

THE BIRD FAUNA OF GRAND TETON
NATIONAL PARK

Special Studies Report No. 1

1969

Prepared by
Douglas B. Houston
Research Biologist
Office of Natural Sciences
Washington D.C.

THE BIRD FAUNA OF GRAND TETON NATIONAL PARK

SPECIAL STUDIES REPORT NO. 1

Research carried out on the ecology of Grand Teton Park's avifauna is reviewed and summarized in this report. Research, management, and interpretive recommendations are also made.

Ecological studies of birds in the park have ranged from general surveys with considerations of relative abundance, through detailed studies of the life histories and population dynamics of individual species, to analyses of energy flows and interspecific organization of bird communities.

GENERAL SURVEYS

The relative abundance of 199 species of birds, representing 16 orders, was rated from rare to abundant in a recent checklist. Eighty-three species were considered common or abundant during spring and summer; 63 species, during fall and winter. In addition, 102 species were considered rare or uncommon during spring and summer; 93 species, during fall and winter. Species diversity probably reflected the variety of vegetation types and seral plant communities present in the park. Spring and fall diversity probably also reflected the proximity of migration routes. The number of common summer resident species (73) is similar to other northern or central Rocky Mountain parks (Parratt, 1964; Brodrick, 1952; Gregg, 1938). Further interpretations of general surveys appear limited because of the subjective nature of the relative abundance categories.

Autecological Studies

At least eight studies of single species, autecological studies, have been wholly or partially done in the park. With two exceptions, the studies have been concerned with species considered to be rare or endangered, "game" birds, and large or conspicuous members of the avifauna. Life history data on a variety of other species can be found in studies of bird communities described in a later section of this report.

Ducks, Geese and Swans (Anseriformes)

Trumpeter Swan (*Olor columbianus*). Routine annual monitoring of swan populations has been carried out in cooperation with the Fish and Wildlife Service during late summer periods (Table 1). These data suggested that the adult swan population may have increased substantially with the enlargement of the park in 1950, but has since leveled off at about 25-30 birds as suitable habitats were filled. Reproductive success has apparently varied annually, but overall data did not suggest a decline in success as park visitation has increased. Banko (1960) made no specific management recommendations concerning the park's swans, and life history data from Banko's study can be applied to the park population.

Canada Goose (*Branta canadensis*). Dimmick (1968) completed a comprehensive study of the ecology and life history of the Canada goose in Jackson Hole. Nest initiation in most park areas occurred from

mid-April to late May, with 8-10 nests found per year from 1962-64 during intensive searches of the Snake River and its tributaries in the park. Hatching success was 62 percent for all nests studied, with about 15 percent of the nests destroyed by avian predators (primarily ravens), 4 percent by flooding. Water release practices from Jackson Lake Dam did not result in significant flooding of nests during the study period, although erratic releases in previous years could have caused extensive losses. Calculations suggested a relatively stable breeding population of about 300 geese in Jackson Hole. Routine population monitoring is carried out annually by the Wyoming Game and Fish Commission (Urakestraw, 1968 pers. comm.). Management recommendations included preservation of existing nesting areas, improvement of nesting habitat, and perhaps eventual reduction of harvests outside the park.

Eagles, Ospreys and Hawks (Falconiformes)

Bald Eagle (*Haliaeetus leucocephalus*). Four nesting pairs of eagles occurred within or immediately adjacent to the park (Figure 1), and data on reproductive success were available for all nests in 1967 and for three nests in 1968 (Table 2) (Turner, 1968, 1969 pers. comm.). Huser (1968) reported 22 young fledged in 12 years (1956-1967) for the Bar BC nest. Nesting began in mid-March and young birds left the Bar BC nest between July 8-19 for the past several years (Barker, 1969, pers. comm.). Management activities have involved signing the Bar BC nest site to prevent disturbance during the nesting season.

Information on reproductive success for this nest does not demonstrate reduced production as use of the river by float trips has increased. Work in other areas suggests that eagles will tolerate a moderate amount of disturbance during the latter part of the nesting season (Mathison, 1968).

Osprey (Pandion haliaetus). Turner (1968) reported 11 active osprey nests within Grand Teton during 1968 (Table 3, Figure 1). Reproductive success was at least 36 percent during the 1968 season. Turner tentatively interprets the overall low reproductive success for northwestern Wyoming (22%) as suggesting a population decline, but detailed data on comparable success for previous years are not available.

In addition to the studies on eagles and ospreys, Craighead and Craighead (1956) presented life history and food habits data for a variety of raptors in the park.

