

Summary of Bird Monitoring at Craters of the Moon National Monument and Preserve 2009



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Executive Summary

Bird surveys were run on 10 point count transects during June of 2009. The surveys were performed on ten routes in both the Monument and the Preserve. There were a total of 2011 individuals of 79 species observed on 175 point counts. The 10 most numerous birds were Brewer's Sparrow, Rock Wren, Western Meadowlark, Western Tanager, American Coot, Mourning Dove, Spotted Towhee, Brewer's Blackbird, Lazuli Bunting and Canada Goose. The Brewer's Sparrow, Mourning Dove, Rock Wren, Western Tanager, Sage Thrasher, Common Ravens, Chipping Sparrows, Spotted Towhees, and Western Meadowlark were all recorded on six or more of the transects.

A total of 143 species were recorded at CRMO during 2009. Two of these (Blue Grosbeak and White-winged Crossbill) had not been previously documented at CRMO. Forty-seven percent (67 of 143) of the species recorded are listed as sensitive by the state of Idaho, the BLM, the USFWS, or are a Partners in Flight priority species (Table 5).

Sage-grouse lek counts were continued in 2009 and a total high count of 139 male birds were observed on the Golden Chariot lek complex in the northwest portion of the preserve. Although still below the peak in 2007 the five year average continues to increase.

The Christmas Bird Count was restarted at Craters of the Moon in 2005. The 2009 count was done on 29 December. Two volunteers and one member of the park staff participated in the count. Over the day 213 birds of 20 species were recorded.

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Craters of the Moon National Monument and Preserve Bird Monitoring 2009

BREEDING BIRD MONITORING

Introduction and Methods

Ten bird survey routes were surveyed during June of 2009. Methods were based on the North American Breeding Bird Survey and modified to be usable as trail based survey instead of a road based one. 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.

Results

In 2009 an annual total of 71,370 meters were surveyed, consisting of 175 survey points, as listed in Table 1. The total number of individuals was 2011. The greatest number (540) were on Goodale's Cutoff 2 and the least (39) on the Caves Trails (Table 1). The mean number of birds per point ranged from 7.4 to 21.6. The number of species recorded per transect ranged from 11 on the Caves Trail and the Sunset Flow to 33 on Goodale's Cutoff 2. The total number of species observed on all transects was 79. The mean number of species per point ranged from 3.2 to 6.4 with an average for all sites of 4.2.

The Brewer's Sparrow had the greatest number with 556 individuals recorded in 2009. They accounted for 28% of all individuals recorded. A record 16 species had total counts of 25 or more (table 2). In addition to Brewer's Sparrow these were Rock Wren (n = 211), American Coot (n = 178), Western Meadowlark (n = 56), Spotted Towhee (n = 96), Western Tanager (n = 83), Mourning Dove (n = 67), Brewer's Blackbird (n = 54), Lazuli Bunting (n = 43), Canada Goose (n = 41), Blue-gray Gnatcatcher (n = 35), Chipping Sparrow (n = 36), Sage Thrasher (n = 33), Brown-headed Cowbird (n = 28), Mallard (n = 27), and Clark's Nutcracker (n = 26).

Mourning Doves and Rock Wrens, were recorded on all ten transects. Brewer's Sparrows were recorded on nine transects. Western Tanagers were recorded on eight transects. Common Raven and Chipping Sparrow were recorded on seven transects. Sage Thrasher, Spotted Towhee, and Western Meadowlark were recorded on six transects. Northern Flicker, Mountain Bluebird, and Brown-headed Cowbirds were recorded on five transects.

Eight species were recorded on 25 or more points. These were Brewer's Sparrow at 131 points (75% of total), Rock Wren at 126 points (72% of total), Western Meadowlark at 64 points (37% of total), Spotted Towhee at 63 points (36% of total), Western Tanager at 51 points (29% of total), Mourning Dove at 50 points (29% of total), Sage Thrasher at 29 points (17% of total), and Lazuli Bunting at 27 points (15% of total).

Two species had not been previously recorded during any surveys. The Ash-throated Flycatcher had been previously recorded by a single incidental observation. Two birds were recorded on the Wood Road transect. A Blue Grosbeak was recorded on the Wilderness Trail transect is the first record for the species at CRMO.

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. These include Dusky Flycatcher, House Wrens, Song Sparrow, Fox Sparrow, Warbling Vireo, and several warblers.

Table 1. Craters of the Moon National Monument's 2009 Breeding Season Survey route summary

ROUTE	LENGTH (m)	# of stops	habitat types	# of indv. (N)	avg. birds per point	# of species on transect	avg.# species per point
Walking Routes							
Carey Kipuka	4250	18	2, 8, 9, 11, 31	134	7.4	14	3.8
Caves Trail	1000	5	2, 21	39	8.0	11	3.2
Little Cottonwood	3000	13	4, 5, 7, 18, 20, 2 4, 25, 26, 29	129	9.9	30	6.4
Sunset Flow	5750	24	4, 29, 34	243	10.1	11	3.1
Tree Molds	2250	10	2, 16, 22	113	11.3	18	6.1
Wood Road	3500	15	2, 34, 36, 41	150	10.0	18	4.3
Wilderness Trail	6000	25	1, 2, 6, 7, 16, 21, 22	205	8.2	25	4.5
Driving Route							
Goodale's Cutoff	19310	25	3, 4, 5, 20, 25, 26, 33, 34, 35, 36	316	12.6	32	6.2
Goodale's Cutoff 2	19310	25	2, 3, 25, 29, 33, 34, 36, 37	540	21.6	33	6.0
Loop Drive	7000	15	1, 2, 4, 16, 21, 22, 27	152	10.1	21	5.3
TOTALS	71370	175		2011	11.5	79	4.2

Habitat Codes:

1 = Cinder Gardens
 2 = Low Vegetation Density Lava Flows
 3 = Medium Vegetation Density Lava Flows
 4 = Mountain Big Sagebrush/Bluebunch Wheatgrass
 5 = Mountain Big Sagebrush/Sandberg Bluegrass
 6 = Mountain Big Sagebrush/Needlegrass
 7 = Mountain Big Sagebrush/
 Needle-and-thread/Cheatgrass
 8 = Mountain Big Sagebrush/Idaho Fescue
 9 = Big Sagebrush/Cheatgrass
 11 = Three-tip Sagebrush/Idaho Fescue
 18 = Bluebunch Wheatgrass/Idaho Fescue
 20 = Great Basin Wildrye
 21 = Limber Pine/Bitterbrush (low total cover)

22 = Limber Pine/Bitterbrush
 (high total cover)
 23 = Limber Pine/Bitterbrush (high
 density Limber Pine)
 24 = Douglas-fir/Mountain Snowberry
 25 = Upland Quaking Aspen
 26 = Riparian
 27 = Developed Areas
 29 = Rock outcrops
 31 = Isolated trees
 33 = Misc. Wetlands
 34 = Misc. Big Sagebrush
 41 = Misc. juniper woodland

Table 2. Species recorded during 2009 Breeding Season Surveys

Species	No. of birds	% of total	Rts. detected on	# of stops	% of stops
Canada Goose	41	2.0	GC2,WR	3	1.7
Gadwall	2	<0.1	GC2	1	0.6
Mallard	27	1.5	GC2	1	0.6
Northern Shoveler	4	0.2	GC2	1	0.6
Ring-necked Duck	6	0.3	GC2	1	0.6
Chukar	11	0.6	GC,LC	6	3.4
Greater Sage-grouse	3	0.2	GC,SF	2	1.1
Turkey Vulture	3	0.2	CA,WT	2	1.1
Northern Harrier	7	0.4	GC,LC	5	2.9
Red-tailed Hawk	2	<0.1	WR,WT	2	1.1
Golden Eagle	2	<0.1	GC2	1	0.6
American Kestrel	2	0.2	GC	1	0.6
American Coot	178	8.9	GC2	1	0.6
Killdeer	7	0.3	GC2	3	1.7
Rock Pigeon	7	0.38	CA	4	2.29
Mourning Dove	67	3.7	CA,CK,GC,GC2,LC,LP,TM,WT,SF,WR	50	28.6
Great Horned Owl	1	<0.1	CK	1	0.6
Short-eared Owl	1	<0.1	SF	1	0.6
Common Poorwill	2	0.1	CK	1	0.6
Common Nighthawk	11	0.5	GC,GC,SF	8	4.6
Black-chinned Hummingbird	1	<0.1	WR	1	0.6
Rufous Hummingbird	1	<0.1	LC	1	0.6
Unidentified hummingbird	1	<0.1	GC2	1	0.6
Lewis' Woodpecker	4	0.0	GC	3	1.7
Northern Flicker	13	0.7	GC,LC,LR,WR,WT	11	6.3
Western Kingbird	1	<0.1	WR	1	0.6
Ash-throated Flycatcher	2	<0.1	WR	2	1.1
Cordilleran Flycatcher	6	0.3	GC,LC	4	2.3
Gray Flycatcher	1	<0.1	SF	1	0.6
Hammond's Flycatcher	5	0.3	GC,LR,TM	4	2.3
Dusky Flycatcher	5	0.3	LC,TM	5	2.9
Western Wood-Pewee	3	0.2	GC,LP,WT	3	1.7

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

Table 2 (cont.) Species recorded during 2009 Breeding Season Surveys

Species	No. of birds	% of total	Rts. detected on	# of stops	% of stops
Say's Phoebe	3	0.2	CK,SF,WT	3	1.7
Loggerhead Shrike	3	0.2	CK,WR,WT	3	1.7
Solitary Vireo	2	0.1	LC	2	1.1
Plumbeous Vireo	1	<0.1	WT	1	0.6
Warbling Vireo	9	0.5	GC2,LC	5	2.9
Clark's Nutcracker	26	1.4	CA,LP,TM,WT	18	10.3
Black-billed Magpie	6	0.3	GC, GC2,	4	2.3
American Crow	1	<0.1	LC	1	0.6
Common Raven	15	0.8	CA,GC,LP,SF,TM,WT,WR	13	7.4
Horned Lark	1	<0.1	GC2	1	0.6
Northern Rough-winged Swallow	4	0.2	GC2	2	1.1
Violet-green Swallow	22	1.2	CA,CK,GC2,LP,WT	10	5.7
Red-breasted Nuthatch	1	<0.1	TM	1	0.6
White-breasted Nuthatch	1	<0.1	TM	1	0.6
Rock Wren	211	11.6	CA,CK,GC,GC2,LC,LP,SF,TM,WT,WR	126	72.0
House Wren	19	0.9	GC,GC2,LP	12	6.9
Ruby-crowned Kinglet	2	0.1	LC	2	1.1
Blue-gray Gnatcatcher	35	1.9	LP,TM,WT,WR	16	9.1
Mountain Bluebird	24	1.3	CA,CK,GC,LP,WT	18	10.3
American Robin	1	<0.1	LP	1	0.6
Sage Thrasher	33	1.8	CK, GC,GC2,LC,SF,WT	29	16.6
Gray Catbird	1	<0.1	LC	1	0.6
Orange-crowned Warbler	4	0.2	GC,LC,TM	3	1.7
Yellow Warbler	12	0.7	GC2,LC	8	4.6
MacGillivray's Warbler	3	0.2	LC	1	0.6
Wilson's Warbler	6	0.3	GC,LC	3	1.7
Green-tailed Towhee	9	0.50	GC,TM,WT,	13	7.4
Spotted Towhee	96	5.3	GC,GC2,LC,LP,TM,WT	63	36.0
Chipping Sparrow	36	2.0	CA,GC1,LC,LP,TM,WT,WR	21	12.0
Brewer's Sparrow	556	27.6	CA,CK,GC,GC2,LC,LP,SF,TM,WT	131	74.8

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

Table 2 (cont.) Species recorded during 2009 Breeding Season Surveys

Species	No. of birds	% of total	Rts. detected on	# of stops	% of stops
Vesper Sparrow	21	1.2	GC,GC2,SF,WT.	22	12.6
Lark Sparrow	22	1.1	GC,GC2,LP	17	9.7
Fox Sparrow	1	<0.1	LC	1	0.6
Song Sparrow	1	<0.1	LC	1	0.6
Dark-eyed Junco	1	<0.1	LC	1	0.6
Western Tanager	83	4.6	CA,GC,GC2,LC,LP,TM,WT,WR	51	29.1
Black-headed Grosbeak	3	0.2	WT,TM	3	1.7
Blue Grosbeak	1	<0.1	WT	1	0.6
Lazuli Bunting	43	2.1	GC,GC2,TM	27	15.4
Bullock's Oriole	4	0.2	GC,LP,WR	4	2.3
Red-winged Blackbird	12	0.7	GC,GC2	5	2.9
Western Meadowlark	156	8.6	CK,GC,GC2,SF,WR,WT	64	36.6
Yellow-headed Blackbird	4	0.2	GC2	1	0.6
Brewer's Blackbird	54	2.7	CK,GC, LC,LP,TM	21	12.0
Brown-headed Cowbird	28	1.4	CK,GC,LC,LP,WR	13	7.4
Cassin's Finch	4	0.2	LP,WT	2	1.1
Red Crossbill	4	0.2	LP,WT	2	1.1

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

CONCLUSION

The total number of birds observed was 2011. This was a 10% increase over 2006 ($n = 1824$) (fig 1). It was also a 33% increase over 2002 ($n = 1357$) which was the first year the full complement of surveys was done (fig 1). In November 2000 the lands of the Preserve came under NPS management. In 2001 and 2002 four additional survey routes were added in the Preserve. This resulted in an increase in the number of points surveyed by 235%. Since that time the number of birds has continued an increasing trend (fig 1).

