. We received data useable for productivity and/or survivorship analyses in time to be included in this report from 467 of the 481 stations that were operated during 1999. A total of 483 MAPS stations was operated during 2000. Of these, 37 (7.7%) were new while 446 were in operation during a previous year. A total of

92.5% of the stations in operation during 1999 continued to be operated during 2000. We received data useable for productivity and/or survivorship analysis in time to be included in this report from 474 of the 483 stations that were operated during 2000. A total of 498 MAPS stations was operated during 2001, a 3.1% increase over 2000. Of these, 49 (9.8%) were new while 449 were in operation during a previous year. A total of 92.1% of the stations in operation during 2000 continued to be operated during 2001. We received data useable for productivity and/or survivorship analyses in time to be included in this report from 484 of the 498 stations that were operated during 2001. The principal operator, sponsoring organization, location, elevation, and habitat(s) for each station newly established in 1999, 2000, or 2001 (or that was established prior to 1999 but not previously reported) are presented in the Appendix. See previous annual reports (DeSante et al. 1993b, 1996, 1998, DeSante and Burton 1994, and DeSante and O'Grady 2000) for these data for stations established prior to 1999.

The proportions of stations located in each of the eight MAPS regions were very similar during 1999, 2000, and 2001 (Fig. 1), and were similar to analogous proportions in previous years. During each year, about 30% of stations were operated in the Northwest region, nearly

twice as many as in any other region. As expected, the fewest stations were operated in the Alaska and, especially, Boreal Canada regions. The proportions of total stations operated in the remaining five regions were similar, ranging from 7-10% in the North-central and South-central to 15-17% in the other three regions. The largest increase in stations during 1999-2001 occurred in the Northeast Region while the largest decrease occurred in the Alaska Region. The locations of all 748 stations that were operated for one or more years between 1992 and 2001 are mapped by 10-minute block in Figure 2.

ADULT POPULATION SIZE AND PRODUCTIVITY

Changes between 1998 and 1999 — Constant-effort data on the numbers of adult and young birds captured and the proportion of young in the catch were obtained for 1998 and 1999 from 384 MAPS stations that were operated comparably during both years (Table 1). Included were 62 species in the Northwest, 38 in the Southwest, 19 in the North-central, 25 in the South-central, 35 in the Northeast, 25 in the Southeast, and 18 in the Alaska/Boreal Canada regions, comprising a total of 112 species overall (plus 19 additional species that met productivity criteria when data were pooled from all seven regions).

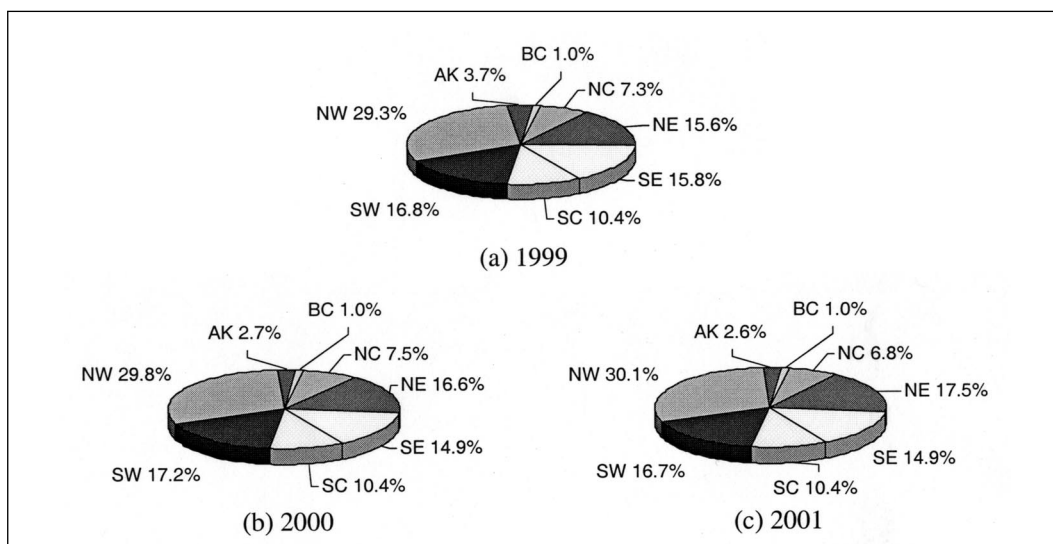


FIGURE 1. Proportion of MAPS stations in each of the seven major geographical regions (NW - Northwest; SW - Southwest; NC - North-central; SC - South-central; NE - Northeast; SE - Southeast; AK/BC - Alaska/Boreal Canada) during (a) 1999, (b) 2000, and (c) 2001.

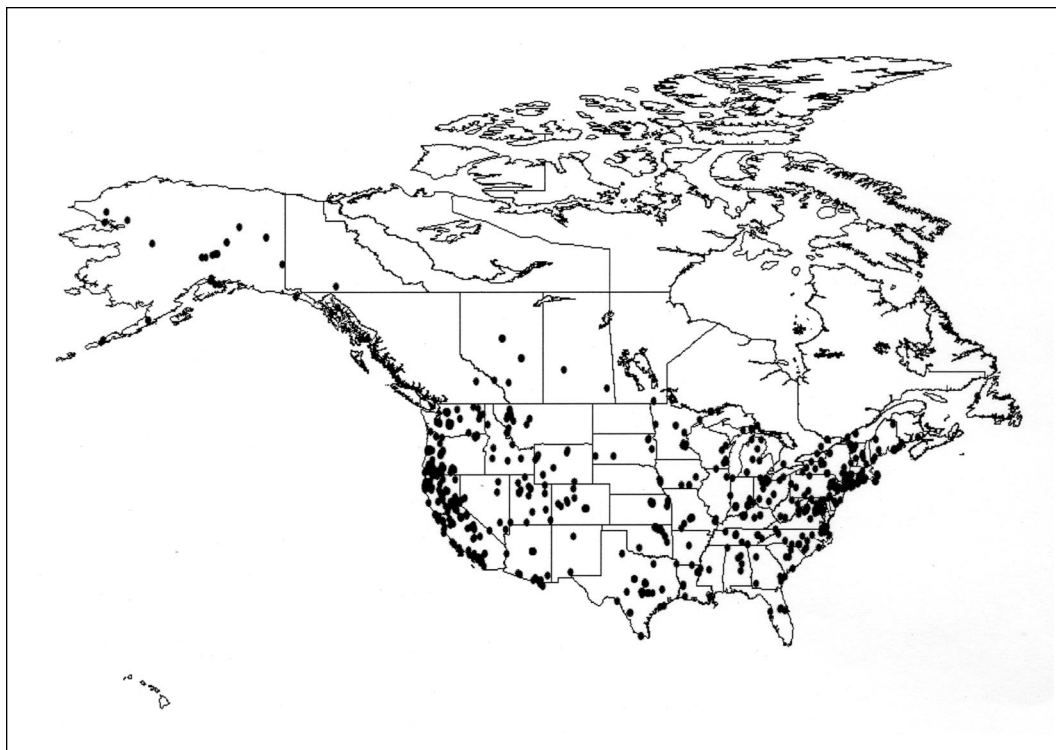


FIGURE 2. Locations (mapped by 10-minute block) of the 757 MAPS stations in operation during one or more years between 1992 and 2001. Some of the larger "individual" circles can represent as many as 11 stations.

Adult populations. — Indices of adult population size for all species pooled (numbers of adults captured) decreased significantly between 1998 and 1999 in the Northwest (by -6.9%) and South-central (by -18.1%) regions and showed slight, non-significant increases (ranging from +0.1% to +2.1%) in the remaining five regions. The proportions of decreasing species in the Northwest (63%) and South-central (80.0%) regions were also significantly >50%. Summing over these two regions, 10 species had significant decreases in numbers of adults and another nine species had nearly significant decreases, while only two species showed significant or nearly significant increases. The proportion of increasing species in the Northeast (66%) was significantly >50%, although the 2.1% increase in adults of all species pooled in the Northeast was not significant. The proportions of increasing species in the remaining four regions (ranging from 40-56%) were not significantly >50%. Summing

over these five regions, 11 species had significant or nearly significant increases in numbers of adults, while 12 species showed significant or nearly significant decreases in numbers of adults.

On a continent-wide basis (all regions pooled), the number of adults captured of all species pooled decreased between 1998 and 1999 by a significant -3.7%, while a highly significant 64% of 131 species showed decreases.

Productivity. — Overall, productivity decreased between 1998 and 1999 in five of the seven regions. In the Northwest Region, numbers of young birds of all species pooled showed a highly significant decrease of -16.7%, substantially greater than the highly significant decrease in adults of -6.9%, so that the reproductive index showed a non-significant decrease of -10.5%. However, the proportion of decreasing species in the Northwest, for both number of young captured (66%) and reproductive index (65%), was significantly

TABLE 1. Regional changes between 1998 and 1999 in the numbers of adult and young individuals captured and in the reproductive index (number of young/number of adults) for 131 species and all species pooled (excluding gallinaceous birds and hummingbirds) at the 384 stations run comparably in both years. For each species, data were included only from stations within the breeding range of the species. Only species for which adults were captured at two or more stations and for which 50 or more aged individuals were captured in either year are included.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
NORTHWEST MAPS REGION																
Red-naped Sapsucker	28	49	28	-42.9	11.5***	23	31	16	-48.4	16.8**	33	0.633	0.571	-0.061	0.199	-9.7
Red-breasted Sapsucker	47	82	82	0.0	17.0	27	34	49	44.1	36.2	50	0.415	0.598	0.183	0.158	44.1
Downy Woodpecker	49	56	49	-12.5	14.1	33	41	32	-22.0	23.0	56	0.732	0.653	-0.079	0.237	-10.8
Western Wood-Pewee	59	166	167	0.6	12.7	21	27	11	-59.3	17.5**	60	0.163	0.066	-0.097	0.044**	-59.5
Willow Flycatcher	61	207	205	-1.0	13.0	10	15	13	-13.3	34.0	62	0.073	0.063	-0.009	0.042	-12.5
Hammond's Flycatcher	66	132	151	14.4	15.2	32	51	28	-45.1	27.7	72	0.386	0.185	-0.201	0.175	-52.0
Dusky Flycatcher	64	235	189	-19.6	10.7	18	17	31	82.4	68.1	65	0.072	0.164	0.092	0.059	126.7
"Western" Flycatcher	84	248	267	7.7	33.5	45	66	45	-31.8	19.5	89	0.266	0.169	-0.098	0.080	-36.7
Cassin's Vireo	29	65	50	-23.1	14.4	18	17	18	5.9	41.7	36	0.262	0.360	0.099	0.182	37.6
Warbling Vireo	98	540	478	-11.5	6.1*	24	36	46	27.8	42.1	99	0.067	0.096	0.030	0.041	44.4
Steller's Jay	36	30	30	0.0	25.7	12	5	20	300.0	259.2*	40	0.167	0.667	0.500	0.259*	300.0
Tree Swallow	13	59	39	-33.9	9.8*	2	9	3	-66.7	14.8	13	0.153	0.077	-0.076	0.050	-49.6
Black-capped Chickadee	45	142	124	-12.7	14.8	41	201	153	-23.9	13.6	51	1.416	1.234	-0.182	0.363	-12.8
Mountain Chickadee	38	91	109	19.8	15.2	28	98	71	-27.6	24.5	40	1.077	0.651	-0.426	0.302	-39.5
Chestnut-backed Chick.	45	82	81	-1.2	25.4	40	84	87	3.6	24.4	57	1.024	1.074	0.050	0.313	4.9
Bushtit	17	35	17	-51.4	18.9*	14	47	59	25.5	57.2	18	1.343	3.471	2.128	1.323	158.4
Red-breasted Nuthatch	38	33	43	30.3	37.6	27	47	34	-27.7	31.0	45	1.424	0.791	-0.634	0.550	-44.5
Brown Creeper	53	77	49	-36.4	12.2**	45	56	29	-48.2	13.0***	70	0.727	0.592	-0.135	0.234	-18.6
Bewick's Wren	11	25	29	16.0	17.1	13	31	50	61.3	49.6	14	1.240	1.724	0.484	0.430	39.0
House Wren	26	41	52	26.8	22.8	32	58	56	-3.4	24.6	40	1.415	1.077	-0.338	0.535	-23.9
Winter Wren	40	137	115	-16.1	8.7*	42	103	102	-1.0	18.2	52	0.752	0.887	0.135	0.235	18.0
Golden-crowned Kinglet	43	103	59	-42.7	9.0***	48	226	116	-48.7	23.9*	59	2.194	1.966	-0.228	0.915	-10.4
Ruby-crowned Kinglet	17	50	51	2.0	39.4	5	55	20	-63.6	20.0**	18	1.100	0.392	-0.708	0.793	-64.3
Swinson's Thrush	96	1238	1163	-6.1	4.5	58	163	169	3.7	16.7	96	0.132	0.145	0.014	0.030	10.4
Hermit Thrush	43	108	119	10.2	15.7	31	46	29	-37.0	12.2**	53	0.426	0.244	-0.182	0.090**	-42.8
American Robin	115	607	559	-7.9	6.5	72	165	109	-33.9	10.2***	116	0.272	0.195	-0.077	0.050	-28.3
Varied Thrush	27	51	44	-13.7	21.0	19	40	12	-70.0	8.1***	32	0.784	0.273	-0.512	0.199**	-65.2
Wrentit	23	82	52	-36.6	10.7***	21	46	74	60.9	46.3	25	0.561	1.423	0.862	0.306***	153.7
Gray Catbird	14	83	105	26.5	21.8	9	19	17	-10.5	37.8	14	0.229	0.162	-0.067	0.071	-29.3
Cedar Waxwing	42	218	169	-22.5	11.7	14	19	10	-47.4	26.1	44	0.087	0.059	-0.028	0.044	-32.1

TABLE 1. Continued.

Species	ADULTS				YOUNG				REPRODUCTIVE INDEX							
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Orange-crowned Warbler†	70	325	247	-24.0	7.6***	68	469	474	1.1	30.2	82	1.443	1.919	0.476	0.700	33.0
Nashville Warbler†	49	84	99	17.9	22.3	41	176	169	-4.0	30.3	56	2.095	1.707	-0.388	0.807	-18.5
Yellow Warbler	69	719	744	3.5	7.6	50	247	288	16.6	15.7	72	0.344	0.387	0.044	0.086	12.7
Yellow-rumped Warbler	71	386	342	-11.4	7.5	46	190	150	-21.1	22.4	76	0.492	0.439	-0.054	0.157	-10.9
Townsend's Warbler	33	80	101	26.3	20.7	20	54	66	22.2	71.6	35	0.675	0.653	-0.022	0.470	-3.2
Hermit Warbler	31	94	110	17.0	25.0	24	80	89	11.3	63.4	35	0.851	0.809	-0.042	0.496	-4.9
American Redstart	12	49	41	-16.3	16.6	8	19	17	-10.5	26.9	13	0.388	0.415	0.027	0.218	6.9
MacGillivray's Warbler	105	909	841	-7.5	4.2*	69	325	247	-24.0	12.0*	107	0.358	0.294	-0.064	0.071	-17.9
Common Yellowthroat	36	238	234	-1.7	9.8	21	71	49	-31.0	20.9	38	0.298	0.209	-0.089	0.076	-29.8
Wilson's Warbler	100	790	683	-13.5	7.5	57	230	142	-38.3	12.4**	105	0.291	0.208	-0.083	0.072	-28.6
Yellow-breasted Chat	20	112	111	-0.9	8.8	11	28	25	-10.7	38.7	20	0.250	0.225	-0.025	0.090	-9.9
Western Tanager	78	175	172	-1.7	15.3	26	40	42	5.0	33.2	80	0.229	0.244	0.016	0.091	6.8
Green-tailed Towhee	10	47	40	-14.9	16.9	9	17	11	-35.3	26.0	12	0.362	0.275	-0.087	0.125	-24.0
Spotted Towhee	36	135	128	-5.2	9.2	32	69	65	-5.8	24.7	41	0.511	0.508	-0.003	0.176	-0.6
Chipping Sparrow	37	75	67	-10.7	18.8	13	12	11	-8.3	51.9	40	0.160	0.164	0.004	0.089	2.6
Savannah Sparrow	5	64	86	34.4	9.2**	3	2	1	-50.0	75.0	7	0.031	0.012	-0.020	0.029	-62.8
Fox Sparrow	28	96	84	-12.5	9.5	15	15	12	-20.0	34.5	33	0.156	0.143	-0.013	0.076	-8.6
Song Sparrow	98	1112	960	-13.7	4.6***	95	1097	786	-28.4	5.7***	103	0.986	0.819	-0.168	0.155	-17.0
Lincoln's Sparrow	47	335	237	-29.3	6.1***	34	140	106	-24.3	16.3	48	0.418	0.447	0.029	0.114	7.0
White-crowned Sparrow	20	73	57	-21.9	13.7	11	24	12	-50.0	22.1	21	0.329	0.211	-0.118	0.132	-36.0
Dark-eyed Junco	83	660	705	6.8	6.5	69	461	403	-12.6	10.5	85	0.698	0.572	-0.127	0.135	-18.2
Black-headed Grosbeak	76	325	270	-16.9	7.6**	36	56	64	14.3	29.7	80	0.172	0.237	0.065	0.067	37.6
Lazuli Bunting	43	141	139	-1.4	17.3	13	29	22	-24.1	23.4	46	0.206	0.158	-0.047	0.089	-23.0
Red-winged Blackbird	17	117	152	29.9	22.6	7	8	15	87.5	118.7	17	0.068	0.099	0.030	0.070	44.3
Brown-headed Cowbird	48	139	137	-1.4	13.8	21	23	14	-39.1	24.7	52	0.166	0.102	-0.063	0.058	-38.2
Bullock's Oriole	22	91	75	-17.6	17.9	13	29	12	-58.6	28.8*	24	0.319	0.160	-0.159	0.249	-49.8
Purple Finch	42	324	248	-23.5	8.1*	27	55	72	30.9	50.9	46	0.170	0.290	0.121	0.101	71.0
Cassin's Finch	27	35	77	120.0	64.6**	8	4	10	150.0	171.1	30	0.114	0.130	0.016	0.084	13.6
House Finch	7	24	56	133.3	123.3	7	12	31	158.3	203.9	9	0.500	0.554	0.054	0.166	10.7
Pine Siskin	56	183	185	1.1	31.2	27	68	36	-47.1	32.4	58	0.372	0.195	-0.177	0.122	-47.6
Lesser Goldfinch	18	55	62	12.7	29.9	11	20	21	5.0	72.7	20	0.364	0.339	-0.025	0.184	-6.9
American Goldfinch	27	148	137	-7.4	15.4	4	4	2	-50.0	45.6	27	0.027	0.015	-0.012	0.019	-46.0
All species pooled	127	13637	12692	-6.9	2.3***	127	6140	5113	-16.7	5.7***	127	0.450	0.403	-0.047	0.044	-10.5
Number decreasing: 39/62 (63%)**																
Number decreasing: 41/62 (66%)*																
Number decreasing: 40/62 (65%)*																

TABLE 1. Continued.

Species	ADULTS				YOUNG				REPRODUCTIVE INDEX							
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
SOUTHWEST MAPS REGION																
Nuttall's Woodpecker	13	36	26	-27.8	16.8	14	29	19	-34.5	26.5	19	0.806	0.731	-0.075	0.533	-9.3
Western Wood-Pewee	31	65	85	30.8	33.6	4	3	1	-66.7	44.4	32	0.046	0.012	-0.034	0.030	-74.5
Dusky Flycatcher	13	36	63	75.0	29.7***	3	2	2	0.0	86.6	13	0.056	0.032	-0.024	0.043	-42.9
"Western" Flycatcher	30	90	131	45.6	33.7*	14	22	22	0.0	45.2	30	0.244	0.168	-0.077	0.129	-31.3
Black Phoebe	10	14	19	35.7	42.4	16	53	26	-50.9	16.1***	17	3.786	1.368	-2.417	1.733	-63.9
Ash-throated Flycatcher	29	118	89	-24.6	12.9	7	15	5	-66.7	24.9	29	0.127	0.056	-0.071	0.062	-55.8
Warbling Vireo	28	125	103	-17.6	21.3	5	5	3	-40.0	67.5	28	0.040	0.029	-0.011	0.025	-27.2
Bush-tit	33	129	185	43.4	36.0	26	140	109	-22.1	19.4	36	1.085	0.589	-0.496	0.324	-45.7
Bewick's Wren	39	208	195	-6.3	8.9	38	269	148	-45.0	8.9***	40	1.293	0.759	-0.534	0.281*	-41.3
House Wren	24	147	138	-6.1	12.4	22	114	70	-38.6	12.6**	26	0.775	0.507	-0.268	0.270	-34.6
Swainson's Thrush	15	208	171	-17.8	15.2	6	26	14	-46.2	10.7**	15	0.125	0.082	-0.043	0.058	-34.5
American Robin	24	88	87	-1.1	17.6	11	26	17	-34.6	16.3	25	0.296	0.195	-0.100	0.131	-33.9
Wrentit	17	124	141	13.7	13.4	15	124	66	-46.8	21.2	18	1.000	0.468	-0.532	0.404	-53.2
Orange-crowned Warbler	22	89	148	66.3	40.8	13	42	49	16.7	40.5	23	0.472	0.331	-0.141	0.132	-29.8
Virginia's Warbler	9	52	31	-40.4	9.3*	4	18	4	-77.8	16.4**	9	0.346	0.129	-0.217	0.234	-62.7
Lucy's Warbler	5	42	36	-14.3	15.9	4	22	6	-72.7	23.9*	6	0.524	0.167	-0.357	0.316	-68.2
Yellow Warbler	31	308	308	0.0	14.8	14	55	45	-18.2	28.0	32	0.179	0.146	-0.033	0.070	-18.2
MacGillivray's Warbler	15	55	59	7.3	19.7	5	3	3	0.0	105.4	18	0.055	0.051	-0.004	0.053	-6.8
Common Yellowthroat	26	348	419	20.4	12.7	18	341	143	-58.1	7.8***	27	0.980	0.341	-0.639	0.148***	-65.2
Wilson's Warbler	14	227	126	-44.5	11.2***	6	112	102	-8.9	11.3	14	0.493	0.810	0.316	0.347	64.1
Yellow-breasted Chat	21	154	183	18.8	13.8	10	9	8	-11.1	57.7	22	0.058	0.044	-0.015	0.038	-25.2
Western Tanager	26	56	58	3.6	22.9	4	2	3	50.0	178.0	26	0.036	0.052	0.016	0.047	44.8
Spotted Towhee	37	208	240	15.4	13.7	33	134	57	-57.5	14.6**	38	0.644	0.238	-0.407	0.181**	-63.1
California Towhee	16	55	71	29.1	25.0	9	60	8	-86.7	9.9***	16	1.091	0.113	-0.978	0.331***	-89.7
Brewer's Sparrow	6	17	8	-52.9	40.5	6	129	3	-97.7	3.1**	7	7.588	0.375	-7.213	7.863	-95.1
Lark Sparrow	11	43	31	-27.9	10.8**	3	70	28	-60.0	13.8**	11	1.628	0.903	-0.725	0.440	-44.5
Sage Sparrow	7	51	17	-66.7	27.0	7	254	0	-100.0	0.0	8	4.980	0.000	-4.980	4.479	-100.0
Song Sparrow	26	378	407	7.7	10.1	25	667	275	-58.8	5.3***	28	1.765	0.676	-1.089	0.417***	-61.7
Dark-eyed Junco	7	31	29	-6.5	11.0	4	25	5	-80.0	18.4**	8	0.807	0.172	-0.634	0.276*	-78.6
Black-headed Grosbeak	41	276	203	-26.4	7.8**	19	42	23	-45.2	16.0*	41	0.152	0.113	-0.039	0.060	-25.5
Blue Grosbeak	14	44	36	-18.2	14.3	6	13	1	-92.3	9.3***	15	0.296	0.028	-0.268	0.114**	-90.6
Lazuli Bunting	25	60	73	21.7	58.1	8	8	5	-37.5	46.3	26	0.133	0.068	-0.065	0.056	-48.6
Red-winged Blackbird	9	64	65	1.6	33.1	3	3	4	33.3	134.7	10	0.047	0.062	0.015	0.071	31.3

TABLE 1. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Brown-headed Cowbird	26	59	47	-20.3	17.6	10	9	2	-77.8	18.7**	27	0.153	0.043	-0.110	0.066*	-72.1
Bullock's Oriole	24	95	78	-17.9	16.8	9	32	44	37.5	120.4	24	0.337	0.564	0.227	0.400	67.5
House Finch	26	47	56	19.1	36.6	12	168	27	-83.9	16.3**	26	3.575	0.482	-3.092	2.714	-86.5
Lesser Goldfinch	23	117	133	13.7	25.7	13	100	25	-75.0	24.5**	23	0.855	0.188	-0.667	0.604	-78.0
American Goldfinch	12	45	56	24.4	41.6	5	9	9	0.0	60.9	12	0.200	0.161	-0.039	0.117	-19.6
All species pooled	48	4955	5060	2.1	6.1	48	3466	1590	-54.1	9.4***	48	0.699	0.314	-0.385	0.145***	-55.1
Number increasing: 19/38 (50%)																
Number decreasing: 30/38 (79%)*																
Number decreasing: 34/38 (89%)*																
NORTH-CENTRAL MAPS REGION																
Downy Woodpecker	18	28	22	-21.4	31.9	16	39	36	-7.7	27.1	19	1.393	1.636	0.244	0.690	17.5
"Traill's" Flycatcher	11	70	68	-2.9	16.8	5	6	15	150.0	166.7	11	0.086	0.221	0.135	0.147	157.4
Red-eyed Vireo	15	40	48	20.0	22.4	3	3	2	-33.3	100.0	15	0.075	0.042	-0.033	0.077	-44.4
Black-capped Chickadee	18	49	64	30.6	24.3	16	62	62	0.0	23.0	18	1.265	0.969	-0.297	0.495	-23.4
Tufted Titmouse	8	23	19	-17.4	35.4	8	31	19	-38.7	31.9	9	1.348	1.000	-0.348	0.720	-25.8
House Wren	13	90	100	11.1	19.5	14	36	83	130.6	66.5**	15	0.400	0.830	0.430	0.173**	107.5
Wood Thrush	11	33	42	27.3	41.1	8	15	10	-33.3	25.1	13	0.455	0.238	-0.217	0.278	-47.6
American Robin	14	65	57	-12.3	17.8	13	41	29	-29.3	31.1	15	0.631	0.509	-0.122	0.393	-19.3
Gray Catbird	18	182	193	6.0	12.9	13	76	68	-10.5	14.9	18	0.418	0.352	-0.065	0.145	-15.6
Cedar Waxwing	7	48	26	-45.8	32.0	4	4	0	-100.0	0.0	7	0.083	0.000	-0.083	0.055	-100.0
Yellow Warbler	9	140	129	-7.9	25.2	8	76	126	65.8	17.7***	10	0.543	0.977	0.434	0.723	79.9
American Redstart	6	44	49	11.4	16.1	4	15	7	-53.3	31.6	6	0.341	0.143	-0.198	0.158	-58.1
Common Yellowthroat	17	142	157	10.6	9.2	10	69	49	-29.0	27.5	17	0.486	0.312	-0.174	0.148	-35.8
Field Sparrow	6	59	59	0.0	21.5	6	24	28	16.7	52.9	6	0.407	0.475	0.068	0.238	16.7
Song Sparrow	13	113	98	-13.3	20.2	12	78	35	-55.1	14.0**	13	0.690	0.357	-0.333	0.197	-48.3
Swamp Sparrow	5	51	35	-31.4	5.3***	3	30	19	-36.7	10.0*	7	0.588	0.543	-0.045	0.073	-7.7
Northern Cardinal	15	62	54	-12.9	9.9	12	13	17	30.8	33.0	15	0.210	0.315	0.105	0.106	50.1
Indigo Bunting	12	97	123	26.8	17.0	5	4	8	100.0	163.0	12	0.041	0.065	0.024	0.037	57.7
American Goldfinch	13	147	188	27.9	5.3*	0	0	0	-	-	13	0.000	0.000	0.000	0.000	-
All species pooled	20	1995	2018	1.2	5.4	20	778	764	-1.8	14.5	20	0.390	0.379	-0.011	0.091	-2.9
Number increasing: 9/19 (47%)																
Number decreasing: 11/19 (58%)																
SOUTH-CENTRAL MAPS REGION																
Common Ground-Dove	5	64	52	-18.8	27.3	1	8	9	12.5		5	0.125	0.173	0.048	0.091	38.5
Yellow-billed Cuckoo	27	57	42	-26.3	15.9	2	1	1	0.0	200.0	27	0.018	0.024	0.006	0.029	35.7

TABLE 1. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Downy Woodpecker	18	42	26	-38.1	13.7**	15	32	27	-15.6	26.7	21	0.762	1.039	0.277	0.442	36.3
Acadian Flycatcher	10	56	41	-26.8	21.9	6	5	5	0.0	53.7	12	0.089	0.122	0.033	0.058	36.6
Brown-crested Flycatcher	4	59	35	-40.7	1.4*	2	6	0	-100.0	0.0	4	0.102	0.000	-0.102	0.005***	-100.0
White-eyed Vireo	27	216	199	-7.9	7.3	25	162	172	6.2	10.6	28	0.750	0.864	0.114	0.268	15.2
Bell's Vireo	9	51	35	-31.4	19.6	4	17	9	-47.1	14.7**	9	0.333	0.257	-0.076	0.226	-22.9
Carolina Chickadee	28	56	48	-14.3	20.2	24	70	33	-52.9	15.0	29	1.250	0.688	-0.563	0.407	-45.0
Tufted Titmouse	22	32	52	62.5	46.6	17	41	41	0.0	46.5	22	1.281	0.789	-0.493	0.427	-38.5
Black-crested Titmouse	17	36	39	8.3	24.6	19	59	26	-55.9	11.7**	19	1.639	0.667	-0.972	0.369**	-59.3
Carolina Wren	34	171	117	-31.6	8.6***	34	78	104	33.3	25.7	37	0.456	0.889	0.433	0.162***	94.9
Bewick's Wren	19	85	56	-34.1	14.8*	18	86	61	-29.1	17.6*	20	1.012	1.089	0.078	0.417	7.7
Blue-gray Gnatcatcher	16	22	31	40.9	41.6	12	19	26	36.8	68.4	17	0.864	0.839	-0.025	0.478	-2.9
Gray Catbird	10	76	101	32.9	32.0	6	45	40	-11.1	26.6	10	0.592	0.396	-0.196	0.077**	-33.1
Kentucky Warbler	15	68	63	-7.4	16.0	10	14	13	-7.1	39.4	16	0.206	0.206	0.001	0.096	0.2
Common Yellowthroat	16	52	43	-17.3	25.2	6	7	8	14.3	55.8	16	0.135	0.186	0.051	0.109	38.2
Yellow-breasted Chat	12	114	88	-22.8	11.7	7	11	12	9.1	54.4	13	0.097	0.136	0.040	0.051	41.3
Olive Sparrow	4	41	68	65.9	32.8	3	6	6	0.0	104.1	4	0.146	0.088	-0.058	0.099	-39.7
Field Sparrow	18	123	88	-28.5	10.0*	12	31	17	-45.2	17.2*	18	0.252	0.193	-0.059	0.084	-23.4
Grasshopper Sparrow	2	38	33	-13.2	5.1	2	5	29	480.0	408.0	2	0.132	0.879	0.747	0.115	567.9
Northern Cardinal	44	416	284	-31.7	4.7***	39	138	149	8.0	25.9	44	0.332	0.525	0.193	0.119	58.2
Indigo Bunting	22	184	161	-12.5	15.0	10	14	14	0.0	51.1	22	0.076	0.087	0.011	0.033	14.3
Painted Bunting	26	196	167	-14.8	15.1	18	46	150	226.1	277.7	26	0.235	0.898	0.664	0.561	282.7
Brown-headed Cowbird	28	48	38	-20.8	12.4	2	6	1	-83.3	5.6	28	0.125	0.026	-0.099	0.098	-78.9
American Goldfinch	9	71	51	-28.2	13.2	0	0	0	-	-	9	0.000	0.000	0.000	0.000	-
All species pooled	46	3158	2586	-18.1	4.2***	46	1172	1189	1.5	15.8	46	0.371	0.460	0.089	0.079	23.9
Number decreasing: 20/25 (80%);*** Number increasing: 9/25 (36%)																
NORTHEAST MAPS REGION																
Downy Woodpecker	36	44	68	54.5	37.0*	39	51	72	41.2	30.6*	45	1.159	1.059	-0.100	0.365	-8.7
"Traill's" Flycatcher	19	62	68	9.7	30.8	8	13	15	15.4	40.4	20	0.210	0.221	0.011	0.141	5.2
White-eyed Vireo	9	42	58	38.1	16.4**	7	13	12	-7.7	14.1	10	0.310	0.207	-0.103	0.101	-33.2
Red-eyed Vireo	45	190	160	-15.8	12.4	13	8	20	150.0	106.1	45	0.042	0.125	0.083	0.040**	196.9
Carolina Chickadee	14	17	36	111.8	108.1	13	18	17	-5.6	48.5	16	1.059	0.472	-0.587	0.535	-55.4
Black-capped Chickadee	39	111	118	6.3	13.5	31	148	111	-25.0	17.3	42	1.333	0.941	-0.393	0.485	-29.4
Tufted Titmouse	27	50	61	22.0	24.3	21	47	48	2.1	23.5	30	0.940	0.787	-0.153	0.282	-16.3

TABLE 1. Continued.