Grouse (Galliformes)

Sage Grouse (Centrocercus urophasianus). Patterson (1952) completed an ecological study of the sage grouse in Wyoming, and reported eight strutting grounds within the park (Figure 1). The number of male grouse present on 6 grounds during 1948-51 are shown in Table 4. The overall population of breeding males was essentially constant during this four year period, and Patterson estimated the breeding population of Jackson Hole at about 500 birds. Regular breeding ground counts have not been conducted since Patterson's study, but Dilley (1966, 1968)

reported 22 males on the Blair Homestead site in 1966; 60 in the Airport site in 1968. These limited data suggest that breeding populations could have remained relatively constant on two areas over a 15-20 year period.

Various Shore Birds and Pelicans (Charadriiformes and Pelecaniformes)

No known rookeries of white pelicans, double crested cormorants, California gulls or Caspian terns occur in Grand Teton, and many of the birds observed in the area are probably associated with rookeries in Yellowstone Park. Information on life histories and population dynamics on these species are available for the Yellowstone area (Dicm and Condon, 1967).

Hérons (Ciconiiformes)

Great blue heron (Ardea herodias). Woodham (1969), in a preliminary survey done in July and August of 1968, reported 52-61 active nests in the three known heron rookeries within the park (Figure 1). Nesting activities probably began in April, with three young/nest reported for one large rookery. Food habits and additional life history data will be presented in subsequent reports.

The "Perching Birds" (Passeriformes)

Black Rosy Finch (Leucosticte lephrocotis strata). French (1959) presented detailed life history data on the black rosy finch. The birds are a common alpine species in the park and nest above timberline in talus slides and cliffs.

Clark Nutcracker (*Nucifraga columbiana*). French (1955) described the foraging behavior and predatory habits of this common coniferous forest and subalpine species.

In addition to the studies described above, a large variety of life history studies are available in the ornithological literature (See Peterson, 1961; Bent, 1919-1950, etc.) that are applicable to the park area.

Bird Communities

Studies of bird communities by major park vegetation types are summarized in Table 5. One or more studies have been completed in four of six major native vegetation types. No studies have been done in types above timberline (not listed in Table 5).

In addition to the studies listed, Craighead & Craighead (1956) presented data on raptor populations for a variety of Upland Forest, Floodplain Forest, Sagebrush Grassland, Bunchgrass-shrub and Agricultural types in a 12 square mile study area at Moose. Ten species of raptors nested in the area during 1947, with 45 pairs producing an average of 2.3 young. The population appeared to be relatively stable between years, and annual re-occupancy of established nest sites was demonstrated for several species.

Salt (1957) described bird community structure, standing crop biomass and energy flow relationships for a variety of park plant communities, including various stages of succession in coniferous forests. By using information on breeding densities, feeding habits, and biomass, Salt showed an increase in community complexity, standing crop biomass and ecological efficiency in succession from lodgepole pine to spruce fir. Additional data on community structure were

presented for the Blueberry Willow/Geyer's Willow Associates, Aspen Associates and a "scrub meadow" associates. Taylor (1969) showed that bird species composition changed as forest canopies closed in previously burned lodgepole pine stands of various ages in Yellowstone Park. The data are probably applicable to Grand Teton.

Cody (Unpublished data.) studied the structure and interspecific relations of bird communities in the sagebrush-grassland and willow vegetation types. Measurements were made of several habitat variables (vegetation height and density) and behavioral patterns (feeding behavior curves, etc.) to determine "co-existence mechanisms" involved in community organization. Earlier work on grasslands (Cody, 1968) showed that bird species coexisted because of differences in habitat preferences and feeding behavior. It was possible to predict the number of species, differences in feeding ecology and relative habitat separation using only the habitat indexes of vegetation height and its standard deviation. This was considered to demonstrate that grassland bird communities had a full quota of species which were optimally adapted to existing environments.

Huckabee (1965) presented data on the phenology of waterfowl nesting, and estimated brood production for a variety of aquatic and willow vegetation types. Eleven species of ducks reared broods in these types, with the mallard (Anas platyrhynchos) and green-winged teal (Anas carolinensis) the most abundant species. Overall brood production was considered to be low. A cold wet spring and summer, and

a large amount of horseback tourist activity that produced confusion in broods of ducklings, presumably increasing their vulnerability to predation, were considered possible causative factors. Recent re-routing of some of the horseback use may have partially solved the problem.

