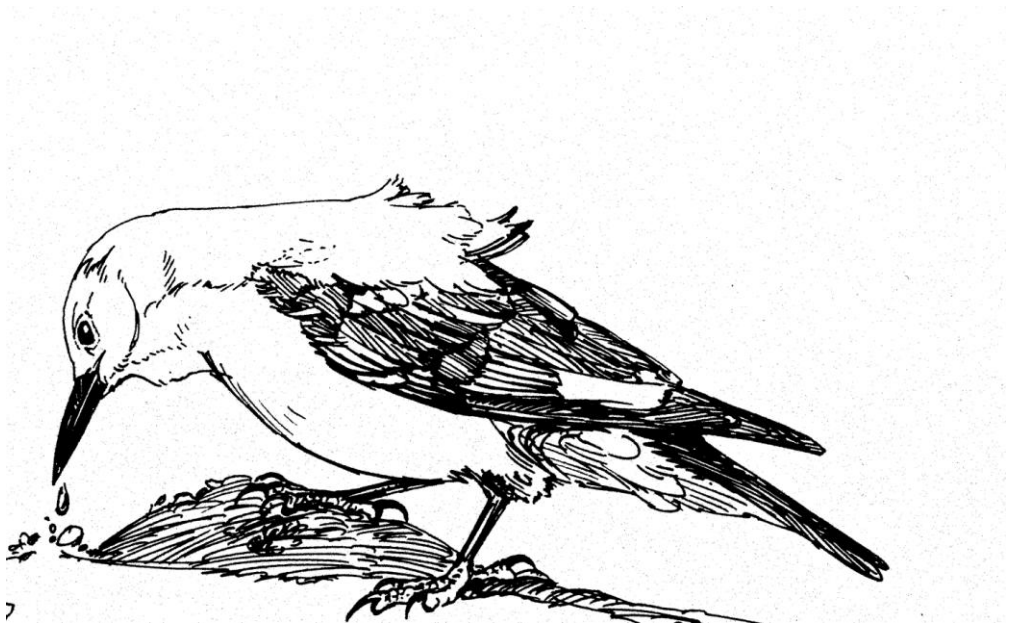


Craters of the Moon National Monument and
Preserve Bird Monitoring
2003-2004



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Executive Summary

Bird surveys were run on ten point count transects during June of 2003 and 2004. The surveys were performed on six routes that were established and first surveyed in 1997, with four additional routes in the Preserve started in 2001 and 2002. These ten routes covered varying amounts of 19 of the 27 habitat types recognized at Craters of the Moon by Day and Wright(1985). There were a total of 1386 individuals of 63 species observed on 166 point counts in 2003. In 2004 1699 individuals of 76 species were found on the same transects. The most numerous birds were Brewer's Sparrow, Rock Wren, Western Meadowlark, Spotted Towhee, American Coot, Mourning Dove, Sage Thrasher, Violet-green Swallow, Brewer's Blackbird, Mountain Bluebird, Brown-headed Cowbird, Lark Sparrow, and Western Tanager. All other species had less than 40 individuals observed over the two seasons. The Mourning Dove, Rock Wren, Brewer's Sparrow, Spotted Towhee, Common Raven, Northern Flicker, Brewer's Blackbirds, Mountain Bluebird, Violet-green Swallow, Common Nighthawk, Blue-gray Gnatcatcher, Sage Thrasher, Western Tanager, and Western Meadowlark were all recorded on 5 or more of the transects.

A total of 144 species were observed at CRMO during the two year period. Ten of these had not been previously documented at CRMO. Forty-five percent(65 of 144) of the species recorded are listed as sensitive by the state of Idaho, the BLM, the US Fish and Wildlife Service, or are a Partners in Flight priority species (Table 6).

Migrant surveys were continued during this time period and resulted in the confirmation of seven additional species for the park.

Sage-grouse leks count were initiated in 2004 and a total high count of 89 birds were observed on six leks that were visited. Three of these leks had no birds at all while two other had only one adult bird each.

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**Craters of the Moon National Monument and
Preserve Bird Monitoring
2003-04**

INTRODUCTION

Relatively undisturbed sites such as Craters of the Moon National Monument and Preserve (CRMO) and the nearby Idaho National Laboratory (INL) typically see much higher counts of shrubsteppe birds than more intensively managed lands. For example counts of Brewer's Sparrow are typically 4-5 per point on the INL and CRMO versus counts typically of 1-2 on Bureau of Land Management (BLM) managed lands in the surrounding area (Jon Bart USGS, personal communication 1999, Trost, personal communication 2002). Much of this decline has been the result of conversion of lands dominated by sagebrush to agriculture and grazing. Big Sagebrush is the dominant shrub on the monument (Day and Wright 1985) and over 95% of this shrub's range on the Snake River Plain has been eliminated or modified by agricultural use or urban development (Hironaka et al 1983).

Furthermore, nearly all of the habitats on the Snake River Plain have been invaded by exotic annual vegetation, primarily cheatgrass. Sagebrush sites that have high cheatgrass component in the understory have experienced an increase in fire frequency from 20-100 years to as little as 3-5 years (Peters and Bunting 1994). This change in the fire frequency has resulted in large areas devoid of native shrubs (Whisenant 1990). This trend is expected to continue in many areas, which will make undeveloped areas such as Craters of the Moon of even greater importance to migratory and breeding birds. Approximately 60% (126700 ha) of the monument is shrubsteppe vegetation (Day and Wright 1985). This unique mix of sagebrush and recent lava flows exists in few other locations in the United States such as the area in and around Newberry Crater National Volcanic Monument in central Oregon and Lava Beds National Monument in Northern California.

In addition to shrubsteppe the monument also contains a large area (2000+ ha) of limber pine stands. This disjunct population is at the lowest known elevation for the species in the region (Ahrens 1987). The limber pine stands provide the only conifer habitat in much of the monument and allow many forest birds to survive in the monument area and provide a major source of food and shelter for many migratory species.

These unique and undisturbed habitats have led to the designation of Craters of the Moon as an Important Bird Area (IBA) of national significance. IBA designation is based on specific criteria. In the case of CRMO these criteria include protection of several species of concern (defined as species which are threatened, endangered, sensitive, and declining), the site is an exceptional representative of a natural habitat, and the site supports long term monitoring. While having no legal status IBA designation is international recognition that CRMO preserves a significant portion of an important habitat. The international IBA program is a cooperative project between Birdlife International and International Partners in Flight. In Idaho the program is administered by the Idaho Department of Fish and Game (IDFG) and Idaho Partners in Flight (IDPIF).

Craters of the Moon National Monument and Preserve was set aside to protect the unique geologic features of the Great Rift volcanic system. The park has also preserved a unique ecosystem and provided an important refuge for shrubsteppe, juniper, limber pine, and other communities of the western United States. This role as an ecological sanctuary will only increase in importance as surrounding lands are increasingly disturbed and modified. In light of this importance as an ecological sanctuary and the relative diversity of birds in the monument long term avian monitoring is the primary component of the wildlife monitoring effort at Craters of the Moon.

The current monitoring program began in 1997. Earlier surveys had been designed to monitor habitat quality using birds as a model and required an extensive effort and was logistically difficult to complete with limited staff. The current procedures were intended to more closely monitor bird populations. The bird survey for CRMO was based on the survey protocols defined by the North American Breeding Bird Survey (BBS) (USGS 1998). This standardization increases the statistical usefulness of data from CRMO and simplifies comparison with other areas whether protected or unprotected. The methods were again modified for the 2001 field season. This change was made to increase accuracy of density estimates (Fancy and Sauer 2000) yet maintain statistical compatibility with previous surveys as well as regional BBS data.

In November of 2000 the monument was increased in size from 21500 ha to approximately 305500 ha. Out of these 305500 ha 190200 are managed by the National Park Service (NPS) as Craters of the Moon National Preserve with the remainder of the added lands continuing under BLM management. This additional area has included most of the habitats identified by Day and Wright 1985) as well as additional habitats for the monument. In 2001 and 2002 four additional routes were added to cover habitats such as riparian, mature shrubsteppe, and juniper communities. Additional routes and habitats may be included in the monitoring program in subsequent years.

This report details only NPS activities within the monument and preserve. Other monitoring was conducted by The Nature Conservancy, The Idaho Bird Observatory, BLM, and IDFG. Two standard BBS routes traversing portions of the Preserve were performed by a private individual. This report summarizes NPS activities only so these projects are not reported here.

METHODS

Breeding season surveys

The standard BBS protocol is a road based point count survey (USGS 1998). This protocol had to be modified since a 25 mile driving route did not exist in the monument prior to the November 2000 expansion. Shorter routes were selected and include primary trails which are surveyed on foot. The loop road is surveyed by vehicle, but is only 4.7 miles in length from the visitor center to the point where the one-way loop ends (spur roads not included in survey). The Goodale's Cutoff route is 24.5 miles long and is the only full length BBS route in use.

The field surveys are started after the arrival of late phase migrants including nighthawks, poorwills, and hummingbirds. This occurs during the first ten days of June with surveys completed by June 30.

The survey consists of ten routes (maps attached):

- 1 - CAREY KIPUKA, starts at the north stake of the vegetation monitoring transect, circling the kipuka half way between the top of the kipuka and the edge of the lava flows in a counter-clockwise direction.
- 2 - CAVES TRAIL, starts at the sign at the beginning of the caves trail and follows the trail to the collapse at the Arco Tunnel entrance.
- 3 - GOODALES CUTOFF 1, starts at the intersection of Goodale's Cutoff and follows the cutoff south to the intersection with Hwy 20 south of Big Cottonwood Creek. Can be combined with Goodale's Cutoff 2 to form a standard length BBS route.
- 4 - GOODALES CUTOFF 2, continues along Goodale's Cutoff from Goodale's Cutoff 1 routes ends. It ends on Goodale's Cutoff in Pioneer Mountains above Carey hot springs. Can be combined with Goodale's Cutoff 1 to form a standard length BBS route.
- 5 - LITTLE COTTONWOOD, starts where Goodale's Cut-off separates from Little Cottonwood road and follows the Little Cottonwood Creek past Martin Mine to the first switchback after the road becomes overgrown and undrivable and before spring box 3. This route was previously referred to as the North End route. The name was changed in 2001 to avoid confusion with other routes through the north end area of the park.
- 6 - LOOP DRIVE, starts at the gate at the beginning of the loop road and ends where the one-way loop ends.
- 7 - SUNSET FLOW, starts at the south side of Hwy 20 at the start of the Blizzard Mountain Road. It then follows the two track road that goes across the Sunset Flow east toward Round Knoll.
- 8 - TREE MOLDS TRAIL, starts at the sign at the head of the trail and continues to the end of the trail.

- 9 - WILDERNESS TRAIL, starts at the sign at the head of the Broken Top Loop trail. The route follows the Broken Top Loop trail to the beginning of the Wilderness Trail then follows the Wilderness to the base of Echo Crater.
- 10 - WOOD ROAD TRAIL, starts at the Wood Road parking area and follows trail to far end of Wood Road kipuka.

All surveys were conducted under acceptable environmental conditions as described in the BBS survey protocol (USGS 1998). Surveys begin 1/2 hour before sunrise. A measuring wheel was used to measure the distance between station stops on the walking routes at 250 meter intervals (825 feet. The odometer in the vehicle was used to measure the distance between station stops on the loop road at 500 meter (.31/mile) intervals. Survey points on Goodale's Cutoff were 0.5 miles apart to maintain consistent methods with the North American Breeding Bird Survey.

The survey begins upon arrival to each station and lasts five minutes. A second individual was present to help keep time and record data, however, only the surveyor's observations were recorded. All birds heard or observed were recorded during each station stop. Birds detected were categorized as under 50 meters, between 50 and 100 meters, over 100 meters, or as flyovers. Flyovers are defined as birds that were flying over a surveyed area and are not associated with the immediate vegetative structures. The 3rd interval of over 100m was added starting in 2001 to comply with the NPS Biological Resources Management Division's monitoring guidelines (Fancy and Sauer 2000). Observations were further subdivided into those recorded in the first 3 minutes and 3 to 5 minutes. Birds flushed while in route between stations were also recorded. Most transects were completed within 3.5 hours. The exception was Goodale's Cutoff which was completed in two consecutive days. The two days are labeled as Goodale's Cutoff 1 and 2 in the tables. When an individual bird was observed from adjacent points it was counted at the first location only.

