BROWNS PARK NATIONAL WILDLIFE REFUGE
Maybell, Colorado

ANNUAL NARRATIVE REPORT
Calendar Year 1990

U.S. Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

REVIEW AND APPROVALS

BROWNS PARK NATIONAL WILDLIFE REFUGE

Maybell, Colorado

ANNUAL NARRATIVE REPORT

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Gene L. Gamble — Refuge Manager — Date 3/21/91

Bernetta W. Schwandt — Associate Manager, Zone 1 Review — Date 3/28/91

William Todd — Regional Office Approval — Date 3/31/91

INTRODUCTION

Browns Park National Wildlife Refuge is located in an isolated mountain valley in extreme northwestern Colorado. It lies along both sides of the Green River, entirely within Moffat County, 25 miles below Flaming Gorge Dam. It contains 13,455 acres of river bottomland and adjacent benchland. The Utah-Colorado state line delineates the western boundary and to the south it shares a mutual boundary with Dinosaur National Monument. The remainder of the refuge shares a mutual boundary with the Bureau of Land Management lands. The refuge is 53 miles northwest of Maybell, Colorado on State Highway 318, 50 miles northeast of Vernal, Utah over Diamond Mountain, and 95 miles south of Rock Springs, Wyoming via State Highway 430 or 70 miles via State Highway 191 and Clay Basin, Utah.

The primary purpose of Browns Park Refuge is to provide high quality nesting and migration habitat for the Great Basin Canada goose, ducks, and other migratory birds. Before Flaming Gorge Dam was constructed in 1962, the Green River flooded annually, creating excellent waterfowl nesting, feeding and resting marshes in the backwater sloughs and old stream meanders. The dam stopped the flooding, eliminating much of this waterfowl habitat. Pumping from the Green River, along with water diverted from Beaver Creek, now maintains nine marsh units comprising approximately 1,430 acres. The river covers approximately 1,000 acres along with sedimentary river bottomlands. Well vegetated grasslands interspersed with cottonwood, willows, salt cedar, greasewood and sage cover approximately 5,000 acres. The remainder of the refuge (6,000 acres) is alluvial benchlands and steep rocky mountain slopes. Elevations vary from 5,355 to 6,200 feet above sea level.

On August 20, 1963, the Migratory Bird Conservation Commission approved acquisition of Browns Park National Wildlife Refuge to develop and manage waterfowl habitat in that portion of Browns Park within the state of Colorado. The private land was purchased with funds from the Migratory Bird Hunting Stamp Act. On July 13, 1965, the first tract of private land was acquired. At this time, 5,356 acres have been purchased at a cost of $622,976, 6,794 acres have been withdrawn from public domain lands, and 1,305 acres are leased from the state of Colorado (state school sections). There is one private inholding on the refuge, a 200 acre tract of grassland and cottonwood groves located at the southeast end of the refuge.

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ANNUAL NARRATIVE REPORT
BROWNS PARK NATIONAL WILDLIFE REFUGE

1990

A. HIGHLIGHTS

Three staff members receive Special Achievement awards. (Section E.1).

Due to our telephone company's upgrade, we finally joined the world of E-Mail! (Section I.5)

A refuge display panel was completed for the new Craig Chamber of Commerce Visitor Center. (Section H.6)

An oil spill occurred upstream from the refuge on August 17. (Section H.17)

Approval was granted for the appointment of two seasonal range technician positions. (Section E.1)

Several wildfires raged on and adjacent to refuge. (Section F.9)

B. CLIMATIC CONDITIONS

Total precipitation for 1990 was 8.47", 1.7" more than 1989 and .27" less than the 10 year average of 8.74". The wettest month of the year was June with 1.33" of precipitation recorded and the driest month was August with .08" of precipitation recorded. The most significant amount of snowfall occurred in February with 22.5". The coldest temperature for the year was on December 23 when the mercury hit minus 43 degrees Fahrenheit, while the highest temperature recorded for the year was on July 1 when the temperature soared to 103 degrees Fahrenheit.

Snowfall in June 06/01/90 Photo 1 JLG

During the first two months of the year, all of the marshes on the refuge were completely frozen over and waterfowl use was restricted to open stretches on the Green River. Aerial deer counts were at their highest in February when snow depths reached the maximum. By March the marshes had started to open up. During March there was an influx of migrating ducks and Canada geese had initiated nesting efforts. By April most Canada geese were incubating and the mule deer had started moving back into the high county. By October the night time temperatures were dipping below the freezing mark, the fall migration was in full swing and small numbers of mule deer were moving down from the mountains. By the end of November all of the marshes were frozen and the waterfowl that remained were again restricted to the Green River. By the end of December a large portion of the Green River was iced over and very few waterfowl remained on the refuge.

The refuge staff maintained two thermographs throughout the year. The purpose of this activity was to monitor temperatures as related to low flows in the Green River. Green River flows throughout the year averaged 800 cfs with periodic releases higher than 800 cfs due to power system emergencies. Most of the discharges over 800 cfs were during the hot summer months when demands for electricity were the highest.

In cooperation with the Colorado Division of Water Resources (CDWR), an evaporation pan was set up at our weather station in April. Kent Holt, a hydrologist with CDWR, installed the equipment. This data will be used in various predictions, studies, and court proceedings that involve hydrologic evaluation of evaporation from reservoirs and evapotranspiration from irrigated lands.

The following table provides the monthly high and low temperatures and the total precipitation for the month:

Month	High	Low	Precipitation	Snowfall
January	54 F.	10 F.	.23"	4.4"
February	57 F.	-18 F.	1.12"	22.5"
March	69 F.	12 F.	.67"	1.5"
April	79 F.	19 F.	.86"	
May	80 F.	23 F.	.43"	
June	100 F.	32 F.	1.33"	
July	103 F.	37 F.	.87"	
August	97 F.	36 F.	.08"	
September	96 F.	32 F.	.80"	
October	82 F.	19 F.	.88	.66"
November	64 F.	7 F.	.58"	
December	56 F.	-43 F.	.62"	19.0"
Total			8.47"	

It appears that we may be emerging from the drought cycle that has plagued both man and beast. This past year the Browns Park area received 96% of the 20 year precipitation average (8.79"). Total precipitation each year for the past 10 years is shown in the following table:

Year	Total Precipitation
1990	8.47 inches
1989	6.77 "
1988	4.63 "
1987	7.09 "
1986	10.87 "
1985	9.31 "
1984	9.12 "
1983	10.69 "
1982	9.84 "
1981	10.61 "

We hope there is a trend that is going to continue and result in a series of "wet years."

C. LAND ACQUISITION

1. Fee Title

Upon our request, Region 6 Realty Division offered an acquisition proposal to Wright Dickinson, Sr. in an attempt to purchase the refuge's only remaining private inholding. Unfortunately, but as expected, the owner refused the offer.

The inholding consists of 200 acres of native grassland and cottonwood groves located at the southeast end of the refuge. The property is adjacent to the Green River and is utilized extensively by wintering bald eagles as a roosting site. Mule deer and elk also use the area for forage, especially during the winter months.

D. PLANNING

2. Management Plan

A comprehensive Grassland Management Plan was completed with a rough draft going to the Regional Office in October. Revisions to the Hunt Plan and Fire Management Plan were also accomplished.

4. Compliance with Environmental and Cultural Resource Mandates

Gary Davis, biologist with the U.S. Army Corps of Engineers at Grand Junction, Colorado inspected three proposed refuge projects on November 13. Sites inspected included the Spitzie pump site, Rye Grass Meadow marsh development, and the diversion ditch from Vermillion Creek to the Grimes Unit. Environmental Assessments, Section 7 consultation, and archeological reviews have been initiated regarding all three projects.

E. ADMINISTRATION

1. Personnel

Back row L. to R. 1. 4. 2. 7. 3. 8.
Front row L. to R. 6. 5.

