

**Breeding Bird Monitoring Point-count Transects at Craters of the Moon National Monument and Preserve 2012**



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## Executive Summary

We conducted bird surveys on 10 point count transects during June of 2012 to continue breeding season bird monitoring routes in Craters of the Moon Monument and the Preserve (CRMO). We detected a total of 2084 individuals of 81 species on 176 point counts. The 10 most numerous bird species (*actually 11 because of a tie for 10<sup>th</sup>*) were Brewer's Sparrow (n=380), Rock Wren (221), Western Meadowlark (186), Spotted Towhee (135), Green-tailed Towhee (89), Mourning Dove (78), Sage Thrasher (62), Western Tanager (57), Brown-headed Cowbird (55), Vesper Sparrow (53), and Violet-green Swallow (53). Only Brewer's Sparrow, Rock Wren, and Mourning Dove were detected on all ten transects. Several other widespread species were detected on seven or more transects, including Northern Flicker, Say's Phoebe, Common Raven, Western Tanager, Western Meadowlark, and Brown-headed Cowbird.



A view south across the northern end of Craters of the Moon National Monument – *photo by Jay Carlisle*

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## Introduction and Methods

Ten bird survey routes were surveyed during June of 2012. Methods were based on the North American Breeding Bird Survey and modified to be usable as trail-based survey instead of a road-based survey. The methods used are described in the document Standard Operating Procedures for Breeding Season Bird Surveys at Craters of the Moon National Monument and Preserve. The Standard Operating Procedures also contains descriptions and maps of the individual survey routes. Most routes have been surveyed every year since 1997 but four survey routes were initiated in 2001 or 2002; these include Goodale's Cutoff, Goodale's Cutoff 2, Sunset Flow, and Wood Road Kipuka.

## Results

In 2012 an annual total of 71,370 meters were surveyed, consisting of 176 survey points (Table 1). The total number of individual birds detected was 2084 of 81 species. The greatest number of birds detected (n=383) were on Goodale's Cutoff 1 and the fewest (75) on the Caves Trails (Table 1). The mean number of birds per point on different transects ranged from 5.7 to 15.3. The number of species recorded per transect ranged from 17 on the Carey Kipuka, Caves Trail, and Sunset Flow to 42 on Goodale's Cutoff 1. The mean number of species per point ranged from 3.3 to 10.5 with an average for all sites of 6.6.

As in past years, the Brewer's Sparrow was most abundant species with 380 individuals recorded in 2012, accounting for 18.23% of all individual birds recorded (Table 2, Appendix 1). The next most abundant species was the Rock Wren (n=221), accounting for 10.6% of birds detected. We detected at least 25 individuals of 20 different species (Table 2, Appendix 1). The most widespread species were Brewer's Sparrows, Rock Wrens, and Mourning Doves (recorded on all 10 transects); Western Tanager was observed on nine transects and Say's Phoebe, Common Raven, Western Meadowlark, and Brown-headed Cowbirds were recorded on eight transects (Table 2). Fourteen species were recorded on 25 or more points (Table 2).

As in past years, the aspen groves and riparian areas around Little Cottonwood Creek and Goodale's Cutoff not only had the highest number of species but also had several species that were not found elsewhere in the monument, including White-crowned Sparrow, Song Sparrow, and several warblers.

We also detected several rare species that deserve mention. Mike Munts first detected Northern Mockingbirds along the Wood Road Kipuka route in 2010, we found four singing male mockingbirds there in 2011, and a single singing bird in June 2012. Also on the Wood Road Kipuka trail, we detected a single singing male Ash-throated Flycatcher in 2012 – a species common in juniper woodlands further south in the Great Basin. We also detected a singing Black-throated Gray Warbler in 2012 along the Wilderness Trail; in 2011 we had detected one along the Wood Road Kipuka. During the Tree Molds transect, we detected a group of 7 immature-plumaged (*one-year-old or fledged earlier in the spring from somewhere further south?*) Pinyon Jays that flew in vocalizing from the S/SW and continued N along the edge of the trees. Also on Tree Molds was a singing Blue Grosbeak.

**Table 1.** Craters of the Moon National Monument's 2012 Breeding Season Survey route summary.

| ROUTE                 | LENGTH<br>(m) | # of<br>stops | habitat<br>types                | Total # of<br>birds<br>(N) | average<br>birds<br>per<br>point | # of species<br>on transect | avg. #<br>species/<br>point |
|-----------------------|---------------|---------------|---------------------------------|----------------------------|----------------------------------|-----------------------------|-----------------------------|
| <b>Walking Routes</b> |               |               |                                 |                            |                                  |                             |                             |
| Carey Kipuka          | 4250          | 18            | 2,8,9,11,31                     | 102                        | 5.7                              | 17                          | 3.3                         |
| Caves Trail           | 1000          | 5             | 2,21                            | 75                         | 15                               | 17                          | 6.4                         |
| Little Cottonwood     | 3000          | 13            | 4,5,7,18,20,24,25,26,29         | 199                        | 15.3                             | 36                          | 10.5                        |
| Sunset Flow           | 5750          | 25            | 4,29,34                         | 226                        | 9                                | 17                          | 4.1                         |
| Tree Molds            | 2250          | 10            | 2,16,22                         | 121                        | 12.1                             | 24                          | 7.5                         |
| Wood Road             | 3500          | 15            | 2,34,36,41                      | 188                        | 12.5                             | 25                          | 8.8                         |
| Wilderness Trail      | 6000          | 25            | 1,2,6,7,16, 21,22               | 275                        | 11                               | 35                          | 6.5                         |
| <b>Driving Routes</b> |               |               |                                 |                            |                                  |                             |                             |
| Goodale's Cutoff      | 19310         | 25            | 3,4,5,20,25,<br>26,33,34,35, 36 | 383                        | 15.3                             | 42                          | 8.5                         |
| Goodale's Cutoff 2    | 19310         | 25            | 2,3,25,29,<br>33,34,36,37       | 364                        | 14.6                             | 28                          | 6.6                         |
| Loop Drive            | 7000          | 15            | 1,2,4,16,21, 22,27              | 151                        | 10.1                             | 27                          | 6.1                         |
| <b>TOTALS</b>         | <b>71370</b>  | <b>176</b>    |                                 | <b>2084</b>                | <b>11.8</b>                      | <b>81</b>                   | <b>6.6</b>                  |

**Habitat Codes:**

- |   |   |
|---|---|
| 1 = Cinder Gardens                                      | 22 = Limber Pine/Bitterbrush (high total cover)         |
| 2 = Low Vegetation Density Lava Flows                   | 23 = Limber Pine/Bitterbrush (high density Limber Pine) |
| 3 = Medium Vegetation Density Lava Flows                | 24 = Douglas-fir/Mountain Snowberry                     |
| 4 = Mountain Big Sagebrush/Bluebunch Wheatgrass         | 25 = Upland Quaking Aspen                               |
| 5 = Mountain Big Sagebrush/Sandberg Bluegrass           | 26 = Riparian   |
| 6 = Mountain Big Sagebrush/Needlegrass                  | 27 = Developed Areas                                    |
| 7 = Mountain Big Sagebrush/Needle-and-thread/Cheatgrass | 29 = Rock outcrops                                      |
| 8 = Mountain Big Sagebrush/Idaho Fescue                 | 31 = Isolated trees                                     |
| 9 = Big Sagebrush/Cheatgrass                            | 33 = Misc. Wetlands                                     |
| 11 = Three-tip Sagebrush/Idaho Fescue                   | 34 = Misc. Big Sagebrush                                |
| 18 = Bluebunch Wheatgrass/Idaho Fescue                  | 41 = Misc. juniper woodland                             |
| 20 = Great Basin Wildrye                                |   |
| 21 = Limber Pine/Bitterbrush (low total cover)          |   |

