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CRATERS OF THE MOON NATIONAL MONUMENT 1995 BIRD CENSUS

Natalene Cummings - Resource Management Specialist, Craters of the Moon National Monument, P.O. Box 29, Arco, Idaho, 83213.

INTRODUCTION

Bird censuses at Craters of the Moon NM (CRMO) began in 1988 as part of an ongoing effort to assess the biological value, richness, uniqueness and health of the area. The 1995 census is the seventh in the series of censuses conducted since 1988, excluding 1989 when a lack of qualified personnel prevented any censusing.

Censuses are scheduled to begin in early May and run to the 15th of June. The 1995 census began May 5 and ended June 29, with the exception of three sites that were visited on July 19 and 26. The unusually wet spring limited the number of days that a census could be conducted, resulting in a longer census season. The censuses were conducted by Natalene Cummings - Resource Management Specialist, Richard Schneider - Interpreter/Resource Technician and Jason (Jake) Rindfleisch - Resource Technician.

METHODS

At the start of the season, before heading into the field, each field person was asked to take the Craters of the Moon National Monument's Bird Identification Skills Evaluation that was incorporated into the bird census in 1993.

Of 26 vegetation types (VT's) identified in the monument, 17 are included in the bird census (Appendix I). Census locations consist of two sites per vegetation type, totalling 34 sites. Since time and staffing are limited, it is impossible to visit all sites during the census season. To accommodate this constraint, four priority vegetation types have been selected that are to be censused each year while visits to the remaining vegetation types are split into two groups that are rotated every other year. (Appendix II).

During the 1995 season, 11 vegetation types were censused, resulting in a total of 22 sites being visited (two sites/vegetation site). Those sites included the four priority VT's (marked with *) and the following:

- 26* - Riparian
- 25* - Upland Quaking Aspen
- 23* - Limber Pine/Antelope Bitterbrush - high overall cover
- 22* - Limber Pine/Antelope Bitterbrush - high limber pine
- 17 - Antelope Bitterbrush/Great Basin Wildrye
- 13 - Low Sagebrush/Sandberg Bluegrass
- 11 - Three-tip Sagebrush/Idaho Fescue
- 8 - Mountain Big Sagebrush/Idaho Fescue
- 3 - Medium Density Lava Flow
- 2 - Low Density Lava Flow
- 1 - Cinder Garden

Standard Operating Procedures (SOP's) for the bird census requires that censusing be conducted during the first two hours after sunrise. Observers are to wait ten minutes after arrival to the site before beginning the 30 minute censusing period. During the censusing period, observers identify all species by sight and by call/song and record each individual observed.

Data is compiled and species diversity is calculated through the application of the Shannon-Weaver Estimate of Diversity formula (Appendix III).

RESULTS

All field staff completed the bird skills evaluation at the start of the 1995 season and achieved scores of 75% or greater.

Natalene Cummings	90%
Richard Schneider	96%
Jason Rindfleisch	90%

INDIVIDUALS

In all 22 sites visited in 1995, 474 **individual** birds were counted, totaling an average of 43 individuals per VT; the range consisting of 27 in VT 11 to 75 in VT 23. In the four priority VT's alone, the total number of individuals increased by 38 this season to a total of 196. (Table I).

Table I. Comparative total number of INDIVIDUALS in each of the four priority vegetation types for each of the bird census years, 1988, 1990-95, at Craters of the Moon National Monument, Arco, Idaho.

VEGETATION TYPES

YEAR	26	25	23	22	Total
1988	*	*	*	*	*
1990	60	71	86	11	327
1991	64	49	67	60	240
1992	70	42	69	67	248
1993	49	88	76	93	306
1994	54	31	41	32	158
1995	31	33	75	57	196

* = missing data

SPECIES RICHNESS

In all 22 sites visited in 1995, **species richness** (the number of species) was 45; the range consisting of 10 in VT 13 to 26 in VT 23. The four priority VT's alone contained 35 species. Figures from all 22 sites and from the four priority sites were down from last year by 10 and 13 species, respectively. (Table II).

Table II. Comparative SPECIES RICHNESS for all vegetation types for each of the bird census years (1988, 1990-1995) at Craters of the Moon National Monument, Arco, Idaho.