When only those routes that have been monitored for the entire 12 years of the program are examined a similar but more erratic pattern is seen. A declining pattern is seen starting in 2000 (fig 2). And continuing through 2004 was seen. This may have been related to these years being a drought period. With the return to near average rainfall in the period from March thru June of 2005 and 2006 overall numbers again increased with a record number of birds in 2008 and 2009 counts only slightly below that year.

The number of species recorded showed a similar pattern to the overall numbers increasing. Like the total number of birds the rate of increase has slowed since 2004 (fig 3). For only those six routes surveyed the entire six years the trend was pretty level from 2000 to 2006 with a gradual increase the last three years. One additional observation of note was that five species which have been recorded in at least low numbers most years the surveys have been done were not observed in 2009. These were Black-capped Chickadee, Mountain Chickadee, Barn Swallow, Yellow-rumped Warbler, and Pine Siskin. Each of these species was observed through incidental observations during the survey period but none were recorded during the actual surveys. Additionally, two species were recorded during surveys which have not been recorded previously during the surveys. Of these two the Blue Grosbeak has not been recorded before at CRMO. There are two incidental records of the Ash-throated Flycatcher but it has not been recorded during surveys before.

The breeding surveys show that CRMO still provides habitat for many sensitive species. Many of these species are either sagebrush obligate or sagebrush dependent species. This includes the most numerous species on the monument, the Brewer's Sparrow, which is on both the BLM and IDFG sensitive lists (Table 5). Most of these species have experienced substantial declines in either part or all of their range including the Snake River Plain. After it showed a modest drop in 2008, the Brewer's Sparrow appears to have again increased in 2009 with the 2nd highest count yet recorded for the species (fig 5). The major changes 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. Patterns can also be seen in some other sagebrush associated species. The Loggerhead Shrike like the Brewer's Sparrow appears to have been quite stable in the period 2001 to 2009 (fig 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. Sage Thrashers, which are also a sagebrush obligate, are shown in figure 7. They show a different pattern to the Brewer's Sparrow with a significant dip in 2004 and numbers decreasing since 2005. The 2009 count was the lowest yet for the species since the full complement of surveys was started in 2002. Thrashers are insectivorous and are more likely to respond to short term conditions than are the sparrows which will feed on seeds as well as insects. Two other species (Green-tailed Towhee and Vesper Sparrow) which are sagebrush dependent but not obligate, also show a gradual increasing trend over the last 10 years. This is particularly noticeable in the 3 year rolling average (figures 8).

One species for which a trend can be seen after 10 years of surveys is the Blue-gray Gnatcatcher. They were not detected in 1997 or 1998. Three birds were then observed in 1999 with numbers steadily increasing until 2008 (figure 9). This species was considered quite rare in the monument prior to this period (NPS 1997). In the western United States it is generally associated with pinyon/juniper woodlands (Cornell 2004). 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 woodlands species have been documented using these stands including Bushtit and Pinyon Jays. The colonization of the northern portions of Craters of the Moon by gnatcatchers may also be further indications of their continued northward expansion over the 20th century (Cornell 2004, Ellison 1992). This range expansion is thought to have been influenced by both fire suppression during the 1900s and climate change (Ellison 1992). The drop in numbers in 2008 and the slight rebound in 2009 (figure 9) may indicate that the suitable habitat is now occupied and the population is reaching equilibrium.

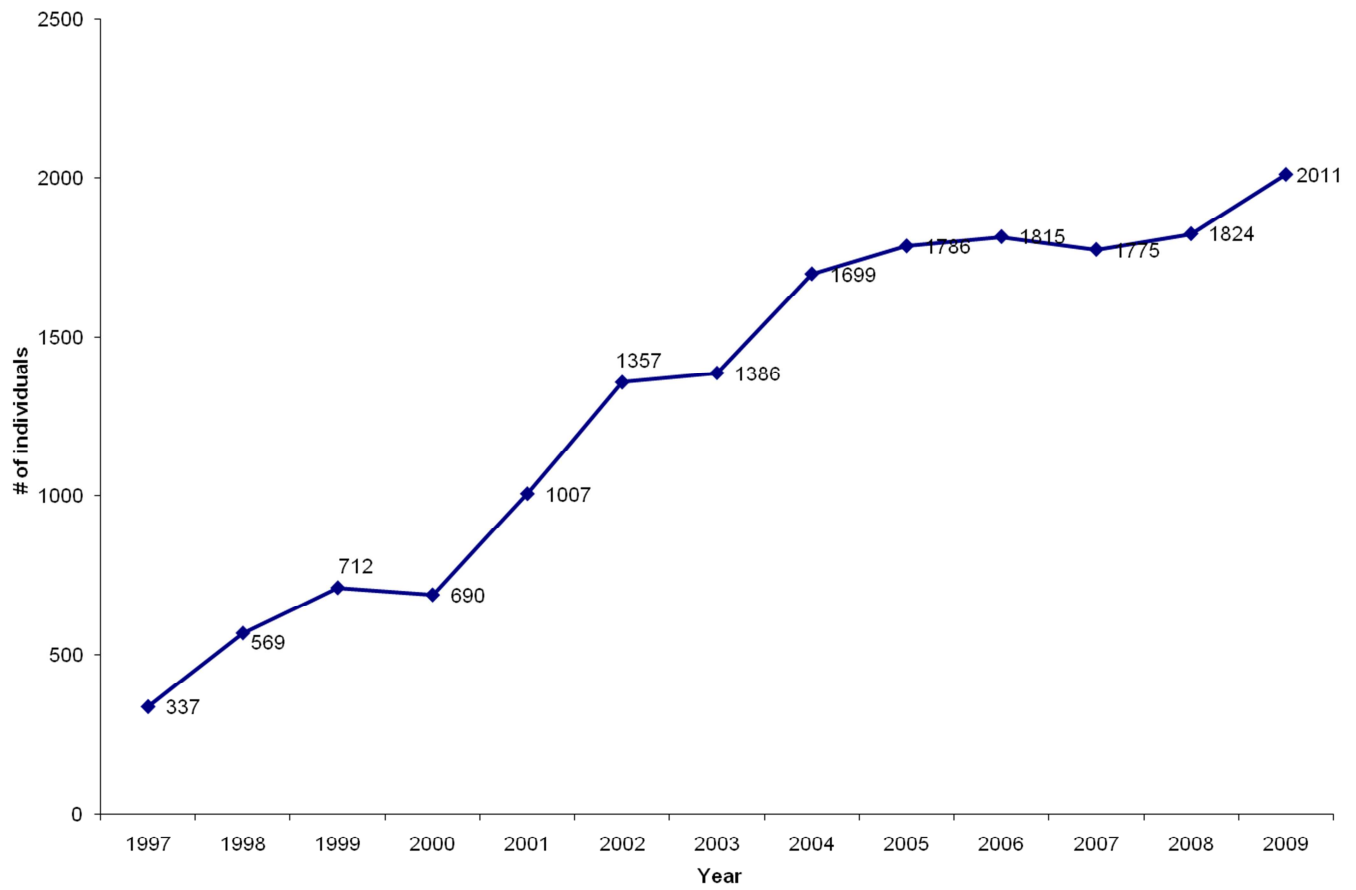


Figure 1. Total numbers of birds recorded during breeding season surveys 1997-2009

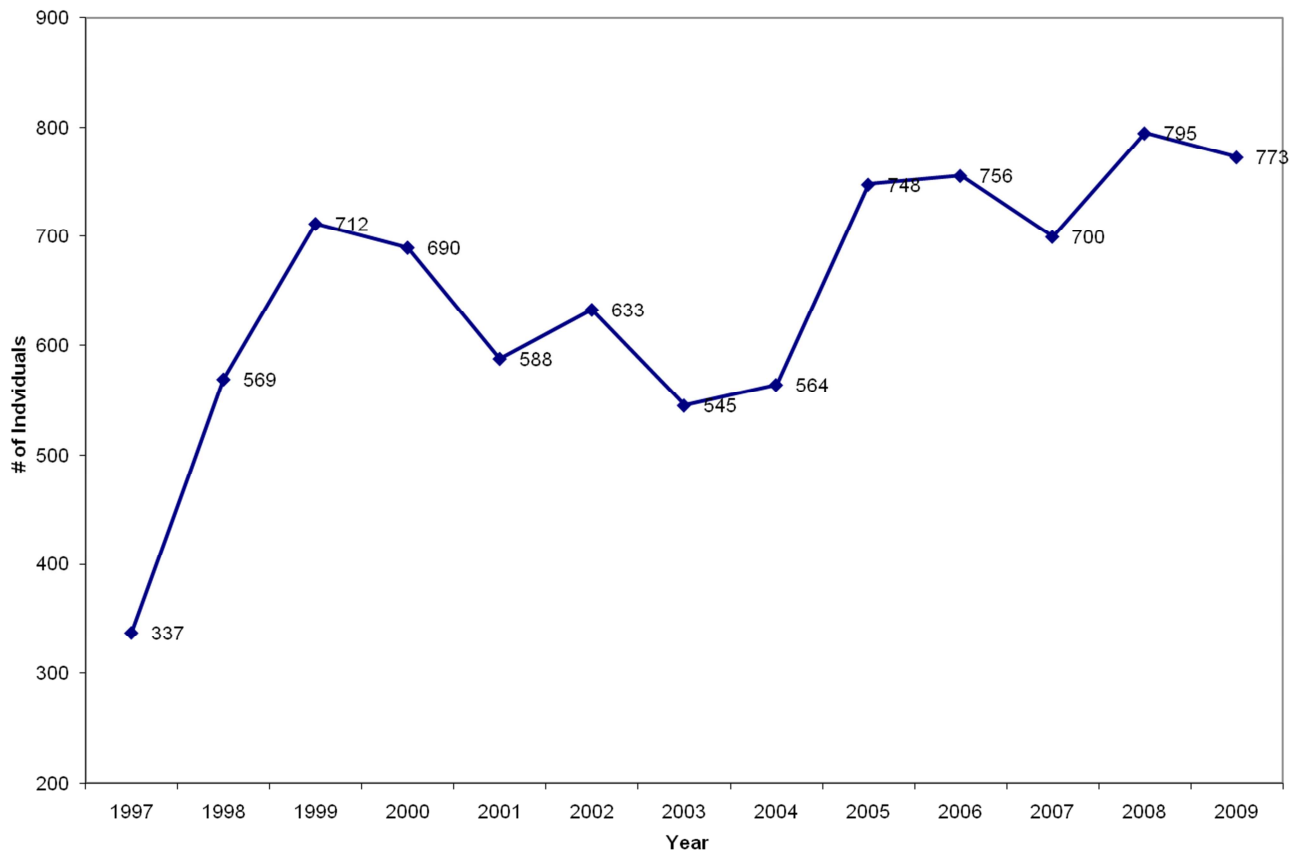


Figure 2. Numbers of birds recorded during breeding season surveys on the six routes surveyed during the years 1997-2009

