INDIAN PEAKS

FOUR SEASON BIRD COUNTS

TWENTY-YEAR SUMMARY

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Published by Boulder County Nature Association, P.O. Box 493, Boulder, CO 80306

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Cover photo: White-tailed ptarmigan by Ruth Carol Cushman
Back cover photo: American dipper by Stephen Jones

INDIAN PEAKS FOUR SEASON BIRD COUNTS TWENTY-YEAR SUMMARY

Abstract

The Indian Peaks Four Season Bird Counts began in 1982 and are conducted much like a Christmas Bird Count; except they are held four times a year and counts can be conducted on any day during a several week period within each season. The 20-year period from 1982-2001 was assessed in this report.

There was an increasing trend for total number of birds seen during all four seasons over the 20-year period. The increasing trend was strongest during the first 13 years, and then there was a decline in total numbers that corresponded with a wetter weather period. However, total numbers at the end of the 20-year period were higher than at the beginning. The spring, breeding and fall counts were similar in their numeric cycles. The winter count was more variable and influenced by the presence or absence of irruptive species, including bohemian waxwing and red crossbill. The spring, breeding and fall counts were numerically dominated by neotropical and short-distance migrants, while resident birds dominated the winter count.

Average annual temperature had a significant ($P \leq 0.05$) positive correlation with breeding, fall, and winter resident annual total birds. Warmer temperatures correlated with more birds. Average annual spring temperature also proved to be a good predictor of annual breeding bird numbers. Precipitation proved to be a poorer predictor of bird numbers, though the non-significant correlations of average annual precipitation with annual spring, breeding, and fall bird counts were negative. Increased precipitation correlated with fewer birds. On the breeding count, short-distance and neotropical migrants had significant positive correlations with average annual temperature and average annual spring temperature. Only neotropical migrants had a significant correlation with precipitation (average annual), and it was negative. Resident breeding birds had no significant correlations with temperature or precipitation.

Early arrival was more pronounced with some short-distance migrants during the spring, including some of the most common species like broad-tailed hummingbird and ruby-crowned kinglet. There was not much evidence of neotropical migrants arriving early in the Indian Peaks count area, though some warblers appear to be departing later.

Corvids are the most consistent increasing species on all counts, particularly American crow, but also Steller's jay, Clark's nutcracker, and black-billed magpie. Black-capped chickadee has also been a steady four-season increaser. An increasing human population may be contributing to their well being. Ruby-crowned kinglet consistently increased during the spring, breeding and fall seasons. Yellow warbler and black-headed grosbeak had a constant increase on the breeding counts.

Evening grosbeak has been a steady four-season decliner. Green-winged teal, spotted sandpiper, violet-green swallow, western tanager, brown-headed cowbird, and brown-capped rosy-finch exhibited continual declines on the breeding count.

Introduction

The purpose of the Indian Peaks Four Season Bird Counts is to track change in the types of avian species and their numbers between seasons and over time along the upper spine of the Southern Rocky Mountains in southwestern Boulder and northwestern Gilpin Counties. The counts began with a Christmas Bird Count on New Year's Day, 1982. With the exception of spring 1982, the count has occurred during each climatic season (winter, spring, summer [referred to as breeding], and fall) for 20 years.

This report presents some of the findings from 1982 to 2001. The data from the 20-year period showed seasonal differences in the types and numbers of birds observed. Temporally, some trends, cycles, and correlations are presented along with their possible relationship to changes in land use and weather.

Methods

Study Area

The count area is primarily located in southwestern Boulder County, but portions of northwestern Gilpin and far eastern Grand Counties are included (Figure 1). The area is a 7.5-mile radius circle centered a half mile northeast of the Rainbow Lakes campground (40º00'50" N, 105º33'40"W). Elevation ranges from 7,400' in Boulder and North Boulder Canyons to 13,502' on top of North Arapaho Peak. Habitat is dominated by four forest types and one grassland: ponderosa pine/Douglas-fir forest below 8,500'; Engelmann spruce/subalpine fir forest from 9,500' to 11,000'; lodgepole pine and aspen forests between 8,000' and 10,000', and alpine tundra above 11,500'. Patches of open woodlands, meadows, wetlands, riparian areas, krummholz, lakes, reservoirs, urban areas, and limber pine are also present.

Human population has grown within the study area over the 20-year period. The population for the census tracts encompassing the count circle (and covering an area larger than the circle) grew from 10,240 in 1980 to 16,185 in 2000, a 58% growth over the 20 years (U.S. Census Bureau data).

Organization of the Count

The organization of the count and methods for counting birds follows those recommended for the Audubon Christmas Bird Count (National Audubon Society 2003), except for when the counts were held, which is further described below.

The study area count circle is divided into 25 areas. Parties of participants cover as many of the areas as possible during each count; generally between 12 and 24 areas were covered. Participants walk, drive, ski, or snowshoe throughout each area recording all birds seen or heard. Participants keep track of time, distance and habitat covered in each area. Counts have averaged 80 party-hours of field time and covered 200 miles of ground.

During the first ten years each seasonal count was held on a particular day, while during the second ten years a count period was established during which participants could conduct their count on any day within the period. During the first ten years, the count days were: Winter – New Year's Day or the first Saturday of January; Spring – first Saturday of May; Breeding – second Saturday of June; Fall – third Saturday of September. During the second ten years the count periods were: Winter – mid-December to mid-February; Spring – first two weeks of May; Breeding – June 1 to July 15 (the July period for subalpine areas); Fall – second and third weeks of September. These differences will be noted, particularly when looking at spring and fall migrants.

The numbers of birds counted is standardized for each count by dividing the number of birds by the number of party-hours for the count. A party-hour is each hour that the party, whether 1 person or each group of people birding together, is conducting the count.

The 25 count areas within the count circle are classified as either montane (below 9,000' elevation) or subalpine/alpine (above 9,000' elevation), depending on the elevation that constituted the majority of habitat.

Trends for individual bird species were assessed using four 5-year averages covering the 20-years of the count.

Use of the terms short-distance migrant, neotropical migrant and resident generally follow Breeding Bird Survey guilds (Peterjohn and Sauer 1993). Adjustments were made to move some resident birds to short distance migrants, particularly those that are known to perform a vertical migration to lower elevation and are rarely present during the winter.

Statistical analyzes were processed using the linear regression analysis function in the Microsoft Excel Statistical Analysis ToolPak (Microsoft Excel 2000 V9.0.3821 SR-1), which used the least squares method.

Weather

Weather can influence many aspects of avian ecology including nesting success, the timing of migration, and winter survival. It can also influence the effort of birdwatchers, as well as the ability to identify and detect birds.

Temperature and precipitation data were taken from the C-1 site (10,000' elevation) at the Mountain Research Center of the University of Colorado (Losleben 2003). The site was approximately 2 miles northeast of the center of the Indian Peaks Bird Count circle, and was located at 9,783' elevation.

Temperature data indicated an increasing trend during the 20 years of the bird count (Figure 2). The historic average was 34.8°F for the 47-year period of data collection at C-1 (1953-2000). The first several years of the counts saw below average temperatures, but since then there was generally an increase.

The amount of precipitation was cyclic (Figure 3). The historic 47-year average is 27.2". Four of the first five years of the count had above average precipitation. The next eight years (1987-1994) were below average. Then, beginning with the exceptionally wet year of 1995 (36.9"), four of the next five years saw above average precipitation. The final two years were well below average. It should be noted that when looking at a longer range of precipitation data (1880-1996), the 1982-1999 period was considered a wet period for Colorado and the Upper South Platte River basin (McKee et al. 1999). However, it is noted that snowpack was modest from 1987-1994. The data from C-1 indicated below average precipitation for all those years.

The greatest amounts of precipitation occurred in spring (9.7") and summer (6.8"), while fall (5.4") and winter (5.1") had lower amounts. The four wettest months were April, May, March, and July. During the spring, the diminishing strength of the westerlies allowed Gulf air masses, in association with low-pressure weather systems, to push north with increasing frequency resulting in heavy precipitation (Benedict 1991). July precipitation was more in the form of afternoon convectional storms, whose moisture also generally originated from the Gulf.

Results

<u>Seasonal Comparisons</u>

Over 200 species were seen during the 20 years of the count. The breeding count has averaged the greatest number of species and individuals per count (Table 1). The spring and fall counts have averaged slightly fewer species and individuals than the breeding count. The winter count averaged fewer than half as many species and individuals as the breeding count.

Resident species averaged 78% of all birds seen on winter counts, but only 22% of the avifauna observed on breeding counts (Figure 4). Short-distance and neotropical migrants averaged 78% of all birds seen on breeding counts, 67% on spring counts, and 90% on fall counts.

Table 1. Twenty-Year Seasonal Averages

	Winter	Spring	Breeding	Fall
Average # of Species	36	83	100	83
Average # of Individuals (Per party-hour)	18	36	42	33

All four counts exhibited increasing numbers of birds during the 20-year period (Figures 5-8). The trend line was strongest for the breeding and fall counts and weakest for the spring and winter. The winter count numbers showed greater variability, probably influenced by irruptions of opportunistic boreal species in search of food. However, when irruptive species were excluded from the winter count and only the primary resident species were included, the fitness of the trend line increases.

Figures 5-8 revealed some consistencies among numeric patterns for the various count seasons. The strongest relationships existed among the spring, breeding and fall counts. Beginning in 1982, all three counts exhibited an increasing numeric trend that peaked in the early 1990s. This was followed by a decline, the steepness more pronounced in the spring and fall counts, which has been followed by another trend of numeric increase. The pattern of the winter counts was poorly correlated with the other three count periods.

Five-year averaged increments portrayed a slightly different pattern of increase and decrease over the 20-years (Figure 9). The winter, spring and breeding counts all showed a decline during the last 5 years (1996-2001), while the fall count exhibited a continual increase.

<u>Linear Regressions Between Weather and Number of Birds</u>

Linear regressions were run between weather data (independent variable) and annual seasonal count totals (dependent variable). Weather data included average annual temperature, average annual precipitation, and seasonal (winter, spring, summer, and fall) average temperature and precipitation. Four sets of regressions were run (Table 2): average annual weather data with the current season's count totals (e.g. 1992 average annual temperature with spring count total for 1992); average seasonal weather data with the current season's count total (e.g. 1992 spring average precipitation with spring count total for 1992); previous year's average annual weather data with the current season's total (e.g. 1991 average annual temperature with spring count total for 1992); and preceding season's weather data with the current season's count total (e.g. 1992 average annual winter temperature with spring count total for 1992).