Where possible the vegetation types (Appendix 1) for each station were identified and recorded, using the Vegetation Types Map for those areas covered by Day and Wright (1985) and through observation of the plant communities on site for those areas not covered by Day and Wright. Bird species and numbers were then tabulated for routes and vegetation types. Vegetation coding for individual points was done in 2000 or as routes were added. To account for succession these will be repeated every five years. In the case of a major disturbance (such as fire) they may be repeated more frequently.

Additional Monitoring

Starting in 2002 migrant and spot surveys were also performed in habitats of interest. During 2003 and 2004 these were Lava Lake and the adjacent lava flow, included the Preserve and all of Lava Lake; the hot springs cluster and the associated wetland, included only that portion of the marsh inside the monument; and the limber pine stands on Broken Top Cinder Cone. These were done as either a long point count or as a walking transect or combination of the two. Lava Lake was performed as a long point count. Counts were generally performed from the highway and lasted until the observer felt all birds in the area were recorded. Counts were performed at various times during the day and revisit intervals varied from 6 to 14 days. The number of visits was opportunistic and varied between locations. In 2003 the number of visits was; 1 visit to the Broken Top Loop, 6 to the hot springs, 11 to Lava Lake. In 2004 the number of visits was 5 to the hot

springs and 9 to Lava Lake.

Daily species lists were also kept for the park throughout the year. This project did not involve recording numbers or location but only recording the species observed in the park each day.

In April of 2004 monument staff initiated monitoring of Greater Sage-grouse leks on NPS lands. Lek surveys were performed using the established SOPs in use by the ID Department of Fish and Game (IDFG) and the BLM. These surveys consisted of 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 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. Approximately $\frac{1}{4}$ of known and mapped historic leks were visited. Two new leks were identified and added to the database. It expected that specific leks will be visited on a 4 year rotation. As additional leks are located additional surveys may be needed to maintain the four year return schedule. During the 2004 season six leks were visited. These were Golden Chariot, Pressure Ridge, MP 237, New Lava # 2, New Lava # 3, and Tuk-a-tuk.

RESULTS

Breeding season surveys

In Both 2003 and 2004 an annual total of 69,680 meters were surveyed, consisting of 165 survey points, as listed in Table 1. The total number of individuals was 1386 in 2003 and 1699 in 2004. The greatest number (418) on Goodale's Cutoff 2 in 2004 and least (35) on the Caves Trails in 2004 (Table 2). The mean number of birds per point ranged from 7.2 to 10.4 in 2003. The range was 7.0 to 16.7 with a mean of 10.2 in 2004. The number of species recorded per transect ranged from 8 at Carey Kipuka to 29 on Goodale's Cutoff 2 in 2003. The range was 8 at the Caves Trail to 29 on the Goodale's Cutoff 2 in 2004. The total number of species observed on all transects was 63 in 2003 and 76 in 2004. The mean number of species per point ranged from 3.2 to 5.3 with an average for all sites of 4.3 in 2003. The range was 2.3 to 7.6 with an overall average of 4.6 in 2004.

The Brewer's Sparrow had the greatest number with 396 and 424 individuals recorded in 2003 and 2004 respectively. They accounted for 27% of all individuals recorded. Other species with total counts of 40 or more over both years included Rock Wren (n = 331, percent of total = 10.7), Western Meadowlark (n = 279, % = 9.0), Spotted Towhee (n = 204, % = 6.6), American Coot (n = 200, % = 6.5), Mourning Dove (n = 130, % = 4.2), Sage Thrasher (n = 107, % = 3.5), Violet-green Swallow (n = 97, % = 3.1), Brewer's Blackbird (n = 77, % = 2.5), Mountain Bluebird (n = 62, % = 2.0), Brown-headed Cowbird (n = 52, % = 1.7), Lark Sparrow (n = 52, % = 1.7), and Western Tanager (n = 49, % = 1.6).

Mourning Dove and Rock Wren were recorded on all ten transects. Brewer's Sparrows were seen on nine transects. Spotted Towhees, Common Ravens, and Northern Flickers were seen on eight transects. Brewer's Blackbirds were seen on seven transects. Mountain Bluebirds and Violet-green Swallows were recorded on six of the ten transects. Common Nighthawk, Blue-gray Gnatcatcher, Sage Thrasher, Western Tanager, Western Meadowlark were recorded on five or more transects.

Eight species were recorded on 40 or more points. These were Brewer's Sparrow at 208 points (63% of total), Rock Wren at 201 points (61% of total), Spotted Towhee at 136 points (41% of total), Mourning Dove at 105 points (33% of total), Western Meadowlark at 94 points (28% of total) Sage Thrasher at 84 points (25% of total), Mountain Bluebird at 42 points (13% of total), and Western Tanager at 40 points (12% of total).

The 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. Incidental observations over the course of the year in both Little Cottonwood and Leech Creeks produce additional species not found elsewhere. These species include Cooper's Hawk, Sharp-shinned Hawk, Brown Creeper, and Lincoln's Sparrow. Several more species that were found throughout the monument were found in much higher numbers in the riparian zone. This group consists of birds such as woodpeckers, finches, jays, owls and other forest birds.

Of all vegetation types big sagebrush was surveyed on the highest percentage of points (64% of points surveyed at least one type of sagebrush)(Table 5). Other vegetation types that were surveyed on more than

10 percent of the points were Lava Flows (31%), Cinder Gardens (17%), antelope bitterbrush (13%), and Limber Pine/Bitterbrush. Of the more general community types lavas (flows and cinders) were monitored on 47% of points, shrubsteppe on 77%, grasslands on 4%, forests on 24%, non-wooded wetlands on 2%, and the developments on less than 1% of points.

Other Surveys

The total number of species detected during 2003 and 2004 was 144 (table 6). The number of species not previously documented in CRMO was 10. The daily and incidental observations detected 127 species. Of these 127 species two were not previously documented within CRMO and were not seen on either the breeding or migrant surveys. Of the 123 species seen on formal surveys, 76 were seen during the regular breeding season surveys and 30 were seen only on the migrant surveys at Broken Top, Lava Lake, and the Hot Springs area (table 2). Of the eight undocumented species seen on the surveys seven were seen only during the migrant surveys and one was seen only during the breeding bird survey. For the migrant surveys 5 species were seen on the Broken Top Loop, 38 species at the hot springs area, and 47 species at Lava Lake.

Sage-grouse Lek Survey

Six lek sites were visited and counted four times each during the month of April. Three of these had no grouse observed on any visit. Those leks were Tuk-a-tuk, New Lava#2, and New Lava#3. The Pressure Ridge lek had two birds observed on the first visit and none on subsequent visits. The MP 237 lek had a single displaying male on the first visit and no birds observed on subsequent visits. The Golden Chariot lek had four visits with counts ranging from 59 to 86.

Table 1. Craters of the Moon National Monument's 2003 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							
Caves Trail	1000	5	2,21	51	9.8	11	4.4
Carey Kipuka	2250	10	2,8,9,11	56	5.6	8	3.2
Little Cottonwood	3000	13	4,5,7,18, 20,24,25, 26,29	93	7.2	24	5.0
Sunset Flow	5750	24	29,34	215	9.0	12	3.5
Tree Molds	1750	8	2,16,22	66	8.3	12	5.3
Wood Road	3500	15	2,36,41	156	10.4	13	3.8
Wilderness Trail	6000	25	1,2,6,7, 16,21,22	162	6.5	20	3.9
Driving Route							
Goodale's Cutoff	19715	25	3,4,5,20, 25,26,33, 34	223	8.9	25	4.6
Goodale's Cutoff 2	19715	25	2,3,25,29 ,33,34	247	9.9	29	4.9
Loop Drive	7000	15	1,2,4,16, 21,22,27	117	7.8	18	4.5
TOTALS	70180	165		1386	8.4	63	4.3

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
 33 = Misc. Wetlands
 34 = Misc. Big Sagebrush

Table 2. Craters of the Moon National Monument's 2004 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							
Caves Trail	1000	5	2,21	35	7.0	8	2.3
Carey Kipuka	2250	10	2,8,9,11	52	5.2	10	3.0
Little Cottonwood	3000	13	4,5,7,18, 20,24,25, 26,29	138	10.6	34	7.6
Sunset Flow	5750	24	29,34	219	9.0	14	3.1
Tree Molds	2250	10	2,16,22	87	8.7	13	5.4
Wood Road	3500	15	2,36,41	165	11.0	15	4.1
Wilderness Trail	6000	25	1,2,6,7, 16,21,22	184	7.4	26	4.6
Driving Route							
Goodale's Cutoff	19715	25	3,4,5,20, 25,26,33, 34	246	9.8	28	4.9
Goodale's Cutoff 2	19715	25	2,3,25,29 ,33,34	418	16.7	29	5.2
Loop Drive	7000	15	1,2,4,16, 21,22,27	155	10.3	17	5.1
TOTALS	69680	167		1699	10.2	76	4.6

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
 33 = Misc. Wetlands
 34 = Misc. Big Sagebrush

Table 3. Species recorded during 2003 Breeding Season Surveys

Species	No. of birds	% of total	Rts. detected on	# of stops	% of stops
Pied-billed Grebe	1	<0.1	GC2	1	0.6
American Coot	50	3.6	GC2	1	0.6
Gadwall	1	<0.1	GC2	1	0.6
Mallard	3	0.2	GC2	1	0.6
Blue-winged Teal	2	0.1	GC2	1	0.6
Ruddy Duck	4	0.3	GC2	1	0.6
Great Blue Heron	1	<0.1	GC2	1	0.6
Turkey Vulture	15	1.1	LP,SF,WT	4	2.4
Northern Harrier	1	<0.1	LC	1	0.6
Red-tailed Hawk	2	0.1	GC2,LP	2	1.2
Golden Eagle	1	<0.1	GC2	1	0.6
American Kestrel	1	<0.1	WT	1	0.6
Killdeer	1	<0.1	GC2	1	0.6
Blue Grouse	1	<0.1	LC	1	0.6
Greater Sage-grouse	2	<0.1	GC2	1	0.6
Ring-necked Pheasant	1	0.1	GC	1	0.6
Rock Pigeon	9	0.1	CA	1	0.6
Mourning Dove	57	4.1	LP,TM,CK,WT,CA,SF,GC,GC2,WR	52	3.2
Common Nighthawk	9	0.1	CA,CK,LP,SF,WR	7	4.2
Hairy Woodpecker	3	0.2	GC,LC	2	1.2
Northern Flicker	19	1.4	CA,LC,LP,CK,TM,WT,GC	19	11.5
Says Phoebe	2	0.1	WT,WR	2	1.2
Western Wood-Pewee	3	0.2	GC,GC2,LP	3	1.8
Dusky Flycatcher	3	0.2	LC	3	1.8
Western Kingbird	1	<0.1	GC2	1	0.6
Loggerhead Shrike	16	1.1	CK,SF	8	4.8
Warbling Vireo	3	0.2	LC	3	1.8
Solitary Vireo	3	0.2	LC	3	1.8
Clark's Nutcracker	10	0.7	CK,LP,TM	7	4.2
Black-billed Magpie	1	<0.1	GC2	1	0.6
Common Raven	23	1.7	CA,GC,GC2,LC,LP,SF,WT,WR	17	10.2
Violet-green Swallow	43	3.1	CA,GC,GC2,LP,SF,WT	12	7.3

