

# MONITORING BREEDING BIRD POPULATIONS IN GRAND TETON NATIONAL PARK

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## ♦ GOALS

The central aim of this project is to instigate a permanent program of monitoring landbird species composition and densities in a variety of representative habitats within Grand Teton National Park (GTNP). Habitats range from grassland and sagebrush on the valley floor of Jackson Hole (around 1900 m) through a range of scrub, woodland, and tall foothill forest vegetation types to montane sites of subalpine fir and tundra (ca. 3000 m). The monitoring program will provide data on year-to-year fluctuations in breeding bird species and densities, and eventually on any longer-term changes in the local avifauna, of both resident and migratory species; the data base will further understanding of population variability, local shifts in distribution and abundance, and potentially form a source for management and conservation decisions.

## ♦ THE 1994 SEASON

The 1994 season was an interim year, it followed a good deal of preliminary site selection and census activity (1966-1993) and is preliminary to full NPS funding of the project (scheduled to begin in 1995 with the collaboration of S. Cain, Natural Resources Manager, GTNP). In anticipation of range of habitats/sites eventually numbering 25-30, a) further site selection was undertaken, b) census methodology was refined, and c) new and prior sites were censused for breeding bird composition and density.

Table 1 lists 26 potential sites to be used in the monitoring study; 16 were established prior to 1994 (some as early as 1966-68), 7 new sites were initiated in 1994, and a further 3 were tentatively selected but not censused. The sites in Table 1 form the basis of the permanent program, and will likely be augmented by several additional sites as need and opportunity arise (beginning with the 1995 season).

This year (1994) was particularly interesting from the standpoint of weather, being unusually dry and cool, with a number of potentially corresponding bird records of note. In particular, Clay-colored sparrow *Spizella pallida* was recorded on territory in the park, apparently for the first time since the early 1970's, and a number of other rarities were present and breeding [including Bobolink *Dolichonyx oryzivorus*, Gray catbird *Dumetella carolinensis*, Lark sparrow *Chondestes grammacus*, and American redstart *Setophaga ruticilla* (the latter by S. Jones)].

## SITES AND CENSUS DATA

Census data on 5 sites listed in Table 1 now span over a quarter century, and are already valuable in providing data on long-term population trends. Representative of such data are those of the Wet Willows site (#9), as shown in Table 2. Eight species (listed first) have bred each census year since 1966; three are more sporadic, but have occurred throughout the census period; one species has not been recorded in the 1990's, and three others were not recorded in the earliest years of the censuses. Note that both parulid and emberizid guilds consist of

TABLE 1. Census sites in GTNP, 1994 season.

Site #	Location	Habitat	Elev(m)	Yr Init.
1.	Wolf Ranch	Grazed meadow	2045	1994
2.	Jackson Lake Junction	Grass-sedge meadow	2053	1992
3.	Jackson Lake Junction	Grass-sagebrush	2043	1966
4.	Jackson Hole Airport	Tall sagebrush	1956	1992
5.	Two-ocean lake Rd.	Forb-meadow	2158	1993
6.	Elk Refuge	Wet grass-marsh	1895	1994
7.	Shadow Mt.	Aspen-scrub	2090	1994
8.	RKO/Snake River Bottoms	Dry willow flats	2003	1993
9.	Jackson Hole Junction	Wet willow flats	2049	1966
10.	Oxbow bend	Willow-aspen	2040	1992
11.	Elk Ranch West	Low aspen woodland	2109	1968
12.	Elk Ranch East	Mid aspen woodland	2152	1968
13.	Signal Mountain	Tall aspen woodland	2091	1968
14.	Spread Creek	Cottonwoods	2085	1992
15.	Schwabacher Landing	Cottonwoods	1988	1992
16.	Beaver Creek*	Lodgepole (1985 burn)	2085	
17.	Granite Canyon mouth*	Lodgepole-aspen wldand	1965	
18.	Timbered Island Moraine	Lodgepole-spruce	2060	1994
19.	AMK Ranch	Lodgepole pine forest	2055	1991
20.	Signal Mountain	Lodgepole-fir forest	2258	1992
21.	Lizard Creek	Lodgepole-spruce-fir	2194	1991
22.	Jenny Lake	Spruce-fir forest	2197	1992
23.	Bradley Lake*	Spruce-fir forest	2180	
24.	Upper Granite Canyon	Spruce forest	2365	1994
25.	Rendezvous Mountain	Subalp. fir-limber pine	2970	1994
26.	Cody Bowl	Arctic-alpine tundra	2900	1994