10/01/90 Photo 2 JLG

1. Jerre L. Gamble, Refuge Manager, GS-11, EOD 09/23/87, PFT.

2. Theodore D. Ondler, Assistant Refuge Manager, GS-09, EOD 01/12/88, PFT.

3. Carole T. Henry, Refuge Assistant, GS-05, EOD 05/23/88, PPT.

4. Robert E. Harding, Maintenance Worker, WG-08, EOD 04/18/82, PFT.

5. Lynn A. Barber, Engineering Equipment Operator, WG-08, EOD 03/05/84, PFT.

6. Rodell L. Eggett, Carpenter, WG-09, Temporary Appointment 07/01/90 - 11/17/90.

7. John Cook, Range Technician, GS-04, Temporary Appointment 05/06/90 - 10/06/90.

8. Keith D. Madsen, Range Technician, GS-05, Temporary Appointment 05/14/90 - 10/20/90.

	PERMANENT		TEMPORARY		
	Full-time	Part-time	Full-time	Part-time	Total FTE
FY 1990	4	1	2	1	6.3
FY 1989	4	1	1	1	5.2
FY 1988	4	1	1		4.7
FY 1987	4		3		5.0
FY 1986	4		3		5.0

4. Volunteer Program

Three volunteers provided valuable assistance this past year. Linda Barber cumulatively spent many hours recording daily weather data at the National Weather Service recording station located on the refuge. Linda also assisted with painting quarters #114.

Volunteer Linda Barber received a Volunter Appreciation Certificate from Manager Gamble.
10/01/90 Photo 3 TDO

Ruth Harding was very helpful assisting many refuge visitors by answering their questions.

Valerie Eggett assisted her husband Rodell with carpentry work to quarters #114 and #115.

Total volunteer activity hours were 110 for the year.

5. Funding

The following is a summary of funding levels by subactivity for the last five years:

FY	ACTIVITY	AMOUNT		TOTAL
1991	1261	$110,000		$341,600
	1262	100,000		
	1262 (Flex)	53,000		
	6860	5,000		
	8610 (with carry over)	7,400		
	9110	500		
	9120	65,700		
1990	1261	110,000		223,700
	1262	100,000		
	6860	5,000		
	8610 (with carry over)	8,500		
	9120	12,200		
1989	1261	110,000		225,500
	1262	69,000		
	1262 (Flex. Maint.)	43,000	(-$13,000 budget cut 5-1-89)	
	6860	5,000		
	8610 (with carry over)	11,500		
1988	1261	147,000		227,400
	1262	65,000		
	6860	5,000		
	8610	10,400		
1987	1260*	225,000		239,400
	6860	5,000		
	8610	9,400		

*Includes $73,000 for ARMMS and $10,000 Resource Problems

6. Safety

Assistant Manager Ted Ondler served as station safety chairman. Lynn Barber and Carole Henry were committee members.

Four station safety meetings were held during the year. Topics included the following: need for pre and post-exposure Lyme's disease testing; use of fire shelters (video tape - NFES Butte Fire Shelter Deployment was reviewed by the staff); ATV safety (video tape - ATV Safety Institute's On Target, Off Road - Safe Riding Tips for ATV Riders was viewed by the staff); and an eight hour refresher training course in CPR and First Aid was completed.

Staff members Gamble, Ondler, Barber, and Harding received base line hearing tests. The testing was conducted by an audiologist in Craig, Colorado.

Two accident reports were filed during the year. Refuge Assistant Carole Henry was driving a government vehicle to Craig, Colorado the morning of December 13 to perform administrative errands in town. Due to icy road conditions the vehicle skidded and swerved off the highway and down an embankment resulting in the vehicle rolling over. Carole was wearing a seat belt which fortunately kept her from sustaining any injury. The vehicle required $1,261 of body shop work.

Assistant Refuge Manager Ondler jammed a thumb during physical training at law enforcement refresher training February 21, 1990.

F. HABITAT MANAGEMENT

1. General

The refuge consists of the following broad types of habitat:

Habitat	Acres
Seasonally Flooded Basins or Flats	30
Shallow Fresh Marshes	1,035
Deep Fresh Marshes	355
Rivers and Streams	1,004
Native Grasslands	3,335
Grasslands - Introduced	180
Brush	6,816
Rocky Outcroppings	500
Administrative Lands	200
TOTAL	13,455

Overview of Green River as seen from east boundary of refuge. 06/15/90 Photo 4 JLG

Dry conditions persisted during the year as a result of less than normal precipitation.

Green River water levels were lower than normal throughout the year. Decreased discharges from Flaming Gorge Dam, located 25 miles upriver, were due to less than normal snowpack and subsequent run-off.

Continued loss of cottonwood trees along the Green River is due to substantially lower water levels in the river and the absence of seasonal flooding. The only cottonwood regeneration occurring is along ditches where water is pumped to maintain marshes, along tributaries (Beaver and Vermillion Creeks) of the Green River and along the river banks and islands of the Green River.

Flow in Vermillion Creek ceased by late July.

2. Wetlands

Before the Flaming Gorge Dam was completed during the early 1960's, seasonal flooding of the bottomlands created excellent waterfowl habitat. After the dam was completed, the flooding ceased, thus eliminating the natural wetland areas. Since the establishment of the refuge, pumping from the Green River

along with a diversion ditch from Beaver Creek presently creates approximately 1,430 acres of marsh. There are currently nine marshes on the refuge.

Flynn and Hoy Marshes along with Hog Lake were maintained at prescribed water levels from early March through mid-November when freeze-up occurred.

Nelson and Warren Marshes were flooded during late April and early May following prescribed burning. Pumping of these units was discontinued prior to reaching their desired levels to prevent flooding of waterfowl nests.

The Butch Cassidy Marsh remained at optimum water levels until mid-summer when flows in Beaver Creek diminished due to dry conditions.

The Spitzie Marsh remained dry throughout the year due to failure of the pump support structure. A new structure is planned for construction in FY 91.

The Horseshoe Marsh was on planned draw down during the entire year.

Water from the Green River was not pumped into the Grimes Marsh due to its inability to hold water. If the surface water rights application for Vermillion Creek is approved, water diverted from the creek carrying silt laden spring run-off should make the marsh bottom less permeable.

Green River water levels remained low due to less than normal run-off this spring. Flaming Gorge Dam releases fluctuated from 700 to 3,500 cfs but only averaged about 800 cfs.

3. Forests

Narrow and broadleafed trees grow along Beaver and Vermillion Creeks. There are several groves of broadleaf cottonwoods in the bottoms along the Green River. Since the establishment of Flaming Gorge Reservoir in the early 1960's, there has been less cottonwood regeneration due to the lack of seasonal river flooding. Care is taken to protect the existing trees and to encourage new tree growth. Beaver numbers are controlled where excessive tree damage occurs. (See Section G.15)

5. Grasslands

Approximately 3,500 acres of refuge grasslands are located on benches, river bottoms adjacent to marsh units, and in meadows along Beaver Creek. The meadows along Beaver Creek are irrigated (gravity flow) from the creek.

Allowing controlled winter grazing of cattle on the refuge removes dead grass, improves cycling of nutrients and structural diversity of post-grazing vegetation in grazed units.

Alkali Sacaton - This bunchgrass represents the most common grassland species found within refuge bottomland meadows. 07/01/90 Photo 5 JLG

6. Other Habitat

Roadways and dikes were mowed to improve visibility for maintenance purposes and for benefit of visitors.

Approximately 6,000 acres of the refuge consist of alluvial benchlands and steep rocky mountain slopes.

7. Grazing

The winter grazing plan implemented on December 1, 1989 was continued through March 31, 1990. Location of refuge grazing units can be found on the refuge leaflet map (back cover).

