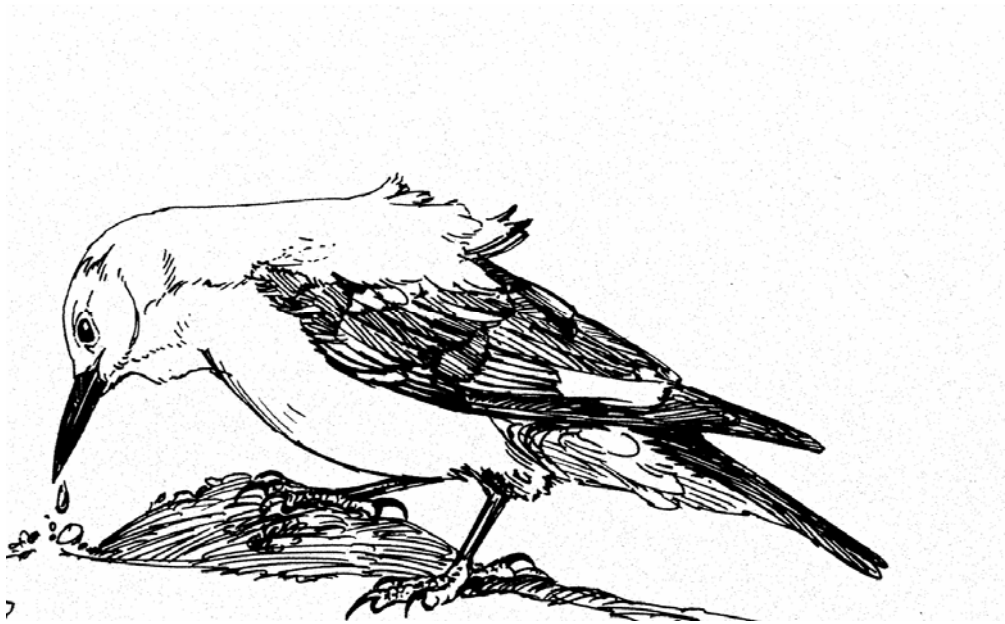


**Craters of the Moon National Monument and
Preserve Bird Monitoring
2002**



Prepared by:
Michael Munts
Wildlife Biologist
Resource Management Division
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Executive Summary

Bird surveys were run on ten point count transects during June of 2001. The surveys were performed on six routes that were established and first surveyed in 1997, two routes that were added in areas that were added to the monument in November 2000, and two addition routes in the Preserve during 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 1357 individuals of 63 species observed on 166 point counts. The most numerous birds were Brewer's Sparrow, Spotted Towhee, Rock Wren, Western Meadowlark, Mourning Dove, Western Tanager, Sage Thrasher, Violet-green Swallow, Mountain Bluebird, Common Raven, Brewer's Blackbird, and Blue-gray Gnatcatcher. All other species had less than 25 total observations. The Brewer's Sparrow, Mourning Dove, Rock Wren, Common Raven, Violet-green Swallow, Northern Flicker, Spotted Towhee, Western Tanager, American Kestrel, Mountain Bluebird, Sage Thrasher, and Brown-headed Cowbird were all recorded on 5 or more of the transects.

Twenty-two percent(14 of 57) 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 3). Fifteen of these are either shrub steppe or riparian associates indicating that Craters of the Moon continues to be a significant sanctuary for these habitats on the upper Snake River Basin. One previously unknown nesting area for Greater Sage Grouse was located during the Sunset Flow.

Migrant surveys were done for the first time this year and resulted in the confirmation of 29 additional species for the park.

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Craters of the Moon National Monument and Preserve Bird Monitoring 2002

INTRODUCTION

Relatively undisturbed sites such as Craters of the Moon National Monument and Preserve (CRMO) and the nearby Idaho National Engineering and Environmental Laboratory (INEEL) typically see much higher counts of shrubsteppe birds than more intensively managed lands. For example counts of Brewer's Sparrow are typically 3-4 per point on the INEEL 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 99% 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 (Ahrensleger 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 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 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, it is important that long term avian monitoring continue. Monitoring of bird species began at Craters of the Moon in 1988 with the implementation of an annual bird survey, consisting of 34 sites located in 17 of the 26 vegetation types described in the monument (Day and Wright, 1985). This survey required an extensive effort and was logistically difficult to complete with limited staff.

The CRMO bird survey was revised in 1997. The earlier surveys had been designed to monitor habitat quality using birds as a model. The revised procedures were intended to more closely monitor bird populations. In the revised Standard Operating Procedure(SOP) monitoring habitat quality would come later with the implementation of the MAPS (Monitoring Avian Productivity and Survival) mist-netting program in the future. The MAPS program was designed to monitor productivity, survival, and recruitment which are key indicators of habitat quality as well as long term population persistence. This second phase of bird monitoring has yet to be initiated due to limited funding. The bird survey for CRMO was based on the survey protocols defined by the North American Breeding Bird Survey (BBS) (USGS 1998). The BBS is sponsored by the United States Geological Survey's Biological Resources Division and the Canadian Wildlife Service and is used throughout North America. 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 under the BLM. 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 is conducted by BLM and IDFG but these are not reported here.

METHODS

Breeding Bird 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 November 2000. 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 in use.

The field surveys are started after the arrival of late phase migrants including nighthawks, poorwills, and hummingbirds. In the spring of 2001 these late phase were not observed in the area until after mid-June. As a result, the surveys did not begin until 06/12/02 and ended 06/26/02.

The survey consists of eight routes (maps attached):

- 1 - LOOP DRIVE, starts at the gate at the beginning of the loop road and ends where the one-way loop ends.
- 2 - TREE MOLDS TRAIL, starts at the sign at the head of the trail.
- 3 - WILDERNESS TRAIL, starts at the sign at the head of the Broken Top/Wilderness trail.
- 4 - 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.
- 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 - 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.
- 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 - 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.
- 9 - 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.

- 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 requirements of the NPS Biological Resources Management Division (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 nearby 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.

Additional Monitoring

Starting in 2002 migrant and spot surveys were also performed in habitats of interest. During 2002 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; the Wood road Trail; 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. The number of visits was; 3 visits to the Broken Top Loop, 6 to the hot springs, 9 to Lava Lake, and 1 to Wood Road.

Daily species list 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.

RESULTS

Breeding bird surveys

A total of 69,130 meters were surveyed, consisting of 166 survey points, as listed in Table 1. The total number of individuals was 1357 with the greatest number (221) on Goodale's Cutoff 1 and least (62) on the Caves Trails route (Table 1). The mean number of birds per point ranged from 7.2 to 12.4 with a mean of 8.2. The number of species recorded per transect ranged from 9 at Carey Kipuka to 31 on Goodale's Cutoff 1. The total number of species observed on all transects was 63. The mean number of species per point ranged from 2.8 to 5.6 with an average for all sites of 4.0.

The Brewer's Sparrow had the greatest number (414) of individuals recorded. They accounted for 31% of all individuals recorded. Other species with total counts of 20 or more included Rock Wren (n = 148, percent of total = 10.9), Western Meadowlark (n = 103, % = 7.6), Spotted Towhee (n = 100, % = 7.4), Mourning Dove (n = 91, % = 6.7), Sage Thrasher (n = 48, % = 3.5) Violet-green Swallow (n = 39, % = 2.9), Mountain Bluebird (n = 36, % = 2.2), American Coot (n = 25, % = 1.8), Rock Dove (n = 25, % = 1.8), Western Tanager (n = 24, % = 1.8), Common Raven (n = 23, % = 1.7), Brewer's Blackbird (n = 23, % = 1.7), and Blue-gray Gnatcatcher (n = 22, % = 1.6) (Table 2).