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, WC = Wood Road Trail

Table 3 (cont.) Species recorded during 2003 Breeding Season Surveys

Species	No. of birds	% of total	Rts. detected on	# of stops	% of stops
Mountain Chickadee	1	<0.1	LC	1	0.6
Red-breasted Nuthatch	1	<0.1	WT	1	0.6
Rock Wren	140	10.1	CA,CK,GC,GC2,LP,SF,TM,WT,WR	93	56.4
House Wren	8	0.5	LC,GC	8	4.8
Ruby-crowned Kinglet	2	0.1	LC,TM	2	1.2
Blue-gray Gnatcatcher	14	1.0	CA,LP,TM,WT,WR	9	5.5
Mountain Bluebird	27	1.9	LP,CA,LC,TM,GC,WT	18	10.9
American Robin	11	0.8	LC,LP	9	5.5
Sage Thrasher	69	5.0	LC,SF,GC,GC2,WT	54	32.7
Orange-crowned Warbler	2	0.1	GC2,LC	2	1.2
Yellow Warbler	11	0.8	GC,LC,WT	10	6.1
MacGillivray's Warbler	3	0.2	GC,LC,WR	3	1.8
Wilson's Warbler	1	<0.1	LC	1	0.6
Western Tanager	19	1.4	LC,LP,TM,WT	16	9.7
Green-tailed Towhee	5	0.4	GC,WT	5	3.0
Spotted Towhee	108	7.8	CA,GC,GC2,LC,LP,TM,WT	70	42.4
Chipping Sparrow	8	0.6	TM,WT	5	33.3
Brewer's Sparrow	396	28.6	LC,LP,TM,WT,CA,SF,GC,GC2,WR	104	63.0
Vesper Sparrow	8	0.6	GC,GC2	8	4.8
Lark Sparrow	28	2.0	GC,GC2,SF,WR	21	12.7
Sage Sparrow	3	0.2	GC2,SF,WR	3	1.8
Fox Sparrow	1	<0.1	LC	1	0.6
Song Sparrow	3	0.2	LC	2	1.2
Dark-eyed Junco	4	0.3	TM	3	1.8
Black-headed Grosbeak	1	<0.1	GC	1	0.6
Lazuli Bunting	9	0.6	GC,GC2,LC,WT	9	5.5
Red-winged Blackbird	3	0.2	GC	1	0.6
Western Meadowlark	158	11.4	CK,GC,GC2,SF,WR	45	27.3
Yellow-headed Blackbird	5	0.4	GC2	3	1.8
Brewer's Blackbird	35	2.5	CK,LP,GC,GC2,WR	15	9.1
Brown-headed Cowbird	16	1.2	WT,GC,GC2,WR	13	7.9
Bullock's Oriole	1	<0.1	WR	1	0.6
Cassin's Finch	1	<0.1	LP	1	0.6

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, WC = Wood Road Trail

Table 4. Species recorded during 2004 Breeding Season Surveys

Species	No. of birds	% of total	Rts. detected on	# of stops	% of stops
American Coot	150	8.8	GC2	1	0.6
Gadwall	2	<0.1	GC2	1	0.6
Mallard	9	0.5	GC2	1	0.6
Cinnamon Teal	5	0.2	GC2	1	0.6
Northern Shoveler	3	0.1	GC2	1	0.6
Ruddy Duck	1	<0.1	GC2	1	0.6
Great Blue Heron	3	0.1	GC2	1	0.6
Turkey Vulture	18	1.0	LP,SF,WT	2	1.2
Northern Harrier	1	<0.1	GC,LC	1	0.6
Red-tailed Hawk	2	<0.1	GC2,LP	2	1.2
American Kestrel	5	0.4	SF,GC,GC2,WT	5	3.0
Prairie Falcon	1	<0.1	WT	1	0.6
Sandhill Crane	1	<0.1	GC2	1	0.6
Killdeer	3	0.1	GC2	1	0.6
Chukar	1	<0.1	GC	1	0.6
Rock Pigeon	2	<0.1	CA	1	0.6
Mourning Dove	73	4.3	LC,LP,TM,CK,WT,CA,SF,GC,GC2,WR	53	3.2
Great Horned Owl	1	<0.1	WR	1	0.6
Common Nighthawk	2	<0.1	CA,CK,LP,SF,WR	2	1.2
Common Poorwill	1	<0.1	GC	1	0.6
Black-chinned Hummingbird	2	<0.1	LC,WT	2	1.2
Lewis Woodpecker	2	<0.1	GC,WT	2	1.2
Red-naped Sapsucker	4	0.2	LC	3	1.8
Hairy Woodpecker	3	0.1	GC,LC	3	1.8
Northern Flicker	14	0.8	LC,LP,CK,SF,TM,WT,GC	12	7.1
Hammond's Flycatcher	3	0.1	LC	3	1.8
Dusky Flycatcher	9	0.5	GC,GC2,LC	8	4.8
Western Kingbird	8	0.4	GC2,WR	4	2.4
Loggerhead Shrike	6	0.3	CK,WR	4	2.4
Warbling Vireo	12	0.1	LC,GC	10	6.0
Solitary Vireo	1	<0.1	LC	1	0.6
Clark's Nutcracker	18	1.1	CK,LP,TM,WT	10	6.0

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, WC = Wood Road Trail

Table 4 (cont.) Species recorded during 2004 Breeding Season Surveys

Species	No. of birds	% of total	Rts. detected on	# of stops	% of stops
Black-billed Magpie	3	0.2	GC2,WR	3	1.8
American Crow	4	0.2	GC2	1	0.6
Common Raven	10	0.6	CA,GC,GC2,LC,LP,SF,WT,WR	9	5.4
Violet-green Swallow	54	3.2	CA,GC,GC2,LP,SF,WT	18	10.1
Mountain Chickadee	5	0.2	LC,LP	5	3.0
Red-breasted Nuthatch	4	0.2	LP,WT	4	2.4
Rock Wren	191	11.2	CA,CK,GC,GC2,LC,LP,SF,TM,WT,WR	108	64.7
House Wren	7	0.4	LC,GC,GC2,TM	5	3.0
Winter Wren	1	<0.1	LC	1	0.6
Ruby-crowned Kinglet	1	<0.1	LP	1	0.6
Blue-gray Gnatcatcher	19	1.1	LP,TM,WT,WR	12	7.2
Mountain Bluebird	35	2.1	LP,CA,LC,TM,GC,WT	24	14.4
American Robin	10	0.6	GC,LC,LP	7	4.2
Gray Catbird	2	<0.1	LC	1	0.6
Northern Mockingbird	1	<0.1	WR	1	0.6
Sage Thrasher	38	2.2	LC,SF,GC,GC2,WT	30	18.0
Orange-crowned Warbler	2	<0.1	GC2,LC	2	1.2
Yellow Warbler	4	2	GC,LC	2	1.2
Yellow-rumped Warbler	1	1	LC	1	0.6
MacGillivray's Warbler	3	0.2	GC,LC,WR	3	1.8
Wilson's Warbler	3	0.2	LC	3	1.8
Western Tanager	30	1.8	GC,LC,LP,TM,WT	24	14.0
Green-tailed Towhee	3	0.2	GC,LC,SF	3	1.8
Spotted Towhee	96	5.7	CA,GC,GC2,LC,LP,SF,TM,WT	66	40.0
Chipping Sparrow	27	1.6	GC,LP,TM,WT	19	11.4
Brewer's Sparrow	424	25.0	LC,LP,TM,WT,CA,SF,GC,GC2,WR	104	62.3
Vesper Sparrow	18	1.1	LC,GC,GC2,SF	15	9.0
Lark Sparrow	24	1.4	GC,GC2,SF,WR	17	10.2
Sage Sparrow	1	<0.1	SF	1	0.6
Fox Sparrow	4	2.0	LC	4	2.4
Song Sparrow	1	<0.1	LC	1	0.6
Lincoln's Sparrow	1	<0.1	LC	1	0.6
Dark-eyed Junco	1	<0.1	TM	1	0.6
Black-headed Grosbeak	3	0.2	GC,LC,	3	1.8
Lazuli Bunting	29	1.7	GC,GC2,LC,WT	29	17.4
Red-winged Blackbird	15	0.9	GC,GC2	3	1.8
Western Meadowlark	121	7.1	CK,GC,GC2,SF,WR	50	30.0

Yellow-headed Blackbird	4	0.2	GC2	1	0.6
Brewer's Blackbird	32	1.9	CK,LC,LP,GC,GC2,SF,WR	11	6.6
Brown-headed Cowbird	30	1.8	LC,WT,GC,GC2,WR	12	7.2
Bullock's Oriole	5	0.2	WR	1	0.6
Pine Siskin	1	<0.1	LC	1	0.6
House Finch	1	<0.1	CK	1	0.6
Cassin's Finch	24	1.4	LC,LP	13	7.8

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, WC = Wood Road Trail

Table 5. Vegetation types included on the Craters of the Moon Breeding Bird Survey routes.

Vegetation Types	Number of Stops per route											% of stops
	CA	CK	GC	GC2	LC	LP	SF	TM	WT	WR	Ttl	
Lavas											79	47.6
1	1	-	-	-	-	10	-	-	17	-	28	16.9
2	5	10	-	17	-	9	2	5	6	-	37	22.3
3	-	-	5	-	-	-	-	-	-	9	14	8.4
Sagebrush											128	77.2
4	-	-	8	-	14	2	-	-	-	-	24	14.5
5	-	-	5	-	1	-	-	-	-	-	6	3.6
6	-	-	-	-	-	-	-	-	9	-	9	5.4
7	-	-	-	-	1	-	-	-	1	-	2	1.2
8	-	10	-	-	2	-	-	-	-	-	12	7.3
9	-	10	-	-	-	-	-	-	-	-	10	6.0
11	-	10	-	-	-	-	-	-	-	-	10	6.0
16	-	-	-	-	-	2	-	5	13	-	21	12.6
34	-	-	15	8	-	-	24	-	-	-	47	28.3
36	-	-	-	15	-	-	-	-	-	15	30	18.1
Grasses											6	3.6
18	-	-	-	-	2	-	-	-	-	-	2	1.2
20	-	-	1	-	1	-	-	-	-	-	2	1.2
37	-	-	-	2	-	-	-	-	-	-	2	1.2
Forests											41	24.7
21	1	-	-	-	-	2	-	-	-	-	3	1.8
22	-	-	-	-	-	8	-	7	9	-	24	14.5
23	-	-	-	-	-	-	-	-	1	-	1	0.6
24	-	-	-	-	1	-	-	-	-	-	1	0.6
25	-	-	3	-	3	-	-	-	-	-	6	3.6
26	-	-	1	-	12	-	-	-	-	-	13	7.8
41	-	-	-	-	-	-	-	-	-	6	6	3.6
Other											3	2.4
27	-	-	-	-	-	1	-	-	-	-	1	0.8
33	-	-	2	1	-	-	-	-	-	-	3	1.8

LP = Loop Road CK = Carey Kipuka WT = Wilderness Trail
 NE = North End Rd TM = Tree Molds Trail CA = Caves Trail GC =
 Goodale's Cutoff GC2 = Goodale's Cutoff second half SF = Sunset
 Flow WR = Wood Road trail

Table 6. Species observed during migrant surveys during 2003 and 2004

Species	Survey area			Species	Survey area		
	BT	CHS	LL		BT	CHS	LL
Canada Goose			X	Northern Flicker		X	
Gadwall			X	Unidentified Empidonax sp.		X	
American Wigeon			X	Eastern Kingbird			X
Mallard			X	Loggerhead Shrike		X	
Northern Shoveler			X	Clark's Nutcracker	X		
Cinnamon Teal			X	Black-billed Magpie		X	X
Blue-winged Teal			X	American Crow			X
Green-winged Teal			X	Common Raven		X	X
Canvasback			X	Violet-green swallow		X	X
Redhead			X	N. Rough-winged Swallow			X
Ring-necked Duck			X	Bank Swallow			X
Lesser Scaup			X	Barn Swallow		X	X
Bufflehead			X	Rock Wren	X	X	
Ruddy Duck			X	Canyon Wren		X	
Chukar		X		Marsh Wren		X	
Gray Partridge		X		Ruby-crowned Kinglet		X	
Pied-billed Grebe			X	Hermit Thrush		X	
Eared Grebe			X	Sage Thrasher		X	
Double Crested Cormorant			X	European Starling			X
Great Blue Heron			X	Orange-crowned Warbler		X	
Turkey Vulture			X	Yellow-rumped Warbler		X	
Northern Harrier		X		MacGillivray's Warbler		X	
Sharp-shinned Hawk			X	Spotted Towhee	X	X	
Red-tailed Hawk			X	Chipping Sparrow	X		
American Coot			X	Lark Sparrow		X	
Virginia Rail		X		Harris' Sparrow		X	
Sora			X	White-crowned Sparrow		X	X
Killdeer		X	X	Dark-eyed Junco (Oregon)	X	X	
Greater Yellowlegs			X	Lazuli Bunting		X	X
Whimbrel		X	X	Red-winged Blackbird		X	X
Spotted Sandpiper		X		Western Meadowlark		X	X
Long-billed Dowitcher			X	Yellow-headed Blackbird			X
Wilson's Snipe			X	Brewer's Blackbird			X
Wilson's Phalarope			X	Cassin's Finch		X	
Ring-billed Gull			X	House Finch		X	
Mourning Dove		X	X	Pine Siskin		X	
Common Nighthawk			X	American Goldfinch		X	
Black-chinned Hummingbird		X		House Sparrow		X	

Area codes: BT = Broken Top Loop Trail, CHS = The marsh and area adjacent to the hot springs near Carey Hot Springs, LL = Lava Lake, WR = the Wood Road Trail

Table 7. List of bird species identified at Craters of the Moon during 2003-04.