1989-90 Grazing Program

Grazing Units	Unit Acreage	AUMs*	Number of Cattle
Grimes	630	199	50
Horseshoe	275	316	79
Hog Lake	445	316	79
Spitzie	580	95	24
Beaver Creek/Rye Grass	475	248	62
Allen	410	355	89
Warren	295	240	60
	3,110	1,769	443

*Animal Unit Months

This grazing plan represented a continuing reduction in AUMs (cattle) determined necessary to provide sufficient carry over of residual vegetation to meet the needs of early upland duck nesting species. The decrease in AUMs which is being phased in during a three year period (1989-1991) will reflect a 35 percent reduction.

Robel pole readings and photo points were taken during the year to monitor changes in vegetation. Daubenmire surveys scheduled to begin in 1991 will also be used to monitor vegetation.

AUM SUMMARY

Permittee	Grazing Period	#AUMs	AUM Rate	Revenue
Wright Dickinson	12/01/89--03/31/90	1,769	6.50/AUM (cattle)	$11,498.50
Jerre L. Gamble	01/01/90--12/31/90	48	8.88/AUM (horses)	426.24
Ted Ondler	01/01/90--12/31/90	35	8.88/AUM (horses)	310.80
Robert Harding	01/01/90--12/31/90	60	8.88/AUM (horses)	532.80

Base AUM Rate for 1989 was $6.50
Base AUM Rate for 1990 was $7.10
Each horse is counted as 1.25 AUM

9. Fire Management

Prescribed burn plans were submitted and approved for Nelson and Warren Marshes. A 200 acre burn of the Nelson Marsh was completed on March 20. An additional 120 acres of marsh fringe and upland area burned out of prescription due to both a sudden change in wind direction and an increase in wind velocity. Several cottonwood trees located adjacent to the marsh unit were lost.

Lodged emergents in Warren bottom pre-burn.
04/01/90 Photo 6 JLG

Prescribed burn on Warren Marsh. 04/01/90 Photo 7 JLG

Warren Marsh, partially flooded following prescribed burn. 04/30/90 Photo 8 JLG

The Warren Marsh burn was completed on April 13. This prescribed burn also went out of prescription due to a sudden increase in wind velocity and a change in wind direction. Unfortunately, this fire which burned approximately 110 acres was somewhat more destructive than the Nelson wildfire. Two power poles and several cottonwood trees were destroyed.

A wildfire occurred in the Carr Bottom on April 14. Manager Gamble and Maintenance Worker Harding responded and contained the fire after it had burned approximately eight acres. However, high winds occurred two days later which blew hot burning embers from trees onto adjacent grassland areas starting another wildfire which burned an additional 40 acres before being contained. Unfortunately, an old settlement cabin and approximately 50 cottonwood trees were lost to the fire.

Thanks to fire money, two range technicians (seasonal fire fighters) were hired during May and worked through September. Their valuable assistance was much appreciated by refuge staff as well as the entire local fire fighting community involving several state and federal agencies. Fire money was also utilized to purchase radio equipment and a portable draft pump. The purchase of multi-channel field programmable radios has greatly facilitated our communication capabilities with other fire fighting agencies in the area. It also allows access to a 24 hour dispatch system which is paramount for safety, especially in a remote area.

Range Technicians, John Cook and Keith Madsen, attended fire training from June 11--13. The fire training workshop was a joint effort of the Bureau of Land Management and the Routt National Forest. Basic Fire Fighting (S-130), Wildland Fire Behavior (S-190) and Incident Command System (S-220) were included.

Refuge staff suppressed a lightning caused wildfire on adjacent BLM land on July 5. Several cedar trees burned over an area of approximately one acre before being controlled.

On July 26, four staff members responded to a lightning caused wildfire in the Hartman Draw area on BLM land. Moffat County and BLM fire crews also responded. Approximately 250 acres of cedar trees and upland grass burned before the fire was controlled.

A lightning caused wildfire was suppressed on the refuge within the Grimes Bottom on August 20. One large cottonwood tree was lost to the fire.

Assistant Manager Ted Ondler attended S-390 Fire Behavior training the week of September 10-14.

Protecting cottonwoods by foaming bases of trees with Silvex. 11/15/90 Photo 9 DO

Hoy Marsh during prescribed burn. 11/15/90 Photo 10 DO

Prescribed burn plans were submitted and approved for Horseshoe, Hoy and Spitzie Marshes. A 50 acre prescribed burn of the Horseshoe Marsh was completed on November 30. Four employees of the National Park Service, Dinosaur National Monument assisted with the burn.

On December 6, Refuge Manager Gamble met with Mike Reiser and Dave Oicles from BLM Fire Control, Craig, Colorado. The meeting was also attended by Glade Ross, NPS Park Ranger, and Mike Glass, NPS Fire Management Officer. The purpose of the meeting was to view new foam equipment on station and discuss mutual assistance for wildfires and prescribed burns. During the afternoon, the individuals attending the meeting assisted refuge staff with a prescribed fire on the north and east sides of Hoy Marsh (110 acres).

Foam worked well to protect utility poles during prescribed burns. 11/20/90 Photo 11 JLG

On December 7 a prescribed fire was completed on the west and south sides of the Hoy dike (90 acres).

On December 8 refuge staff blacklined a firebreak along the road at Spitzie Marsh. This burn was not completed due to snowfall.

10. Pest Control

Mormon crickets were seen again this year during late spring in some of the draws on the south side of the Green River. Large numbers of crickets were observed on Diamond Mountain, located south of the refuge. Since the crickets tend to forage on much of the vegetation along their path, the BLM annually applies pesticides on the heaviest cricket concentrations. Nosema locustae, a biological agent applied in a bait formula, was also utilized on BLM land adjacent to the refuge. Normally, the crickets never reach refuge lands. However, during the last five years, they have been seen on the refuge along the south side of the Green River in the vicinity of the Nelson and Warren Marshes. During the last two years, Mormon crickets have been observed on the north side of the Green River. Fortunately, they were not very numerous making control unnecessary. Various birds and fish apparently enjoyed feeding on them.

11. Water Rights

Refuge and Colorado Division of Wildlife meadows adjacent to Beaver Creek were irrigated during alternate weeks under our cooperative water sharing agreement. The state's permittee honored all conditions of the agreement including the minimum instream flow requirement.

A water rights application for 20 cfs (cubic feet second) of surface water was filed with the Colorado Division of Water Resources during November of 1989. If granted, gravity flow water out of Vermillion Creek can be utilized to fill the Grimes Marsh located just to the west of the creek. This would aid the operation of the refuge twofold: less water would be pumped out of the Green River into the Grimes Unit which would mean a savings in the cost of electricity and pump maintenance. Also, silt carried by gravity flow water from Vermillion Creek would help seal the bottom of the Grimes Marsh which has a history of not holding water very well. It seems that during construction of the Grimes Unit, the contractor excavated several areas too deep, digging below an impermeable clay layer into sandy material that won't hold water. Because of this, the Grimes Marsh has been seldom utilized due to the high cost of operating a lift pump which has to run almost constantly to keep the marsh full of water.

During early February, Pat Carson from Region 6 Realty Division surveyed proposed ditch lines that would allow gravity flow of water from Vermillion Creek to the Grimes Marsh.

12. Wilderness and Special Areas

There are four National Historic Sites registered in Moffat County, Colorado. Three of them are located on the refuge. One is the Two-Bar Ranch, headquarters of one of the largest cattle and sheep ranch operations in the West during the late 1800's. It is protected from vandals and is being allowed to yield to the effects of nature without interference.

Lodore Hall, built in 1911, was the first district funded school in the area. It presently serves as the Community Hall for Browns Park residents. The Browns Hole Homemaker's Club has a Special Use Permit for the building and grounds with the stipulation that they maintain and repair the building when needed.

Lodore Hall historic site. Hoy Marsh can be seen in background. 06/01/90 Photo 12 JLG

The third National Historic Site on the refuge is the White-Indian Contact Site. It is believed to be the site of Fort Davy Crocket, an old fur trading post. The area was partially excavated by Scientific Applications in 1980, then re-covered by refuge personnel. Since then, it has been protected from further disturbance.