Species	ADULTS				YOUNG				REPRODUCTIVE INDEX							
	¹ n	1998	1999	%change ²	SE ³	⁴ n	1998	1999	%change ⁵	SE ⁶	⁷ n	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Carolina Wren	16	60	71	18.3	35.2	16	33	24	-27.3	21.8	21	0.550	0.338	-0.212	0.193	-38.5
House Wren	12	38	32	-15.8	27.6	10	15	15	0.0	31.4	14	0.395	0.469	0.074	0.333	18.8
Veery	35	262	248	-5.3	6.6	23	48	48	0.0	27.9	35	0.183	0.194	0.010	0.055	5.6
Hermit Thrush	20	76	77	1.3	16.6	12	44	19	-56.8	18.9*	21	0.579	0.247	-0.332	0.169**	-57.4
Wood Thrush	38	211	187	-11.4	10.0	24	45	46	2.2	29.3	41	0.213	0.246	0.033	0.091	15.3
American Robin	39	137	163	19.0	17.7	24	84	72	-14.3	15.4	43	0.613	0.442	-0.171	0.320	-28.0
Gray Catbird	45	600	569	-5.2	5.8	35	245	213	-13.1	15.5	46	0.408	0.374	-0.034	0.098	-8.3
Cedar Waxwing	19	70	56	-20.0	23.1	1	1	0	-100.0		19	0.014	0.000	-0.014	0.014	-100.0
Yellow Warbler	21	127	85	-33.1	10.3*	14	44	34	-22.7	38.3	23	0.347	0.400	0.054	0.176	15.5
Chestnut-sided Warbler	13	56	49	-12.5	23.4	11	29	19	-34.5	24.8	17	0.518	0.388	-0.130	0.182	-25.1
Magnolia Warbler	15	49	48	-2.0	27.0	9	29	19	-34.5	21.0	16	0.592	0.396	-0.196	0.218	-33.1
Yellow-rumped Warbler	10	48	39	-18.8	19.5	5	21	4	-81.0	5.5***	10	0.438	0.103	-0.335	0.157*	-76.6
Blk.-throated Gm. Warb.	17	52	60	15.4	20.0	11	14	15	7.1	73.4	20	0.269	0.250	-0.019	0.153	-7.1
Black-and-white Warbler	40	67	73	9.0	19.7	20	47	33	-29.8	11.6*	41	0.701	0.452	-0.249	0.228	-35.6
American Redstart	27	256	233	-9.0	12.7	25	186	123	-33.9	12.6	30	0.727	0.528	-0.199	0.210	-27.3
Worm-eating Warbler	19	41	54	31.7	37.5	10	35	13	-62.9	6.8***	20	0.854	0.241	-0.613	0.307*	-71.8
Ovenbird	45	215	257	19.5	10.3*	33	101	91	-9.9	22.7	45	0.470	0.354	-0.116	0.118	-24.6
Common Yellowthroat	33	266	288	8.3	11.9	28	77	95	23.4	29.2	33	0.290	0.330	0.040	0.090	14.0
Hooded Warbler	16	61	98	60.7	12.5***	10	18	10	-44.4	20.5	18	0.295	0.102	-0.193	0.127	-65.4
Eastern Towhee	23	59	69	16.9	20.4	20	30	23	-23.3	24.0	24	0.509	0.333	-0.175	0.154	-34.4
Song Sparrow	22	137	142	3.7	10.2	26	101	107	5.9	26.7	29	0.737	0.754	0.016	0.219	2.2
White-throated Sparrow	10	33	45	36.4	27.0	8	16	21	31.3	57.8	10	0.485	0.467	-0.018	0.217	-3.8
Dark-eyed Junco	13	41	47	14.6	23.4	13	108	63	-41.7	18.3	16	2.634	1.340	-1.294	1.135	-49.1
Northern Cardinal	30	102	142	39.2	19.1**	22	34	45	32.4	33.8	30	0.333	0.317	-0.016	0.097	-4.9
Rose-breasted Grosbeak	17	38	41	7.9	22.9	10	10	10	0.0	81.6	19	0.263	0.244	-0.019	0.230	-7.3
Indigo Bunting	23	67	75	11.9	18.1	7	10	13	30.0	63.4	23	0.149	0.173	0.024	0.117	16.1
Red-winged Blackbird	13	51	45	-11.8	15.2	2	3	6	100.0	66.7	13	0.059	0.133	0.074	0.062	126.7
American Goldfinch	30	141	174	23.4	19.9	0	0	0	-	-	30	0.000	0.000	0.000	0.000	-
All species pooled	55	4603	4699	2.1	3.5	55	2025	1768	-12.7	6.3*	55	0.440	0.376	-0.064	0.047	-14.5
Number increasing: 23/35 (66%)**																
Number decreasing: 19/35 (54%)																
Number decreasing: 24/35 (69%)**																
SOUTHEAST MAPS REGION																
Downy Woodpecker	34	44	35	-20.5	18.0	32	34	42	23.5	35.1	46	0.773	1.200	0.427	0.349	55.3
Acadian Flycatcher	51	218	229	5.0	9.4	24	20	20	0.0	37.5	53	0.092	0.087	-0.004	0.033	-4.8

TABLE 1. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
White-eyed Vireo	39	140	131	-6.4	9.2	24	26	46	76.9	56.7*	39	0.186	0.351	0.165	0.075**	89.1
Red-eyed Vireo	54	277	261	-5.8	12.1	14	10	13	30.0	69.6	55	0.036	0.050	0.014	0.024	38.0
Blue Jay	35	53	48	-9.4	23.6	11	12	4	-66.7	18.4**	38	0.226	0.083	-0.143	0.096	-63.2
Carolina Chickadee	43	69	69	0.0	15.2	34	89	71	-20.2	16.3	52	1.290	1.029	-0.261	0.396	-20.2
Tufted Titmouse	59	141	103	-27.0	10.4**	45	141	86	-39.0	11.6**	60	1.000	0.835	-0.165	0.212	-16.5
Carolina Wren	59	220	218	-0.9	10.1	52	182	162	-11.0	14.2	61	0.827	0.743	-0.084	0.177	-10.2
Wood Thrush	60	351	360	2.6	9.0	37	70	91	30.0	27.4	60	0.199	0.253	0.053	0.065	26.8
American Robin	17	39	48	23.1	74.3	17	48	35	-27.1	34.5	20	1.231	0.729	-0.502	0.590	-40.8
Gray Catbird	31	95	107	12.6	26.1	17	46	64	39.1	22.1*	33	0.484	0.598	0.114	0.323	23.5
Blue-winged Warbler	10	44	30	-31.8	13.5*	6	5	23	360.0	170.7*	10	0.114	0.767	0.653	0.157***	574.7
Prairie Warbler	17	55	38	-30.9	21.3	10	23	18	-21.7	32.6	18	0.418	0.474	0.056	0.227	13.3
Prothonotary Warbler	13	41	59	43.9	27.4*	7	15	21	40.0	40.2	14	0.366	0.356	-0.010	0.188	-2.7
Worm-eating Warbler	25	49	50	2.0	15.2	15	10	19	90.0	86.5	27	0.204	0.380	0.176	0.136	86.2
Ovenbird	49	217	253	16.6	11.6	36	115	108	-6.1	19.3	51	0.530	0.427	-0.103	0.122	-19.5
Louisiana Waterthrush	25	58	50	-13.8	16.5	21	27	34	25.9	48.9	29	0.466	0.680	0.215	0.229	46.1
Kentucky Warbler	30	169	163	-3.6	11.6	27	42	96	128.6	42.5***	35	0.249	0.589	0.340	0.115***	137.0
Common Yellowthroat	42	157	202	28.7	17.6*	26	48	75	56.3	31.8*	45	0.306	0.371	0.066	0.116	21.4
Hooded Warbler	28	69	77	11.6	18.3	15	6	15	150.0	151.4	32	0.087	0.195	0.108	0.081	124.0
Yellow-breasted Chat	18	59	53	-10.2	18.0	6	10	4	-60.0	23.8*	19	0.170	0.075	-0.094	0.067	-55.5
Northern Cardinal	61	275	268	-2.5	8.5	48	98	88	-10.2	13.3	62	0.356	0.328	-0.028	0.113	-7.9
Indigo Bunting	41	165	162	-1.8	11.6	16	17	23	35.3	70.6	41	0.103	0.142	0.039	0.058	37.8
Common Grackle	19	56	43	-23.2	26.8	8	8	8	0.0	46.3	20	0.143	0.186	0.043	0.097	30.2
American Goldfinch	16	54	92	70.4	26.5*	1	2	0	-100.0		17	0.037	0.000	-0.037	0.043	-100.0
All species pooled	66	3575	3578	0.1	3.6	66	1245	1299	4.3	9.1	66	0.348	0.363	0.015	0.046	4.3
Number increasing: 10/25 (40%)																
Number increasing: 13/25 (52%)																
Number increasing: 14/25 (56%)																
ALASKA AND BOREAL CANADA MAPS REGIONS																
Alder Flycatcher	14	74	68	-8.1	17.7	7	10	7	-30.0	38.5	15	0.135	0.103	-0.032	0.053	-23.8
Black-capped Chickadee	12	36	34	-5.6	42.5	12	87	36	-58.6	25.4	15	2.417	1.059	-1.358	0.691*	-56.2
Ruby-crowned Kinglet	9	29	15	-48.3	10.4**	8	28	29	3.6	22.6	10	0.966	1.933	0.968	0.567	100.2
Swinson's Thrush	15	93	102	9.7	15.8	14	41	39	-4.9	23.9	16	0.441	0.382	-0.059	0.136	-13.3
Hermit Thrush	13	137	104	-24.1	12.8*	11	111	32	-71.2	5.4***	13	0.810	0.308	-0.503	0.248*	-62.0
American Robin	14	39	61	56.4	61.7	11	22	9	-59.1	12.1**	18	0.564	0.148	-0.417	0.162**	-73.8
Orange-crowned Warbler	16	210	212	1.0	12.0	14	340	52	-84.7	4.0***	16	1.619	0.245	-1.374	0.365***	-84.9

TABLE 1. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX				
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹ % change ¹⁰
Yellow Warbler	9	149	175	17.5	19.7	9	78	67	-14.1	27.8	11	0.523	0.383	-0.141	0.227 -26.9
Yellow-rumped Warbler	15	105	78	-25.7	9.4**	13	69	48	-30.4	28.0	15	0.657	0.615	-0.042	0.331 -6.4
Wilson's Warbler	16	396	509	28.5	20.7	15	645	143	-77.8	8.2***	16	1.629	0.281	-1.348	0.423*** -82.8
American Tree Sparrow	8	25	21	-16.0	16.9	7	54	47	-13.0	26.7	9	2.160	2.238	0.078	0.937 3.6
Savannah Sparrow	7	12	19	58.3	98.2	7	30	33	10.0	33.1	10	2.500	1.737	-0.763	1.882 -30.5
Fox Sparrow	11	58	59	1.7	12.7	15	60	37	-38.3	21.1	15	1.035	0.627	-0.407	0.492 -39.4
Lincoln's Sparrow	5	27	38	40.7	49.2	7	59	19	-67.8	4.8**	8	2.185	0.500	-1.685	1.018 -77.1
White-crowned Sparrow	11	100	58	-42.0	13.0**	9	85	63	-25.9	26.0	11	0.850	1.086	0.236	0.399 27.8
Golden-crowned Sparrow	8	41	51	24.4	22.1	3	22	2	-90.9	8.7***	8	0.537	0.039	-0.497	0.277 -92.7
Dark-eyed Junco	11	101	83	-17.8	17.7	12	123	60	-51.2	15.3*	13	1.218	0.723	-0.495	0.341 -40.6
Common Redpoll	15	150	156	4.0	25.0	13	42	61	45.2	56.2	15	0.280	0.391	0.111	0.148 39.7
All species pooled	22	2170	2185	0.7	9.4	22	2099	898	-57.2	10.1***	22	0.967	0.411	-0.556	0.166*** -57.5
Number increasing: 10/18 (56%)															
Number decreasing: 15/18 (83%)***															
Number decreasing: 14/18 (78%)**															
ALL REGIONS POOLED															
All species pooled	384	34093	32818	-3.7	1.6**	384	16925	12621	-25.4	4.5***	384	0.496	0.385	-0.111	0.033*** -22.5
Number decreasing: 84/131 (64%)***															
Number decreasing: 79/131 (60%)***															

¹ Number of stations at which at least one individual adult bird of the species was captured in either year.
² Percent change between the two years in the number of adult individuals captured.
³ Standard error and statistical significance of the percent change in the number of adult individuals captured.
⁴ Number of stations at which at least one individual young bird of the species was captured in either year.
⁵ Percent change between the two years in the number of adult individuals captured.
⁶ Standard error and statistical significance of the percent change in the number of adult individuals captured.
⁷ Number of stations at which at least one individual young bird of the species was captured in either year.
⁸ Change between the two years in the reproductive index (number of young/number of adults).
⁹ Standard error and statistical significance of the change in the reproductive index.
¹⁰ Percent change between the two years in the reproductive index.
† Reproductive indices for this species should be interpreted with caution because it likely includes data from stations where the species occurs only as an altitudinal disperser (a situation in which large numbers of adults and, especially, young, disperse up-mountain after the breeding season) and, therefore, may be biased high.
* 0.05 ≤ P < 0.10; ** 0.01 ≤ P < 0.05; *** P < 0.01

>50%. Similar declines in the number of young captured (-12.7%, nearly significant) and in reproductive index (-14.5%, not significant) were also found for the Northeast Region, where the proportion of decreasing species (66%) was significantly >50% for reproductive index but not for number of young. Very large, highly significant declines in number of young captured (-54.1% and -57.2%) and reproductive index (-55.1% and -57.5%) were documented for both the Southwest and Alaska/Boreal Canada regions, respectively. Moreover, the proportions of decreasing species were significantly >50% for both parameters in both regions. Decreases in number of young and reproductive index were also found in the North-central Region, but the decreases were small (-1.8% and -2.9%, respectively) and non-significant. The proportion of decreasing species for each of these parameters (58%) likewise was not significantly >50%. Summing over all five of these regions, 43 species had significant or nearly significant decreases, while only five species showed significant or nearly significant increases in number of young captured. Similarly, 19 species had significant or nearly significant decreases, while only four species showed significant or nearly significant increases in reproductive index.

In sharp contrast to all of the western and northern regions, both numbers of young and reproductive index increased slightly between 1998 and 1999 for both the South-central and Southeast regions, although none was significant (number of young in Southeast nearly significant, +12.7%) and none of the proportions of increasing species was significant. Even in these two regions, however, the seven species with significant or nearly significant decreases in number of young outnumbered the five species with such increases. Furthermore, the three species with significant or nearly significant decreases in reproductive index nearly equaled the four species with such increases in these two regions.

On a continent-wide basis, both the number of young captured and the reproductive index (young/adult) for all species pooled showed highly significant decreases of -25.4% and -22.5%, respectively, between 1998 and 1999, while the percentages of decreasing species for these two parameters were 64% and 60%,

respectively, both significantly >50%.

Changes between 1999 and 2000 — Constant-effort data on the number of adult and young birds captured and the proportion of young in the catch were obtained for 1999 and 2000 from 407 MAPS stations operated comparably in both years (Table 2). Included were 62 species in the Northwest, 42 in the Southwest, 20 in the North-central, 24 in the South-central, 39 in the Northeast, 28 in the Southeast, and 16 in the Alaska/Boreal Canada regions, comprising a total of 114 species overall (plus 21 additional species that met productivity criteria when data were pooled from all seven regions).

Adult populations. — Numbers of adults for all species pooled decreased between 1999 and 2000 in six of the seven regions (all except the South-central Region) by amounts that ranged from highly significant decreases of -19.4% in the Southwest, -18.0% in Alaska/Boreal Canada, and -11.2% in the Northeast regions to non-significant decreases of -4.2% in the North-central, -3.8% in the Southeast, and -0.0% in the Northwest regions. The proportion of decreasing species was significantly >50% for the Southwest (83%) and Northeast (69%) regions, but not for the other four regions that showed decreases in adults for all species pooled. Summing over the three regions that showed significant decreases in adults of all species pooled, 28 species had significant or nearly significant decreases in adults, while only five species showed significant or nearly significant increases. Summing over the three regions that showed non-significant decreases in adults of all species pooled, 11 species had significant or nearly significant decreases in adults, while eight species showed significant or nearly significant increases.

In contrast to all of the other six regions, the South-central Region showed a significant 15.2% increase between 1999 and 2000 in numbers of adults for all species pooled and a proportion of increasing species (67%) that was nearly significantly >50%. Three species in the South-central Region had significant or nearly significant increases in adults between 1999 and 2000, while no species showed a significant or even nearly significant decrease in numbers of adults.

On a continent-wide basis, numbers of adults of all species pooled decreased between 1999

TABLE 2. Regional changes between 1999 and 2000 in the numbers of adult and young individuals captured and in the reproductive index (number of young/number of adults) for 135 species and all species pooled (excluding gallinaceous birds and hummingbirds) at the 407 stations run comparably in both years. For each species, data were included only from stations within the breeding range of the species. Only species for which adults were captured at two or more stations and for which 50 or more aged individuals were captured in either year are included

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX				
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹ % change ¹⁰
NORTHWEST MAPS REGION															
Red-breasted Sapsucker	49	83	116	39.8	21.5**	32	51	52	2.0	27.0	51	0.614	0.448	-0.166	0.154 -27.0
Downy Woodpecker	50	46	64	39.1	27.0	30	30	31	3.3	31.6	55	0.652	0.484	-0.168	0.202 -25.7
Western Wood-Pewee	55	167	150	-10.2	11.4	18	10	27	170.0	130.7	58	0.060	0.180	0.120	0.057** 200.6
Willow Flycatcher	65	202	210	4.0	14.7	17	13	29	123.1	156.4	67	0.064	0.138	0.074	0.053 114.6
Hammond's Flycatcher	64	160	158	-1.3	11.8	36	29	70	141.4	56.1***	70	0.181	0.443	0.262	0.129** 144.4
Dusky Flycatcher	59	205	195	-4.9	12.4	28	30	51	70.0	61.9*	65	0.146	0.262	0.115	0.068* 78.7
"Western" Flycatcher	80	275	188	-31.6	21.7	41	57	59	3.5	24.7	86	0.207	0.314	0.107	0.110 51.4
Cassin's Vireo	32	45	71	57.8	30.3**	18	20	25	25.0	35.2	42	0.444	0.352	-0.092	0.216 -20.8
Warbling Vireo	96	485	466	-3.9	8.1	25	40	59	47.5	38.5**	96	0.083	0.127	0.044	0.046 53.5
Steller's Jay	35	28	32	14.3	27.6	16	18	19	5.6	55.5	39	0.643	0.594	-0.049	0.326 -7.6
Tree Swallow	14	39	48	23.1	19.3*	3	3	4	33.3	100.0	15	0.077	0.083	0.006	0.047 8.3
Black-capped Chickadee	44	131	138	5.3	15.1	44	160	178	11.3	21.8	51	1.221	1.290	0.068	0.410 5.6
Mountain Chickadee	40	118	139	17.8	18.8	37	70	174	148.6	56.6***	45	0.593	1.252	0.659	0.261** 111.0
Chestnut-backed Chick.	48	81	90	11.1	27.0	38	72	130	80.6	45.9**	54	0.889	1.444	0.556	0.370 62.5
Bushtit	16	21	22	4.8	42.4	19	54	51	-5.6	49.1	21	2.571	2.318	-0.253	1.384 -9.8
Red-breasted Nuthatch	49	43	76	76.7	36.8***	34	33	110	233.3	126.8***	60	0.767	1.447	0.680	0.477 88.6
Brown Creeper	49	52	66	26.9	23.1	47	28	111	296.4	113.1***	61	0.539	1.682	1.143	0.362*** 212.3
Bewick's Wren	14	27	34	25.9	28.4	15	41	53	29.3	34.0	18	1.519	1.559	0.040	0.464 2.7
House Wren	29	57	59	3.5	22.1	40	56	60	7.1	22.1	46	0.982	1.017	0.035	0.405 -3.5
Winter Wren	33	113	101	-10.6	11.9	40	104	100	-3.8	17.3	47	0.920	0.990	0.070	0.328 7.6
Golden-crowned Kinglet	37	60	94	56.7	30.2**	42	114	398	249.1	73.3*	53	1.900	4.234	2.334	1.790 122.8
Ruby-crowned Kinglet	19	64	59	-7.8	28.5	13	23	43	87.0	82.3	23	0.359	0.729	0.369	0.274 102.8
Swainson's Thrush	88	1154	1169	1.3	4.9	59	168	279	66.1	28.4**	89	0.146	0.239	0.093	0.053* 63.9
Hermit Thrush	41	131	78	-40.5	12.5**	27	37	53	43.2	54.0	50	0.282	0.680	0.397	0.209* 140.6
American Robin	113	599	560	-6.5	6.0	73	118	198	67.8	31.9**	116	0.197	0.354	0.157	0.070** 79.5
Varied Thrush	25	39	51	30.8	23.5	13	11	35	218.2	118.9*	29	0.282	0.686	0.404	0.281 143.3
Wrentit	21	51	86	68.6	27.0***	22	84	93	10.7	20.1	25	1.647	1.081	-0.566	0.416 -34.3

TABLE 2. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX				
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹ % change ¹⁰
Gray Catbird	14	114	127	11.4	10.7	8	17	40	135.3	80.3	14	0.149	0.315	0.166	0.101 111.2
Cedar Waxwing	40	170	245	44.1	18.4**	11	10	21	110.0	181.6	41	0.059	0.086	0.027	0.059 45.7
Orange-crowned Warbler†	79	287	314	9.4	13.4	68	538	660	22.7	34.7	86	1.875	2.102	0.227	0.678 12.1
Nashville Warbler†	45	106	92	-13.2	11.3	41	195	152	-22.1	21.0	53	1.840	1.652	-0.188	0.612 -10.2
Virginia's Warbler	4	14	29	107.1	47.6	4	16	24	50.0	93.1	5	1.143	0.828	-0.315	0.502 -27.6
Yellow Warbler	69	791	800	1.1	6.7	50	296	481	62.5	34.3	73	0.374	0.601	0.227	0.162 60.7
Yellow-rumped Warbler	79	373	394	5.6	8.5	50	157	288	83.4	56.1*	82	0.421	0.731	0.310	0.173* 73.7
Townsend's Warbler	31	94	76	-19.1	9.7*	22	68	110	61.8	96.3	34	0.723	1.447	0.724	0.527 100.1
Hermit Warbler	35	104	142	36.5	18.2**	22	90	91	1.1	50.6	38	0.865	0.641	-0.225	0.447 -25.9
American Redstart	12	48	26	-45.8	9.2***	7	16	17	6.3	30.2	13	0.333	0.654	0.321	0.247 96.2
MacGillivray's Warbler	103	846	781	-7.7	4.6	79	253	358	41.5	21.6**	106	0.299	0.458	0.159	0.076** 53.3
Common Yellowthroat	41	228	184	-19.3	7.0**	23	38	91	139.5	50.1**	43	0.167	0.495	0.328	0.181* 196.7
Wilson's Warbler	99	711	543	-23.6	6.0***	49	118	193	63.6	25.8***	102	0.166	0.355	0.190	0.069*** 114.2
Yellow-breasted Chat	19	106	90	-15.1	15.0	11	26	37	42.3	29.8	20	0.245	0.411	0.166	0.126 67.6
Western Tanager	74	181	213	17.7	14.9	39	43	94	118.6	61.3**	77	0.238	0.441	0.204	0.149 85.8
Green-tailed Towhee	14	43	36	-16.3	15.6	9	11	16	45.5	59.6	18	0.256	0.444	0.189	0.173 73.7
Spotted Towhee	43	125	138	10.4	10.5	39	68	142	108.8	38.6***	50	0.544	1.029	0.485	0.214** 89.2
Chipping Sparrow	44	75	85	13.3	25.5	26	11	38	245.5	169.0**	48	0.147	0.447	0.300	0.120** 204.8
Savannah Sparrow	5	87	48	-44.8	4.3*	5	4	6	50.0	106.4	8	0.046	0.125	0.079	0.115 171.9
Fox Sparrow	31	88	84	-4.5	14.0	15	12	20	66.7	56.5	34	0.136	0.238	0.102	0.095 74.6
Song Sparrow	100	975	969	-0.6	4.9	99	746	1244	66.8	15.1***	104	0.765	1.284	0.519	0.142*** 67.8
Lincoln's Sparrow	47	262	257	-1.9	7.1	42	112	194	73.2	27.7***	53	0.428	0.755	0.327	0.172* 76.6
White-crowned Sparrow	21	96	81	-15.6	13.5	14	23	45	95.7	48.5*	24	0.240	0.556	0.316	0.122*** 131.9
Dark-eyed Junco	82	730	669	-8.4	5.6	78	423	737	74.2	26.7***	90	0.580	1.102	0.522	0.175*** 90.1
Black-headed Grosbeak	76	255	262	2.7	10.6	35	54	88	63.0	30.5**	79	0.212	0.336	0.124	0.104 58.6
Lazuli Bunting	46	136	163	19.9	26.7	27	23	40	73.9	48.1**	49	0.169	0.245	0.076	0.053 45.1
Red-winged Blackbird	16	159	208	30.8	30.9	8	18	29	61.1	82.8	17	0.113	0.139	0.026	0.056 23.2
Brown-headed Cowbird	47	122	135	10.7	14.0	18	17	16	-5.9	41.0	47	0.139	0.119	-0.021	0.063 -14.9
Bullock's Oriole	23	68	73	7.4	21.1	17	10	50	400.0	224.4*	28	0.147	0.685	0.538	0.364 365.8
Purple Finch	40	247	314	27.1	16.2	26	76	76	0.0	31.8	42	0.308	0.242	-0.066	0.108 -21.3
Cassin's Finch	29	84	49	-41.7	14.0*	10	10	7	-30.0	53.5	32	0.119	0.143	0.024	0.095 20.0

TABLE 2. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
House Finch	9	49	38	-22.4	17.8	5	25	13	-48.0	24.1	10	0.510	0.342	-0.168	0.130	-32.9
Pine Siskin	62	202	190	-5.9	18.8	32	38	79	107.9	73.5*	66	0.188	0.416	0.228	0.157	121.0
Lesser Goldfinch	16	42	38	-9.5	17.7	9	15	67	346.7	417.2	16	0.357	1.763	1.406	1.342	393.7
American Goldfinch	23	156	217	39.1	26.5	8	3	10	233.3	253.7	23	0.019	0.046	0.027	0.021	139.6
All species pooled	126	13100	13095	0.0	2.0	126	5194	8284	59.5	12.4***	126	0.397	0.633	0.236	0.053***	59.6
Number decreasing: 27/62 (44%)																
Number increasing: 55/62 (89%)*																
SOUTHWEST MAPS REGION																
Nuttall's Woodpecker	19	37	57	54.1	32.4*	14	26	38	46.2	25.6*	21	0.703	0.667	-0.036	0.430	-5.1
Downy Woodpecker	20	42	40	-4.8	21.2	15	16	22	37.5	60.4	22	0.381	0.550	0.169	0.197	44.4
Western Wood-Pewee	27	88	40	-54.5	11.4**	5	2	10	400.0	370.8	27	0.023	0.250	0.227	0.117*	1000.0
Dusky Flycatcher	13	64	41	-35.9	11.3**	2	2	0	-100.0	0.0	13	0.031	0.000	-0.031	0.022	-100.0
"Western" Flycatcher	38	159	106	-33.3	13.2*	20	32	35	9.4	31.6	39	0.201	0.330	0.129	0.139	64.1
Black Phoebe	13	20	18	-10.0	30.0	21	35	56	60.0	42.7**	24	1.750	3.111	1.361	1.557	77.8
Ash-throated Flycatcher	41	131	106	-19.1	13.2	12	13	14	7.7	86.8	41	0.099	0.132	0.033	0.082	33.1
Loggerhead Shrike	10	32	29	-9.4	25.2	7	24	20	-16.7	23.0	11	0.750	0.690	-0.060	0.439	-8.0
Bell's Vireo	6	35	36	2.9	15.0	6	6	17	183.3	60.7*	7	0.171	0.472	0.301	0.100**	175.5
Warbling Vireo	34	131	95	-27.5	20.1	9	3	14	366.7	361.7	35	0.023	0.147	0.125	0.080	543.5
Cliff Swallow	7	44	24	-45.5	23.9	2	8	2	-75.0	50.0	8	0.182	0.083	-0.099	0.137	-54.2
Chestnut-backed Chick.	7	12	17	41.7	34.7	8	46	100	117.4	68.7	8	3.833	5.882	2.049	1.996	53.5
Oak Titmouse	13	35	30	-14.3	19.5	12	35	44	25.7	37.4	14	1.000	1.467	0.467	0.530	46.7
Bushtit	42	290	207	-28.6	13.7	34	175	203	16.0	20.0	44	0.603	0.981	0.377	0.255	62.5
Bewick's Wren	47	253	236	-6.7	8.4	45	192	323	68.2	23.3***	50	0.759	1.369	0.610	0.293**	80.3
House Wren	25	185	161	-13.0	18.5	20	128	167	30.5	20.0	26	0.692	1.037	0.345	0.457	49.9
Swainson's Thrush	18	222	131	-41.0	9.7**	8	16	29	81.3	65.1	18	0.072	0.221	0.149	0.062**	207.2
American Robin	21	110	62	-43.6	11.0***	12	16	16	0.0	43.3	22	0.146	0.258	0.113	0.119	77.4
Wrentit	21	223	134	-39.9	8.8**	19	107	166	55.1	46.8*	21	0.480	1.239	0.759	0.250***	158.2
Orange-crowned Warbler	25	200	89	-55.5	6.3***	17	82	54	-34.1	23.3	26	0.410	0.607	0.197	0.223	48.0
Lucy's Warbler	7	91	57	-37.4	13.8**	7	55	39	-29.1	34.7	7	0.604	0.684	0.080	0.268	13.2
Yellow Warbler	38	403	330	-18.1	21.2	12	55	85	54.5	52.3	39	0.137	0.258	0.121	0.112	88.7
MacGillivray's Warbler	21	58	49	-15.5	17.8	6	3	5	66.7	126.5	23	0.052	0.102	0.050	0.058	97.3

TABLE 2. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX				
	¹ n	1998	1999	%change ²	SE ³	⁴ n	1998	1999	%change ⁵	SE ⁶	⁷ n	1998	1999	change ⁸	SE ⁹ % change ¹⁰
Common Yellowthroat	36	608	417	-31.4	5.1***	24	265	438	65.3	17.1***	38	0.436	1.050	0.614	0.182*** 141.0
Wilson's Warbler	14	140	110	-21.4	15.2	7	95	72	-24.2	23.8	14	0.679	0.654	-0.024	0.319 -3.5
Yellow-breasted Chat	23	228	193	-15.4	10.5	10	19	33	73.7	47.8	23	0.083	0.171	0.088	0.059 105.2
Western Tanager	23	59	38	-35.6	20.5	7	4	10	150.0	180.1	23	0.068	0.263	0.195	0.153 288.2
Spotted Towhee	43	326	292	-10.4	8.6	32	77	173	124.7	45.8***	43	0.236	0.593	0.356	0.129*** 150.8
California Towhee	20	125	75	-40.0	6.7**	14	10	50	400.0	321.5	20	0.080	0.667	0.587	0.146*** 733.3
Brewer's Sparrow	7	18	29	61.1	60.2	7	5	25	400.0	278.3	9	0.278	0.862	0.584	0.215** 210.3
Lark Sparrow	15	51	43	-15.7	31.8	7	48	11	-77.1	14.5***	16	0.941	0.256	-0.685	0.246** -72.8
Sage Sparrow	7	26	45	73.1	55.7	4	0	13	+++ ¹¹		9	0.000	0.289	0.289	0.099*** +++ ¹¹
Song Sparrow	35	627	468	-25.4	6.0***	31	388	647	66.8	45.9*	36	0.619	1.383	0.764	0.270*** 123.4
Black-headed Grosbeak	40	235	224	-4.7	16.4	18	24	23	-4.2	42.7	41	0.102	0.103	0.001	0.050 0.5
Blue Grosbeak	22	56	38	-32.1	11.3***	5	3	2	-33.3	68.0	23	0.054	0.053	0.001	0.044 -1.8
Lazuli Bunting	34	98	67	-31.6	16.8	8	3	15	400.0	478.1	35	0.031	0.224	0.193	0.104* 631.3
Red-winged Blackbird	13	110	65	-40.9	10.8**	6	5	15	200.0	259.2	13	0.046	0.231	0.185	0.107 407.7
Brown-headed Cowbird	28	76	75	-1.3	14.7	7	5	4	-20.0	56.7	28	0.066	0.053	-0.013	0.042 -18.9
Bullock's Oriole	36	111	152	36.9	12.6**	13	56	23	-58.9	26.0**	39	0.505	0.151	-0.353	0.241 -70.0
House Finch	31	98	145	48.0	37.4	22	78	218	179.5	66.7**	33	0.796	1.503	0.708	0.487 88.9
Lesser Goldfinch	24	142	114	-19.7	25.1	16	19	31	63.2	57.3	26	0.134	0.272	0.138	0.076* 103.2
American Goldfinch	17	108	102	-5.6	30.4	6	29	20	-31.0	25.4	17	0.269	0.196	-0.072	0.186 -27.0
All species pooled	58	6843	5518	-19.4	4.2***	57	2425	3638	50.0	13.3***	58	0.354	0.659	0.305	0.076*** 86.0
Number decreasing: 35/42 (83%);*** Number increasing: 29/42 (69%);***															
NORTH-CENTRAL MAPS REGION															
Downy Woodpecker	22	30	35	16.7	29.0	22	62	60	-3.2	16.8	24	2.067	1.714	-0.352	0.608 -17.1
"Traill's" Flycatcher	17	71	60	-15.5	23.5	7	15	12	-20.0	25.3	17	0.211	0.200	-0.011	0.192 -5.3
Black-capped Chickadee	21	72	80	11.1	20.1	22	127	123	-3.2	27.7	22	1.764	1.538	-0.226	0.606 -12.8
House Wren	16	126	101	-19.8	16.8	17	150	91	-39.3	15.7	19	1.191	0.901	-0.290	0.346 -24.3
Wood Thrush	12	53	44	-17.0	14.9	9	13	14	7.7	63.6	13	0.245	0.318	0.073	0.181 29.7
American Robin	21	77	78	1.3	21.4	18	42	47	11.9	29.0	21	0.546	0.603	0.057	0.279 10.5
Gray Catbird	23	277	301	8.7	11.1	17	136	155	14.0	11.2	23	0.491	0.515	0.024	0.155 4.9
Cedar Waxwing	15	23	49	113.0	79.6	1	0	1	+++ ¹¹		15	0.000	0.020	0.020	0.020 +++ ¹¹

TABLE 2. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Yellow Warbler	10	170	174	2.4	14.2	9	148	46	-68.9	13.1***	11	0.871	0.264	-0.606	0.493	-69.6
American Redstart	7	46	39	-15.2	8.7	4	6	4	-33.3	54.4	7	0.130	0.103	-0.028	0.075	-21.4
Ovenbird	12	31	41	32.3	33.8	8	9	9	0.0	47.5	14	0.290	0.220	-0.071	0.092	-24.4
Common Yellowthroat	23	156	181	16.0	19.3	17	99	78	-21.2	10.7	24	0.635	0.431	-0.204	0.205	-32.1
Field Sparrow	11	96	75	-21.9	21.4	11	36	20	-44.4	15.1***	12	0.375	0.267	-0.108	0.179	-28.9
Song Sparrow	19	118	105	-11.0	15.2	17	69	101	46.4	30.7*	19	0.585	0.962	0.377	0.222	64.5
Northern Cardinal	20	62	75	21.0	16.4	14	22	24	9.1	28.2	21	0.355	0.320	-0.035	0.116	-9.8
Rose-breasted Grosbeak	15	35	34	-2.9	29.5	8	15	4	-73.3	20.5*	16	0.429	0.118	-0.311	0.249	-72.5
Indigo Bunting	20	154	119	-22.7	9.4*	7	9	6	-33.3	38.8	20	0.058	0.050	-0.008	0.034	-13.7
Red-winged Blackbird	8	75	61	-18.7	22.3	2	6	3	-50.0	83.3	8	0.080	0.049	-0.031	0.075	-38.5
Baltimore Oriole	15	44	41	-6.8	34.2	6	22	10	-54.5	6.3***	15	0.500	0.244	-0.256	0.320	-51.2
American Goldfinch	19	265	219	-17.4	10.0*	1	0	1	++++ ¹¹		19	0.000	0.005	0.005	0.003	++++ ¹¹
All species pooled	26	2565	2457	-4.2	3.2	26	1198	1051	-12.3	10.3	26	0.467	0.428	-0.039	0.088	-8.4
Number decreasing: 11/20 (55%)																
Number decreasing: 12/20 (60%)																
Number decreasing: 14/20 (70%)*																