	VEGETATION TYPES																						
YEAR	+26	+25	+23	+22	+TOT	24	21	17	16	13	11	8	6	5	4	3	2	1	TOTAL				
1988	26	25	26	20	48	34	20	11	14	14	16	13	14	13	15	12	12	4	64				
1990	17	20	18	19	38	24	16	-	12	-	-	-	9	11	13	-	-	-	51				
1991	18	16	16	16	35	22	17	13	14	9	9	14	14	9	21	-	-	-	49				
1992	20	17	20	21	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
1993	19	30	27	27	47	-	-	23	-	6	10	11	-	-	-	10	10	14	56				
1994	26	21	27	20	48	20	16	-	12	-	-	-	12	9	13	-	-	-	55				
1995	11	20	26	19	35	-	-	15	-	10	13	14	-	-	-	14	15	15	45				
AVERAGE SPECIES RICHNESS FOR PRIORITY VT's FOR ALL YEARS					41														AVERAGE SPECIES RICHNESS FOR ALL VT's FOR ALL YEARS				53

(+) = a top four priority site
 (-) = not censused

NOTE: All figures taken from Craters of the Moon National Monument Annual Bird Census Reports.

SPECIES DIVERSITY

The Shannon-Weaver Species diversity estimate (H') for the 11 VT's censused in 1995 averaged 2.469. The greatest diversity was 3.018, occurring in VT 23 while the lowest was 2.067 in VT 13. Since the identical VT's are not censused each year, comparisons between the diversity estimates for all the VT's censused may not be accurate. However, since the same four priority sites are censused each year, a more accurate comparison can be made between them.

When comparing the four priority VT's, the 1995 census average of 2.757 was lower than last year's average of 3.077. Although the diversity estimate decreased individually for each of the four priority sites, figures in the remaining VT's increased in six of the seven sites censused. (Table III).

Table III. Comparative species DIVERSITY (H') for the all vegetation types for each of the bird census years, (1988, 1990-1995) at Craters of the Moon National Monument, Arco, Idaho.

	VEGETATION TYPES																				
YEAR	+26	+25	+23	+22	+AVG.	24	21	17	16	13	11	8	6	5	4	3	2	1	AVERG		
1988	2.999	2.843	2.807	2.475	2.781	3.102	2.760	1.908	1.944	2.172	2.418	2.113	1.949	2.213	2.204	1.858	1.903	1.277	2.291		
1990	2.654	2.726	2.735	2.725	2.710	2.998	2.452	-	2.315	-	-	-	1.863	2.283	2.283	-	-	-	2.507		
1991	2.759	2.678	2.552	2.497	2.622	2.900	2.602	2.354	2.293	1.954	1.732	2.402	2.437	1.926	2.430	-	-	-	2.394		
1992	2.807	2.691	2.898	3.001	2.849	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1993	2.850	2.729	3.169	3.142	2.973	-	-	2.615	-	1.662	2.126	2.198	-	-	-	2.194	2.194	2.502	2.489		
1994	3.161	3.106	3.154	2.888	3.077	2.842	2.574	-	2.314	-	-	-	2.347	2.052	1.777	-	-	-	2.622		
1995	2.313	2.920	3.018	2.776	2.757	-	-	2.156	-	2.067	2.539	2.392	-	-	-	2.415	2.480	2.532	2.510		
AVERAGE DENSITY OF PRIORITY VT'S FOR ALL YEARS					2.824														AVERAGE DIVERSITY FOR ALL VT'S FOR ALL YEARS		2.469

(+) = a top four priority site
 (-) = not censused

Although previously recorded in the monument, two species were new to the census, including the common poorwill and the colliope hummingbird. A total of 21 other species were found in VT's where they had not previously been recorded, six of which were found in two or more new VT's. There were no birds new to the monument recorded during the census. The northern harrier, that has appeared in every census since it's start in 1988, was not recorded anywhere during the 1995 census (Table IV).

Table IV. Birds detected during the 1995 census in the eleven priority vegetation types surveyed at Craters of the Moon National Monument, Arco, Idaho.