Species	Survey detected on		
	Breed	Migrant	Incidental
Canada Goose		X	X
Gadwall	X	X	X
American Wigeon	X	X	
Mallard	X	X	X
Northern Shoveler	X	X	X
Cinnamon Teal	X	X	X
Blue-winged Teal	X	X	X
Green-winged Teal		X	X
Canvasback		X	X
Redhead		X	X
Ring-necked Duck		X	X
Lesser Scaup		X	X
Bufflehead		X	X
Ruddy Duck	X	X	X
Chukar	X	X	X
Gray Partridge		X	X
Ring-necked Pheasant	X		X
Greater Sage-grouse	X		X
Blue Grouse	X		X
Pied-billed Grebe	X	X	X
Eared Grebe		X	X
Double Crested Cormorant		X	X
Great Blue Heron	X	X	X
Turkey Vulture	X	X	X
Bald Eagle			X
Northern Harrier	X	X	X

Sharp-shinned Hawk		X	X
Cooper's Hawk			X
Swainson's Hawk			X
Red-tailed Hawk	X	X	X
Ferruginous Hawk			X
Golden Eagle	X		X
American Kestrel	X		X
Peregrine Falcon			X
Prairie Falcon	X		X
American Coot	X	X	X
Virginia Rail		X	
Sora		X	
Sandhill Crane	X		X
Killdeer	X	X	X
Greater Yellowlegs		X	
Whimbrel		X	
Spotted Sandpiper		X	X
Long-billed Dowitcher		X	
Wilson's Snipe		X	X
Wilson's Phalarope		X	X
Ring-billed Gull		X	X
Rock Pigeon	X		X
Mourning Dove	X	X	X
Common Nighthawk	X	X	X
Common Poorwill	X		X
Great Horned Owl	X		X
Burrowing Owl			X
Black-chinned Hummingbird	X	X	X
Broad-tailed Hummingbird			X

Rufous Hummingbird			X
Lewis' Woodpecker	X		
Red-naped Sapsucker	X		X
Downy Woodpecker	X		X
Hairy Woodpecker	X		X
Northern Flicker	X	X	X
Western Wood-pewee	X		X
Unidentified <u>Empidonax</u> sp.		X	
Hammond's Flycatcher	X		X
Dusky Flycatcher	X		X
Cordilleran Flycatcher			X
Say's Phoebe	X		X
Western Kingbird	X		X
Eastern Kingbird			X
Loggerhead Shrike	X		X
Northern Shrike			X
Cassin's Vireo	X		
Warbling Vireo	X		X
Clark's Nutcracker	X	X	X
Black-billed Magpie	X	X	X
American Crow	X	X	X
Common Raven	X	X	X
Horned Lark			X
Violet-green swallow	X	X	X
N. Rough-winged Swallow		X	X
Bank Swallow		X	
Barn Swallow	X	X	X
Black-caped Chickadee			X
Mountain Chickadee	X		X
Red-breasted Nuthatch	X		X
White-breasted Nuthatch	X		X
Brown Creeper			X

Rock Wren	X	X	X
Canyon Wren		X	
House Wren	X		X
Winter Wren	X		X
Marsh Wren		X	X
Golden-crowned Kinglet			X
Ruby-crowned Kinglet	X	X	X
Blue-gray Gnatcatcher	X		X
Mountain Bluebird	X		X
Townsend's Solitaire			X
American Robin	X		X
Varied Thrush			X
Hermit Thrush		X	X
Gray Catbird	X		
Sage Thrasher	X	X	X
Northern Mockingbird	X		
European Starling		X	X
Cedar Waxwing			X
Bohemian Waxwing			X
Orange-crowned Warbler	X	X	X
Yellow Warbler	X		X
Yellow-rumped Warbler	X	X	X
Townsend's Warbler			X
MacGillivray's Warbler	X	X	X
Wilson's Warbler			X
Western Tanager	X		X
Green-tailed Towhee	X		X
Spotted Towhee	X	X	X
Chipping Sparrow	X	X	X
Brewer's Sparrow	X		X
Vesper Sparrow	X		X
Lark Sparrow	X	X	X

Black-throated Sparrow			X
Sage Sparrow	X		X
Lark Bunting			X
Fox Sparrow	X		X
Song Sparrow	X		X
Lincoln's Sparrow	X		
White-crowned Sparrow		X	X
Harris' Sparrow		X	
Dark-eyed Junco (Oregon)	X	X	X
Snow Bunting			X
Black-headed Grosbeak	X		X
Lazuli Bunting	X	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		
Gray-crowned Rosy-Finch			X
Cassin's Finch	X	X	X
House Finch	X	X	X
Common Redpoll			X
Pine Siskin	X	X	X
American Goldfinch		X	X
Evening Grosbeak			X
House Sparrow		X	X

Breed are species detected during the breeding season survey.

Migrant are species detected during the migrant survey.

Incidental are species recorded in the daily tallies and incidental observations.

Species in Bold are species not previously recorded at CRMO

Table 8. List of special status species observed during 2003 and 2004.

Species	USFWS	BLM	Idaho	PIF
Gadwall				P
Cinnamon Teal				P
Greater Sage-grouse	C			P
Blue Grouse		S		
Bald Eagle				
Northern Harrier				P
Sharp-shinned Hawk				P
Cooper's Hawk				P
Swainson's Hawk		S		P
Ferruginous Hawk	C	S		P
Golden Eagle				P
American Kestrel				P
Peregrine Falcon	C	S	E	P
Prairie Falcon		S		P
Sandhill Crane				P
Killdeer				P
Wilson's Snipe				P
Wilson's Phalarope		S		
Common Poorwill				P
Burrowing Owl	C	S		P
Black-chinned Hummingbird				P
Broad-tailed Hummingbird				P
Lewis' Woodpecker		S		P
Red-naped Sapsucker		S		P
Hairy Woodpecker				P
Western Wood-pewee				P
Hammond's Flycatcher		S		P
Dusky Flycatcher				P
Cordilleran Flycatcher		S		P
Say's Phoebe				P
Western Kingbird				P
Loggerhead Shrike	C	S	C	P
Cassin's Vireo				P
Warbling Vireo				P
Clark's Nutcracker				P
Black-billed Magpie				P
N. Rough-winged Swallow				P
Mountain Chickadee				P
Red-breasted Nuthatch				P
Brown Creeper				P
Rock Wren				P
Marsh Wren				P
Golden-crowned Kinglet				P
Ruby-crowned Kinglet				P
Blue-gray Gnatcatcher				P
Mountain Bluebird				P
Townsend's Solitaire				P
Sage Thrasher		S		P
MacGillivray's Warbler				P
Wilson's Warbler				P
Western Tanager				P
Green-tailed Towhee		S		P

Chipping Sparrow				P
Brewer's Sparrow		S		P
Lark Sparrow				P
Black-throated Sparrow		S		P
Sage Sparrow		S		P
Lark Bunting				P
Black-headed Grosbeak				P
Lazuli Bunting				P
Yellow-headed Blackbird				P
Brewer's Blackbird		S		
Bullock's Oriole				P
Gray-crowned Rosy-Finch				P
Cassin's Finch		S		P

USFWS species listed as a species of Concern "C" or as threatened "T" by the US Fish and Wildlife Service

BLM species are listed as sensitive "S"

Idaho species are listed as a species of Special Concern "C" or as endangered "E" by the state of Idaho

PIF species are species listed as Priority species by Partners in Flight "P"

CONCLUSION

Breeding Season Survey

The total number of birds observed in 2003 was 1386 and in 2004 was 1699. This was a 2% increase over 2002 ($n = 1357$) in 2003 but in 2004 was a 20% increase over 2002 for 2004 (fig 1). The 2004 numbers showed a 146% increase over 2000. In late 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%. When only those routes that have been monitored for the entire eight years of the program are examined a declining pattern is seen starting in 2000 (fig 2). For example the total count in 2004 was 564 this is a 21% drop from 1999 ($n = 712$). This pair of years was used because 1999 was the last year that the precipitation from January thru June was at or above average (appendix 2). The number of species recorded showed a different trend with numbers continuing to increase in (fig 3). This is the case for both the overall numbers and for only those six routes surveyed the entire six years (fig 4).

The 2004 season was the eighth year of monitoring on six of these routes, the fourth for two routes, and the third for two others. Thus it is difficult to interpret these numbers in terms of any trends that may or may not be present. Difficulty in interpreting short term results is particularly influenced by the tremendous year to year variability in weather patterns at CRMO. For example the prevailing weather conditions were very different in the years these surveys have been done. Temperatures and precipitation levels were below normal during the spring of 1997. While temperatures were close to the 50 year average throughout winter and spring of 97-98. The winter of 1999 saw near average temperatures throughout the winter but the snow levels especially in the last half of the winter were high with snow accumulation approximately 150% of normal at the end of March. Snow thaw was prolonged with snow remaining into May and June in some areas. By contrast 2000-04 had above average temperatures throughout the period and precipitation levels were well below average for January to June. As a result vegetation dried out earlier than in previous years and flowering and presumably seed production was low. Additionally, typically perennial water sources dried up as early as the first half of June resulting in wildlife species including birds spreading out more in search of water and some may not have defended territory at all. The precipitation changed in the second half of 2004 with the period from late May to the end of the year producing higher than average precipitation. With the actual June survey period experiencing near average conditions. This was the first year since the additional routes were added with average conditions the weather may account for the increase in overall numbers recorded.

As a result of this tremendous year to year variability many experts recommend a minimum of 10 years of data be available to analyze trends. (Hutto, personal communication 1992, Fancy and Sauer 2000). If only those results are examined for those routes monitored for the entire 8 years, a pattern is beginning to emerge. One pattern is the large increase in both overall numbers and the number of species detected in the first two years of the monitoring (figs 2 and 4). This was likely a result of a change in observers in 1998. The observer from 1998 to 2004 has more extensive experience in bird identification and the operation of point counts than did the observer in 1997. Observer differences while unintentional is well documented problem

with point count surveys. This is why the USGS recommends that same observer monitors the same routes in the North American Breeding Bird Survey (USGS 1998).

Two of the 144 bird species observed during 2003-04 are on the federal or state endangered species lists. Both of these were only incidental sightings during the period. One the Bald Eagle (federal threatened) was observed nesting on private land near the Preserve and the pair likely uses the preserve on a year round basis. The other the Peregrine Falcon (state endangered) was observed as a migrant only.

However, of these 144 species, 65 of the species have been listed as a priority species by Idaho Partner's in Flight (IDPIF 2002), are listed by the Idaho Department of Fish and Game (IDFG 2003) as species of special concern, as species of concern by the US Fish and Wildlife Service (USFWS 2000), or as sensitive by the US Bureau of Land Management (USBLM 2003) (Table 7).

This includes the most numerous species on the monument, the Brewer's Sparrow, which is on two of these sensitive lists. Most of these species have experienced substantial declines in either part or all of their range including the Snake River Plain. The Brewer's Sparrow appears to have been quite stable over the last eight years. The major changes in figure 5 coincide with increases in the monitoring effort in the Preserve. Two species are on all four lists. These are the Loggerhead Shrike and the Peregrine Falcon. The Loggerhead Shrike like the Brewer's Sparrow appears to have been quite stable in the period 1997 to 2004 (fig 6). Shrikes however are found in much lower numbers and to determine accurate trends for this species would require targeted surveys and productivity data.

Many bird species maintained numbers despite drought conditions throughout spring and early summer. For example the sparrow and shrike discussed above. This includes Greater Sage-grouse discussed below. Additionally, some species were found at much higher numbers on the new routes. For example Brewers Sparrow were found at an average of 4 per point overall at CRMO. On the Sunset Flow the mean per point was 5.5. This compares with a recent average of 1-2 on BLM lands statewide and 4-5 on the INL (Bart, personal communication 1999 and Rich, personal communication 2001). It is important to identify and monitor sites with high densities of sensitive species because they are important source populations for the entire Upper Snake River Basin and are critical to the long term survival of the species in the region.

Migrant Surveys

The total number of species observed during the migrant surveys was 76. Of these, five were previously undocumented in at CRMO. These surveys have been very productive at targeting specific habitats that are of importance to both migrant and resident species. These counts targeted restricted habitats that are of importance to many species. Wetland species in particular followed this pattern. These surveys indicate that CRMO has an extensive complement of wetland and waterbird species. These habitats are limited throughout the region, including CRMO. This monitoring suggests these habitats may be important stops for bird migrating through the region. The forested habitats are much more scattered and used by numerous species over a greater period of time. These habitats will require significant effort to thoroughly document.