SOUTH-CENTRAL MAPS REGION

Common Ground-Dove	5	49	64	30.6	25.4	2	10	14	40.0	72.0	5	0.204	0.219	0.015	0.091	7.2
Downy Woodpecker	15	31	29	-6.5	24.3	13	28	26	-7.1	34.6	15	0.903	0.897	-0.007	0.398	-0.7
Acadian Flycatcher	9	61	65	6.6	12.4	6	9	4	-55.6	18.2**	11	0.148	0.062	-0.086	0.043*	-58.3
White-eyed Vireo	28	202	274	35.6	13.7***	24	167	176	5.4	7.4	28	0.827	0.642	-0.184	0.268	-22.3
Bell's Vireo	7	45	48	6.7	37.1	2	11	8	-27.3	66.1	7	0.244	0.167	-0.078	0.154	-31.8
Red-eyed Vireo	19	21	40	90.5	56.1	4	3	11	266.7	365.1	19	0.143	0.275	0.132	0.203	92.5
Carolina Chickadee	31	53	60	13.2	26.0	25	37	45	21.6	43.0	33	0.698	0.750	0.052	0.313	7.4
Tufted Titmouse	23	55	39	-29.1	16.5	18	42	71	69.0	51.1	25	0.764	1.821	1.057	0.430**	138.4
Black-crested Titmouse	15	26	42	61.5	50.4	16	26	34	30.8	39.8	18	1.000	0.810	-0.191	0.377	-19.0
Carolina Wren	34	120	147	22.5	14.8*	35	114	121	6.1	15.2	38	0.950	0.823	-0.127	0.202	-13.4
Bewick's Wren	17	67	73	9.0	20.3	16	71	74	4.2	11.5	17	1.060	1.014	-0.046	0.372	-4.3
House Wren	5	23	41	78.3	16.9**	4	12	15	25.0	49.9	5	0.522	0.366	-0.156	0.165	-29.9
Blue-gray Gnatcatcher	19	32	30	-6.3	33.7	17	26	19	-26.9	20.9	21	0.813	0.633	-0.179	0.332	-22.1
Gray Catbird	7	112	110	-1.8	9.0	8	51	37	-27.5	12.3*	9	0.455	0.336	-0.119	0.061*	-26.1
Kentucky Warbler	16	63	85	34.9	25.6	9	13	21	61.5	70.6	17	0.206	0.247	0.041	0.108	19.7

TABLE 2. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Common Yellowthroat	15	44	53	20.5	41.4	5	10	5	-50.0	13.7**	15	0.227	0.094	-0.133	0.122	-58.5
Yellow-breasted Chat	13	118	132	11.9	15.9	6	17	16	-5.9	29.4	14	0.144	0.121	-0.023	0.053	-15.9
Field Sparrow	18	88	86	-2.3	18.1	10	17	20	17.6	45.3	18	0.193	0.233	0.039	0.085	20.4
Grasshopper Sparrow	2	32	25	-21.9	68.4	2	29	8	-72.4	22.8	2	0.906	0.320	-0.586	0.043	-64.7
Northern Cardinal	41	280	303	8.2	8.5	37	157	121	-22.9	19.7	41	0.561	0.399	-0.161	0.133	-28.8
Indigo Bunting	24	176	141	-19.9	10.0	12	16	14	-12.5	46.3	24	0.091	0.099	0.008	0.052	9.2
Painted Bunting	26	165	320	93.9	59.2	18	155	34	-78.1	15.9***	27	0.939	0.106	-0.833	0.549	-88.7
Brown-headed Cowbird	28	44	54	22.7	26.2	4	2	4	100.0	230.9	28	0.046	0.074	0.029	0.059	63.0
American Goldfinch	10	50	40	-20.0	24.6	0	0	0	-	-	10	0.000	0.000	0.000	0.000	-
All species pooled	45	2539	2938	15.7	7.2**	45	1264	1072	-15.2	12.4	45	0.498	0.365	-0.133	0.076*	-26.7
Number increasing: 16/24 (67%)* Number decreasing: 11/24 (46%) Number decreasing: 15/24 (63%)																
NORTHEAST MAPS REGION																
Downy Woodpecker	40	78	47	-39.7	10.5***	47	77	64	-16.9	17.8	54	0.987	1.362	0.375	0.371	37.9
"Traill's" Flycatcher	24	82	73	-11.0	15.2	7	16	7	-56.3	20.8**	24	0.195	0.096	-0.099	0.069	-50.9
Eastern Phoebe	18	16	24	50.0	50.0	17	23	37	60.9	72.1	22	1.438	1.542	0.104	0.646	7.2
White-eyed Vireo	10	60	55	-8.3	12.7	7	13	14	7.7	38.4	11	0.217	0.255	0.038	0.094	17.5
Red-eyed Vireo	45	164	189	15.2	12.6	16	18	34	88.9	99.7	45	0.110	0.180	0.070	0.078	63.9
Carolina Chickadee	14	36	22	-38.9	23.2	12	20	24	20.0	35.0	16	0.556	1.091	0.535	0.506	96.4
Black-capped Chickadee	47	174	148	-14.9	10.7	35	133	107	-19.5	18.5	49	0.764	0.723	-0.041	0.263	-5.4
Tufted Titmouse	35	78	51	-34.6	16.1*	30	65	40	-38.5	17.8*	37	0.833	0.784	-0.049	0.254	-5.9
Carolina Wren	21	81	70	-13.6	22.2	16	25	35	40.0	50.4	23	0.309	0.500	0.191	0.190	62.0
House Wren	12	32	39	21.9	57.3	9	22	11	-50.0	20.5	14	0.688	0.282	-0.405	0.293	-59.0
Veery	36	246	207	-15.9	7.6*	23	45	55	22.2	18.7	36	0.183	0.266	0.083	0.070	45.3
Hermit Thrush	24	104	81	-22.1	10.8*	17	25	45	80.0	58.3	25	0.240	0.556	0.315	0.154**	131.1
Wood Thrush	41	194	171	-11.9	12.8	27	48	48	0.0	30.2	43	0.247	0.281	0.033	0.098	13.5
American Robin	46	211	197	-6.6	14.0	27	95	79	-16.8	17.2	47	0.450	0.401	-0.049	0.197	-10.9
Gray Catbird	51	704	701	-0.4	5.2	38	295	290	-1.7	13.9	52	0.419	0.414	-0.005	0.098	-1.3
European Starling	6	12	5	-58.3	16.6**	4	52	16	-69.2	5.8**	7	4.333	3.200	-1.133	1.715	-26.2
Cedar Waxwing	24	74	142	91.9	41.6**	4	3	4	33.3	180.5	24	0.041	0.028	-0.012	0.039	-30.5
Yellow Warbler	20	172	196	14.0	11.7*	13	82	107	30.5	31.0	20	0.477	0.546	0.069	0.117	14.5

TABLE 2. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Chestnut-sided Warbler	12	43	43	0.0	27.3	8	12	21	75.0	83.6	14	0.279	0.488	0.209	0.130	75.0
Magnolia Warbler	13	54	55	1.9	16.8	11	21	23	9.5	61.2	14	0.389	0.418	0.029	0.296	7.5
Yellow-rumped Warbler	12	41	49	19.5	23.4	4	4	7	75.0	75.7	12	0.098	0.143	0.045	0.063	46.4
Blk.-throated Grn. Warb.	20	69	68	-1.4	13.8	11	19	9	-52.6	16.8**	22	0.275	0.132	-0.143	0.101	-51.9
Black-and-white Warbler	37	73	74	1.4	19.8	23	35	39	11.4	28.5	38	0.480	0.527	0.048	0.137	9.9
American Redstart	32	230	217	-5.7	10.2	24	122	168	37.7	23.4	34	0.530	0.774	0.244	0.192	46.0
Worm-eating Warbler	14	55	55	0.0	22.0	11	12	32	166.7	102.5	18	0.218	0.582	0.364	0.187*	166.7
Ovenbird	50	288	227	-21.2	6.2***	36	98	127	29.6	24.5	52	0.340	0.560	0.219	0.110**	64.4
Common Yellowthroat	40	345	218	-36.8	5.8***	30	89	117	31.5	24.2	42	0.258	0.537	0.279	0.113**	108.0
Hooded Warbler	16	104	51	-51.0	6.2***	7	10	17	70.0	52.0	17	0.096	0.333	0.237	0.137	246.7
Yellow-breasted Chat	6	49	38	-22.4	12.8	2	4	3	-25.0	37.5	6	0.082	0.079	-0.003	0.089	-3.3
Eastern Towhee	31	78	78	0.0	13.8	22	26	42	61.5	48.1*	33	0.333	0.539	0.205	0.143	61.5
Song Sparrow	24	186	129	-30.6	6.6***	25	126	132	4.8	13.6	28	0.677	1.023	0.346	0.247	51.1
White-throated Sparrow	11	53	51	-3.8	13.1	6	21	19	-9.5	23.5	11	0.396	0.373	-0.024	0.155	-6.0
Dark-eyed Junco	12	45	35	-22.2	22.0	12	64	67	4.7	26.2	14	1.422	1.914	0.492	0.866	34.6
Northern Cardinal	37	158	113	-28.5	7.5***	25	52	51	-1.9	20.3	37	0.329	0.451	0.122	0.108	37.1
Rose-breasted Grosbeak	21	42	34	-19.0	28.2	13	10	20	100.0	97.6	25	0.238	0.588	0.350	0.269	147.1
Indigo Bunting	22	86	53	-38.4	9.8***	10	14	18	28.6	57.9	22	0.163	0.340	0.177	0.125	108.6
Red-winged Blackbird	15	54	47	-13.0	15.1	6	9	5	-44.4	50.9	15	0.167	0.106	-0.060	0.077	-36.2
Baltimore Oriole	11	27	45	66.7	29.6**	6	12	5	-58.3	26.4*	14	0.444	0.111	-0.333	0.275	-75.0
American Goldfinch	35	263	198	-24.7	8.9**	2	0	2	++++ ¹¹		36	0.000	0.010	0.010	0.007	++++ ¹¹
All species pooled	65	5626	4998	-11.2	2.3***	65	2067	2204	6.6	7.6	65	0.367	0.441	0.074	0.040*	20.0
Number decreasing: 27/39 (69%)** Number increasing: 24/39 (62%)* Number increasing: 26/39 (67%)**																

SOUTHEAST MAPS REGION

Downy Woodpecker	41	42	48	14.3	24.1	38	44	64	45.5	34.7	52	1.048	1.333	0.286	0.408	27.3
Acadian Flycatcher	52	260	233	-10.4	7.1	23	20	30	50.0	38.1	54	0.077	0.129	0.052	0.040	67.4
White-eyed Vireo	41	144	134	-6.9	11.3	28	53	54	1.9	22.4	44	0.368	0.403	0.035	0.102	9.5
Red-eyed Vireo	56	282	279	-1.1	12.4	23	13	36	176.9	133.7**	57	0.046	0.129	0.083	0.040**	179.9
Carolina Chickadee	51	90	90	0.0	16.8	40	85	108	27.1	23.5	56	0.944	1.200	0.256	0.278	27.1
Tufted Titmouse	59	123	142	15.4	15.1	51	113	158	39.8	24.8*	64	0.919	1.113	0.194	0.210	21.1

TABLE 2. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Carolina Wren	63	244	185	-24.2	7.8***	55	193	190	-1.6	13.5	64	0.791	1.027	0.236	0.213	29.8
Blue-gray Gnatcatcher	20	24	33	37.5	52.5	14	9	17	88.9	81.9	29	0.375	0.515	0.140	0.271	37.4
Wood Thrush	55	373	324	-13.1	8.9	38	78	97	24.4	23.1	57	0.209	0.299	0.090	0.070	43.2
American Robin	13	45	37	-17.8	22.1	13	38	36	-5.3	24.5	18	0.844	0.973	0.129	0.281	15.2
Gray Catbird	35	145	152	4.8	17.8	16	79	67	-15.2	9.7	35	0.545	0.441	-0.104	0.247	-19.1
Brown Thrasher	29	27	36	33.3	38.3	16	13	20	53.8	58.7	34	0.482	0.556	0.074	0.243	15.4
Blue-winged Warbler	11	39	40	2.6	42.1	7	21	19	-9.5	45.5	12	0.539	0.475	-0.063	0.188	-11.8
Prairie Warbler	21	74	73	-1.4	28.1	17	30	31	3.3	39.7	24	0.405	0.425	0.019	0.157	4.7
Prothonotary Warbler	13	56	35	-37.5	21.1	9	21	25	19.0	18.1	17	0.375	0.714	0.339	0.380	90.5
Worm-eating Warbler	34	61	61	0.0	17.1	23	23	38	65.2	51.5	38	0.377	0.623	0.246	0.180	65.2
Ovenbird	52	271	271	0.0	9.4	37	106	114	7.5	30.4	56	0.391	0.421	0.030	0.098	7.5
Louisiana Waterthrush	29	59	66	11.9	16.3	22	29	38	31.0	39.9	34	0.492	0.576	0.084	0.196	17.1
Kentucky Warbler	35	172	179	4.1	11.4	26	94	63	-33.0	15.9	38	0.547	0.352	-0.195	0.113*	-35.6
Common Yellowthroat	47	216	165	-23.6	9.0**	33	82	87	6.1	24.8	49	0.380	0.527	0.148	0.135	38.9
Hooded Warbler	32	84	90	7.1	20.7	17	13	22	69.2	59.1	34	0.155	0.244	0.090	0.120	57.9
Yellow-breasted Chat	22	83	89	7.2	18.2	10	9	21	133.3	74.7	23	0.108	0.236	0.128	0.071*	117.6
Eastern Towhee	27	33	34	3.0	21.6	19	5	28	460.0	280.2	35	0.152	0.823	0.672	0.255***	443.5
Field Sparrow	18	49	36	-26.5	17.8	7	18	12	-33.3	24.2	18	0.367	0.333	-0.034	0.191	-9.3
Northern Cardinal	65	312	286	-8.3	9.0	54	95	158	66.3	28.8***	66	0.305	0.552	0.248	0.088***	81.4
Indigo Bunting	46	182	199	9.3	11.6	19	16	33	106.3	97.1	47	0.088	0.166	0.078	0.060	88.6
Common Grackle	19	41	61	48.8	65.1	8	8	13	62.5	90.1	19	0.195	0.213	0.018	0.110	9.2
American Goldfinch	25	92	80	-13.0	17.1	1	0	5	++++ ¹¹		25	0.000	0.063	0.063	0.068	++++ ¹¹
All species pooled	70	4087	3930	-3.8	3.6	70	1455	1730	18.9	8.3**	70	0.356	0.440	0.084	0.043*	23.7
Number decreasing: 12/28 (43%)																
Number increasing: 22/28 (79%)*																
Number increasing: 24/28 (86%)*																
ALASKA AND BOREAL CANADA MAPS REGIONS																
Ruby-crowned Kinglet	6	19	26	36.8	53.9	4	16	45	181.3	87.2	7	0.842	1.731	0.889	0.719	105.5
Swainson's Thrush	11	54	51	-5.6	14.4	8	22	18	-18.2	20.7	12	0.407	0.353	-0.055	0.219	-13.4
Hermit Thrush	7	71	64	-9.9	8.1	5	34	54	58.8	49.6	7	0.479	0.844	0.365	0.234	76.2
American Robin	13	65	50	-23.1	17.8	6	10	20	100.0	83.4	13	0.154	0.400	0.246	0.112**	160.0
Orange-crowned Warbler	11	166	93	-44.0	4.6***	11	40	67	67.5	62.7	11	0.241	0.720	0.480	0.220*	199.0

TABLE 2. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Yellow Warbler	7	150	123	-18.0	18.7	6	62	92	48.4	26.7	7	0.413	0.748	0.335	0.340	81.0
Yellow-rumped Warbler	11	65	84	29.2	23.0	7	27	49	81.5	54.1	11	0.415	0.583	0.168	0.132	40.4
Wilson's Warbler	12	501	332	-33.7	4.9**	11	143	455	218.2	123.9*	12	0.285	1.371	1.085	0.294***	380.1
American Tree Sparrow	7	18	22	22.2	44.7	9	41	39	-4.9	51.6	9	2.278	1.773	-0.505	1.368	-22.2
Savannah Sparrow	8	20	12	-40.0	25.2	7	31	23	-25.8	32.4	9	1.550	1.917	0.367	1.459	23.7
Fox Sparrow	9	36	48	33.3	23.2	10	29	28	-3.4	24.7	11	0.806	0.583	-0.222	0.365	-27.6
White-crowned Sparrow	8	58	52	-10.3	15.9	8	56	50	-10.7	32.6	9	0.966	0.962	-0.004	0.427	-0.4
Golden-crowned Sparrow	5	40	39	-2.5	7.8	4	2	21	950.0	738.2	6	0.050	0.539	0.489	0.095***	976.9
Dark-eyed Junco	7	40	30	-25.0	15.8	7	25	69	176.0	116.8	8	0.625	2.300	1.675	1.204	268.0
Common Redpoll	11	154	203	31.8	27.2	11	55	65	18.2	71.1	11	0.357	0.320	-0.037	0.149	-10.3
Pine Siskin	3	66	3	-95.5	2.0***	1	7	0	-100.0		3	0.106	0.000	-0.106	0.136	-100.0
All species pooled	17	1914	1569	-18.0	6.7**	17	707	1211	71.3	41.3*	17	0.369	0.772	0.402	0.145**	109.0
	Number decreasing: 11/16 (69%)					Number increasing: 10/16 (63%)					Number increasing: 10/16 (63%)					
ALL REGIONS POOLED																
All species pooled	407	36674	34505	-5.9	1.6***	406	14310	19190	34.1	5.8***	407	0.390	0.556	0.166	0.028***	42.5
	Number decreasing: 76/135 (56%)*					Number increasing: 101/135 (75%)*					Number increasing: 97/135 (72%)*					

¹Number of stations at which at least one individual adult bird of the species was captured in either year.

²Percent change between the two years in the number of adult individuals captured.

³Standard error and statistical significance of the percent change in the number of adult individuals captured.

⁴Number of stations at which at least one individual young bird of the species was captured in either year.

⁵Percent change between the two years in the number of adult individuals captured.

⁶Standard error and statistical significance of the percent change in the number of adult individuals captured.

⁷Number of stations at which at least one individual aged bird of the species was captured in either year.

⁸Change between the two years in the reproductive index (number of young/number of adults).

⁹Standard error and statistical significance of the change in the reproductive index.

¹⁰Percent change between the two years in the reproductive index.

¹¹Percent change undefined because no young were captured in the first year of the comparison.

#Reproductive indices for this species should be interpreted with caution because it likely includes data from stations where the species occurs only as an altitudinal disperser (a situation in which large numbers of adults and, especially, young, disperse up-mountain after the breeding season) and, therefore, may be biased high.

* 0.05 ≤ P < 0.10; ** 0.01 ≤ P < 0.05; *** P < 0.01

and 2000 by a highly significant -5.9%, while 56% of 135 species had decreasing numbers of adults, a proportion that was nearly significantly >50%.

Productivity. — Both the Northwest and Southwest regions showed highly-significant increases in numbers of young captured and in reproductive index between 1999 and 2000 for all species pooled, 59.5% and 59.6%, respectively, for the Northwest and 50.0% and 86.0%, respectively, for the Southwest. The proportions of increasing species for these two parameters for these two regions ranged from 69% to 89% and were highly significantly >50% for each parameter in each region. Summing over these two regions, fully 34 species had significant or nearly significant increases in number of young captured, while only two species showed significant or nearly significant decreases. Similarly, 31 species had significant or nearly significant increases in reproductive index, while only one species showed a significant or nearly significant decrease. The Alaska /Boreal Canada Region likewise showed large increases in both number of young (71.3%) and reproductive index (109.0%) for all species pooled, but the increase in number of young was only nearly significant while that for reproductive index was significant. The proportion of increasing species in the region for each parameter (63%), was not significantly >50%. Nevertheless, five species in the region showed significant or nearly significant increases in one or the other of these two parameters while no species showed significant or nearly significant decreases. Number of young and reproductive index for all species pooled also increased between 1999 and 2000 in both the Northeast (a non-significant 6.6% and nearly significant 20.0%, respectively) and Southeast (a significant 18.9% and nearly significant 23.7%, respectively) regions, but the magnitude and significance of the increases were less than in the western regions. Still, the proportions of increasing species for the two parameters in the Northeast (62% and 67%, respectively), were nearly significantly and significantly >50%, respectively, while the proportions of increasing species for the two parameters for the Southeast (79% and 86%, respectively), were both highly significantly >50%. Summing over the two eastern regions, the six species with significant

or nearly significant increases in young was similar in number to the five species with significant or nearly significant decreases in young, but the eight species with significant or nearly significant increases in reproductive index was much greater in number than the one species with significant or nearly significant decreases in reproductive index.

Again, in contrast to the other five regions, modest decreases between 1999 and 2000 were recorded in the North-central (-12.3%) and South-central (-15.2%) regions in the number of young captured for all species pooled and in the reproductive index (-8.4% and -26.7%, respectively). Only the last difference, however, reached even the nearly significant level. The proportion of decreasing species for these two parameters in these two regions ranged from 46% to 70%, but only the proportion of decreasing species for reproductive index in the North-central region (70%) was even nearly significant. Summing for these two regions, eight species showed significant or nearly significant decreases in young (as opposed to one species showing a nearly significant increase), and two species showed nearly significant decreases in reproductive index (as opposed to one species showing a significant increase).

On a continent-wide basis, both the number of young captured and the reproductive index for all species pooled showed highly significant increases of 5.8% and 42.5%, respectively, between 1999 and 2000, while the proportions of increasing species for these two parameters (75% and 72%, respectively) were both highly significantly >50%.

Changes between 2000 and 2001 — Constant-effort data on the numbers of adult and young birds captured and the proportion of young in the catch were obtained for 2000 and 2001 from 415 MAPS stations operated comparably in both years (Table 3). Included were 66 species in the Northwest, 42 in the Southwest, 24 in the North-central, 24 in the South-central, 41 in the Northeast, 29 in the Southeast, and 17 in the Alaska/Boreal Canada regions, comprising a total of 123 species overall (plus 16 additional species that met productivity criteria when data were pooled from all seven regions).

Adult populations. — Increases in adult population size between 2000 and 2001 for all

TABLE 3. Regional changes between 2000 and 2001 in the numbers of adult and young individuals captured and in the reproductive index (number of young/number of adults) for 139 species and all species pooled (excluding gallinaceous birds and hummingbirds) at the 415 stations run comparably in both years. For each species, data were included only from stations within the breeding range of the species. Only species for which adults were captured at two or more stations and for which 50 or more aged individuals were captured in either year are included.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
NORTHWEST MAPS REGION																
Red-naped Sapsucker	22	35	53	51.4	29.8**	16	12	22	83.3	71.9*	26	0.343	0.415	0.072	0.138	21.1
Red-breasted Sapsucker	51	112	127	13.4	14.5	32	53	89	67.9	29.1***	52	0.473	0.701	0.228	0.143	48.1
Downy Woodpecker	53	71	67	-5.6	14.7	38	36	29	-19.4	22.5	63	0.507	0.433	-0.074	0.140	-14.6
Hairy Woodpecker	50	39	48	23.1	26.7	31	15	28	86.7	68.6*	60	0.385	0.583	0.199	0.201	51.7
Western Wood-Pewee	59	170	182	7.1	11.3	29	31	36	16.1	40.6	60	0.182	0.198	0.015	0.066	8.5
Willow Flycatcher	78	239	313	31.0	15.2**	20	29	17	-41.4	27.1	82	0.121	0.054	-0.067	0.042	-55.2
Hammond's Flycatcher	62	169	134	-20.7	12.1	36	80	44	-45.0	8.9***	67	0.473	0.328	-0.145	0.149	-30.6
Dusky Flycatcher	62	274	250	-8.8	11.0	27	61	42	-31.1	21.5	68	0.223	0.168	-0.055	0.062	-24.5
"Western" Flycatcher	85	183	183	0.0	11.0	57	61	105	72.1	46.6**	98	0.333	0.574	0.240	0.153	72.1
Cassin's Vireo	40	65	67	3.1	16.9	24	31	26	-16.1	23.4	46	0.477	0.388	-0.089	0.194	-18.6
Warbling Vireo	98	477	506	6.1	7.8	39	66	95	43.9	34.0	99	0.138	0.188	0.049	0.063	35.7
Steller's Jay	40	37	22	-40.5	19.1	20	20	5	-75.0	13.0***	46	0.541	0.227	-0.313	0.179*	-58.0
Tree Swallow	16	51	87	70.6	27.2	4	4	8	100.0	91.3	18	0.078	0.092	0.014	0.040	17.2
Black-capped Chickadee	50	154	135	-12.3	14.6	51	198	169	-14.6	13.0	57	1.286	1.252	-0.034	0.332	-2.6
Mountain Chickadee	43	134	105	-21.6	15.0	40	176	109	-38.1	14.0*	48	1.313	1.038	-0.275	0.289	-21.0
Chestnut-backed Chick.	53	82	150	82.9	24.6***	37	120	95	-20.8	18.6	59	1.463	0.633	-0.830	0.365**	-56.7
Bushtit	28	25	54	116.0	75.1**	24	56	88	57.1	54.1	33	2.240	1.630	-0.610	0.905	-27.2
Red-breasted Nuthatch	53	73	72	-1.4	18.9	44	106	60	-43.4	16.3*	63	1.452	0.833	-0.619	0.419	-42.6
Brown Creeper	46	61	69	13.1	21.2	54	103	89	-13.6	20.1	66	1.689	1.290	-0.399	0.401	-23.6
Bewick's Wren	25	47	45	-4.3	23.5	23	71	71	0.0	20.5	27	1.511	1.578	0.067	0.529	4.4
House Wren	33	81	84	3.7	19.1	46	75	100	33.3	24.6	50	0.926	1.191	0.265	0.310	28.6
Winter Wren	31	101	128	26.7	23.6	38	99	84	-15.2	14.5	43	0.980	0.656	-0.324	0.340	-33.0
Golden-crowned Kinglet	47	101	147	45.5	23.9**	44	411	349	-15.1	27.1	61	4.069	2.374	-1.695	1.592	-41.7
Ruby-crowned Kinglet	22	64	101	57.8	18.9***	17	37	69	86.5	88.8	25	0.578	0.683	0.105	0.269	18.2
Veery	6	58	35	-39.7	9.3***	3	9	6	-33.3	19.2	6	0.155	0.171	0.016	0.091	10.5
Swainson's Thrush	100	1205	1321	9.6	5.9	60	273	259	-5.1	15.9	101	0.227	0.196	-0.031	0.056	-13.5
Hermit Thrush	36	78	97	24.4	19.5	24	48	47	-2.1	22.1	44	0.615	0.485	-0.131	0.220	-21.3
American Robin	120	605	670	10.7	7.4	76	215	170	-20.9	15.7	122	0.355	0.254	-0.102	0.071	-28.6

TABLE 3. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	¹ n	1998	1999	%change ²	SE ³	⁴ n	1998	1999	%change ⁵	SE ⁶	⁷ n	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Varied Thrush	27	48	52	8.3	23.2	18	35	35	0.0	24.6	31	0.729	0.673	-0.056	0.288	-7.7
Wrentit	22	79	82	3.8	18.7	21	94	144	53.2	31.3**	23	1.190	1.756	0.566	0.391	47.6
Gray Catbird	18	143	156	9.1	16.9	11	43	27	-37.2	32.9	18	0.301	0.173	-0.128	0.113	-42.4
Cedar Waxwing	42	254	219	-13.8	13.8	8	26	6	-76.9	19.5***	43	0.102	0.027	-0.075	0.060	-73.2
Orange-crowned Warbler†	81	335	350	4.5	10.2	77	669	508	-24.1	9.9*	93	1.997	1.451	-0.546	0.422	-27.3
Nashville Warbler†	45	96	132	37.5	21.9*	43	160	195	21.9	26.2	53	1.667	1.477	-0.190	0.577	-11.4
Virginia's Warbler	4	26	29	11.5	45.7	3	24	9	-62.5	26.6	4	0.923	0.310	-0.613	0.482	-66.4
Yellow Warbler	68	975	1003	2.9	5.8	56	500	415	-17.0	19.4	71	0.513	0.414	-0.099	0.125	-19.3
Yellow-rumped Warbler	79	409	394	-3.7	10.1	55	251	294	17.1	36.6	85	0.614	0.746	0.133	0.264	21.6
Townsend's Warbler	29	76	113	48.7	24.0**	21	78	60	-23.1	27.8	31	1.026	0.531	-0.495	0.320	-48.3
Hermit Warbler	33	138	146	5.8	14.9	28	99	77	-22.2	26.0	36	0.717	0.527	-0.190	0.236	-26.5
MacGillivray's Warbler	101	798	830	4.0	5.1	86	381	512	34.4	17.1**	109	0.477	0.617	0.139	0.103	29.2
Common Yellowthroat	46	205	183	-10.7	10.6	26	94	57	-39.4	11.2***	48	0.459	0.312	-0.147	0.183	-32.1
Wilson's Warbler	100	653	712	9.0	11.9	63	203	276	36.0	15.6***	106	0.311	0.388	0.077	0.099	24.7
Yellow-breasted Chat	15	91	130	42.9	25.1	9	40	42	5.0	29.0	15	0.440	0.323	-0.117	0.154	-26.5
Western Tanager	86	213	253	18.8	15.0	42	92	96	4.3	30.0	91	0.432	0.379	-0.053	0.172	-12.2
Green-tailed Towhee	15	57	61	7.0	22.2	16	22	45	104.5	43.8***	20	0.386	0.738	0.352	0.240	91.1
Spotted Towhee	52	180	218	21.1	11.6*	47	164	167	1.8	16.0	59	0.911	0.766	-0.145	0.208	-15.9
Chipping Sparrow	40	95	108	13.7	20.0	30	49	49	0.0	27.5	48	0.516	0.454	-0.062	0.173	-12.0
Brewer's Sparrow	19	53	33	-37.7	19.1	22	33	31	-6.1	37.2	25	0.623	0.939	0.317	0.372	50.9
Savannah Sparrow	6	53	75	41.5	12.8	6	7	14	100.0	66.4	9	0.132	0.187	0.055	0.163	41.3
Fox Sparrow	31	87	96	10.3	15.2	23	21	36	71.4	56.9	39	0.241	0.375	0.134	0.153	55.4
Song Sparrow	108	1040	1105	6.3	4.4	113	1317	897	-31.9	5.5***	118	1.266	0.812	-0.455	0.127***	-35.9
Lincoln's Sparrow	41	259	266	2.7	10.0	45	194	159	-18.0	12.5	49	0.749	0.598	-0.151	0.180	-20.2
White-crowned Sparrow	21	75	88	17.3	23.7	13	40	30	-25.0	20.5	22	0.533	0.341	-0.192	0.131	-36.1
Dark-eyed Junco	86	670	672	0.3	7.1	90	742	717	-3.4	14.1	97	1.108	1.067	-0.041	0.218	-3.7
Black-headed Grosbeak	83	282	299	6.0	12.0	49	90	145	61.1	27.3**	86	0.319	0.485	0.166	0.142	52.0
Lazuli Bunting	49	219	201	-8.2	14.5	29	45	75	66.7	29.8**	53	0.206	0.373	0.168	0.081**	81.6
Red-winged Blackbird	21	205	182	-11.2	21.9	7	28	4	-85.7	12.1***	23	0.137	0.022	-0.115	0.035***	-83.9
Brown-headed Cowbird	50	146	144	-1.4	14.1	22	19	20	5.3	33.0	52	0.130	0.139	0.009	0.051	6.7
Bullock's Oriole	29	84	117	39.3	30.6	19	57	36	-36.8	37.5	31	0.679	0.308	-0.371	0.331	-54.7
Purple Finch	38	313	325	3.8	14.4	28	90	162	80.0	33.1**	41	0.288	0.499	0.211	0.146	73.4
Cassin's Finch	30	64	42	-34.4	19.1	13	9	7	-22.2	49.2	34	0.141	0.167	0.026	0.100	18.5

TABLE 3. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX				
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹ % change ¹⁰
House Finch	11	41	38	-7.3	18.4	9	16	18	12.5	45.8	14	0.390	0.474	0.083	0.211 21.4
Pine Siskin	55	201	201	0.0	19.2	30	84	91	8.3	43.5	57	0.418	0.453	0.035	0.170 8.3
Lesser Goldfinch	21	43	70	62.8	54.1	10	85	44	-48.2	46.2	23	1.977	0.629	-1.348	1.146 -68.2
American Goldfinch	27	244	184	-24.6	11.3*	9	10	11	10.0	53.7	27	0.041	0.060	0.019	0.051 45.9
Evening Grosbeak	19	51	59	15.7	34.8	6	4	5	25.0	97.8	20	0.078	0.085	0.006	0.069 8.1
All species pooled	133	14153	15033	6.2	2.8**	133	8614	8033	-6.7	4.9	133	0.609	0.534	-0.075	0.051 -12.2
Number increasing: 45/66 (68%)****															
Number decreasing: 34/66 (52%)															
Number decreasing: 38/66 (58%)															
SOUTHWEST MAPS REGION															
Nuttall's Woodpecker	23	61	43	-29.5	15.0*	19	40	40	0.0	19.6	24	0.656	0.930	0.275	0.295 41.9
Downy Woodpecker	23	42	50	19.0	29.4	18	22	23	4.5	36.7	24	0.524	0.460	-0.064	0.217 -12.2
Western Wood-Pewee	25	41	30	-26.8	19.4	5	10	2	-80.0	25.9**	25	0.244	0.067	-0.177	0.134 -72.7
"Western" Flycatcher	33	103	53	-48.5	10.4***	17	31	44	41.9	44.1	35	0.301	0.830	0.529	0.329 175.8
Black Phoebe	20	24	30	25.0	29.2	26	54	63	16.7	25.9	31	2.250	2.100	-0.150	1.225 -6.7
Ash-throated Flycatcher	48	121	152	25.6	18.0	13	13	11	-15.4	51.4	48	0.107	0.072	-0.035	0.052 -32.6
Loggerhead Shrike	8	30	21	-30.0	13.6*	10	20	15	-25.0	43.7	12	0.667	0.714	0.048	0.432 7.1
Bell's Vireo	7	37	28	-24.3	16.1	5	16	10	-37.5	17.5*	7	0.432	0.357	-0.075	0.130 -17.4
Warbling Vireo	29	88	58	-34.1	19.7	8	12	21	75.0	99.2	29	0.136	0.362	0.226	0.163 165.5
Chestnut-backed Chick.	7	18	24	33.3	39.8	8	95	85	-10.5	20.1	8	5.278	3.542	-1.736	1.441 -32.9
Oak Titmouse	14	38	40	5.3	20.7	12	48	40	-16.7	14.7	15	1.263	1.000	-0.263	0.386 -20.8
Verdin	4	18	14	-22.2	30.5	5	39	32	-17.9	31.6	5	2.167	2.286	0.119	1.729 5.5
Bushtit	42	215	242	12.6	18.6	36	194	185	-4.6	17.7	43	0.902	0.765	-0.138	0.242 -15.3
Bewick's Wren	49	246	237	-3.7	11.1	46	314	360	14.7	15.3	50	1.276	1.519	0.243	0.277 19.0
House Wren	24	144	195	35.4	16.4***	26	155	153	-1.3	23.9	26	1.076	0.785	-0.292	0.235 -27.1
Swainson's Thrush	16	141	117	-17.0	17.5	9	30	47	56.7	66.6	16	0.213	0.402	0.189	0.133 88.8
American Robin	21	79	52	-34.2	14.7*	12	16	14	-12.5	56.9	22	0.203	0.269	0.067	0.165 32.9
Wrentit	22	188	240	27.7	15.8*	22	252	309	22.6	18.4	22	1.340	1.288	-0.053	0.242 -3.9
California Thrasher	11	22	15	-31.8	21.6	8	29	27	-6.9	20.5	11	1.318	1.800	0.482	0.620 36.6
Orange-crowned Warbler	16	94	99	5.3	16.1	15	62	129	108.1	79.7*	20	0.660	1.303	0.644	0.385 97.6
Lucy's Warbler	10	71	62	-12.7	26.4	11	47	43	-8.5	35.9	11	0.662	0.693	0.032	0.222 4.8
Yellow Warbler	35	324	205	-36.7	16.2	14	62	46	-25.8	23.9	35	0.191	0.224	0.033	0.089 17.3
Common Yellowthroat	37	446	455	2.0	8.6	29	350	432	23.4	18.4	41	0.785	0.949	0.165	0.210 21.0
Wilson's Warbler	13	132	92	-30.3	11.5**	10	70	95	35.7	33.8	13	0.530	1.033	0.502	0.491 94.7

TABLE 3. Continued.