Table 2. Linear Regressions Between Weather and Seasonal Count Totals (*P≤0.05)												
	Bird Count											
Weather Data	Winter			Spring			Breeding			Fall		
Temperature:	r	r^2	P	r	r^2	P	r	r^2	P	r	r^2	P
Current Year	.20	.04	.40	.34	.12	.31	.59	.35	.006*	.53	.28	.017*
Current Season	.25	.06	.29	.41	.17	.08	.45	.20	.045*	.28	.08	.24
Preceding Season	.15	.02	.52	.09	.01	.70	.63	.39	.003*	.34	.12	.14
Previous Year	.05	.00	.85	.35	.12	.14	.43	.19	.065	.22	.05	.37
Precipitation:												
Current Year	.35	.12	.13	-.31	.10	.19	-.39	.16	.08	-.26	.06	.28
Current Season	.15	.02	.52	-.14	.02	.56	-.39	.15	.09	-.29	.09	.21
Preceding Season	.09	.01	.70	-.45	.20	.06	-.16	.03	.50	-.12	.01	.61
Previous Year	.21	.05	.38	-.35	.12	.15	-.20	.04	.41	-.19	.03	.45

Temperature proved to have the strongest correlation with the changes in number of birds seen from year-to-year (Table 2). Significant (P≤0.05) positive correlations occurred between average annual temperature and breeding and fall count numbers. Breeding count numbers were also significantly positively correlated with the average temperature of the breeding season, as well as the temperature of the preceding (in this case spring) season, with the latter providing the strongest relationship.

Precipitation proved to be a poorer predictor of annual change in seasonal bird numbers. No correlations proved significant. The strongest correlation was with the breeding count. There was a nonsignificant negative correlation between average annual precipitation and annual breeding count numbers.

Winter Count Summary

The winter count was the only one dominated by resident species, which comprise an average of 78% of all birds seen. Just over one of every four birds observed was a mountain chickadee. The 20-year trend for resident species was a gradual increase (Figure 4). The primary variable influencing the peaks and valleys of resident birds was the number of mountain chickadees, which ranged between 2.04-7.69 per party-hour. While the change in annual numbers of all winter birds was not significantly correlated with weather trends (see Table 2), there was a positive relationship between winter resident birds and the change in average annual temperature ($r^2 = .26$; $P = .02$).

The fluctuation of irruptive species was another story of the winter counts. Some boreal species, including Clark's nutcracker, red-breasted nuthatch, bohemian waxwing, pine grosbeak, red and white-winged crossbills, pine siskin, and evening grosbeak, periodically disperse south and east from Canada in winter, probably due to food shortages and/or cold temperatures in the north (Bock and Lepthien 1976). The presence or absence of irruptive species has greatly influenced the winter count totals. These patterns are often part of an irruption that is taking place over a greater geographic area.

The presence of bohemian waxwings was sometimes the single most important factor leading to a high count total, such as in 1987 and 1999 (Figures 4 and 10). Since 1982, there have been three exceptional waxwing appearances (greater than 10 per count hour), and an additional four other years of good appearances (between 2-5 per party-hour).

The cycles of tree-cone seed-eating birds appeared related to the cone crops of local conifer species. High numbers of seed-eating birds occurred in relation to good cone crops, particularly on Engelmann spruce trees in the subalpine lifezone. Seed-eating bird numbers peaked three times during the 20-year count period: 1984, 1991, and 1995 (Figure 11). The number of these occurrences correlates with information on cone production of Engelmann spruce from the Fraser Experimental Forest located fifteen miles west of Boulder County (Alexander et al. 1986). There, the trees had two “bumper” cone crops during a fifteen-year period.

Several other species proved to be numerically erratic and influenced the overall winter count totals. They were (with per party-hour ranges): pygmy nuthatch (0-1.2), golden-crowned kinglet (0-.6), Townsend’s solitaire (.1-.7), American robin (0-1.3), dark-eyed junco (0-2.8), and all rosy-finches (0-5.7).

The Changing Seasons: Spring and Fall Summaries

The spring and fall counts occurred during times of the year that signaled movement and change for many species. These counts were reference points for describing early and late migrants. Short-distance migrants greatly outnumbered neotropical migrants on both counts.

Because count methodology changed between the first and second ten-year periods, from a single count day to a two-week period for the spring and fall counts, there are problems in looking at changes over the 20-year period. The spring count now runs later into May while the fall count runs earlier into September, making it likely that more migrating birds will be counted.

The earlier arrival and later departure of migrants is of interest in light of possible global warming. Early arrival was more pronounced with short-distance migrants during the spring, including some of the most common species like broad-tailed hummingbird and ruby-crowned kinglet (Table 3). Because of the methodological differences between the first ten years and the second ten, the numbers are not comparable. But the pattern of more birds arriving early was present within both 10-year periods for many short-distance migrants. There was not much evidence of neotropical migrants arriving early in the Indian Peaks count area, though some warblers appear to be staying later.

Table 3. Numbers of Selected Migrants on Spring and Fall Counts.

	Spring				Fall			
	83-86	87-91	92-96	97-01	83-86	87-91	92-96	97-01
Broad-tailed Hummingbird	0.11*	0.32	0.74	1.10	0.07	0.02	0.03	0.03
Ruby-crowned Kinglet	0.99	1.84	2.30	2.52	0.35	0.47	0.63	0.91
All Flycatchers	0.00	0.02	0.06	0.06	0.03	0.02	0.04	0.03
All Neotropical Warblers	0.03	0.01	0.02	0.03	0.49	0.60	0.61	0.89

* Numbers are per party-hour 5-year averages.

Breeding Count Summary

The breeding count comes at a time when the majority of birds in the count area should be nesting. Short-distance migrants comprised almost half (48%) of all birds seen during the summer, followed by neotropical migrants (30%) and resident birds (22%).

Like the other count seasons, the general numeric trend over the 20 years was an increase (Figure 7), with peaks and valleys that produced a high in the early 1990s, and then a subsequent decline, though the numbers for most species (61%) were higher at the end of the 20-year period than at the start. There was a significant positive correlation between numbers of birds' counted and average annual temperature, and with numbers of birds counted and average summer temperature (Table 2). However, the strongest correlation existed between numbers of birds counted and average spring temperature. All of these correlations were particularly strong within subalpine and alpine count areas (Table 4).

Table 4. Correlation Between Temperature and Montane and Subalpine/Alpine Breeding Count Areas (*P≤0.05)

	Montane			Subalpine/Alpine		
Temperature Data:	r	r^2	P	r	r^2	P
Current Year Average	.48	.23	.03*	.61	.38	.004*
Current Season Average	.34	.11	.15	.46	.21	.043*
Previous Season Average	.54	.30	.01*	.62	.38	.004*
Previous Year Average	.28	.08	.25	.48	.23	.038*

Additional data analysis provided some insight into the correlation between weather and the migratory status of birds. Numbers of resident species did not correspond with temperature or precipitation, whereas numbers of neotropical and short-distance migrants did. Numbers of neotropical migrants corresponded with average annual temperature (r^2 = .37; P = .004) and average spring temperature (r^2 = .33; P = .008), and exhibited a negative correlation with annual precipitation (r^2 = .24; P = .03). Short-distance migrants had a positive correlation with average annual temperature (r^2 = .39; P = .003), but were not significantly correlated with precipitation, though what relationship there was also was negative. However, their strongest relationship was with average spring temperature (r^2 = .44; P = .001).

Increasers

During the 20-year period, there was an overall increase in the number of birds reported (see Figures 5-8). Though the majority of species declined in number during the 1997-2001 period, the averages for the period were still higher than the 1982-1986 period (see Figure 9). The percentage of species exhibiting higher numbers during the last 5-year period than the first, for each season, were: winter 63%, spring 65%, breeding 58% and fall 61%. A similar trend was found in the Southern Rocky Mountains on the North American Breeding Bird Survey, where 61% of birds had in increasing trend between 1980 and 2001 (Sauer et al. 2002).

Several species exhibited a continual increase and were not subject to the decline during the 1997-2001 period. Additionally, some of the increases were seen during all four seasons for resident birds. Black-capped chickadee stands out as the only four season continual increaser (Figure 12), while American crow had a continual increase for three of the four seasons (Figure

13). Ruby-crowned kinglet, a short-distance migrant not present during the winter, showed continual increase during its three seasons (Figure 14). Finally, for neotropical species only present during the breeding season, yellow warbler and black-headed grosbeak exhibited a continual increase (Figure 15).

Besides American crow, all corvids have increased in number during all four seasons of the count (Figure 16). Steller's jays, Clark's nutcrackers, and black-billed magpies have demonstrated steady gains. Gray jays and common ravens have numerically held steady. Crows have also spatially expanded their regular range within the count area. During the 1982-86 period, crows were observed in 30% of the count areas; this number has now increased to over 60%. On the North American Breeding Bird survey, 5 of the 6 corvid species had significant increases from 1980-2001 (Sauer 2002).

Decreasers

Given that the majority of species had increasing trends over the 20-year period, those that did not tend to stand out, particularly those with continuous declines. They are shown in Figures 17 and 18.

Evening grosbeak has been the most continuous and extreme decliner over all four seasons (Figure 17), and has a declining trend in the Southern Rocky Mountains on the Breeding Bird Survey. Christmas Bird Count data indicate a declining trend in North America, though much of the decline is centered in the east while in the west they appear stable (Kelling 2002). A review of Colorado CBC data does not indicate a declining trend.

The decline of brown-capped rosy-finch is of interest (Figure 18), as it is an endemic species to the Southern Rocky Mountains. There are insufficient data on the Breeding Bird Survey to note any trend. But rosy-finches have shown an overall decline during all four of the Indian Peak's count seasons (the numbers have included gray-crowned and black rosy-finches, particularly winter counts). Christmas Bird Count data for Colorado had the highest numbers of rosy-finches in the early 1980s, and since then their numbers have been very cyclic. What we have observed in the Indian Peaks may be a localized situation.

Some may view the decline of the brown-headed cowbird (Figure 18) as a good thing as they are brood parasites and can have adverse impacts on other avian species (Chace 1995). They show a declining trend on the Breeding Bird Surveys.

Upward Mobility?

There has been interest in possible distribution changes of avian species due to climate change, particularly global warming (Price 2000). Birds may find habitat types that are currently marginal more appealing, and there could be an upward movement of some species. Is this occurring in the Indian Peaks? Yellow warbler and black-headed grosbeak have already been noted as increasers on the breeding count (Figure 15). Additionally, in the subalpine count areas black-capped chickadee and rock wren have consistently increased in number (Figure 19).