**Table 2.** Species recorded during 2012 Breeding Season Surveys.

| Species   | # of birds | % of total | Routes detected on       | # of stops | % of stops |
|---|------------|------------|--------------------------|------------|------------|
| Mallard   | 4          | 0.19       | GC2                      | 1          | 0.6        |
| Turkey Vulture                                  | 1          | 0.05       | SF                       | 1          | 0.6        |
| Swainson's Hawk                                 | 2          | 0.10       | WR                       | 1          | 0.6        |
| Red-tailed Hawk                                 | 7          | 0.34       | CA,GC2,LC,LP,WR          | 7          | 4.1        |
| Bald Eagle                                      | 1          | 0.05       | GC2                      | 1          | 0.6        |
| Golden Eagle <sup>P,FWS</sup>                   | 3          | 0.14       | GC,WT                    | 3          | 1.7        |
| American Kestrel                                | 8          | 0.38       | GC,LP,TM,WT              | 7          | 4.1        |
| Killdeer <sup>P</sup>                           | 3          | 0.14       | GC,GC2                   | 2          | 1.2        |
| Rock Pigeon                                     | 10         | 0.04       | CA                       | 1          | 0.6        |
| Mourning Dove                                   | 78         | 3.74       | <b>all</b>               | 52         | 30.1       |
| Common Nighthawk                                | 4          | 0.19       | CA,CK,GC,GC2,WT          | 2          | 1.2        |
| Broad-tailed Hummingbird                        | 2          | 0.10       | GC,LC                    | 2          | 1.2        |
| Red-naped Sapsucker <sup>P,5</sup>              | 2          | 0.10       | GC                       | 2          | 1.2        |
| Lewis' Woodpecker<br><sub>P,FWS,ID,3</sub>      | 3          | 0.14       | GC                       | 2          | 1.2        |
| Hairy Woodpecker                                | 1          | 0.05       | GC                       | 1          | 0.6        |
| Northern Flicker                                | 30         | 1.44       | CA,CK,GC,LP,TM,WR,WT     | 25         | 14.5       |
| Western Kingbird <sup>P</sup>                   | 7          | 0.34       | GC,WR                    | 6          | 3.5        |
| Cordilleran Flycatcher                          | 1          | 0.05       | LC                       | 1          | 0.6        |
| Gray Flycatcher <sup>P</sup>                    | 16         | 0.77       | LP,TM,WT                 | 13         | 7.5        |
| Willow Flycatcher                               | 2          | 0.10       | GC,LC                    | 2          | 1.2        |
| Hammond's Flycatcher <sup>3</sup>               | 1          | 0.05       | TM                       | 1          | 0.6        |
| Dusky Flycatcher <sup>P</sup>                   | 34         | 1.63       | GC,GC2,LC,LP,WT          | 24         | 13.9       |
| Unidentified <i>Empidonax</i>                   | 1          | 0.05       | GC2                      | 1          | 0.6        |
| Olive-sided Flycatcher<br><sub>P,FWS,ID,3</sub> | 2          | 0.10       | GC,LP                    | 2          | 1.2        |
| Ash-throated Flycatcher                         | 1          | 0.05       | WR                       | 1          | 0.6        |
| Western Wood-Pewee                              | 5          | 0.24       | LC,TM,WT                 | 4          | 2.3        |
| Say's Phoebe                                    | 19         | 0.91       | CA,CK,GC2,LP,SF,TM,WR,WT | 17         | 9.8        |
| Loggerhead Shrike <sup>P,FWS,ID,3</sup>         | 6          | 0.29       | CK,WT,WR                 | 5          | 2.9        |
| Warbling Vireo <sup>P</sup>                     | 34         | 1.63       | GC,GC2,LC,LP,WT          | 23         | 13.3       |
| Cassin's Vireo                                  | 1          | 0.05       | LC                       | 1          | 0.6        |
| Clark's Nutcracker <sup>P</sup>                 | 50         | 2.40       | CA,GC,LC,LP,TM,WT        | 28         | 16.2       |
| <b>Pinyon Jay*</b> <sup>P,FWS,ID,5</sup>        | 7          | 0.34       | TM                       | 1          | 0.6        |
| Black-billed Magpie <sup>P</sup>                | 12         | 0.58       | GC,GC2,LC,WR             | 10         | 5.8        |
| Common Raven                                    | 46         | 2.21       | CA,GC,GC2,LP,SF,TM,WR,WT | 34         | 19.7       |

| Species                                | # of birds | % of total | Routes detected on          | # of stops | % of stops |
|--|------------|------------|-----------------------------|------------|------------|
| American Crow                          | 6          | 0.29       | GC,LC                       | 5          | 2.9        |
| Horned Lark                            | 8          | 0.38       | CK,GC,SF                    | 7          | 4.1        |
| Violet-green Swallow                   | 53         | 2.54       | CA,CK,GC2,LP,TM,WT          | 16         | 9.3        |
| Mountain Chickadee <sup>P</sup>        | 5          | 0.24       | LP,TM,WT                    | 4          | 2.3        |
| Red-breasted Nuthatch <sup>P</sup>     | 3          | 0.14       | LP,WT                       | 3          | 1.7        |
| Rock Wren <sup>P</sup>                 | 221        | 10.6       | <b>all</b>                  | 117        | 67.6       |
| House Wren                             | 22         | 1.06       | GC,LC                       | 15         | 8.7        |
| Ruby-crowned Kinglet <sup>P</sup>      | 1          | 0.05       | LC                          | 1          | 0.6        |
| Blue-gray Gnatcatcher <sup>P</sup>     | 29         | 1.39       | LP,SF,TM,WR,WT              | 18         | 10.4       |
| Mountain Bluebird <sup>P</sup>         | 21         | 1.01       | CA,GC,LP,TM,WT              | 15         | 8.7        |
| American Robin                         | 9          | 0.43       | CK,GC,LC,LP,WR              | 8          | 4.6        |
| European Starling                      | 3          | 0.14       | WR                          | 2          | 1.2        |
| Northern Mockingbird                   | 1          | 0.05       | WR                          | 1          | 0.6        |
| Sage Thrasher <sup>P,FWS,5</sup>       | 62         | 2.98       | GC,LC,SF,WT                 | 39         | 22.5       |
| Orange-crowned Warbler                 | 7          | 0.34       | GC,LC                       | 6          | 3.5        |
| Yellow Warbler                         | 18         | 0.86       | GC,GC2,LC                   | 12         | 6.9        |
| Yellow-rumped Warbler                  | 7          | 0.34       | LP,SF,TM,WT                 | 6          | 3.5        |
| Black-throated Gray Warbler            | 1          | 0.05       | WT                          | 1          | 0.6        |
| MacGillivray's Warbler <sup>P</sup>    | 7          | 0.34       | LC,TM                       | 7          | 4.1        |
| Wilson's Warbler                       | 4          | 0.19       | GC,LC                       | 4          | 2.3        |
| Green-tailed Towhee <sup>P,FWS,5</sup> | 89         | 4.27       | GC,GC2,LC,LP,TM,WT          | 49         | 28.3       |
| Spotted Towhee <sup>P</sup>            | 135        | 6.48       | GC,GC2,LC,SF,TM,WT          | 74         | 42.8       |
| Chipping Sparrow <sup>P</sup>          | 23         | 1.10       | CA,GC2,LC,LP,TM,WT          | 18         | 10.4       |
| Brewer's Sparrow <sup>P,FWS,ID,3</sup> | 380        | 18.23      | <b>all</b>                  | 117        | 67.6       |
| Vesper Sparrow                         | 53         | 2.54       | GC,GC2,LC,SF,WT             | 37         | 21.4       |
| Lark Sparrow <sup>P</sup>              | 29         | 1.39       | CA,CK,GC2,LP,WR             | 14         | 8.1        |
| Black-throated Sparrow                 | 6          | 0.29       | CK,GC2,WT                   | 5          | 2.9        |
| Sage Sparrow <sup>P,FWS,3</sup>        | 4          | 0.19       | SF                          | 3          | 1.7        |
| Song Sparrow                           | 14         | 0.67       | GC,LC                       | 9          | 5.2        |
| Fox Sparrow                            | 1          | 0.05       | LC                          | 1          | 0.6        |
| White-crowned Sparrow                  | 2          | 0.10       | LC                          | 2          | 1.2        |
| Unidentified sparrow                   | 1          | 0.05       | SF                          | 1          | 0.6        |
| Dark-eyed Junco                        | 5          | 0.24       | LC,WT                       | 3          | 1.7        |
| Western Tanager <sup>P</sup>           | 57         | 2.74       | CA,CK,GC,GC2,LC,LP,TM,WR,WT | 39         | 22.5       |
| Lazuli Bunting <sup>P</sup>            | 42         | 2.02       | CA,GC,GC2,LC,WR,WT          | 28         | 16.2       |
| Blue Grosbeak <sup>ID</sup>            | 1          | 0.05       | TM                          | 1          | 0.6        |