Species	ADULTS				YOUNG				REPRODUCTIVE INDEX							
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Yellow-breasted Chat	23	233	209	-10.3	7.5	13	33	36	9.1	39.1	23	0.142	0.172	0.031	0.049	21.6
Summer Tanager	8	48	47	-2.1	16.4	3	1	7	600.0	1053.6	8	0.021	0.149	0.128	0.079	614.9
Spotted Towhee	39	291	248	-14.8	7.2*	33	194	168	-13.4	12.8	39	0.667	0.677	0.011	0.156	1.6
California Towhee	24	87	88	1.1	12.3	18	69	78	13.0	24.3	26	0.793	0.886	0.093	0.278	11.8
Abert's Towhee	6	44	36	-18.2	7.9*	4	7	12	71.4	92.9	6	0.159	0.333	0.174	0.112	109.5
Rufous-crowned Sparrow	9	28	32	14.3	52.4	12	22	47	113.6	57.6*	13	0.786	1.469	0.683	0.656	86.9
Lark Sparrow	12	46	38	-17.4	21.4	7	11	6	-45.5	28.8	13	0.239	0.158	-0.081	0.095	-34.0
Sage Sparrow	3	26	22	-15.4	25.0	4	11	101	818.2	220.3**	5	0.423	4.591	4.168	1.374**	985.1
Song Sparrow	37	526	467	-11.2	7.4	37	608	514	-15.5	11.3	39	1.156	1.101	-0.055	0.205	-4.8
Black-headed Grosbeak	43	231	204	-11.7	14.0	19	26	29	11.5	39.2	44	0.113	0.142	0.030	0.053	26.3
Blue Grosbeak	23	59	49	-16.9	11.8	7	2	9	350.0	298.3	25	0.034	0.184	0.150	0.080*	441.8
Lazuli Bunting	25	71	61	-14.1	28.4	8	13	10	-23.1	61.7	27	0.183	0.164	-0.019	0.135	-10.5
Red-winged Blackbird	13	54	53	-1.9	18.1	3	5	3	-40.0	12.0*	13	0.093	0.057	-0.036	0.048	-38.9
Brown-headed Cowbird	31	90	82	-8.9	13.9	7	3	7	133.3	214.0	31	0.033	0.085	0.052	0.058	156.1
Bullock's Oriole	28	158	97	-38.6	9.9**	14	20	20	0.0	42.2	30	0.127	0.206	0.080	0.097	62.9
House Finch	33	226	131	-42.0	14.7*	29	241	168	-30.3	32.4	36	1.066	1.282	0.216	0.638	20.3
Lesser Goldfinch	29	157	164	4.5	17.3	16	49	37	-24.5	29.0	30	0.312	0.226	-0.087	0.098	-27.7
American Goldfinch	16	88	100	13.6	25.3	3	7	0	-100.0	0.0	16	0.079	0.000	-0.079	0.054	-100.0
All species pooled	59	6088	5388	-11.5	3.2***	58	3594	3812	6.1	7.5	59	0.590	0.708	0.117	0.077	19.8
Number decreasing: 28/42 (67%)**																
Number increasing: 19/42 (45%)																
Number increasing: 26/42 (62%)*																
NORTH-CENTRAL MAPS REGION																
Downy Woodpecker	19	38	33	-13.2	18.9	21	56	55	-1.8	17.7	22	1.474	1.667	0.193	0.518	13.1
"Traill's" Flycatcher	17	58	63	8.6	23.8	7	3	5	66.7	113.9	18	0.052	0.079	0.028	0.039	53.4
Red-eyed Vireo	16	53	50	-5.7	14.9	3	3	2	-33.3	50.9	16	0.057	0.040	-0.017	0.043	-29.3
Black-capped Chickadee	21	89	84	-5.6	19.0	23	121	124	2.5	25.7	24	1.360	1.476	0.117	0.470	8.6
Tufted Titmouse	12	25	26	4.0	54.1	10	27	27	0.0	48.4	12	1.080	1.039	-0.042	0.506	-3.8
House Wren	16	102	83	-18.6	11.4	16	92	88	-4.3	18.0	18	0.902	1.060	0.158	0.328	17.5
Wood Thrush	16	51	75	47.1	23.0**	10	11	21	90.9	90.4	16	0.216	0.280	0.064	0.133	29.8
American Robin	25	86	81	-5.8	13.1	17	47	49	4.3	25.1	25	0.547	0.605	0.058	0.189	10.7
Gray Catbird	21	307	381	24.1	9.3**	20	154	196	27.3	17.2*	22	0.502	0.514	0.013	0.164	2.6
Cedar Waxwing	13	58	36	-37.9	15.0***	4	3	2	-33.3	54.4	13	0.052	0.056	0.004	0.052	7.4
Yellow Warbler	10	196	182	-7.1	12.4	10	45	30	-33.3	25.6	11	0.230	0.165	-0.065	0.082	-28.2

TABLE 3. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX				
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹ % change ¹⁰
American Redstart	12	50	57	14.0	19.7	3	5	8	60.0	122.6	12	0.100	0.140	0.040	0.095 40.4
Ovenbird	15	49	51	4.1	24.1	8	9	13	44.4	59.0	16	0.184	0.255	0.071	0.105 38.8
Common Yellowthroat	19	219	214	-2.3	14.4	16	85	112	31.8	55.3	20	0.388	0.523	0.135	0.151 34.8
Clay-colored Sparrow	2	34	39	14.7	7.6	2	3	13	333.3	66.7	3	0.088	0.333	0.245	0.040** 277.8
Field Sparrow	12	71	72	1.4	23.3	10	19	46	142.1	60.5**	13	0.268	0.639	0.371	0.187* 138.7
Song Sparrow	16	122	120	-1.6	8.1	15	106	87	-17.9	19.9	17	0.869	0.725	-0.144	0.253 -16.6
Swamp Sparrow	3	10	20	100.0	17.3	4	8	42	425.0	375.5	6	0.800	2.100	1.300	0.557* 162.5
Northern Cardinal	20	70	70	0.0	14.5	16	16	33	106.3	45.3***	20	0.229	0.471	0.243	0.117* 106.3
Rose-breasted Grosbeak	17	38	58	52.6	31.2	7	6	8	33.3	109.3	17	0.158	0.138	-0.020	0.130 -12.6
Indigo Bunting	18	115	113	-1.7	12.5	9	7	15	114.3	132.9	18	0.061	0.133	0.072	0.060 118.1
Red-winged Blackbird	6	40	46	15.0	74.3	3	0	4	+++ ¹¹		6	0.000	0.087	0.087	0.029** ++++
Baltimore Oriole	14	43	46	7.0	32.0	6	9	11	22.2	46.5	14	0.209	0.239	0.030	0.171 14.3
American Goldfinch	16	227	256	12.8	23.0	1	1	0	-100.0		16	0.004	0.000	-0.004	0.003 -100.0
All species pooled	26	2631	2703	2.7	5.6	26	1010	1140	12.9	11.7	26	0.384	0.422	0.038	0.070 9.9
Number increasing: 13/24 (54%)															
Number increasing: 16/24 (67%)**															
Number increasing: 18/24 (75%)*															
SOUTH-CENTRAL MAPS REGION															
Common Ground-Dove	6	91	55	-39.6	10.2	3	15	34	126.7	69.3	6	0.165	0.618	0.453	0.153** 275.0
Downy Woodpecker	20	29	23	-20.7	29.9	20	25	44	76.0	63.0*	24	0.862	1.913	1.051	0.574* 121.9
Acadian Flycatcher	14	71	86	21.1	13.0	7	5	9	80.0	109.0	14	0.070	0.105	0.034	0.043 48.6
White-eyed Vireo	29	308	266	-13.6	7.2*	27	191	192	0.5	20.4	29	0.620	0.722	0.102	0.216 16.4
Bell's Vireo	7	50	47	-6.0	10.2	4	8	13	62.5	102.1	7	0.160	0.277	0.117	0.136 72.9
Red-eyed Vireo	23	40	65	62.5	33.7**	5	11	5	-54.5	12.5**	23	0.275	0.077	-0.198	0.141 -72.0
Carolina Chickadee	30	71	62	-12.7	27.1	27	44	66	50.0	47.7	32	0.620	1.065	0.445	0.387 71.8
Tufted Titmouse	26	52	69	32.7	20.5*	25	80	64	-20.0	19.9	26	1.539	0.928	-0.611	0.377 -39.7
Black-crested Titmouse	16	41	31	-24.4	17.3	13	28	46	64.3	43.2	16	0.683	1.484	0.801	0.397* 117.3
Carolina Wren	34	172	118	-31.4	13.6**	29	135	140	3.7	15.0	36	0.785	1.186	0.402	0.271 51.2
Bewick's Wren	15	63	49	-22.2	18.5	15	51	52	2.0	10.8	16	0.810	1.061	0.252	0.320 31.1
House Wren	6	43	24	-44.2	15.2	3	12	9	-25.0	9.5	6	0.279	0.375	0.096	0.250 34.4
Blue-gray Gnatcatcher	18	41	36	-12.2	33.1	16	19	20	5.3	45.6	22	0.463	0.556	0.092	0.203 19.9
Gray Catbird	9	106	86	-18.9	5.6***	6	37	43	16.2	29.3	10	0.349	0.500	0.151	0.104 43.2
Black-and-white Warbler	17	24	40	66.7	55.8	18	21	24	14.3	27.2	19	0.875	0.600	-0.275	0.372 -31.4
Prothonotary Warbler	8	20	40	100.0	49.0*	7	4	16	300.0	205.6	8	0.200	0.400	0.200	0.183 100.0

TABLE 3. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Kentucky Warbler	16	95	76	-20.0	12.0	14	26	32	23.1	29.2	18	0.274	0.421	0.147	0.142	53.8
Common Yellowthroat	13	53	39	-26.4	12.4	6	6	12	100.0	63.2	13	0.113	0.308	0.195	0.188	171.8
Yellow-breasted Chat	10	121	127	5.0	8.4	6	16	34	112.5	73.2	11	0.132	0.268	0.136	0.076	102.5
Field Sparrow	17	82	65	-20.7	24.1	12	21	46	119.0	115.1	17	0.256	0.708	0.452	0.214*	176.3
Northern Cardinal	41	355	289	-18.6	6.4**	40	132	311	135.6	45.5***	42	0.372	1.076	0.704	0.150***	189.4
Indigo Bunting	27	144	182	26.4	13.0**	13	15	21	40.0	69.2	27	0.104	0.115	0.011	0.053	10.8
Painted Bunting	25	310	266	-14.2	13.6	21	26	92	253.8	80.4***	26	0.084	0.346	0.262	0.083***	312.4
Brown-headed Cowbird	30	54	39	-27.8	20.5	6	4	5	25.0	96.8	32	0.074	0.128	0.054	0.073	73.1
All species pooled	45	3117	2862	-8.2	4.1*	45	1093	1539	40.8	11.5***	45	0.351	0.538	0.187	0.061***	53.4
Number decreasing: 17/24 (71%)**																
Number increasing: 21/24 (88%)*																
NORTHEAST MAPS REGION																
Downy Woodpecker	44	50	64	28.0	24.2	42	65	67	3.1	17.9	55	1.300	1.047	-0.253	0.382	-19.5
"Traill's" Flycatcher	23	80	79	-1.3	15.3	8	9	14	55.6	96.7	24	0.113	0.177	0.065	0.099	57.5
Eastern Phoebe	21	29	27	-6.9	28.4	21	39	21	-46.2	13.5**	28	1.345	0.778	-0.567	0.418	-42.2
White-eyed Vireo	9	38	37	-2.6	25.5	7	5	20	300.0	341.6	10	0.132	0.541	0.409	0.194*	310.8
Red-eyed Vireo	51	169	164	-3.0	12.8	18	31	17	-45.2	21.1	52	0.183	0.104	-0.080	0.056	-43.5
Carolina Chickadee	16	25	38	52.0	58.1	14	25	23	-8.0	26.3	16	1.000	0.605	-0.395	0.410	-39.5
Black-capped Chickadee	43	141	180	27.7	17.5*	32	99	96	-3.0	17.4	44	0.702	0.533	-0.169	0.182	-24.0
Tufted Titmouse	39	58	71	22.4	25.4	29	52	100	92.3	43.8***	43	0.897	1.409	0.512	0.330	57.1
Carolina Wren	23	71	83	16.9	20.7	20	38	41	7.9	31.3	27	0.535	0.494	-0.041	0.228	-7.7
House Wren	13	46	38	-17.4	25.5	16	14	32	128.6	97.3*	19	0.304	0.842	0.538	0.331	176.7
Veery	37	215	206	-4.2	10.7	26	58	38	-34.5	17.4	38	0.270	0.185	-0.085	0.062	-31.6
Hermit Thrush	28	80	98	22.5	18.1	21	43	35	-18.6	20.2	30	0.537	0.357	-0.180	0.153	-33.6
Wood Thrush	44	175	185	5.7	15.1	28	47	55	17.0	28.6	45	0.269	0.297	0.029	0.081	10.7
American Robin	48	228	210	-7.9	7.8	28	95	97	2.1	36.1	50	0.417	0.462	0.045	0.263	10.9
Gray Catbird	48	718	658	-8.4	5.5	37	326	310	-4.9	12.1	49	0.454	0.471	0.017	0.097	3.8
Cedar Waxwing	28	165	146	-11.5	17.6	6	4	6	50.0	144.9	28	0.024	0.041	0.017	0.026	69.5
Yellow Warbler	20	240	197	-17.9	7.7**	14	109	53	-51.4	13.6***	20	0.454	0.269	-0.185	0.116	-40.8
Chestnut-sided Warbler	13	43	47	9.3	30.1	12	21	22	4.8	36.4	18	0.488	0.468	-0.020	0.142	-4.2
Magnolia Warbler	17	64	72	12.5	17.2	13	28	20	-28.6	35.4	19	0.438	0.278	-0.160	0.220	-36.5
Yellow-rumped Warbler	15	48	33	-31.3	16.9*	6	7	11	57.1	60.2	15	0.146	0.333	0.188	0.092*	128.6
Blk.-throated Grn. Warb.	22	69	68	-1.4	12.8	10	12	15	25.0	75.1	22	0.174	0.221	0.047	0.118	26.8

TABLE 3. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX				
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹ % change ¹⁰
Black-and-white Warbler	34	70	59	-15.7	12.0	21	38	47	23.7	31.0	38	0.543	0.797	0.254	0.187 46.7
American Redstart	32	245	229	-6.5	9.5	24	177	115	-35.0	11.5*	35	0.722	0.502	-0.220	0.207 -30.5
Worm-eating Warbler	17	50	56	12.0	41.5	12	32	53	65.6	49.7	19	0.640	0.946	0.306	0.351 47.9
Ovenbird	52	222	283	27.5	11.5***	38	132	98	-25.8	12.4*	55	0.595	0.346	-0.248	0.116** -41.8
Louisiana Waterthrush	13	18	13	-27.8	21.7	9	36	25	-30.6	28.7	16	2.000	1.923	-0.077	1.649 -3.8
Common Yellowthroat	42	205	231	12.7	13.3	29	115	89	-22.6	15.4	43	0.561	0.385	-0.176	0.152 -31.3
Hooded Warbler	14	53	67	26.4	16.4*	11	19	33	73.7	72.0	15	0.359	0.493	0.134	0.171 37.4
Scarlet Tanager	24	30	38	26.7	33.5	8	13	22	69.2	67.5	24	0.433	0.579	0.146	0.275 33.6
Eastern Towhee	32	77	79	2.6	14.5	21	40	24	-40.0	21.2*	37	0.520	0.304	-0.216	0.129* -41.5
Chipping Sparrow	15	32	43	34.4	38.8	10	9	19	111.1	79.5	17	0.281	0.442	0.161	0.149 57.1
Song Sparrow	27	144	165	14.6	15.0	28	138	143	3.6	12.9	32	0.958	0.867	-0.092	0.207 -9.6
White-throated Sparrow	12	51	52	2.0	31.8	10	22	16	-27.3	31.5	14	0.431	0.308	-0.124	0.182 -28.7
Dark-eyed Junco	16	36	62	72.2	31.4*	14	80	88	10.0	26.8	17	2.222	1.419	-0.803	0.909 -36.1
Northern Cardinal	35	119	134	12.6	12.1	28	55	63	14.5	23.7	37	0.462	0.470	0.008	0.113 1.7
Rose-breasted Grosbeak	19	35	44	25.7	36.4	11	19	12	-36.8	33.4	22	0.543	0.273	-0.270	0.267 -49.8
Indigo Bunting	22	56	65	16.1	26.7	10	16	17	6.3	84.7	24	0.286	0.262	-0.024	0.201 -8.5
Red-winged Blackbird	14	66	96	45.5	30.6	5	4	7	75.0	144.9	14	0.061	0.073	0.012	0.043 20.3
Common Grackle	19	43	48	11.6	27.9	7	6	4	-33.3	50.9	19	0.140	0.083	-0.056	0.091 -40.3
Baltimore Oriole	16	46	31	-32.6	16.6	5	5	4	-20.0	68.1	18	0.109	0.129	0.020	0.107 18.7
American Goldfinch	38	203	238	17.2	14.4	2	2	0	-100.0	0.0	39	0.010	0.000	-0.010	0.007 -100.0
All species pooled	68	5176	5358	3.5	3.4	68	2334	2193	-6.0	7.3	68	0.451	0.409	-0.042	0.041 -9.2
Number increasing: 25/41 (61%) Number decreasing: 19/41 (46%) Number decreasing: 23/41 (56%)															
SOUTHEAST MAPS REGION															
Downy Woodpecker	40	45	57	26.7	24.2	41	55	80	45.5	30.2**	54	1.222	1.404	0.181	0.406 14.8
Acadian Flycatcher	52	233	297	27.5	11.9***	25	29	20	-31.0	24.1	52	0.125	0.067	-0.057	0.040 -45.9
White-eyed Vireo	36	124	132	6.5	10.4	26	55	43	-21.8	25.3	40	0.444	0.326	-0.118	0.148 -26.6
Red-eyed Vireo	49	283	245	-13.4	9.4	22	37	18	-51.4	19.8*	51	0.131	0.073	-0.057	0.045 -43.8
Blue Jay	41	43	52	20.9	25.5	9	8	11	37.5	86.0	42	0.186	0.212	0.026	0.112 13.7
Carolina Chickadee	55	85	87	2.4	17.8	44	100	110	10.0	20.0	58	1.177	1.264	0.088	0.345 7.5
Tufted Titmouse	61	138	155	12.3	15.1	60	147	186	26.5	17.5*	64	1.065	1.200	0.135	0.196 12.7
Carolina Wren	58	179	236	31.8	16.1**	56	203	248	22.2	17.2	61	1.134	1.051	-0.083	0.252 -7.3
Blue-gray Gnatcatcher	21	31	22	-29.0	20.6	14	19	22	15.8	43.8	22	0.613	1.000	0.387	0.385 63.2

TABLE 3. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX					
	n ¹	1998	1999	%change ²	SE ³	n ⁴	1998	1999	%change ⁵	SE ⁶	n ⁷	1998	1999	change ⁸	SE ⁹	% change ¹⁰
Wood Thrush	53	334	395	18.3	9.7**	40	101	106	5.0	16.8	53	0.302	0.268	-0.034	0.069	-11.3
American Robin	14	36	52	44.4	64.4	14	34	46	35.3	44.3	19	0.944	0.885	-0.060	0.400	-6.3
Gray Catbird	30	164	156	-4.9	10.8	20	76	70	-7.9	16.1	33	0.463	0.449	-0.015	0.182	-3.2
Brown Thrasher	22	32	25	-21.9	24.9	16	20	19	-5.0	38.0	26	0.625	0.760	0.135	0.279	21.6
Blue-winged Warbler	12	37	32	-13.5	31.4	8	16	15	-6.3	78.1	13	0.432	0.469	0.036	0.273	8.4
Prairie Warbler	16	70	65	-7.1	29.2	14	33	30	-9.1	22.8	18	0.471	0.462	-0.010	0.157	-2.1
Prothonotary Warbler	14	23	33	43.5	37.5	11	7	17	142.9	108.5	17	0.304	0.515	0.211	0.232	69.3
Worm-eating Warbler	32	56	69	23.2	25.6	20	32	30	-6.3	17.3	35	0.571	0.435	-0.137	0.179	-23.9
Ovenbird	49	242	233	-3.7	8.6	38	107	156	45.8	33.4	51	0.442	0.670	0.227	0.145	51.4
Louisiana Waterthrush	31	64	54	-15.6	13.5	23	38	48	26.3	32.0	36	0.594	0.889	0.295	0.240	49.7
Kentucky Warbler	34	187	172	-8.0	10.7	28	62	89	43.5	29.7*	36	0.332	0.517	0.186	0.096*	56.1
Common Yellowthroat	44	167	194	16.2	15.6	30	73	66	-9.6	17.8	48	0.437	0.340	-0.097	0.108	-22.2
Hooded Warbler	34	96	92	-4.2	13.6	21	24	22	-8.3	40.7	38	0.250	0.239	-0.011	0.116	-4.3
Yellow-breasted Chat	21	95	88	-7.4	10.5	11	21	22	4.8	35.6	22	0.221	0.250	0.029	0.093	13.1
Eastern Towhee	27	37	32	-13.5	15.1	18	28	16	-42.9	18.7*	30	0.757	0.500	-0.257	0.279	-33.9
Field Sparrow	16	45	51	13.3	29.6	8	13	13	0.0	41.9	16	0.289	0.255	-0.034	0.116	-11.8
Northern Cardinal	62	277	339	22.4	8.7***	53	162	163	0.6	20.4	62	0.585	0.481	-0.104	0.125	-17.8
Indigo Bunting	44	203	199	-2.0	9.7	17	28	36	28.6	24.4	45	0.138	0.181	0.043	0.089	31.2
Common Grackle	17	58	32	-44.8	11.6*	7	13	17	30.8	77.2	18	0.224	0.531	0.307	0.321	137.0
American Goldfinch	23	85	150	76.5	79.9	1	5	2	-60.0		23	0.059	0.013	-0.046	0.065	-77.3
All species pooled	66	3889	4185	7.6	3.7**	66	1690	1899	12.4	7.9*	66	0.435	0.454	0.019	0.046	4.4
Number increasing: 15/29 (52%)																
Number increasing: 16/29 (55%)																
Number increasing: 14/29 (48%)																
ALASKA AND BOREAL CANADA MAPS REGIONS																
Black-capped Chickadee	8	13	20	53.8	45.2	8	14	50	257.1	95.8**	11	1.077	2.500	1.423	0.881	132.1
Ruby-crowned Kinglet	6	25	33	32.0	38.6	7	40	24	-40.0	26.3	7	1.600	0.727	-0.873	0.590	-54.5
Swainson's Thrush	12	57	56	-1.8	17.1	10	14	20	42.9	60.3	13	0.246	0.357	0.112	0.131	45.4
Hermit Thrush	7	66	76	15.2	13.2	6	55	71	29.1	31.2	7	0.833	0.934	0.101	0.295	12.1
American Robin	12	51	43	-15.7	12.1	6	20	19	-5.0	31.3	13	0.392	0.442	0.050	0.185	12.7
Orange-crowned Warbler	11	89	111	24.7	22.3	11	64	116	81.3	66.1*	12	0.719	1.045	0.326	0.391	45.3
Yellow Warbler	9	126	128	1.6	27.4	7	86	68	-20.9	18.3	10	0.683	0.531	-0.151	0.283	-22.2
Yellow-rumped Warbler	12	92	60	-34.8	21.4	10	49	35	-28.6	37.9	13	0.533	0.583	0.051	0.151	9.5
American Redstart	5	30	47	56.7	42.9	4	5	19	280.0	271.5	5	0.167	0.404	0.238	0.305	142.6

TABLE 3. Continued.

Species	ADULTS					YOUNG					REPRODUCTIVE INDEX							
	¹ n	1998	1999	%change ²	SE ³	⁴ n	1998	1999	%change ⁵	SE ⁶	⁷ n	1998	1999	change ⁸	SE ⁹	% change ¹⁰		
Wilson's Warbler	12	331	289	-12.7	10.3	12	453	600	32.5	26.7	12	1.369	2.076	0.708	0.436	51.7		
American Tree Sparrow	6	20	17	-15.0	28.9	8	42	59	40.5	77.5	8	2.100	3.471	1.371	2.559	65.3		
Savannah Sparrow	9	13	15	15.4	46.3	10	23	48	108.7	42.2	11	1.769	3.200	1.431	1.825	80.9		
Fox Sparrow	9	45	47	4.4	31.6	11	29	51	75.9	67.1	11	0.644	1.085	0.441	0.572	68.4		
White-crowned Sparrow	9	52	57	9.6	18.9	9	49	126	157.1	52.9**	10	0.942	2.211	1.268	0.615*	134.6		
Golden-crowned Sparrow	5	40	46	15.0	12.0	5	21	13	-38.1	16.7*	7	0.525	0.283	-0.242	0.127	-46.2		
Dark-eyed Junco	6	31	30	-3.2	26.1	8	68	102	50.0	25.3*	9	2.194	3.400	1.207	1.498	55.0		
Common Redpoll	11	202	130	-35.6	12.1**	9	57	56	-1.8	81.1	11	0.282	0.431	0.149	0.312	52.7		
All species pooled	18	1636	1596	-2.4	7.3	18	1189	1652	38.9	22.1**	18	0.727	1.035	0.308	0.184	42.4		
		Number decreasing: 7/17 (41%)						Number increasing: 11/17 (65%)						Number increasing: 14/17 (82%)*				
ALL REGIONS POOLED																		
All species pooled	415	36690	37125	1.2	1.5	414	19524	20268	3.8	3.3	415	0.532	0.546	0.014	0.029	2.6		
		Number increasing: 77/139 (55%)						Number increasing: 77/139 (55%)						Number increasing: 81/139 (58%)*				

¹Number of stations at which at least one individual adult bird of the species was captured in either year.

²Percent change between the two years in the number of adult individuals captured.

³Standard error and statistical significance of the percent change in the number of adult individuals captured.

⁴Number of stations at which at least one individual young bird of the species was captured in either year.

⁵Percent change between the two years in the number of adult individuals captured.

⁶Standard error and statistical significance of the percent change in the number of adult individuals captured.

⁷Number of stations at which at least one individual aged bird of the species was captured in either year.

⁸Change between the two years in the reproductive index (number of young/number of adults).

⁹Standard error and statistical significance of the change in the reproductive index.

¹⁰Percent change between the two years in the reproductive index.

¹¹Percent change undefined because no young were captured in the first year of the comparison.

† Reproductive indices for this species should be interpreted with caution because it likely includes data from stations where the species occurs only as an altitudinal disperser (a situation in which large numbers of adults and, especially, young, disperse up-mountain after the breeding season) and, therefore, may be biased high.

* 0.05 ≤ P < 0.10; ** 0.01 ≤ P < 0.05; *** P < 0.01

species pooled were recorded for four of the seven regions with significant increases in the Northwest (6.2%) and Southeast (7.6%). The proportion of increasing species in the Northwest (68%) was highly significantly >50%, but that for the Southeast (52%) was not. Summing over these two regions, 13 species showed significant or nearly significant increases compared to only three species that showed significant or nearly significant decreases. The Northeast and North-central regions had smaller and non-significant increases in the number of adults of all species pooled (3.5% and 2.7%, respectively) and had proportions of increasing species (61% and 54%, respectively) that were not significantly >50%. Summing over these two regions, six species showed significant or nearly significant increases compared to only three species that showed significant or nearly significant decreases.

In contrast, adult population size for all species pooled decreased in the remaining three regions by a highly significant -11.5% in the Southwest, a nearly significant -8.2% in the South-central, and a non-significant -2.4% in the Alaska/Boreal Canada regions. The proportions of declining species in the Southwest (67%) and South-central (71%) regions were significantly >50%. Summing over these two regions, 13 species showed significant or nearly significant decreases compared to only six species that showed significant or nearly significant increases. The proportion of decreasing species in the Alaska/Boreal Canada Region was not significantly >50% and only one species showed a significant or nearly significant decrease while no species showed a significant or nearly significant increase.

On a continent-wide basis, numbers of adults of all species pooled increased between 2000 and 2001 by a non-significant 1.2%, and a non-significant 55% of 139 species showed increases.

Productivity. — Over most regions, numbers of young captured and reproductive index for all species pooled were relatively similar between 2000 and 2001. Exceptions were in the South-central Region, where numbers of young and the reproductive index increased by 40.8% and 53.4% (both highly significant), respectively, and the proportions of increasing species for these two parameters were each 88% (again, both highly significant); and in the Alaska/Boreal

Canada Region, where numbers of young and the reproductive index increased by 38.9% (significant) and 42.8% (highly significant), respectively, and the proportions of increasing species for these two parameters were 65% (non-significant) and 82% (highly significant), respectively. Summing over these two regions, seven species showed significant or nearly significant increases in young (as opposed to only two species showing significant or nearly significant decreases), and seven species showed significant or nearly significant increases in reproductive index (as opposed to no species showing even a nearly significant decrease). Numbers of young captured for all species pooled also increased in three other regions by amounts ranging from 6.1% (Southwest) to 12.9% (North-central), but only the 12.4% increase in the Southeast region was even nearly significant. The proportion of species with increasing numbers of young was significantly >50% only for the North-central Region (67%). Reproductive index showed similar, relatively small increases for these three regions, ranging from 4.4% (Southeast) to 19.9% (Southwest); none of these increases were even nearly significant. The proportion of species with increasing reproductive indices in these three regions ranged from a non-significant 48% (Southeast) to a significant 75% (North-central) with that for the Southwest (62%) being nearly significantly >50%. Summing over these three regions, nine species showed significant or nearly significant increases in young (as opposed to five species showing significant or nearly significant decreases), and eight species showed significant or nearly significant increases in reproductive index (as opposed to no species showing even a nearly significant decrease).

The number of young captured and the reproductive index decreased relatively slightly between 2000 and 2001 in the Northwest (-6.7% and -12.2%, respectively) and Northeast (-6.0% and -9.2%, respectively) regions; none of the four changes was even nearly significant. Similarly, the proportion of decreasing species for the two parameters in the two regions ranged from 46% to 58% and none of the four proportions was even nearly significantly >50%. Summing over these two regions, 14 species showed significant or nearly significant decreases in young, while 13 species showing significant or nearly significant

increases; and six species showed significant or nearly significant decreases in reproductive index, while three species showed significant or nearly significant decreases.

On a continent-wide basis, the number of young captured and the proportion of young in the catch showed non-significant increases of 3.8% and 2.6%, respectively, between 2000 and 2001, while the proportions of increasing species for these two parameters were 55% (non-significant) and 58% (significant), respectively.

SURVIVAL-RATES

Maximum-likelihood estimates of time-constant regional annual adult apparent survival rates, recapture probabilities, and proportions of residents among newly captured adults were derived from 10 years of capture-mark-recapture data pooled over all stations (in each region) that were operated for four or more consecutive years during the 1992-2001 period (Table 4). Data were thus pooled from 136 stations in the Northwest, 68 in the Southwest, 38 in the North-central, 62 in the South-central, 73 in the Northeast, 73 in the Southeast, and 29 in the Alaska/Boreal Canada region, for a total of 479 stations and an average of 68 stations per region (Table 5). The increases for the 10-yr period (1992-2001) over the 7-yr period (1992-1998) in the number of stations contributing data to survivorship analyses ranged from 11% in the South-central Region to 100% in the Southwest and averaged 44%.

Within the 10-yr data set, 77 species fulfilled the revised selection criteria for survivorship analyses in the Northwest Region, 72 in the Southwest, 54 in the North-central, 60 in the South-central, 71 in the Northeast, 41 in the Southeast, and 36 in the Alaska/Boreal Canada Region, for an average of 59 species per region (Tables 4 and 5). The increases, due primarily to the revised selection criteria, in the number of species per region for which survivorship estimates could be obtained ranged from 15% in the Northwest to 60% in the Southwest and averaged 34%.

Also included in Table 4 for each species in each region are the number of stations from which data were pooled and the total number of individual adult birds captured during the 10 years, as well as the total number of captures and total number of returns of these individuals.

The mean number of individual adult birds captured per station per species during the 10 years (1992-2001) was lowest for the Northeast (21.3) and Southeast (22.1) regions, higher for the South-central (29.1), Northwest (33.3), North-central (35.0), and Southwest (35.3) regions, and highest for the Alaska/Boreal Canada Region (51.2). Two of the Southwest stations operated more than 10 nets for up to eight days per period, which may have slightly inflated the average number of individuals per station per species there. No such large amounts of extra effort were characteristic of any Alaska/Boreal Canada station, so the high average number of individuals per station per species there appeared not to be a function of extra effort. Altogether, the 479 stations included in this survivorship analysis were operated for an average of 6.97 yr each (62 stations for four years, 105 for five, 45 for six, 55 for seven, 78 for eight, 53 for nine, and 81 for 10 years) and produced an average capture rate of 4.41 adult individuals per station per species per year. These captures, of course, were not distributed uniformly over all stations at which a species was captured; typically, fewer individuals than average were captured at most stations and many more individuals than average were captured at a few stations.

As in past years, the average total number of captures per individual per species (for species that met survivorship selection criteria) was remarkably constant over the seven regions, ranging from 1.34 ± 0.21 in the South-central region to 1.54 ± 0.25 in the Alaska/Boreal Canada Region, and averaging 1.41 ± 0.28 overall. Similarly, the average total number of returns per individual per species also remained remarkably constant over the seven regions, ranging from 0.129 ± 0.058 in the Southeast region to 0.158 ± 0.076 in the Alaska/Boreal Canada region, and averaging 0.140 ± 0.079 overall.

The precision of the estimates of annual adult survival rate using 10 years of data (1992-2001) from a total of 479 stations increased over that obtained during seven years (1992-1998) from a total of 346 stations (Table 5). The mean coefficient of variation in survival probability, $CV(\phi)$, for all species in each region ranged from 16.4% in the Northwest Region to 23.4% in the South-central Region and averaged $20.8 \pm 2.7\%$ over the seven regions. These figures compare to

TABLE 4. Regional time-constant estimates of annual adult survival probability, recapture probability, and proportion of residents from modified Cormack-Jolly-Seber capture-mark-recapture analyses¹ (using a transient model²) and the selected time-dependent models from ten years (1992-2001) of MAPS data for species with adequate data³.