Discussion

Participants of the Indian Peaks Bird Counts were somewhat baffled by the continual increase in number of birds during the first 10 years. There was speculation that it might be due to improving bird identification skills. This certainly could play a role with the initial numerical increases. As one participant expressed, “I can look at the numbers for my count area over the years and see when I finally learned the song of the ruby-crowned kinglet.”

What else may be driving the changing numbers of birds seen in the Indian Peaks? Weather and continued urbanization could be two factors.

The relationship between certain measurements of weather and bird numbers during this 20-year period is of interest. This is particularly true with so much recent attention being paid to the effects of global warming and drought. However, what was seen for primarily the breeding birds of the Indian Peaks was a significant positive correlation with higher temperatures along with a mostly non-significant negative correlation with more precipitation. The correlations were stronger in the higher, wetter, and colder climes of the subalpine lifezone than in the montane, and and they were stronger for neotropical and short-distance migrants than for resident birds.

It is probable that the relationship between weather and number of birds is more complex than a simple linear regression. The current season’s weather, the preceding season’s weather, several sustained years of above or below average weather, or one extreme season may all play a part. But on the surface, temperature and precipitation data may help explain some of the variation in bird numbers. The initial low numbers found at the start of the count in 1982 may make sense when noting that seven out of the ten previous years had below average temperatures. The general numeric increase of birds through 1994 on the spring, breeding and fall seasons occurred during a period of above average temperature and below average precipitation. The highest breeding count numbers during the 20-year period occurred during the second warmest year. The drop in avian numbers in 1995 through 1999 occurred during a period of above average precipitation (though there was also above average temperature), punctuated by the exceptional spring moisture in 1995. The number of birds began to rebound in 2000 as precipitation dropped and temperatures continued to rise. Though the drought year 2002 is outside the period of this paper, it produced breeding bird numbers equal to the previous record high of 1992.

Another change occurring within the count area that may have influenced the numbers of particular avian species was an increasing human presence from more homes. Members of the family *Corvidae* (jays, crows, magpies, and ravens) are known for their ability to live in close proximity to humans. Their numbers have been shown to increase in rural landscapes compared to more natural areas with little human habitation (Craig 1997). They increased more consistently in the montane, where there is more housing development, than in the subalpine and alpine (Figure 20). The continual increase for black-capped chickadee may also be related to more dwellings.

Land use changes in the count area may also have contributed to the decline of brown-headed cowbirds. In 1982 close to 35% of National Forest land in the count area contained an active cattle-grazing allotment (Boulder District, Roosevelt National Forest, unpublished data). By 2001, there were no active allotments.

It was just a coincidence, but on the day that I ran the statistical analysis and first saw the positive correlation between temperature and birds for the Indian Peaks Bird Count, I had been rereading *The Archaeology of Colorado* (Cassells 1997) and the chapter on the “Early Archaic and the Altithermal Refugium." The premise is that during a period 4,500 to 7,000 years before present the climate was warmer and drier than most of the past 10,000 years, resulting in greater use, based on archaeological evidence, by prehistoric people of higher elevation sites and less use of the plains. It is theorized that if people were there, the animal and plant food resources must have been sufficient in the mountains during this warmer and drier period.

Avian refugium? I doubt we can go that far. But the evidence suggests that warmer temperatures and less precipitation may not be limiting factors for most avian species of montane, subalpine, and alpine habitat as they may be for birds of lower elevations in Colorado. In fact, these might be the good times. The next ice age will possibly present more of a problem for many high elevation birds.

Acknowledgments

Two hundred and ninety-one participants have taken part during the 20 years. They have been the heart and "sole" of the counts. The following individuals have participated in the count for eight or more years (**bold** = participant for 15+ years): Linda Andes-Georges, Bev Baker, **Barbara & Earl Bolton**, **Alex Brown**, **Diane Brown**, George Coffee, Jack & Tressa Coss, Don & Marty Dick, **Lee & Virginia Evans**, **Mike Figgs**, Fern Ford, **Dave Hallock**, Paula Hansley, Elaine Hill, Lynn Hoffmann, **Jim Holitza**, Jody Hovorka, **Steve Jones**, **Bill Kaempfer**, Joe Krieg, Dawn Kummli, **Nan Lederer**, Cherie Long, **Merle & Sally Miller**, Paul Mintier, Naseem Munshi, **Carol Newman-Holitza**, Elm Sturkol, Michael Tupper, and **Tom VanZandt**.

A special thanks goes to Bill Kaempfer who has helped with compilation. Dr. Carl Bock and Stephen R. Jones reviewed and provided constructive comments on the paper.

Logistical support and weather data were provided by the NSF supported Niwot Ridge Long-Term Ecological Research Project and the University of Colorado Mountain Research Station. Todd Ackerman and Mark Losleben of the Mountain Research Station helped with obtaining weather information.

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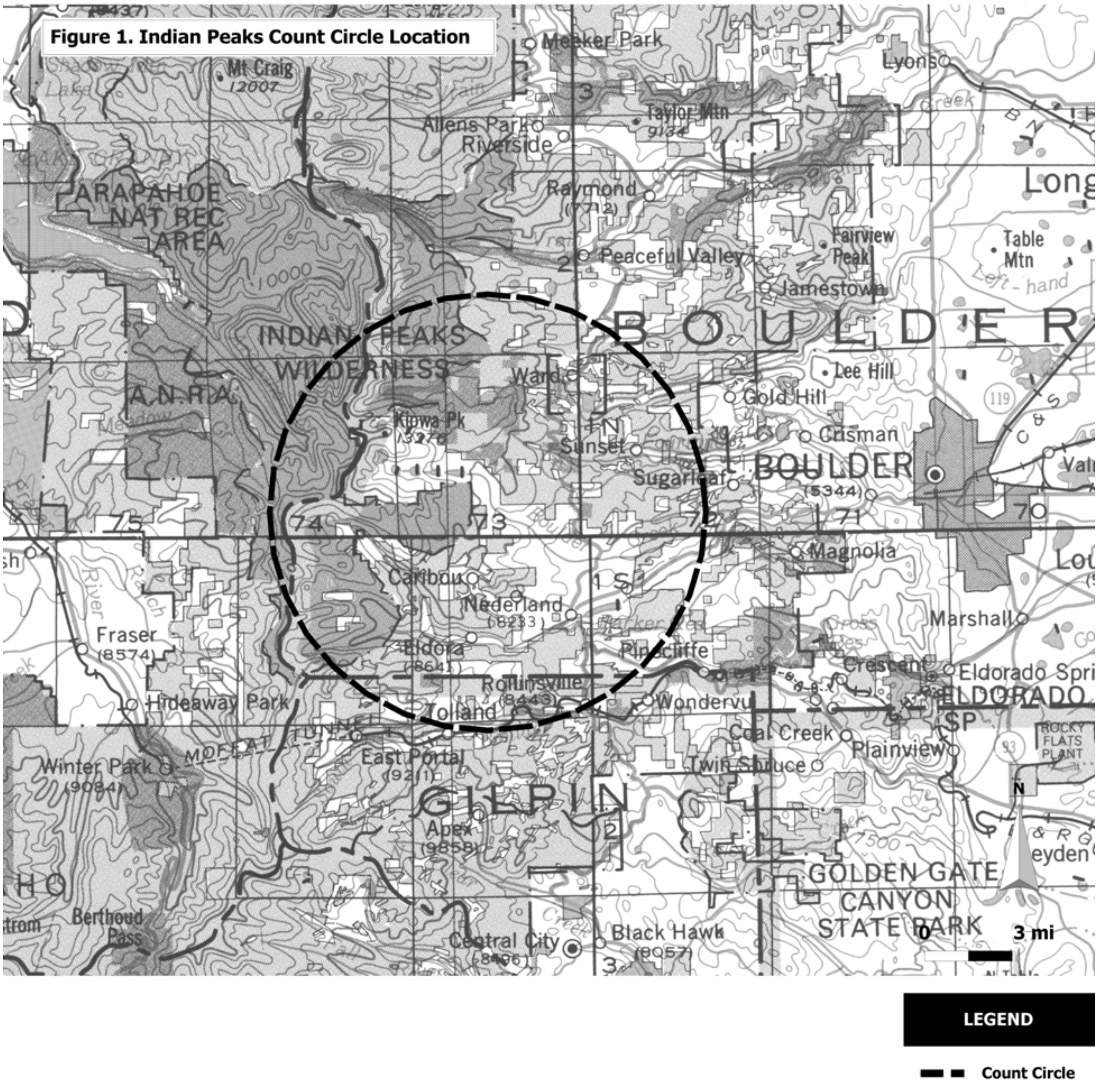

Figure 1. Indian Peaks Count Circle Location

Figure 2. Average Annual Temperature (°F) and Trend Line, 1982-2001. Data from C-1 station at University of Colorado Mountain Research Station (10,000' elevation).

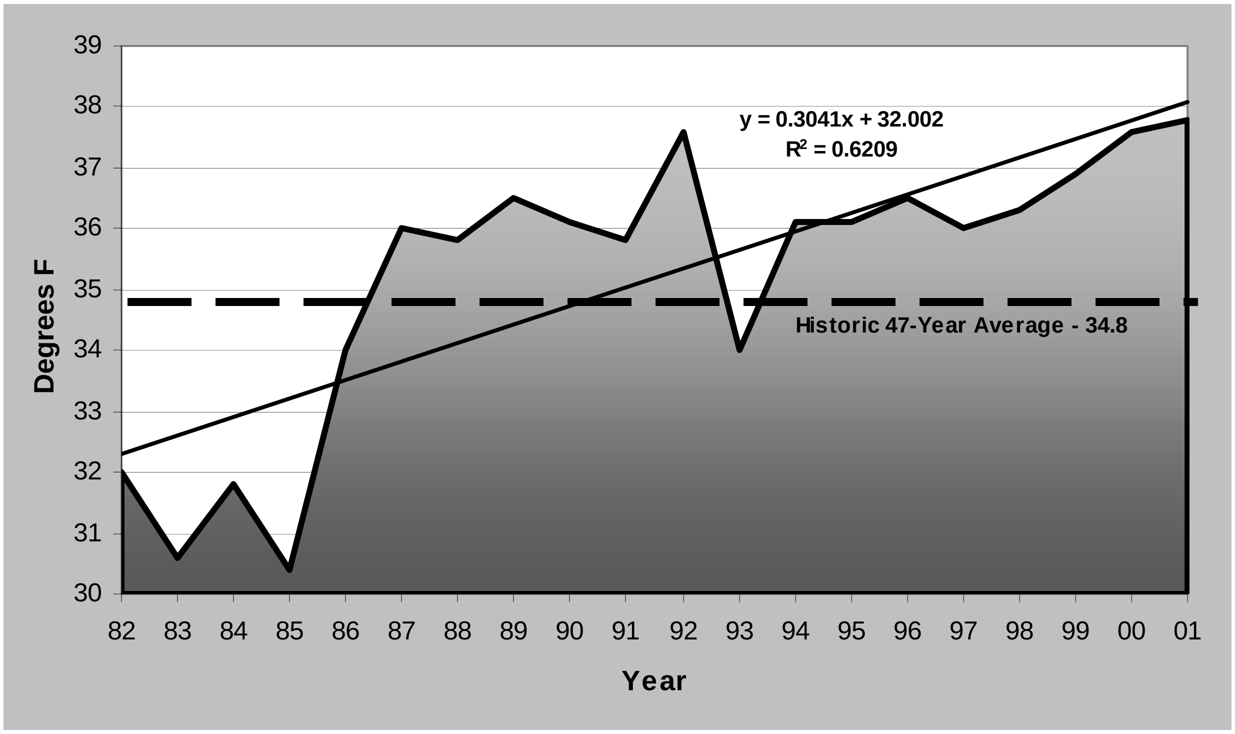

Figure 3. Average Annual Precipitation (inches) and Trend Line, 1982-2001. Data from C-1 station at University of Colorado Mountain Research Station (10,000' elevation).