The Brewer's Sparrow, Mourning Dove, and Rock Wren were recorded on all ten transects. No species were seen on eight or nine transects. The Common Raven and Violet-green Swallow were recorded on seven of the ten transects. Northern Flicker, Spotted Towhee, and Western Tanager were recorded on six transects. The American Kestrel, Mountain Bluebird, Sage Thrasher, and Brown-headed Cowbird were recorded on five or more transects.

Seven species were recorded on 20 or more points. These were Brewer's Sparrow at 108 points (65% of total), Rock Wren at 104 points (63% of total), Spotted Towhee at 66 points (40% of total), Mourning Dove at 55 points (33% of total), Sage Thrasher at 36 points (22% of total), Mountain Bluebird at 22 points (13% of total), and Western Tanager at 22 points (13% of total).

Several species such as Sage Thrasher, Brewer's Sparrow, and Loggerhead Shrike were found only in shrubsteppe areas and in cinder gardens that contained shrub layers (Table 3). Other species such as the Spotted Towhee, American Robin, Mountain Bluebird were found in a much broader spectrum of habitats. The Northern Flicker, Clark's Nutcracker, Western Tanager, and the two finches which are considered forest birds while not always recorded at sites classified as forest but were always observed in the immediate vicinity of trees if only isolated pines within the lava flows.

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.

The Goodale's Cutoff route passes through areas added to the monument in November of 2000 as well as some lands adjacent to but not in the monument. This route passes through several isolated clumps of quaking aspen and a significant sink area which is adjacent to a lava flow. These habitats were not included in the bird surveys prior to 2001. Several species were found in these habitats that have been previously recorded during surveys. These include American Coot, Killdeer, Black-billed Magpie, and Red-winged Blackbird. Several species were found here in addition to the Little Cottonwood riparian zone. This included warblers, wrens, woodpeckers, and the Northern Harrier.

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 4). 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 2002 was 140 (table 6). The number of species not previously documented in CRMO was 21. The daily and incidental observations detected 123 species. Of these 123 species 34 were not previously documented within CRMO. Five of the previously undocumented species were also not seen on any survey including both breeding and migrant surveys. Of the 89 species seen on formal surveys 57 (table 2) were seen during the regular breeding season surveys and 32 were seen only on the migrant surveys at Broken Top, Lava Lake, and the Hot Springs area. Of the 29 undocumented species seen on the surveys all 29 were seen during the migrant surveys and only one was seen during the breeding bird survey. For the migrant surveys 15 species were seen on the Broken Top Loop, 29 species at the hot springs area, 46 species at Lava Lake, and 14 on the Wood Road.

Table 1. Craters of the Moon National Monument's 2002 Breeding Bird 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	62	12.4	9	4.0
Carey Kipuka	2250	10	2, 8, 9, 11	65	6.5	11	3.4
Little Cottonwood	3250	14	4, 5, 7, 18, 20, 24, 25, 26, 29	100	7.2	29	4.9
Sunset Flow	5750	24	29, 34	186	7.8	10	2.8
Tree Molds	1750	8	2, 16, 22	80	10.0	16	5.6
Wood Road	3500	15	2, 36, 41	122	8.1	14	4.0
Wilderness Trail	6000	25	1, 2, 6, 7, 16, 21, 22	216	8.6	23	4.7
Driving Route							
Goodale's Cutoff	20120	26	3, 4, 5, 20, 25, 26, 33, 34	221	8.5	31	5.1
Goodale's Cutoff 2	18510	24	2, 3, 25, 29, 33, 34	195	8.1	22	4.1
Loop Drive	7000	15	1, 2, 4, 16, 21, 22, 27	110	7.3	21	4.8
TOTALS	69130	166		1357	8.2	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. Species recorded during 2002 Breeding Bird Survey

Species	No. of birds	% of total	Rts. detected on	# of stops	% of stops
American Coot	25	1.8	GC2	1	0.6
Turkey Vulture	1	<0.1	WT	1	0.6
Northern Harrier	2	<0.1	GC	2	1.2
Cooper's Hawk	1	<0.1	GC	1	0.6
Red-tailed Hawk	2	<0.1	GC	2	1.2
Golden Eagle	1	<0.1	GC	1	0.6
American Kestrel	5	0.4	LC,LP,CK,SF,GC2	5	3.0
Blue Grouse	2	<0.1	LC	2	1.2
Ring-necked Pheasant	1	<0.1	GC	1	0.6
Chukar	1	<0.1	WR	1	0.6
Rock Dove	25	1.8	CA	1	0.6
Mourning Dove	91	6.7	LC,LP,TM,CK,WT,CA,SF,GC,GC2,WR	55	33.1
Killdeer	1	<0.1	GC2	1	0.6
Common Nighthawk	4	0.3	CK,LC,TM,SF	4	2.4
Lewis Woodpecker	2	<0.1	WT,GC	2	1.2
Hairy Woodpecker	1	<0.1	LC	1	0.6
Northern Flicker	13	0.1	LC,LP,CK,WT,GC,WR	9	7.1
Says Phoebe	1	<0.1	CA	1	0.6
Western Wood-Pewee	1	<0.1	GC	1	0.6
Hammond's Flycatcher	5	3.7	GC,LP,WT	4	2.4
Dusky Flycatcher	3	0.2	LC	3	1.8
Cordilleran Flycatcher	1	<0.1	LC	1	0.6
Loggerhead Shrike	6	4.4	CK,GC2,WR	6	3.6
Cassin's Vireo	2	<0.1	LC, GC	2	1.2
Plumbeous Vireo	1	1	WT	1	0.6
Warbling Vireo	15	0.1	LC,GC	5	3.0
Clark's Nutcracker	9	0.7	LP,WT	8	4.8
Black-billed Magpie	3	0.2	GC2	1	0.6
Common Raven	23	1.7	CA,GC,GC2,LP,TM,WT,WR	17	10.2
Horned Lark	2	<0.1	SF,WR	2	1.2
Violet-green Swallow	39	2.9	CA,CK,GC,LP,SF,TM,WT	13	10.2
Northern Rough-winged Swallow	1	<0.1	GC2	1	0.6

Route codes: NE = North End Road LP = Loop Road TM = Tree Molds Trail CK = Carey Kipuka WT =

Wilderness Trail GC = Goodale's Cutoff GC = Goodale's Cutoff 2 SF = sunset Flow WC = Wood Road Trail