Species	No. stn. ⁴		No. indiv. ⁵		No. capt. ⁶	No. btwn. year	Survival probability ⁸		Recapture probability ⁹		Proportion of residents ¹⁰		Models selected ¹²								
	No.	year	ϕ	SE(ϕ)			CV(ϕ)	W(ϕ) ¹¹	p	SE	CV(p)	w(p) ¹¹	τ	SE(τ)	CV(τ)	w(τ) ¹¹	1	2	3	4	5
NORTHWEST MAPS REGION																					
Williamson's Sapsucker	8	81	112	9	0.324	0.132	40.7	0.010	0.341	0.212	62.3	0.119	0.734	0.485	66.0	0.019	...				
Red-naped Sapsucker	28	370	608	62	0.366	0.049	13.3	0.002	0.544	0.091	16.6	0.004	0.544	0.125	23.0	0.002	...				
R-naped x R-breasted Hybrid	8	46	110	19	0.628	0.094	14.9	0.009	0.556	0.131	23.5	0.046	0.452	0.188	41.6	0.145	...				
Red-breasted Sapsucker	47	671	1061	107	0.449	0.040	9.0	0.008	0.371	0.055	14.9	0.056	0.624	0.110	17.6	0.022	...				
Downy Woodpecker	45	355	433	27	0.319	0.083	26.0	0.014	0.213	0.102	47.8	0.143	0.952	0.450	47.3	0.001	...				
Hairy Woodpecker	56	249	311	43	0.550	0.068	12.3	0.205	0.286	0.076	26.6	0.125	0.643	0.199	30.9	0.025	...				
Northern Flicker	46	171	189	6	0.436	0.183	42.0	0.159	0.096	0.104	108.3	0.039	0.592	0.628	106.1	0.009	...				
Western Wood-Pewee	54	1015	1348	146	0.513	0.037	7.2	0.159	0.336	0.044	13.2	0.383	0.503	0.077	15.4	0.350	.t.	.t	...	t.	
"Traill's" Flycatcher	32	1115	1644	166	0.524	0.033	6.4	0.160	0.460	0.046	10.0	0.052	0.329	0.046	13.8	0.915	.t				
Hammond's Flycatcher	53	1142	1650	185	0.453	0.031	6.9	0.222	0.404	0.044	10.9	0.109	0.530	0.071	13.4	0.003	...				
Dusky Flycatcher	47	1903	2895	276	0.488	0.024	4.9	0.992	0.421	0.034	8.1	0.019	0.324	0.035	10.9	0.013	t.				
"Western" Flycatcher	54	1681	2232	190	0.481	0.030	6.3	0.135	0.314	0.037	11.9	0.024	0.407	0.056	13.7	0.127	...				
Cassin's Vireo	29	459	548	32	0.544	0.076	13.9	0.034	0.162	0.059	36.6	0.056	0.426	0.163	38.2	0.014	...				
Hutton's Vireo	11	54	70	6	0.585	0.169	28.8	0.000	0.337	0.196	58.1	0.002	0.224	0.165	73.7	0.001	...				
Warbling Vireo	86	3560	5306	604	0.479	0.017	3.6	0.180	0.422	0.024	5.7	0.017	0.465	0.034	7.3	0.070	...				
Red-eyed Vireo	7	126	187	14	0.664	0.116	17.5	0.168	0.198	0.086	43.1	0.045	0.309	0.152	49.4	0.002	...				
Gray Jay	12	55	76	18	0.754	0.088	11.7	0.007	0.232	0.082	35.5	0.014	0.677	0.266	39.2	0.004	...				
Steller's Jay	50	203	222	14	0.659	0.121	18.4	0.001	0.094	0.065	69.5	0.004	0.529	0.376	71.1	0.004	...				
Western Scrub-Jay	9	38	46	6	0.624	0.153	24.6	0.001	0.207	0.147	71.1	0.002	0.487	0.375	77.0	0.000	...				
Tree Swallow	15	386	538	45	0.447	0.066	14.8	0.005	0.272	0.075	27.7	0.005	0.682	0.206	30.2	0.003	...				
Barn Swallow	4	298	376	34	0.524	0.070	13.4	0.473	0.185	0.062	33.3	0.334	0.573	0.199	34.8	0.014	t.	.t	...		
Black-capped Chickadee	43	831	1179	136	0.466	0.038	8.2	0.624	0.443	0.054	12.3	0.899	0.489	0.075	15.4	0.091	tt.	.t			
Mountain Chickadee	41	891	1133	109	0.471	0.042	8.9	0.015	0.414	0.058	14.0	0.030	0.376	0.067	17.7	0.006	...				
Chestnut-backed Chickadee	45	784	902	53	0.325	0.059	18.1	0.007	0.180	0.068	38.0	0.094	0.999	0.390	39.0	0.003	...				
Bushtit*†	13	142	164	4	0.256	0.206	80.3	0.025	0.102	0.165	162.1	0.006	1.000	1.488	148.8	0.019	...				
Red-breasted Nuthatch	64	510	574	22	0.336	0.091	27.2	0.004	0.170	0.099	58.3	0.022	0.594	0.356	60.0	0.028	...				
Brown Creeper	48	492	615	41	0.328	0.067	20.3	0.005	0.252	0.090	35.5	0.018	0.836	0.312	37.3	0.001	...				
Bewick's Wren	13	168	298	40	0.452	0.065	14.4	0.002	0.461	0.099	21.5	0.016	0.803	0.221	27.6	0.001	...				
House Wren	27	597	831	53	0.278	0.051	18.3	0.002	0.373	0.098	26.2	0.001	0.660	0.186	28.2	0.002	...				
Winter Wren	37	926	1489	117	0.375	0.035	9.4	0.855	0.521	0.064	12.4	0.078	0.354	0.061	17.3	0.089	t.				
Golden-crowned Kinglet*	54	859	1056	13	0.128	0.078	60.9	0.004	0.358	0.256	71.4	0.003	0.232	0.127	54.7	0.026	...				

TABLE 4. Continued.

Species	No. stn. ⁴	No. indv. ⁵	No. capt. ⁶	No. year recap. ⁷	No. btwn. year	Survival		Recapture		Proportion of residents ^{9,10}		Models selected ¹²												
						ϕ	SE(ϕ)	CV(ϕ)	W(ϕ) ¹¹	p	SE	CV(p)	w(p) ¹¹	τ	SE(τ)	CV(τ)	w(τ) ¹¹	1	2	3	4	5		
Ruby-crowned Kinglet	14	628	793	30		0.255	0.069	26.8	0.366	0.275	0.112	40.7	0.737	0.564	0.224	39.8	0.031	t.	t.					
Veery	4	92	183	36		0.714	0.073	10.3	0.001	0.386	0.080	20.8	0.001	0.587	0.159	27.1	0.015	...						
Swainson's Thrush	78	7394	16732	2809		0.586	0.008	1.3	0.014	0.629	0.011	1.7	0.002	0.438	0.015	3.4	0.098	...						
Hermit Thrush	35	808	1251	148		0.461	0.033	7.3	0.003	0.537	0.053	9.8	0.070	0.383	0.056	14.7	0.003	...						
American Robin	116	3947	5322	595		0.575	0.019	3.3	0.418	0.258	0.018	7.0	0.005	0.582	0.045	7.7	0.398	t.	.t	...				
Varied Thrush	30	388	526	51		0.494	0.059	11.9	0.050	0.407	0.080	19.6	0.083	0.343	0.087	25.2	0.002	...						
Wrentit	21	487	1143	174		0.527	0.029	5.6	0.677	0.637	0.045	7.1	0.164	0.424	0.063	14.9	0.818	t.t	.t					
Gray Catbird	12	584	885	106		0.561	0.048	8.6	0.021	0.450	0.059	13.2	0.004	0.450	0.076	16.9	0.442	...	.t					
Cedar Waxwing	24	1456	1656	11		0.639	0.152	23.8	0.006	0.022	0.016	71.5	0.001	0.246	0.165	67.0	0.038	...						
Orange-crowned Warbler	40	1468	2024	183		0.481	0.032	6.6	0.035	0.418	0.044	10.5	0.015	0.329	0.044	13.4	0.006	...						
Nashville Warbler	21	685	825	35		0.334	0.066	19.9	0.015	0.371	0.111	29.8	0.026	0.297	0.099	33.4	0.076	...						
Virginia's Warbler	3	180	203	12		0.443	0.141	31.8	0.007	0.171	0.124	72.2	0.863	0.668	0.489	73.2	0.006	t.						
Yellow Warbler	49	4086	6770	906		0.571	0.015	2.7	0.166	0.493	0.020	4.0	0.005	0.410	0.024	5.8	0.059	...						
Yellow-rumped Warbler	60	2906	3482	234		0.486	0.030	6.1	0.076	0.208	0.028	13.4	0.644	0.504	0.071	14.1	0.010	t.	...					
Black-throated Gray Warbler	17	121	139	5		0.487	0.196	40.2	0.022	0.092	0.100	108.5	0.005	0.582	0.627	107.7	0.005	...						
Townsend's Warbler	23	823	1031	83		0.451	0.048	10.5	0.007	0.216	0.049	22.8	0.007	0.704	0.171	24.3	0.012	...						
Hermit Warbler	34	1030	1125	29		0.599	0.083	13.9	0.023	0.069	0.033	47.7	0.013	0.360	0.171	47.5	0.010	...						
American Redstart	7	304	518	52		0.443	0.054	12.2	0.018	0.526	0.089	16.9	0.371	0.343	0.088	25.7	0.132	...	.t					
Northern Waterthrush	5	121	162	14		0.626	0.122	19.5	0.652	0.257	0.114	44.3	0.007	0.389	0.195	50.2	0.049	t.	...					
MacGillivray's Warbler	85	5763	11260	1365		0.479	0.011	2.3	0.559	0.614	0.018	2.9	0.011	0.408	0.020	4.8	0.415	t.	...	.t				
Common Yellowthroat	27	1452	2958	386		0.499	0.021	4.2	0.007	0.556	0.032	5.7	0.012	0.470	0.043	9.1	0.006	...						
Wilson's Warbler	56	3638	5707	548		0.438	0.017	3.9	0.016	0.526	0.028	5.3	0.010	0.338	0.026	7.8	0.952	.t						
Yellow-breasted Chat	15	873	1607	195		0.448	0.028	6.2	0.878	0.560	0.047	8.3	0.105	0.474	0.062	13.1	0.118	t.						
Western Tanager	73	1386	1520	80		0.538	0.052	9.6	0.002	0.129	0.038	29.5	0.024	0.533	0.164	30.7	0.001	...						
Green-tailed Towhee	5	209	343	45		0.602	0.069	11.4	0.004	0.360	0.076	21.1	0.017	0.539	0.139	25.9	0.005	...						
Spotted Towhee	42	955	1492	188		0.476	0.030	6.4	0.575	0.508	0.046	9.1	0.078	0.460	0.060	13.0	0.019	t.	...					
Chipping Sparrow	37	760	935	62		0.403	0.053	13.1	0.055	0.203	0.056	27.7	0.062	0.673	0.193	28.7	0.446	...	.t					
Vesper Sparrow	3	48	60	8		0.688	0.141	20.5	0.002	0.346	0.161	46.5	0.008	0.320	0.195	61.0	0.001	...						
Savannah Sparrow	2	321	403	53		0.585	0.076	12.9	0.002	0.285	0.071	25.0	0.001	0.622	0.176	28.3	0.002	...						
Fox Sparrow	25	505	877	103		0.553	0.043	7.8	0.871	0.451	0.057	12.6	0.044	0.396	0.069	17.5	0.419	t.	tt					
Song Sparrow	98	5868	12172	1515		0.470	0.011	2.2	0.250	0.598	0.017	2.8	0.047	0.500	0.023	4.6	0.004	...						
Lincoln's Sparrow	37	2091	4937	629		0.432	0.016	3.6	0.125	0.631	0.027	4.2	0.045	0.643	0.045	7.0	0.073	...						
White-crowned Sparrow	14	598	1037	145		0.474	0.033	7.0	0.024	0.544	0.052	9.6	0.004	0.493	0.072	14.6	0.039	...						
Dark-eyed Junco	83	5217	8874	1124		0.461	0.012	2.7	0.971	0.500	0.019	3.8	0.044	0.527	0.028	5.3	0.097	t.						

TABLE 4. Continued.

Species	No. stn. ⁴	No. indv. ⁵	No. capt. ⁶	No. year recap. ⁷	Survival probability ⁸		Recapture probability ⁹		Proportion of residents ¹⁰		Models selected ¹²											
					ϕ	SE(ϕ)	CV(ϕ)	$W(\phi)$ ¹¹	p	SE	CV(p)	$w(p)$ ¹¹	τ	SE(τ)	CV(τ)	$w(\tau)$ ¹¹	1	2	3	4	5	
Black-headed Grosbeak	68	2057	2652	272	0.568	0.027	4.8	0.008	0.280	0.028	10.0	0.005	0.445	0.051	11.4	0.016	...					
Lazuli Bunting	25	1074	1375	93	0.552	0.044	8.0	0.002	0.245	0.043	17.5	0.004	0.321	0.062	19.4	0.050	...					
Red-winged Blackbird	18	799	899	55	0.784	0.085	10.8	0.017	0.148	0.043	29.1	0.008	0.346	0.103	29.7	0.047	...					
Brewer's Blackbird**	10	51	54	2	0.586	0.304	51.9	0.000	0.032	0.094	289.7	0.000	1.000	2.874	287.4	0.000	...					
Brown-headed Cowbird	60	748	1105	140	0.486	0.039	8.0	0.030	0.485	0.055	11.3	0.124	0.483	0.072	14.9	0.027	...					
Bullock's Oriole	19	497	633	43	0.454	0.068	15.0	0.047	0.429	0.096	22.4	0.402	0.266	0.075	28.3	0.020	...				.t.	
Purple Finch	32	2386	2975	235	0.434	0.028	6.4	0.038	0.364	0.039	10.7	0.046	0.394	0.049	12.6	0.016	...					
Cassin's Finch	18	437	466	12	0.345	0.122	35.4	0.024	0.181	0.132	73.3	0.792	0.298	0.222	74.4	0.017	...				.t.	
House Finch†	5	300	340	15	0.477	0.118	24.8	0.029	0.070	0.064	91.7	0.018	1.000	0.930	93.0	0.025	...					
Pine Siskin**	46	2178	2327	17	0.175	0.090	51.1	0.218	0.041	0.052	126.5	0.075	1.000	1.190	119.0	0.087	...					
Lesser Goldfinch**	9	264	285	7	0.297	0.171	57.6	0.001	0.082	0.121	147.7	0.001	1.000	1.443	144.3	0.001	...					
American Goldfinch	20	1434	1930	171	0.470	0.032	6.8	0.640	0.328	0.040	12.3	0.996	0.441	0.063	14.3	0.015	...				.t.	
Mean (77 species)	34	1164	1847	203	0.482	0.071	16.4	0.162	0.333	0.072	36.4	0.114	0.524	0.247	38.9	0.093						
Std. Dev. (77 species)	25	1474	2877	415	0.122	0.054	15.1	0.266	0.166	0.047	44.3	0.224	0.199	0.415	42.5	0.195						
Mean (66 adequately-est. sp.) ¹³	36	1285	2074	235	0.503	0.056	11.3	0.181	0.365	0.063	22.6	0.104	0.488	0.129	26.1	0.105						
Std. Dev. (66 species)	25	1541	3038	440	0.107	0.037	6.8	0.281	0.152	0.036	17.4	0.205	0.156	0.101	17.9	0.208						
SOUTHWEST MAPS REGION																						
Williamson's Sapsucker	5	82	106	6	0.572	0.172	30.1	0.003	0.171	0.121	70.9	0.032	0.315	0.242	76.7	0.001	...					
Red-naped Sapsucker	4	119	237	49	0.494	0.058	11.8	0.004	0.665	0.090	13.5	0.033	0.624	0.153	24.5	0.004	...					
Red-breasted Sapsucker	2	30	39	5	0.689	0.179	26.0	0.000	0.452	0.221	49.0	0.000	0.261	0.192	73.5	0.000	...					
Nuttall's Woodpecker	16	195	312	40	0.551	0.068	12.4	0.003	0.381	0.086	22.5	0.008	0.580	0.160	27.5	0.084	...					
Downy Woodpecker	20	217	339	43	0.605	0.066	11.0	0.003	0.431	0.082	19.0	0.009	0.353	0.094	26.8	0.019	...					
Hairy Woodpecker	10	71	106	16	0.834	0.097	11.7	0.002	0.182	0.069	38.0	0.025	0.410	0.177	43.3	0.002	...					
Northern Flicker*	21	140	158	7	0.310	0.158	51.0	0.003	0.191	0.195	102.2	0.004	0.658	0.684	104.0	0.001	...					
Olive-sided Flycatcher	2	55	77	12	0.870	0.088	10.1	0.000	0.724	0.128	17.7	0.000	0.027	0.027	100.0	0.000	...					
Western Wood-Pewee	15	278	362	29	0.384	0.073	19.1	0.016	0.446	0.124	27.7	0.064	0.394	0.136	34.5	0.078	...					
"Traill's" Flycatcher*	5	43	57	5	0.615	0.260	42.3	0.000	0.306	0.218	71.2	0.000	0.373	0.305	81.7	0.000	...					
"Western" Flycatcher	15	892	1019	43	0.595	0.069	11.5	0.051	0.183	0.054	29.5	0.918	0.208	0.064	30.6	0.004	...				.t.	
Black Phoebe	13	143	173	14	0.522	0.119	22.8	0.007	0.369	0.147	39.7	0.010	0.281	0.136	48.5	0.001	...					
Ash-throated Flycatcher	31	676	787	66	0.659	0.064	9.7	0.011	0.137	0.041	29.5	0.004	0.595	0.181	30.3	0.057	...					
Bell's Vireo	5	112	190	25	0.482	0.096	19.9	0.005	0.596	0.144	24.1	0.000	0.478	0.166	34.7	0.001	...					
Plumbeous Vireo*	8	54	77	9	0.722	0.203	28.1	0.001	0.206	0.117	56.8	0.001	0.537	0.322	60.0	0.000	...					
Warbling Vireo	15	1253	1576	95	0.539	0.044	8.2	0.005	0.460	0.060	13.1	0.008	0.135	0.025	18.3	1.000	...				.t.	

TABLE 4. Continued.

Species	No. sn. ⁴	No. indiv. ⁵	No. capt. ⁶	No. year recap. ⁷	No. btwn. year	Survival		Recapture			Proportion of residents ¹⁰		Models selected ¹²											
						ϕ	SE(ϕ)	CV(ϕ)	W(ϕ) ¹¹	p	SE	CV(p)	w(p) ¹¹	τ	SE(τ)	CV(τ)	w(τ) ¹¹	1	2	3	4	5		
Steller's Jay	9	98	137	24		0.762	0.075	9.8	0.001	0.234	0.070	29.8	0.645	0.497	0.169	34.1	0.018		.t	...				
Western Scrub-Jay	13	64	74	5		0.643	0.194	30.2	0.001	0.084	0.090	107.0	0.004	0.664	0.698	105.1	0.001		...					
Mexican Jay*	3	35	42	2		0.531	0.377	71.0	0.000	0.166	0.233	140.7	0.000	0.284	0.381	134.4	0.000		...					
Tree Swallow	5	75	92	6		0.556	0.163	29.3	0.007	0.320	0.192	60.2	0.003	0.182	0.137	75.2	0.014		...					
Violet-green Swallow	5	111	150	13		0.570	0.126	22.1	0.004	0.248	0.112	45.1	0.983	0.368	0.191	52.0	0.005		.t					
Black-capped Chickadee	7	110	179	20		0.366	0.092	25.0	0.021	0.600	0.166	27.7	0.005	0.673	0.271	40.3	0.001		...					
Mountain Chickadee	10	254	344	33		0.408	0.072	17.6	0.609	0.292	0.094	32.0	0.401	0.758	0.264	34.8	0.008		t.					
Chestnut-backed Chickadee	6	259	453	68		0.501	0.051	10.2	0.072	0.512	0.075	14.7	0.968	0.587	0.123	21.0	0.001		.t					
Bridled Titmouse*	4	28	40	8		0.714	0.238	33.4	0.000	0.344	0.207	60.1	0.000	0.779	0.510	65.5	0.000		...					
Oak Titmouse	11	153	232	24		0.514	0.081	15.7	0.001	0.358	0.104	29.0	0.001	0.391	0.147	37.6	0.070		...					
Juniper Titmouse	4	44	82	16		0.655	0.133	20.3	0.000	0.409	0.139	34.0	0.000	0.759	0.310	40.9	0.001		...					
Bushtit†	30	975	1151	52		0.300	0.061	20.3	0.568	0.152	0.061	39.9	0.699	1.000	0.391	39.1	0.171		tt	.t	.t	tt		
White-breasted Nuthatch	14	87	112	12		0.486	0.135	27.8	0.068	0.396	0.171	43.1	0.034	0.436	0.239	54.9	0.130		...					
Brown Creeper*	9	130	156	4		0.317	0.220	69.5	0.160	0.177	0.214	121.3	0.112	0.414	0.462	111.7	0.023		...					
Bewick's Wren	38	1047	1727	186		0.424	0.031	7.4	0.936	0.538	0.051	9.5	0.127	0.492	0.064	13.1	0.976		tt					
House Wren	27	941	1417	117		0.388	0.038	9.8	0.002	0.439	0.062	14.0	0.014	0.499	0.085	17.0	0.001		...					
Golden-crowned Kinglet*	5	43	62	4		0.342	0.212	62.1	0.000	0.292	0.296	101.5	0.000	0.866	0.937	108.2	0.000		...					
Western Bluebird	10	90	126	7		0.380	0.143	37.6	0.006	0.355	0.212	59.9	0.012	0.278	0.201	72.3	0.000		...					
Swainson's Thrush	8	1819	3187	292		0.619	0.026	4.1	0.101	0.578	0.034	5.9	0.913	0.144	0.016	11.0	1.000		tt					
Hermit Thrush	9	410	613	93		0.450	0.045	10.0	0.032	0.400	0.064	15.9	0.021	0.840	0.162	19.2	0.001		...					
American Robin	27	706	910	111		0.529	0.044	8.3	0.221	0.309	0.050	16.2	0.008	0.579	0.108	18.7	0.739		.t					
Wrentit	16	838	1583	213		0.540	0.029	5.4	0.652	0.618	0.043	6.9	0.037	0.346	0.043	12.5	0.365		t.		.t			
California Thrasher†	8	62	78	9		0.687	0.180	26.2	0.005	0.115	0.089	77.5	0.002	1.000	0.774	77.4	0.001		...					
Orange-crowned Warbler	15	1076	1332	73		0.413	0.051	12.4	0.069	0.318	0.067	21.0	0.029	0.320	0.075	23.4	0.097		...					
Virginia's Warbler	9	283	379	32		0.484	0.075	15.5	0.001	0.395	0.102	25.9	0.044	0.307	0.099	32.2	0.005		...					
Lucy's Warbler	5	256	330	33		0.507	0.084	16.7	0.006	0.260	0.084	32.2	0.002	0.667	0.229	34.3	0.002		...					
Yellow Warbler	18	1097	1603	167		0.479	0.035	7.3	0.777	0.526	0.052	9.9	0.022	0.357	0.049	13.7	0.120		t.					
Yellow-rumped Warbler	9	301	339	12		0.285	0.113	39.7	0.073	0.231	0.167	72.3	0.032	0.524	0.390	74.4	0.478		.t		...			
Black-throated Gray Warbler**†	1	23	27	2		0.704	0.582	82.7	0.000	0.082	0.175	212.4	0.000	1.000	1.908	190.8	0.000		...					
MacGillivray's Warbler	7	124	172	10		0.294	0.126	43.1	0.003	0.329	0.209	63.4	0.044	0.690	0.450	65.2	0.004		...					
Common Yellowthroat	22	1624	2476	240		0.525	0.033	6.2	0.957	0.426	0.040	9.5	0.010	0.399	0.046	11.5	0.005		t.					
Wilson's Warbler	9	2609	3421	194		0.446	0.029	6.6	0.020	0.510	0.047	9.2	0.967	0.142	0.019	13.2	1.000		tt					
Yellow-breasted Chat	17	750	1334	178		0.522	0.035	6.6	0.058	0.521	0.048	9.2	0.036	0.510	0.066	13.0	0.034		...					
Summer Tanager	6	125	198	33		0.506	0.089	17.5	0.084	0.451	0.111	24.7	0.006	0.783	0.243	31.0	0.001		...					
Western Tanager	12	380	420	19		0.558	0.097	17.3	0.000	0.174	0.080	46.0	0.018	0.265	0.128	48.3	0.004		...					

TABLE 4. Continued.

Species	No. stn. ⁴	No. indiv. ⁵	No. year capt. ⁶	No. btwn. recap. ⁷	Survival probability ⁸			Recapture probability ⁹			Proportion of residents ¹⁰		Models selected ¹²									
					ϕ	SE(ϕ)	CV(ϕ)	W(ϕ_i) ¹¹	p	SE	CV(p)	w(p_i) ¹¹	τ	SE(τ)	CV(τ)	w(τ_i) ¹¹	1	2	3	4	5	
Spotted Towhee	36	1170	1758	238	0.496	0.028	5.7	0.026	0.430	0.039	9.1	0.852	0.577	0.066	11.5	0.019	t.					
California Towhee	17	392	559	87	0.536	0.048	9.0	0.072	0.356	0.059	16.5	0.018	0.687	0.135	19.6	0.150	...					
Rufous-crowned Sparrow	7	94	140	14	0.579	0.139	24.1	0.004	0.235	0.117	49.9	0.016	0.673	0.343	50.9	0.000	...					
Chipping Sparrow†	8	131	149	9	0.455	0.157	34.6	0.004	0.098	0.111	112.8	0.002	1.000	1.173	117.3	0.008	...					
Lark Sparrow	8	271	298	17	0.509	0.127	25.0	0.003	0.324	0.136	42.0	0.002	0.229	0.111	48.6	0.004	...					
Sage Sparrow*†	3	118	123	3	0.587	0.297	50.6	0.004	0.033	0.083	252.0	0.003	1.000	2.428	242.8	0.001	...					
Fox Sparrow	3	95	157	21	0.519	0.081	15.5	0.019	0.551	0.125	22.8	0.007	0.346	0.143	41.1	0.001	...					
Song Sparrow	26	2101	3515	451	0.520	0.022	4.2	0.717	0.479	0.030	6.2	0.289	0.513	0.042	8.2	0.091	t.	t.				
Lincoln's Sparrow	3	112	383	35	0.437	0.057	13.0	0.002	0.876	0.080	9.1	0.002	0.172	0.099	57.3	0.000	...					
White-crowned Sparrow*	3	36	44	3	0.688	0.183	26.7	0.000	0.232	0.189	81.5	0.000	0.156	0.177	113.2	0.000	...					
Dark-eyed Junco	8	336	516	63	0.387	0.051	13.1	0.011	0.560	0.090	16.0	0.992	0.617	0.139	22.5	0.009	t.					
Black-headed Grosbeak	35	1684	2150	216	0.526	0.030	5.8	0.127	0.345	0.037	10.6	0.006	0.380	0.048	12.7	0.779	t.					
Blue Grosbeak	11	187	228	20	0.409	0.114	28.0	0.012	0.488	0.171	35.1	0.003	0.408	0.189	46.3	0.003	...					
Lazuli Bunting	21	643	790	47	0.372	0.057	15.4	0.042	0.473	0.100	21.2	0.805	0.241	0.066	27.2	0.003	t.					
Red-winged Blackbird*†	9	232	259	13	0.880	0.263	29.8	0.000	0.037	0.038	102.5	0.001	1.000	0.957	95.7	0.001	...					
Brown-headed Cowbird	30	275	419	59	0.463	0.057	12.3	0.000	0.568	0.087	15.3	0.001	0.524	0.118	22.6	0.001	...					
Bullock's Oriole	18	566	739	52	0.458	0.063	13.7	0.007	0.377	0.082	21.7	0.015	0.307	0.079	25.7	0.002	...					
Purple Finch	7	932	1202	113	0.531	0.043	8.2	0.049	0.304	0.047	15.3	0.914	0.445	0.081	18.1	0.008	t.					
Cassin's Finch*†	5	143	154	5	0.320	0.175	54.8	0.001	0.088	0.148	168.7	0.003	1.000	1.704	170.4	0.000	...					
Lesser Goldfinch	23	916	992	27	0.422	0.089	21.2	0.007	0.124	0.065	52.5	0.002	0.408	0.213	52.1	0.793	t.					
American Goldfinch	14	549	622	26	0.407	0.089	21.8	0.150	0.101	0.061	59.9	0.227	0.854	0.507	59.4	0.034	...	t.				
Mean (72 species)	12	450	636	60	0.519	0.112	22.3	0.096	0.349	0.108	46.8	0.159	0.508	0.309	53.1	0.117						
Std. Dev. (72 species)	9	541	800	82	0.131	0.091	16.8	0.222	0.175	0.060	46.6	0.315	0.249	0.427	44.0	0.270						
Mean (52 adequately-est. sp.) ¹³	14	568	815	79	0.519	0.073	14.2	0.116	0.412	0.089	25.0	0.202	0.443	0.138	33.1	0.149						
Std. Dev. (52 species)	9	583	866	89	0.105	0.037	6.8	0.246	0.156	0.044	14.4	0.349	0.195	0.092	18.8	0.304						
NORTH-CENTRAL MAPS REGION																						
Red-bellied Woodpecker*	9	38	44	5	0.442	0.200	45.4	0.000	0.267	0.242	90.7	0.000	0.687	0.705	102.6	0.000	...					
Downy Woodpecker	22	283	361	34	0.405	0.075	18.4	0.001	0.229	0.085	37.2	0.004	0.940	0.373	39.7	0.002	...					
Hairy Woodpecker	16	59	69	8	0.471	0.153	32.4	0.028	0.752	0.212	28.2	0.002	0.186	0.115	61.7	0.002	...					
Northern Flicker*	18	79	99	4	0.340	0.190	55.8	0.003	0.340	0.289	85.0	0.003	0.240	0.229	95.3	0.001	...					

TABLE 4. Continued.

Species	No. stn. ⁴	No. indv. ⁵	No. capt. ⁶	No. year recap. ⁷	No. btwn. year	Survival		Recapture		Proportion of residents ¹⁰		Models selected ¹²												
						ϕ	SE(ϕ)	CV(ϕ)	W(ϕ) ¹¹	p	SE	CV(p)	w(p) ¹¹	τ	SE(τ)	CV(τ)	w(τ) ¹¹	1	2	3	4	5		
Western Wood-Pewee†	2	79	136	22		0.486	0.095	19.6	0.334	0.388	0.123	31.8	0.491	1.000	0.387	38.7	0.001	t.	t.					
Eastern Wood-Pewee	15	147	179	12		0.522	0.124	23.8	0.039	0.368	0.158	42.9	0.024	0.215	0.114	53.1	0.012	...	...					
"Traill's" Flycatcher	12	649	1026	101		0.484	0.040	8.2	0.005	0.509	0.061	12.1	0.020	0.354	0.062	17.6	0.069	...	...					
Least Flycatcher	12	847	1161	94		0.368	0.043	11.8	0.006	0.431	0.071	16.4	0.771	0.457	0.089	19.5	0.022	t.	t.					
Great Crested Flycatcher	16	99	118	16		0.747	0.111	14.8	0.000	0.306	0.105	34.2	0.001	0.276	0.118	43.0	0.000	...	...					
White-eyed Vireo	2	32	74	11		0.515	0.106	20.5	0.000	0.569	0.174	30.6	0.000	0.340	0.242	71.1	0.000	...	...					
Warbling Vireo	8	105	114	5		0.413	0.193	46.8	0.012	0.216	0.214	99.2	0.031	0.320	0.337	105.2	0.004	...	...					
Red-eyed Vireo	24	631	851	85		0.534	0.045	8.4	0.135	0.391	0.059	15.2	0.925	0.345	0.067	19.4	0.107	t.	t.					
Blue Jay†	20	194	214	14		0.525	0.120	22.8	0.005	0.083	0.072	86.8	0.011	1.000	0.892	89.2	0.004	...	...					
Black-capped Chickadee	28	654	855	74		0.417	0.048	11.6	0.012	0.394	0.071	18.1	0.014	0.438	0.096	21.9	0.263	...	...					
Tufted Titmouse	10	163	230	39		0.555	0.071	12.8	0.007	0.407	0.089	21.9	0.005	0.566	0.158	27.9	0.010	...	...					
White-breasted Nuthatch	15	76	88	6		0.589	0.185	31.5	0.001	0.187	0.141	75.4	0.005	0.331	0.265	80.1	0.001	...	...					
Carolina Wren	7	87	130	15		0.357	0.099	27.6	0.660	0.619	0.193	31.1	0.120	0.421	0.198	47.0	0.001	t.	...					
House Wren	18	892	1343	101		0.322	0.038	11.7	0.511	0.440	0.071	16.0	0.178	0.542	0.101	18.6	0.086	t.	...					
Veery	9	390	702	129		0.575	0.037	6.5	0.067	0.586	0.051	8.7	0.135	0.532	0.077	14.4	0.017	...	...					
Wood Thrush	12	263	406	40		0.453	0.069	15.2	0.008	0.317	0.084	26.5	0.004	0.744	0.218	29.3	0.017	...	...					
American Robin	26	787	955	54		0.380	0.056	14.8	0.009	0.423	0.090	21.2	0.054	0.270	0.070	26.1	0.033	...	...					
Gray Catbird	23	2196	3562	405		0.497	0.021	4.1	0.293	0.478	0.030	6.3	0.721	0.424	0.037	8.8	0.154	t.	t.					
Brown Thrasher	5	85	108	12		0.660	0.115	17.4	0.004	0.169	0.086	50.9	0.006	0.546	0.300	55.0	0.021	...	...					
Blue-winged Warbler	4	112	198	16		0.525	0.097	18.4	0.021	0.495	0.144	29.1	0.019	0.188	0.093	49.7	0.045	...	...					
Nashville Warbler	4	183	212	8		0.372	0.137	36.7	0.014	0.422	0.234	55.4	0.005	0.178	0.121	67.8	0.043	...	...					
Yellow Warbler	15	1336	2085	265		0.548	0.026	4.7	0.001	0.398	0.033	8.3	0.002	0.451	0.049	10.8	0.003	...	...					
Chestnut-sided Warbler	4	380	651	71		0.378	0.045	12.0	0.044	0.572	0.083	14.6	0.002	0.625	0.132	21.2	0.004	...	...					
Yellow-rumped Warbler††	1	37	45	2		0.386	0.296	76.6	0.000	0.097	0.234	241.2	0.000	1.000	2.454	245.4	0.000	...	...					
Black-and-white Warbler	7	121	159	18		0.512	0.101	19.8	0.080	0.514	0.143	27.8	0.009	0.256	0.107	41.9	0.002	...	...					
American Redstart	11	605	842	54		0.454	0.056	12.4	0.005	0.282	0.065	23.0	0.207	0.397	0.102	25.7	0.012	...	...					
Ovenbird	8	373	479	42		0.575	0.065	11.3	0.424	0.272	0.068	25.1	0.204	0.390	0.112	28.8	0.320	...	t.	t.	...	tt.		
Northern Waterthrush†	2	61	80	7		0.336	0.155	46.0	0.001	0.270	0.223	82.6	0.000	1.000	0.887	88.7	0.000	...	...					
Kentucky Warbler	2	88	176	41		0.610	0.073	12.0	0.003	0.698	0.090	12.9	0.042	0.540	0.133	24.7	0.006	...	...					
Mourning Warbler	3	122	220	32		0.421	0.072	17.1	0.048	0.608	0.119	19.6	0.024	0.664	0.203	30.6	0.002	...	...					
Common Yellowthroat	24	1299	2267	216		0.433	0.027	6.3	0.081	0.498	0.044	8.8	0.122	0.448	0.055	12.2	0.821	t.	t.					
Scarlet Tanager*	11	64	73	4		0.352	0.207	58.8	0.000	0.370	0.344	93.2	0.002	0.298	0.320	107.3	0.001	...	...					
Eastern Towhee	7	48	72	7		0.462	0.149	32.3	0.034	0.443	0.227	51.1	0.148	0.393	0.272	69.2	0.001	...	...					
Chipping Sparrow†	9	172	218	13		0.400	0.119	29.7	0.000	0.134	0.096	71.9	0.087	1.000	0.718	71.8	0.005	...	...					

TABLE 4. Continued.