| Species                              | # of birds | % of total | Routes detected on       | # of stops | % of stops |
|--------------------------------------|------------|------------|--------------------------|------------|------------|
| Black-headed Grosbeak <sup>P</sup>   | 2          | 0.10       | GC,LC                    | 2          | 1.2        |
| Bullock's Oriole <sup>P</sup>        | 15         | 0.72       | GC,GC2,TM,WR             | 9          | 5.2        |
| Red-winged Blackbird                 | 20         | 0.96       | GC,GC2                   | 6          | 3.5        |
| Western Meadowlark <sup>P</sup>      | 186        | 8.93       | CA,CK,GC,GC2,SF,TM,WR,WT | 80         | 46.2       |
| Yellow-headed Blackbird <sup>P</sup> | 20         | 0.96       | GC2                      | 2          | 1.2        |
| Brewer's Blackbird <sup>P,5</sup>    | 29         | 1.39       | CK,GC,LP                 | 10         | 5.8        |
| Brown-headed Cowbird                 | 55         | 2.64       | CK,GC,GC2,LC,LP,SF,WT,WR | 37         | 21.4       |
| Red Crossbill                        | 3          | 0.14       | LP,WT                    | 2          | 1.2        |
| Cassin's Finch <sup>P</sup>          | 4          | 0.19       | LP,WT                    | 2          | 1.2        |
| House Finch                          | 4          | 0.19       | CA,GC,LP,WR              | 4          | 2.3        |
| Pine Siskin                          | 6          | 0.29       | LP,WR,WT                 | 6          | 3.5        |
| American Goldfinch                   | 5          | 0.24       | GC,GC2,SF,WT             | 5          | 2.9        |

Route codes: CA = Caves Trail, CK = Carey Kipuka, GC = Goodale's Cutoff, GC2 = Goodale's Cutoff 2, LC = Little Cottonwood Road, LP = Loop Road, SF = Sunset Flow, TM = Tree Molds Trail, WT = Wilderness Trail, WR = Wood Road Trail

\* had not previously been recorded during breeding season surveys.

<sup>3,4,5</sup> BLM listed species: <sup>3</sup>=Regional/State Imperiled, <sup>4</sup>=Species of Concern, <sup>5</sup>=Watchlist Species

<sup>ID</sup> Listed as a Species of Greatest Conservation Need by the state of Idaho

<sup>P</sup> Listed as Priority species in the Idaho Partners in Flight Idaho Bird Conservation Plan

<sup>FWS</sup> USFWS species listed as Birds of Conservation Concern by the US Fish and Wildlife Service



## Discussion

The total number of birds observed in 2012 was 2,084, the second highest in any year of this study (Figure 1). When only those routes that have been monitored for the entire 15 years of the program are examined, we see a general increase over time but with a dip during the early 2000s (Figure 2). Mike Munts (pers. comm.) has suggested that this may have been related to a drought period during the early 2000s. The overall number of species recorded in each year has been relatively stable since 2004 (Figure 3). For only those six routes surveyed the entire 15 years, the trend has been pretty level since 2000 but with several years with spikes in species richness (Figure 4).

The breeding season bird surveys show that CRMO provides habitat for numerous sensitive species, many of which are sagebrush reliant species. This includes the most numerous species on the monument, the Brewer's Sparrow, which is on both the Bureau of Land Management (BLM) and Idaho Department of Fish and Game (IDFG) sensitive lists (Table 2). Most sagebrush dependent species have experienced substantial declines in either part or all of their range, including the Snake River Plain; thus areas of relatively undisturbed shrub-steppe such as what occurs at CRMO are likely critical. The counts of Brewers' Sparrow peaked from 2005-10 and show a decline for 2011 and 2012 (Figure 5). Short term fluctuations like this presumably reflect changes in weather and/or climatic cycles. The major increases in Figure 5 coincide with increases in the monitoring effort in the Preserve in 2001 and 2002. The continued increases in numbers since 2004 coincide with a return to average or higher precipitation in the April to June period which has likely resulted in improved forage and cover (Mike Munts, pers. comm.).

The Loggerhead Shrike appears to have been relatively stable in the period of the monitoring but with peaks in 2003, 2006, and 2011 (Figure 6). Shrikes, however, are found in much lower numbers and to determine accurate trends for this species would require additional effort through targeted surveys and collection of productivity data. Numbers for Sage Thrasher, also a sagebrush obligate, have been a little more erratic from year to year; numbers are relatively stable over time but with peaks in 2003, 2005, and 2011-12 (Figure 7). Two other species (Green-tailed Towhee and Vesper Sparrow) which are sagebrush dependent, but not necessarily obligate species, also show a gradual increasing trend over the last 10 years (Figure 8) with quite a spike in 2011, and especially for the towhee, in 2012.

The most dramatic trend data occurs for the Blue-gray Gnatcatcher. This species was not detected in 1997 or 1998 surveys and was considered quite rare in the monument prior to this period (USNPS 1997). Three birds were then observed in 1999 and numbers steadily increased to a peak in 2007 and they have declined somewhat, or possibly are stabilizing, since then (Figure 9). In the western United States, gnatcatchers are generally associated with pinyon/juniper woodlands (Cornell 2004). Though the use of other pines is not well documented in this species, the limber pine stands where gnatcatchers occur at Craters of the Moon are unique and in many ways resemble pinyon stands in their structure and function. Other pinyon/juniper woodland species have been documented using these stands in past years, including Bushtit and Pinyon Jays. The colonization of the northern portions of Craters of the Moon by gnatcatchers may also be a further indication of their continued northward expansion over the 20<sup>th</sup> century (Ellison 1992, Cornell 2004). This range expansion is thought to have been influenced by both fire suppression during the 1900s and climate change (Ellison 1992).