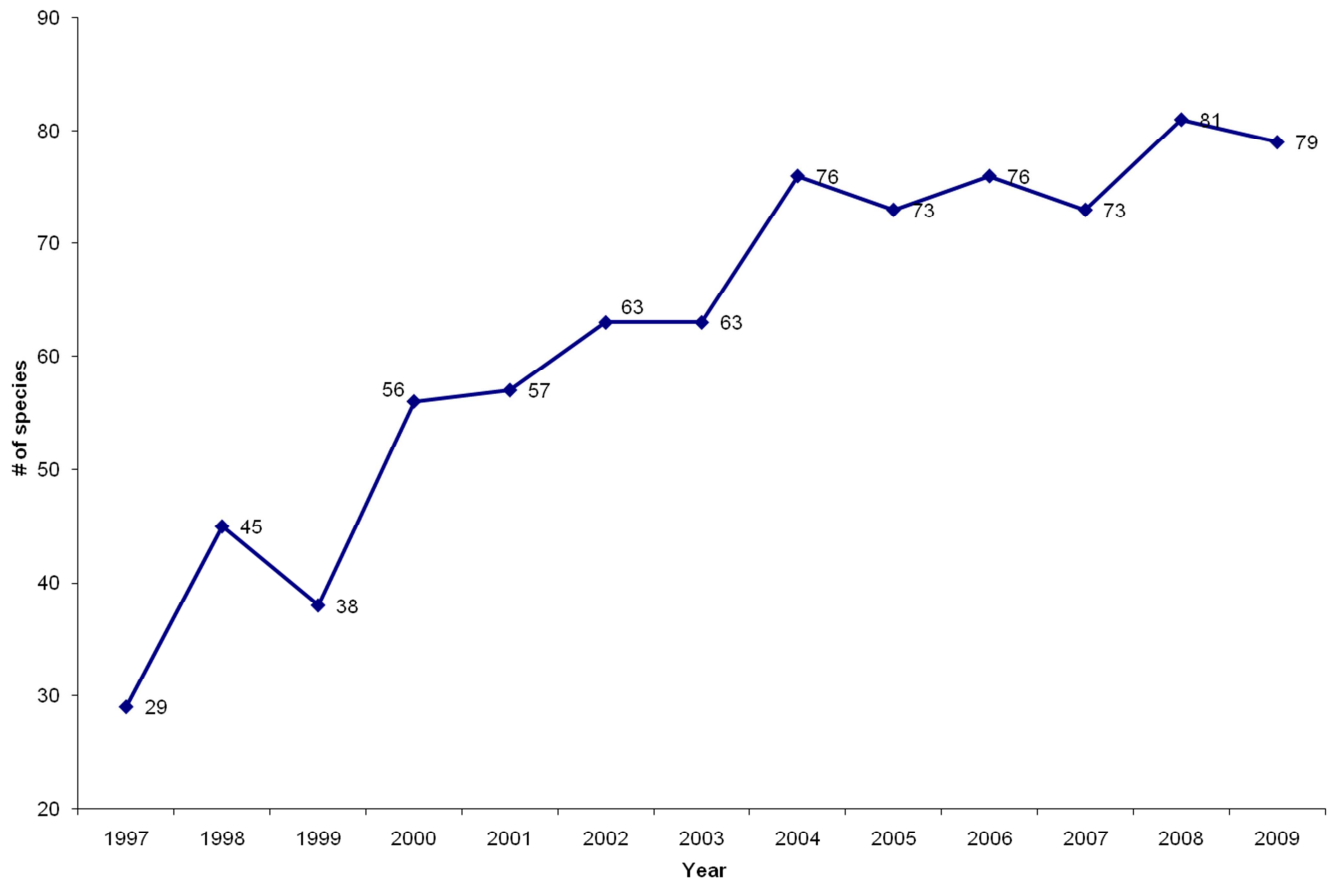


Figure 3. Number of species detected during breeding season surveys 1997-2009

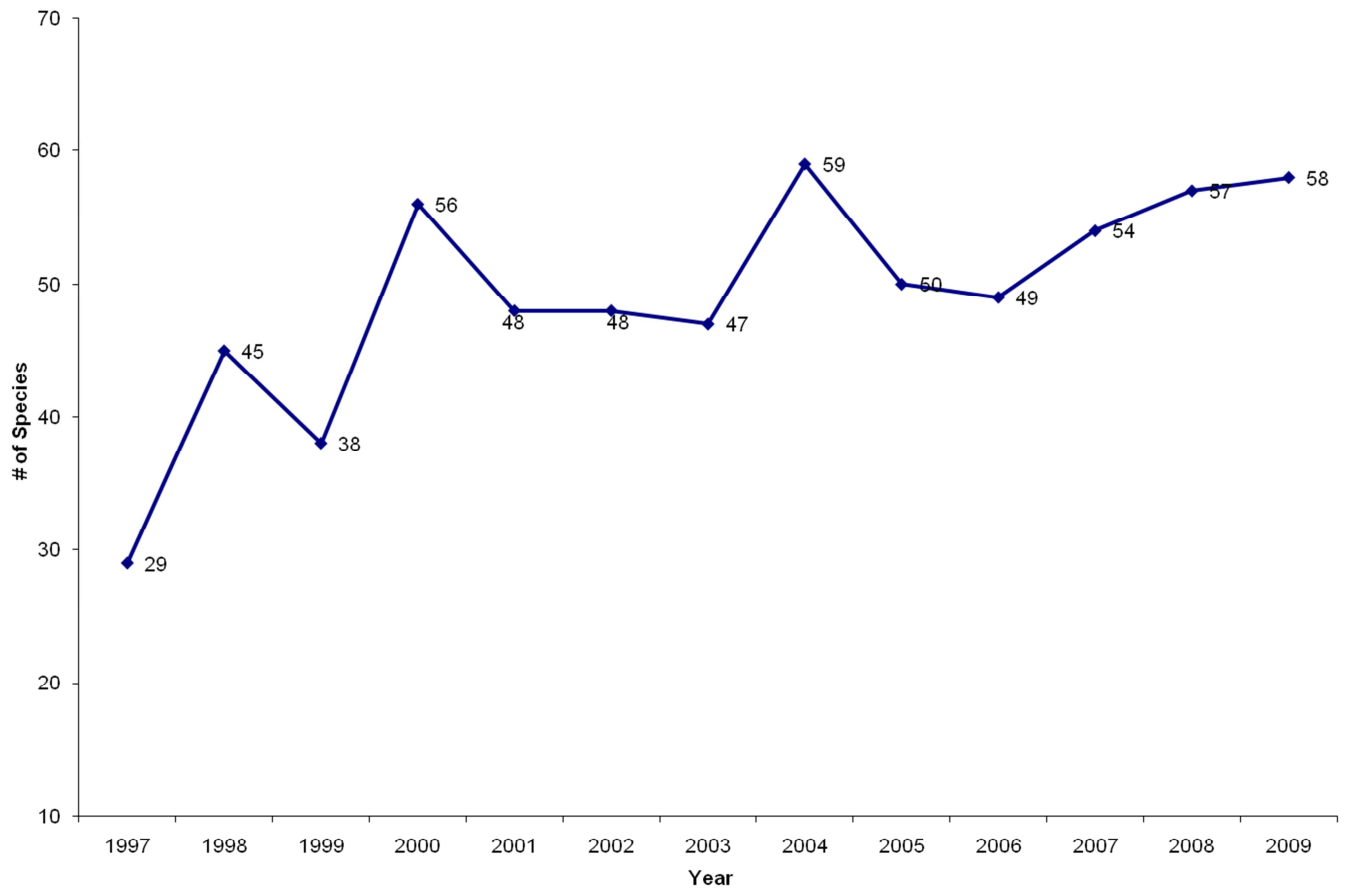


Figure 4. Number of species detected on the six routes surveyed during the years 1997-2009

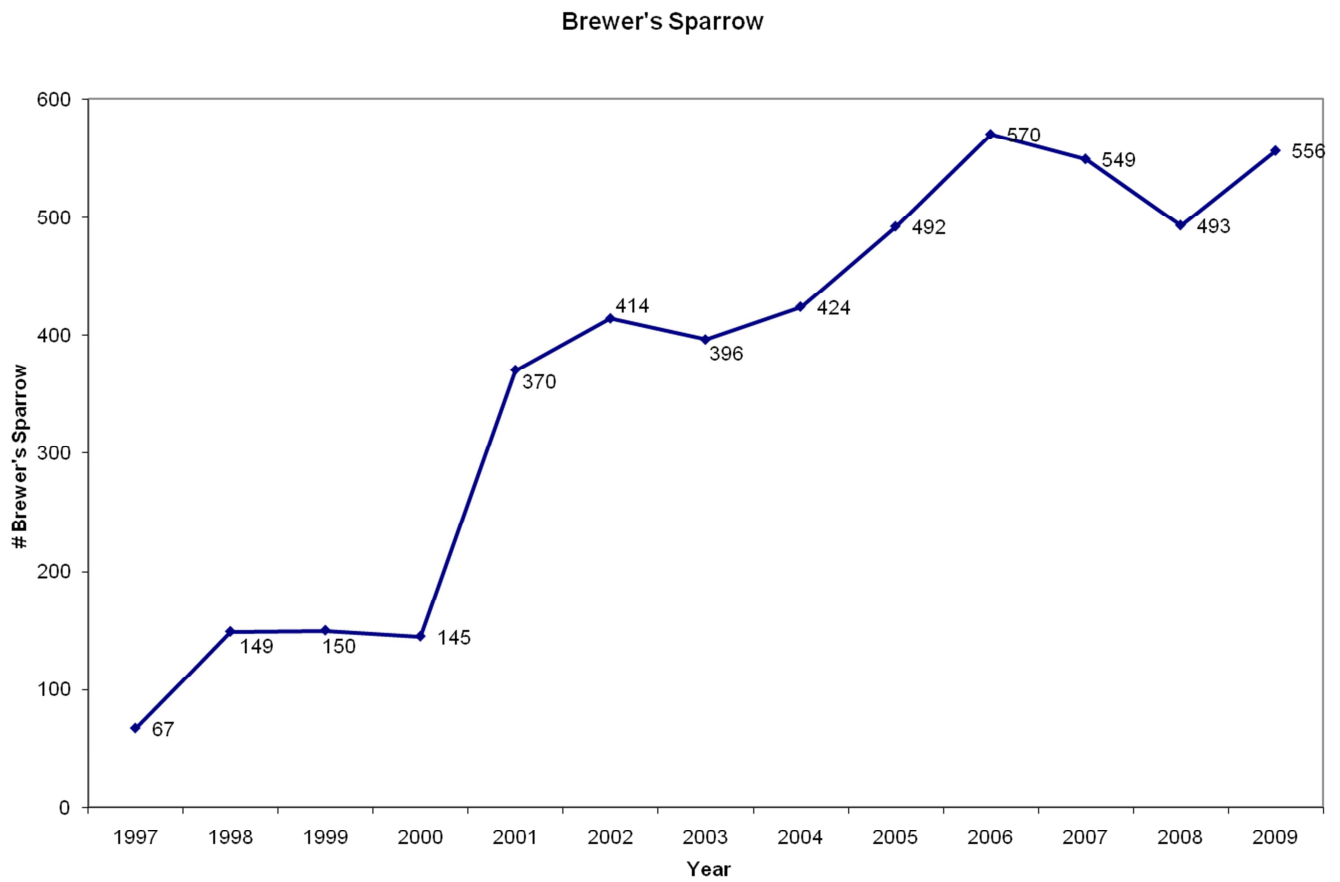


Figure 5. Numbers of Brewer's Sparrows observed in Breeding Season Surveys 1997-2009