Species	No. stn. ⁴	No. indiv. ⁵	No. capt. ⁶	No. year recap. ⁷	No. btwn. year	Survival probability ⁸		Recapture probability ⁹		Proportion of residents ¹⁰		Models selected ¹²										
						ϕ	SE(ϕ)	CV(ϕ)	W(ϕ) ¹¹	p	SE	CV(p)	w(p) ¹¹	τ	SE(τ)	CV(τ)	w(τ) ¹¹	1	2	3	4	5
Clay-colored Sparrow	6	233	268	7	0.568	0.194	34.2	0.066	0.059	0.064	108.1	0.063	0.540	0.566	104.9	0.013	...					
Field Sparrow	8	593	871	93	0.426	0.043	10.1	0.005	0.392	0.062	15.9	0.003	0.600	0.114	19.0	0.001	...					
Savannah Sparrow*	3	39	49	3	0.479	0.221	46.1	0.000	0.441	0.336	76.3	0.000	0.114	0.131	115.1	0.000	...					
Song Sparrow	22	1137	1967	233	0.444	0.026	5.9	0.390	0.517	0.042	8.2	0.238	0.527	0.061	11.6	0.012	...	t.				
Lincoln's Sparrow	2	48	90	10	0.426	0.115	26.9	0.001	0.785	0.184	23.5	0.001	0.233	0.147	62.8	0.000	...					
Swamp Sparrow	6	201	357	32	0.386	0.062	15.9	0.004	0.776	0.110	14.1	0.009	0.231	0.081	35.1	0.002	...					
White-throated Sparrow	3	309	633	60	0.383	0.046	11.9	0.218	0.621	0.087	14.1	0.103	0.495	0.118	23.9	0.033	...					
Northern Cardinal	18	603	819	97	0.539	0.043	8.0	0.069	0.355	0.053	14.9	0.059	0.435	0.079	18.3	0.066	...					
Rose-breasted Grosbeak	18	285	319	12	0.233	0.108	46.6	0.042	0.317	0.223	70.2	0.424	0.509	0.378	74.3	0.005	...	t.				
Black-headed Grosbeak*	1	55	72	4	0.584	0.221	37.9	0.011	0.109	0.114	105.2	0.001	0.743	0.819	110.2	0.001	...					
Indigo Bunting	16	793	1090	115	0.518	0.042	8.1	0.023	0.312	0.047	15.2	0.020	0.509	0.089	17.4	0.002	...					
Red-winged Blackbird†	9	303	318	6	0.388	0.178	46.0	0.006	0.035	0.078	220.5	0.005	1.000	2.210	221.0	0.003	...					
Brown-headed Cowbird	22	219	300	35	0.487	0.071	14.5	0.007	0.411	0.098	23.7	0.010	0.429	0.131	30.4	0.005	...					
Baltimore Oriole	14	309	376	39	0.615	0.072	11.7	0.013	0.184	0.061	33.2	0.784	0.613	0.218	35.5	0.002	t.					
Bullock's Oriole*	1	52	66	3	0.778	0.269	34.5	0.000	0.052	0.062	119.3	0.000	0.482	0.569	118.1	0.000	...					
American Goldfinch	21	1635	2061	176	0.347	0.032	9.2	0.711	0.360	0.050	14.0	0.033	0.671	0.107	15.9	0.333	t.					
Mean (54 species)	11	382	560	56	0.471	0.104	23.0	0.083	0.383	0.122	46.8	0.114	0.502	0.312	55.5	0.048						
Std. Dev. (54 species)	8	448	697	77	0.105	0.067	16.0	0.165	0.184	0.078	47.5	0.219	0.240	0.453	47.4	0.129						
Mean (35 adequately-est. sp.) ¹³	13	528	791	82	0.481	0.063	13.3	0.112	0.448	0.087	21.0	0.139	0.460	0.127	29.4	0.071						
Std. Dev. (35 species)	8	495	770	84	0.095	0.029	5.7	0.191	0.150	0.042	10.3	0.248	0.162	0.072	15.2	0.155						
SOUTH-CENTRAL MAPS REGION																						
Common Ground-Dove*	6	274	302	8	0.553	0.229	41.4	0.002	0.051	0.057	112.3	0.001	0.819	0.854	104.2	0.005	...					
Yellow-billed Cuckoo	45	417	452	14	0.574	0.119	20.7	0.022	0.148	0.086	58.1	0.451	0.218	0.133	60.8	0.007	...	t.				
Golden-fronted Woodpecker*†	4	107	134	7	0.199	0.128	64.3	0.047	0.345	0.309	89.8	0.008	1.000	0.922	92.2	0.003	...					
Ladder-backed Woodpecker	11	77	95	12	0.543	0.131	24.1	0.001	0.365	0.160	43.9	0.001	0.488	0.262	53.7	0.003	...					
Downy Woodpecker	28	257	322	35	0.598	0.073	12.2	0.023	0.274	0.074	27.1	0.147	0.383	0.119	31.0	0.128	...					
Eastern Wood-Pewee*	14	108	119	5	0.741	0.217	29.3	0.001	0.264	0.198	75.0	0.000	0.134	0.121	90.6	0.010	...					
Acadian Flycatcher	6	349	513	76	0.583	0.048	8.2	0.001	0.478	0.064	13.5	0.002	0.353	0.070	19.9	0.001	...					
Great Crested Flycatcher	20	144	169	13	0.476	0.121	25.3	0.070	0.262	0.138	52.8	0.745	0.449	0.271	60.3	0.021	t.					
Brown-crested Flycatcher	2	215	278	37	0.495	0.078	15.8	0.009	0.252	0.090	35.6	0.071	0.926	0.371	40.1	0.004	...					
Eastern Kingbird*	11	63	68	2	0.832	0.277	33.3	0.000	0.225	0.218	96.9	0.002	0.044	0.055	123.8	0.000	...					
White-eyed Vireo	24	1380	2504	327	0.601	0.024	4.0	0.003	0.498	0.031	6.3	0.018	0.343	0.034	10.0	0.054	...					
Bell's Vireo	12	450	700	100	0.593	0.040	6.8	0.008	0.377	0.050	13.3	0.739	0.482	0.083	17.2	0.009	t.					

TABLE 4. Continued.

Species	No. stn. ⁴	No. indiv. ⁵	No. capt. ⁶	No. year recap. ⁷	Survival probability ⁸		Recapture probability ⁹		Proportion of residents ¹⁰		Models selected ¹²												
					ϕ	SE(ϕ)	CV(ϕ)	$W(\phi)$ ¹¹	p	SE	CV(p)	$w(p)$ ¹¹	τ	SE(τ)	CV(τ)	$w(\tau)$ ¹¹	1	2	3	4	5		
Red-eyed Vireo	15	328	404	45	0.575	0.066	11.5	0.004	0.221	0.063	28.5	0.030	0.622	0.194	31.1	0.042	...						
Western Scrub-jay*	2	20	25	5	0.649	0.213	32.7	0.000	0.545	0.250	45.9	0.000	0.355	0.260	73.4	0.000	...						
Carolina Chickadee	37	556	646	35	0.527	0.073	13.9	0.010	0.124	0.049	39.3	0.082	0.582	0.232	39.9	0.003	...						
Black-capped Chickadee	6	131	160	11	0.471	0.134	28.5	0.374	0.192	0.120	62.5	0.092	0.570	0.360	63.2	0.190	t.	...				.t	
Tufted Titmouse	24	318	421	54	0.486	0.061	12.6	0.007	0.296	0.072	24.3	0.004	0.773	0.211	27.2	0.002	...						
Black-crested Titmouse	18	263	345	39	0.484	0.073	15.1	0.009	0.237	0.075	31.5	0.002	0.870	0.293	33.7	0.114	...						
Carolina Wren	31	888	1451	174	0.459	0.031	6.8	0.015	0.517	0.049	9.4	0.901	0.429	0.059	13.7	0.003	t.						
Bewick's Wren	21	480	728	87	0.431	0.046	10.6	0.697	0.498	0.072	14.4	0.825	0.505	0.097	19.2	0.245	tt.						
House Wren	6	145	186	16	0.428	0.124	29.0	0.001	0.455	0.176	38.7	0.002	0.404	0.189	46.7	0.017	...						
Blue-gray Gnatcatcher	26	257	275	7	0.539	0.171	31.7	0.021	0.078	0.083	107.0	0.007	0.388	0.411	105.8	0.004	...						
Wood Thrush	7	94	138	17	0.382	0.105	27.4	0.096	0.383	0.162	42.4	0.088	0.971	0.466	48.0	0.003	...						
American Robin	13	106	122	7	0.376	0.150	40.0	0.012	0.184	0.178	96.4	0.024	0.728	0.748	102.7	0.003	...						
Gray Catbird	9	741	1102	153	0.581	0.035	6.0	0.022	0.467	0.045	9.7	0.659	0.370	0.052	13.9	0.951	tt					.t	
Northern Mockingbird	16	348	438	15	0.323	0.101	31.2	0.037	0.178	0.104	58.5	0.042	0.499	0.281	56.4	0.107	...						
Brown Thrasher	15	288	368	31	0.408	0.074	18.2	0.005	0.572	0.125	21.9	0.015	0.293	0.096	32.9	0.011	...						
Long-billed Thrasher	3	133	181	26	0.628	0.100	15.9	0.026	0.396	0.114	28.8	0.512	0.552	0.198	35.9	0.000	t.					...	
Blue-winged Warbler	4	244	362	49	0.555	0.060	10.9	0.012	0.490	0.083	16.9	0.013	0.361	0.089	24.8	0.001	...						
Northern Parula*†	6	45	51	3	0.345	0.253	73.3	0.000	0.163	0.268	164.0	0.000	1.000	1.733	173.3	0.000	...						
Yellow Warbler	3	103	144	23	0.353	0.088	25.0	0.146	0.515	0.158	30.7	0.018	0.867	0.349	40.3	0.009	...						
Prairie Warbler	3	128	166	16	0.508	0.122	24.0	0.044	0.213	0.116	54.4	0.035	0.812	0.485	59.7	0.005	...						
Black-and-white Warbler	12	163	183	11	0.709	0.130	18.3	0.001	0.258	0.119	46.2	0.006	0.152	0.082	54.1	0.087	...						
American Redstart	1	57	73	8	0.394	0.147	37.4	0.010	0.409	0.228	55.8	0.001	0.616	0.408	66.2	0.001	...						
Prothonotary Warbler†	5	118	153	9	0.533	0.152	28.5	0.000	0.097	0.075	77.4	0.001	1.000	0.757	75.7	0.001	...						
Worm-eating Warbler	2	67	87	7	0.597	0.147	24.6	0.006	0.429	0.195	45.5	0.007	0.146	0.100	68.7	0.007	...						
Swainson's Warbler*	2	36	73	6	0.516	0.219	42.4	0.000	0.320	0.213	66.6	0.000	0.520	0.392	75.4	0.000	...						
Ovenbird	5	80	113	15	0.649	0.103	15.9	0.000	0.333	0.115	34.7	0.002	0.346	0.158	45.6	0.003	...						
Louisiana Waterthrush	4	73	104	15	0.515	0.116	22.5	0.014	0.519	0.161	31.1	0.308	0.452	0.203	44.8	0.004	...					.t	
Kentucky Warbler	11	457	776	131	0.608	0.037	6.1	0.005	0.535	0.050	9.3	0.003	0.371	0.056	15.2	0.008	...					.t	
Common Yellowthroat	14	440	690	81	0.471	0.045	9.6	0.037	0.478	0.068	14.2	0.329	0.425	0.084	19.8	0.045	...					.t	
Hooded Warbler	3	103	147	11	0.456	0.137	30.0	0.001	0.195	0.122	62.7	0.002	0.813	0.518	63.7	0.007	...						
Yellow-breasted Chat	8	651	1078	143	0.521	0.038	7.2	0.007	0.391	0.047	12.0	0.460	0.648	0.095	14.7	0.001	...					.t	
Summer Tanager	19	223	283	35	0.531	0.076	14.3	0.009	0.377	0.095	25.2	0.024	0.441	0.137	31.1	0.073	...						
Olive Sparrow	3	208	410	66	0.510	0.053	10.3	0.016	0.738	0.073	9.9	0.016	0.552	0.114	20.7	0.007	...						
Eastern Towhee*	10	37	47	5	0.621	0.217	35.0	0.000	0.121	0.126	104.3	0.000	0.890	0.952	107.1	0.000	...						

TABLE 4. Continued.

Species	No. stn. ⁴	No. indv. ⁵	No. capt. ⁶	No. year recap. ⁷	No. btwn. year	Survival probability ⁸		Recapture probability ⁹		Proportion of residents ¹⁰		Models selected ¹²														
						ϕ	SE(ϕ)	CV(ϕ)	W(ϕ)	$w(\phi)$ ¹¹	p	SE	CV(p)	w(p) ¹¹	τ	SE(τ)	CV(τ)	w(τ) ¹¹	1	2	3	4	5			
Rufous-crowned Sparrow	7	81	121	16		0.523	0.109	20.9	0.233	0.431	0.145	33.7	0.012	0.400	0.177	44.1	0.001	...	...	...	...	...	...	...	...	...
Field Sparrow	31	1108	1610	188		0.482	0.030	6.2	0.020	0.343	0.039	11.3	0.970	0.600	0.080	13.3	0.016	t.	t.	t.	t.	t.	t.	t.	t.	t.
Lark Sparrow**†	6	120	129	3		0.536	0.297	55.5	0.001	0.037	0.096	261.4	0.000	1.000	2.617	261.7	0.000	...	...	...	...	...	...	...	...	...
Grasshopper Sparrow	6	193	285	28		0.336	0.079	23.4	0.073	0.455	0.140	30.9	0.454	0.728	0.262	36.0	0.001	...	t.	t.	t.	t.	t.	t.	t.	t.
Northern Cardinal	48	2475	3714	567		0.581	0.018	3.1	0.201	0.356	0.021	6.0	0.582	0.554	0.041	7.3	0.007	t.	...	...	...	...	...	...	...	...
Blue Grosbeak**†	7	70	79	3		0.343	0.243	70.9	0.016	0.119	0.193	161.9	0.004	1.000	1.576	157.6	0.001	...	...	...	...	...	...	...	...	...
Indigo Bunting	23	1181	1734	209		0.459	0.030	6.5	0.081	0.422	0.042	10.0	0.008	0.560	0.070	12.5	0.131	...	...	...	...	...	...	...	...	...
Painted Bunting	31	1591	2136	236		0.558	0.029	5.2	0.051	0.439	0.038	8.6	0.827	0.336	0.038	11.4	0.087	t.	t.	t.	t.	t.	t.	t.	t.	t.
Dickcissel	15	630	708	26		0.440	0.078	17.7	0.014	0.209	0.084	40.2	0.024	0.299	0.131	43.8	0.031	...	...	...	...	...	...	...	...	...
Eastern Meadowlark	11	51	61	5		0.594	0.172	29.0	0.000	0.347	0.215	61.9	0.000	0.237	0.190	80.0	0.000	...	...	...	...	...	...	...	...	...
Bronzed Cowbird††	2	69	85	9		0.436	0.160	36.6	0.001	0.233	0.198	85.1	0.001	1.000	0.958	95.8	0.000	...	...	...	...	...	...	...	...	...
Brown-headed Cowbird	39	477	618	70		0.474	0.051	10.8	0.058	0.364	0.068	18.7	0.109	0.521	0.118	22.7	0.558	t.	...	...	...	...	...	...	...	...
Orchard Oriole	11	156	181	9		0.318	0.139	43.8	0.008	0.330	0.223	67.6	0.004	0.449	0.339	75.4	0.030	...	...	...	...	...	...	...	...	...
American Goldfinch	19	520	615	37		0.339	0.069	20.5	0.213	0.186	0.078	41.8	0.124	0.855	0.365	42.7	0.005	...	...	...	...	...	...	...	...	...
Mean (60 species)	13	348	494	57		0.506	0.111	23.4	0.047	0.329	0.118	49.7	0.164	0.558	0.352	55.9	0.051	...	...	...	...	...	...	...	...	...
Std. Dev. (60 species)	11	432	663	93		0.112	0.068	15.8	0.108	0.149	0.067	44.8	0.276	0.254	0.452	44.6	0.144	...	...	...	...	...	...	...	...	...
Mean (42 adequately-est. sp.) ¹³	16	448	647	78		0.515	0.077	15.3	0.063	0.377	0.094	28.5	0.231	0.506	0.172	34.6	0.069	...	...	...	...	...	...	...	...	...
Std. Dev. (42 species)	12	481	738	105		0.083	0.038	7.7	0.125	0.129	0.048	16.2	0.305	0.206	0.116	18.0	0.168	...	...	...	...	...	...	...	...	...
NORTHEAST MAPS REGION																										
Red-bellied Woodpecker†	14	48	56	5		0.399	0.190	47.6	0.002	0.190	0.212	111.2	0.002	1.000	1.162	116.2	0.001	...	...	...	...	...	...	...	...	...
Yellow-bellied Sapsucker†	12	99	130	14		0.406	0.123	30.4	0.029	0.252	0.151	59.8	0.026	1.000	0.666	66.6	0.020	...	...	...	...	...	...	...	...	...
Downy Woodpecker	49	414	553	52		0.445	0.058	13.1	0.017	0.525	0.092	17.5	0.016	0.298	0.075	25.0	0.005	...	...	...	...	...	...	...	...	...
Hairy Woodpecker	33	139	180	20		0.845	0.090	10.6	0.001	0.080	0.038	47.4	0.071	0.751	0.344	45.7	0.004	...	...	...	...	...	...	...	...	...
Northern Flicker	27	90	103	5		0.561	0.190	33.8	0.001	0.093	0.100	107.9	0.001	0.564	0.603	106.9	0.004	...	...	...	...	...	...	...	...	...
Eastern Wood-Pewee	30	160	210	21		0.532	0.091	17.1	0.005	0.313	0.104	33.3	0.643	0.365	0.146	40.0	0.023	t.	...	...	...	...	...	...	...	...
Acadian Flycatcher	11	135	170	6		0.739	0.172	23.3	0.000	0.072	0.062	85.6	0.000	0.320	0.262	81.8	0.001	...	...	...	...	...	...	...	...	...
"Traill's" Flycatcher	17	636	859	63		0.502	0.050	10.0	0.007	0.541	0.077	14.2	0.203	0.152	0.035	23.3	0.043	...	...	...	...	...	...	...	...	...
Eastern Phoebe	24	238	331	23		0.571	0.081	14.2	0.220	0.405	0.107	26.3	0.042	0.164	0.062	38.1	0.003	...	...	...	...	...	...	...	...	...
Great Crested Flycatcher	27	142	161	12		0.663	0.122	18.5	0.017	0.102	0.071	70.0	0.046	0.603	0.433	71.9	0.042	...	...	...	...	...	...	...	...	...
Eastern Kingbird	8	45	65	9		0.532	0.135	25.5	0.001	0.504	0.195	38.8	0.001	0.420	0.241	57.3	0.001	...	...	...	...	...	...	...	...	...
White-eyed Vireo	13	295	480	56		0.479	0.060	12.6	0.003	0.396	0.079	20.0	0.003	0.629	0.150	23.9	0.001	...	...	...	...	...	...	...	...	...
Yellow-throated Vireo*	4	27	31	3		0.694	0.237	34.2	0.000	0.321	0.257	80.1	0.000	0.224	0.228	101.8	0.000	...	...	...	...	...	...	...	...	...
Blue-headed Vireo	13	121	153	10		0.366	0.134	36.6	0.012	0.265	0.166	62.6	0.003	0.586	0.381	65.0	0.005	...	...	...	...	...	...	...	...	...

TABLE 4. Continued.

Species	No. stn. ⁴	No. indiv. ⁵	No. capt. ⁶	No. year btwn. recap. ⁷	Survival probability ⁸			Recapture probability ⁹			Proportion of residents ¹⁰			Models selected ¹²								
					ϕ	SE(ϕ)	CV(ϕ)	$W(\phi)$ ¹¹	p	SE	CV(p)	$w(p)$ ¹¹	τ	SE(τ)	CV(τ)	$w(\tau)$ ¹¹	1	2	3	4	5	
Red-eyed Vireo	55	1459	1936	208	0.582	0.031	5.3	0.007	0.295	0.033	11.0	0.037	0.450	0.058	12.9	0.003	...					
Blue Jay	43	268	288	14	0.869	0.108	12.4	0.001	0.164	0.074	45.1	0.006	0.110	0.056	50.7	0.224	...					
Carolina Chickadee	19	187	213	14	0.484	0.127	26.2	0.011	0.449	0.180	40.0	0.029	0.248	0.129	51.9	0.017	...					
Black-capped Chickadee	50	1099	1551	155	0.514	0.034	6.6	0.295	0.294	0.038	13.1	0.003	0.540	0.080	14.9	0.056	...	t..				
Tufted Titmouse	36	411	556	48	0.393	0.062	15.7	0.464	0.298	0.081	27.3	0.165	0.750	0.220	29.3	0.192	t..	...	..t			
White-breasted Nuthatch	23	99	125	9	0.424	0.138	32.5	0.015	0.328	0.187	57.2	0.156	0.421	0.274	64.9	0.007	...					
Carolina Wren	21	371	499	28	0.264	0.075	28.5	0.006	0.406	0.151	37.3	0.005	0.622	0.238	38.2	0.007	...					
House Wren	17	229	331	15	0.250	0.090	36.0	0.001	0.465	0.209	45.0	0.005	0.389	0.192	49.3	0.004	...					
Eastern Bluebird	9	76	128	9	0.451	0.133	29.6	0.003	0.349	0.174	49.7	0.049	0.372	0.232	62.3	0.003	...					
Veery	41	1792	3513	664	0.577	0.016	2.8	0.099	0.574	0.023	3.9	0.115	0.519	0.034	6.5	0.027	...					
Bicknell's Thrush	1	28	45	10	0.632	0.132	20.9	0.000	0.300	0.149	49.8	0.000	0.840	0.479	57.0	0.000	...					
Swainson's Thrush	6	91	184	39	0.621	0.077	12.4	0.006	0.686	0.094	13.8	0.001	0.529	0.135	25.5	0.084	...					
Hermit Thrush	21	328	608	90	0.457	0.047	10.3	0.259	0.631	0.074	11.7	0.752	0.667	0.120	17.9	0.002	t.					
Wood Thrush	53	1981	3043	254	0.424	0.025	5.9	0.184	0.403	0.038	9.3	0.124	0.412	0.048	11.6	0.234	...	t.		tt		
American Robin	54	1479	1873	133	0.429	0.037	8.7	0.394	0.329	0.049	15.0	0.430	0.422	0.072	17.1	0.297	...	tt.		ttt		
Gray Catbird	50	4849	7735	966	0.515	0.014	2.7	0.017	0.460	0.019	4.1	0.933	0.446	0.025	5.7	0.004	t.					
Brown Thrasher	14	100	137	10	0.472	0.134	28.5	0.002	0.195	0.121	62.3	0.004	0.681	0.437	64.2	0.021	...					
Cedar Waxwing ⁺⁺	29	1081	1119	2	0.733	0.309	42.2	0.000	0.001	0.005	509.5	0.000	1.000	5.031	503.1	0.000	...					
Blue-winged Warbler	18	352	444	39	0.442	0.067	15.2	0.031	0.387	0.096	24.9	0.040	0.380	0.117	30.8	0.231	...					
Nashville Warbler	8	235	283	9	0.356	0.144	40.6	0.042	0.162	0.132	81.1	0.379	0.512	0.395	77.3	0.007	...	t.				
Northern Parula	5	106	137	11	0.368	0.127	34.4	0.016	0.531	0.227	42.7	0.112	0.367	0.210	57.2	0.024	...					
Yellow Warbler	28	1268	1879	215	0.509	0.028	5.5	0.017	0.475	0.040	8.4	0.011	0.356	0.043	12.0	0.539	...	t.		...		
Chestnut-sided Warbler	18	459	745	94	0.475	0.043	9.1	0.032	0.527	0.065	12.4	0.018	0.439	0.080	18.2	0.015	...					
Magnolia Warbler	11	401	618	53	0.346	0.054	15.5	0.966	0.738	0.104	14.1	0.037	0.312	0.078	25.0	0.006	t..					
Black-throated Blue Warbler	7	104	144	18	0.561	0.106	18.9	0.001	0.392	0.131	33.4	0.001	0.430	0.179	41.6	0.009	...					
Yellow-rumped Warbler	11	292	441	56	0.460	0.061	13.3	0.003	0.501	0.089	17.8	0.002	0.519	0.124	23.9	0.002	...					
Black-throated Green Warbler	17	337	524	63	0.402	0.056	13.9	0.015	0.589	0.095	16.1	0.171	0.571	0.128	22.4	0.053	...					
Blackburnian Warbler*	5	41	52	5	0.641	0.221	34.5	0.000	0.117	0.120	102.4	0.000	0.799	0.831	103.9	0.000	...					
Blackpoll Warbler	2	80	109	6	0.339	0.130	38.3	0.000	0.573	0.283	49.4	0.000	0.076	0.081	106.6	0.000	...					
Black-and-white Warbler	40	667	913	101	0.502	0.043	8.7	0.276	0.301	0.051	17.0	0.121	0.591	0.116	19.6	0.360	...			t..		
American Redstart	36	1943	2746	270	0.525	0.027	5.1	0.029	0.331	0.031	9.5	0.010	0.432	0.048	11.2	0.994	...	t.				
Worm-eating Warbler	12	405	576	56	0.520	0.057	10.9	0.016	0.395	0.075	19.0	0.038	0.373	0.090	24.2	0.023	...					
Ovenbird	51	1752	2560	338	0.557	0.024	4.3	0.002	0.425	0.031	7.2	0.017	0.426	0.041	9.5	0.047	...					
Northern Waterthrush	4	96	127	12	0.401	0.110	27.5	0.002	0.498	0.189	38.0	0.001	0.383	0.203	52.8	0.032	...					

TABLE 4. Continued.

Species	No. stn. ⁴	No. indv. ⁵	No. capt. ⁶	No. year recap. ⁷	Survival		Recapture		Proportion of residents ¹⁰		Models selected ¹²												
					probability ⁸		probability ⁹		residents ¹⁰														
					ϕ	SE(ϕ)	CV(ϕ)	W(ϕ) ¹¹	p	SE	CV(p)	w(p) ¹¹	τ	SE(τ)	CV(τ)	w(τ) ¹¹	1	2	3	4	5		
Louisiana Waterthrush	11	185	333	33	0.477	0.065	13.6	0.040	0.745	0.105	14.1	0.001	0.145	0.058	39.7	0.204	...						
Kentucky Warbler	5	57	88	12	0.569	0.137	24.1	0.000	0.535	0.186	34.7	0.001	0.324	0.166	51.3	0.002	...						
Mourning Warbler†	3	49	80	6	0.767	0.188	24.5	0.000	0.065	0.056	85.2	0.002	1.000	0.778	77.8	0.000	...						
Common Yellowthroat	45	2263	3619	429	0.502	0.020	4.0	0.003	0.493	0.029	5.9	0.004	0.383	0.033	8.5	0.004	...						
Hooded Warbler	15	499	868	93	0.460	0.043	9.5	0.079	0.610	0.069	11.4	0.006	0.361	0.066	18.4	0.117	...						
Canada Warbler	7	122	149	10	0.398	0.134	33.5	0.006	0.554	0.224	40.4	0.020	0.243	0.143	58.7	0.005	...						
Yellow-breasted Chat	7	214	303	33	0.501	0.079	15.8	0.007	0.356	0.097	27.3	0.010	0.484	0.152	31.5	0.022	...						
Scarlet Tanager†	37	298	345	15	0.623	0.116	18.6	0.024	0.042	0.034	80.6	0.082	1.000	0.785	78.5	0.010	...						
Eastern Towhee	35	543	764	86	0.489	0.048	9.8	0.009	0.331	0.058	17.6	0.001	0.595	0.121	20.3	0.002	...						
Chipping Sparrow	13	172	245	23	0.432	0.084	19.4	0.003	0.399	0.123	30.8	0.025	0.454	0.174	38.2	0.008	...						
Song Sparrow	37	1192	1999	144	0.336	0.032	9.4	0.727	0.511	0.061	12.0	0.154	0.461	0.071	15.4	0.082	t.						
Swamp Sparrow	8	131	232	33	0.422	0.072	17.0	0.146	0.721	0.114	15.9	0.009	0.455	0.138	30.3	0.153	...						
White-throated Sparrow	14	537	829	67	0.289	0.046	15.8	0.057	0.583	0.101	17.3	0.036	0.576	0.134	23.2	0.874	t.						
Dark-eyed Junco	15	322	461	33	0.407	0.077	18.9	0.012	0.259	0.085	32.7	0.077	0.750	0.253	33.7	0.071	...						
Northern Cardinal	41	826	1150	149	0.618	0.036	5.9	0.633	0.365	0.041	11.2	0.376	0.414	0.059	14.2	0.013	t.						
Rose-breasted Grosbeak	25	370	442	27	0.542	0.084	15.5	0.003	0.241	0.083	34.4	0.036	0.302	0.117	38.7	0.004	...						
Indigo Bunting	26	504	717	76	0.465	0.050	10.8	0.332	0.543	0.076	13.9	0.066	0.352	0.072	20.4	0.012	...						
Red-winged Blackbird	20	471	548	41	0.587	0.069	11.8	0.298	0.320	0.076	23.9	0.582	0.244	0.071	29.3	0.055	t.						tt.
Common Grackle	21	300	318	11	0.316	0.137	43.5	0.003	0.209	0.192	92.0	0.006	0.464	0.466	100.4	0.016	...						
Brown-headed Cowbird	25	157	185	12	0.398	0.134	33.8	0.007	0.257	0.167	64.8	0.001	0.559	0.407	72.8	0.044	...						
Baltimore Oriole	22	305	402	28	0.418	0.075	17.9	0.049	0.476	0.123	25.7	0.275	0.267	0.093	34.7	0.052	...						
Purple Finch†	10	118	157	16	0.324	0.100	30.8	0.491	0.372	0.179	48.1	0.077	1.000	0.577	57.7	0.014	t.						
American Goldfinch	39	1780	2017	84	0.442	0.047	10.7	0.023	0.209	0.047	22.6	0.056	0.329	0.079	24.1	0.165	...						
Mean (71 species)	22	542	788	81	0.493	0.091	19.2	0.091	0.378	0.106	42.8	0.095	0.488	0.288	49.3	0.079							
Std. Dev. (71 species)	15	752	1176	151	0.126	0.057	11.4	0.186	0.175	0.062	62.0	0.182	0.222	0.609	60.9	0.175							
Mean (53 adequately-est. sp.) ¹³	25	664	982	106	0.503	0.069	13.9	0.110	0.416	0.087	24.8	0.111	0.442	0.136	30.9	0.103							
Std. Dev. (53 species)	15	826	1298	168	0.112	0.037	7.0	0.202	0.158	0.045	16.9	0.201	0.161	0.103	17.4	0.196							
SOUTHEAST MAPS REGION																							
Red-bellied Woodpecker*†	43	143	162	9	0.175	0.117	66.9	0.061	0.351	0.324	92.2	0.189	1.000	1.015	101.5	0.036	...						
Downy Woodpecker	61	381	446	33	0.620	0.076	12.3	0.003	0.344	0.085	24.6	0.003	0.187	0.058	31.1	0.045	...						
Hairy Woodpecker	32	98	116	12	0.536	0.135	25.2	0.009	0.189	0.125	65.8	0.004	0.737	0.521	70.7	0.001	...						
Eastern Wood-Pewee†	42	201	239	20	0.386	0.103	26.7	0.001	0.194	0.113	58.4	0.001	1.000	0.615	61.5	0.001	...						
Acadian Flycatcher	47	1786	2584	316	0.483	0.024	5.1	0.010	0.556	0.037	6.6	0.022	0.375	0.037	9.9	0.621	t.						

TABLE 4. Continued.