Flack (1967) studied the relationships between tree density and size in various stands of the Aspen Associates and the density and composition of the existing bird communities. Density of nesting birds was greatest in stands of low density and large size. Common species were considered to show some "ecologic isolation" in the locations of nesting and feeding sites.

RESEARCH AND MANAGEMENT RECOMMENDATIONS

Research

The ornithological literature contains extensive studies of life histories and ecology that are applicable to the park avifauna. No pressing research needs on individual species are evident. However, a population study of the raven (Corvus corvax) and its relationship to artificial food sources in park garbage dumps should be initiated. The study should evaluate factors influencing raven numbers and the possible effects on other faunal species if the raven populations are maintained at artificially high levels. A study could also be done on habitat use by the three species of grouse found in the park as it is influenced by plant succession. The nesting status of the prairie falcon should be determined because of increased demands for birds by falconers in outside areas.

Quantitative studies of bird communities should be expanded to include the remaining major vegetation types. Salt's (1957) studies in the lodgepole pine should be repeated to evaluate effects on the avifauna after recent habitat alteration caused by death of overmature pines.

Management

Park management is generally limited to correcting or compensating for the effects of human alterations of a natural environment. Protection of all bird species and vegetation types, while allowing natural succession to occur, is the only extensive management provided the park's avifauna. This is generally considered to be adequate. Human activities around certain bald eagle and swan nesting areas have also been restricted.

Routine population monitoring of rare and unusual components of the avifauna should be initiated and continued. Aerial surveys of August or September swan populations should be continued. An aerial survey of the osprey populations could be done in late July to evaluate annual production. A ground survey of bald eagle nesting success should be conducted in early July. Monitoring of both the osprey and eagle could be especially valuable because of the reported depressant effects of pesticides on reproductive success in many "outside" areas.

Monitoring of the breeding populations of sagegrouse could be done in late April and early May after Patterson's (1952) strutting grounds

were re-located. A large sagegrouse population in a national park may be unique to Grand Teton, and represents an important visitor attraction during spring periods. Conflicts between airport developments and one of the sagegrouse strutting grounds should be evaluated.

In addition to routine population monitoring, the productivity of nesting eagles, swans and ospreys should be evaluated in relation to the amount and timing of human activities and disturbance. Increasing numbers of hikes and river float trips that could result in nest desertions may require seasonal restrictions.

Interpretive Recommendations

Interpretation of the park's avifauna is done during naturalist hikes, interpretive programs and at several "sconic turnouts".

Interpretive walks aimed specifically at the avifauna have been considered quite successful (Dilley, 1969, pers. comm.). Interpretation varies from species identification to detailed discussions of life histories and ecology of some of the unusual species. The occurrence of specific bird communities are also pointed out.

In addition, bird communities should also be used to promote the concepts of organization in nature (the ecosystem) and land uses in a national park, because of recent research on factors controlling ecologic niches, species diversity and energy flows. The studies of Salt (1957), Cody (1968) and MacArthur et. al. (1958, 1961, 1962) provide excellent data on the interspecific organization and structure of bird communities.

LITERATURE CITED

- Banko, W.E. 1950. The Trumpeter Swan, Its History, Habits, and Population in the U.S. North American Fauna. No. 63. 214p.
- Bent, A.C. 1919-1950. Life Histories of North American Birds. U.S. National Museum Publications.
- Brodrick, H.J. 1952. Birds of Yellowstone National Park. Yellowstone National Park. 57p.
- Cody, M.L. On the Methods of Resource Division in Grassland Bird Communities. Amer. Nat. Vol 102:107-147.
- Craighead, J.J. and F.C. Craighead. 1956. Hawks, Owls, and Wildlife. Stackpole Co.
- Dien, K.L. and D.D. Condon. 1967. Banding Studies of Water Birds on the Molly Islands Yellowstone Lake, Wyoming.
- Dilley, W.E. 1966-1968. Field Observations of Sage Grouse. NPS Card Files.
- Dimmick, R.W. 1968. Canada Geese of Jackson Hole, Their Ecology and Management. Technical Bulletin No. 11. Wyoming Game and Fish Commission. 86p.
- Flack, Douglas. 1967. Relations of Structure in Aspen Forest to Bird Populations. M. A. Thesis Dep't. of Zoology, Univ. of Wisconsin. 84p.
- French, H.R. 1955. Foraging Behavior and Predation by Clark Nutcracker. Condor Vol. 57: 61-62.
- French, H.R. 1959. Life History of the Black Rosy Finch. Auk 76: 159-180.
- Gregg, H. R. 1938. Birds of Rocky Mountain National Park. Publ. No. 4. Rocky Mountain Nature Assoc. 80p.
- Houston, D.B. 1968. The Shiras Moose in Jackson Hole, Wyoming. Tech. Bull. No. 1. Grand Teton Natural History Association. 110 p.
- Huckabee, J.W. 1965. Population Study of Waterfowl in the Third Creek Area, Jackson Hole, Wyoming. Unpublished M.S. Thesis. Univ. of Wyoming. 54p.