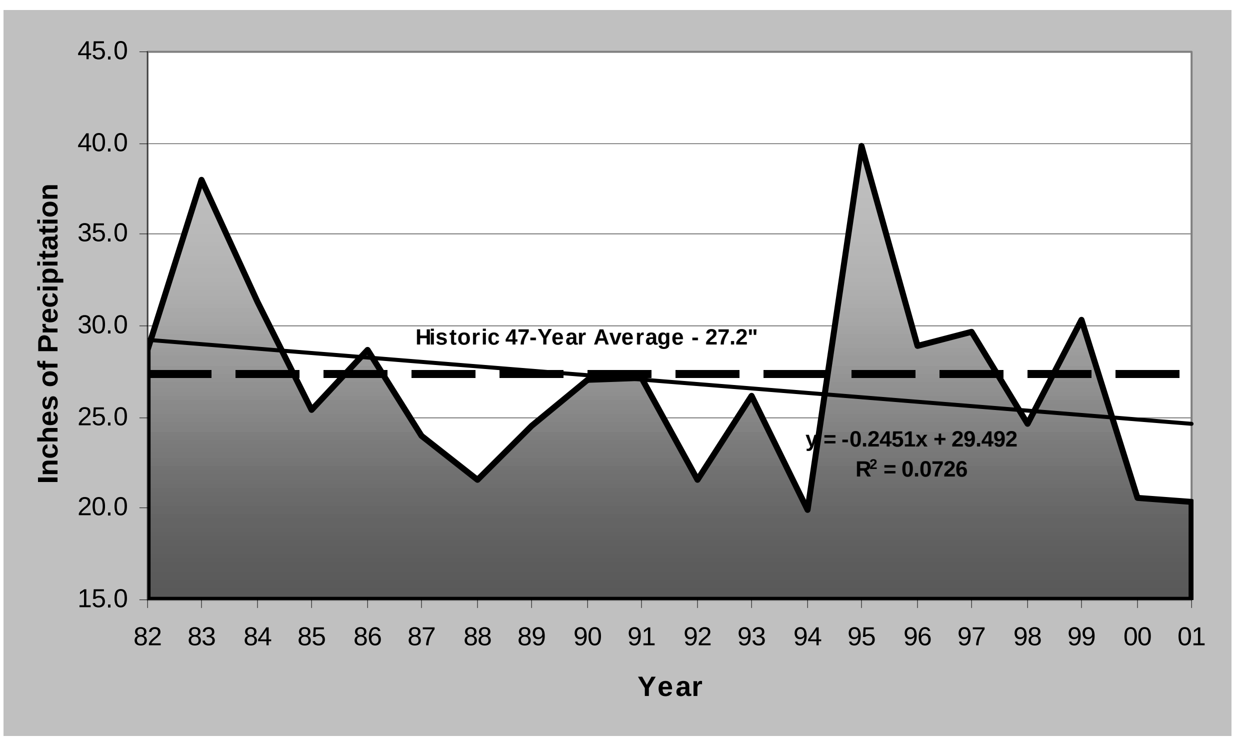

Figure 4. Resident and Migratory Bird Numbers, All Seasons, 20-Year Averages.

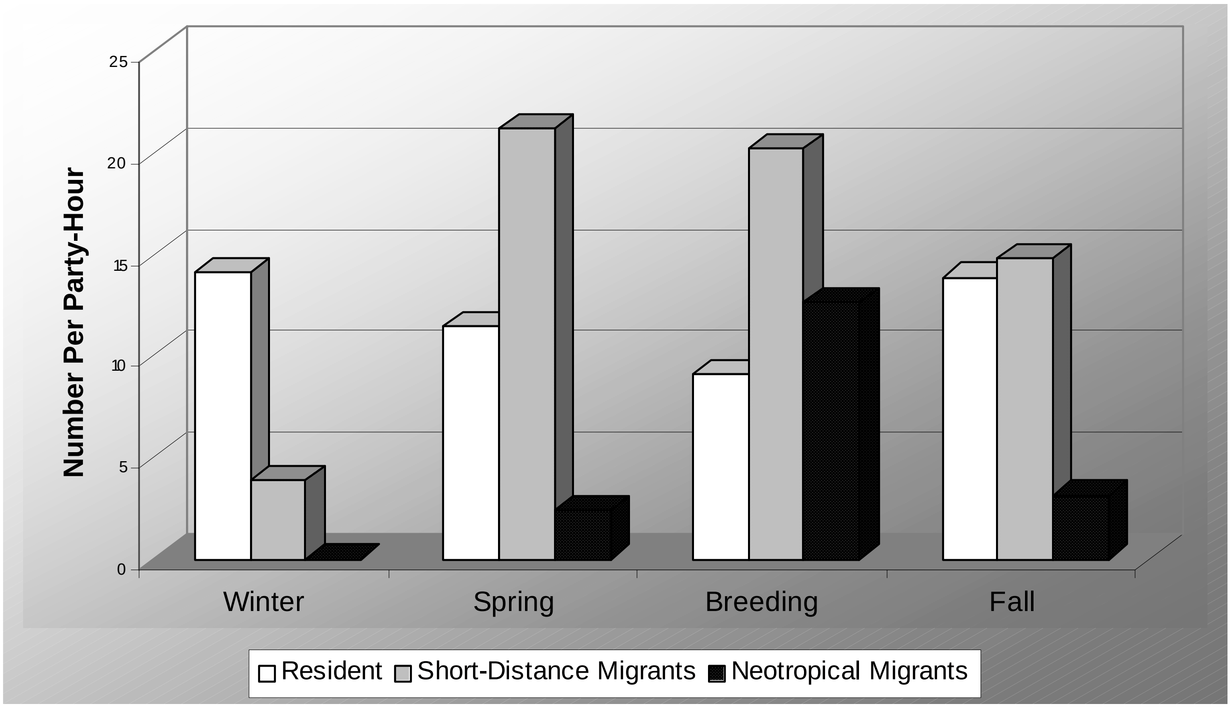

Figure 5. Winter Count Totals and Trend Lines, 1982-2001.