G. WILDLIFE

1. Wildlife Diversity

The rich mixture of habitat types ensures a diverse array of wildlife species. The physical topography lends itself to extensive habitat edge. Several broad habitat types can be found within the long narrow river corridor. Bottomland grasslands, freshwater wetlands, riverine islands, cottonwood groves, and extensive benchlands comprise the predominant habitat types.

Bald eagles were frequently observed along the Green River throughout the winter months with peak numbers present from January through March when an average of nine bald eagles were present. 12/30/90 Photo 13 JLG

2. Endangered and/or Threatened Species

There were six sightings of peregrine falcons this past year. The sighting of peregrines on the refuge comes as no surprise as there is an ongoing peregrine falcon restoration project in the adjacaent Dinosaur National Monument.

Without protection, the Colorado squawfish, humpback chub, bonytail chub, and razorback sucker may disappear from the Upper Colorado River Basin. These four species are endangered under Colorado state law. All but the razorback sucker are also classified as endangered under Federal law. Restricted releases of water from Flaming Gorge Reservoir are part of continuing studies on endangered fish species. The Colorado River Fisheries Project is primarily concerned with the Colorado squawfish which is found in the Green River. During the past year there were no reports of squawfish being caught on the refuge.

The river otter is currently classified as endangered by the state of Colorado. During 1989 and 1990 the Utah Division of Wildlife Resources released several river otters on the Green River below Flaming Gorge Reservoir. During the past year a refuge visitor observed five river otters near the Spitzie pump site.

3. Waterfowl

The 1990 duck breeding pair survey was conducted on May 10. The survey included the Green River, Beaver Creek and all of the refuge marshes. Data was tabulated in the same manner as in past years using the modified Hammond's formula. For dabbling ducks: pairs, single drakes and groups of drakes numbering less than five were counted as pairs; for divers only pairs actually observed were counted as pairs. A total of 701 pair of dabblers and 87 pair of divers were counted.

Dabbler production was calculated by multiplying the total number of dabbler pairs by the average brood size (6.1). and then multiplying this product by the estimated dabbler survival rate (45 percent). Diver production was calculated by multiplying the total number of diver pairs by the average brood size (6.3) and multiplying this product by the estimated diver survival rate (60 percent).

Production estimates from the 1990 breeding pair count were as follows:

Dabbler Pairs

Mallard	164
Pintail	69
Green-winged teal	54
Blue-winged/ Cinnamon teal	97
Northern shoveler	99
American widgeon	48
Gadwall	170
Total Dabbler Pairs	701

701 pairs x 6.1 (average brood size) = 4276.1

4276.1 x .45 (estimated dabbler survival rate) = 1924.2 (estimated dabbler production)

Diver Pairs

Redhead	48
Canvasback	2
Common goldeneye	-
Common merganser	2
Ring-necked duck	12
Bufflehead	-
Ruddy duck	20
Lesser scaup	3
Total Diver Pairs	87

87 pairs x 6.3 (average brood size) = 548.1

548.1 x .60 (estimated diver survival rate) = 328.8 (estimated diver production)

Gadwall, mallard, northern shoveler, blue-winged/cinnamon teal, and pintail (in that order) represented the most abundant dabblers. Redhead, ruddy duck and ring-necked ducks were the most abundant diving ducks.

Estimated duck production (based on pair counts) showed a decrease from the previous year. Total production of dabblers and divers was estimated at 2,253 ducks compared with 3,903 in 1989.

The goose nesting survey was conducted on May 1 with subsequent nest rechecks on June 7 and 8. A total of 226 Canada geese were observed, including 77 pairs and 72 unpaired geese. A total of 46 nests were found, of which eight were destroyed by predators or abandoned. There was a total of 38 successful nests. The average brood size was 4.73 goslings/brood., A total of 38 successful nests should have produced 180 goslings.

Goslings - "1990 models."
05/15/90 Photo 14 TDO

Goose production for 1990 is a sharp contrast to 1989 when total estimated production was only 41 goslings. Management improvements for 1990 included rehabilitation of nesting structures with improved nesting materials and earlier flooding of the marshes. We feel that the earlier flooding resulted in making the artificial structures more attractive to nesting geese and also provided a greater degree of protection by isolating the birds from mammalian predators.

Table 1. Waterfowl Production for 1973 Through 1990

Year	Geese	Ducks	Coots
1973	150	3,200	5,700
1974	150	3,275	2,000
1975	250 (69)	3,200	2,000
1976	150 (61)	3,100	500
1977	225 (75)	3,060 (1,001)	1,500
1978	290 (85)	2,450 (807)	4,300
1979	225 (73)	2,725 (953)	3,150
1980	170 (60)	2,855 (955)	2,280
1981	245 (72)	4,025 (1,391)	2,500
1982	264 (76)	4,318 (1,427)	2,600
1983	305 (106)	4,406 (2,491)	3,600
1984	296 (107)	4,112 (1,376)	2,330
1985	277 (145)	4,036 (1,396)	1,772
1986	334 (106)	6,382 (1,957)	3,000
1987	357 (151)	3,789 (1,027)	2,500
1988	336 (69)	2,475 (820)	1,900
1989	41 (128)	3,903 (1,288)	2,400
1990	180 (77)	2,253 (788)	1,500

Breeding pair counts in parenthesis.

During the past four waterfowl nesting seasons (1987-1990), duck nests have been located by dragging a chain between two four-wheeled ATV's. During the past three waterfowl nesting seasons (1988-1990), a Mayfield analysis was completed. The current objectives of nest dragging are as follows: 1) Identify high use nesting habitats. 2) Calculate nest success. 3) Provide insight for future management including assessing the value of predator control. 4) Compare nesting preference and success of grazed and ungrazed habitat.

Eight areas were searched on three occasions (May 14, June 11, June 25), with a total of 325 acres of nesting habitat being dragged each time. The areas searched consisted of 181 acres that were not grazed during the 1989-90 winter grazing season and 144 acres that were grazed during the winter of 1989-90.

Table 2. Nests Found Within Marsh Units 1990

Management Unit	Acres Searched	Total Nests	Nests/ Acre	Success. Nests
Hoy (ungrazed)	59.4	24	.40	10
Butch Cassidy (ungrazed)	24.2	8	.33	4
Flynn (ungrazed)	55.2	52	.94	35
Nelson (ungrazed)	41.8	16	.38	10
Horseshoe (grazed)	36.4	1	.03	0
Spitzie (grazed)	23.6	2	.08	0
Hog Lake (grazed)	51.5	18	.35	2
Warren (grazed)	32.7	7	.21	4
Totals	324.8	128	.34 avg.	65

A total of 128 nests were located in 1990. Of these, 48 percent were blue-winged or cinnamon teal, 35 percent gadwall, 10 percent mallard, and 7 percent northern shoveler.

Nest success was calculated for all combined duck species using three different methods. Nest success was also calculated comparing grazed and ungrazed habitat using three different methods.

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Table 3. Nest Success Over Three Year Period 1988-1990

	1988	1989	1990
Total No. Nests	54	80	128
No. Nests Usable for Mayfield	42	70	116
Apparent Nest Success	53.7%	48.6%	56.0%
Shortcut Mayfield Nest Success	29.4%	33.3%	38.7%
Mayfield Nest Success	26.9%	28.1%	37.8%
Grazed Habitat Apparent Nest Success	62.1%	45.0%	26.1%
Grazed Habitat Shortcut Mayfield	36.7%	29.9%	14.6%
Grazed Habitat Mayfield	37.8%	24.4%	14.3%
Not Grazed Habitat Apparent Nest Success	38.5%	53.0%	63.4%
Not Grazed Habitat Shortcut Mayfield	16.1%	36.4%	46.3%
Not Grazed Habitat Mayfield	7.9%	33.4%	45.9%
Trap Nights	0	0	2,718
Total Predators Removed	0	0	20

Predator management at Browns Park NWR was initiated as part of an effort to monitor and improve nest success. This year was the first attempt at removing nest predators. Management commenced on May 5 and discontinued July 19 on the Hoy and Flynn Marsh Units and was carried out with the authorization of a Special Use Permit issued by the Colorado Division of Wildlife. Three types of traps were employed: wooden cubby sets with #220 Conibear traps, Havahart type live animal cage traps, and #1 1/2 coil spring leghold traps with offset jaws. The following species and numbers of animals were removed:

Striped Skunks - 6 Raccoons - 7
Brewer's Blackbird - 1 Porcupines - 6

All animals were captured in the wooden cubby sets with #220 Conibear traps with the exception of one porcupine which was captured in a leghold trap and released.