\*Proposed sites not yet initiated.

Table 2. Breeding bird community in the Wet Willows site (#9, Table 1), showing breeding density in units of prs/ha.

Year of census:	1966	1991	1992	1993	1994	CV
Yellow warbler	1.99	2.00	2.61	2.91	2.67	0.17
Wilson's warbler	1.81	1.55	0.40	1.10	0.64	0.54
Northern yellowthroat	3.08	1.45	2.06	2.55	2.50	0.26
Willow flycatcher	0.36	0.50	0.37	0.41	0.49	0.15
Lincoln's sparrow	1.99	1.27	0.92	0.89	1.05	0.37
Fox sparrow	1.00	0.82	1.04	1.21	1.01	0.14
Song sparrow	0.90	1.36	1.44	1.72	1.55	0.22
Wh.-crowned sparrow	0.36	0.82	0.64	0.86	0.77	0.29
Calliope hummingbird	1.36	--	0.09	0.07	0.58	1.37
MacGillivray's warbler	0.09	--	--	0.26	0.08	
Swainson's thrush	0.27	--	0.03	--	--	
Clay-colored sparrow	0.72	--	--	--	--	
Northern waterthrush	--	--	0.18	--	0.15	
Savannah sparrow	--	--	0.06	0.20	0.05	
Marsh wren	--	--	0.25	--	0.22	
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Summary totals for above 15 mapped species:						
# Species breeding:	12	8	13	11	13	
Tot. breeding density:	14.93	9.77	10.09	12.18	11.76	0.18
# Paruline spp.:	4	3	4	4	5	
Tot. breeding density:	6.97	5.00	5.25	6.82	6.04	0.15
# Emberizine spp.:	5	4	5	5	5	
Tot. breeding density:	5.97	4.27	4.10	4.88	4.43	0.16

species with a range of CV (coefficient of variation of inter-year density) values with a 2-3 fold range, whereas the summed densities within guilds show far more modest variation, and support the notion of intraguild density compensation. The site also provides support for the influence of a) habitat change within site, and b) long-term change in population levels extrinsic of site characteristics (Cody, 1996 in press).

A feature of census replicability in GTNP is the influence of habitat type. Woodland and

forest habitats yield consistent results among years, whereas meadow habitats are far more variable. For example, lodgepole pine forest (AMK Ranch, site #19) supported 21-27 species over three years (Table 3), and about 80% of the passerine species listed are present in each year; total bird density varied by 46%, and pairs/species between 1.75 and 2.0. In contrast, meadow habitat (e.g. Two Ocean Lake meadow, site #5) varied two-fold in both species count and total density in adjacent years, 1993-1994; this site is remarkable in supporting some 11 species of finches and emberizine (Table 4).