As in the case of the gnatcatchers, Craters of the Moon exists near the northern edge of the range for Northern Mockingbirds and several other species. The mockingbird is abundant in the southwestern United States but less than five occurrences had been documented at Craters of the Moon prior to 2010 and the previous high count for the species during breeding season surveys was two individuals in 2008. Five different mockingbirds were recorded on the survey of the Wood Road Kipuka Trail in 2010, four

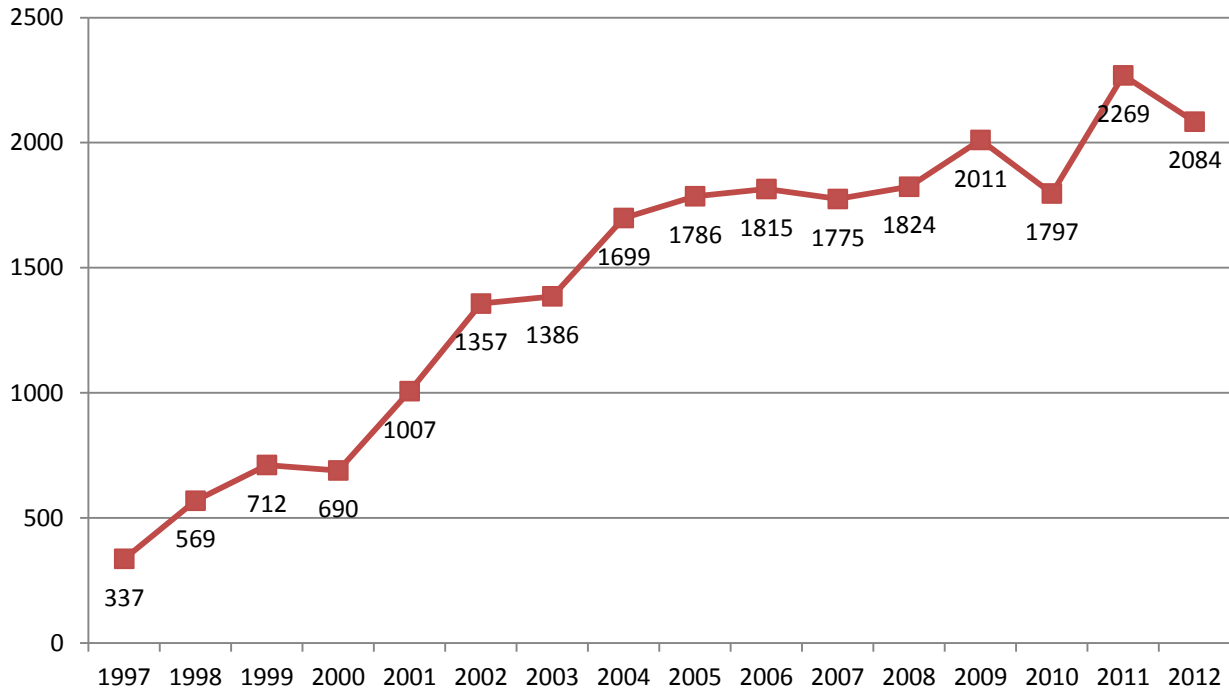
were observed in 2011, and one was counted there in 2012. Other species with first detections on CRMO surveys since 2008 include Ash-throated Flycatcher, Bushtit, Virginia's and Black-throated Gray warblers, and Blue Grosbeak (M. Munts, pers. comm.). Could these species be responding to a warming climate?

Another observation of note was a single Olive-sided Flycatcher observed along the Loop Road (point 6) during both 2011 and 2012 surveys; another was observed at Goodale's Cutoff point 18 in 2012 but, given the early June timing of counts, this could have been a northbound migrant. In 2008 a singing male was observed for the first record at CRMO since 2000. At least one male was heard singing in the same stand (Grassy Cone) in both 2009 and 2010 (M. Munts, pers. comm.). Additional survey work targeting coniferous forest at CRMO may be necessary to determine if this species breeds in the park. This species is a mature conifer associate and the North American Breeding Bird Survey has shown a 60% decline in this species throughout North America since the year 2000. As a result, the Canadian Wildlife Service listed the species as endangered in the fall of 2007. The U.S. Fish and Wildlife Service has petitioned to list the species as threatened but has postponed a full status review pending higher priority reviews.