Table 2 (cont.) Species recorded during 2001 Breeding Bird Survey

Species	No. of birds	% of total	Rts. detected on	# of stops	% of stops
Black-capped Chickadee	3	0.2	LP	2	1.2
Mountain Chickadee	2	<0.1	TM,WT	2	1.2
Red-breasted Nuthatch	1	<0.1	LC	1	0.6
Rock Wren	148	10.9	CA,CK,GC,GC2,LC,LP,SF,TM,WT,WR	104	62.7
House Wren	7	0.5	LC,GC	6	3.6
Blue-gray Gnatcatcher	22	1.6	LP,TM,WT,WR	12	7.2
Mountain Bluebird	36	2.2	LP,WT,CA,TM,GC	22	13.3
American Robin	7	0.5	GC,GC2,LC,LP	5	3.9
Sage Thrasher	48	3.5	TM,CK,SF,GC,GC2	36	21.7
Orange-crowned Warbler	2	<0.1	GC,LC	2	1.2
Yellow Warbler	6	0.4	GC,LC	6	3.6
MacGillivray's Warbler	3	0.2	GC,LC,WR	3	1.8
Wilson's Warbler	3	0.2	LC	3	1.8
Western Tanager	24	1.8	LC,LP,TM,WT,CA,GC2	22	13.3
Green-tailed Towhee	12	0.9	GC,LC,SF,TM,WT	10	6.0
Spotted Towhee	100	7.4	LC,LP,TM,WT,GC,GC2	66	40.0
Chipping Sparrow	12	0.8	LP,TM,WT,WR	9	5.4
Brewer's Sparrow	414	30.5	LC,LP,TM,CK,WT,CA,SF,GC,GC2,WR	108	65.1
Vesper Sparrow	9	0.7	LC,GC,GC2	7	4.2
Lark Sparrow	8	0.6	GC2,CK	6	3.6
Sage Sparrow	6	0.4	GC2,LC,SF	6	3.6
Fox Sparrow	1	<0.1	LC	1	0.6
Song Sparrow	2	<0.1	LC	2	1.2
Black-headed Grosbeak	6	0.4	LC,LP	4	2.4
Lazuli Bunting	18	1.3	LC,GC	14	8.4
Red-winged Blackbird	2	0.1	GC,GC2	2	1.2
Western Meadowlark	103	7.6	CK,GC,GC2,TM,WT,WR	10	28.3
Brewer's Blackbird	23	1.7	LP,GC,GC2,WR	9	11.7
Brown-headed Cowbird	9	0.7	LC,LP,WT,GC2,WR	7	4.2
House Finch	1	<0.1	GC	1	0.6
Cassin's Finch	1	<0.1	LP	1	0.6

Route codes: NE = North End Road LP = Loop Road TM = Tree Molds Trail CK = Carey Kipuka WT = Wilderness Trail GC = Goodale's Cutoff GC2 = Goodale's Cutoff 2 SF = sunset Flow WC = Wood Road Trail

Table 3 Species list recorded by vegetation type.

VEGETATION TYPE		Lavas			Shrubsteppe Communities													Forested							Other	
					Shrublands									Grasslands												
SPECIES	STATUS	1	2	3	4	5	6	7	8	9	11	16	34	36	18	20	37	21	22	23	24	25	26	41	27	33
Turkey Vulture							X																			
Northern Harrier	B												X			X										
Cooper's Hawk																						X				
Red-tailed Hawk					X																					
Golden Eagle	P												X													
American Kestrel								X				X						X		X						
Blue Grouse	P																						X			
Ring-necked Pheasant																										X
Chukar				X																						
American Coot																										X
Killdeer																	X									
Rock Dove			X																							
Mourning Dove			X	X	X		X		X	X	X	X	X	X				X	X					X		
Common Nighthawk			X			X						X	X													
Lewis' Woodpecker	B, P																		X			X				
Hairy Woodpecker																				X						
Northern Flicker																		X	X			X	X	X		
Say's Phoebe													X													
Western Wood-pewee																						X				
Dusky Flycatcher	P																						X			
Hammond's Flycatcher	P																		X			X				
Cordillian Flycatcher	P																					X				

Status column codes: P = Idaho Partners in Flight priority species recommendation
I = Idaho Department of Fish and Game species of special concern
B = US Bureau of Land Management sensitive species
F = US Fish and wildlife Service species of concern
For vegetation codes see appendix 1

Table 3 cont. Species list recorded by vegetation type.

VEGETATION TYPE		Lavias			Shrubsteppe Communities													Forested							Other	
					Shrublands									Grasslands												
SPECIES	STATUS	1	2	3	4	5	6	7	8	9	11	16	34	36	18	20	37	21	22	23	24	25	26	41	27	33
Loggerhead Shrike	F,I,B,P								X		X			X												
Cassin's Vireo																					X	X				
Plumbeous Vireo	B,P																			X						
Warbling Vireo	P																				X	X				
Horned Lark													X	X												
Violet-green Swallow			X	X					X				X					X	X			X				
N. Rough-winged Swallow														X												
Clark's Nutcracker																		X	X							
Black-billed Magpie																										
Common Raven			X	X			X					X		X				X						X		
Black-capped Chickadee																			X							
Mountain Chickadee																			X	X						
Red-breasted Nuthatch																					X					
House Wren																						X	X			
Rock Wren			X	X																						
Blue-gray Gnatcatcher																		X	X					X		
Mountain Bluebird			X		X		X					X						X	X	X						
American Robin									X			X									X	X	X		X	
Sage Thrasher	P				X				X			X	X													

Status column codes: P = Idaho Partners in Flight priority species recommendation
I = Idaho Department of Fish and Game species of special concern
B = US Bureau of Land Management sensitive species
F = US Fish and wildlife Service species of concern
For vegetation codes see appendix 1

Table 3 cont. Species list recorded by vegetation type.

VEGETATION TYPE		Lavás			Shrubsteppe Communities													Forested							Other	
					Shrublands										Grasslands											
SPECIES	STATUS	1	2	3	4	5	6	7	8	9	11	16	34	36	18	20	37	21	22	23	24	25	26	41	27	33
Orange-crowned Warbler																					X	X				
Yellow Warbler	B																				X	X	X			
MacGillivray's Warbler	B																		X			X	X			
Wilson's Warbler	P																						X			
Western Tanager	P												X					X	X	X	X					
Green-tailed Towhee	P				X		X					X	X					X								
Spotted Towhee					X	X	X					X	X	X					X							
Chipping Sparrow																		X	X				X			
Brewer's Sparrow	B,P	X			X	X	X		X	X	X	X	X	X				X	X							
Vesper Sparrow					X								X	X		X										
Lark Sparrow									X				X	X												
Sage Sparrow	B,P				X								X													
Fox Sparrow																							X			
Song Sparrow																							X			
Black-headed Grosbeak	P																	X					X			
Lazuli Bunting	P				X							X														
Red-winged Blackbird														X												X
Western Meadowlark									X	X	X	X	X	X					X							
Brewer's Blackbird					X								X	X											X	
Brown-headed Cowbird														X					X				X		X	
Cassin's Finch	P																		X						X	
House Finch														X												

Status column codes: P = Idaho Partners in Flight priority species recommendation
I = Idaho Department of Fish and Game species of special concern
B = US Bureau of Land Management sensitive species
F = US Fish and wildlife Service species of concern
For vegetation codes see appendix 1

Table 4. 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 5. Species observed during migrant surveys during 2002.