Family Species	Vegetation Types										
	26	25	23	22	17	13	11	8	3	2	1
Accipitridae											
Red-tailed Hawk			23								
Golden Eagle*								8*			
Falconidae											
American Kestrel	26							8			
Phasianidae											
Blue Grouse						13					
Columbidae											
Morning Dove		25	23	22	17			8	3	2	
Caprimulgidae											
Common Poorwill**		25									
Trochilidae											
Rufus Hummingbird			23								
Colliepe Hummingbird**								11			
Hummingbird spp.							11				
Picidae											
Red-napped Sapsucker*				22*							
Northern Flicker*	26	25	23	22	17*			8	3	2	1
Tyrannidae											
Dusky Flycatcher		25	23		17						
Gray Flycatcher		25									
Say's Phoebe*							11*		3		
Hiruninidae											
Violet-gr. Swallow					17					2	
Barn Swallow*						13*					
Corvidae											
Clark's Nutcracker*		25	23	22		13*			3		1
American Crow	26	25				13					
Common Raven*		25	23*	22			11*		3*	2	
Paridae											
Mountain Chickadee*		25	23	22							1*
Sittidae											
Red-br. Nuthatch*			23	22	17			8*			1*
Troglodytidae											
Rock Wren			23		17	13	11		3	2	
N. House Wren*		25	23*								
Musciapidae											
Bl.-gray Gnatcat.		25	23	22							
Ruby-crnd. Kinglet*		25	23	22						2*	1*
Mountain Bluebird*			23				11*		3	2	1
American Robin*	26			22						2*	1
Mimidae											
Sage Thrasher*					17	13*		8	3		
Vireonidae											
Warbling Vireo	26	25									
Emberizidae											
Yel.-rumped Warb.		25	23								1

Table IV continued. Birds detected during the 1994 bird census in the ten vegetation types surveyed at Craters of the Moon National Monument, Arco, Idaho.

Family	Vegetation Types										
Species	26	25	23	22	17	13	11	8	3	2	1
MacGill.'s Warb.	26										
Wilson's Warbler*	26									2*	
Thraupinae											
Western Tanager		25	23	22							
Cardinalinae											
Lazuli Bunting*	26	25					11*				
Emberizidae											
Grn-tailed Towhee	26		23	22	17	13	11	8	3		
Rufus-sided Towhee	26		23	22	17		11	8	3		
Chipping Sparrow*		25	23		17				3*		1*
Brewer's Sparrow			23	22	17	13	11	8	3	2	
Vesper Sparrow					17	13	11	8			
Dark-eyed Junco*		25	23	22				8*		2*	1*
Icterinae											
Western Meadowlark							11	8		2	
Brewer's Bl.bird*			23	22	17			8	3*		1
Br.- Hded Cowbird			23	22	17		11			2	1
Fringillidae											
Cassin's Finch*		25	23	22	17				3	2	1*
Pine Siskin*		25	23			13*				2*	1

* = first time noted in particular vegetation type

** = first time noted on Craters of the Moon National Monument bird census

CONCLUSION

As stated in the 1994 Bird Census Report, it is difficult to make accurate comparisons between the census years when different vegetation types are censused each year. Some VT's have lower species richness and diversity than others based on the fewer number of vegetative species and decreased cover, and, depending on which VT's are surveyed, the total average for the year will be influenced by this bias. In addition, the number of VT's surveyed has an effect on the total average as well. For this reason, it seems only logical, at this point in time, to compare the four priority VT's for data that is best representative of any trends.

In addition, it has been difficult, if not impossible, to visit all the census sites in one season requiring a bi-yearly schedule for visits to sites that are not regarded as priority. And, as stated above, data that is collected from these sites cannot be used to its fullest potential. It is suggested that first; the number of sites in the census be decreased by eliminating sites that are closely duplicated by other vegetation sites in vegetation and bird species present, and second; by eliminating sites that are difficult to get to. If every site is visited every year, data collected from each site would be more useful and information a more accurate representation of what is out in the field.

When examining the 1995 data for the priority VT's, while the number of individuals increased over last years count, it is still the second lowest count in the past seven years of the census. Species richness and diversity decreased, following a increase in these two parameters in 1993 and 1994.

Weather is a prominent factor influencing many other factors, including the availability of food. Although the winter of 1994-95 was within the 37 year

average range for precipitation and temperature, the spring months of May and June received over 2.5 times the normal precipitation (Appendix IV). Temperatures were a few degrees cooler than the 37 year average. This is following the 1994 winter/spring season that was much dryer and warmer than the 37 year average (see 1994 report). However, without further investigation, it is difficult to determine the factors responsible for the decrease. If numbers continue to decline in following annual bird censuses, investigations into the cause would be highly recommended.