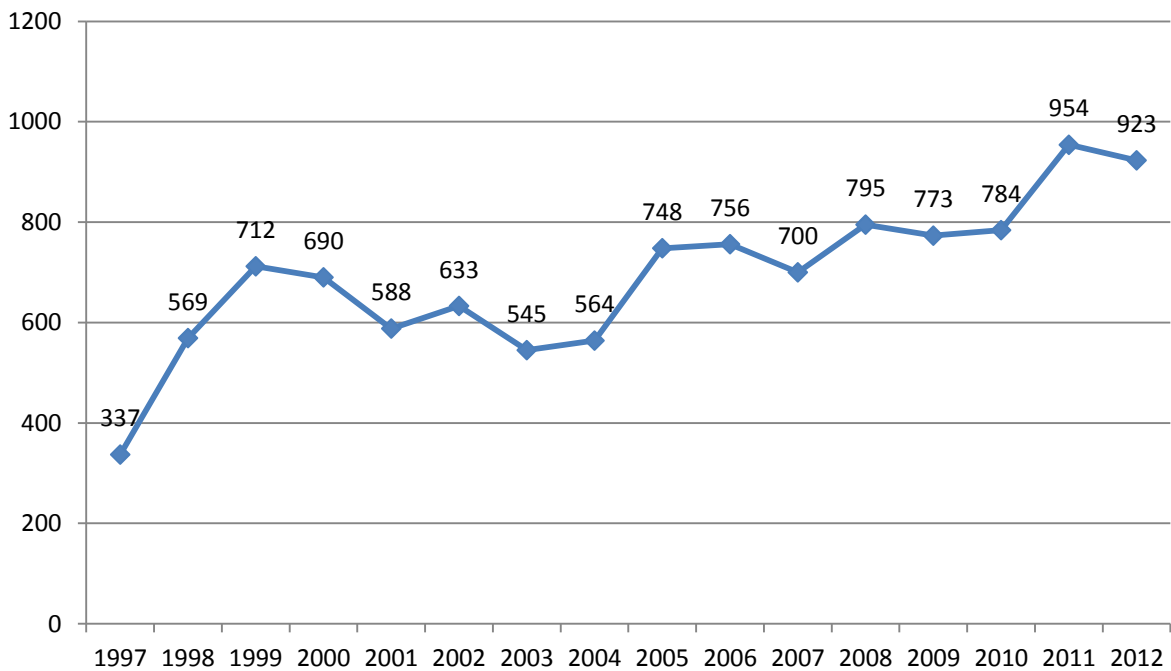


A view up Little Cottonwood creek – *photo by Jay Carlisle*

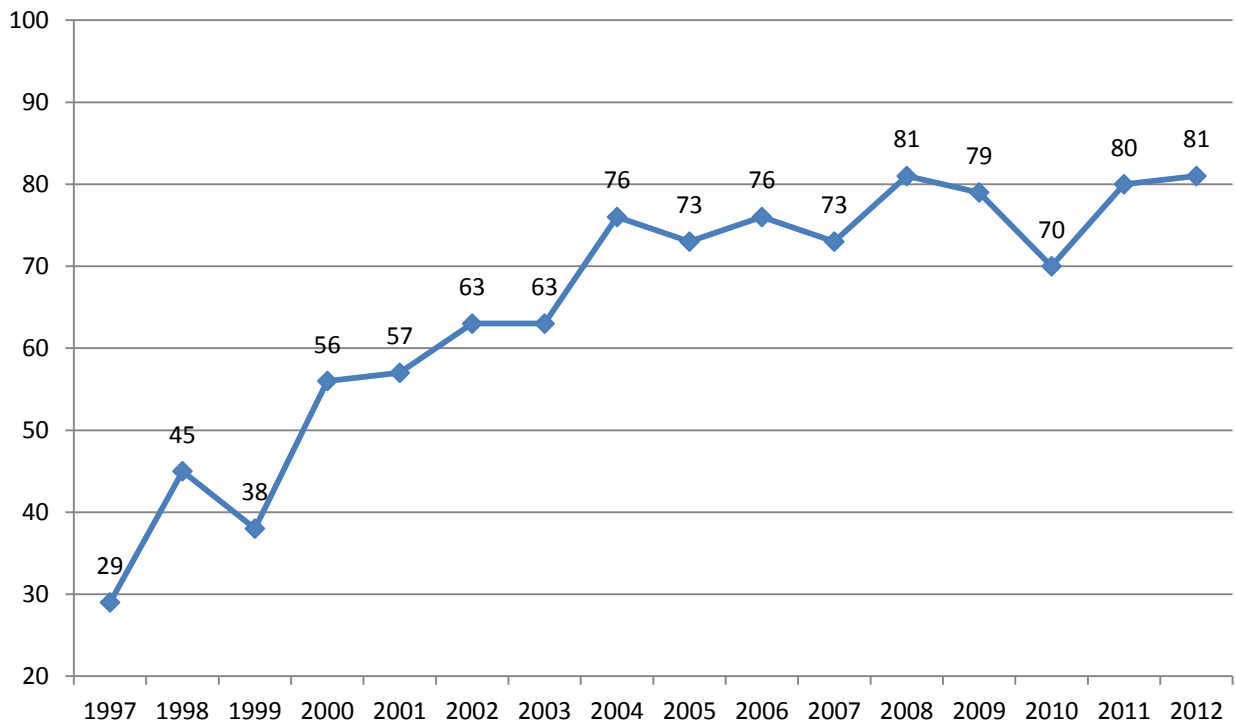
**Figure 1.** Total numbers of birds recorded during breeding season surveys 1997-2012.



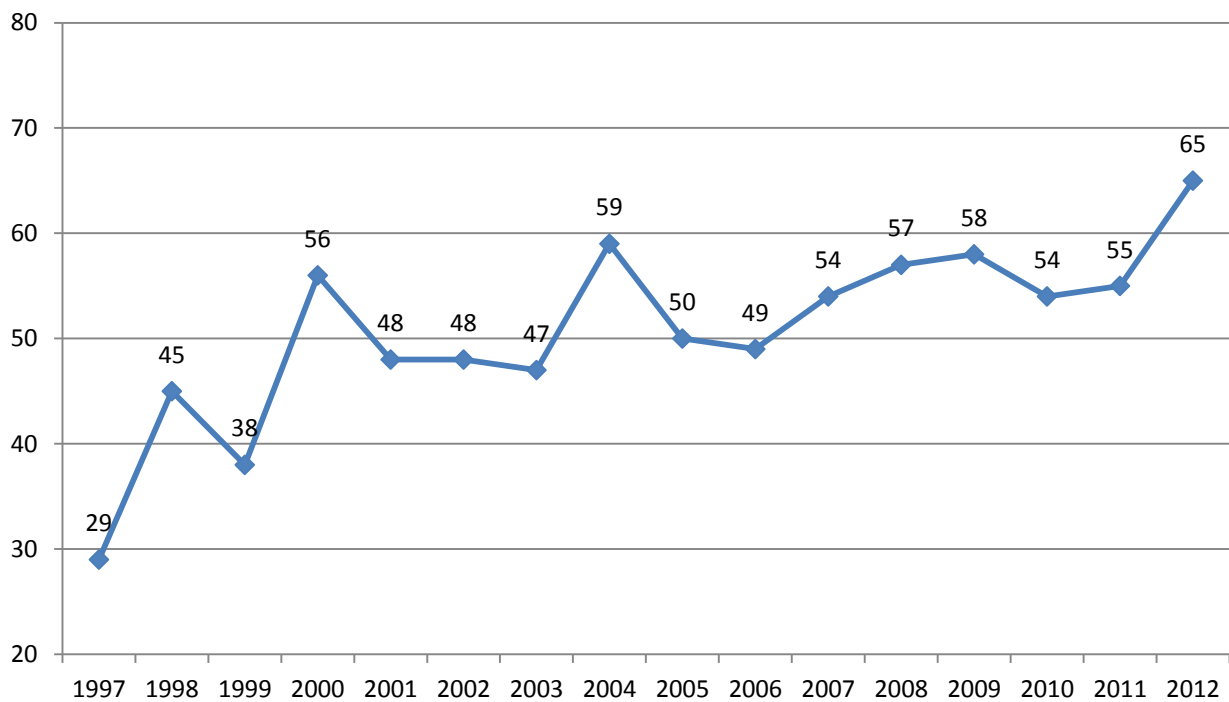
**Figure 2.** Numbers of birds recorded during breeding season surveys on the six routes surveyed during the years 1997-2012



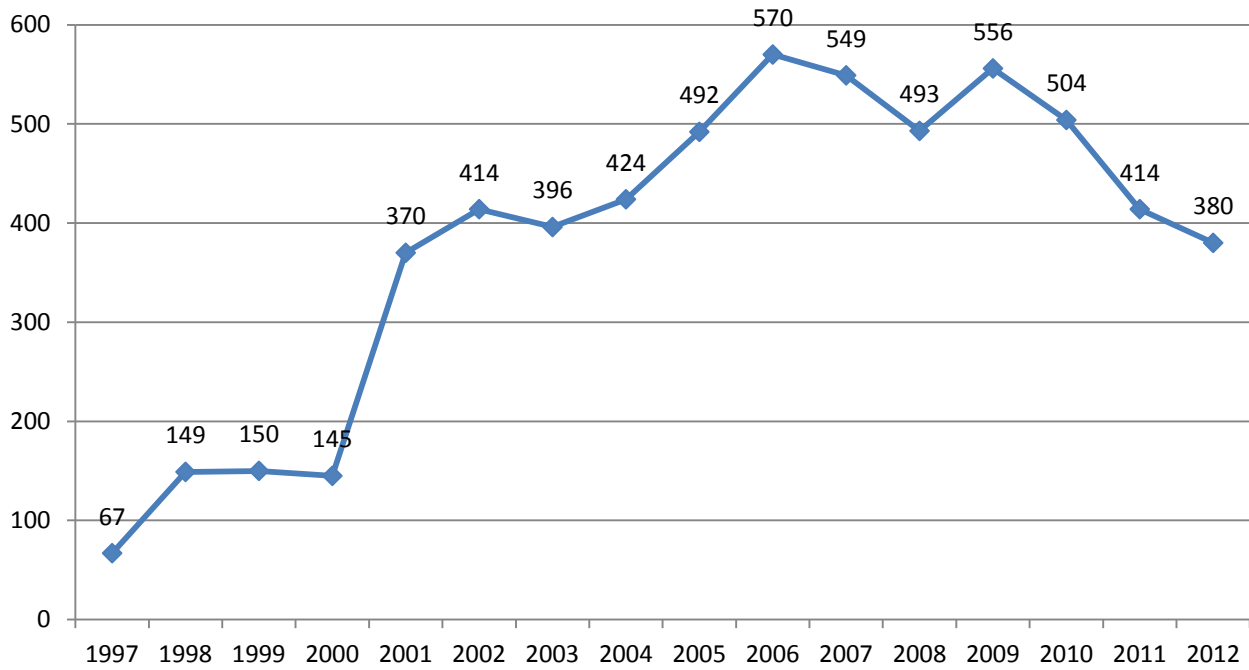
**Figure 3.** Total number of bird species detected during breeding season surveys 1997-2012.