Table 3. Bird census results from AMK lodgepole pine for site #19, 1992-1994

AREA: 10 ha DT/hr:			Summ	1015	600	Summ	1500	1730	600	Summ
SPECIES	62092	62692	1992	62493	70293	1993	62594	62994	70394	1994
Br. head. cowbird	1.5	2	2	1.5		1.5			1	1
Raven	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Wh. cr. sparrow		1	1	1	0.5	1			0.5	0.5
Robin	1.5	4	3	2	3	3		1	1	1
Red-sh. flicker	1	1	1	1.5	1.5	1.5		1	1	1
Red-tailed hawk							0.2	0		0.1
Br. tail. hummingbird								0.5		0.5
Violet-gr. swallow	1		0.5					1		1
Warbling vireo	2	1.5	2	2	2	2	2.5		2.5	2.5
Swainson's thrush	1	1	1	1		1			1	1
Dusky flycatcher									1	1
Red-n. sapsucker	1		0.5							
W. wood pewee	4	4	4	1	2	2		2		2
Yellow-r. warbler	4	3.5	4	4.5	3	3.5	2	1	6.5	6
Dark-eyed junco	5	9	8	6	3	5	2	3.5	6	5
Pine siskin	2	2	2	1	1	1	4	4	3	4
Chipping sparrow	2	5	4	0.5	3	3		2	4	4
Red crossbill	1	1	1						2	1.5
Ruby-cr. kinglet	3	6	5	3	3.5	3.5	2	2	2	2
Cassin's finch	2	1	2	1	1	1		2	2	2
Pine grosbeak					1	0.5			1	0.5
Red-br. nuthatch	3	3	3	2	1	2		1	3	3
Mt. chickadee	3	2	3	1	1	1	1	2	2	2
Gray jay	1	0.25	0.5	1		0.5			1	0.5
Clark's nutcracker	1	0.5	0.75						0.5	0.5
Western tanager	1	2.75	2.5		2	2	2	1	2	2
Ol. sided flycatcher	1	1	1							
Hairy woodpecker	1	1	1	1	1	1			1	1
Blue grouse		1	0.5							
Brown creeper		1	0.5							
Hermit thrush					1	0.5				
TOT. SPP.:	23	24	26	18	18	21	11	16	22	27
TOT. DENS.:	43.5	55	54.25	30.5	31	37	19.7	24.5	46	48.1

Table 4. Bird census results from Two Ocean Lk Meadow, Site #5, 1993-1994.

AREA: HA; DT/hr:	600					
SPECIES	62793	71194		AVE	Rank	Guild
Sandhill crane	0.05	0.1		0.075	24	
Savannah sparrow	6	5		5.5	1	E
Raven		0.1		0.1	21 =	
Mourning dove		1		1	8 =	
Brewer's sparrow		2		2	4 =	E
Vesper sparrow		1		1	8 =	E
Red. t. hawk		0.1		0.1	21 =	
Swainson's hawk	0.1			0.1	21 =	
Am. goldfinch		2		2	4 =	F
White-cr. sparrow	3	3		3	2	E
Rufous hummingbird		1		1	8 =	
Lazuli bunting		2		2	4 =	F
Song sparrow		1		1	8 =	E
Chipping sparrow		0.5		0.5	16 =	E
Robin	0.2	1.5		0.85	18	
Red-sh. flicker	0.2			0.2	20	
Red-br. sapsucker		0.5		0.5	16 =	
Bl. h. grosbeak		1		1	8 =	F
Mt. bluebird		0.5		0.5	16 =	
Tree swallow	2	3		2.5	3	
Willow flycatcher	1			1	8 =	
Dusky flycatcher		0.5		0.5	16 =	
House finch	1			1	8 =	F
Lincoln's sparrow	2	2		2	4 =	E
TOT. SPP.:	10	20				
TOT. DENS.:	15.55	27.8				

#### ◆ PROJECTED 1995 SEASON

The monitoring project will move to fully active status in the 1995 season, when the remaining census sites will be initiated and all sites censused on a formal rotation with an established protocol. Sites will be GPS-established with permanent markers, and habitat/vegetation measurements conducted.

#### ◆ LITERATURE CITED

Cody, M.L. 1996. Bird communities of the Central Rocky Mountains. Ch. XX in Long-term Studies of Vertebrate Communities, eds. M.L. Cody and J.A. Smallwood, Academic Press, Orlando (in prep.).