- Huser, Verno. 1968. The Bald Eagle in Jackson Hole. Defenders of Wildlife. 43(2):148-152.
- MacArthur, R.H. 1958. Population Ecology of Some Warblers of Northeastern Coniferous Forests. Ecology 39:599-619.
- MacArthur, R.H. and J.W. MacArthur. 1961. On Bird Species Diversity. Ecology 42:594-598.
- MacArthur, R.H. and J. Preer. 1962. On Bird Species Diversity II. Prediction of Bird Censuses for Habitat Measurements. Amer. Nat. 96:167-174.
- Mathisen, J.W. 1968. Effects of Human Disturbance on Nesting Bald Eagles. J. Wild. Mgmt. Vol 32:1-5.
- Parratt, L.P. 1964. Birds of Glacier National Park. Special Bulletin No. 9. Glacier Natural History Association. 78 p.
- Patterson, R.L. 1952. The Sage Grouse in Wyoming. Wyoming Game and Fish Commission and Sage Books, Inc., Denver. 341p.
- Peterson, R.T. 1961. A Field Guide to Western Birds. Houghton Mifflin Co., Boston. 366p.
- Salt, G.W. An Analysis of Avifaunas in the Teton Mountains and Jackson Hole, Wyoming. Condor. Vol. 59:373-393.
- Taylor, D.T. 1969. Biotic Succession of Lodgepole Pine Forests of Fire Origin in Yellowstone National Park. Ph.D. Thesis. University of Wyoming. 310p.
- Turner, J.F. 1968. Preliminary Report on the Osprey in N.W. Wyoming. Mimeo report, University of Michigan. 7p.
- Woodham, H.D. A Survey of Great Blue Heron Rookeries in Grand Teton National Park. Investigator's Annual Report. 6p.