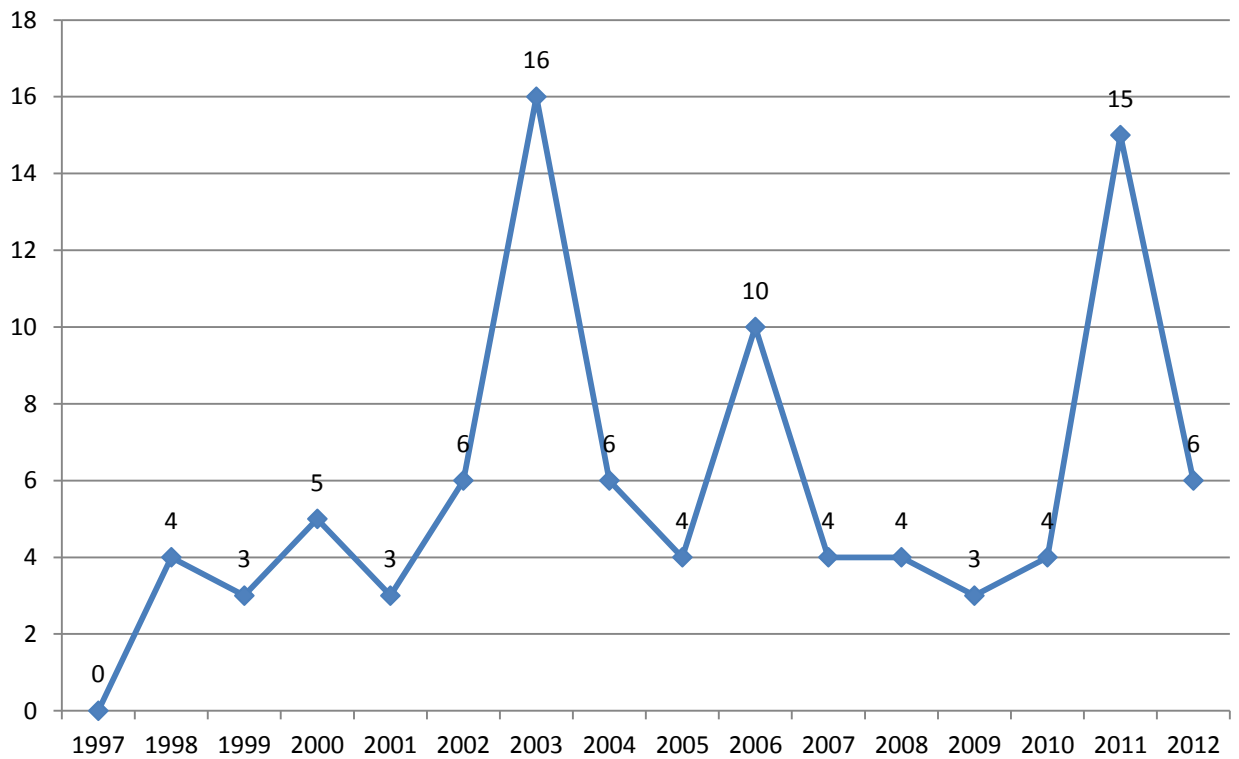
**Figure 4.** Number of bird species detected on the six routes surveyed during the years 1997-2012.



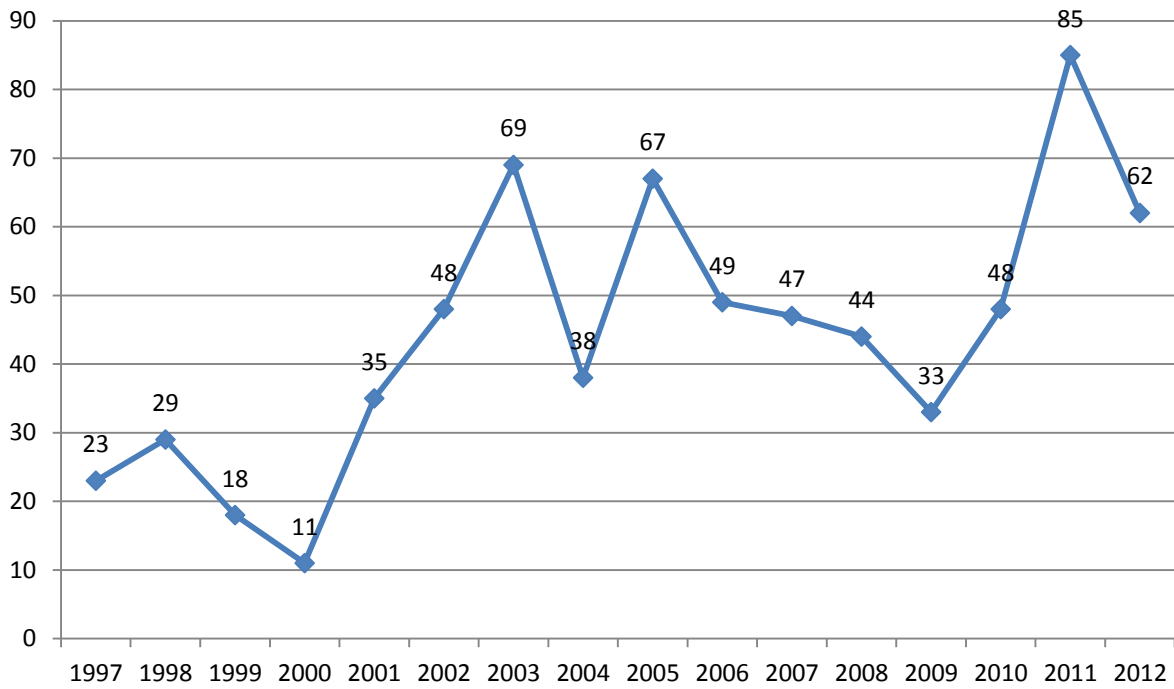
**Figure 5.** Numbers of Brewer’s Sparrows observed in breeding season surveys 1997-2012.



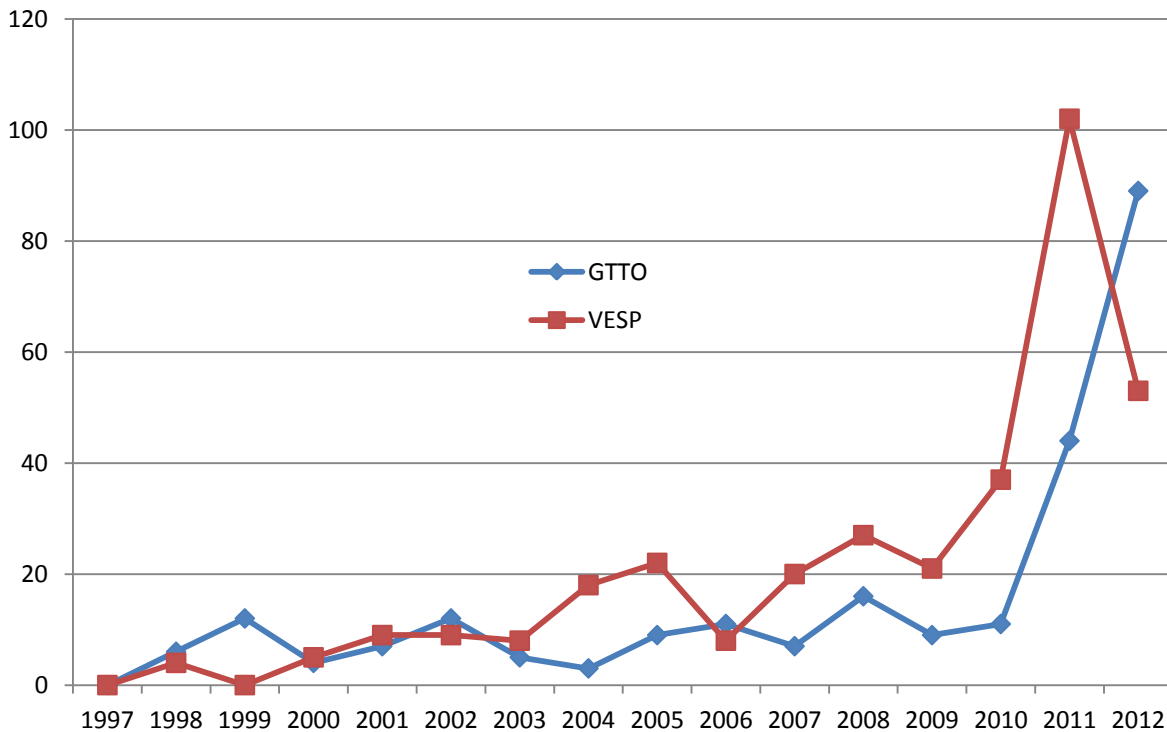
**Figure 6.** Numbers of Loggerhead Shrikes observed in breeding season surveys 1997-2012.