Species	Survey area				Species	Survey area			
	BT	CHS	LL	WR		BT	CHS	LL	WR
Pied-billed Grebe			X		Say's Phoebe				X
Eared Grebe			X		Western Kingbird		X		
Double Crested Cormorant			X		Eastern Kingbird		X		
Turkey Vulture	X		X		Loggerhead Shrike				X
Canada Goose			X		Pinyon Jay				X
Gadwall			X		Black-billed Magpie		X		
American Wigeon			X		Common Raven		X	X	X
Mallard			X		Violet-green swallow		X	X	
Northern Shoveler			X		N. Rough-winged Swallow			X	
Cinnamon Teal			X		Rock Wren	X	X	X	X
Northern Pintail			X		House Wren		X		
Blue-winged Teal			X		Marsh Wren		X		
Ruddy Duck			X		Ruby-crowned Kinglet		X		X
Canvasback			X		Blue-gray Gnatcatcher	X			
Redhead			X		Mountain Bluebird	X			
Ring-necked Duck			X		Sage Thrasher			X	
Lesser Scaup			X		Orange-crowned Warbler	X	X	X	
Bufflehead			X		Nashville Warbler			X	
Northern Harrier		X			Yellow Warbler			X	
Sharp-shinned Hawk			X		Yellow-rumped Warbler (Audubon's)	X			
Red-tailed hawk			X		MacGillivray's Warbler	X			
Golden Eagle		X			Wilson's Warbler	X		X	
American Kestrel				X	Western Tanager	X			
American Coot			X		Green-tailed Towhee	X	X		
Virginia Rail		X			Spotted Towhee	X	X		X
Sandhill Crane		X	X		Chipping Sparrow	X			
Killdeer		X	X		Brewer's Sparrow	X	X	X	
American Avocet			X		Vesper Sparrow			X	
Spotted Sandpiper					White-crowned Sparrow		X		X
Long-billed Curlew					Dark-eyed Junco (Oregon)	X			
Wilson's Phalarope			X		Lazuli Bunting		X		
California Gull					Red-winged Blackbird		X	X	
Mourning Dove		X	X	X	Western Meadowlark		X	X	X
Downy Woodpecker		X			Yellow-headed Blackbird		X	X	
Northern Flicker				X	Brewer's Blackbird		X	X	
Olive-sided Flycatcher	X				Brown-headed Cowbird			X	
Willow Flycatcher		X			American Goldfinch		X		
Unidentified <i>Empidonax</i> sp.		X		X	House Sparrow		X		

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

Table 6. List of bird species identified at Craters of the Moon during 2002.

Pied-billed Grebe	Franklin's Gull	Ruby-crowned Kinglet
Eared Grebe	Rock Dove	Blue-gray Gnatcatcher
Double Crested Cormorant	Mourning Dove	Mountain Bluebird
White-faced Ibis	Great Horned Owl	Townsend's Solitaire
Turkey Vulture	Burrowing Owl	Hermit Thrush
Canada Goose	Short-eared Owl	American Robin
Tundra Swan	Common Nighthawk	Sage Thrasher
Gadwall	Common Poorwill	European Starling
American Wigeon	Rufous Hummingbird	Bohemian Waxwing
Mallard	Lewis' Woodpecker	Cedar Waxwing
Northern Shoveler	Red-naped Sapsucker	Orange-crowned Warbler
Cinnamon Teal	Downy Woodpecker	Nashville Warbler
Northern Pintail	Hairy Woodpecker	Yellow Warbler
Blue-winged Teal	Northern Flicker	Yellow-rumped Warbler (Audubon's)
Ruddy Duck	Olive-sided Flycatcher	MacGillivray's Warbler
Canvasback	Western Wood-pewee	Wilson's Warbler
Redhead	Willow Flycatcher	Western Tanager
Ring-necked Duck	Hammond's Flycatcher	Green-tailed Towhee
Lesser Scaup	Dusky Flycatcher	Spotted Towhee
Bufflehead	Cordilleran Flycatcher	Chipping Sparrow
Bald Eagle	Say's Phoebe	Brewer's Sparrow
Northern Harrier	Western Kingbird	Vesper Sparrow
Sharp-shinned Hawk	Eastern Kingbird	Lark Sparrow
Copper's Hawk	Loggerhead Shrike	Sage Sparrow
Northern Goshawk	Northern Shrike	Fox Sparrow
Swainson's Hawk.	Plumbeous Vireo	Song Sparrow
Red-tailed hawk	Cassin's Vireo	White-crowned Sparrow
Rough-legged Hawk	Warbling Vireo	Dark-eyed Junco (Oregon)
Ferruginous Hawk	Steller's Jay	Snow Bunting
Golden Eagle	Pinyon Jay	Black-headed Grosbeak
American Kestrel	Clark's Nutcracker	Lazuli Bunting
Peregrine Falcon	Black-billed Magpie	Red-winged Blackbird
Prairie Falcon	American Crow	Western Meadowlark
Chukar	Common Raven	Yellow-headed Blackbird
Gray Partridge	Horned Lark	Brewer's Blackbird
Ring-necked Pheasant	Violet-green swallow	Brown-headed Cowbird
Greater Sage Grouse	N. Rough-winged Swallow	Bullock's Oriole
Blue Grouse	Barn Swallow	Gray-crowned Rosy-Finch
American Coot	Black-capped Chickadee	Cassin's Finch
Virginia Rail	Mountain Chickadee	House Finch
Sandhill Crane	Red-breasted Nuthatch	Red Crossbill
Killdeer	White-breasted Nuthatch	Hoary Redpoll
American Avocet	Brown Creeper	Common Redpoll
Spotted Sandpiper	Rock Wren	Pine Siskin
Long-billed Curlew	House Wren	American Goldfinch
Wilson's Phalarope	Marsh Wren	House Sparrow
California Gull	Golden-crowned Kinglet	

Bold = Species not previously identified at Craters of the Moon

Blue text = Species not found on traditional breeding season surveys

CONCLUSION

Breeding Season Survey

The total number of birds observed in 2001 was 1357. This was a 35% increase over 2001 (n=1007) and a 97% increase over 2000 (n=690) and 1999 (n=712), a 140% increase over 1998 (n=569) and a 300% increase over 1997 (n=335) (fig. 1). This compares with a 235% increase in the number of points surveyed during the period 1997 to 2002. However when totals are compiled for only those routes that have been surveyed for the entire six year period, 2002 total numbers are about the same as 1998 and 2001 or about a 14% drop from 1999-2000 (fig. 2). The number of species observed on these six routes showed the same trend with the same number of species detected in 2002 as 2001 which is a 14% drop in 2001 following a increasing trend (fig. 3).

This was only the sixth year of monitoring on six of these routes, the second for two routes, and the first 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. Conversely the temperatures were close to the 40 year average throughout winter and spring of 97-98 but precipitation was well below normal in early winter rising to more twice the average amount in May and June. 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 2000-02 had above average temperatures throughout the period and precipitation levels were at less than half the mean for January to June. The winter and spring of 2000-2001 was the driest of any during the period of these surveys. The period for 2001-02 alternated between average and unusually dry months. As result vegetation dried out earlier than any other year 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. These conditions led to very different vegetative conditions during the breeding season for many species. 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).

None of the 63 bird species observed during the 2001 surveys are on either the federal or state endangered species lists. However, of these 63 species, 14 of the species have been listed as a priority species by Idaho Partner's in Flight (IDPIF 1998), are listed by the Idaho Department of Fish and Game IDFG 1998) as species of special concern, as species of concern by the US Fish and Wildlife Service (USFWS), or as sensitive by the US Bureau of Land Management (USBLM 2001) (Table 3).