A total of 38 sets were made on the two marshes. Each trap was set an average of 71.5 nights. Total trap nights was 2,718.

Trapped and non-trapped areas were compared with regard to nesting success. The results of that comparison are as follows:

	Trapped Units	Non-trapped Units
Apparent Nest Success	65.2%	42.5%
Shortcut Mayfield	50.1%	24.1%
Mayfield	47.4%	26.4%

4. Marsh and Water Birds

There is an active great blue heron rookery located on the eastern end of the refuge, along the Green River. The first heron was observed in early March. An estimated 20-30 young are produced annually.

White-faced ibis commonly migrate through the area during late April. During late August approximately 50 ibis were observed in the Flynn Unit.

Migrating sandhill cranes were seen passing over the refuge during the spring and fall months. Flocks of cranes frequently stopover for one/two days during their migrations.

On several occasions during the summer months, small flocks (10-12) of white pelicans were observed on the refuge marshes.

Other marsh and water birds sighted were: western grebe, horned grebe, pied-billed grebe, American bittern, and sora rail.

5. Shorebirds, Gulls, Terns, and Allied Species

Black-necked stilts were occasionally sighted during the spring and summer months. The more common American avocet is thought to nest on the refuge.

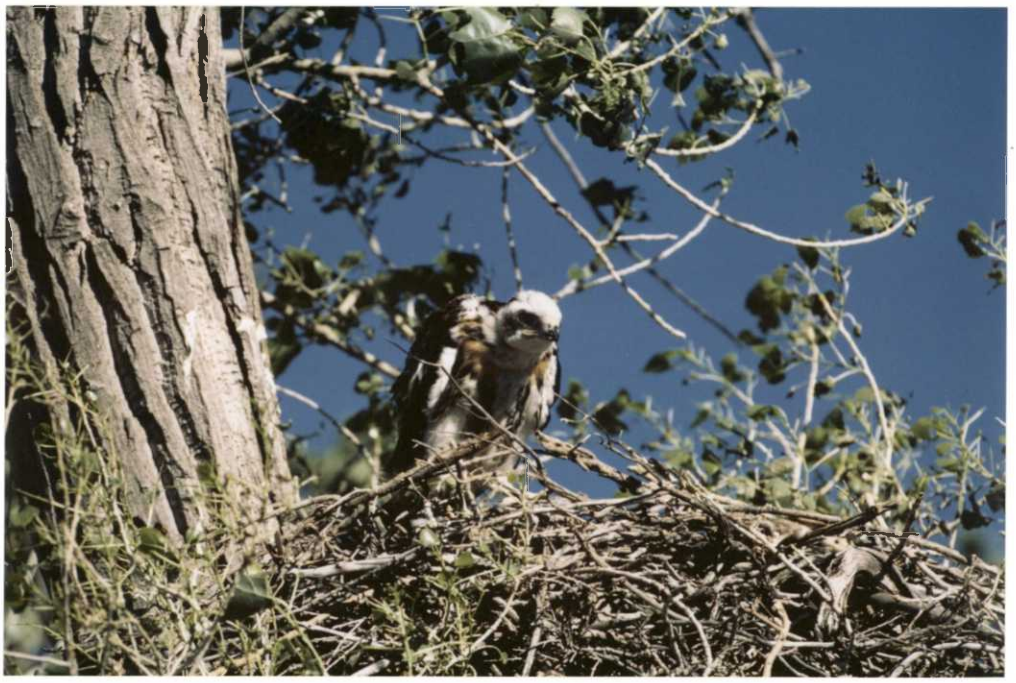
Wilson's phalarope were abundant during late spring.

Other birds commonly observed were: common snipe, lesser yellowlegs, western willet, spotted sandpiper, and killdeer.

6. Raptors

Golden eagles were frequently observed during the winter months. They were observed year round and nested near the refuge.

Red-tailed hawks, American kestrel, merlin, northern harriers, and great-horned owls were observed during most months and are known to nest on the refuge. Rough-legged hawks were infrequently observed during the winter months. Cooper's sharp-shinned, Swainson's, and ferruginous hawks were occasionally observed.



One of five red-tailed hawk nests found on the refuge this spring. 05/18/90 Photo 15 JLG

Following two reports by refuge staff of electrocuted golden eagles (off refuge) on power poles, Moon Lake Electric Cooperative provided safety insulators to the power poles that were causing the problem.

Northern Harrier - a common ground nesting raptor.
05/11/90 Photo 16 JLG

7. Other Migratory Birds

Mountain bluebirds generally arrived in early March and departed around the first of October.

Mountain bluebirds readily accept our nest boxes.
04/17/90 Photo 17 JLG

Common nighthawks were often observed around the refuge residences during summer evenings.

Feeders at refuge residences hosted scores of black-chinned and broad-tailed hummingbirds.

8. Game Mammals

Small herds of pronghorn antelope were frequently observed on the refuge or adjacent BLM lands. The total number of animals was generally less than 40.
06/11/90 Photo 18 JLG

The refuge is a wintering area for mule deer which migrate into the river valley from Cold Springs Mountain to the north and Diamond Mountain to the south. The number of deer wintering in Browns Park is dependent on snow depth at the higher elevations. The following is a summary of the aerial deer counts conducted on the refuge over the past year.

Date	Total Deer Counted	Number Deer North of River	Number Deer South of River	Number Antlered Deer Observed
01/04/90	244	187	57	2
02/05/90	428	355	73	* 0
12/08/90	208	143	65	* 8

*Bucks probably shed their antlers by this time.

Elk were occasionally observed when deep snow forced them down out of the high country. During the January aerial deer survey there were 40 elk on the refuge including four spikes and a large bull.

Elk commonly use river bottoms during winter months.
12/12/90 Photo 19 JLG

10. Other Resident Wildlife

Chukars are occasionally observed among rock outcroppings. 09/05/90 Photo 20 JLG

Two cows and a young bull moose were observed on and around the refuge during the fall months.

It appears that the cottontail rabbit population may have crashed this past year. The coyote population remained high. Both white-tailed and black-tailed jackrabbits were present, their numbers have remained stable. Porcupine, badger, raccoon, and striped skunk were occasionally observed.

"Snake in the grass" - Great basin gopher snake is our most common reptile. 07/21/90 Photo 21 JLG

11. Fisheries Resources

The Green River, which flows through the center of the refuge, is a popular sport fishery. Brown, cutthroat and rainbow trout were the species most sought after. Carp, catfish and suckers were also present in the river.

Beaver Creek also provided a brook trout sport fishery as well as a few rainbow and cutthroat trout.

12. Wildlife Propagation and Stocking

On April 12, the Colorado Division of Wildlife stocked approximately 2,000 catchable size rainbow trout (8"-10") in the Green River.

14. Scientific Collections

During August a Special Use Permit was issued to a representative of The Nature Conservancy. The permit allowed a one-time sampling of the riparian vegetation along the Green River and Beaver Creek.

15. Animal Control

Several nuisance raccoons and skunks were removed in the vicinity of the refuge residences. Four beaver were also removed at locations along Beaver Creek and the Green River where excessive tree damage and water control structure plugging was occurring.