Species	No. stn. ⁴	No. indiv. ⁵	No. capt. ⁶	No. year recap. ⁷	No. btwn. year	Survival probability ⁸		Recapture probability ⁹		Proportion of residents ¹⁰		Models selected ¹²														
						ϕ	SE(ϕ)	CV(ϕ)	W(ϕ) ¹¹	p	SE	CV(p)	w(p) ¹¹	τ	SE(τ)	CV(τ)	w(τ) ¹¹	1	2	3	4	5				
Great Crested Flycatcher	33	189	211	10		0.534	0.151	28.3	0.002	0.233	0.137	58.6	0.011	0.233	0.148	63.7	0.006	0.233	0.148	63.7	0.006	...	...	...	...	...
White-eyed Vireo	43	1012	1846	216		0.465	0.028	5.9	0.025	0.561	0.044	7.8	0.025	0.416	0.051	12.3	0.133	0.416	0.051	12.3	0.133	...	...	...	t.	...
Red-eyed Vireo	56	2230	2886	341		0.620	0.024	3.9	0.434	0.212	0.020	9.7	0.067	0.568	0.059	10.5	0.021	0.568	0.059	10.5	0.021	...	...	...	...	...
Blue Jay	55	339	376	26		0.652	0.094	14.4	0.008	0.116	0.056	48.7	0.247	0.527	0.264	50.1	0.161	0.527	0.264	50.1	0.161	...	...	...	...	...
Carolina Chickadee	65	569	692	56		0.493	0.061	12.4	0.001	0.282	0.067	23.8	0.001	0.446	0.118	26.5	0.002	0.446	0.118	26.5	0.002	...	...	...	...	...
Tufted Titmouse	67	948	1334	178		0.511	0.032	6.3	0.932	0.434	0.044	10.2	0.034	0.487	0.064	13.2	0.033	0.487	0.064	13.2	0.033	t.	...	...	...	...
Carolina Wren	65	1367	2244	229		0.369	0.026	7.0	0.975	0.582	0.049	8.4	0.004	0.545	0.065	11.9	0.080	0.545	0.065	11.9	0.080	t.	...	...	...	...
House Wren	2	59	87	5		0.514	0.193	37.5	0.001	0.155	0.135	87.1	0.001	0.551	0.475	86.2	0.000	0.551	0.475	86.2	0.000	...	...	...	...	...
Wood Thrush	56	2635	4784	509		0.455	0.018	3.9	0.011	0.552	0.029	5.3	0.005	0.410	0.033	8.0	0.003	0.410	0.033	8.0	0.003	...	...	...	...	...
American Robin	19	489	526	18		0.429	0.107	25.0	0.064	0.103	0.074	71.8	0.659	0.606	0.441	72.8	0.008	0.606	0.441	72.8	0.008	t.	...	...	...	...
Gray Catbird	25	1054	1551	143		0.428	0.034	8.0	0.191	0.477	0.054	11.3	0.014	0.378	0.057	15.2	0.036	0.378	0.057	15.2	0.036	...	...	...	...	...
Brown Thrasher	24	170	210	19		0.635	0.104	16.3	0.019	0.205	0.084	40.7	0.145	0.395	0.169	42.8	0.004	0.395	0.169	42.8	0.004	...	...	...	...	...
Blue-winged Warbler	9	286	417	49		0.558	0.063	11.3	0.006	0.279	0.065	23.3	0.005	0.570	0.149	26.2	0.001	0.570	0.149	26.2	0.001	...	...	...	...	...
Yellow Warbler†	1	45	61	7		0.391	0.173	44.3	0.000	0.317	0.234	73.9	0.001	1.000	0.832	83.2	0.000	1.000	0.832	83.2	0.000	...	...	...	...	...
Prairie Warbler	18	365	468	61		0.400	0.077	19.3	0.005	0.253	0.089	35.3	0.016	0.620	0.227	36.6	0.003	0.620	0.227	36.6	0.003	...	...	...	...	...
Black-and-white Warbler†	14	122	146	8		0.479	0.181	37.8	0.002	0.103	0.106	102.5	0.001	1.000	1.023	102.3	0.004	1.000	1.023	102.3	0.004	...	...	...	...	...
American Redstart††	2	36	43	4		0.465	0.235	50.7	0.001	0.149	0.202	135.5	0.000	1.000	1.421	142.1	0.000	1.000	1.421	142.1	0.000	...	...	...	...	...
Prothonotary Warbler	14	348	446	41		0.512	0.071	13.8	0.034	0.261	0.076	28.9	0.005	0.534	0.171	32.1	0.005	0.534	0.171	32.1	0.005	...	...	...	...	...
Worm-eating Warbler	16	309	441	53		0.529	0.061	11.5	0.004	0.404	0.079	19.4	0.002	0.463	0.114	24.7	0.048	0.463	0.114	24.7	0.048	...	...	...	...	...
Swainson's Warbler	5	55	75	6		0.743	0.181	24.4	0.004	0.062	0.065	104.7	0.003	0.962	1.000	104.0	0.004	0.962	1.000	104.0	0.004	...	...	...	...	...
Ovenbird	46	1588	2393	28		0.528	0.026	4.9	0.002	0.480	0.036	7.5	0.007	0.371	0.039	10.4	0.013	0.371	0.039	10.4	0.013	...	...	...	...	...
Louisiana Waterthrush	19	295	504	68		0.520	0.055	10.5	0.035	0.516	0.077	14.9	0.007	0.477	0.100	21.0	0.034	0.477	0.100	21.0	0.034	...	...	...	...	...
Kentucky Warbler	35	1232	2302	331		0.507	0.023	4.5	0.002	0.600	0.035	5.8	0.009	0.443	0.043	9.7	0.001	0.443	0.043	9.7	0.001	...	...	...	...	...
Common Yellowthroat	41	1422	2428	211		0.439	0.027	6.2	0.063	0.503	0.044	8.8	0.004	0.318	0.041	12.9	0.143	0.318	0.041	12.9	0.143	...	...	...	...	...
Hooded Warbler	29	619	1139	133		0.514	0.035	6.8	0.030	0.525	0.052	10.0	0.004	0.356	0.056	15.9	0.038	0.356	0.056	15.9	0.038	...	...	...	...	...
Yellow-breasted Chat	24	524	732	48		0.292	0.057	19.6	0.545	0.323	0.094	29.3	0.169	0.800	0.241	30.1	0.029	0.800	0.241	30.1	0.029	t.	...	...	...	...
Summer Tanager	28	198	236	14		0.294	0.108	36.6	0.006	0.504	0.220	43.6	0.005	0.390	0.214	54.8	0.006	0.390	0.214	54.8	0.006	...	...	...	...	...
Scarlet Tanager	36	263	303	20		0.616	0.101	16.4	0.001	0.131	0.066	50.6	0.006	0.487	0.255	52.3	0.008	0.487	0.255	52.3	0.008	...	...	...	...	...
Eastern Towhee	45	279	390	47		0.472	0.064	13.5	0.002	0.344	0.081	23.5	0.056	0.630	0.172	27.2	0.002	0.630	0.172	27.2	0.002	...	...	...	...	...
Field Sparrow†	16	195	247	21		0.367	0.095	25.8	0.001	0.216	0.111	51.2	0.003	1.000	0.529	52.9	0.002	1.000	0.529	52.9	0.002	...	...	...	...	...
Song Sparrow	2	167	270	27		0.410	0.072	17.5	0.048	0.520	0.127	24.3	0.032	0.360	0.129	35.8	0.006	0.360	0.129	35.8	0.006	...	...	...	...	...
Northern Cardinal	69	2105	3204	453		0.543	0.020	3.8	0.010	0.392	0.026	6.5	0.023	0.561	0.046	8.2	0.008	0.561	0.046	8.2	0.008	...	...	...	...	...
Indigo Bunting	47	1220	1687	183		0.521	0.033	6.4	0.033	0.306	0.037	12.0	0.024	0.527	0.072	13.7	0.009	0.527	0.072	13.7	0.009	...	...	...	...	...
Common Grackle†	20	576	592	9		0.561	0.154	27.5	0.003	0.016	0.038	244.7	0.020	1.000	2.453	245.3	0.003	1.000	2.453	245.3	0.003	...	...	...	...	...

TABLE 4. Continued.

Species	No. stn. ⁴	No. indv. ⁵	No. capt. ⁶	No. year recap. ⁷	No. btwn. year	Survival		Recapture		Proportion of residents ¹⁰		Models selected ¹²												
						ϕ	SE(ϕ)	CV(ϕ)	W(ϕ)	$W(\phi)^{11}$	p	SE	CV(p)	$w(p)^{11}$	τ	SE(τ)	CV(τ)	$w(\tau)^{11}$	1	2	3	4	5	
Brown-headed Cowbird	34	147	171	9		0.321	0.124	38.5	0.004	0.660	0.257	39.0	0.017	0.228	0.140	61.6	0.002	...						
American Goldfinch	22	706	808	50		0.582	0.061	10.4	0.002	0.119	0.040	33.7	0.009	0.560	0.193	34.4	0.003	...						
Mean (41 species)	32	653	971	104		0.485	0.084	18.7	0.088	0.330	0.091	42.9	0.045	0.574	0.338	47.0	0.038							
Std. Dev. (41 species)	20	658	1077	131		0.108	0.055	14.4	0.223	0.172	0.067	45.0	0.112	0.240	0.470	44.8	0.100							
Mean (31 adequately-est. sp.) ¹³	36	808	1220	134		0.513	0.063	12.1	0.113	0.350	0.064	26.8	0.052	0.495	0.166	30.1	0.049							
Std. Dev. (31 species)	19	684	1128	138		0.090	0.040	7.0	0.251	0.162	0.029	23.2	0.124	0.155	0.190	22.6	0.113							
ALASKA AND BOREAL CANADA MAPS REGIONS																								
Three-toed Woodpecker	3	20	30	5		0.742	0.150	20.2	0.000	0.347	0.184	53.1	0.000	0.266	0.268	100.6	0.000	...						
Western Wood-Pewee	2	84	110	12		0.461	0.135	29.3	0.000	0.621	0.203	32.6	0.000	0.320	0.163	51.1	0.000	...						
"Traill's" Flycatcher	13	584	819	50		0.383	0.053	13.7	0.023	0.506	0.094	18.7	0.007	0.236	0.062	26.2	0.023	...						
Gray Jay†	11	46	70	15		0.542	0.103	19.1	0.001	0.375	0.134	35.8	0.006	1.000	0.438	43.8	0.000	...						
Tree Swallow**†	1	77	91	6		0.223	0.151	67.8	0.001	0.311	0.325	104.3	0.001	1.000	1.147	114.7	0.000	...						
Black-capped Chickadee	10	244	389	47		0.426	0.057	13.4	0.284	0.401	0.086	21.5	0.479	0.782	0.206	26.3	0.201	...	t.	...	t.	tt.	t.	t.
Boreal Chickadee	10	132	199	29		0.492	0.081	16.4	0.003	0.365	0.105	28.8	0.006	0.827	0.283	34.3	0.004	...	...					
Arctic Warbler	2	249	453	49		0.339	0.054	15.9	0.151	0.605	0.107	17.6	0.017	0.623	0.161	25.9	0.009	...	...					
Gray-cheeked Thrush	6	253	539	74		0.459	0.047	10.3	0.001	0.683	0.075	10.9	0.000	0.518	0.106	20.4	0.008	...	...					
Swainson's Thrush	16	837	1384	190		0.456	0.029	6.4	0.073	0.590	0.047	7.9	0.161	0.477	0.060	12.7	0.103	...	...					
Hermit Thrush	9	611	1326	184		0.499	0.029	5.9	0.738	0.766	0.043	5.6	0.010	0.330	0.048	14.4	0.120	...	t.	...				
American Robin†	14	360	434	27		0.354	0.086	24.3	0.017	0.166	0.087	52.6	0.001	1.000	0.533	53.3	0.001	...	...					
Varied Thrush**†	10	105	123	4		0.258	0.196	76.1	0.013	0.157	0.251	159.7	0.005	1.000	1.606	160.6	0.002	...	...					
Orange-crowned Warbler	16	1324	2055	191		0.413	0.029	6.9	0.013	0.504	0.048	9.5	0.043	0.387	0.051	13.1	0.005	...	...					
Yellow Warbler	9	1114	1766	154		0.445	0.033	7.4	0.028	0.456	0.051	11.1	0.024	0.387	0.056	14.6	0.010	...	...					
Yellow-rumped Warbler	16	680	885	71		0.367	0.049	13.4	0.001	0.432	0.083	19.1	0.013	0.460	0.107	23.2	0.007	...	...					
Townsend's Warbler*	4	155	195	8		0.201	0.113	56.1	0.000	0.443	0.311	70.3	0.000	0.492	0.384	78.0	0.009	...	...					
Blackpoll Warbler	5	97	163	17		0.312	0.088	28.2	0.003	0.809	0.165	20.4	0.000	0.518	0.224	43.3	0.004	...	...					
American Redstart	2	256	366	46		0.571	0.062	10.8	0.080	0.308	0.069	22.3	0.919	0.470	0.123	26.2	0.009	t.	...					
Ovenbird*	2	80	100	5		0.598	0.234	39.1	0.000	0.349	0.236	67.7	0.001	0.111	0.094	85.1	0.000	...	...					
Northern Waterthrush	9	213	363	48		0.528	0.058	11.0	0.035	0.725	0.081	11.2	0.029	0.276	0.071	25.9	0.002	...	...					
Mourning Warbler	1	59	91	10		0.377	0.131	34.7	0.000	0.323	0.186	57.6	0.001	0.892	0.565	63.4	0.000	...	...					
Wilson's Warbler	15	2861	4677	342		0.366	0.021	5.6	0.025	0.565	0.039	7.0	0.666	0.292	0.030	10.2	0.922	...	tt	...				
Canada Warbler	2	149	258	30		0.462	0.076	16.5	0.001	0.475	0.115	24.3	0.002	0.498	0.162	32.5	0.010	...	...					
American Tree Sparrow	7	199	331	34		0.483	0.069	14.2	0.003	0.500	0.105	21.0	0.007	0.350	0.108	30.9	0.009	...	...					
Chipping Sparrow	3	50	78	8		0.360	0.138	38.3	0.001	0.390	0.228	58.6	0.001	0.772	0.516	66.9	0.000	...	...					

TABLE 4. Continued.

Species	No. stn. ⁴	No. indiv. ⁵	No. capt. ⁶	No. year btwn. year recap. ⁷	Survival probability ⁸		Recapture probability ⁹		Proportion of residents ¹⁰		Models selected ¹²										
					ϕ	SE(ϕ)	CV(ϕ)	$W(\phi)$ ¹¹	p	SE	CV(p)	$w(p)$ ¹¹	τ	SE(τ)	CV(τ)	$w(\tau)$ ¹¹	1	2	3	4	5
Savannah Sparrow	6	130	166	12	0.303	0.115	37.9	0.001	0.716	0.230	32.1	0.002	0.340	0.188	55.3	0.001	...				
Fox Sparrow	13	391	638	81	0.518	0.046	8.8	0.196	0.556	0.068	12.2	0.048	0.383	0.075	19.6	0.562	.t	...			
Lincoln's Sparrow	10	277	513	27	0.347	0.070	20.3	0.001	0.368	0.114	30.9	0.008	0.453	0.165	36.5	0.004	...				
White-throated Sparrow	2	146	219	12	0.503	0.118	23.4	0.191	0.183	0.092	50.2	0.019	0.320	0.179	55.8	0.001	...				
White-crowned Sparrow	13	626	1046	115	0.435	0.038	8.8	0.040	0.412	0.057	13.8	0.260	0.663	0.112	16.8	0.014	...	.t			
Golden-crowned Sparrow	5	279	537	76	0.533	0.047	8.8	0.001	0.490	0.067	13.7	0.014	0.535	0.109	20.4	0.007	...				
Dark-eyed Junco	15	630	1099	110	0.309	0.034	10.9	0.004	0.636	0.074	11.6	0.002	0.673	0.116	17.2	0.004	...				
Rusty Blackbird*†	2	23	28	3	0.676	0.293	43.4	0.000	0.077	0.119	155.9	0.000	1.000	1.535	153.5	0.000	...				
Pine Grosbeak	5	73	93	8	0.473	0.159	33.5	0.001	0.380	0.219	57.7	0.010	0.420	0.303	72.2	0.001	...				
Common Redpoll	14	1609	2011	18	0.437	0.111	25.4	0.005	0.023	0.016	68.5	0.009	0.779	0.489	62.7	0.000	...				
Mean (36 species)	8	417	657	59	0.435	0.092	22.8	0.054	0.445	0.125	38.8	0.077	0.551	0.301	47.4	0.057					
Std. Dev. (36 species)	5	555	876	72	0.115	0.061	17.1	0.133	0.186	0.078	36.8	0.198	0.252	0.375	36.9	0.176					
Mean (25 adequately-est. sp.) ¹³	9	555	887	80	0.451	0.063	14.1	0.076	0.493	0.088	21.7	0.110	0.473	0.141	30.4	0.082					
Std. Dev. (25 species)	5	615	963	77	0.091	0.034	6.8	0.154	0.174	0.044	15.2	0.230	0.167	0.097	19.6	0.207					

¹ Using the computer program TMSURVIV (Hines et al. 2003), a modification of the computer program SURVIV (White 1983).
² This model, developed by Pradel et. al (1997), modified by Nott and DeSante (2002), and fully formulated by Hines et al. (2003), includes both between- and within-year information on transients and permits the estimation of three parameters: survival probability (ϕ), recapture probability (p), and proportion of residents (τ) among those newly-captured adults which were not recaptured seven or more days later during the year they were initially marked. In the time-constant model, each of these three parameters is constrained to be constant over all years.
³ Species included are those for which an average of at least 2.5 individual adult birds were captured per year over the ten years 1992-2001 (at least 25 year-unique records), for which there were at least two returns from all stations pooled, and for which survival and recapture probabilities were neither 1.000 or 0.000. Data were only included from stations where the species was a regular or usual breeder (i.e., attempted to breed during all or more than half of the years the station was operated).
⁴ Number of stations that were operated for a least four consecutive years during the ten-year period 1992-2001 at which at least one adult individual of the species was captured, and at which the species was a regular or usual breeder. For capture-mark-recapture analyses, stations within 1 km of each other were merged into a single "super-station" to prevent individuals whose home range encompassed parts of both stations from being treated as two individuals.
⁵ Total number of individual adult birds captured during the ten years 1992-2001 at stations where the species was a regular or usual breeder; thus the number of capture histories upon which the estimates of survival probability, recapture probability, and proportion of residents were based.
⁶ Total number of captures of adults of the species during the ten years 1992-2001 at stations where the species was a regular or usual breeder.
⁷ Total number of returns during the ten years 1992-2001 at stations where the species was a regular or usual breeder. A return is defined as the first capture of an individual adult bird in any year other than the year during which it was initially marked (banded).

TABLE 5. Comparison of numbers of stations contributing data to survivorship analyses, numbers of species for which survivorship could be estimated, and precision of the survivorship estimates using data from the seven years, 1992-1998, and the ten years, 1992-2001.

Region	No. stations		No. species		Mean CV(ϕ)		Number (proportion) of species with					
							CV(ϕ)<30%		CV(ϕ)<20%		CV(ϕ)<10%	
	7-YR	10-YR	7-YR	10-YR	7-YR	10-YR	7-YR	10-YR	7-YR	10-YR	7-YR	10-YR
NORTHWEST	105	136	67	77	19.5%	16.4%	55 (0.821)	67 (0.870)	43 (0.642)	58 (0.753)	22 (0.328)	34 (0.442)
SOUTHWEST	34	68	45	72	23.8%	22.3%	38 (0.844)	57 (0.792)	20 (0.444)	40 (0.556)	3 (0.067)	17 (0.236)
NORTH-CENTRAL	28	38	39	54	23.3%	23.0%	29 (0.744)	38 (0.704)	21 (0.538)	32 (0.593)	5 (0.128)	10 (0.185)
SOUTH-CENTRAL	56	62	43	60	25.4%	23.4%	32 (0.744)	44 (0.733)	20 (0.465)	28 (0.467)	7 (0.163)	12 (0.200)
NORTHEAST	40	73	51	71	23.9%	19.2%	36 (0.706)	55 (0.775)	24 (0.471)	45 (0.634)	9 (0.176)	16 (0.225)
SOUTHEAST	60	73	34	41	22.4%	18.7%	26 (0.765)	34 (0.829)	18 (0.529)	27 (0.659)	7 (0.206)	13 (0.317)
ALASKA/BOREAL CANADA	23	29	28	36	20.3%	22.8%	23 (0.821)	27 (0.750)	16 (0.421)	20 (0.556)	4 (0.143)	8 (0.222)
Mean	49	68	44	59	22.7%	20.8%	34 (0.778)	46 (0.779)	23 (0.501)	36 (0.603)	8 (0.173)	16 (0.261)
Std. Dev.	28	34	13	16	2.1%	2.7%	11 (0.051)	14 (0.057)	9 (0.075)	13 (0.091)	6 (0.081)	9 (0.090)

a range from 19.5% (Northwest) to 25.4% (South-central) and an average of $22.7 \pm 2.1\%$ for 1992-1998 data, and represent only an 8% average improvement (Table 5), compared to a 28% average improvement going from five to seven years of data. The reason for the relatively small average improvement is that substantial increases in precision for many of the more common species tended to be offset by poor precision for those species that fulfilled the revised (and relaxed) selection criteria. A better measure of the increased precision provided by 10 rather than seven years of data is the mean numbers of species over the seven regions having $CV(\phi) < 30\%$, which increased by 35% from 34 species (with seven years of data) to 46 species (with 10 years of data). Similarly, the mean number of species per region having $CV(\phi) < 20\%$ increased by 57% from 23 to 36 species; and the mean number having $CV(\phi) < 10\%$ increased by 100% from 8 to 16 species (Table 5). The mean proportions of species over the seven regions having $CV(\phi) < 30\%$, $< 20\%$, and $< 10\%$ also increased by having 10 rather than seven years of data (Table 5), but, for the reasons given above, by amounts much less than the corresponding increases for mean numbers of species (by 0.1%, 20.4%, and 50.9%, respectively).

Mean regional survival probabilities for all species in each region (Table 4) ranged from 0.435 (Alaska/Boreal Canada) to 0.519 (Southwest) and averaged 0.484 ± 0.027 for the seven regions; mean recapture probabilities ranged from 0.329 (South-central) to 0.445 (Alaska/Boreal Canada) and averaged 0.364 ± 0.042 ; and mean proportion of residents among newly-captured adults ranged from 0.488 (Northeast) to 0.574 (Southeast) and averaged 0.529 ± 0.032 .

As in previous years, mean regional survival and recapture probabilities increased and mean regional proportion of residents decreased when consideration was limited in each region to species for which survival was "adequately estimated," i.e., species for which (a) survival estimates were based on at least five or more returns, (b) estimates for the proportion of residents among newly captured adults were < 1.00 , (c) $SE(\phi) < 0.20$, and (d) $CV(\phi) < 30\%$ (Table 4). Indeed, when consideration was limited in each region to these adequately estimated species, mean regional survival probabilities ranged from a low of 0.451 (Alaska/Boreal

Canada) to a high of 0.519 (Southwest) and averaged 0.498 ± 0.024 for the seven regions; mean regional recapture probabilities ranged from 0.350 (Southeast) to 0.493 (Alaska/Boreal Canada) and averaged 0.409 ± 0.050 ; and proportion of residents among newly captured adults ranged from 0.442 (Northeast) to 0.506 (South-central) and averaged 0.472 ± 0.025 .

Again, as in previous years, mean regional survival rates for adequately estimated species were higher for the three more southerly regions (Southwest: 0.519 ± 0.105 ; South-central: 0.515 ± 0.083 ; and Southeast: 0.513 ± 0.090) than for the three more northerly regions (Northwest: 0.503 ± 0.107 ; Northeast: 0.503 ± 0.112 ; and North-central: 0.481 ± 0.095), and were lowest for the far northern Alaska/Boreal Canada region (0.451 ± 0.091). In contrast, mean regional recapture probabilities for these same species tended to show the opposite pattern, being lower in the Southeast (0.350 ± 0.162) and South-central (0.377 ± 0.129) regions than in the Northeast (0.416 ± 0.158) and North-central (0.448 ± 0.150) regions, and highest of all in the Alaska/Boreal Canada region (0.493 ± 0.174). Breaking this pattern, however, were the western regions, where recapture probabilities were lower in the Northwest Region (0.365 ± 0.152) than the Southwest Region (0.412 ± 0.156). Mean regional proportion of residents among newly captured adults for these same species showed no distinct pattern, being lowest for the Northeast and Southwest regions (0.442 ± 0.161 and 0.443 ± 0.195 , respectively), and highest for the South-central and Southeast regions (0.506 ± 0.206 and 0.495 ± 0.155 , respectively).

In general, both for all species for which survival was estimated and for adequately estimated species, mean regional survival probabilities from 10 years of data were lower than those from seven years of data for each of the four central and eastern regions and for the Alaska/Boreal Canada Region (cf. Table 4 herein and Table 3 in DeSante and O'Grady 2000). In contrast, mean regional survival probabilities for both groups of species from 10 years of data were higher than those from seven years of data for both the Northwest and Southwest regions (cf. Table 4 here, Table 3 in DeSante and O'Grady 2000). To control for potential differences in the species being compared, we ran matched-pairs t-tests between survival estimates

from ten and seven years of data for those species-region combinations for which survival for the species was estimated with $CV(\phi) < 30\%$ for both sets of data. We found that regional survival estimates were slightly, but non-significantly, lower for ten than for seven years of data for each of the seven regions [nearly significantly so ($t = 1.71$, $n = 28$, $P = 0.098$) by 0.029 (5.7%) for the North-central Region]. For all 224 species-region combinations with $CV(\phi) < 30\%$ for both sets of data, survival estimates were also slightly, but highly significantly ($t = 2.65$, $n = 224$, $P = 0.009$), lower by 0.015 (2.9%) for ten than for seven years of data.

Finally, for each species in each region, we modeled all possible combinations of time dependence in the three parameters, ϕ , p , τ (Table 4). We detected time dependence in at least one parameter (by having a time-dependent model that was at least an equivalent model) for 107 (26.0%) of the 411 species-region combinations (Table 6). We found that time dependence in at least one parameter was the selected model (by having a $QAIC_c$ that was at least 2.0 $QAIC_c$ units lower than the $QAIC_c$ of the fully time-independent model) for 61 (14.8%) of the 411 species-region combinations. Time dependence in survival rate was detected for 47 (11.4%) of the 411 species-region combinations, and was found to be the selected model for 14 (3.4%) of the species-region combinations. Interestingly, time-dependence in survival was detected more frequently in the three more northerly regions (Northwest - 19.5% of species; North-central - 13.0%; and Northeast - 14.1%) than in the three more southerly regions (Southwest - 9.7%; South-central - 3.3%; and Southwest - 9.8%) or the Alaska/Boreal Canada Region (5.6%).

DISCUSSION

MAPS coverage of North America in 1999, 2000, and 2001 was widespread with useable data received in time for this report from 467, 474, and 484 stations, respectively. Although coverage was generally good, there still were gaps, most notably in the Great Basin, southwest deserts, Great Plains, deep South, and most of Canada. Continuity of station operation remained high during the three years (averaging 91.6%), but was slightly lower than the approximately 95% continuity rate that characterized the first five

years of the program (1992-1996). Because station continuity is vital for continued success of MAPS, it is important that operators attempt to identify and train new operators to take over their station(s) when, for whatever reason, they find that they must discontinue operation.

POPULATION SIZE AND PRODUCTIVITY INDICES

Adult population sizes, as indexed by MAPS, decreased substantially and significantly between 1998 and 1999 in the Northwest and South-central regions and increased slightly and non-significantly in the remaining five regions, resulting in a small but significant decrease continent-wide. The patterns of changes in adult population size between 1999 and 2000 were generally reversed from those between 1998 and 1999, with a substantial and significant increase in the South-central region and decreases of varying size and significance in the other six regions, resulting in a highly significant decrease continent-wide. These patterns generally reversed again between 2000 and 2001, with significant decreases in adult population sizes in the Southwest and South-central regions and increases in four of the five remaining regions resulting in a very small and non-significant increase continent-wide. Indeed, in most regions, an alternating pattern of increases and decreases has characterized the annual changes in adult population size from 1997-1998 through 2000-2001, during which the numbers of stations available for between-year comparisons remained relatively constant (ranging 375 - 415 and averaging 395).

Of further interest is the fact that regional reproductive indices have also shown a generally alternating pattern of increases and decreases over the five pairs of years from 1996-1997 through 2000-2001, but the pattern of increases and decreases in productivity has generally been out-of-phase with the analogous pattern in adult population size. Thus, for example, regional increases in productivity in 1997 were often followed by regional increases in adult population size in 1998 that coincided with decreases in productivity in 1998, which were then followed by decreases in adult population size in 1999, etc. Indeed, 20 of 28 (71%; $P = 0.036$, binomial test) annual changes in reproductive index in the various regions were

TABLE 6. Number (proportion) of species in each region for which time-dependence in survival rate, ϕ_i , or time-dependence in any parameter, ϕ_i , p_i , or τ_i was detected using modified Cormack-Jolly-Seber capture-mark-recapture analyses from ten years (1992-2001) of MAPS data.

Model	Number (proportion) of species						
	Northwest	Southwest	North-central	South-central	Northeast	Southeast	Ak/Bor. Can. All regions
ϕ_i selected ¹	5 (0.065)	3 (0.042)	1 (0.019)	1 (0.017)	2 (0.028)	2 (0.049)	0 (0.000) 14 (0.034)
ϕ_i equivalent ²	10 (0.130)	4 (0.056)	6 (0.111)	1 (0.017)	8 (0.113)	2 (0.049)	2 (0.056) 33 (0.080)
ϕ_i detected ³	15 (0.195)	7 (0.097)	7 (0.130)	2 (0.033)	10 (0.141)	4 (0.098)	2 (0.056) 47 (0.114)
ϕ time-independent ⁴	62 (0.805)	65 (0.903)	47 (0.870)	58 (0.967)	61 (0.859)	37 (0.902)	34 (0.944) 364 (0.886)
Total	77	72	54	60	71	41	36 411
ϕ_i , p_i , or τ_i selected ⁵	15 (0.195)	20 (0.278)	8 (0.148)	7 (0.117)	7 (0.099)	2 (0.049)	2 (0.056) 61 (0.148)
ϕ_i , p_i , or τ_i equivalent ⁵	9 (0.117)	3 (0.042)	5 (0.093)	9 (0.150)	12 (0.169)	4 (0.098)	4 (0.111) 46 (0.112)
ϕ_i , p_i , or τ_i detected ⁵	24 (0.312)	23 (0.319)	13 (0.241)	16 (0.267)	19 (0.268)	6 (0.146)	6 (0.167) 107 (0.260)
ϕ , p , and τ each time-independent ⁵	53 (0.688)	49 (0.681)	41 (0.759)	44 (0.733)	52 (0.732)	35 (0.854)	30 (0.833) 304 (0.740)
Total	77	72	54	60	71	41	36 411

¹ One or more models with time-dependent survival had QAIC_c more than 2.0 units lower than all models with time-independent survival.
² One or more models with time-dependent survival had QAIC_c within 2.0 units of the time-independent survival model with the lowest QAIC_c.
³ All models that fulfilled either of the above two conditions.
⁴ All time-dependent survival models had QAIC_c more than 2.0 units higher than the model with the lowest QAIC_c.
⁵ Same as corresponding criteria above but applied to any parameter, ϕ_i , p_i , or τ_i .

followed the next year in those regions by changes in adult population size that had the same sign. Interestingly, 14 of 18 (78%; $P = 0.031$, binomial test) significant or nearly significant regional changes in productivity (as determined by changes in the reproductive index for all species pooled or by the proportion of species with increases or decreases) were followed the next year by regional changes in adult population size of the same sign, while only 6 of 10 (60%; $P = 0.754$, binomial test) non-significant regional changes in productivity were followed by regional changes in adult population size of the same sign.

These alternating out-of-phase patterns in productivity and population size suggest that (a) increases in productivity in a given year may result in increases in adult population size the following year through increased recruitment of young birds, and (b) this increased density of breeding birds, coupled with a higher proportion of young, inexperienced breeders in the population, may suppress productivity presumably through increased competition for food or other critical resources needed for nesting. The fact that increases in adult population size in a given year were not always coincident with decreases in productivity that year suggest that density-independent factors (presumably including weather- and climate-related phenomena) may also drive changes in productivity. Moreover, the fact that increased productivity in a given year was not always followed the next year by increased adult population size suggests that other factors besides productivity (presumably survival of young and adults) also drive year-to-year changes in adult population size. Indeed, it should be emphasized that long-term population trends depend on the balance between recruitment of young and survival of adults (and immigration and emigration), even in situations in which alternating increases and decreases in adult population size are perfectly out-of-phase with analogous increases and decreases in productivity.

It is also of interest to note that the general pattern of changes in adult population size in the Northwest, Southwest, and South-central regions during the four between-year comparisons from 1997-1998 through 2000-2001 (increase, decrease, increase, decrease) was opposite the general pattern of changes during

those years in the North-central, Northeast, and Southeast regions (decrease, increase, decrease, increase). This suggests that the annual changes in productivity (that greatly influence subsequent annual changes in adult population size) may be driven by weather factors that tend to act in concert over large areas of the continent, but that tend to differ between the eastern and western portions of the continent. In this respect, it is interesting that annual variations in productivity and population sizes for the South-central Region tend to be more similar to those in Northwest and Southwest regions, while annual variations in the North-central Region tend to be more similar to those in the Northeast and Southeast regions. We emphasize that weather conditions on the breeding grounds during the breeding season may not necessarily be the most important weather factors driving annual variations in landbird productivity. Indeed, Nott et al. (2002) used MAPS data to show that annual variations in productivity of Neotropical-wintering migratory landbirds that breed in national forests in the Pacific Northwest (Washington and Oregon) correlate best with annual variations in late-winter/early-spring weather on their west Mexican wintering grounds that are apparently driven by annual variations in the El Niño/Southern Oscillation climate cycle. In contrast, however, annual variations in productivity of temperate-wintering landbirds that breed in those same forests correlate best with variations in late-winter/early-spring weather on their breeding grounds that are apparently driven by annual variations in the North Atlantic Oscillation climate cycle. In both cases, however, it seems to be weather just prior to, rather than during, the breeding season that controls productivity.

SURVIVAL-RATE ESTIMATES

The mean number of stations per region operated for at least four consecutive years (the minimum number of years necessary to be included in survivorship analyses) increased by an average of 39%, from 49 to 68 stations, when data from 10 years (1992-2001) rather than seven years (1992-1998; DeSante and O'Grady 2000) were included in survivorship analyses. Because of a relaxation of the criteria for including

species in survival analyses (from 49 to 25 year-unique records), the mean number of species per region for which data were sufficient to be included in regional survivorship analyses increased by an average of 34%, from 44 to 59 species. The increase in the number of stations and in the length of the study (thus an increase in the total number of capture histories and the average number of years over which they were captured) resulted in a substantial increase in the precision of the parameter estimates obtained from capture-mark-recapture analyses. Thus, the mean number of species per region with $CV(\phi) < 30\%$, $< 20\%$, and $< 10\%$ increased by 35% (from 34 species with seven years of data to 46 with ten years of data), by 57% (from 23 to 36 species), and by 100% (from 8 to 16 species), respectively.

Again, as in previous years, a pattern of survivorship was detected in which mean regional annual adult survival probabilities tended to be lower at more northerly regions. This might be an expected result as the longer migration routes of more northerly nesting migratory species and the more severe weather faced by more northerly nesting permanent resident species may each reduce survival probabilities of adults. Moreover, these expected lower survival rates at higher latitudes may well be compensated by higher productivity at more northerly latitudes. Future analyses of MAPS data will test these hypotheses by modeling survival and productivity using latitude (and perhaps altitude) covariates.

It is of interest that survival rates for adequately-estimated species tended to be lower for the 10-yr data set, than for the 7-yr data set, in all seven regions. DeSante and O'Grady (2000) noted a similar difference between the 7-yr and 5-yr (1992-1996) data sets, although at least some of that difference likely was caused by inclusion of the within-year transient model (Hines et al. 2003, Nott and DeSante 2002) in the 7-yr but not the 5-yr data set. However, because both the 7- and 10-yr data sets included the within-year transient model, survival for these species during the last three years of the 10-yr study may well have been lower than in earlier years of the study. Moreover, if the analogous differences between the 7- and 5-yr data sets were not entirely due to the inclusion of the within-year transient model in the 7-yr data set,

then a negative trend in survival among North American landbirds over the past 10 years may well exist. In future analyses, we will test this hypothesis directly by modeling survival as a linear function of year.

Interestingly, for capture-mark-recapture analyses utilizing the 10 years of data, the proportion of species for which time-dependent survival (or time-dependence in any parameter estimate) was detected was less than the analogous proportion utilizing seven years (1992-1998) of data for each of the seven regions except the Southeast Region (where the proportion of species with time-dependent survival from the 10-yr data set [0.098] was only slightly higher than the analogous proportion [0.088] from the 7-yr data set). Moreover, in only this one case was the actual *number* of species showing time-dependent survival (or time-dependence in any parameter estimate) greater for the 10-yr (4 species) than the 7-yr (3 species) data sets, despite the fact that we were able to estimate survival for more species from the 10-yr data sets than from the 7-yr data sets. Indeed, using the 10-yr data set and summing over all regions, only 47 species-region combinations (11.4%) showed time-dependent survival and 107 species-region combinations (26.0%) showed time-dependence in any parameter estimate. This compares to 56 species-region combinations (18.2%) that showed time-dependent survival and 124 species-region combinations (40.4%) that showed time-dependence in any parameter estimate using the 7-yr data set. This rather unexpected result suggests that estimates of annual survival (and annual estimates of other parameters) tended to be closer to the mean for the latter three years (1999-2001) than for the earlier seven years (1992-1998). These results, in conjunction with results showing mean regional survival rates from the 10-year data set tended to be lower than those from the 7-yr data set, reinforce the hypothesis that there may well be a negative trend in survival among North American landbirds. We hasten to add, however, that considering the great annual variability in weather and its likely effect upon annual variations in survival, at least 20 years of data may be necessary to detect meaningful trends in survival for most target species (Rosenberg et al. 2000).

RECENT RESULTS RELATED TO RESEARCH AND MANAGEMENT GOALS OF MAPS

During the past three years, we have continued to make considerable progress toward attaining the research and management goals of MAPS. In particular, we have formulated management strategies based on modeling demographic parameters of landbirds (adult population size, reproductive index, and trends in each of these two parameters) as functions of remote-sensed landscape characteristics within areas of 2-4 km radius surrounding MAPS stations on military installations and national forests (Nott et al. 2003, 2005). Now, in cooperation with foresters, natural resource managers, and land managers on these forests and installations, our management strategies have begun to be integrated into new and on-going land management designed simultaneously to conserve natural resources and enhance the particular forest or military mission. In each case, MAPS stations have been established or sustained to monitor the effectiveness of our avian management strategies.