In this portion of their range all but one of these 14 are primarily associated with either shrubsteppe or

riparian areas. The most abundant bird species are in one or more of these sensitive categories. This includes the most numerous species on the monument, the Brewer's Sparrow, which is on all 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.

An increase of six species from 2001 to 2002 (57 to 63, fig.3) was an increase of about 10%. The total number of birds increased at rate comparable to increase in effort. Numbers increased by 34% compared to an increase in points of 31%. Many bird species maintained numbers despite drought conditions throughout spring and early summer. This includes identification of previously unknown nesting area for Greater Sage Grouse in the Preserve. Female grouse were observed in the area during the survey and. One female was displaying defensive behavior indicating a brood was in the immediate area. 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 INEEL (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 the migrant surveys was 76. Of these, 29 were previously undocumented in at CRMO. These surveys have been very productive at targeting specific habitats that are of importance to migrant species. These counts targeted restricted habitats that are of much 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 habitat are limited throughout the region, including CRMO, so this initial year of 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 to effort to thoroughly document.

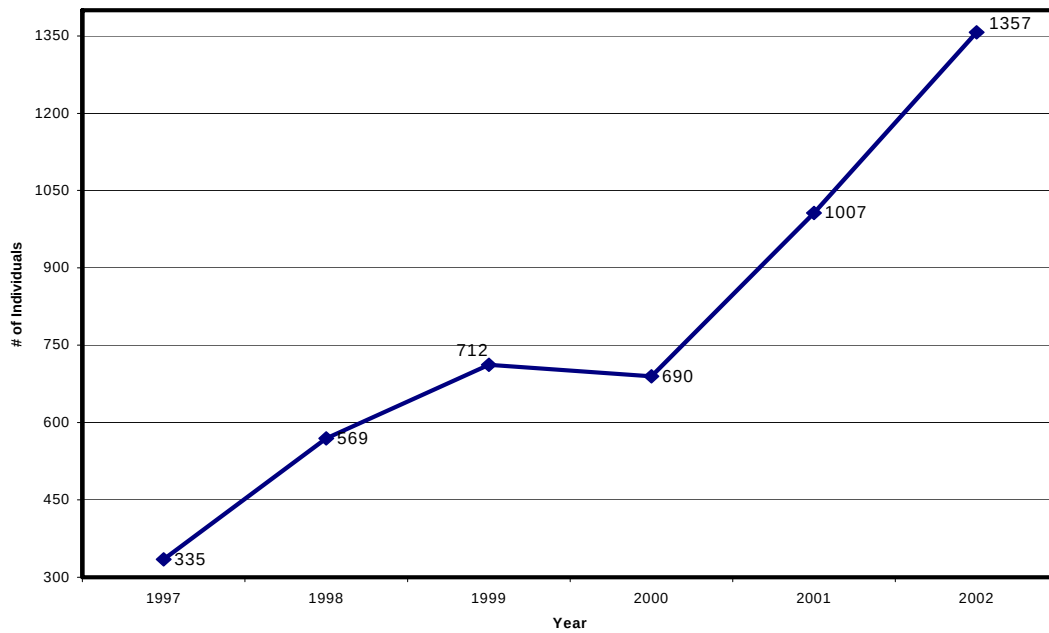


Figure 1. Total numbers of birds recorded during breeding bird surveys 1997-2002

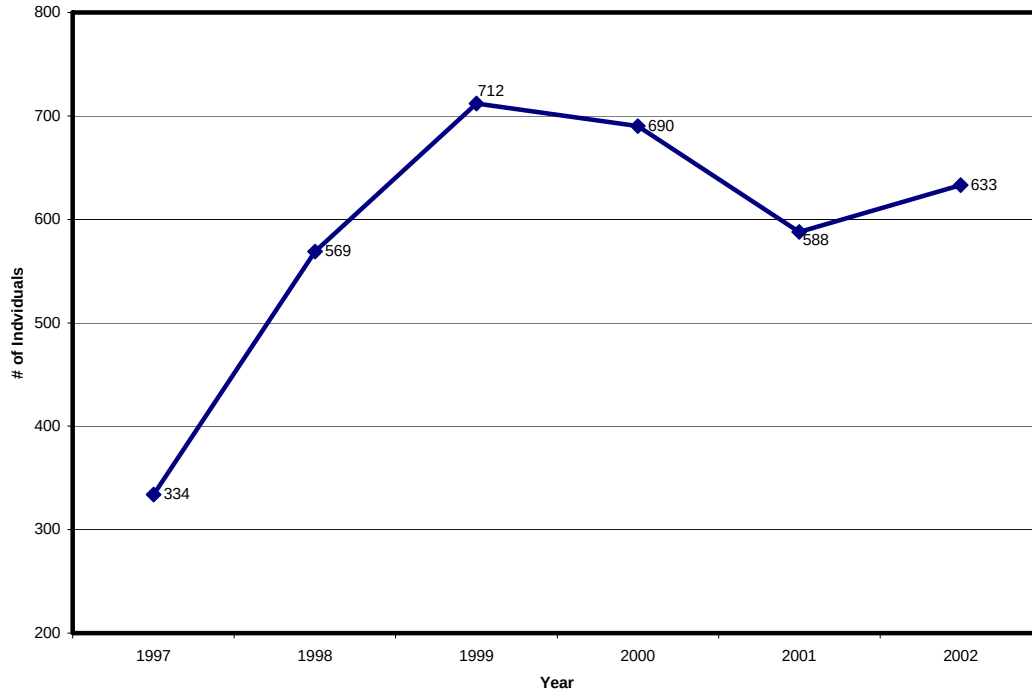


Figure 2. Numbers of birds recorded during breeding bird surveys on the six routes surveyed during the years 1997-2002