H. PUBLIC USE

1. General

Refuge visitor use was down slightly from 1989 (10,607 in 1990 and 11,329 in 1989). Average annual visitor use (over the past five years) was 8,070. A large number of refuge visitors travel from Craig, Colorado (85 miles) and the Steamboat Springs, Colorado area (140 miles) to recreate in Browns Park.

5. Interpretive Tour Routes

A graveled tour road begins at the Crook Campground near the east end of the refuge and parallels the Green River for most of its seven mile length. The west end of the tour road is just north of the Swinging Bridge which is a local landmark. There are several interpretive signs and "overlook sites" above the marshes. Refuge leaflets, available in boxes along the route, were utilized by an estimated 2,100 visitors.

6. Interpretive Exhibits/Demonstrations

Volunteer Rodell Eggett completed the construction of our second kiosk which is located on the auto tour route. Display panels and a cattle exclosure were added to the kiosk during June.

During October, the Browns Park NWR display board at the new Craig Chamber of Commerce Visitor Center was completed with the addition of photographs and captions. The refuge exhibit is accompanied by several other agency displays (U.S. Forest Service, U.S. Bureau of Land Management, Dinosaur National Monument-National Park Service, and the Colorado Division of Wildlife). In addition to the display inside the visitor center, the agency logos are displayed on the visitor center sign which is located on State Highway 40 in Craig, Colorado. Refuge leaflets were provided to the visitor center for distribution to the public.

Land management agency displays at Craig visitor center. 06/15/90 Photo 22 JLG

Welcome sign outside Craig visitor center. 06/15/90 Photo 23 JLG

7. Other Interpretive Programs

Due to the remoteness of the refuge, the opportunity to present interpretive talks and tours seldom arises. In August, Range Technician Keith Madsen provided a talk/tour for a group of wildlife professionals from South America and their hosts from the BLM.

During June, Maintenance Worker Harding provided an informational talk to a group of outdoor writers touring the area with representatives of the Bureau of Land Management.

In October, Mr. Rick Hildebrand and six volunteers from the State Welcome Center at Dinosaur, Colorado visited the refuge. The purpose of their visit was to become familiar with the refuge and to view the auto tour route.

8. Hunting

Hunting was allowed on the refuge under State and Federal regulations. Mule deer and cottontail rabbits may be hunted in all areas except those posted. Ducks, coots and geese may be hunted along the Green River channel and within 100 yards of each bank. Hog Lake and Butch Cassidy bottoms are also open to waterfowl hunting.

Hog Lake with Green River and Flynn Marsh in background. 06/15/90 Photo 24 JLG

Archery deer season was August 23-31 (bucks only) and September 1-25 (either sex). Muzzleloading rifle season was September 15-25. There were few hunters during either season. No known deer were harvested on the refuge during either season.

There were three separate rifle deer seasons again this year: October 13-17; October 20-31; and November 3-11. The first and second seasons carried antler point restrictions of three points or better on one antler. A limited number of doe (antlerless) licenses were issued for the second and third seasons. No deer were harvested during the first season and only four antlerless deer were harvested during the second season on the refuge. The third rifle deer season attracted more hunters than the previous two rifle seasons. Compared to previous years, hunting pressure was light. The small number of hunters can probably be attributed to the limited number of buck licenses that were issued for Unit 201 which includes that portion of the refuge which lies north of the Green River. During the third rifle deer season, there were approximately 32 mule deer harvested on the refuge, nine antlered and 23 antlerless.

Cottontail rabbit season was from September 1, 1990 until February 28, 1991. There is a daily bag limit of 10 and a possession limit of 20. Few people travel to Browns Park just to hunt rabbits. Rabbit hunting is usually in conjunction with deer or waterfowl hunting trips.

The Browns Park Special Goose Season was from October 27 until December 9. The daily bag limit was one goose and the possession limit was two geese. There was moderate goose hunting pressure on the opening weekend.

Browns Park NWR is within the Pacific Flyway. The first part of a split duck season opened on October 6 and closed on October 13. No harvest data was gathered because we were requested not to work (Congress had not approved the budget). The second part of the split duck season opened on November 17 and closed January 6, 1991. On the second "opener," hunting pressure was relatively light and hunter success was spotty. The most common species in the bag were American widgeon and green-winged teal. Three hunters were successful with each bagging a Canada goose. All of the refuge marshes were frozen over by the end of the month.

9. Fishing

Approximately 2,200 visitors fished an estimated 8,200 hours this past year. There was a significant increase in fishing success after the Colorado Division of Wildlife stocked the Green River. The most common fish species in the creel were

rainbow, cutthroat and brown trout. Catfish were occasionally caught incidental to trout fishing. Beaver Creek also provided a brook trout fishery for those who were willing to walk the stream.

11. Wildlife Observation

Most refuge visitors come to Browns Park to hunt or fish and wildlife observation is a by-product of those activities. However, once in a great while there is the occasional visitor who journeys to the "Park" for the sole purpose of viewing wildlife.

12. Other Wildlife Oriented Recreation

An estimated 4,000 people visited the refuge spending approximately 21,400 hours camping and boating. The public seems to be spending more time at non-consumptive wildlife oriented recreation.

Swinging Bridge campground. 07/01/90 Photo 25 REH

15. Off-Road Vehicling

No violations were written this past year for off-road vehicle use. The terrain on the refuge is very fragile. Off-road use of three and four wheeled ATV's has left permanent scarring of the landscape at several locations. Whenever a refuge visitor

is observed with three or four wheelers, it has become a standard practice to explain where they can be used.

16. Other Non-wildlife Oriented Recreation

Most refuge camping visits were related to hunting and fishing ventures. An exception to this was the Memorial and Labor Day weekends when many of the campers were here to attend dances at Lodore Hall.

17. Law Enforcement

Refuge law enforcement was low-key but highly visible. Special enforcement patrols were conducted during the deer and waterfowl seasons.

There were six citations written in 1990 as compared to four in 1989. A summary of the violations is as follows:

Month	Number of Violations	Violation	Court	Disposition
May	2	Camping out-side of a designated camping area	Federal	$200.00 Fine
June	1	"	Federal	Dismissed
June	1	Discharge of fireworks on a NWR	Federal	$100.000 Fine
October	1	Spike bull elk taken on a cow license	State	$68.50 Fine
November	1	Hunt buck deer without a valid Unit 201 license	State	$342.15 Fine

Following the Memorial Day dance at Lodore Hall, a number of signs and a mail box on the refuge were vandalized. The incident was reported to the Moffat County Sheriff's office.

The two cases involving state managed game mammals (mule deer and elk) were turned over to the Colorado Division of Wildlife.

During the January and February one-week law enforcement refresher training sessions at Marana, Arizona, Refuge Manager

Gamble served as a firearms instructor. Refuge Officers Ondler and Harding attended the February session.

Managers Gamble and Ondler attended a joint law enforcement meeting with the Colorado Division of Wildlife on August 8 and 9 in Glenwood Springs, Colorado. Night firing and semi-annual qualifications were also conducted.

Manager Gamble conducted semi-annual qualifications for the Seedskadee NWR law enforcement staff on August 22.

Refuge Officers Ondler and Harding participated in a Colorado Division of Wildlife roadblock near Dinosaur, Colorado in mid-November.

Refuge Manager Gamble attended the Firearms Instructor Refresher Training at Marana, Arizona from December 17-20.

I. EQUIPMENT AND FACILITIES

1. New Construction

As discussed in Section H.6, the construction of a second kiosk was completed.

2. Rehabilitation

Several major painting/staining projects were completed during the summer months. The refuge headquarters, main shop building and oil house were all stained. All of the refuge residences were stained/painted except quarters #1 which was painted in 1989.

The refuge residence (quarters #114) occupied by Equipment Operator Barber underwent a major overhaul; a new gabled roof was constructed and insulation and cedar siding were added to the exterior. Similiar modifications were done to quarters #115 during 1989 and completed in the spring of 1990. This work was completed by Rodell Eggett who was hired as a temporary carpenter.