It is important to note that the Northern Harrier was absent from the 1995 census for the first time since the census started in 1988. Although the species was observed outside the census, the birds did not appear to occupy their historic nesting territory in the Little Cottonwood drainage near the old Martin Mine site. The Golden Eagle nesting site in the Douglas Fir site in the north end of the monument had signs of occupation in the early weeks of nesting season, but later observations lacked any fresh signs. High failure rates in nesting raptors were observed and discussed by park biologists throughout the Pacific Northwest, Great Basin, and Northern Rockies regions during the 1995 season. It is hypothesized that the cold, wet spring may have been the contributing factor.

In the past couple of years, attempts have been made by park resources staff to interpret exactly what the Shannon-Weaver Diversity Index tells us with respect to what is happening to the bird populations. It is difficult to determine what degree of change in the index value is considered significant. In an effort to make the data more functional, considerations are being made to consult with experts and determine an alternative statistical analysis method to apply to the data that would tell us what changes are occurring and whether those changes are significant.

In addition, the appropriateness of using birds as indicator species for measuring the health of an ecosystem/habitat when many of the individual species are migratory, therefore influenced by factors outside of the habitat being monitored, is questionable. Present declines in neotropical migrant species (those that migrate to Central and South America during the winter months) will very likely influence bird populations at the monument as many of the monument's summer resident species are migratory.

Although we do not recommend terminating the annual bird census, it may be necessary to reconsider the purpose of the monument's annual bird census and redesign the study to focus on neotropical migratory birds. Such a program would not only help to monitor the bird populations at the monument specifically, but also contribute to national cooperative efforts to monitor migratory bird populations.

Appendix I.

The eleven vegetation types and the 22 individual site locations surveyed in 1995.

Site Number	Vegetation Type	Location
26.1	Riparian	Below Martin mine
26.2	"	Above Martin mine
25.1	Upland Quaking Aspen	Big Cinders-E. side
25.2	"	Research Camp
23.1	Limber pine/Antelope bitterbrush	Silent Cone-E. side
23.2	"	Half Cone-E. side
22.1	Limber pine/Ant. bitterbrush-hi gr cover	Inferno cone-E. side
22.2	" " -hi pine	Big Cinders-W. side
17.1	Antelope Bitterbrush/Great Basin Wildrye	E. side of Sunset Cone
17.2	"	E. side of Silent Cone
13.1	Low Sagebrush/Sandberg Bluegrass	Top of ridge N. of Grassy Flow
13.2	"	Ridge top E. of Martin Mine
11.1	Three-tip Sagebrush/Idaho Fescue	E. side Carey Kipuka
11.2	"	W. headwall of Little Cottonwood Creek
8.1	Mtn Big Sagebrush/Idaho Fescue	Hillside W. of Sunset Cone, across from Carey Kipuka
8.2	"	S. side of Carey Kipuka
3.1	Medium Density Lava Flow	Between Half Cone and Crescent Cone
3.2	"	" "
2.1	Low Density Lava Flow	Little Park Flow, S.E. of Carey Kipuka
2.2	"	Highway Flow
1.1	Cinder Gardens	Along loop rd., between Inferno and Paisley Cones
1.2	"	W. side of Hwy Flow

Checklist of vegetation types, the years they were censused and the sites recommended for next season's bird census at Craters of the Moon National Monument.

1=priority, 2=second priority, 3=third priority

Shannon-Weaver estimate of diversity

H' = Shannon-Weaver estimate of diversity
 S = the number of species
 i = individual
 p_i = the proportion of the total number of individuals
 consisting of the ith species.
 p_i is estimated by n_i/N
 N = the total number of individuals detected
 n_i = the number of individuals of species i

Precipitation (inches) and average monthly temperature values (degrees Fahrenheit) at Craters of the Moon National Monument for the 1994-1995 winter and spring seasons compared to the 37 year average (December 01, 1958 - November 31, 1995). Taken from Craters of the Moon National Monument NOAA Weather Records Database.

Precipitation (Inches)								
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
37 yr avrg	1.46	1.84	2.02	1.6	1.38	1.05	1.72	1.37
94-95 seas.	1.98	1.67	2.84	.66	3.44	1.16	4.46	3.85
Temperature (Fahrenheit)								
37 yr avrg	29.9	20.6	19.3	23.9	30.8	41.0	50.5	59.3
94-95 seas.	23.0	21.7	21.4	30.7	32.3	41.9	48.7	56.2