Sage-grouse Lek Counts

At least some of the known historical leks are no longer in use. By contrast other leks have been formed in recent years. The Golden Chariot lek is in a burned stand with birds first observed on the site in 2002. The site burned in 2000. The following year the Pressure Ridge lek was discovered. No surveys were done that year but incidental observations indicate that the site was used by at least 10 birds at the peak of activity. This site is about 1/2 mile southwest of the Golden Chariot site. In 2002 birds were found using the previously unknown Golden Chariot Lek. The high count that year was 42 birds. Two incidental counts in April 2003 were both in the mid 50s at this site. The site was counted to protocol for the first time in 2004 with a high count of 86 birds. It is unknown at this time whether the local population is actually increasing. It is also quite possible that the fire created a higher quality site and that other small lower quality leks in the area have been abandoned.

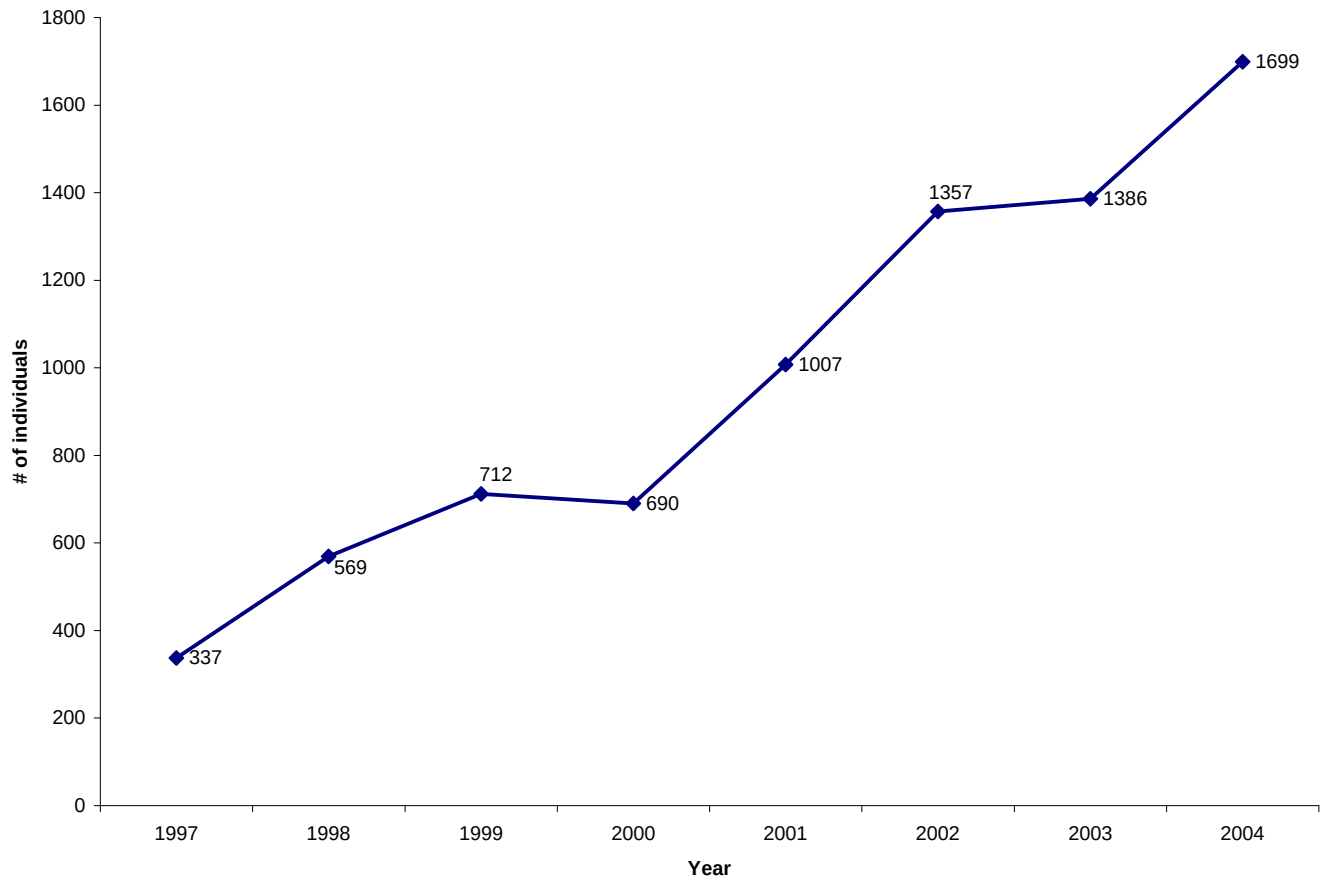


Figure 1. Total numbers of birds recorded during breeding season surveys 1997-2002

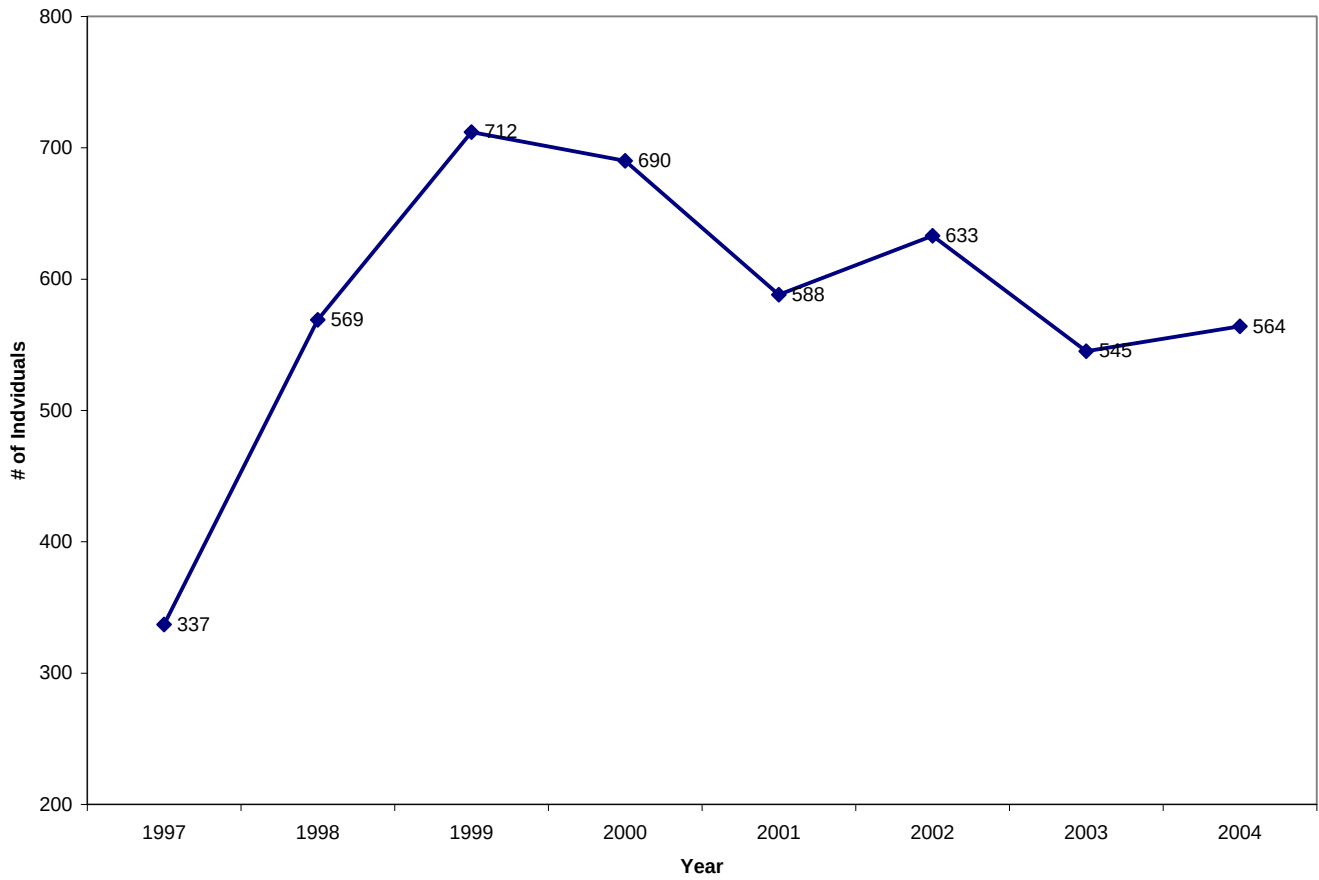


Figure 2. Numbers of birds recorded during breeding season surveys on the six routes surveyed during the years 1997-2002