Quarters #114 before rehab. 02/03/90 Photo 26 TDO

Quarters #114 after rehab. 04/30/90 Photo 27 TDO

4. Equipment Utilization and Replacement

A light duty 3/4 ton Chevrolet pickup was delivered on June 26.

Maintenance Worker Harding traveled to Upper Souris NWR to pick up a surplus foam/pumper unit for use in a new fire truck which is on order.

A 1978 Ford Courier was sold via GSA.

Mr. Nathan Mock, Maybell Repair Service, inspected and certified that the ROPS on the D-6 dozer meet or exceed OSHA and Service standards.

5. Communications Systems

The Union Telephone Company connected all of the telephone lines in Browns Park to the new underground telephone cable on June 5. The ambient noise level on the telephone line is now greatly reduced.

A Bendix/King mobile radio was purchased and installed in the new 3/4 ton truck.

Mr. Gary Klug, Colorado Public Utilities Commission, and an employee of Union Telephone visited the refuge on September 19. The purpose of Mr. Klug's visit was to obtain feedback on the upgraded telephone services.

Severe cold temperatures resulted in intermittent telephone service throughout the month of December. To add insult to injury, Union Telephone Company disconnected the refuge telephone due to nonpayment of the bill (Denver Finance Center strikes again).

6. Computer Systems

The computer monitor was sent to Denver for repair in March.

On October 9, Browns Park NWR joined the rest of the world by linking into the E-Mail system.

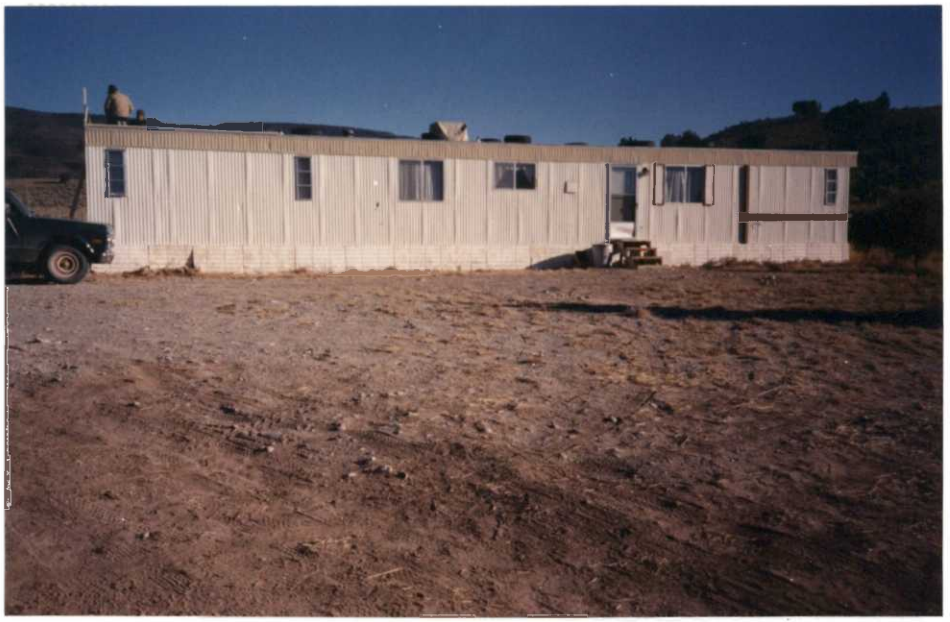
Refuge Assistant Henry spent one day at Arapahoe NWR learning the revised budget tracking system.

7. Energy Conservation

The three staff members living on the east end of the refuge continued to car pool to save on fuel consumption.

We continued to use the woodstove in the shop to minimize the use of electricity for the hot air heating system.

Quarters #114 and #115 were insulated, resided and covered with a gabled roof. In addition to improved aesthetics, heating costs should be reduced.



Quarters #115 before rehab. 11/15/89 Photo 28 TDO

Quarters #115 after rehab. 11/01/90 Photo 29 TDO

J. OTHER ITEMS

1. Cooperative Programs

A weather station was maintained at the refuge sub-headquarters where daily temperatures, precipitation and evapotranspiration were recorded in cooperation with the National Weather Service.

The refuge has a cooperative agreement with the National Park Service, Dinosaur National Monument, to provide mutual aid in the areas of law enforcement and fire fighting. A common boundary is shared with the Park Service on the southeast side of the refuge.

The refuge also has a cooperative fire fighting agreement with the Bureau of Land Management (BLM). We share a common boundary with the BLM on the north and south sides of the refuge.

3. Items of Interest

Pat Carson, Regional Office Reality, was at Browns Park NWR during late January. Pat established elevations in mean sea level for all refuge impoundments. Pat also surveyed the proposed Spitzie pump site and ditch lines in the Grimes Unit.

All four male members of the staff passed the step-test and were Red Card qualified.

Assistant Manager Ondler attended a Wildlife Management Workshop that was held at Colorado State University, Fort Collins, Colorado.

Gamble, Harding, and Ondler underwent physical examinations at the Craig Clinic on February 2, prior to attending law enforcement refresher training.

Maintenance Worker Harding and Managers Gamble and Ondler attended the annual law enforcement refresher training February 20-28 at Marana, Arizona. The training also included a 12 hour water law short course.

Heavy Equipment Operator Barber attended a mormon cricket control meeting which was held in Maybell, Colorado on February 27.

Heavy Equipment Operator Barber completed ATV instructor training in Boulder, Colorado from March 15-18.

Assistant Manager Ondler reviewed three FmHA properties in the Grand Junction and Delta, Colorado area on March 21 and 22.

Managers Gamble and Ondler attended the project leaders meeting in Denver, Colorado from March 27 - April 1.

On April 11, Deputy Regional Director John L. Spinks, Jr. toured the refuge.

Refuge Manager Gamble attended at least one meeting each month of the Coordinated Resources Management Group.

During the first week of May, Arnie Kruse, Habitat Management Biologist, Jamestown, North Dakota and Associate Manager Barney Schranck were at the refuge. The purpose of their visit was to review grassland management and provide suggestions for increasing waterfowl production. Their recommendations will be incorporated into the Grassland Management Plan.

On May 14, Refuge Manager Gamble presented the Moffat County Commissioners with the revenue sharing check.

During May, Heavy Equipment Operator Barber provided ATV (four wheeler) safety training to the following: Browns Park NWR - one staff member; Ouray NWR - three staff members; Seedskadee NWR - two staff members; and National Elk NWR - seven staff members. Training for National Elk staff was in Jackson, Wyoming.

Manager Gamble a.k.a. Firearms Instructor Gamble conducted a weapons familiarization course for two seasonal employees from Seedskadee NWR on May 25. The training was required for the employees to participate in the station predator control program.

During May, Managers Gamble and Ondler visited with a private property owner near the confluence of the Elk and Yampa Rivers. The property is being considered for wetland development potential under the Farm Bill program. 05/07/90 Photo 30 JLG

On June 14, Moffat County Pest Management sprayed two acres of leafy spurge and 30 acres of whitetop on the refuge. The refuge reimbursed the county for the chemical that was used.

During July, Maintenance Worker Harding provided a guided tour of Fort Davy Crocket for historian Bill Bailey.

An oil spill occurred upstream from the refuge in Utah on August 17. Approximately 500 gallons of fuel oil was spilled into the Green River at the construction site of a new pipeline crossing. The accident was investigated by representatives of Utah Wildlife Resources, BLM, Questar Pipeline and the U.S. F.W.S. The spill was reported to the Region 6 oil spill coordinator and the EPA. Questar, owner of the pipeline, conducted a clean-up at the spill site by removing contaminated soil from the river bank. Water quality was sampled at several locations downstream from the spill site.

Refuge staff attended the Colorado Wildlife Federation BBQ/meeting held in Maybell, Colorado on August 11. Manager Gamble gave a presentation on the refuge grazing program.

On August 20 Manager Gamble presented Assistant Manager Ondler with a 20 year length of service award.