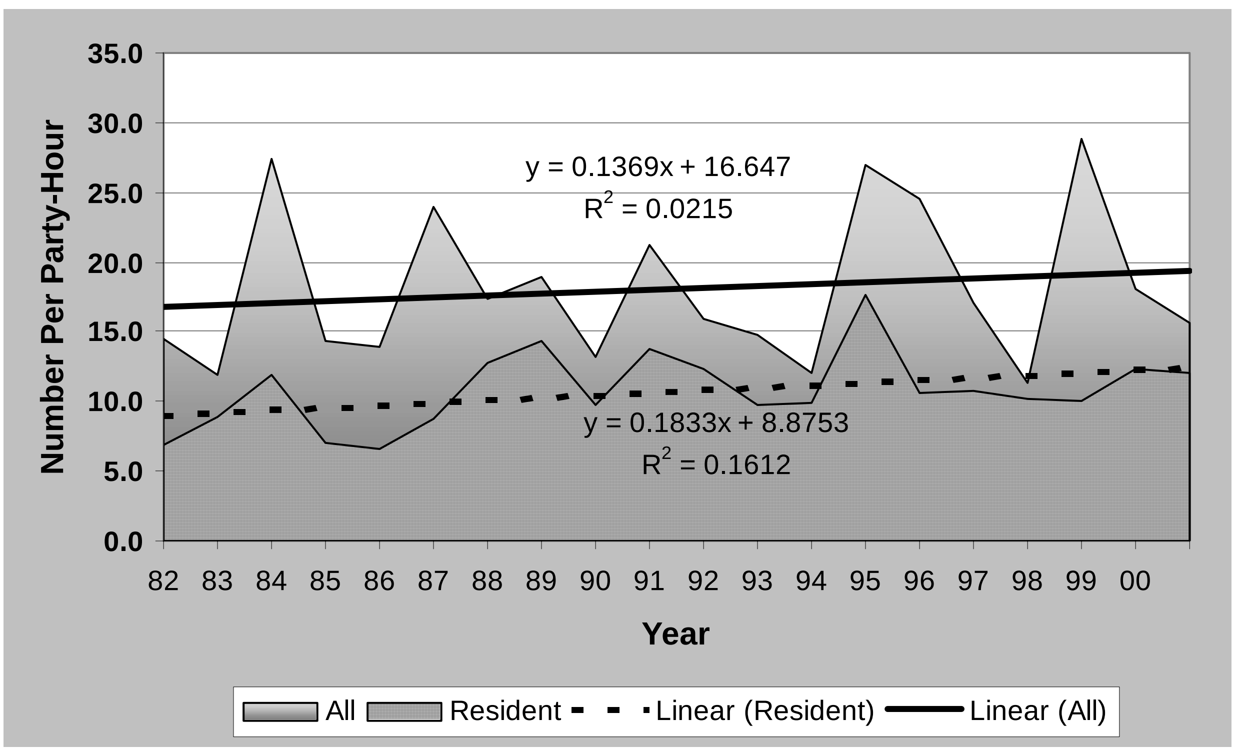

Figure 6. **Spring Count Totals and Trend Line, 1982-2001.**

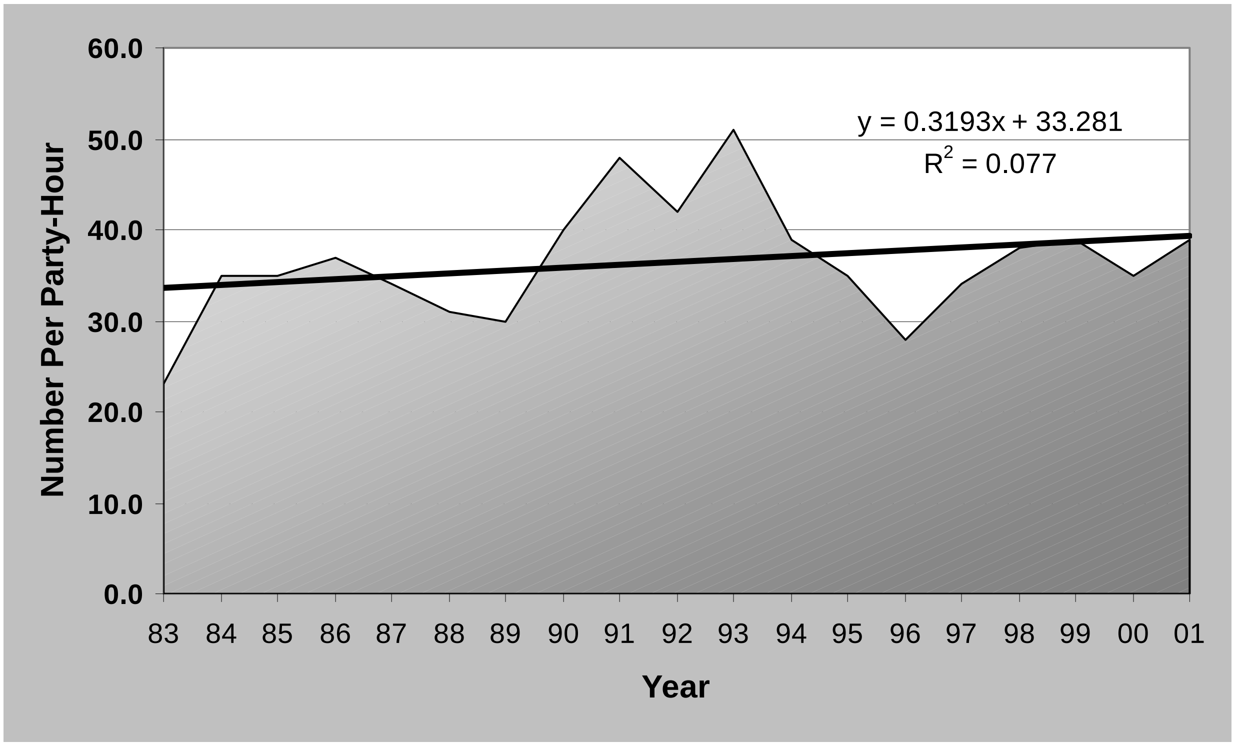

Figure 7. **Breeding Count Totals and Trend Line, 1982-2001.**

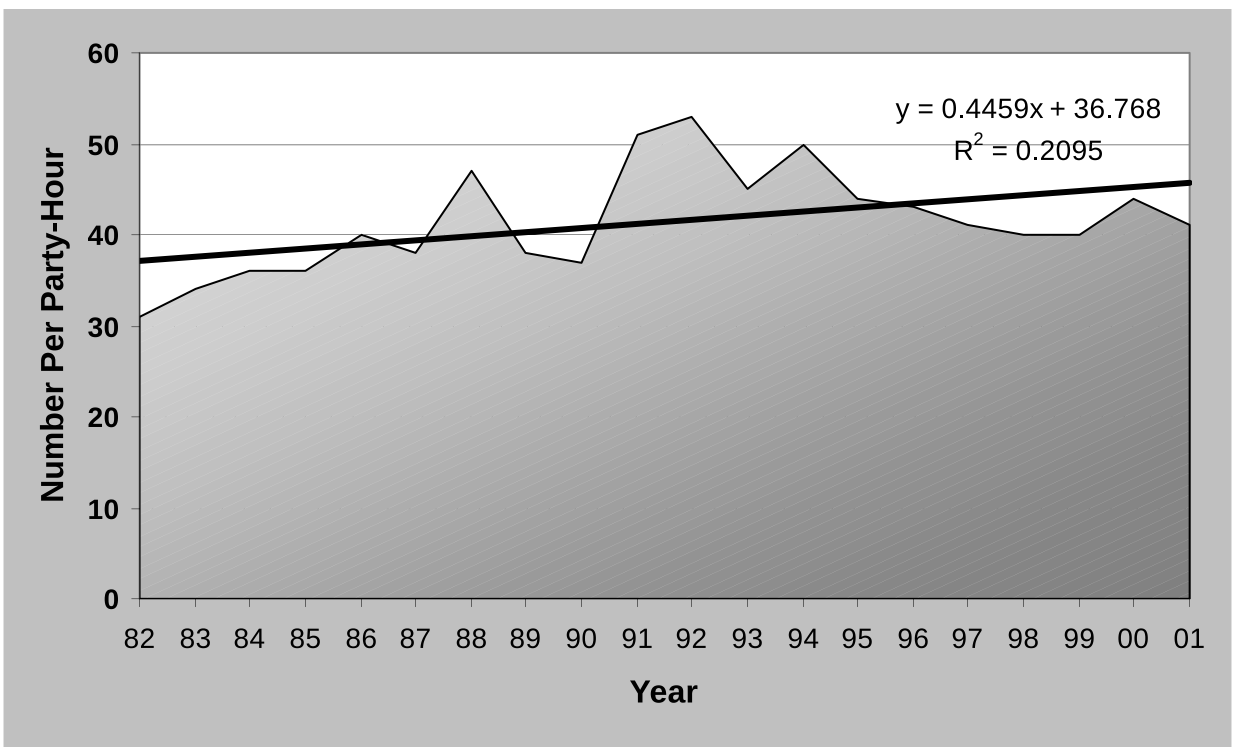

Figure 8. Fall Count Totals and Trend Line, 1982-2001.

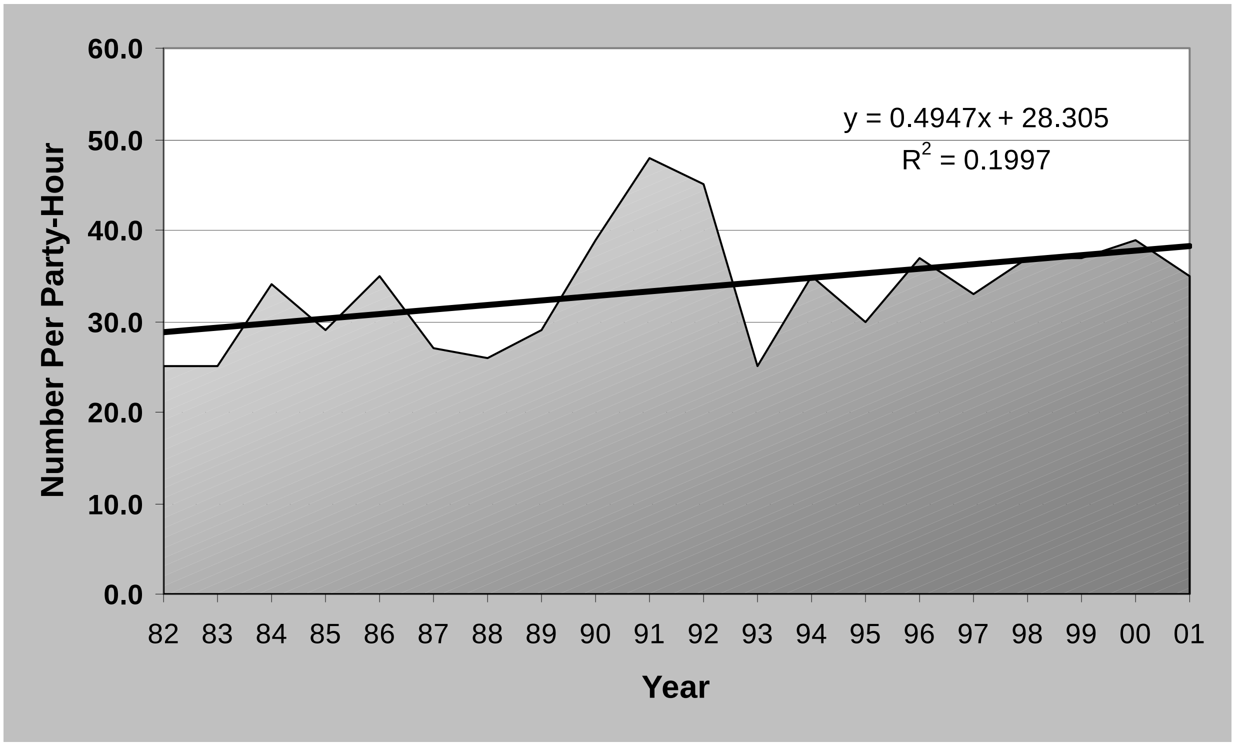

Figure 9. Total Numbers, 5-Year Averages, All Seasons, 1982-2001.