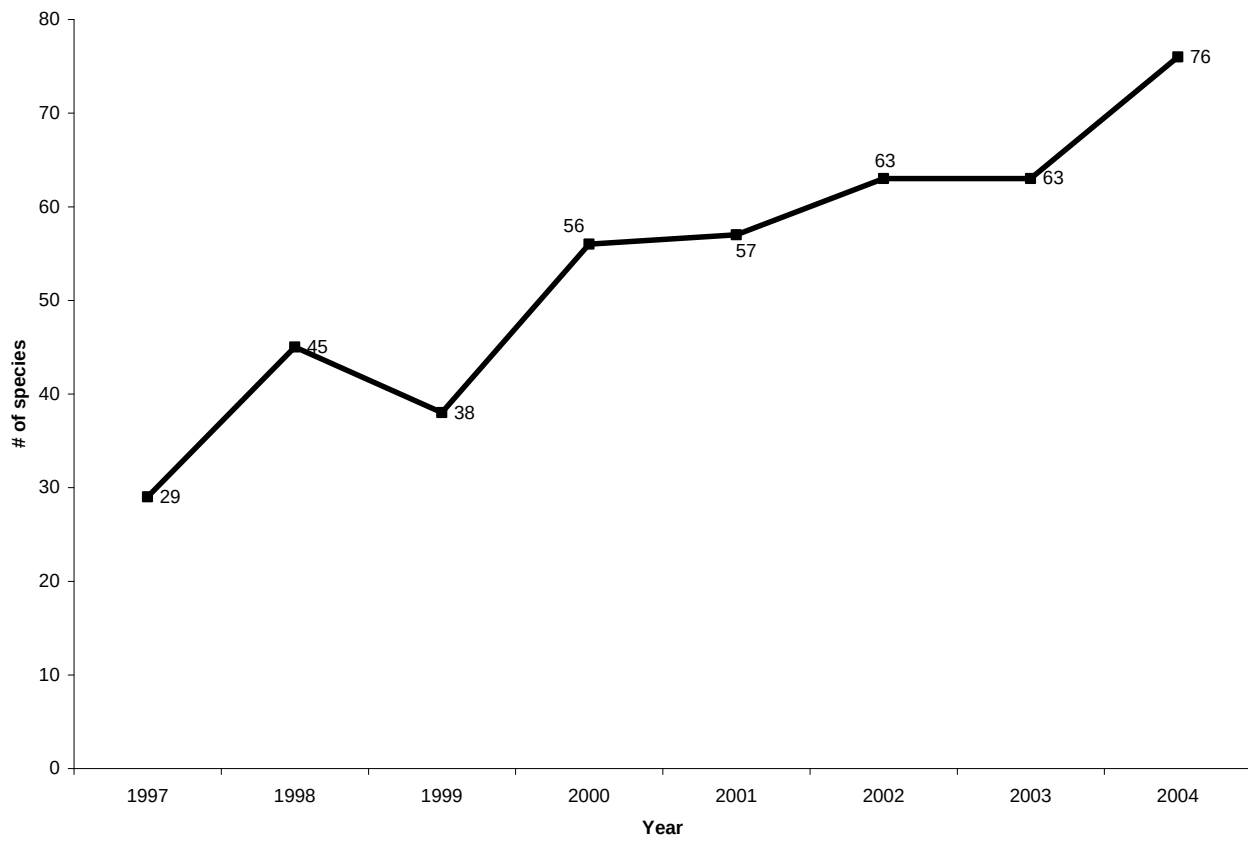


Figure 3. Number of species detected during breeding season surveys 1997-2002

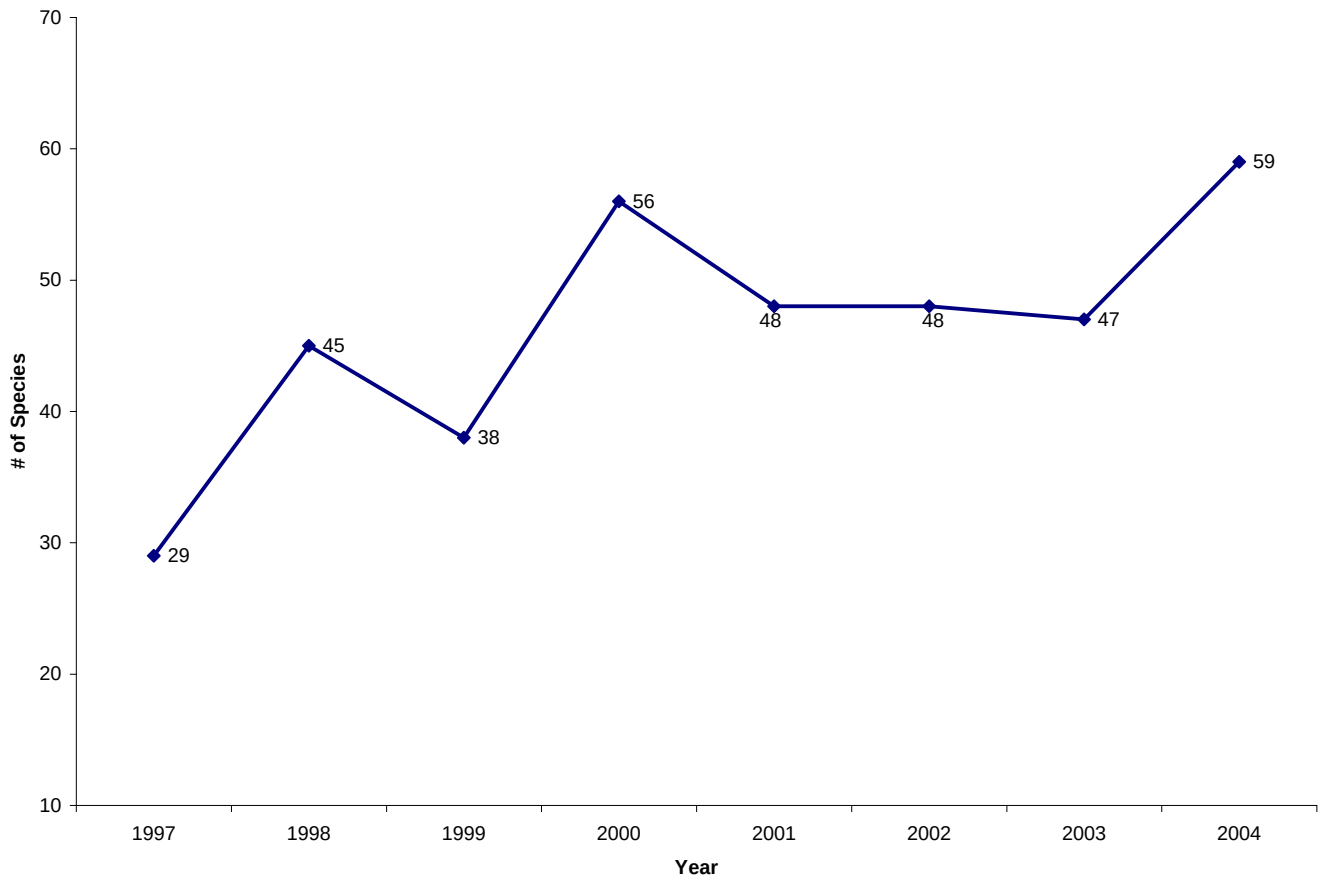


Figure 4. Number of species detected on the six routes surveyed during the years 1997-2002

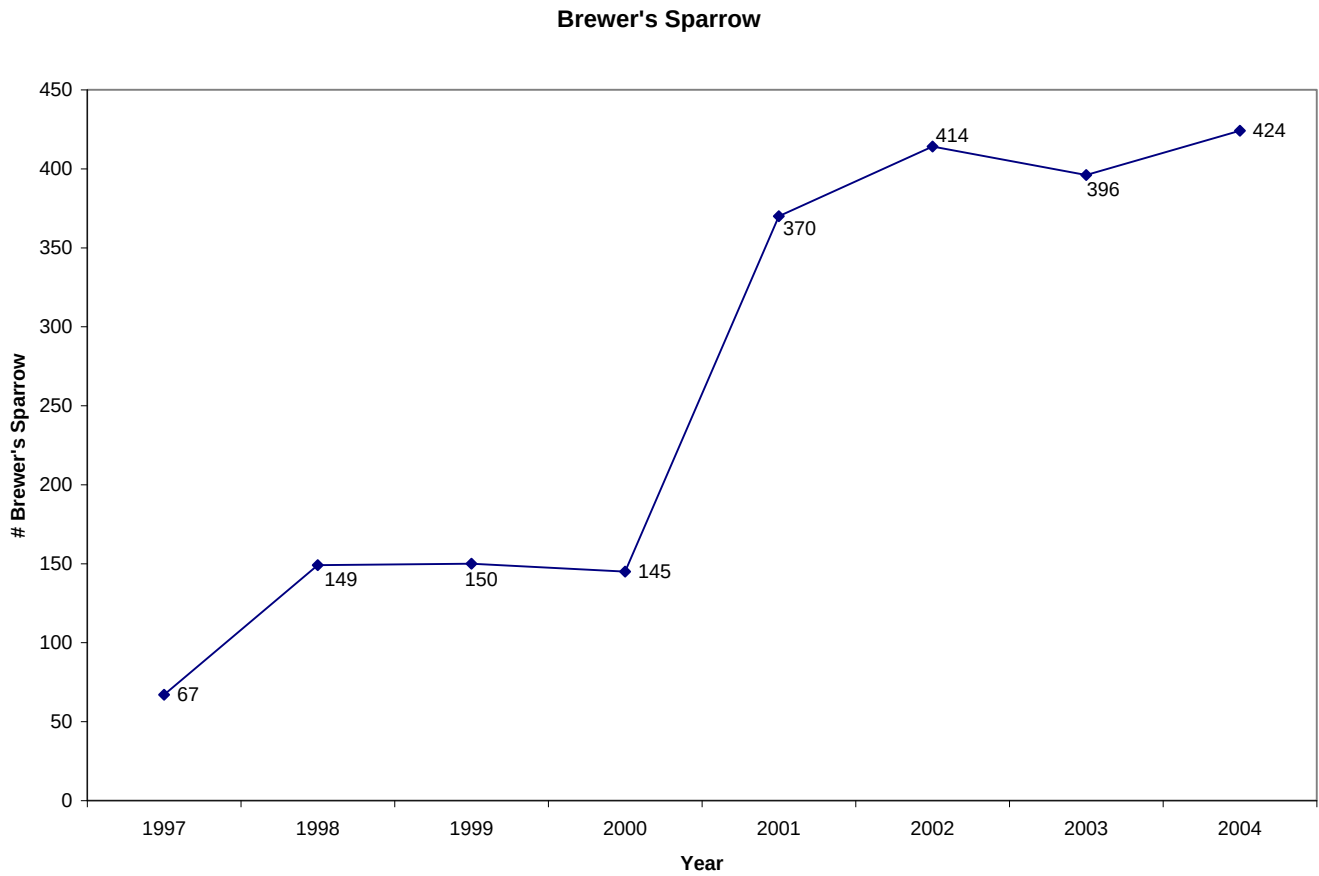


Figure 5. Numbers of Brewer's Sparrows observed in Breeding Season Surveys 1997-2004.

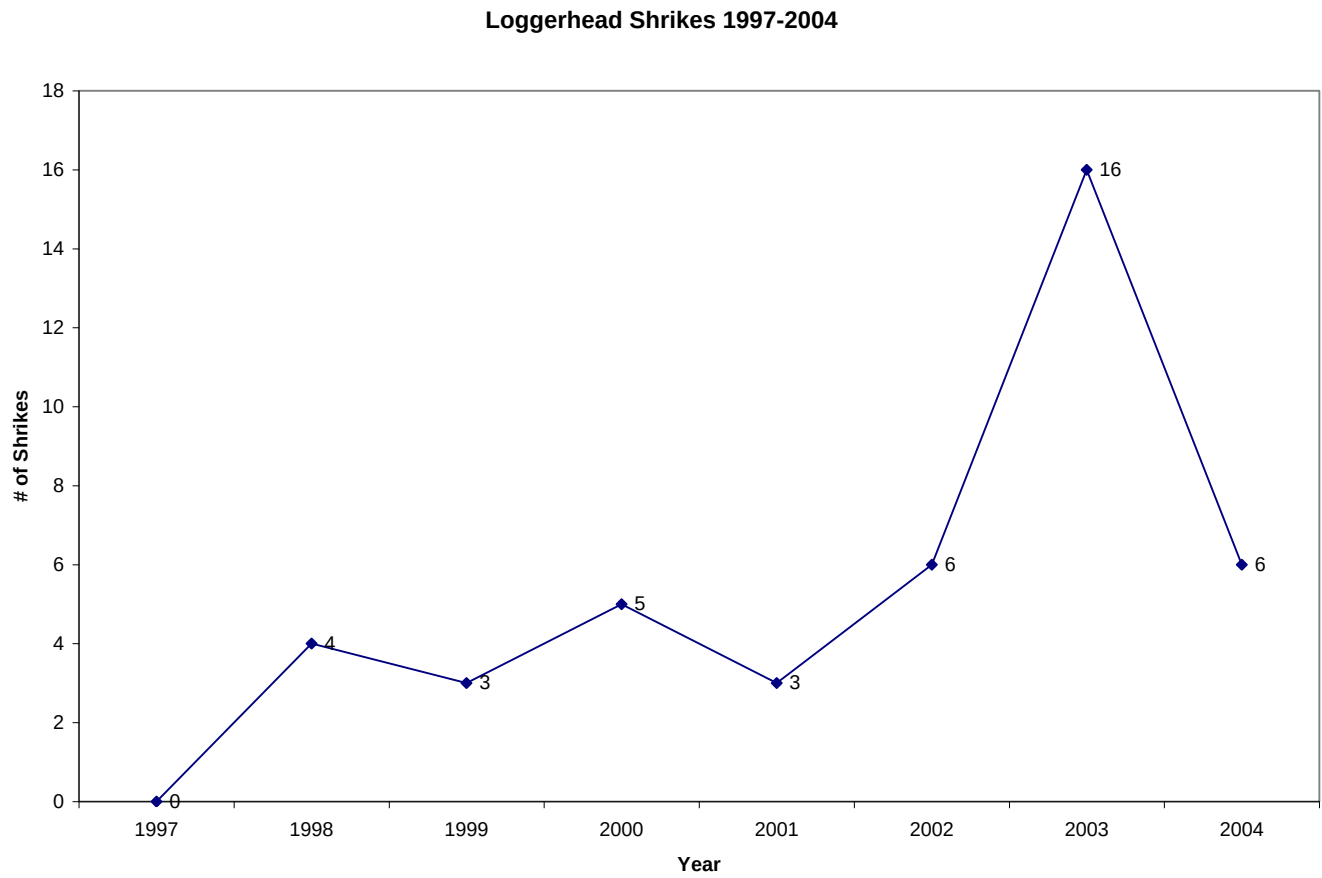


Figure 6. Numbers of Loggerhead Shrikes observed in Breeding Season Surveys 1997-2004.

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Appendix 1.

Craters of the Moon National Monument
Vegetation Types

LAVAS

- 1 **Cinder Gardens**
- 2 **Low Vegetation Density Lava Flows**
- 3 **Medium Vegetation Density Lava Flows**

SAGEBRUSH COMMUNITIES

- 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**
- 10 Complex of 4 and 8
- 11 **Three-tip Sagebrush/Idaho Fescue**
- 12 Early Low Sagebrush/Idaho Fescue
- 13 Low Sagebrush/Sandberg Bluegrass
- 14 Low Sagebrush/Idaho Fescue
- 15 Complex of 13 and 14
- 34 **Misc. Big Sagebrush**

OTHER SHRUB COMMUNITIES

- 16 **Antelope Bitterbrush**
- 17 Antelope Bitterbrush/Great Basin Wildrye

GRASSLANDS

- 18 **Bluebunch Wheatgrass/Idaho Fescue**
- 19 Bluebunch Wheatgrass/Sandberg Bluegrass
- 20 **Great Basin Wildrye**

FOREST COMMUNITIES

- 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**

OTHER AREAS

- 27 **Developed Areas**
- 29 **Rock outcrops**
- 33 **Misc. Wetlands**

Bold = Vegetation types present in the BBS routes

Appendix 2.

Precipitation (inches) and average monthly temperature values (degrees Fahrenheit) at Craters of the Moon National Monument for the 2001-2002 winter and spring seasons compared to the 40 year average. Taken from National Weather Service database for Craters of the Moon.