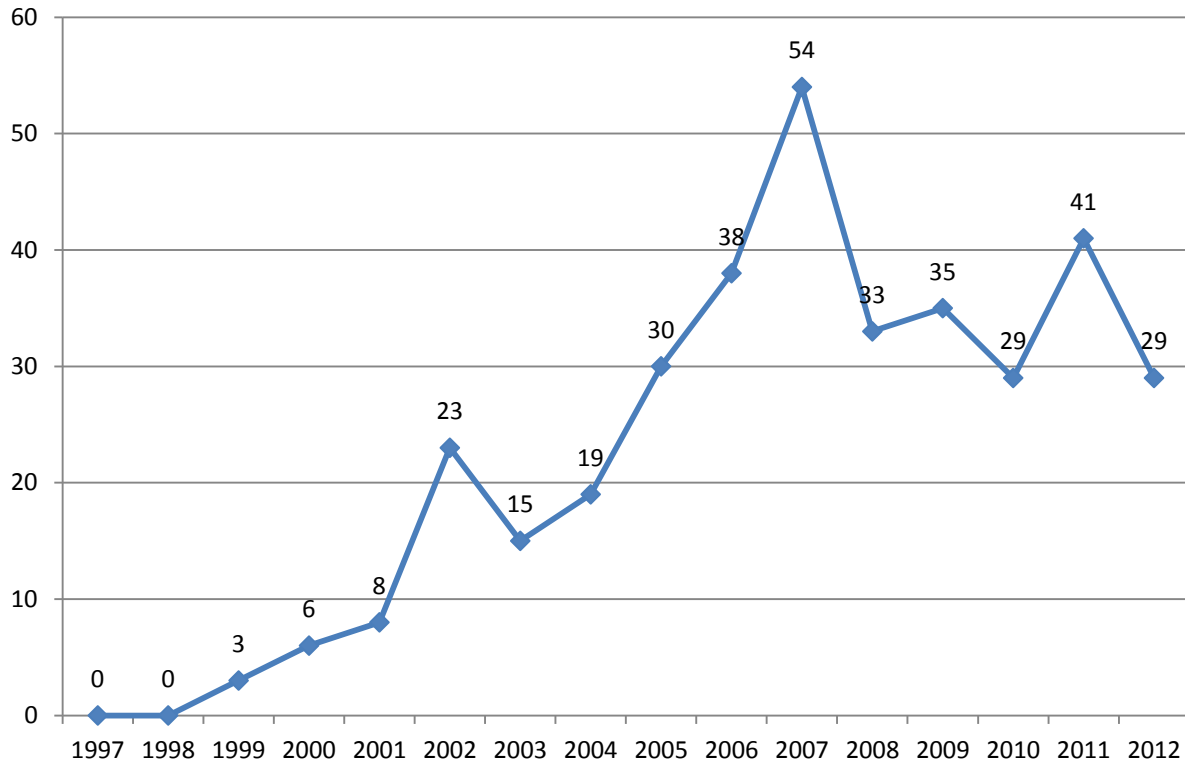
**Figure 7.** Numbers of Sage Thrashers observed in breeding season surveys 1997-2012.



**Figure 8.** Numbers of Green-tailed Towhees (GTTO) and Vesper Sparrows (VESP) observed in breeding season surveys 1997-2012.



**Figure 9.** Numbers of Blue-gray Gnatcatchers observed in breeding season surveys 1997-2012.



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**Appendix 1.** Numbers of each species detected, listed in order of descending abundance, on each of the ten survey routes in 2012, Craters of the Moon National Monument.

| Species                 | Carey K. | Caves | Goodale's 1 | Goodale's 2 | Little Cott. | Loop Road | Sunset | Tree Molds | Wilderness | Wood Rd | Total      |
|-------------------------|----------|-------|-------------|-------------|--------------|-----------|--------|------------|------------|---------|------------|
| Brewer's Sparrow        | 1        | 3     | 91          | 30          | 31           | 22        | 108    | 27         | 63         | 4       | <b>380</b> |
| Rock Wren               | 16       | 13    | 28          | 45          | 7            | 20        | 7      | 13         | 38         | 34      | <b>221</b> |
| Western Meadowlark      | 39       | 1     | 5           | 71          |              |           | 16     | 1          | 19         | 34      | <b>186</b> |
| Spotted Towhee          |          |       | 32          | 51          | 10           |           | 6      | 9          | 27         |         | <b>135</b> |
| Green-tailed Towhee     |          |       | 44          | 10          | 17           | 4         |        | 7          | 7          |         | <b>89</b>  |
| Mourning Dove           | 9        | 4     | 7           | 7           | 1            | 5         | 6      | 1          | 10         | 28      | <b>78</b>  |
| Sage Thrasher           |          |       | 14          |             | 1            |           | 43     |            | 4          |         | <b>62</b>  |
| Western Tanager         | 1        | 1     | 5           | 14          | 5            | 14        |        | 5          | 7          | 5       | <b>57</b>  |
| Brown-headed Cowbird    | 4        |       | 3           | 16          | 7            | 2         | 2      |            | 12         | 9       | <b>55</b>  |
| Violet-green Swallow    | 1        | 26    |             | 4           |              | 13        |        | 4          | 5          |         | <b>53</b>  |
| Vesper Sparrow          |          |       | 21          | 12          | 6            |           | 18     |            | 1          |         | <b>53</b>  |
| Clark's Nutcracker      |          | 1     | 3           |             | 1            | 18        |        | 9          | 18         |         | <b>50</b>  |
| Common Raven            |          | 1     | 11          | 6           |              | 7         | 8      | 2          | 6          | 5       | <b>46</b>  |
| Lazuli Bunting          |          | 2     | 10          | 17          | 11           |           |        |            | 1          | 1       | <b>42</b>  |
| Warbling Vireo          |          |       | 9           | 1           | 20           | 1         |        |            | 3          |         | <b>34</b>  |
| Dusky Flycatcher        |          |       | 12          | 1           | 17           | 1         |        |            | 3          |         | <b>34</b>  |
| Northern Flicker        | 2        | 4     | 8           |             |              | 2         |        | 3          | 8          | 3       | <b>30</b>  |
| Lark Sparrow            | 1        | 1     |             | 19          |              | 1         |        |            |            | 7       | <b>29</b>  |
| Brewer's Blackbird      | 14       |       | 13          |             |              | 2         |        |            |            |         | <b>29</b>  |
| Blue-gray Gnatcatcher   |          |       |             |             |              | 2         | 1      | 4          | 10         | 12      | <b>29</b>  |
| Chipping Sparrow        |          | 1     |             | 1           | 3            | 5         |        | 5          | 8          |         | <b>23</b>  |
| House Wren              |          |       | 11          |             | 11           |           |        |            |            |         | <b>22</b>  |
| Mountain Bluebird       |          | 3     | 2           |             |              | 11        |        | 4          | 1          |         | <b>21</b>  |
| Yellow-headed Blackbird |          |       |             | 20          |              |           |        |            |            |         | <b>20</b>  |
| Red-winged Blackbird    |          |       | 3           | 17          |              |           |        |            |            |         | <b>20</b>  |
| Say's Phoebe            | 3        | 2     |             | 2           |              | 1         | 1      | 2          | 1          | 7       | <b>19</b>  |
| Yellow Warbler          |          |       | 6           | 1           | 11           |           |        |            |            |         | <b>18</b>  |
| Gray Flycatcher         |          |       |             |             |              | 4         |        | 8          | 4          | 3       | <b>16</b>  |
| Bullock's Oriole        |          |       | 2           | 1           |              |           |        | 1          |            | 11      | <b>15</b>  |
| Song Sparrow            |          |       | 8           |             | 6            |           |        |            |            |         | <b>14</b>  |