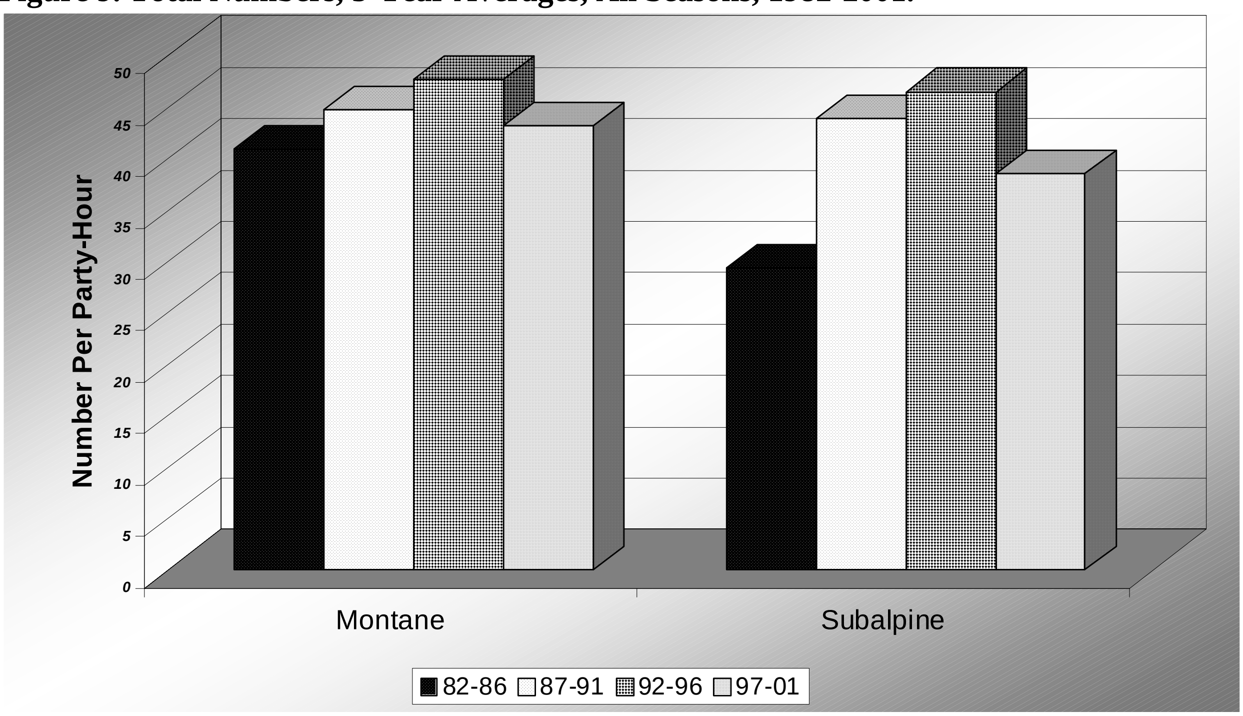

Figure 10. Number of Bohemian Waxwings on Winter Counts, 1982-2001.

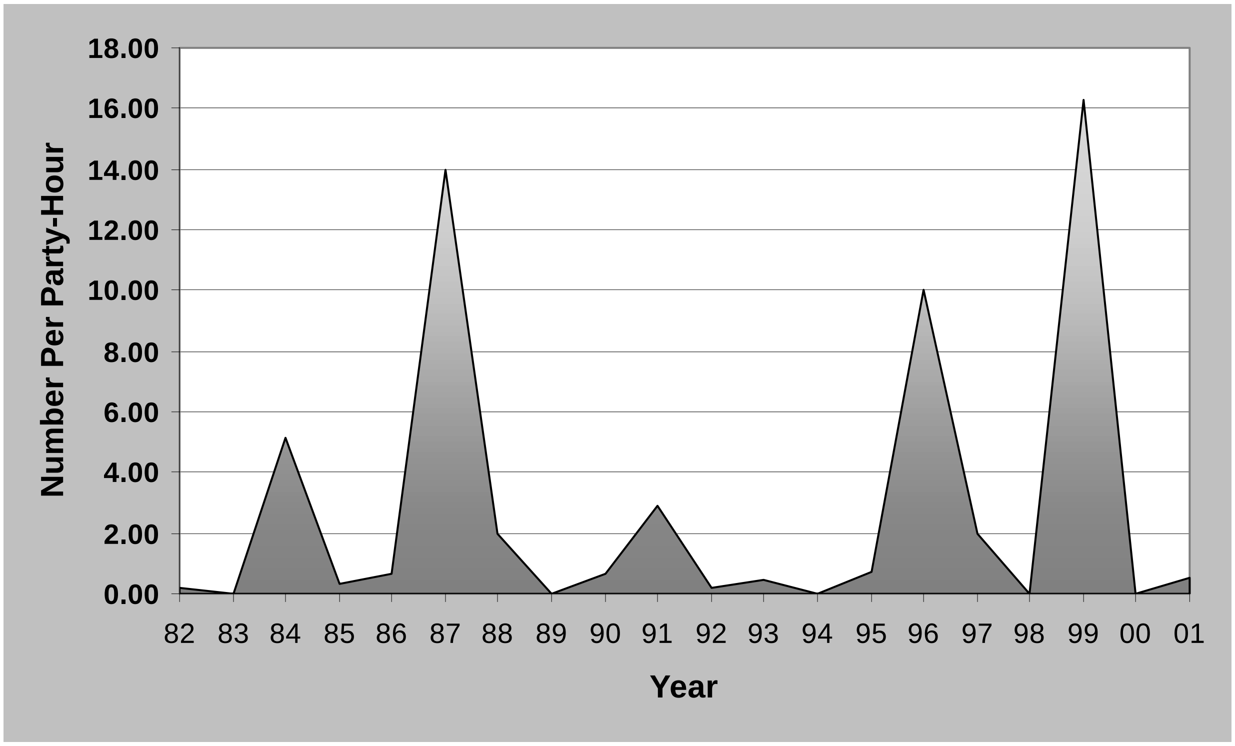

Figure 11. Number of Selected Tree-Cone Seed-Eaters on Winter Counts, 1982-2001. (Red-breasted Nuthatch, Pine Grosbeak, Red Crossbill and White-Winged Crossbill)

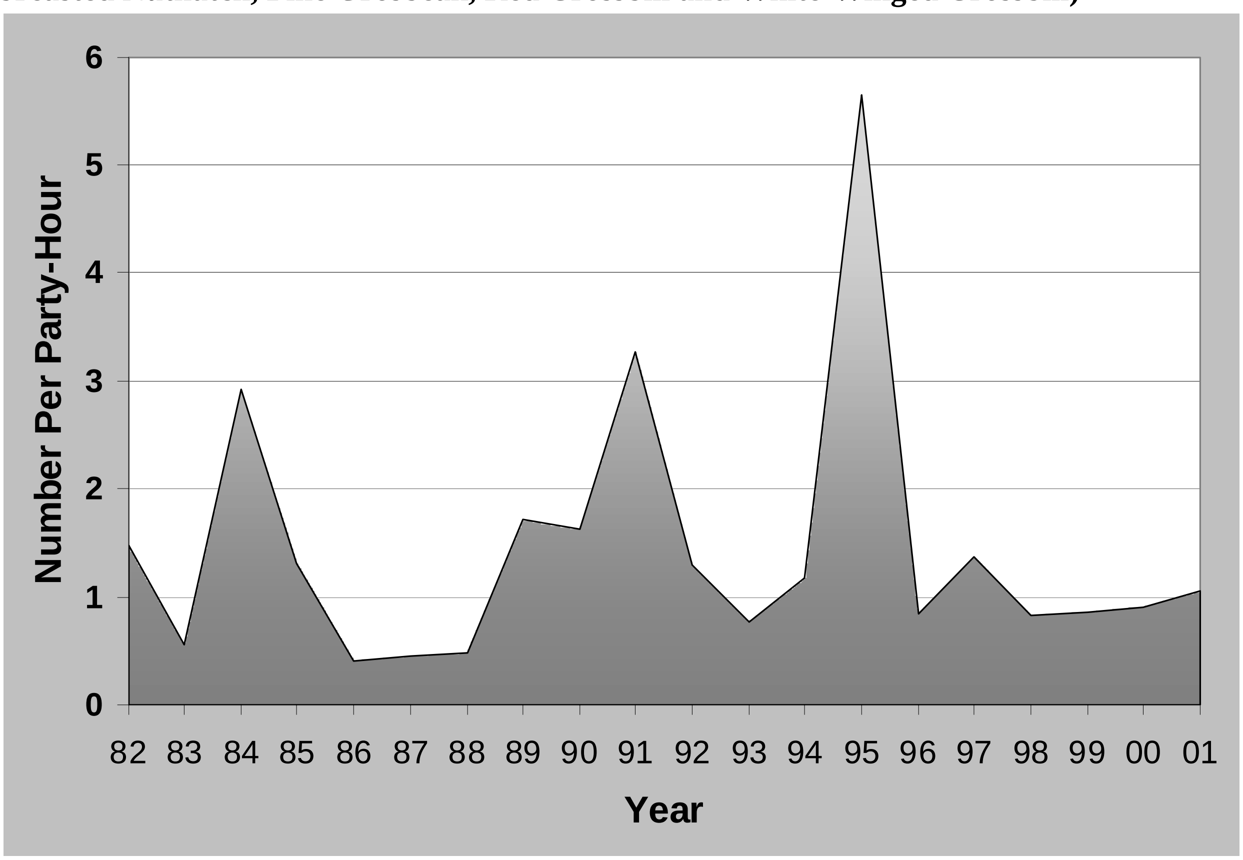

Figure 12. Number of Black-capped Chickadees, All Seasons, 1982-2001.

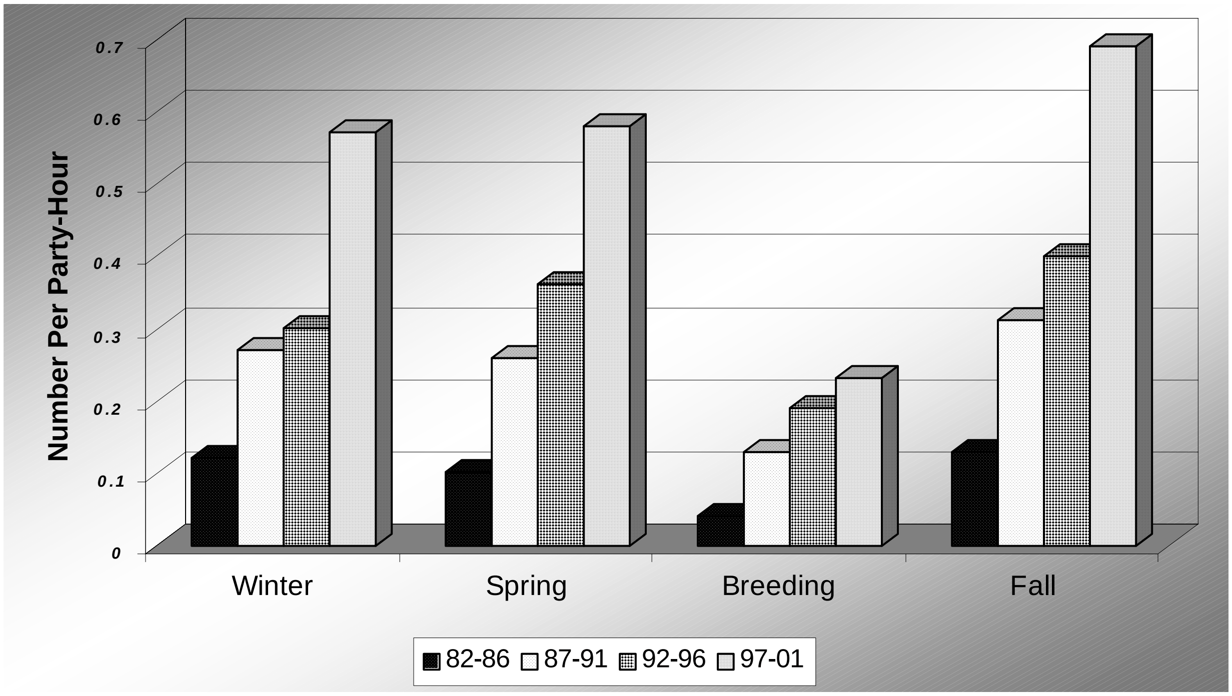

Figure 13. Number of American Crows, All Seasons, 1982-2001.