Additional recent analyses have summarized results from 10 years (1992-2001) of MAPS data in Alaska and documented anomalously low productivity and survival rates for several species in South-central Alaska; examined the usefulness of MAPS stations on national wildlife refuges in USFWS Region 1 to monitor the demographics of bird species of conservation concern in target habitat types; and examined MAPS data from stations throughout the Northwest MAPS region (from SE Alaska to NW Wyoming and northern California) to formulate a strategy for maintaining existing stations and establishing new stations to effectively monitor the demographics of bird species of conservation concern and other target and focal species listed in the various Bird Conservation Plans in the Region. We have also assessed the statistical power to detect differences in survival between populations or changes in survival over time using MAPS data and determined the numbers of species for which adult survival rates can be effectively assessed and monitored in each of the seven MAPS regions and for all seven regions combined. We are currently combining these results with those from the above mentioned analyses in order to formulate a vision for enhancing and expanding the MAPS Program in

order to optimize its utility as part of continent-wide Coordinated Bird Monitoring.

Finally, other current, on-going analyses of MAPS data are showing strong positive correlations between MAPS productivity indices and nest monitoring results from the Breeding Biology Research and Monitoring Database (BBIRD) for about 30 species of wood-warblers and between estimates of lambda from MAPS capture-mark-recapture data and population trends estimated from the North American Breeding Bird Survey (BBS) for these species. Additional current analyses combining MAPS, BBS, and MoSI (Monitoreo de Sobrevivencia Invernal – Monitoring Overwintering Survival; DeSante et al. 2005b) are providing results suggesting that population trends in these warbler species may be driven primarily by factors operating away from their breeding grounds and affecting survival, especially survival of first-year birds.

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LITERATURE CITED

- BAILLIE, S. R. 1990. Integrated population monitoring of breeding birds in Britain and Ireland. *Ibis* 132:151-161.
- BAILLIE, S. R., R. E. GREEN, M. BODDY, AND S. T. BUCKLAND. 1986. An Evaluation of the Constant Effort Sites Scheme. British Trust for Ornithology, Thetford, U.K. 103 pp.
- BOCK, C. E., AND Z. F. JONES. 2004. Avian habitat evaluation: should counting birds count? *Frontiers in Ecology and Environment* 2:403-410.
- BURNHAM, K. P., AND D. R. ANDERSON. 1992. Data-based selection of an appropriate biological model: the key to modern data analysis. Pp. 16-30 in McCullough, D. C. and R. H. Barrett (eds.), *Wildlife 2001: Populations*. Elsevier Applied Science, London, U.K.
- BURNHAM, K. P., AND D. R. ANDERSON. 1998. *Model Selection and Inference: a Practical Information Theoretic Approach*. Springer-Verlag, New York, NY.
- CLOBERT, J., J. D. LEBRETON, AND D. ALLAINE. 1987. A general approach to survival rate estimation by recaptures or resightings of marked birds. *Ardea* 75:133-142.
- COCHRAN, W. G. 1977. *Sampling Techniques*, Third Edition. John Wiley & Sons, New York, NY.
- DESANTE, D. F. 1992. Monitoring Avian Productivity and Survivorship (MAPS): a sharp, rather than blunt, tool for monitoring and assessing landbird populations. Pp. 511-521 in McCullough, D. C., and R. H. Barrett (eds.), *Wildlife 2001: Populations*. Elsevier Applied Science, London, U.K.
- DESANTE, D. F. 1995. Suggestions for future directions for studies of marked migratory landbirds from the perspective of a practitioner in population management and conservation. *Journal of Applied Statistics* 22:949-965.
- DESANTE, D. F., AND K. M. BURTON. 1994. The Monitoring Avian Productivity and Survivorship (MAPS) Program third annual report (1992). *Bird Populations* 2:62-89.
- DESANTE, D. F., K. M. BURTON, AND D. R. O'GRADY. 1996. The Monitoring Avian Productivity and Survivorship (MAPS) Program fourth and fifth annual report (1993 and 1994). *Bird Populations* 3:67-120.
- DESANTE, D. F., K. M. BURTON, J. F. SARACCO, AND B. L. WALKER. 1995. Productivity indices and survival rate estimates from MAPS, a continent-wide programme of constant-effort mist netting in North America. *Journal of Applied Statistics* 22:935-947.
- DESANTE, D. F., K. M. BURTON, P. VELEZ, AND D. FROELICH. 2004b. MAPS Manual: 2004 Protocol. The Institute for Bird Populations, Point Reyes Station, CA.
- DESANTE, D. F., K. M. BURTON, AND O. E. WILLIAMS. 1993b. The Monitoring Avian Productivity and Survivorship (MAPS) Program second annual report (1990-1991). *Bird Populations* 1:68-97.
- DESANTE, D. F. AND T. L. GEORGE. 1994. Population trends in the landbirds of western North America. In J. R. Jehl, Jr. and N. K. Johnson (eds.), *A Century of Avifaunal Change in Western North America*. *Studies in Avian Biology* 15:173-190.
- DESANTE, D. F., M. P. NOTT, AND D. R. KASCHUBE. 2005a. Monitoring, modeling, and management: why base avian management on vital rates and how should it be done? Pp. 795-804 in Ralph, C. J., and T. D. Rich (eds.), *Bird Conservation Implementation and Integration in the Americas*. USDA Forest Service Gen. Tech. Rep. PSW-191.
- DESANTE, D. F., AND D. R. O'GRADY. 2000. The Monitoring Avian Productivity and Survivorship (MAPS) Program 1997 and 1998 report. *Bird Populations* 5:49-101.
- DESANTE, D. F., D. R. O'GRADY, K. M. BURTON, P. VELEZ, D. FROELICH, E. E. FEUSS, H. SMITH, AND E. D. RUHLEN. 1998. The Monitoring Avian Productivity and Survivorship (MAPS) Program sixth and seventh annual report (1995 and 1996). *Bird Populations* 4:69-122.
- DESANTE, D. F., AND D. K. ROSENBERG. 1998. What do we need to monitor in order to manage landbirds? Pp. 93-106 in Marzluff, J. M. and R. Sallabanks (eds.), *Avian Conservation: Research and Management*. Island Press, Washington, D.C.
- DESANTE, D. F., J. F. SARACCO, D. K. O'GRADY, K. M. BURTON, AND B. L. WALKER. 2004a. Methodological Considerations of the Monitoring Avian Productivity and Survivorship (MAPS) Program. *Studies in Avian Biology* 29:28-45.
- DESANTE, D. F., T. S. SILLETT, R. B. SIEGEL, J. F. SARACCO, C. A. ROMO DE VIVAR ALVAREZ, S. MORALES, A. CEREZO, D. R. KASCHUBE, M. GROSSELET, AND B. MILA. 2005b. MoSI (Monitoreo de Sobrevivencia Invernal): Assessing habitat-specific overwintering survival of Neotropical migratory landbirds. Pp. 926-936 In *Bird Conservation Implementation and Integration in the Americas* (C. J. Ralph and T. D. Rich, eds.). USDA Forest Service Gen. Tech. Rep. PSW-GTR-191.
- DESANTE, D. F., O. E. WILLIAMS, AND K. M. BURTON. 1993a. The Monitoring Avian Productivity and Survivorship (MAPS) Program: overview and progress. Pp. 208-222 in Finch, D. M., and P. W. Stangel (eds.), *Status and Management of*

- Migratory Birds. USDA Forest Service, Rocky Mt. Forest and Range Experimental Station, Ft. Collins, CO. General Technical Report RM-229.
- DONOVAN, T. M., F. R. THOMPSON III, J. FAABORG, AND J. R. PROBST. 1995. Reproductive success of migratory birds in habitat sources and sinks. *Conservation Biology* 9:1380-1395.
- FROELICH, D., D. F. DeSANTE, AND P. VELEZ. 2004. MAPSPROG Version 3.7 User's Guide and Manual. The Institute for Bird Populations, Pt. Reyes Station, CA. 93 pp.
- HINES, J. E., W. L. KENDALL, AND J. D. NICHOLS. 2003. On the use of the robust design with transient capture-recapture models. *Auk* 120:1151-1158.
- LEBRETON, J. -D., K. P. BURNHAM, J. CLOBERT, AND D. R. ANDERSON. 1992. Modeling survival and testing biological hypotheses using marked animals: a unified approach with case studies. *Ecological Monographs* 62:67-118.
- MARRA, P. P., K. A. HOBSON, AND R. T. HOLMES. 1998. Linking winter and summer events in a migratory bird by using stable-carbon isotopes. *Science* 282:1884-1886.
- NOON, B. R. AND J. R. SAUER. 1992. Population models for passerine birds: structure, parameterization, and analysis. Pp. 441-464 in *Wildlife 2001: Populations*. D. C. McCullough and R. H. Barrett (eds.), Elsevier Applied Science, London.
- NOTT, M. P., AND D. F. DeSANTE. 2002. Demographic monitoring and the identification of transients in mark-recapture models. Pp 727-736 in J. M. Scott and P. Heglund (eds.), *Predicting species occurrences: issues of scale and accuracy*. Island Press, New York.
- NOTT, M. P., D. F. DeSANTE, R. B. SIEGEL, AND P. PYLE. 2002. Influences of the El Niño/Southern Oscillation and the North Atlantic Oscillation on avian productivity in forests of the Pacific Northwest of North America. *Global Ecology and Biogeography* 11:333-342.
- NOTT, M. P., D. F. DeSANTE, AND N. MICHEL. 2003. Management Strategies for Reversing Declines in Landbirds of Conservation Concern on Military Installations: A Landscape-scale Analysis of MAPS Data. Unpublished report to the U.S. Department of Defense Legacy Resource Management Program. The Institute for Bird Populations, Point Reyes Station, CA. 119 p.
- NOTT, M. P., D. F. DeSANTE, P. PYLE, AND N. MICHEL. 2005. Managing Landbird Populations in Forests of the Pacific Northwest: Formulating Population Management Guidelines from Landscape-scale Analyses of MAPS Data from Avian Communities on Seven National Forests in the Pacific Northwest. Unpublished report to the National Fish and Wildlife Foundation and the USDA Forest Service, Northwest Region. The Institute for Bird Populations, Point Reyes Station, CA. 163 p.
- PEACH, W. J., S. T. BUCKLAND, AND S. R. BAILLIE. 1996. The use of constant effort mist-netting to measure between-year changes in the abundance and productivity of common passerines. *Bird Study* 43:142-156.
- PEACH, W. J., S. R. BAILLIE, AND D. E. BALMER. 1998. Long-term changes in the abundance of passerines in Britain and Ireland as measured by constant effort mist-netting. *Bird Study* 45:257-275.
- POLLOCK, K. H., J. D. NICHOLS, C. BROWNIE, AND J. E. HINES. 1990. Statistical inference for capture-recapture experiments. *Wildlife Monographs* No. 107.
- PRADEL, R., J. HINES, J.-D. LEBRETON, AND J. D. NICHOLS. 1997. Capture-recapture survival models taking account of transients. *Biometrics* 53:60-72.
- PULLIAM, H. R. 1988. Sources, sinks, and population regulation. *American Naturalist* 132:652-661.
- ROBBINS, C. S., D. BYSTRAK, AND P. H. GEISSLER. 1986. The Breeding Bird Survey: Its First Fifteen Years, 1965-1979. U.S. Fish and Wildlife Service, Resource Publication 157. 196 pp.
- ROSENBERG, D. K., D. F. DeSANTE, AND J. E. HINES. 2000. Monitoring survival rates of landbirds at varying spatial scales: an application of the MAPS Program. Pp. 178-184 in Bonney, R., D. N. Pashley, R. J. Cooper, and L. Niles (eds.), *Strategies for Bird Conservation: the Partners in Flight Planning Process*. Proceedings of the Third Partners in Flight Workshop; 1995 October 1-5; Cape May, NJ. Proceedings RMRS-P-16. Ogden, UT: USDA, Forest Service, Rocky Mountain Research Station.
- SCHLAEPFER, M. A., M. C. RUNGE, AND P. W. SHERMAN. 2002. Evolutionary and ecological traps. *Trends in Ecology and Evolution* 17:474-480.
- TEMPLE, S. A., AND J. A. WIENS. 1989. Bird populations and environmental changes: can birds be bio-indicators? *American Birds* 43:260-270.
- VAN HORNE, B. 1983. Density as a misleading indicator of habitat quality. *Journal of Wildlife Management* 47:893-901.
- WHITE, G. C. 1983. Numerical estimation of survival rates from band-recovery and biotelemetry data. *Journal of Wildlife Management* 47:716-728.

APPENDIX. Summary of the 49 MAPS stations newly established in 1999, the 37 stations newly established in 2000, the 49 stations newly established in 2001, and the 8 stations established prior to 1999 but not previously summarized in a MAPS annual report.

Stn. no.	Station name	Operator	Sponsor	Prov./ State	Nearest town	10' block	Elev. (m)	Habitat(s)	First Year
I. Stations established before 1999									
NORTHWEST REGION									
11218	Provo River - Old #2	J. Parrish	Federal/State/Private	UT	Heber	403-1112	1750	cottonwood-willow riparian/cattails	97
SOUTHWEST REGION									
12348	Palomarin Grid (Uppers)	D. Humple	PRBO Conservation Science	CA	Bolinas	375-1224	122	coastal scrub/douglas fir	92
SOUTH-CENTRAL REGION									
14493	Shelterwood Harvest	D. Twedt	U.S. Fish & Wildlife Service	LA	Delhi	321-0912	22	bottomland hardwood forest	94
14513	North 1/3 of Comp. 16	D. Twedt	U.S. Geological Survey /U.S. FWS	LA	Delhi	321-0912	21	oak-gum bottomland hardwood for.	94
14514	Forest Comp. 11, south	D. Twedt	U.S. Geological Survey /U.S. FWS	LA	Delhi	322-0911	21	oak-gum bottomland hardwood for.	94
14515	Not cut/managed forest	D. Twedt	U.S. Geological Survey /U.S. FWS	LA	Delhi	321-0912	21	oak-gum bottomland, unharvested	94
14517	Cottonwood Brake stand	D. Twedt	U.S. Geological Survey /U.S. FWS	MS	Fidler	323-0910	21	pulpwood managed cottonwd forest	94
SOUTHEAST REGION									
16687	Pilot Knob	D. Skinner	Kentucky State Natural Prairie	KY	Westbend	375-0835	259	deciduous forest	98
II. Stations established in 1999									
NORTHWEST REGION									
11200	Wildcat Ranch	L. Vidal	Pitkin City/Wildcat Ranch	CO	Snowmass Village	391-1065	2438	deciduous shrubland	99
11201	Arco Desert	T. Reynolds	Private	ID	Atomic City	433-1123	1500	sagebrush steppe	99
11202	Pattee Creek	V. Guyer	U.S. Bureau of Land Management	ID	Tendoy	445-1133	1585	riparian willow/alder shrub	99
11203	Cheerwood	L. Fish	Private	OR	Blachly	441-1233	378	mixed woodland/mixed grassland	99
11991	Ranger Creek	K. Symington	Parks Canada/Friends of Banff NP	AB	Banff	511-1154	1400	mixed shrubland/grassland	99
11992	Neotrop.Bird Sanc. Roseb	R. Espinosa	Private	OR	Canyonville	425-1231	488	open madrone woodl., shrub unders	99
SOUTHWEST REGION									
12281	Overton WMA	M. Boyles	National Park Service	NV	Overton	363-1142	380	tamarisk-willow riparian corridor	99
12282	Chorro Flats	P. Nieto	AS-Morro Coast	CA	Morro Bay	352-1204	30	riparian/grasslands/marsh	99
12283	Oso Flaco	P. Nieto	Private	CA	Guadalupe	350-1203	15	riparian woodland/dune scrub	99
12288	Atascadero Creek	K. Whitney	AS-Santa Barbara	CA	Goleta	342-1194	10	riparian corridor w/ marsh & woods	99
12291	Starr Ranch Sanctuary	S. DeSimone	National Audubon Society	CA	Mission Viejo	333-1173	236	oak-sycamore woods/sagebr. flats	99
12292	Irvine Park	D. DeSante	CCOCNCCP	CA	Orange Park Acres	334-1174	223	coastal sage scrub/live oak woodlnd	99
12293	Upper Laurel Canyon	D. DeSante	CCOCNCCP	CA	Laguna Beach	333-1174	195	coastal sage scrub/live oak woodlnd	99
12294	Upper Wood Canyon	D. DeSante	CCOCNCCP	CA	Laguna Hills	333-1174	140	coastal sage scrub	99
12295	Upper Weir Canyon	D. DeSante	CCOCNCCP	CA	Anaheim	335-1174	329	coastal sage scrub/grassland	99
12296	Gardner's Cove	K. Griggs	U.S. Fish & Wildlife Service	CA	Modesto	373-1211	28	oak woodland/cottonwood/willow	99
12300	O'Neill Forebay Wildl. Ar	L. Sparks	CA Fish & Game	CA	Santa Nella	370-1210	32	grassland/deciduous woodland	99
12312	UT Test & Training Rng.	J. Parrish	U.S. Department of Defense	UT	Lakeside	410-1125	1286	greasewood/shadscale	99
13326	Project Area	R. Burnett	PRBO Conservation Science	CA	Redding	403-1222	107	cottonwood-willow riparian	99
NORTH-CENTRAL REGION									
13359	Mary Gray Bird Sanc.	R. Weiss	Chipper Woods Bird Observatory	IN	Connerville	393-0851	289	2nd deciduous forest/grassland	99
13360	Alma College Bird Obs.	M. Bishop	Alma College	MI	Vestaburg	432-0845	259	deciduous forest	99
13361	North Oaks	M. Patty	Private	MN	North Oaks	450-0930	274	willow scrub wetland / oak savanna	99

APPENDIX. Continued.

Stn. no.	Station name	Operator	Sponsor	Prov./ State	Nearest town	10' block	Elev. (m)	Habitat(s)	First Year
13362	Shiawassee NWR	R. Grefe	Private	MI	Saginaw	432-0840	178	grassland/floodplain forest	99
13363	Lawrence Woods	N. Moore	Ohio Northern University	OH	Kenton	403-0833	305	deciduous woodland/meadow	99
13364	River Edge Nature Center	A. Sherkow	River Edge Nature Center	WI	Newburg	432-0880	280	deciduous forest/deciduous shrubl	99
13365	Miller Woods	S. Wilmore	U.S. EPA-Great Lakes National Park	IN	Gary	413-0871	183	dune & swale savanna and wetlands	99
NORTHEAST REGION									
15605	Nauset School	D. DeSante	National Park Service - Cape Cod	MA	Eastham	415-0695	15	oak/pine (high density)	99
15606	Marconi Beach	D. DeSante	National Park Service - Cape Cod	MA	Wellfleet	415-0695	12	pine (low density)	99
15607	Blueberry Hill	D. DeSante	National Park Service - Cape Cod	MA	Wellfleet	415-0695	15	oak/pine (low density)	99
15608	Higgins House	D. DeSante	National Park Service - Cape Cod	MA	Wellfleet	415-0700	15	pine (high density)	99
15609	Oak Dunes	D. DeSante	National Park Service - Cape Cod	MA	Truro	415-0700	30	oak (low density)	99
15610	Longnook Beach	D. DeSante	National Park Service - Cape Cod	MA	Truro	420-0700	46	oak (high density)	99
15611	Montezuma NWR	T. Jasikoff	U.S. Fish & Wildlife Service	NY	Seneca Falls	425-0764	118	deciduous shrubland/dec. woodland	99
15612	Apple Orchard	J. Bullis	Electric Utility Companies	NJ	Harmony	404-0750	287	old apple orchard	99
15613	Willowbrook	R. Veit	PSC-Cuny Grant	NY	New York	403-0740	12	floodplain forest	99
15614	Boise de L'Heritage	G. Burelle	Private	PQ	Montreal	454-0733	12	?	99
15615	Nissiquogue River	P. Pelkowski	Long Island Community Foundation	NY	Smithtown	405-0731	8	closed canopy forest and field	99
15616	Beall Tract	J. Tinsman	?	WV	Davis	390-0792	985	maple-beech-cherry forest	99
15634	Stokely Creek Control	S. Holmes	Natural Resources Canada	ON	Sault Ste. Marie	464-0841	380	tolerant hardwood	99
15670	Gilsland Farm	J. Walker	?	ME	Falmouth	434-0701	6	deciduous forest/mixed shrubland	99
SOUTHEAST REGION									
16688	Spring Creek	J. Lamb	U.S. Department of Defense-Air Force	TN	Tullahoma	352-0860	345	fire managed oak & loblolly pine	99
16689	Cowan's Ford Wildl. Ref.	J. Esely	Mecklenburg County	NC	Huntersville	352-0805	221	mixed woodland/grassland	99
16690	Wassaw Island, South	P. Range	U.S. Fish & Wildlife Service	GA	Isle of Hope	315-0805	3	salt marsh to oak-pine forest	99
16691	South, Illinois Bird Obs.	C. Hutcheson	Private	IL	Makanda	373-0891	183	deciduous forest/mixed shrubland	99
16692	Sage Point	D. Skinner	Kentucky State Natural Prairie	KY	Westbend	375-0835	274	oak-hickory forest w/ utility row	99
16693	Woodcock Lane	T. Casselman	U.S. Fish & Wildlife Service/CMBO	NJ	Dias Creek	390-0745	3	deciduous woodland/dec. shrubland	99
16694	E.B. Forsythe NWR	T. Casselman	U.S. Fish & Wildlife Service/CMBO	NJ	Oceanville	392-0742	5	marsh and adjacent woods	99
16697	Fort Stewart A-7	L. Carlile	U.S. Department of Defense	GA	Flemington	315-0812	7	longleaf pine/wiregrass flatwoods	99
ALASKA AND BOREAL CANADA									
18805	Gros Morne	W. Burdett	Parks Canada	NF	Rocky Harbour	493-0575	20	shrubland/evergreen forest	99
III. Stations established in 2000									
NORTHWEST REGION									
11205	Lindzey's Place	A. Lyon	Private	WY	Laramie	411-1060	2286	cottonwood/willow riparian	00
11206	Dike	M. Bailey	U.S. Fish & Wildlife Service	WA	McKenna	470-1224	5	decid. shrub corridor/wetlands	00
11207	Restoration	M. Bailey	U.S. Fish & Wildlife Service	WA	McKenna	470-1224	10	oldfield	00
11208	Rivertine	M. Bailey	U.S. Fish & Wildlife Service	WA	McKenna	470-1224	9	big-leaf maple-cottonwd rip. forest	00
11209	Surge Plain	M. Bailey	U.S. Fish & Wildlife Service	WA	McKenna	470-1224	10	decid. rip. surge plain-tide infl	00
11210	Lucky	G. Kaltenecker	U.S. FS/U.S. BLM/ID Fish & Game	ID	Boise	433-1160	1845	montane decid shrubland/doug-fir	00
11211	Lee Vining Creek	S. Heath	NFWF/U.S. BLM/U.S. FS/PRBO/Mono	CA	Lee Vining	375-1190	1960	black cottonwood/willow riparian	00
11212	Mill Creek	S. Heath	NFWF/U.S. BLM/U.S. FS/PRBO/Mono	CA	Lee Vining	380-1190	2036	riparian	00

APPENDIX. Continued.

Stn. no.	Station name	Operator	Sponsor	Prov./ State	Nearest town	10' block	Elev. (m)	Habitat(s)	First Year
11213	Rush Creek	S. Heath	NFWF/U.S.BLM/U.S.FS/PRBO/Mono	CA	Lee Vining	375-1190	2963	willow riparian passive restoration	00
11214	Wilson Creek	S. Heath	NFWF/U.S.BLM/U.S.FS/PRBO/Mono	CA	Lee Vining	380-1190	2073	willow riparian/pasture/ditch	00
11229	Snow Cow	J. Alexander	Klamath Bird Observatory	OR	Canyonville	424-1220	1585	rip. willow, mixed hardwood/pine	00
SOUTHWEST REGION									
12302	Headgate Rock	J. Kahl, Jr.	U.S. Bureau of Reclamation	AZ	Parker	341-1141	110	salt cedar/mesquite/arrowweed	00
12303	Christmas Island	K. Griggs	U.S. Fish & Wildlife Service	CA	Vernalis	373-1211	30	cottonwood-willow-valley oak rip.	00
12304	Ernest Debs Reg. Park	D. Cooper	NAS	CA	Los Angeles	340-1181	155	ca black walnut/live oak woodland	00
12305	Sierra Ajos	T. Wood	NPS/U.S. BLM/U.S. EPA	SO	Cananea, Sonora	305-1095	1920	mixed oak-pine madrean woodland	00
12306	Morelos	T. Wood	NPS/U.S. BLM/U.S. EPA	SO	Cananea, Sonora	311-1101	1333	cottonwood-willow riparian woods	00
12307	Goleta Slough	K. Whitney	?	CA	Isla Vista	342-1195	3	meadow shrubland/deciduous woodl	00
12313	Garden Wash	J. Whetstone	U.S. Bureau of Land Management	AZ	Sierra Vista	313-1100	1250	cotton-willow riparian/small pond	00
12335	Florida Canyon	W. Leitner	Private	AZ	Madera Canyon	314-1105	4250	cottonwood-mesquite rip./grassland	00
NORTH-CENTRAL REGION									
13366	Buffalo Riv. Monitor Sta	G. Hoch	?	MN	Glyndon	465-0962	300	grassland/deciduous forest	00
13367	1961 Kirtland's Warbler	M. Petrucha	U.S. FWS/U.S. Geological Survey	MI	Rose City	442-0841	381	evergreen forest	00
SOUTH-CENTRAL REGION									
14474	Audubon Inst. Banding St	M. Myers	Audubon Nature Institute	LA	Meraux/Violet	295-0895	1	lowland hardwood forest	00
14475	Bell Slough	C. Rideout	AR Game & Fish Commission	AR	Mayflower	345-0922	77	bald cypress-swamp tupelo forest	00
14476	Stringfellow WMA	M. Ealy	TX Parks and Wildlife Department	TX	Brazoria	285-0955	2	oak-hackberry-green ash forest	00
14477	Hackberry Grove	J. Gallagher	TX Parks and Wildlife Department	TX	Artesia Wells	281-0992	160	hackberry/mesquite mixed brush	00
NORTHEAST REGION									
15618	Mashamack Preserve	M. Scheibel	The Nature Conservancy	NY	Shelter Island	410-0721	3	deciduous woodland/tidal marsh	00
15619	Carp Ridge	M. Caskey	?	ON	Constance Bay	452-0760	100	sugar maple forest/meadow	00
15620	Grt Smoky Mtns Tremont	P. Super	NPS - Great Smokies/CO PI	TN	Townsend	353-0834	430	hardwood riparian forest	00
15621	Kettle Creek	D. Speicher	Private	PA	Reeders	405-0751	243	mixed for.; riparian and upland	00
15622	Skytop	D. Speicher	Private	PA	Skytop	411-0751	524	ripar. decid. for. w/ norway spruce	00
15623	Helmer Marsh	J. van Niel	U.S. Fish & Wildlife Service/Private	NY	Montezuma	430-0764	120	shrub/pioneer tree on forest edge	00
15624	Adventure	G. Radko	MD Orn.Soc/MD Ntl Capital Prk/Hood C	MD	Potomac	390-0771	91	grassland/deciduous woodland	00
15625	Corson's Wood/Brook	R. Veit	PSC-Cuny Grant	NY	Staten Island	403-0740	43	?	00
15626	Fundy National Park 2	D. Diamond	Fundy National Park	NB	Alma	453-0650	20	deciduous forest/mixed woodland	00
15640	Queens College Center	P. Schmidt	Private	NY	Lloyd Harbor	405-0732	32	?	00
SOUTHEAST REGION									
16700	Reedy Marsh Trail	J. Sasser	Johnston Community College	NC	Four Oaks	352-0781	29	bottomland hardwood forest	00
ALASKA AND BOREAL CANADA									
18806	Residence	A. Wotton	Provincial/Federal	AB	Slave Lake	552-1144	592	boreal-l-mixed woodland	00
IV. Stations established in 2001									
NORTHWEST REGION									
11215	Wallula - McNarry NWR	H. Browers	U.S. Fish & Wildlife Service	WA	Wallula	460-1185	106	cottonwood-willow riparian corrid	01
11216	Wildlife Research	T. Smucker	Plum Creek Timber Co./Private	MT	Seely lake	471-1133	1200	mixed forest/willow riparian cor.	01
11217	Snagboat Bend	J. Hagar	U.S. Fish & Wildlife Service	OR	Peoria	442-1231	73	cotton-willow riparian	01

APPENDIX. Continued.

Stn. no.	Station name	Operator	Sponsor	Prov./ State	Nearest town	10' block	Elev. (m)	Habitat(s)	First Year
11219	Schwaubacker's Landing	D. Wachob	Teton Science School	WY	Moose	434-1104	1980	cottonwood riparian corridor	01
11220	Jarvis Lane Housing Dev.	D. Wachob	Teton Science School	WY	Wilson	433-1105	1888	cottonwood riparian corridor	01
11230	Little Applegate	J. Alexander	Klamath Bird Observatory	OR	Ashland	421-1230	494	?	01
11231	Willow Wind	J. Alexander	Klamath Bird Observatory	OR	Ashland	421-1224	549	riparian willow /blackberry field	01
11258	McCarran Ranch	E. Ammon	U.S. FWS/TNC/GBBO	NV	Sparks	393-1193	1312	degraded cottonwood /willow rip.	01
SOUTHWEST REGION									
12308	Emerald Canyon	D. DeSante	CCOCNCCP	CA	Laguna Beach	333-1174	264	coastal sage scrub in steep canyon	01
12309	Round Canyon	D. DeSante	CCOCNCCP	CA	Irvine	334-1174	217	coastal sage scrub /oak woodland	01
12310	Sycamore Hills	D. DeSante	CCOCNCCP	CA	Laguna Woods	333-1174	186	coastal sage scrub	01
12311	Whiting Ranch	D. DeSante	CCOCNCCP	CA	Lake Forest	334-1173	276	coastal sage scrub /oak woodland	01
12314	Nav. Weap. Sta, Det. Fall	T. Campbell	Private	CA	Fallbrook	332-1171	95	cottonwood-willow riparian/scrub	01
12315	Solstice Canyon	W. Sakai	Private / LA Audubon Society	CA	Malibu	340-1184	59	riparian w costal scrub&chaparral	01
12316	Great Egret	S. Hudson	NFWF /City of San Jose	CA	San Jose	372-1215	2	riparian corridor in urban area	01
12317	Red-shouldered Hawk	S. Hudson	NFWF /City of San Jose	CA	San Jose	372-1215	2	riparian corridor in urban area	01
12318	Sharp-shinned Hawk	S. Hudson	NFWF /City of San Jose	CA	San Jose	372-1215	2	riparian corridor in urban area	01
12319	Turkey Vulture	S. Hudson	NFWF /City of San Jose	CA	San Jose	372-1215	2	riparian corridor in urban area	01
12320	White-tailed Kite	S. Hudson	NFWF /City of San Jose	CA	San Jose	372-1215	2	riparian corridor in urban area	01
12327	Saeltzer Dam	R. Burnett	PRBO Conservation Science	CA	Redding	402-1222	152	cottonwood-willow riparian	01
NORTH-CENTRAL REGION									
13368	Hitchcock Nature Area	C. Williams	Pottawatamie County Counsel	IA	Honey Creek	412-0955	396	bur oak-hickory forest /dogwd. edg	01
13369	Boyer Chute NWR	E. Grenon	U.S. Fish & Wildlife Service	NE	Ft. Calhoun	412-0955	305	cottonwood-mulberry riparian corr	01
13372	Scissons Envir. Ed. Cent.	T. Haughian	Saskatoon Catholic Schools Foundation	SK	Arelee	521-1072	495	native prairie/grassland/shrubland	01
SOUTH-CENTRAL REGION									
14478	Lacassine NWR 1	W. Syron	U.S. Fish & Wildlife Service	LA	Lake Arthur	295-0924	2	mixed hardwood / freshwater marsh	01
14479	Proving Grounds Res.Stat.	A. Kinslow	Private/EPA	MO	Fordland	371-0930	131	fragmented oak-hickory riparian	01
14480	Sulphur River WMA	C. Rideout	AR Game & Fish Commission	AR	Foulke	331-0935	62	bottomland hardwood	01
14481	Lower Ouachita WMA	C. Rideout	AR Game & Fish Commission	AR	Crossett	330-0920	21	sand prairie/bottomland hardwood	01
14482	Bird's Creek	J. Johnson	U.S. Department of Defense-Army	LA	Cravens	310-0930	29	mixed hardwood /long leaf riparian	01
NORTHEAST REGION									
15627	S. Fork Potomac River	D. DeSante	U.S. Department of Defense-Navy	WV	Brandywine	383-0791	536	riparian corridor / mixed confif. forest	01
15628	Beaver Creek	D. DeSante	U.S. Department of Defense-Navy	WV	Brandywine	383-0791	658	mixed coniferous-deciduous forest	01
15629	Flat Rock Brook Nat. As.	P. Magasich	Private	NJ	Englewood	405-0735	85	deciduous woods /suburbia	01
15630	Beaver Marsh	L. Doss	Marvelwood School	CT	Kent	414-0732	399	marsh edge w h.hornbeam&w.birch	01
15631	South Shore Nature Cent.	J. Horman	Private	NY	East Islip	404-0731	1	upl.oak-hick./rmaple-tupelo swmp	01
15632	Trinity College Field Sta	C. Millard	Private	CT	Ashford	415-0721	102	oak-hickory-red maple forest	01
15633	CT Aud. Center Pontifret	C. Millard	Audubon Council of CT	CT	Pomfret Center	415-0715	115	mixed decid.-conifer /open meadows	01
15635	Hoffman Center	I. Fernandes	Hoffman Foundation	NY	East Norwich	405-0733	59	mixed woodland /grassland in sub.	01
15636	Five Rivers	P. Nye	NY State Department of Environment	NY	Delmar	423-0735	50	open field /mixed decid.for./ripar	01
15637	James A Zaepfel N.S.	T. LeBlanc	Private - Cattaraugus Loc.	NY	Napoli	421-0785	502	shrubland /old field	01
15638	Mississquoi NWR	M. LaBarr	U.S. FWS/Audubon Vermont	VT	Swanton	445-0731	35	maple-ash bottomland forest /edge	01

APPENDIX. Continued.

Stn. no.	Station name	Operator	Sponsor	Prov./ State	Nearest town	10' block	Elev. (m)	Habitat(s)	First Year
15639	Rapidan WMA	J. Cooper	Virginia Dept. of Game & Inld. Fisheries	VA	Wolfstown	382-0782	488	mesic hardwood forest/riparian cor	01
15652	Long Road	D. Speicher	Private	PA	Canadensis	411-0751	442	deciduous forest/hemlock forest	01
15653	Two Mile Run	D. Speicher	Private	PA	Blakeslee	410-0753	472	boreal bog	01
SOUTHEAST REGION									
16695	North Montgomery Cnty	F. Bassett	Hummer/Bird Study Group/Private	AL	Montgomery	322-0861	50	mixed woodland/riparian corridor	01
16696	Poinsett Elec. Comb. Rng.	J. Hovis	U.S. Department of Defense - Air Force	SC	Pinewood	334-0802	60	bay&hardwd ridge w longleaf pine	01
16699	Ichuaway	J. Stober	Joseph W. Jones Ecological	GA	Newton	311-0842	120	mature longleaf pine forest	01
16701	Weekiwachee Preserve	C. Black	SW Florida Water Management District	FL	Spring Hill	282-0823	3	hardw hammock/pine flat/karst	01
16704	NC Wesleyan College	M. Brooks	North Carolina Wesleyan College	NC	Rocky Mount	360-0774	28	oldfield/mixed woodland/suburbia	01
16705	Foxsparrow Farms	F. Moore	Private/Hummer-Bird Study	AL	Steele	335-0861	400	mature oldfield	01
16707	Cahaba Mountain	B. Brame	Private	AL	Springville	334-0863	48	pine & hardwood hillside/meadow	01