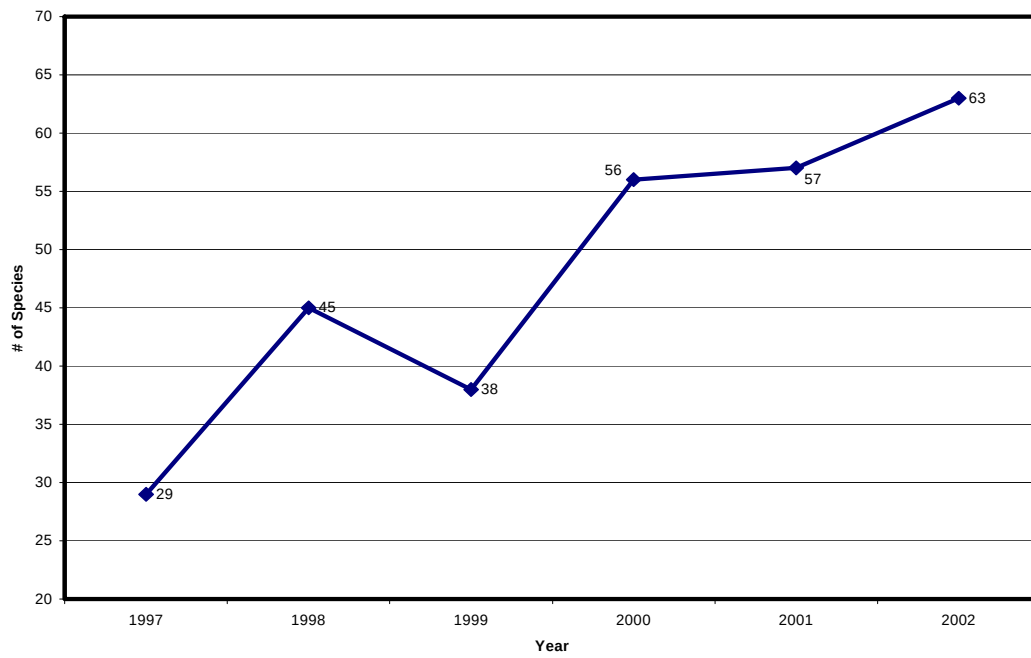


Figure 3. Number of species detected during breeding bird surveys 1997-2002

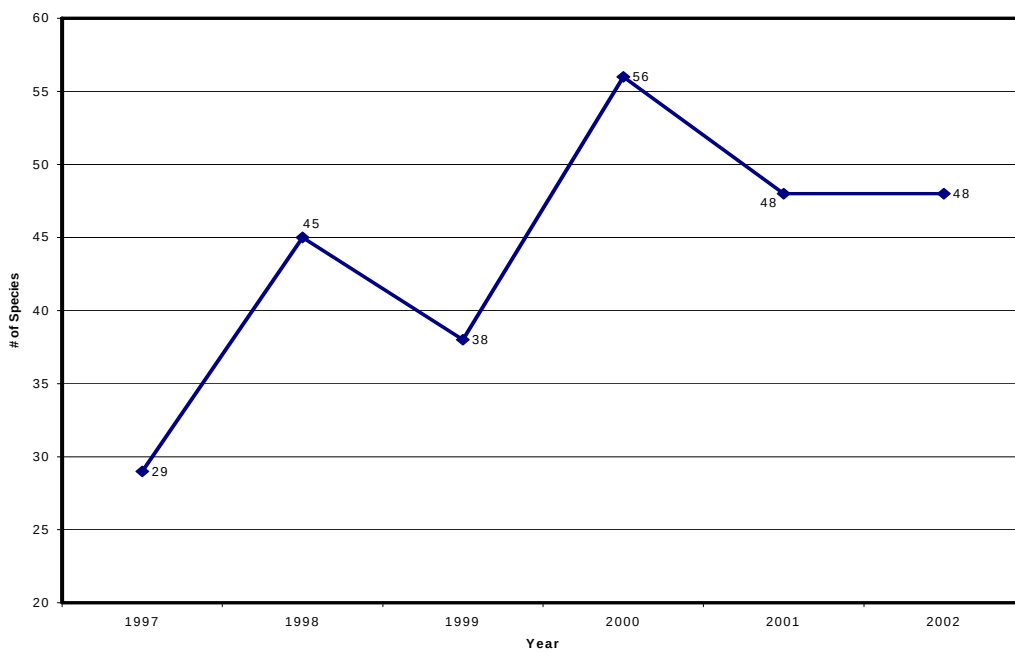


Figure 4. Number of species detected on the six routes surveyed during the years 1997-2002

Recommendations

If we are to maintain natural faunal communities it is important that we know what species are here and their relative abundance and any trends in their population. Relative abundance information and long term trends can be determined with long term data sets from the current variable circular plot (VCP) method (Fancy and Sauer 2000).

To maintain healthy populations we also need to know information regarding distribution, productivity, survival, recruitment and other individual and population characteristics. This type of information is not readily available from point counts and needs to be gathered using other techniques. Yet the need for this type of information will become increasingly important in the future. As it is likely that shrubsteppe will become even more fragmented on the Snake River Plain.

We also need to address the effects on wildlife of plant succession either as a result of disturbance or lack of disturbance. Examples may include large stand replacing fires in shrubsteppe that reach unnatural proportions resulting in continued decline of sagebrush communities. On the other side of fire is suppression in aspen communities resulting their continued aging and decline. What are the effects of fragmentation and edge on shrubsteppe birds including sage grouse? Invasive species from starlings to knapweeds can alter habitat suitability in ways which may not be immediately apparent. Could these factors produce an ecological sink where marginal habitat attracts large numbers of birds that either don't breed or nest success is very low? Such an area may actually have deleterious affect on long term populations in spite of localized high numbers. The Monitoring Avian Productivity and Survival (MAPS) program is designed to answer these types of demographic questions about bird populations and is the recommended method for use in national parklands (Fancy and Sauer 2000). The information gathered has the potential to produce much useful information for the management and preservation of the avian component of the wildlife resources at Craters of the Moon. This expansion of monitoring has recommended in the 1997 Standard Operating Procedures but was never implemented due to budget and personnel constraints. It is recommended that this additional monitoring be implemented as soon as feasible.

The Preserve has had essentially no wildlife surveys in recent decades. This area should have additionally inventory work as well as establishment of long term monitoring sites. ISU personnel have had Breeding Bird Survey routes on and adjacent to lands under NPS management. This data can be acquired and added to the monitoring collected by NPS personnel. The professor performing these routes has recently retired but intends to continue these surveys. At some point in the future Dr. Trost may be unable to continue these surveys. At that point it would in the interest of both the NPS and BLM to see that these long term surveys are continued.

Large portions of the Preserve are at substantially lower elevation and in close proximity to the main stem of the Snake River and is adjacent to irrigated farmland. On the Wapi flow there are recorded Juniper stands that are among the oldest in Idaho. Sand dunes and an agricultural interface can also be found in this area. These habitats differ from the rest of monument will likely result in different avian communities in the southern areas of the expanded monument.

Some species are sedentary, secretive or nocturnal and are not readily observed using community based

techniques. This includes hawks, grouse, owls, poorwills, and nighthawks. In order to fully monitor these types of birds, specialized group or species specific techniques will need to be used. In the case of Sage Grouse, which are likely candidate for threatened or endangered listing, it would be advantageous to initiate monitoring on NPS lands in the near future. Idaho Department of Fish and Game and the BLM are already conducting Sage Grouse monitoring and it may be possible to partner with these agencies to conduct monitoring for the entire monument area.

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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.