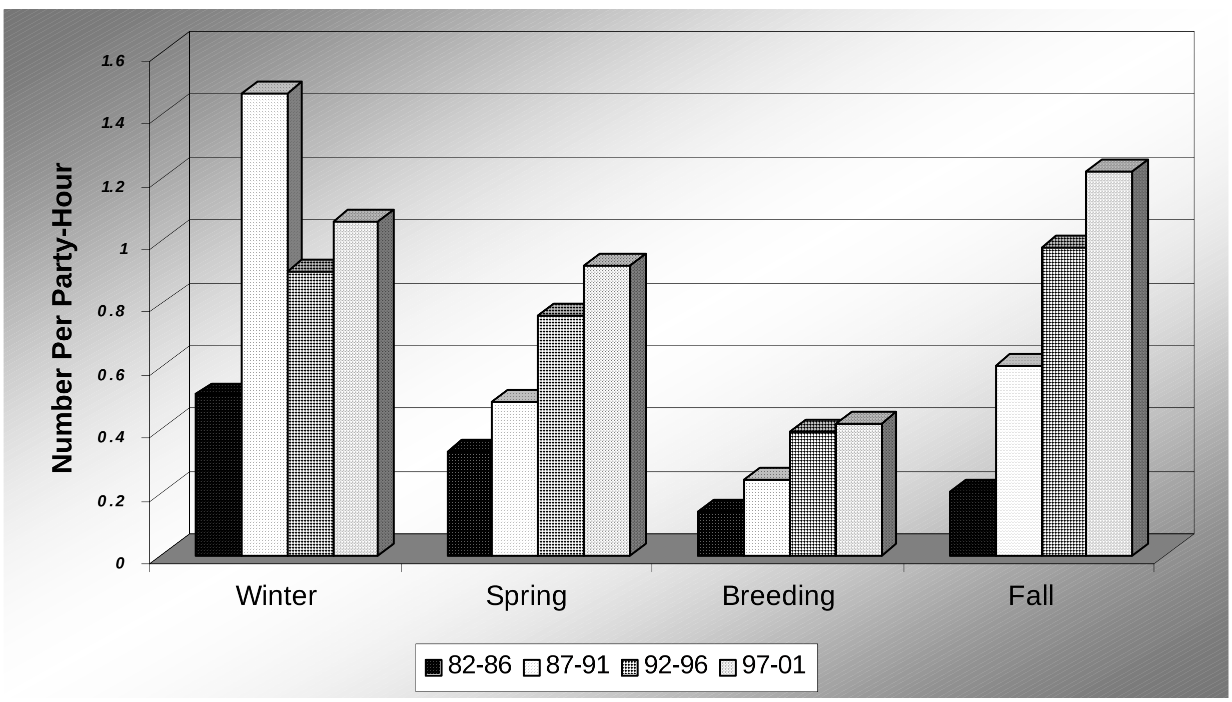

Figure 14. Number of Ruby-crowned Kinglets, Spring, Breeding and Fall Counts, 1982-2001.

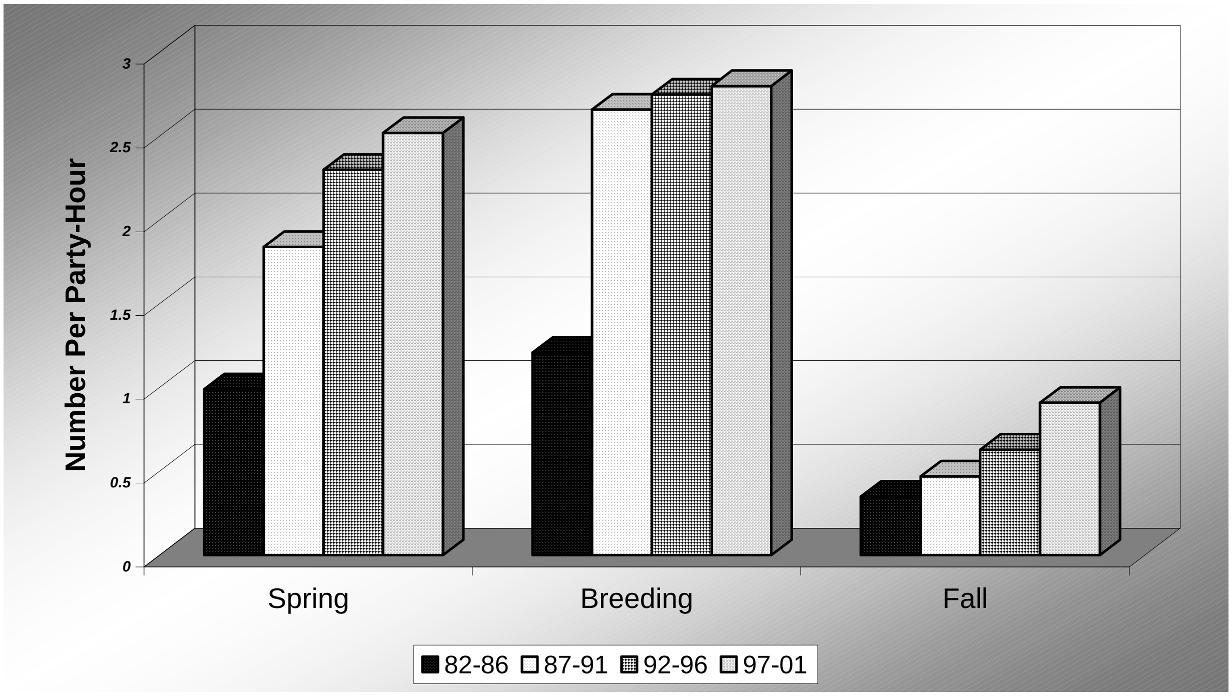

Figure 15. Number of Yellow Warblers and Black-headed Grosbeaks, Breeding Count, 1982-2001.

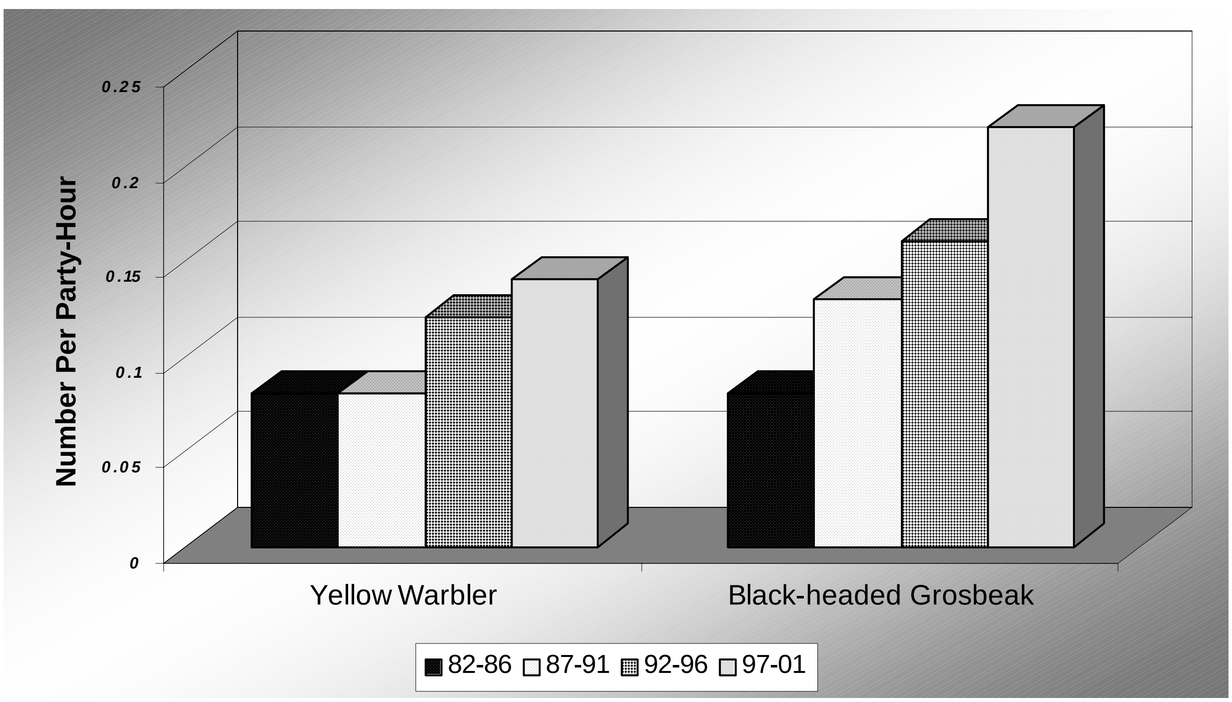

Figure 16. Number of Corvids, All Seasons, 1982-2001.