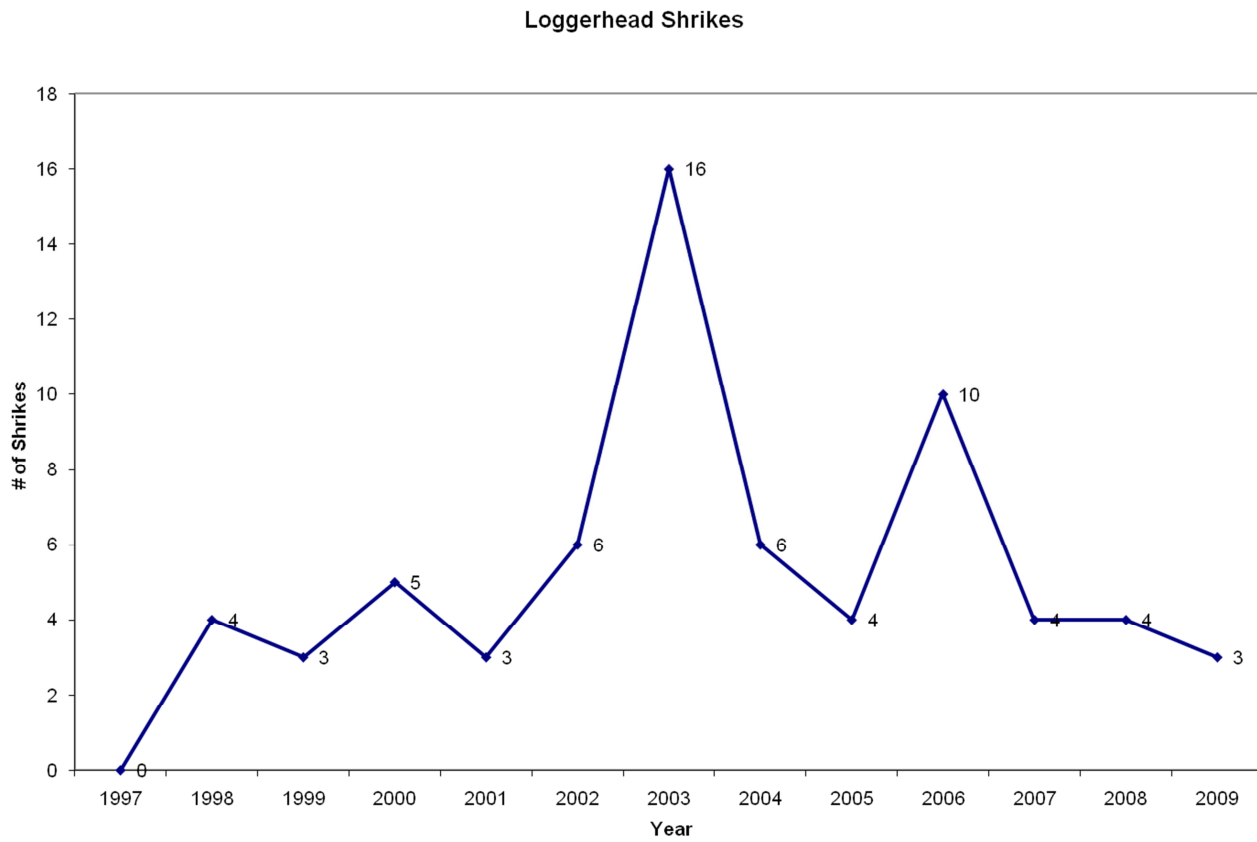


Figure 6. Numbers of Loggerhead Shrikes observed in Breeding Season Surveys 1997-2009

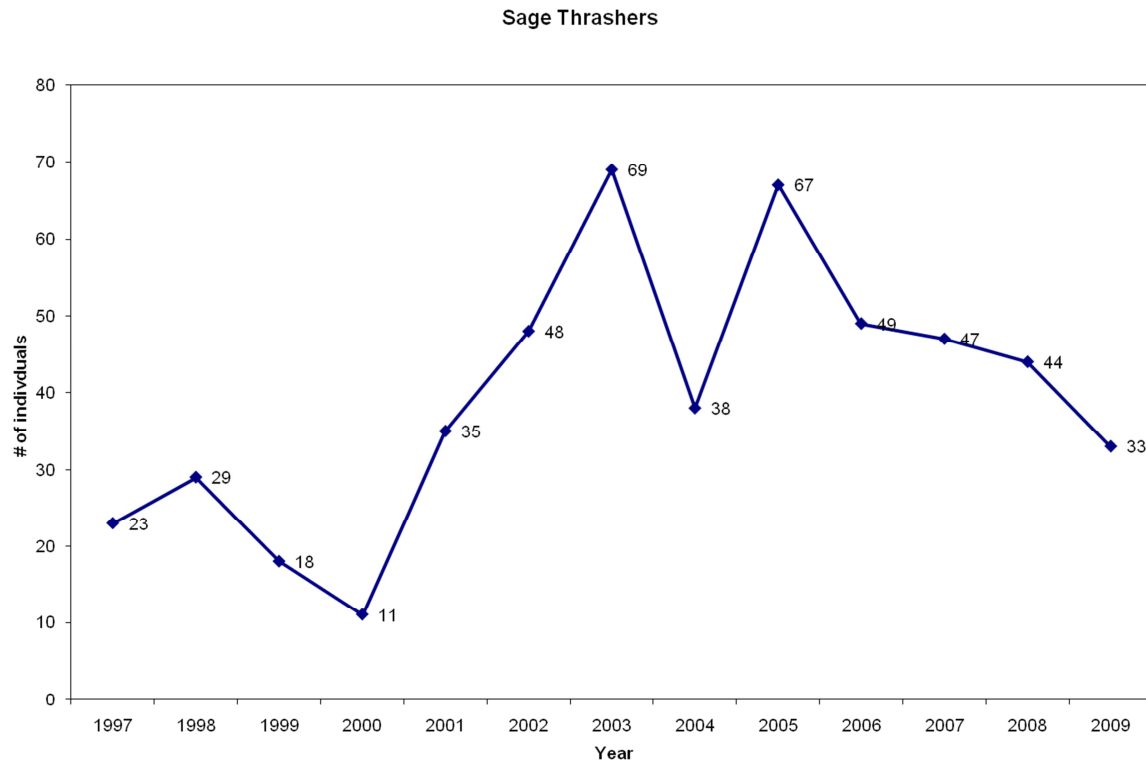


Figure 7. Numbers of Sage Thrashers observed in Breeding Season Surveys 1997-2009

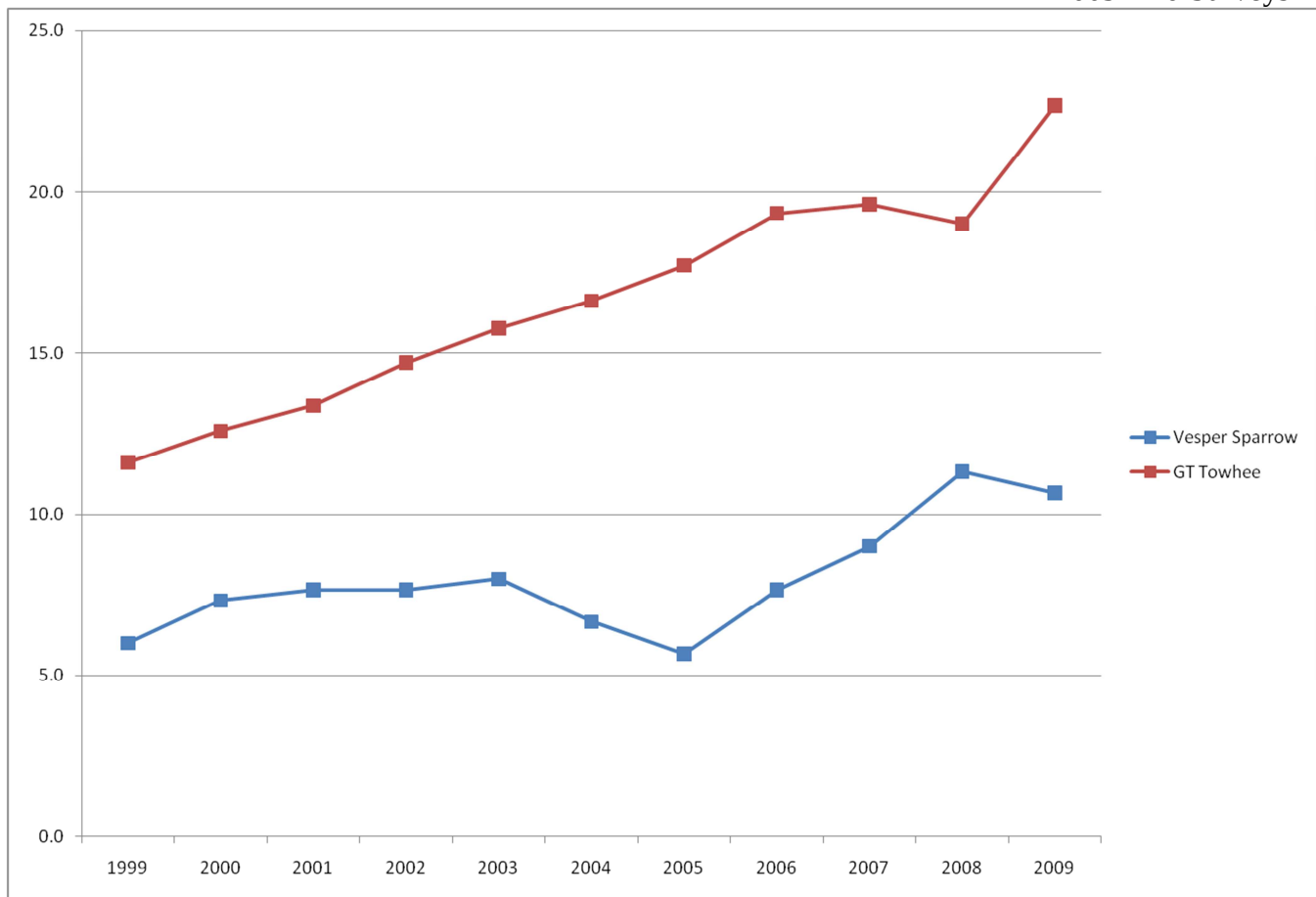


Figure 8. Numbers of Green-tailed Towhees and Vesper Sparrows.