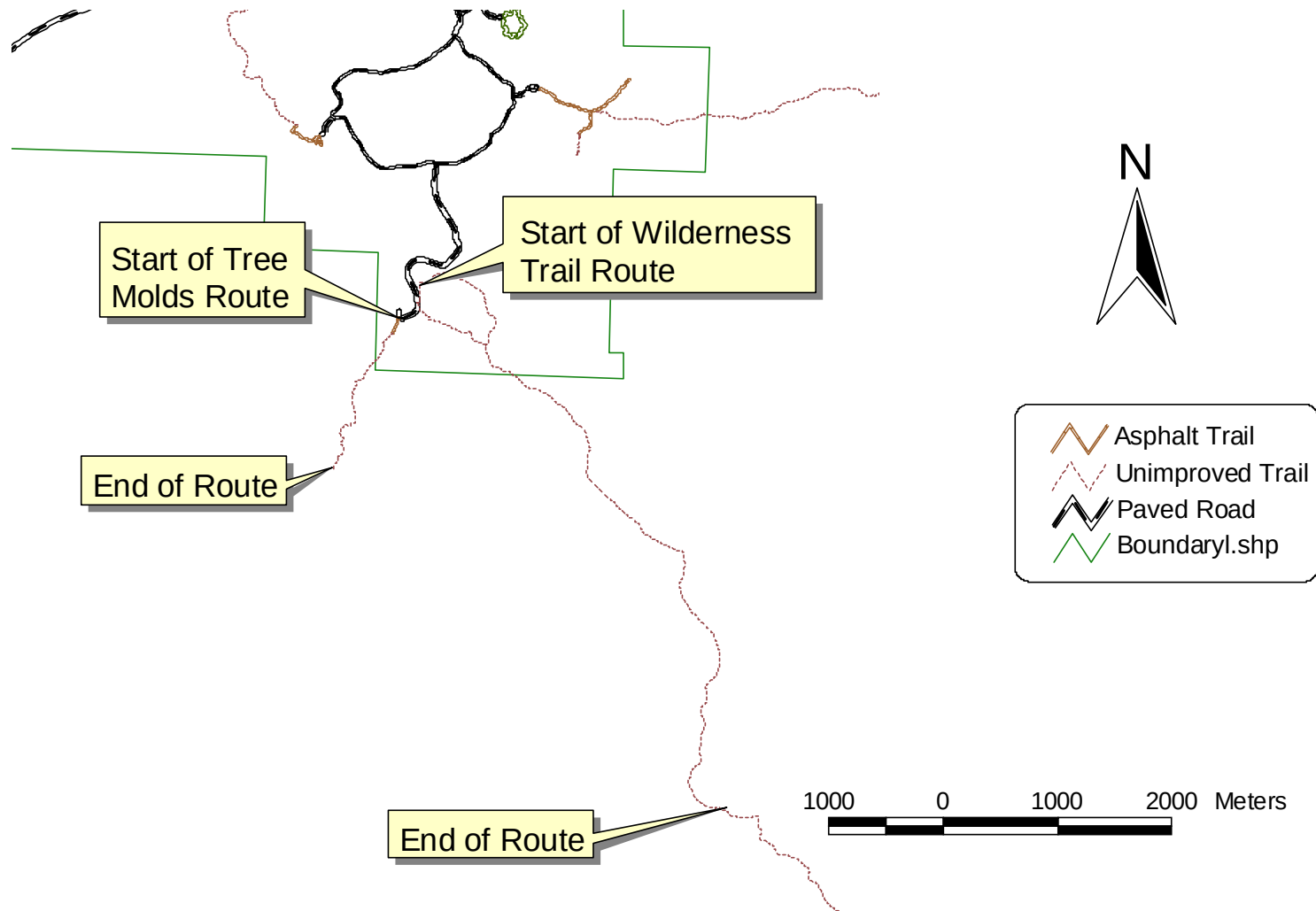
Precipitation (Inches)

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
40 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	.02	.02	.66	.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

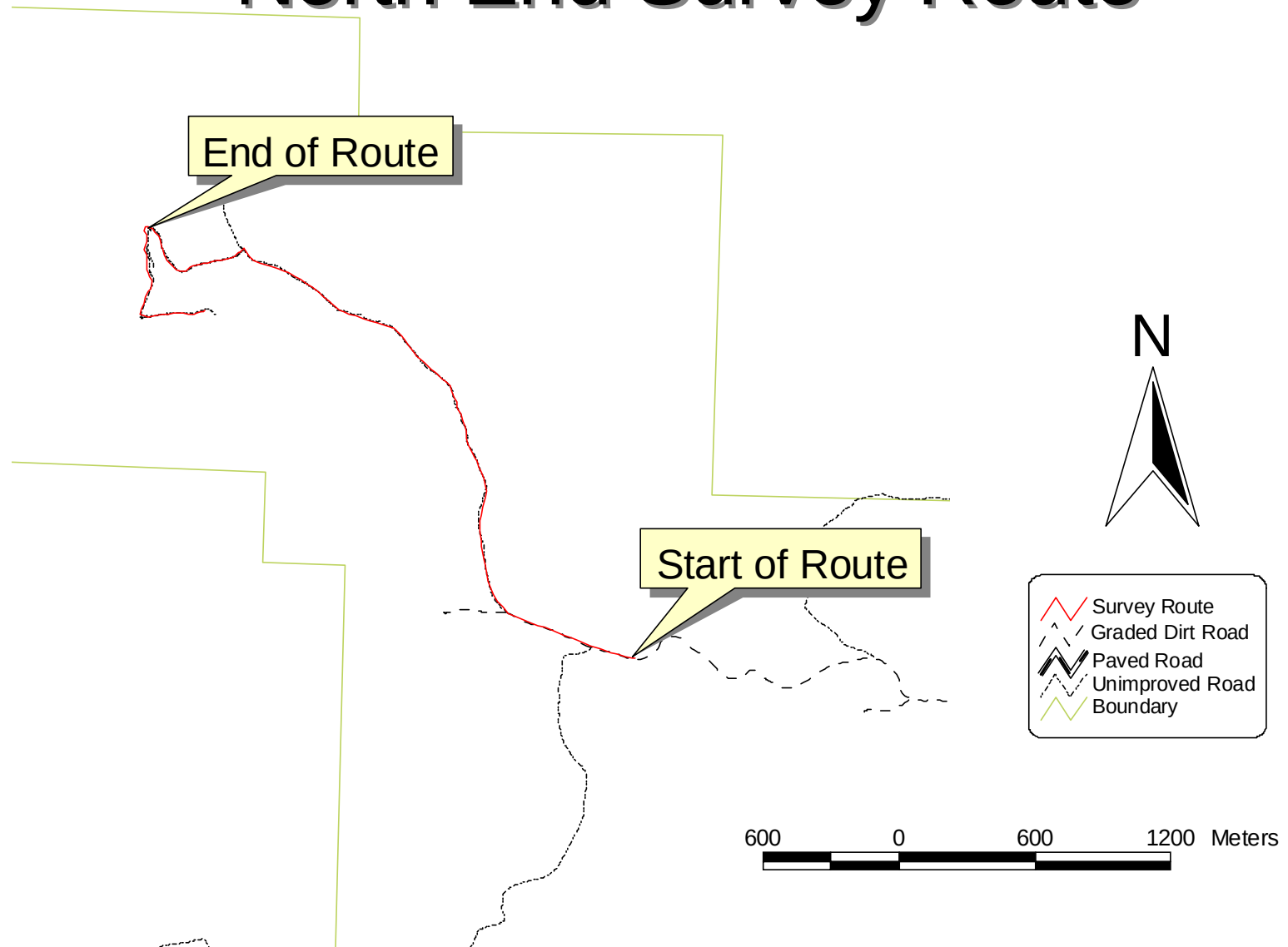
Temperature (Fahrenheit)

	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
40 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
00-01	22.9	20.2	16.9	19.4	35.0	40.1	56.1	61.2