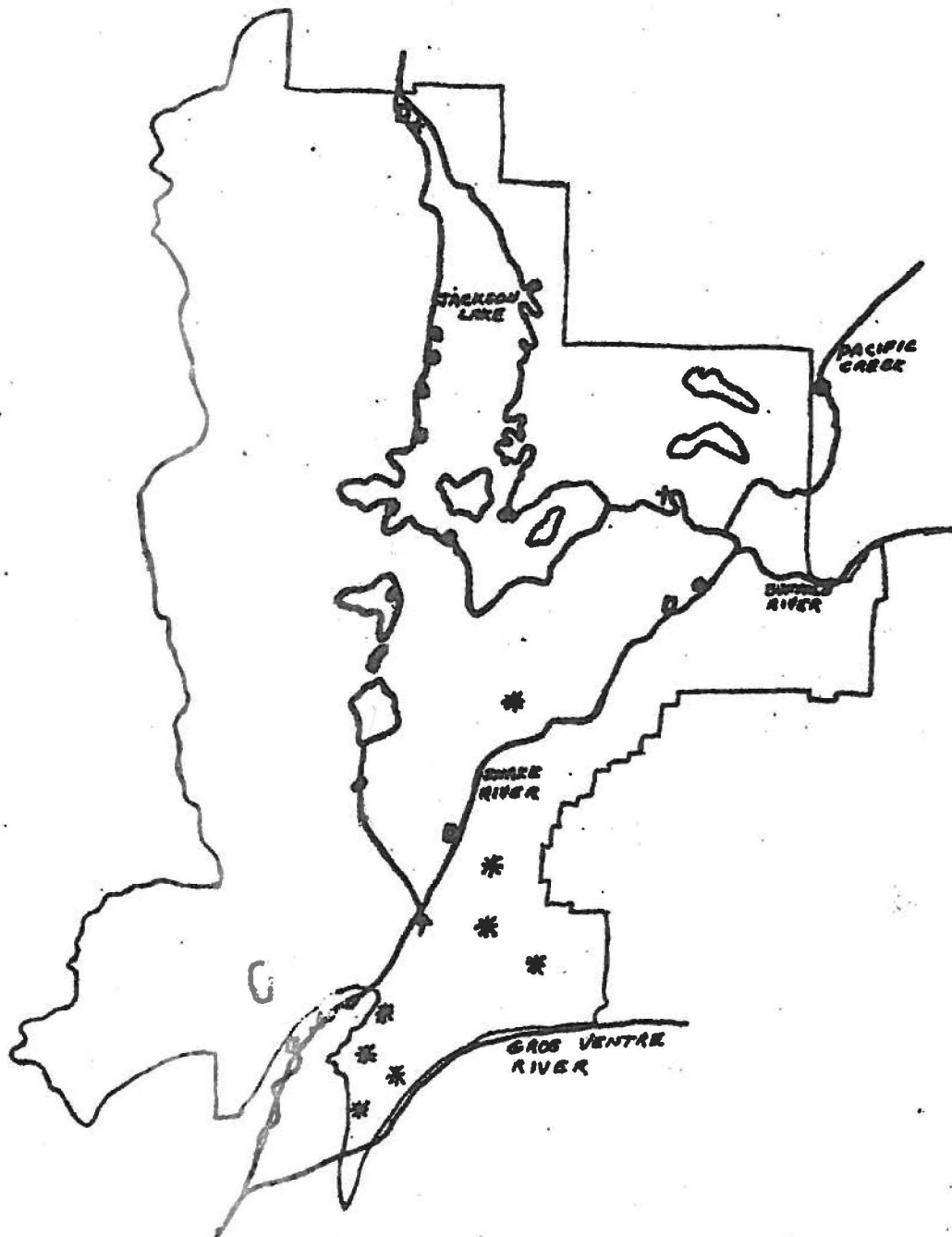


FIGURE 1. Map of Grand Teton Park showing locations of osprey nests (●), bald eagle nests (■), heron rookeries (†), and sagegrouse strutting grounds (*).

Table 1. Aerial Trumpeter Swan Counts in Grand Teton 1954-1968^a

Year	No. Adults	Cygnets		Total
		No.	(No broods)	
1954	8	4	(1)	12
1960	36	6		42
1961	21	8		29
1962	13	0		13 ^b
1964	26	1	(1)	27
1965	24	0	(0)	24
1966	26	4	(1)	30
1967	24	5	(3)	29
1968	29	14	(4)	43

^aData from U.S. Fish and Wildlife Service annual Trumpeter Swan surveys.^bExtremely poor flying conditions.Table 2. Reproductive Success of Four Active Bald Eagles in Grand Teton^a

Nest Site	Young Fledged	
	1967	1968
N. Jackson Lake	1	
Snake River (Moosehead Ranch)	0	0
Snake River (H. Bar BC Ranch)	1	2
Snake River (R Lazy S Ranch)	0	b

^aActive = adults present at beginning of nesting season^bActive; result unknown.Table 3. Reproductive success of 11 active osprey nests, Grand Teton, 1968^a

Nest Site	Young Fledged
Snake River (Elk Ranch)	0
Cottonwood Creek	2
Leigh Lake	0
Jackson Lake (E. Moran Bay)	2
Jackson Lake (Moran Bay)	0
Jackson Lake (West Island)	0
Jackson Lake (Leaning Tree Island)	0
Jackson Lake (Open Slope)	1
Jackson Lake (Hermitage Point)	0
Pacific Creek	2

^aActive=adults present at beginning of nesting season

Table 4. Number Male Sage Grouse Present on Strutting Grounds Within Grand Teton, 1948-1951^a

Location of Ground	Number Male Grouse			
	1948	1949	1950	1951
Antelope Flat	59	62	55	46
Blair Homestead	20	32	16	28
Kelly Warningspring	36	14	20	20
3 Bar H Road	13	18	9	7
Airport	61	51	73	61
1 mile S.E. Airport	<u>16</u>	<u>14</u>	<u>50</u>	<u>52</u>
Total	205	191	223	214

^aFrom Patterson 1952.

Table 5. Summary of Studies of Bird Communities by Vegetation Types, Grand Teton^a.

Vegetation Type With Major Subtypes	Authors
Willow	
<u>Blueberry Willow/Geyers Willow Associates</u>	Huckabee (1965) Salt (1957) Cody (Unpublished data)
Upland Forests	
<u>Engelmann Spruce/Subalpine Fir Assn.</u>	Salt (1957)
<u>Lodgepole Pine Associates</u>	Salt (1957)
<u>Aspen Associates</u>	Salt (1957) Flack (1967)
Floodplain Forest	
Sagebrush-Grassland	Cody (Unpublished)
Bunchgrass-Shrub	
Aquatic	Huckabee (1965)

^aVegetation types from Houston, 1968.