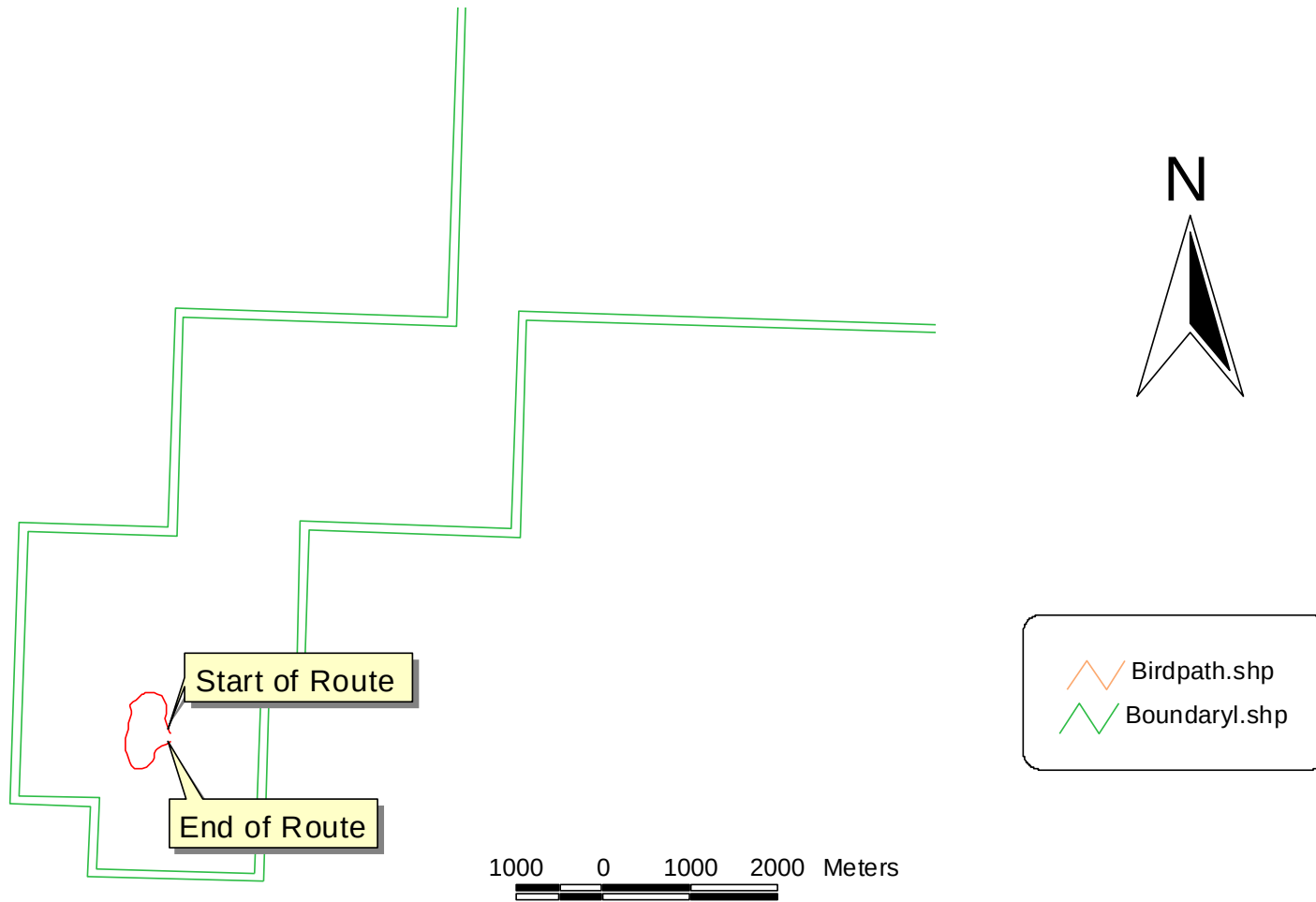
Precipitation (Inches)

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
50 yr ave	1.34	1.85	2.16	1.49	1.31	1.05	1.74	1.32
96-97	2.33	4.25	2.12	0.02	0.02	0.66	0.35	1.46
97-98	0.82	0.53	2.57	2.71	1.42	1.31	3.49	3.30
98-99	3.93	0.95	2.91	5.53	0.38	1.05	2.29	0.70
99-00	0.21	1.22	1.82	2.26	0.97	0.76	0.96	0.08
00-01	0.69	1.41	1.89	1.66	0.47	1.64	0.14	0.13
01-02	1.78	3.71	1.77	0.37	1.08	1.91	0.34	1.26
02-03	1.00	3.00	0.76	1.18	1.01	1.78	1.07	0.25 03-
04	0.54	2.83	1.96	1.47	0.02	0.50	1.92	0.87

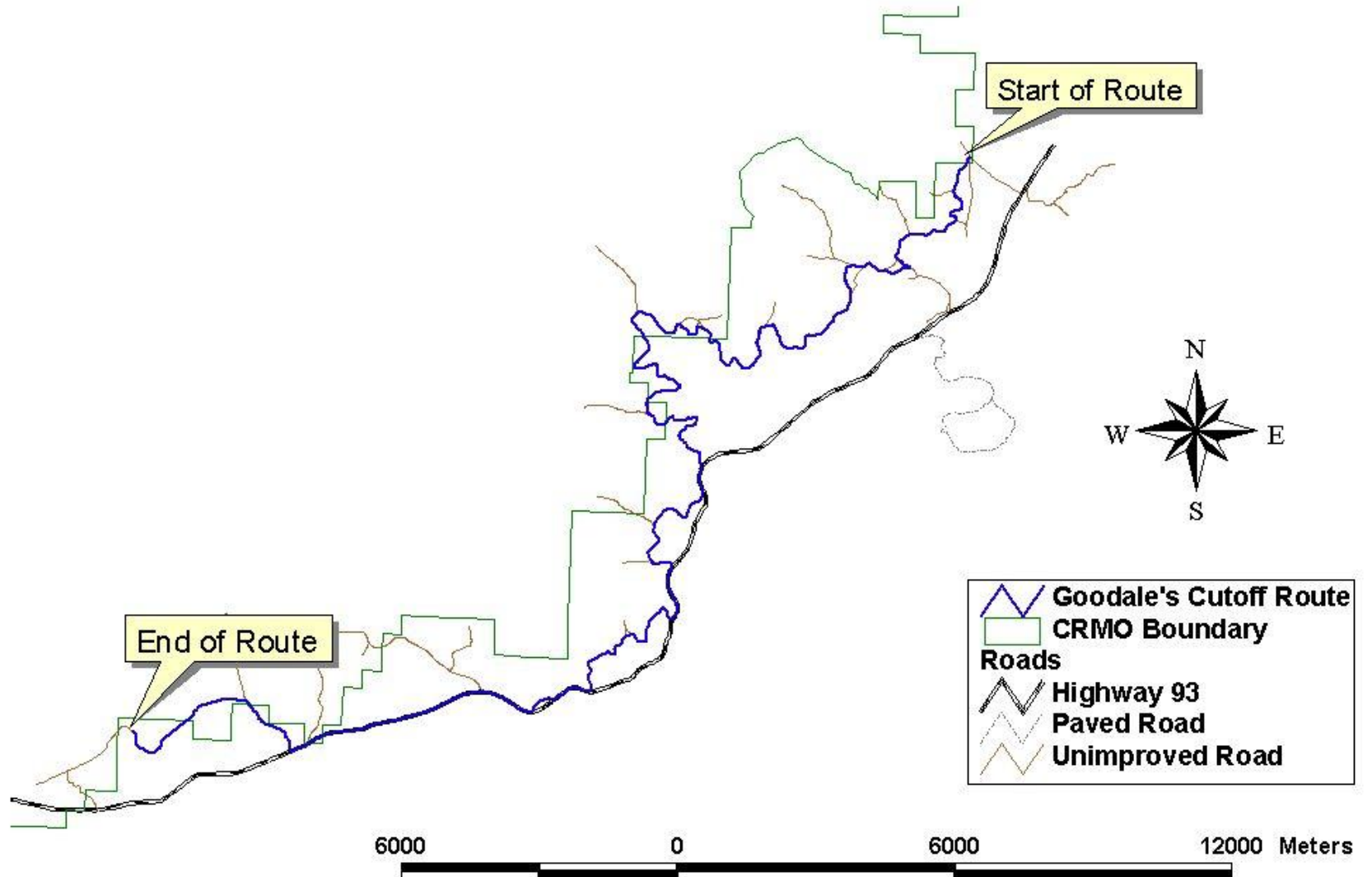
Temperature (Fahrenheit)

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
50 yr ave	30.4	20.6	19.6	24.0	31.0	40.6	50.7	59.5
96-97	34.1	22.2	20.8	25.0	35.6	40.0	56.3	61.2
97-98	32.4	20.8	25.6	26.6	29.2	41.9	50.2	55.6
98-99	30.1	18.1	22.8	21.7	30.0	39.4	47.3	58.7
99-00	37.8	22.3	21.2	29.3	32.1	46.7	52.4	61.9
00-01	22.9	20.2	16.9	19.4	35.0	40.1	56.1	61.2
01-02	34.9	15.9	16.5	16.8	26.2	41.9	51.2	61.7
02-03	30.6	24.3	27.3	25.1	35.0	40.3	52.4	61.0
03-04	25.8	24.7	16.8	19.5	36.9	45.3	49.8	60.8