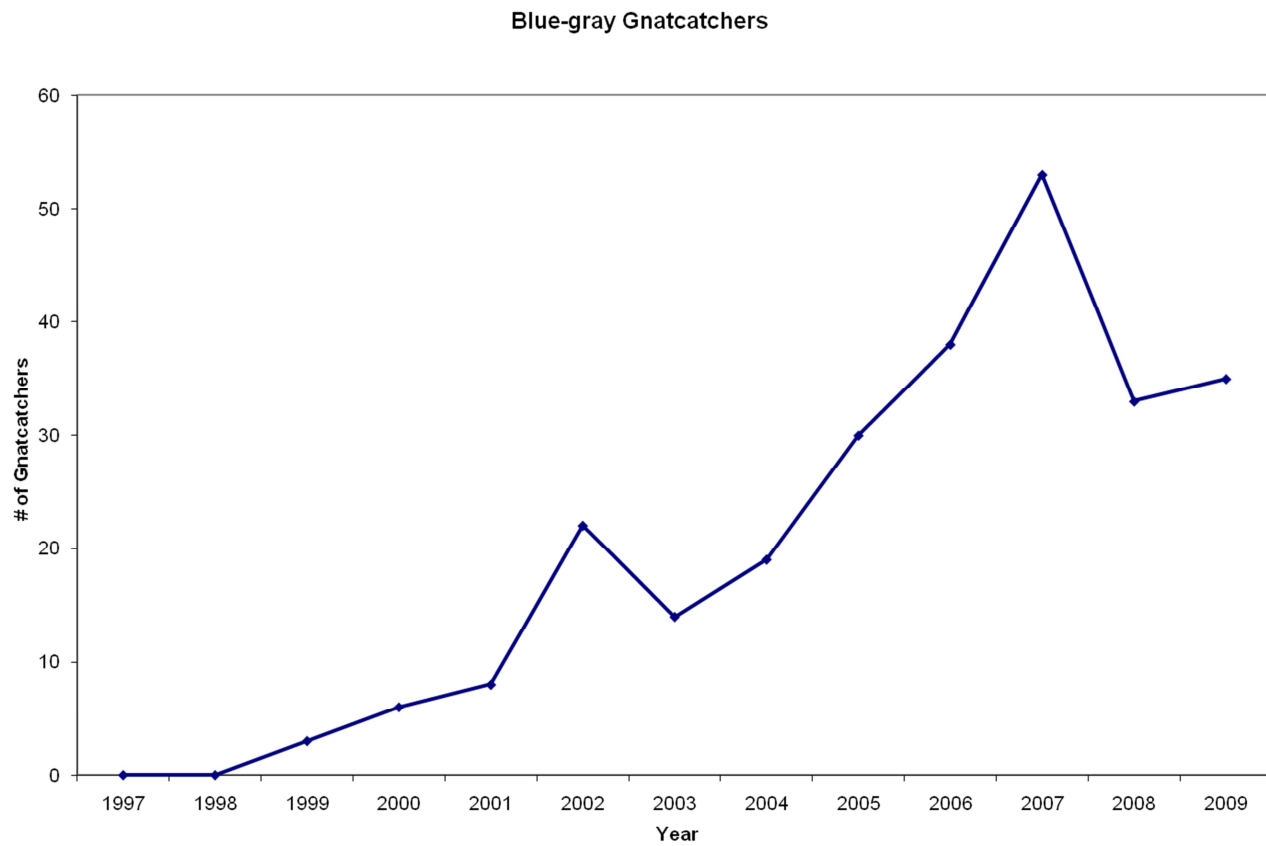


Figure 9. Numbers of Blue-gray Gnatcatchers observed in Breeding Season Surveys 1997-2009

GREATER SAGE-GROUSE MONITORING

Introduction and Methods

In April of 2004 monument staff initiated monitoring of Greater Sage-grouse leks on NPS managed lands. Lek surveys were performed using established methods used by the ID Department of Fish and Game (IDFG) and the BLM. These surveys consisted of three or four visits to designated leks within the Preserve during the month of April. Counting started as soon as light conditions allowed in the morning. Do to access conditions counts were done on foot and from an observation point near but outside the leks. When close enough together multiple leks were counted in a single morning but all counts were completed within 1.5 hours of sunrise. The standard lek forms in use by IDFG were used and copies were sent to IDFG for inclusion in the statewide database. A compilation of NPS and IDFG datasets shows 21 leks have been identified on NPS managed lands. From those 21 IDFG has classified 16 as inactive. This criteria is based on at least 10 years of surveys with no detections. No leks with status unknown are found on NPS managed lands at CRMO. During the period from 2004 to 2006 half of inactive historic leks were visited and no sage-grouse were detected on any visit. The remaining eight were not accessible without extended backpacking or aircraft. With over ten years of no observations these sites were then dropped from routine monitoring. One lek (New Lava #3 on the Grassy Flow near the edge of Little Park) is surveyed every other year and was last surveyed in 2007. The remaining six leks are all on the Sunset Flow and are in close proximity to each other. These leks are counted every year as a lek route which is used by the Idaho department of Fish and Game to determine trend data for the region. The group is called the Golden Chariot Complex for the largest of the leks. The Golden Chariot complex includes the Golden Chariot, MP 237, Lower Big Lost-Circular Water tank, Pressure Ridge, Blizzard Mountain Road, and Brodie Ranch leks. In 2009 theses leks were visited during the period from March 31 to April 21. Each lek was visited four times during this period.

Results

The six lek sites of the Golden Chariot Complex were visited and counted four times each during the month of April. For the third year in a row the Pressure Ridge lek was visited but had no grouse observed on any visit. The MP 237 lek had two males on it for the first time since 2005. Both of these are associated with the highway and disturbance by vehicles was high. Since both of these are within ½ mile of either the Golden Chariot or the Brodie Ranch lek is assumed that these birds may have moved to the higher quality sites. The Brodie Ranch lek was discovered in 2006 while moving between two other leks on the route. In 2009 this lek had a peak count of 22 male birds on the first visit on 31 March. This lek had a peak 21 males when it was discovered in 2006 and 42 in 2008. The Lower Big Lost-Circular Water Tank lek had a peak count of 37 males. This was slightly below the 10 year average of 41 for this specific lek. This lek is partially in the preserve and about 2/3 on private land and is often subject to heavy grazing of the private lands during the last half of the normal leking season. The Golden Chariot lek continued to be the largest count in the area. Counts ranged from a low of 16 on 14 April to a high of 78 on 31 March. The peak count was 139 males were seen on four of the six leks of the Golden Chariot complex. This compares to a ten year average of 99 and record high 202 in 2007.

The New Lava #3 and a three nearby leks were counted in 2009. New Lava #3 had no birds observed. However, one lek Tukatuk had been classified as inactive due to no activity in more than 10 years, had a single male displaying on 4/23/09.

Conclusions

For the first time since its discovery the male count on the Golden Chariot lek dropped significantly in 2008. The 39% drop in 2008 was followed by a 14% increase in 2009 (figure 10). The winter of 2007-8 was unusually cold and sage-grouse counts declined throughout Idaho. The rebound in 2009 suggests that much of the previous year's decline may be weather related given the more mild winter in 2008-9. While still well below the peak count of 2007 the increased count in 2009 contrasts with the continued decline in IDFG counts on BLM lands in the Magic Valley Region.

Lek routes run by the Idaho Department of Fish and Game in the north half of the Magic Valley region showed a 65% decline in numbers from 2006 to 2008. While only a one year snap shot, this is also a 55% decline from the five year average. By contrast the lek surveys in the Preserve showed 60% increase in male counts during the last five years. This change may likely have been influenced by winter conditions and survival. The rolling five year average continues to rise with only a slight drop in the rate increase (fig 11).

The importance of CRMO to sage-grouse can be seen in these surveys. Not only is the Golden Chariot the largest count in the region but few lek routes in Idaho and no other route in the region have showed a continuous increase during the current 10 year period. None showed percentage increases of this size. The number of Greater-sage Grouse and other sagebrush obligates was cited as a primary factor in Craters if the Moon meeting the criteria and being designated as an Important Bird Area of global significance during 2009.

Given the significance of the Golden Chariot lek complex there is additional information that is needed to preserve the population. Leks counts are an excellent way to measure the population but account for only a brief period in the annual life cycle of the birds. Nesting, brood rearing, and wintering areas are critical for the survival of the species. Yet, none of these areas have been identified for the birds that lek in the Golden Chariot complex. Given this lack of information additional research needs to be conducted in order to protect the population in the future.

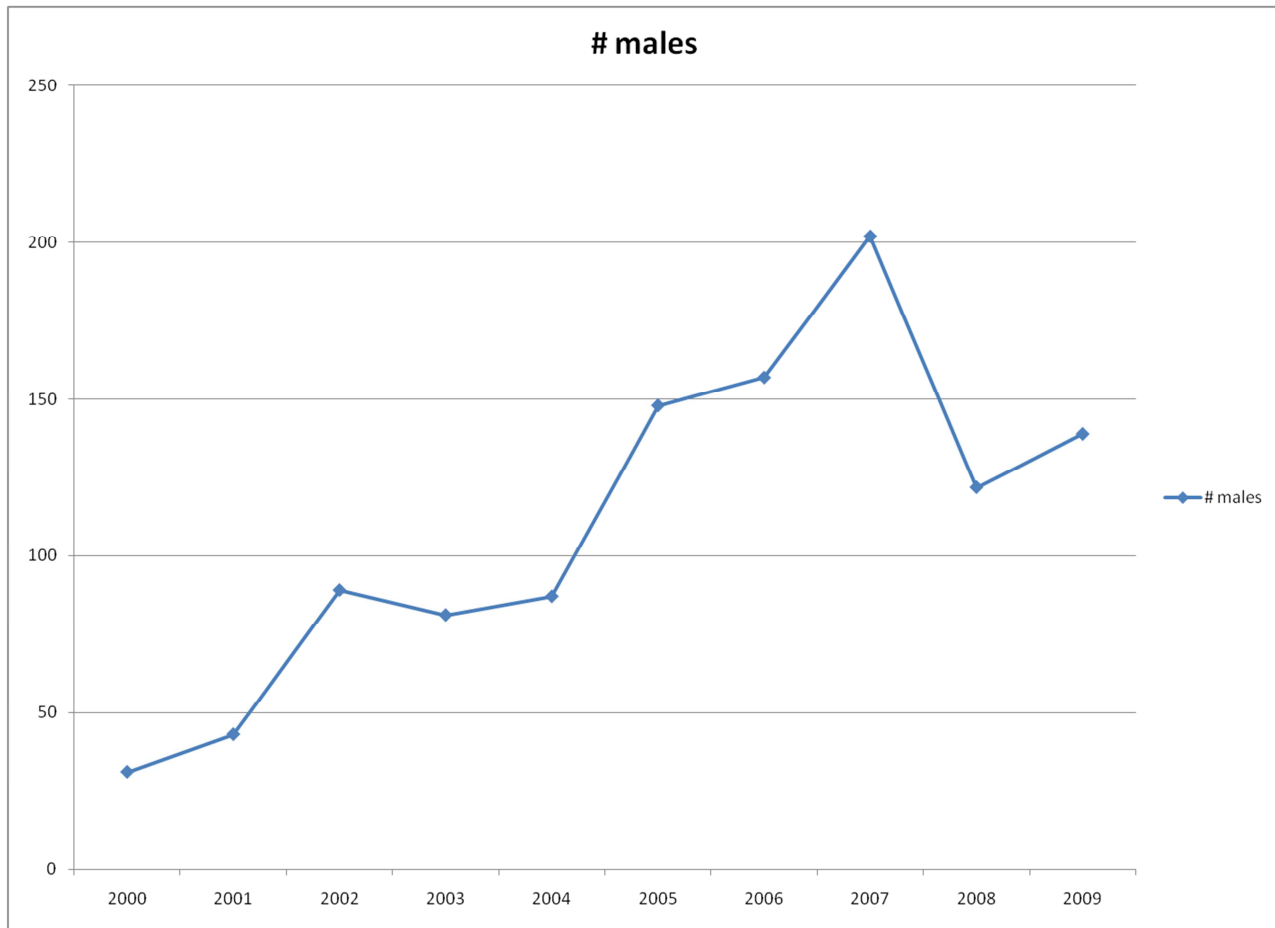


Figure 10. Number of male Greater Sage-grouse on the Golden Chariot Lek Complex 2000-2009.