| Species                | Carey K. | Caves | Goodale's 1 | Goodale's 2 | Little Cott. | Loop Road | Sunset | Tree Molds | Wilderness | Wood Rd | Total |
|------------------------|----------|-------|-------------|-------------|--------------|-----------|--------|------------|------------|---------|-------|
| Black-billed Magpie    |          |       | 3           | 3           | 1            |           |        |            |            | 5       | 12    |
| Rock Pigeon            |          | 10    |             |             |              |           |        |            |            |         | 10    |
| American Robin         | 1        |       | 2           |             | 2            | 1         |        |            |            | 3       | 9     |
| Red-tailed Hawk        |          | 1     |             | 3           | 1            |           |        |            |            | 3       | 8     |
| American Kestrel       |          |       | 3           |             | 1            |           |        | 3          | 1          |         | 8     |
| Horned Lark            | 1        |       | 1           |             |              |           | 6      |            |            |         | 8     |
| Western Kingbird       |          |       | 1           |             |              |           |        |            |            | 6       | 7     |
| Pinyon Jay             |          |       |             |             |              |           |        | 7          |            |         | 7     |
| Orange-crowned Warbler |          |       | 3           |             | 4            |           |        |            |            |         | 7     |
| Audubon's Warbler      |          |       |             |             | 3            |           | 2      | 1          | 1          |         | 7     |
| MacGillivray's Warbler |          |       |             |             | 6            |           |        | 1          |            |         | 7     |
| Loggerhead Shrike      | 4        |       |             |             |              |           |        |            | 1          | 1       | 6     |
| American Crow          |          |       | 5           |             | 1            |           |        |            |            |         | 6     |
| Black-throated Sparrow | 2        |       |             | 3           |              |           |        |            | 1          |         | 6     |
| Pine Siskin            |          |       |             |             |              | 2         |        |            | 3          | 1       | 6     |
| Western Wood-pewee     |          |       |             |             | 1            |           |        | 2          | 2          |         | 5     |
| Mountain Chickadee     |          |       |             |             |              | 5         |        |            |            |         | 5     |
| American Goldfinch     |          |       | 2           | 1           |              | 1         | 1      |            | 1          |         | 5     |
| Dark-eyed Junco        |          |       |             |             | 2            |           |        |            | 3          |         | 5     |
| Mallard                |          |       |             | 5           |              |           |        |            |            |         | 4     |
| Common Nighthawk       | 3        |       |             |             |              |           |        |            |            | 1       | 4     |
| Wilson's Warbler       |          |       | 1           |             | 3            |           |        |            |            |         | 4     |
| Sage Sparrow           |          |       |             |             |              |           | 4      |            |            |         | 4     |
| Cassin's Finch         |          |       |             |             |              | 3         |        |            | 1          |         | 4     |
| House Finch            |          | 1     | 1           |             |              | 1         |        |            |            | 1       | 4     |
| Golden Eagle           |          |       | 2           |             |              |           |        |            | 1          |         | 3     |
| Killdeer               |          |       | 1           | 2           |              |           |        |            |            |         | 3     |
| Lewis's Woodpecker     |          |       | 3           |             |              |           |        |            |            |         | 3     |
| Red-breasted Nuthatch  |          |       |             |             |              | 1         |        |            | 2          |         | 3     |
| European Starling      |          |       |             |             |              |           |        |            |            | 3       | 3     |
| Red Crossbill          |          |       |             |             |              | 2         |        |            | 1          |         | 3     |

| Species                       | Carey K.   | Caves     | Goodale's 1 | Goodale's 2 | Little Cott. | Loop Road  | Sunset     | Tree Molds | Wilderness | Wood Rd    | Total       |
|-------------------------------|------------|-----------|-------------|-------------|--------------|------------|------------|------------|------------|------------|-------------|
| Swainson's Hawk               |            |           |             |             |              |            |            |            |            | 2          | 2           |
| Red-naped Sapsucker           |            |           | 2           |             |              |            |            |            |            |            | 2           |
| Broad-tailed Hummingbird      |            |           | 1           |             | 1            |            |            |            |            |            | 2           |
| Olive-sided Flycatcher        |            |           | 1           |             |              | 1          |            |            |            |            | 2           |
| Willow Flycatcher             |            |           | 1           |             | 1            |            |            |            |            |            | 2           |
| Black-headed Grosbeak         |            |           | 1           |             | 1            |            |            |            |            |            | 2           |
| White-crowned Sparrow         |            |           |             |             | 2            |            |            |            |            |            | 2           |
| Turkey Vulture                |            |           |             |             |              |            | 1          |            |            |            | 1           |
| Hairy Woodpecker              |            |           | 1           |             |              |            |            |            |            |            | 1           |
| Bald Eagle                    |            |           |             |             |              |            |            |            |            |            | 1           |
| Ash-throated Flycatcher       |            |           |             |             |              |            |            |            |            | 1          | 1           |
| Cordilleran Flycatcher        |            |           |             |             | 1            |            |            |            |            |            | 1           |
| Hammond's Flycatcher          |            |           |             |             |              |            |            | 1          |            |            | 1           |
| Cassin's Vireo                |            |           |             |             | 1            |            |            |            |            |            | 1           |
| Ruby-crowned Kinglet          |            |           |             |             | 1            |            |            |            |            |            | 1           |
| Northern Mockingbird          |            |           |             |             |              |            |            |            |            | 1          | 1           |
| Black-throated Gray Warbler   |            |           |             |             |              |            |            |            | 1          |            | 1           |
| Blue Grosbeak                 |            |           |             |             |              |            |            | 1          |            |            | 1           |
| Fox Sparrow                   |            |           |             |             | 1            |            |            |            |            |            | 1           |
| Unidentified <i>Empidonax</i> |            |           |             | 1           |              |            |            |            |            |            | 1           |
| Unidentified sparrow          |            |           |             |             |              |            | 1          |            |            |            | 1           |
| <b>Total</b>                  | <b>102</b> | <b>75</b> | <b>383</b>  | <b>364</b>  | <b>199</b>   | <b>151</b> | <b>226</b> | <b>121</b> | <b>275</b> | <b>188</b> | <b>2084</b> |