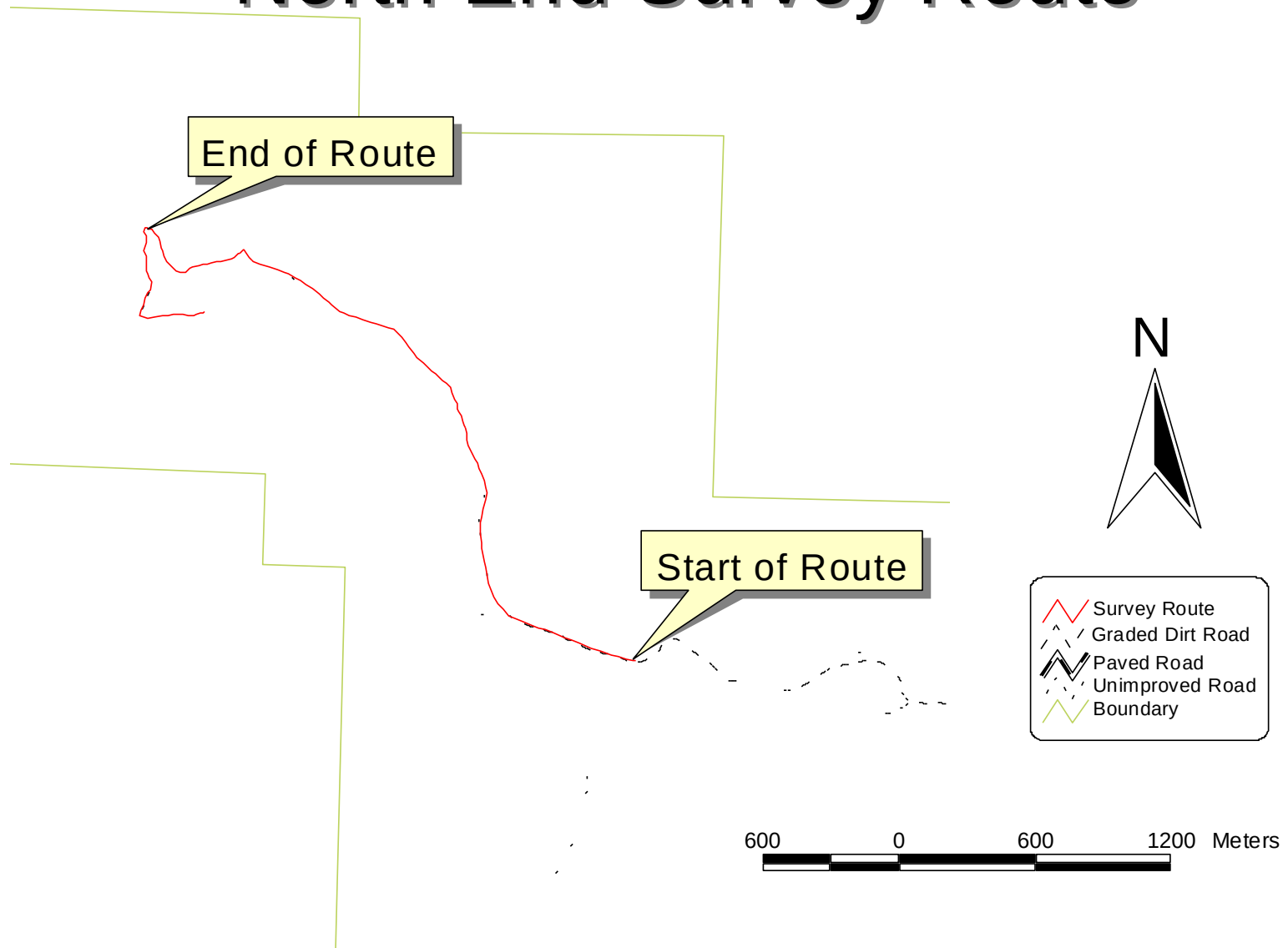
Carey Kipuka Survey Route



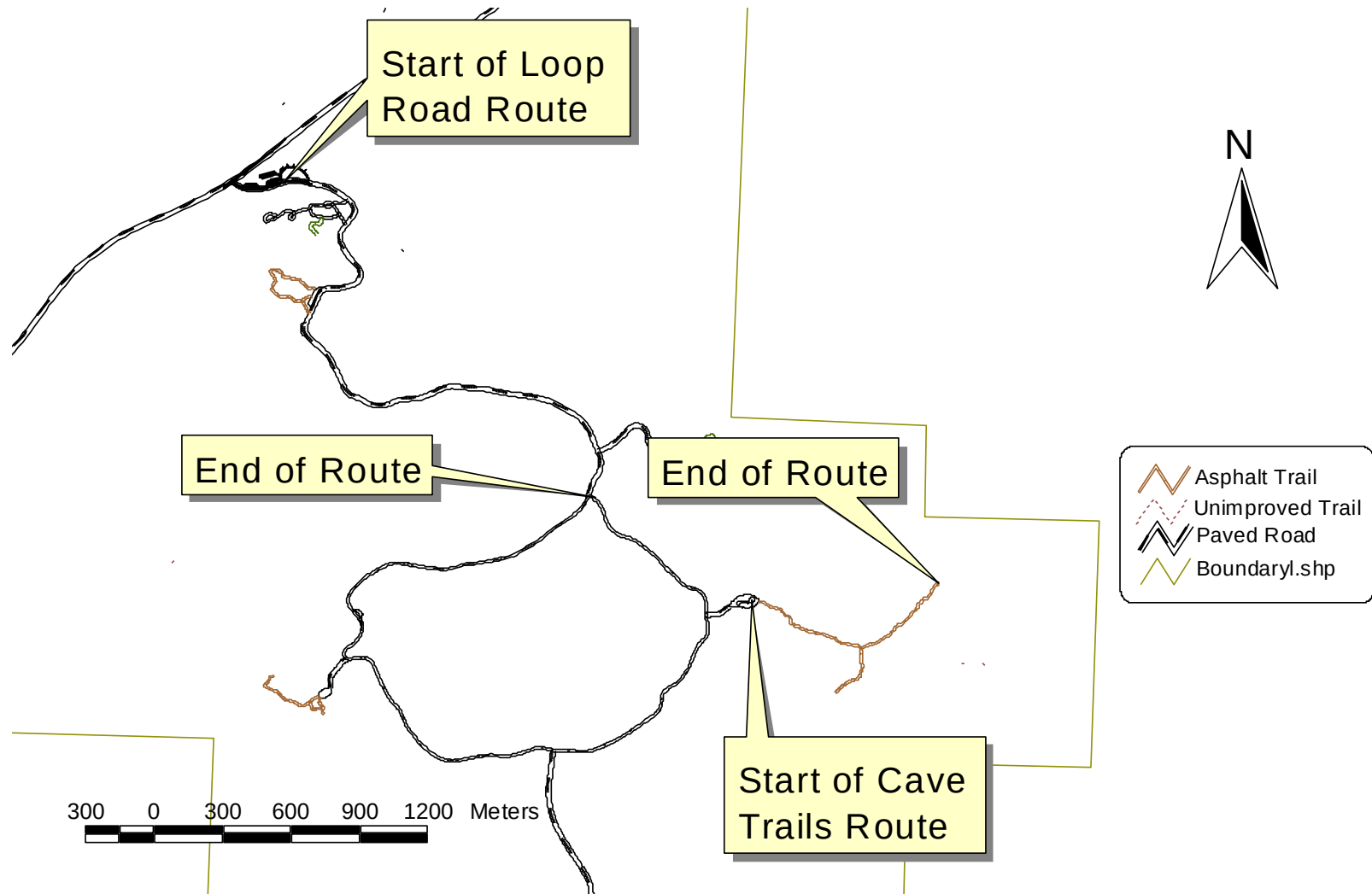
Goodale's Cutoff Survey Route



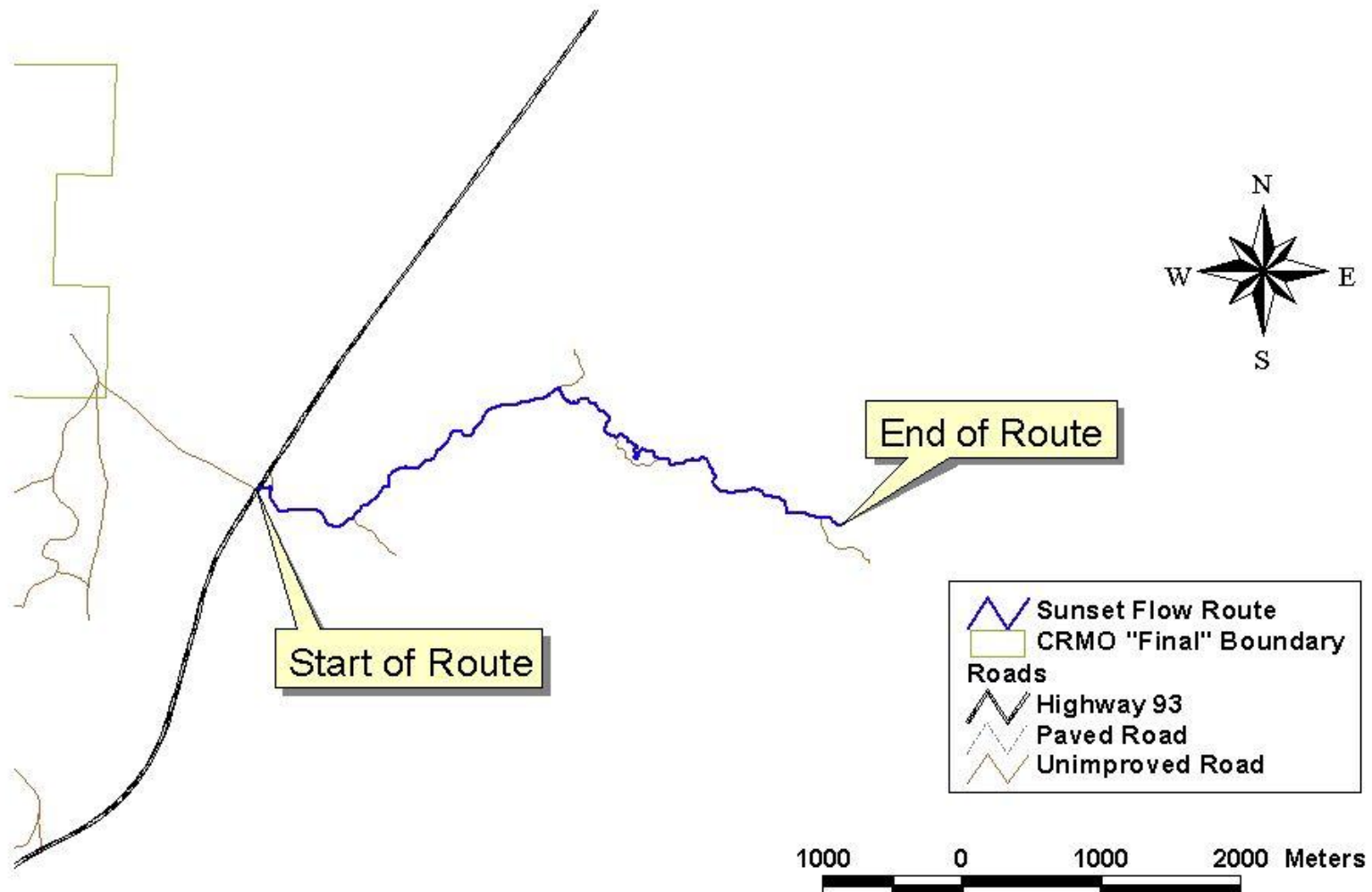
North End Survey Route



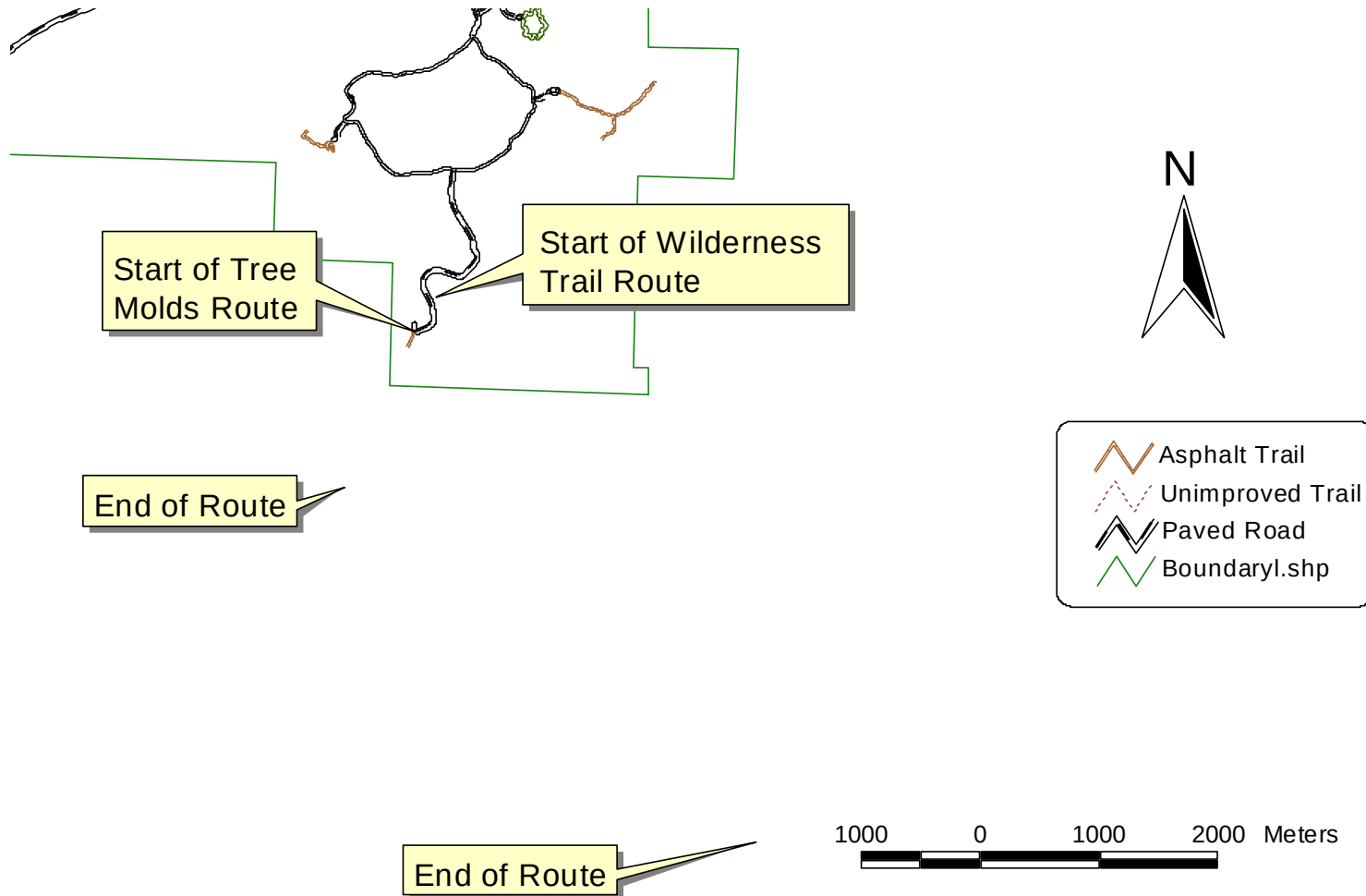
Loop Road and Caves Trail Routes



Sunset Flow Survey Route



Tree Molds and Wilderness Trail Survey Routes



Wood Road Trail