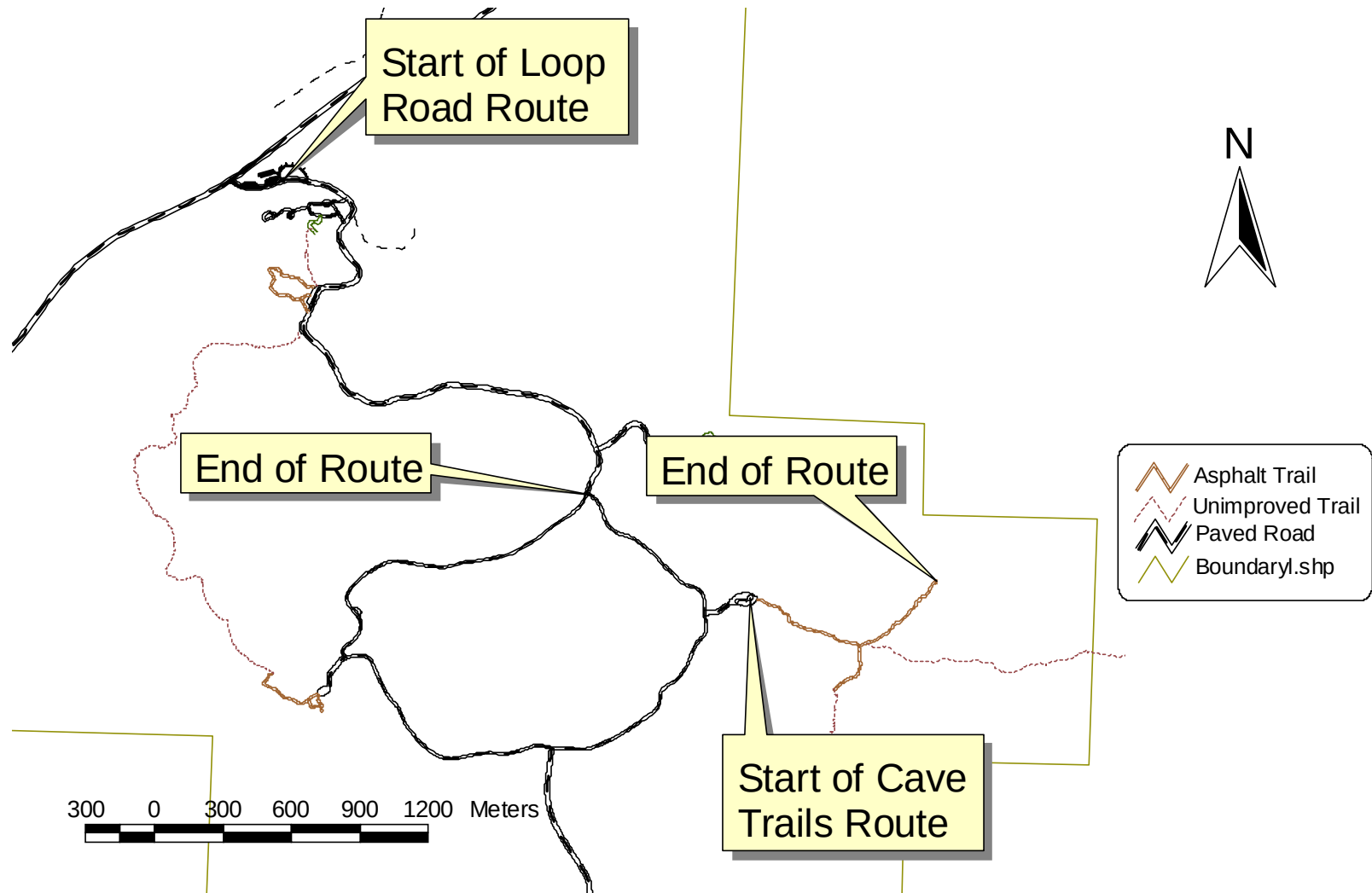
Tree Molds and Wilderness Trail Survey Routes



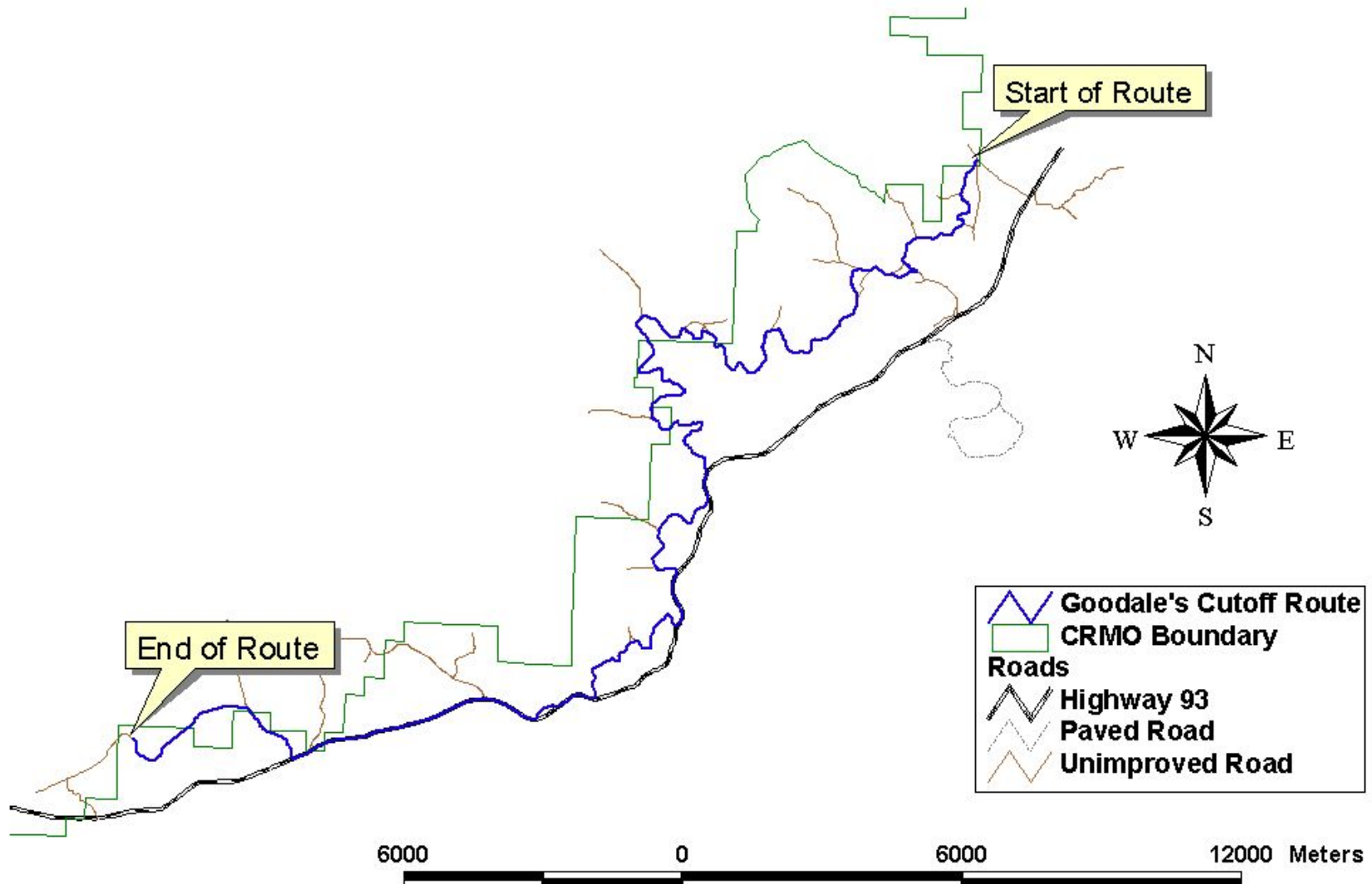
North End Survey Route



Loop Road and Caves Trail Routes



Goodale's Cutoff Survey Route



Sunset Flow Survey Route