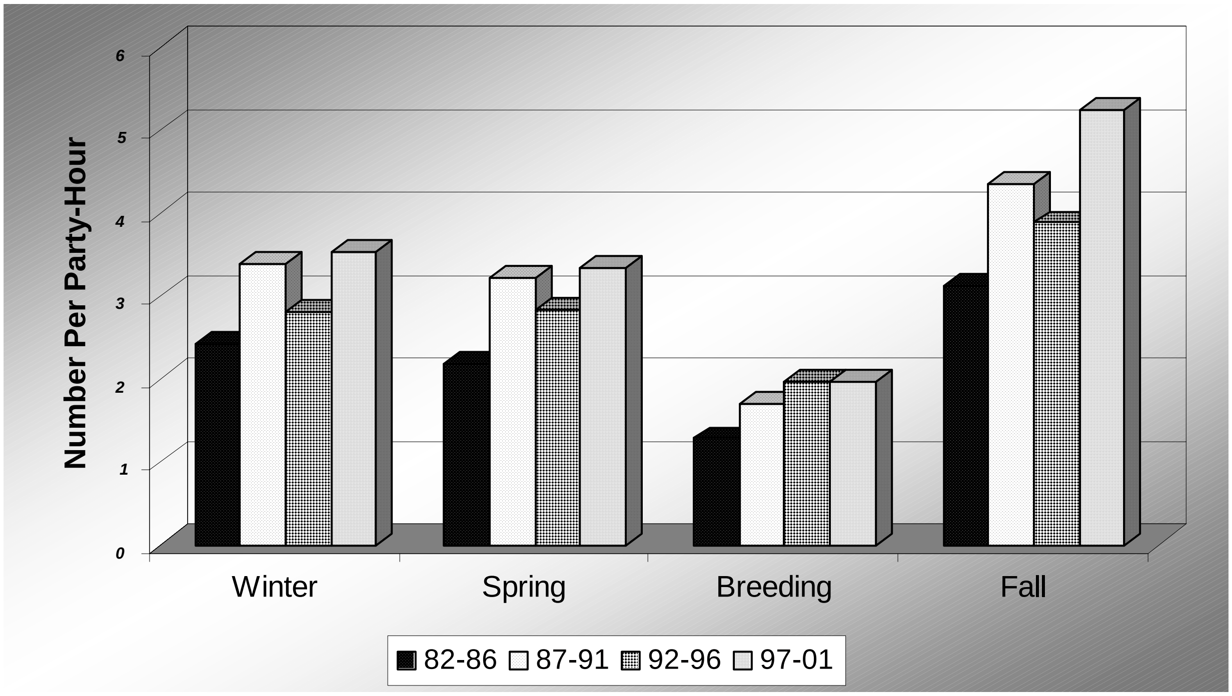

Figure 17. Number of Evening Grosbeaks, All Seasons, 1982-2001.

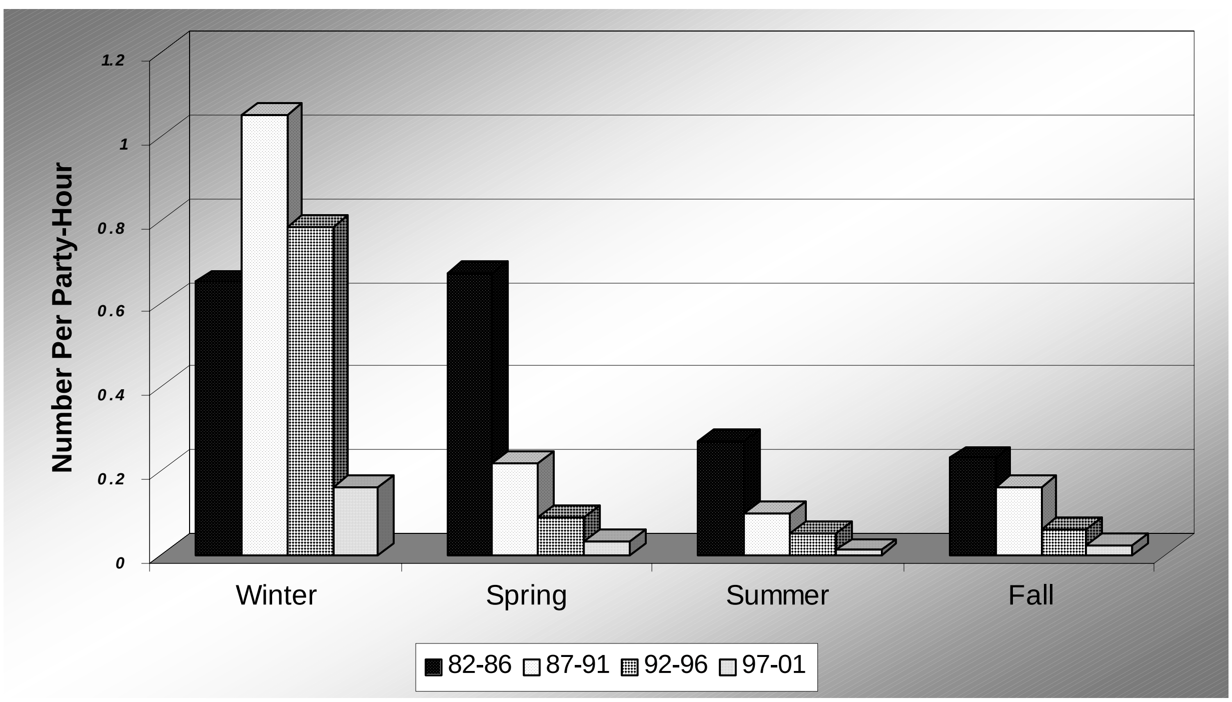

Figure 18. Number of Green-winged Teals, Spotted Sandpipers, Violet-green Swallows, Western Tanagers, Brown-headed Cowbirds, and Brown-capped Rosy-Finches, Breeding Season, 1982-2001.

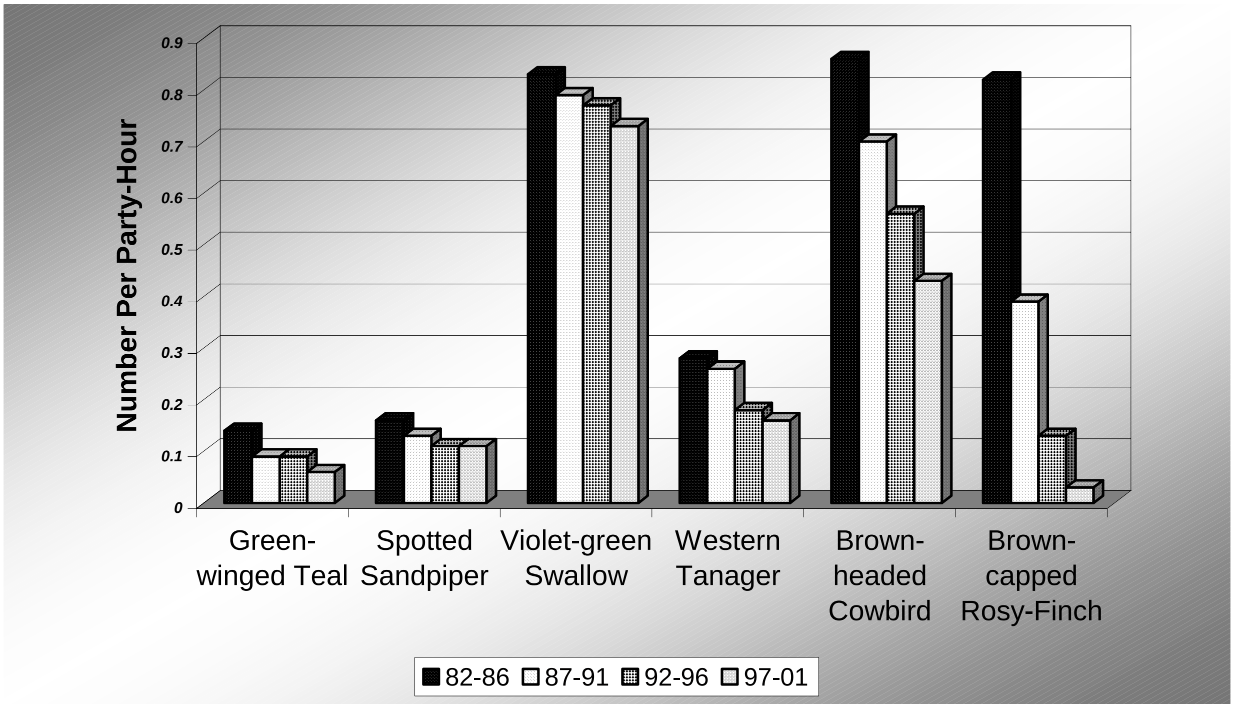

Figure 19. Number of Black-capped Chickadees and Rock Wrens in Subalpine/Alpine Count Areas, Breeding Season, 1982-2001.

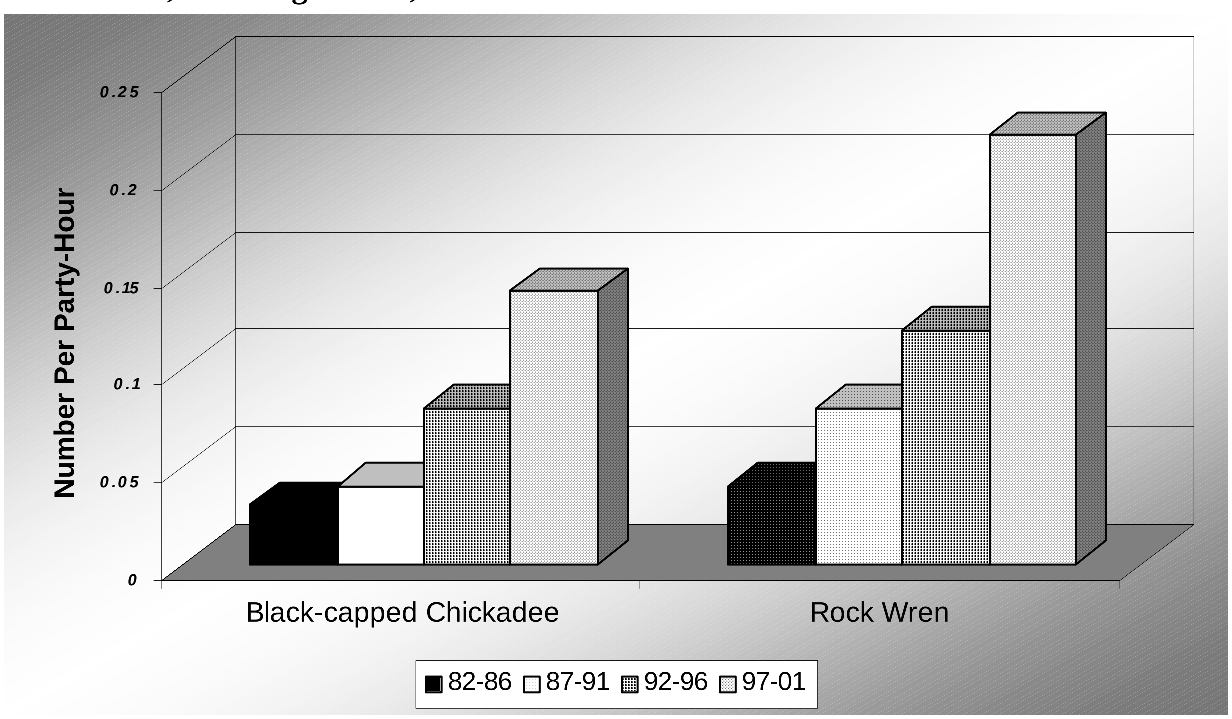

Figure 20. Number of Corvids, Montane and Subalpine/Alpine Count Areas, Breeding Season, 1982-2001.