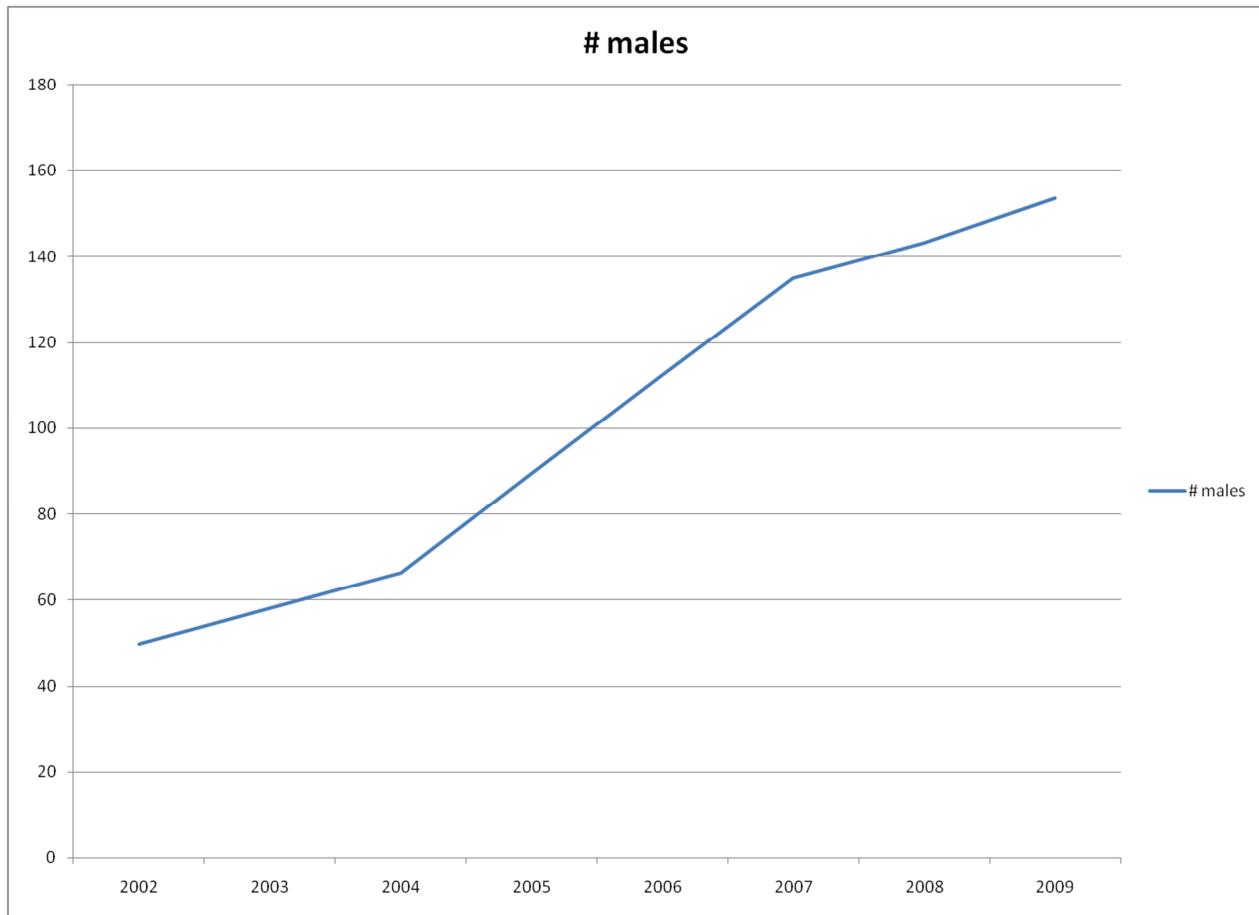


Figure 11. Rolling Five Year Average Count on the Golden Chariot Lek Complex.

MIGRANT SURVEYS

Introduction and Methods

Starting in 2002 migrant and spot surveys were also performed in habitats of interest. During 2009 these were Lava Lake and the adjacent lava flow, including the Preserve and all of Lava Lake; the hot springs cluster and the associated wetland, the survey included that portion of the marsh inside the livestock exclusion fence. The hot springs marsh was conducted as a walking transect. Lava Lake was performed as a long point count. Counts were generally performed until the observer felt all birds in the area were recorded. Counts were generally performed in the morning and the number of visits was opportunistic and varied between locations. During 2009 the number of visits was: 1 to the hot springs and 3 to Lava Lake.

Results and Conclusions

As in previous years the migrant surveys focused on water resources adjacent to the highway. A total of 43 species were seen on the migrant surveys at Lava Lake and the Hot Springs area (table 3). For the migrant surveys 17 species were recorded at the hot springs area and 34 species at Lava Lake. The number of species was reduced this year. This is likely due to a reduced survey effort in 2009. These surveys are conducted sporadically as time allows and only 4 surveys were done in 2009.

Table 3. Species observed during migrant surveys during 2009

Species	Survey area			Species	Survey area		
	CHS	LL			CHS	LL	
Canada Goose		X		Northern Flicker	X		
Gadwall		X		Eastern Kingbird		X	
American Wigeon		X		Black-billed Magpie	X	X	
Mallard		X		American Crow		X	
Northern Shoveler		X		Common Raven		X	
Cinnamon Teal	X	X		Violet-green swallow		X	
Green-winged Teal		X		Barn Swallow		X	
Redhead		X		Tree Swallow		X	
Canvasback		X		Rock Wren	X	X	
Ring-necked Duck		X		Marsh Wren	X		
Lesser Scaup		X		American Robin	X		
Bufflehead		X		Sage Thrasher	X		
Ruddy Duck		X		European Starling		X	
Pied-billed Grebe		X		Yellow Warbler		X	
Turkey Vulture		X		Spotted Towhee	X	X	
Northern Harrier	X			Song Sparrow	X		
Sandhill Crane	X	X		White-crowned Sparrow	X		
Virginia Rail	X	X		Red-winged Blackbird	X	X	
American Coot		X		Yellow-headed Blackbird		X	
Wilson's Snipe	X			Western Meadowlark	X	X	
Killdeer		X		Brewer's Blackbird		X	
Mourning Dove	X						

Area codes: CHS = The marsh and area adjacent to the hot springs near Carey Hot Springs, LL = Lava Lake

DAILY SPECIES LISTING

Starting in 1999 daily species lists of bird species observed have been compiled. This is not a formal survey but a list of species that were identified within CRMO each day. Species are observed in the course of other work so effort varies substantially from day to day or season to season. Even informal data collection of this nature can yield useful information. It provides a list of species that are observed from day to day or month to month. It provides information on first arrival and last departure date for migrant species. This project can also provide an early warning to problems with particularly species that may be showing significant shifts in the number of days a year is observed or shifts in the time of year it may be observed. This type of presence information is expected to be the first observable response to climate change by migrant populations.

For example the most abundant migrant bird species is the Brewer's Sparrow. The total number of birds detected in the breeding season surveys has been increasing over the last ten year period (figure 5). However the total number of days the species is observed has been contracting over the same time period (figure 12). Prior to 2008 the first observed arrival in the spring had been getting earlier. In 2008 and 2009 the first arrival again retracted to mid-May (figure 12). This is presumably related to a return to cooler spring temperatures in April and May in 2008 and 2009.

The second most common species recorded in the shrubsteppe during the breeding season surveys is the Spotted Towhee. Unlike the Brewer's Sparrow which is a sagebrush obligate the towhee is a shrub generalist. They can be found in a variety of habitats from coastal scrub to alpine shrublands. They will also occupy closed canopy forest if they have a significant shrub layer. They also have a more varied diet than many other sparrow species. This enables them to respond more rapidly to weather fluctuations. Like the Brewer's Sparrow the Towhee has declined in the number of days per year it has been recorded at CRMO (figure 13). Arrival dates are much more erratic and are presumably more closely tied to local snow pack than continent wide temperatures (figure 14). This coincides with count numbers from the breeding season surveys which have been very stable over the course of the project (figure 15).

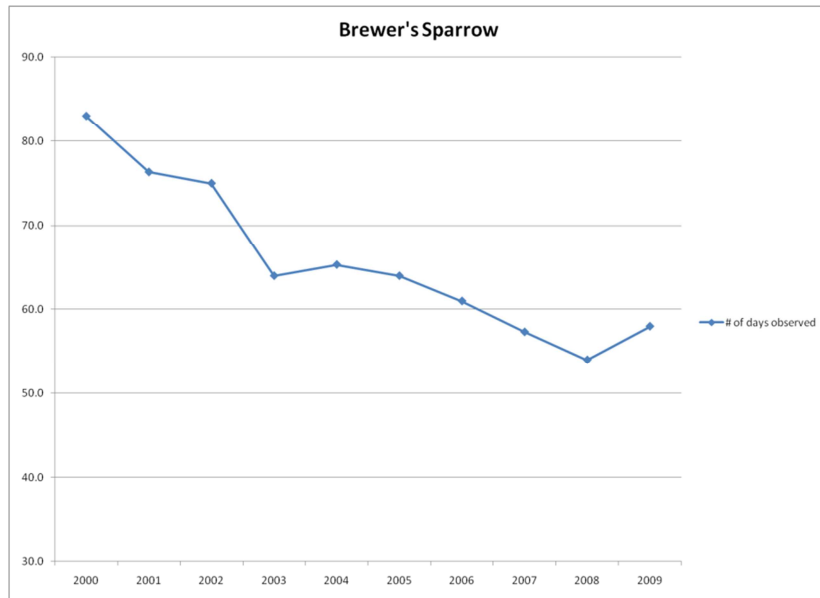


Figure 12. Three Year Rolling Average of the Numbers of Days Brewer's Sparrows Were observed

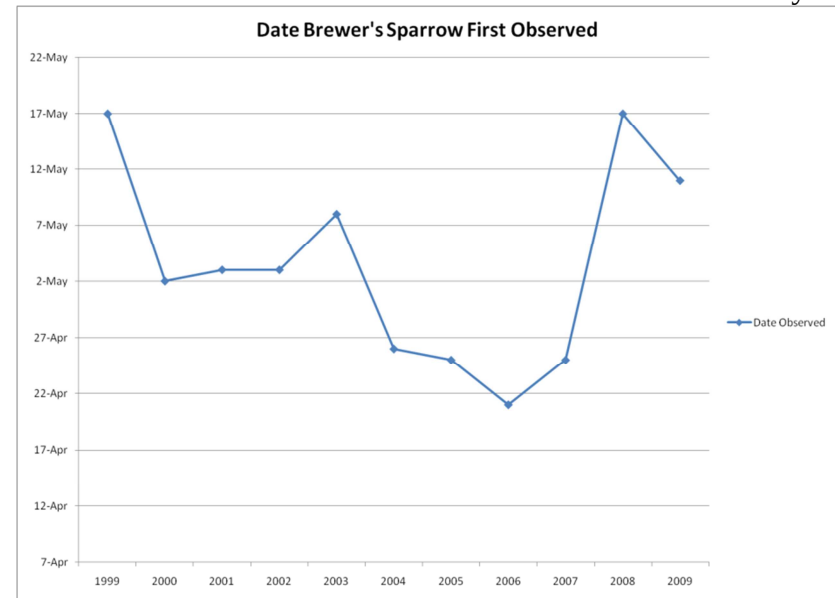


Figure 13. First Recorded Arrival Dates for Brewer's Sparrow

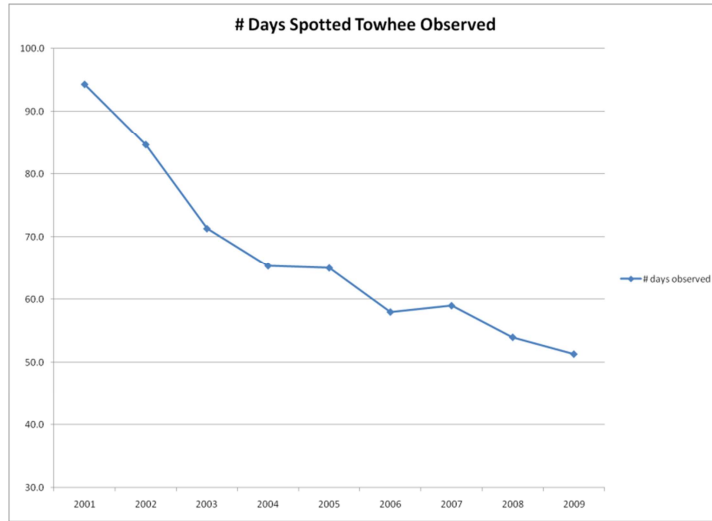


Figure 14. Three Year Rolling Average of the Numbers of Days Spotted Towhees Were observed

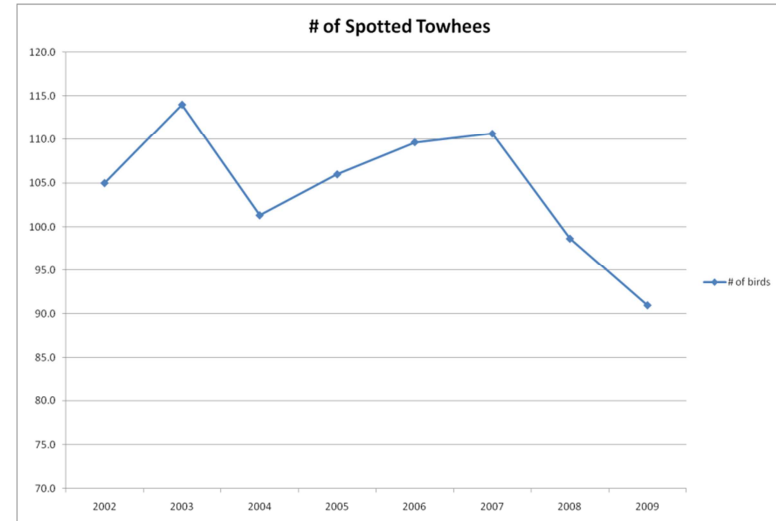


Figure 15. Number of Spotted Towhees Recorded in Breeding Season Survey

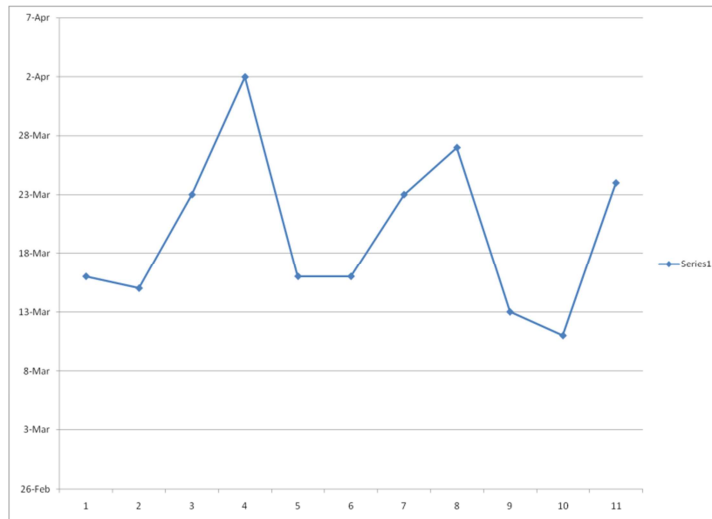


Figure 16. First Recorded Arrival Date for Spotted Towhee

WINTER MONITORING

Introduction and Methods

In December of 2005 a Christmas Bird Count (CBC) was restarted in the area around the park headquarters. This count had not been done since 1969. The 2009 count was performed on December 18. The CBC is the continent wide winter bird survey program sponsored by the National Audubon Society. The count is performed in 15 diameter circle. All birds observed within the circle during a single day are recorded. Detailed criteria and methods have been published by the National Audubon Society and available at the NAS web site at <http://www.audubon.org/bird/cbc/index.html>. It is a volunteer count and 3 people including the public and park staff participated in the Craters of the Moon count. A map of the count circle is in appendix 2. Each group has at least one person experienced in bird identification. The count was conducted on 29 December 2009 from 0820 to 1700. The group was in single party. The number of party hours was 8.5. Number of participants was 3.

The other winter project is the Craters/Big Lost route of the Mid-winter Eagle Count. Although a US Fish and Wildlife Service (USFWS) administered program this route has been counted by NPS personnel since its inception. In 2009 this count was conducted on January 8 using standard procedures published by the USFWS. In addition to eagles other birds of prey and raven and shrikes are also recorded

Results and Conclusions

Christmas Bird Count

Number of species detected was 20 and number of individuals was 213. This annual survey has been conducted 7 times in the past. The 20 species recorded in 2009 is the third highest species count yet recorded (table 5). For the complete list of birds counted see table 4. For a summary of the 7 years see Table 5. Ten of species were not recorded on any other survey at CRMO in 2009. Five of these species are either wintering birds or most common in winter and are highly unlikely to be recorded in other monitoring. Even with the smallest number of participants since the count was restarted in 2005 the number of species remained stable. When the count week species are included the number of species detected was 25. This compares to the high count of 26 species in 2007.

Mid-winter Eagle Count

The count was performed on January 8, 2009. Only one eagle was observed during the count. This was a single adult Golden Eagle. Several additional raptors were observed. These included 4 Rough-legged Hawks, 16 Common Raven, and two Prairie Falcons. Several common species were not located during the count. These in Red-tailed Hawk, American Kestrel, Northern Harrier, and Northern Shrike. This was likely influenced by heavy snow fall. More than three feet of snow fell in the two weeks prior to the count.

Table 4. Birds recorded on the Craters of the Moon Christmas Bird Count 2009

Species	Number counted
Greater Sage-grouse	CW
Rough-legged Hawk	CW
Golden Eagle, adult	1
Golden Eagle, immature	1
Northern Flicker	1
Hairy Woodpecker	1
Northern Shrike	1
Steller's Jay	CW
Clark's Nutcracker	7
Black-billed Magpie	19
American Crow	2
Common Raven	13
Horned Lark	CW
Black-capped Chickadee	1
Mountain Chickadee	5
Red-breasted Nuthatch	7
White-breasted Nuthatch	1
Marsh Wren	2
Song Sparrow	4
Dark-eyed Junco	13
Snow Bunting	CW
Gray-crowned Rosy-finch	30
House Finch	15
Red Crossbill	40
Pine Siskin	22
American Goldfinch	27

CW = species was recorded during the count week but not on the count day

Species in bold names are species not recorded on other surveys at CRMO

Table 5. Summary of Craters of the Moon Christmas Bird Count 1967-2009.

Year	Number of Species	Number of Individuals	Party Hours	Participants
1967	16	111	16	4
1969	9	49	10	1
2005	16	80	18	11
2006	20	258	15	8
2007	24	203	25	9
2008	22	128	17	10
2009	20	213	8.5	3

General Conclusion and Summary

In all a total of 143 species were detected in 2009 (table 6). Of these, 79 were seen during the regular breeding season surveys and 41 were seen on the migrant surveys at Lava Lake and the Hot Springs area, (table 3). Two species not previously recorded on spring surveys were detected on the counts; one of these (Ash-throated Flycatcher) had previously been recorded one or more times by incidental observations. One (Blue Grosbeak) was previously undocumented at CRMO.

A few incidental observations are particularly noteworthy. One was the observation of a White-winged Crossbill at the visitor center. This sighting is the first documentation of this species at CRMO. This species is generally found in northern spruce forests, It known to make periodic irruptions in to the northern states and hundreds of individuals of the species were reported throughout the region during the winter of 2008-9.

Another observation of note was an Olive-sided Flycatcher seen in the Douglas-fir stand on Grassy Cone in June. This species is a mature conifer associate. 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 US Fish and Wildlife Service has been petitioned to list the species as threatened but has postponed a full status review pending higher priority reviews. In 2008 a singing male observed for the first record at CRMO since 2000. At least one male was heard singing again in the same stand in 2009. Additional survey work targeting coniferous forest at CRMO may be necessary to determine if this species still breeds in the park.

Sixty-seven species (47% of species detected in 2008) have been listed as a priority species by Idaho Partner's in Flight (IDPIF 2002), are identified by the Idaho Department of Fish and Game (IDFG 2005) as species of with the greatest conservation need, or as sensitive by the Bureau of Land Management (USBLM 2003) (Table 5).

Table 6. List of bird species identified at Craters of the Moon during 2009

Species	Survey detected on			
	Breed	CBC	Migrant	Daily
Canada Goose	X		X	X
Snow Goose				X
Gadwall	X		X	X
American Wigeon			X	X
Mallard	X		X	X
Green-winged Teal			X	X
Northern Pintail				X
Northern Shoveler	X		X	X
Cinnamon Teal			X	X
Canvasback				X
Redhead			X	X
Ring-necked Duck	X		X	X
Lesser Scaup			X	X
Common Goldeneye				X
Bufflehead			X	X
Ruddy Duck			X	X
Great Blue Heron				X
Turkey Vulture	X		X	X
Osprey				X
Northern Harrier	X		X	X
Cooper's Hawk				X
Swainson's Hawk				X
Red-tailed Hawk	X			X
Ferruginous Hawk				X
Rough-legged Hawk		X		X
Bald Eagle				X
Golden Eagle	X	X		X
American Kestrel	X			X

Species	Survey detected on			
	Breed	CBC	Migrant	Daily
Merlin				
Prairie Falcon				X
Chukar				X
Gray Partridge				
Dusky Grouse				X
Greater Sage-grouse	X	X		X
Pied-billed Grebe			X	X
American Coot	X		X	X
Virginia Rail			X	
Sandhill Crane			X	X
Killdeer	X		X	X
Long-billed Curlew				X
Rock Pigeon	X			X
Mourning Dove	X		X	X
Burrowing Owl				X
Great Horned Owl				X
Long-eared Owl				X
Short-eared Owl				X
Northern Saw-whet Owl				
Common Nighthawk	X			X
Common Poorwill	X			X
Black-chinned Hummingbird	X			X
Broad-tailed Hummingbird				X
Rufous Hummingbird	X			X
Unidentified Hummingbird	X			
Lewis' Woodpecker	X			X
Hairy Woodpecker		X		X
Downy Woodpecker				X
Red-naped Sapsucker				X
Northern Flicker	X	X	X	X

Species	Survey detected on			
	Breed	CBC	Migrant	Daily
Ash-throated Flycatcher	X			
Olive-sided Flycatcher				X
Western Wood-pewee	X			X
Unidentified <u>Empidonax</u> sp.	X			
Hammond's Flycatcher	X			X
Gray Flycatcher	X			X
Dusky Flycatcher	X			X
Cordilleran Flycatcher	X			X
Say's Phoebe	X			X
Western Kingbird				X
Eastern Kingbird			X	X
Northern Shrike		X		X
Loggerhead Shrike	X			X
Warbling Vireo	X			X
Plumbeous Vireo	X			X
Cassin's Vireo				X
Steller's Jay		X		X
Clark's Nutcracker	X	X		X
Black-billed Magpie	X	X	X	X
American Crow	X	X	X	X
Common Raven	X	X	X	X
Horned Lark	X	X		X
Violet-green swallow	X		X	X
N. Rough-winged Swallow	X			X
Tree Swallow			X	X
Barn Swallow			X	X
Black-caped Chickadee		X		X
Mountain Chickadee		X		X
Red-breasted Nuthatch	X	X		X
White-breasted Nuthatch	X	X		X
Rock Wren	X		X	X

Species	Survey detected on			
	Breed	CBC	Migrant	Daily
House Wren	X			X
Marsh Wren		X	X	X
Golden-crowned Kinglet				X
Ruby-crowned Kinglet	X			X
Blue-gray Gnatcatcher	X			X
Mountain Bluebird	X			X
Townsend's Solitaire				X
American Robin	X		X	X
Hermit Thrush				X
Varied Thrush				X
Gray Catbird	X			X
Sage Thrasher	X		X	X
European Starling	X		X	X
Cedar Waxwing				X
Bohemian Waxwing				X
Orange-crowned Warbler	X			X
Yellow Warbler	X		X	X
Yellow-rumped Warbler				X
Townsend's Warbler				X
American Redstart				X
MacGillivray's Warbler	X			X
Nashville Warbler				X
Wilson's Warbler	X			X
Western Tanager	X			X
Green-tailed Towhee	X			X
Spotted Towhee	X		X	X
Dark-eyed Junco	X	X		X
Chipping Sparrow	X			X
American Tree Sparrow				
Brewer's Sparrow	X			X
Vesper Sparrow	X			X

Incident are species from incidental observations during the year.

Species in Bold are species not previously recorded at CRMO

Species	Survey detected on			
	Breed	CBC	Migrant	Daily
Lark Sparrow	X			X
Grasshopper Sparrow				X
Fox Sparrow	X			X
Song Sparrow	X	X	X	X
White-crowned Sparrow				X
Black-headed Grosbeak	X			X
Blue Grosbeak	X			
Snow Bunting		X		
Lazuli Bunting	X			X
Red-winged Blackbird	X		X	X
Western Meadowlark	X		X	X
Yellow-headed Blackbird	X		X	X
Brewer's Blackbird	X		X	X
Brown-headed Cowbird	X			X
Bullock's Oriole	X			X
Gray-crowned Rosy-finch		X		X
Cassin's Finch	X			X
House Finch		X		X
White-winged Crossbill				X
Red Crossbill	X	X		X
Common Redpoll				
American Goldfinch		X		
Pine Siskin		X		X
Evening Grosbeak				X

Breed are species detected during the breeding season survey.

CBC are species detected during the Christmas Bird Count

Migrant are species detected during the migrant survey.

Table 7. List of special status species recorded during surveys.

Species	BLM	Idaho	FWS	PIF
Cinnamon Teal				P
Northern Pintail		C		
Redhead				P
Lesser Scaup		C		
Northern Harrier				P
Swainson's Hawk	W	C	CC	P
Ferruginous Hawk	S	C	CC	P
Bald Eagle	S	C		
Golden Eagle			CC	P
Peregrine Falcon	S	C,T	CC	P
Prairie Falcon	S			P
Dusky Grouse	W			P
Greater Sage-grouse	S	C	CC	P
Sandhill Crane		C		P
Killdeer				P
Long-billed Curlew	W	C	CC	P
Burrowing Owl	S	C		P
Short-eared Owl	W	C		P
Black-chinned Hummingbird				P
Rufous Hummingbird				P
Lewis' Woodpecker	S	C	CC	P
Red-naped Sapsucker	W			P
Hammond's Flycatcher	S			P
Gray Flycatcher				P
Dusky Flycatcher				P

Species	BLM	Idaho	FWS	PIF
Cordilleran Flycatcher	W			P
Olive-sided Flycatcher		C	CC	P
Loggerhead Shrike	S	C	CC	P
Plumbeous Vireo				P
Black-billed Magpie				P
Brown Creeper				P
Rock Wren				P
Sage Thrasher	W		CC	P
MacGillivray's Warbler				P
Western Tanager				P
Green-tailed Towhee	W		CC	P
Brewer's Sparrow	S	C	CC	P
Lark Sparrow				P
Sage Sparrow	S		CC	P
Grasshopper Sparrow	W	C		P
Lazuli Bunting				P
Tree Swallow				P
Northern Rough-winged Swallow				P
Red-breasted Nuthatch				P
Mountain Chickadee				P
Marsh Wren				P
Ruby-crowned Kinglet				P
Blue-gray Gnatcatcher				P
Mountain Bluebird				P
Townsend's Solitaire				P
Say's Phoebe				P
Western Kingbird				P

Species	BLM	Idaho	FWS	PIF
Wilson's Warbler				P
Warbling Vireo				P
Clark's Nutcracker				P
Spotted Towhee				P
Chipping Sparrow				P
Grasshopper Sparrow	S			P
Black-headed Grosbeak				P
Blue Grosbeak		C		
Yellow-headed Blackbird				P
Bullock's Oriole				P
Western Meadowlark				P
Brewer's Blackbird	W			P
Black Rosy-finch				P
Cassin's Finch	S		CC	P
Gray-crowned Rosy-finch				P

BLM species are listed as sensitive "S" or Watch "W"

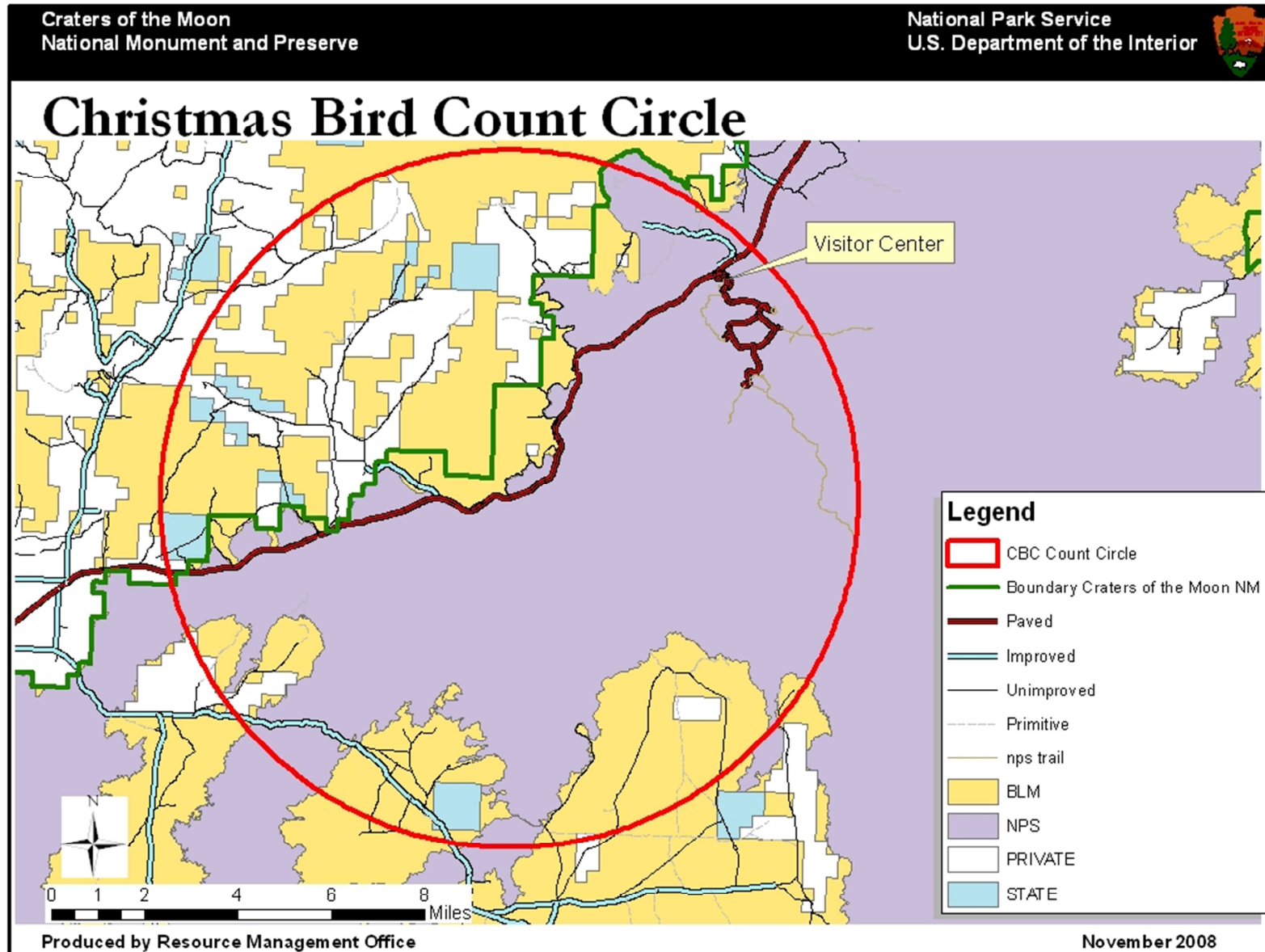
Idaho species are listed as a species of Greatest Conservation Need "C" or as threatened "T" by the state of Idaho

PIF species are species listed as Priority species in the Idaho Partners in Flight Idaho Bird Conservation Plan "P"

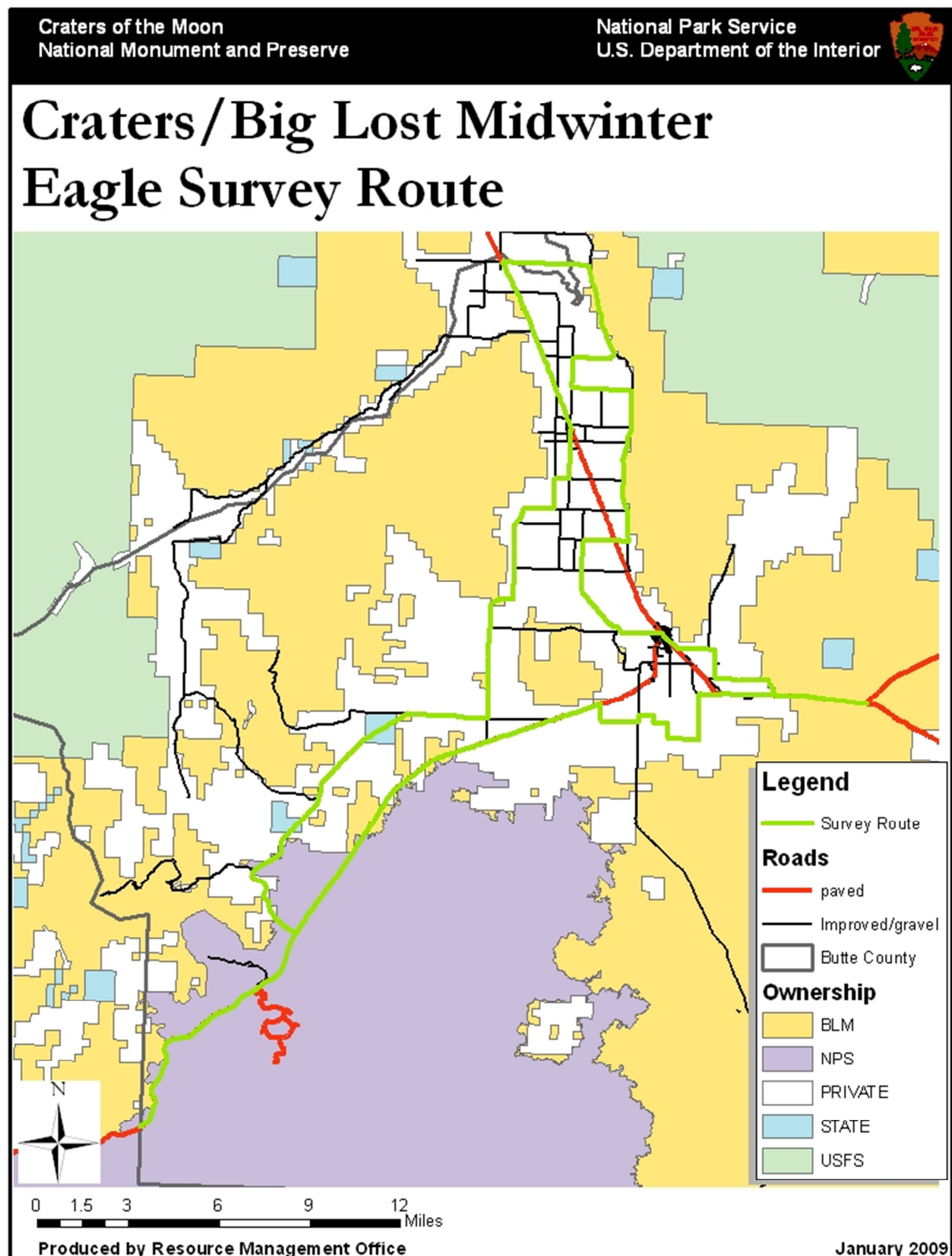
USFWS species listed as Birds of Conservation Concern by the US Fish and Wildlife Service "CC"

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Appendix 1. Location of the Craters of the Moon Christmas Bird Count



Appendix 2. Location of Craters/Big Lost Midwinter eagle Count Survey Route.