Refuge staff attended refresher first aid and CPR training on August 20. Joel Huelskamp, Craig Memorial Hospital, conducted the training on station.

Managers Gamble and Ondler attended the project leaders meeting in Missoula, Montana from August 26-31.

Refuge Manager Gamble received a Special Achievement Award for performance of duties from Associate Manager Barney Schranck.

Assistant Manager Ondler attended fire behavior training (S-390) during the week of September 10-14.

On September 13, Moffat County Pest Management conducted a follow-up spot treatment of noxious weeds on the refuge. They also located a small infestation of Russian knapweed.

On September 16 Maintenance Worker Harding provided the station's portable oxygen cylinder for a refuge neighbor that was having heart problems.

Refuge Manager Gamble, representing the Moffat County Undesirable Plant Management Advisory Commission, attended a meeting in Delta, Colorado on September 28. The meeting was sponsored by Colorado State University for the purpose of developing weed management programs for all counties on the western slope.

During November, Heavy Equipment Operator Lynn Barber and Refuge Assistant Carole Henry were presented with Special Achievement Awards for outstanding job performance. 11/08/90 Photos 31 & 32 JLG & TDO

Refuge Manager Gamble signed an agreement for the station to become part of the State Department of Highways and Public Transportation's Adopt-a-Highway Program. The refuge will be responsible for picking up litter for two highway miles, from the Colorado/Utah state line to mile marker #2 on State Highway 318. The State will erect a sign acknowledging this effort.

Refuge Manager Gamble attended a public meeting re: the reintroduction of black footed ferrets in Colorado, Wyoming, and Montana. The meeting was held in Craig, Colorado on November 26.

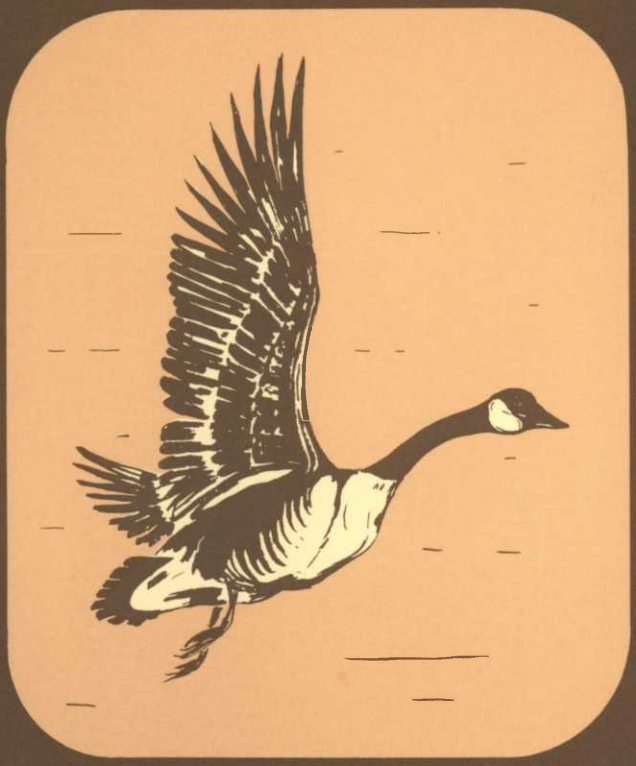
Representatives of the Soil Conservation Service in Craig, Colorado inspected the proposed Spitzie pump site on December 6.

4. Credits

Jerre Gamble wrote the Introduction, Sections A, C, D, E, F, and K. Ted Ondler wrote Sections B, G, H, I, and J. Carole Henry edited, typed, and assembled the report.

Sunset over another year passed. 06/23/90 Photo 33 JLG

BROWNS PARK
NATIONAL WILDLIFE REFUGE



GENERAL REFUGE REGULATIONS

- Motor vehicles are allowed only on roads. Closed roads are marked with signs.
- Parking is permitted along roadways. Please do not block roads or gates.
- Pets must be leashed or closely supervised.
- Plants and animals are protected. Do not remove or molest them.
- Please use trash barrels or take litter out with you.
- Boating is permitted on the Green River.
- Camping is allowed only in the Swinging Bridge and Crook Campgrounds.
- Fires are permitted only in camp areas.
- Firearms must be unloaded and cased on the Refuge except during authorized hunting seasons.
- Please contact a refuge officer if you have questions on regulations or on other activities.

U.S. FISH AND WILDLIFE SERVICE
Department of the Interior

RF6-65571-1 GPO 853-666 Reprinted May 1987

THE REFUGE

Browns Park National Wildlife Refuge lies on the Green River in the far north-western corner of Colorado, between the Utah-Colorado stateline and Dinosaur National Monument. The Refuge is managed by the U.S. Fish and Wildlife Service as a nesting and resting area for migratory waterfowl.

In pristine times, annual flooding of the Green River maintained the wet meadows preferred by nesting waterfowl. Flaming Gorge Dam now prevents this flooding. Consequently, refuge personnel now pump water from the river to maintain approximately 6,000 acres of developed waterfowl habitat.

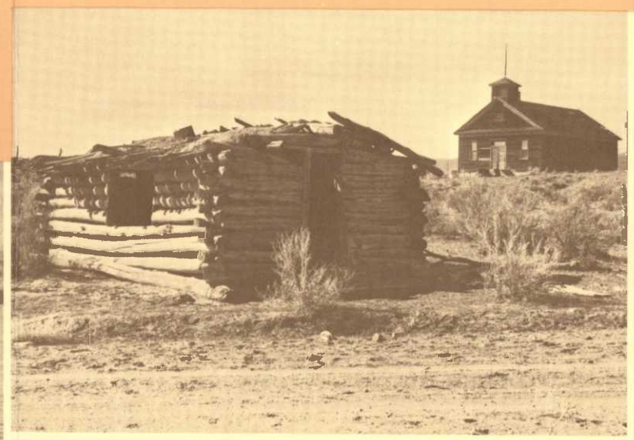
This semiarid region receives less than 10 inches of precipitation annually. Ducks, geese, and other water birds travel hundreds of miles to utilize this unique habitat.

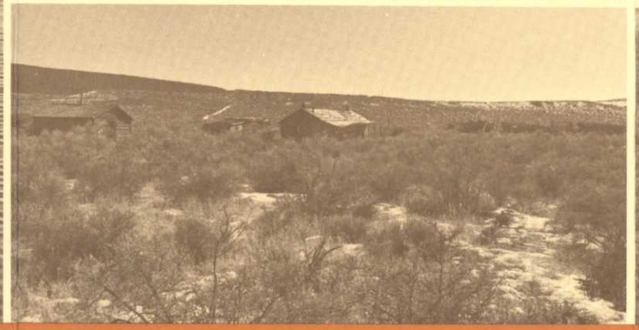
Spitzie Marsh - U.S.F.W.S. photo - J.L. Sellers.

HISTORY

The sheltered valley and abundant wildlife of the Green River lured Indians and fur trappers. "Browns Hole", as it was then called, was a favored winter rendezvous as far back as 1826. By the 1890's, Butch Cassidy and other cattle rustlers used this remote area to rest and hide their stolen herds. Browns Park was the winter headquarters for some of the larger livestock operations in the West, including Ora Haley's Two Bar Ranch.

Lodore School National Historical Site - U.S.F.W.S. photo - Jim Creasy.
Two-Bar Ranch National Historical Site - U.S.F.W.S. photo - Jim Creasy.





WILDLIFE

Mallards, redheads, teal, canvasbacks, other ducks, and Great Basin Canada geese nest on the Refuge. About 300 goslings and 2,500 ducklings are hatched annually and production should increase when more habitat is developed. The waterfowl population swells by thousands during the spring and fall migrations. Wading birds, shore birds, song birds, and a variety of hawks and eagles also use the Refuge during various seasons.

Resident species include mule deer, antelope, chukar partridge, and sage grouse. Elk and bighorn sheep occasionally visit the Refuge.

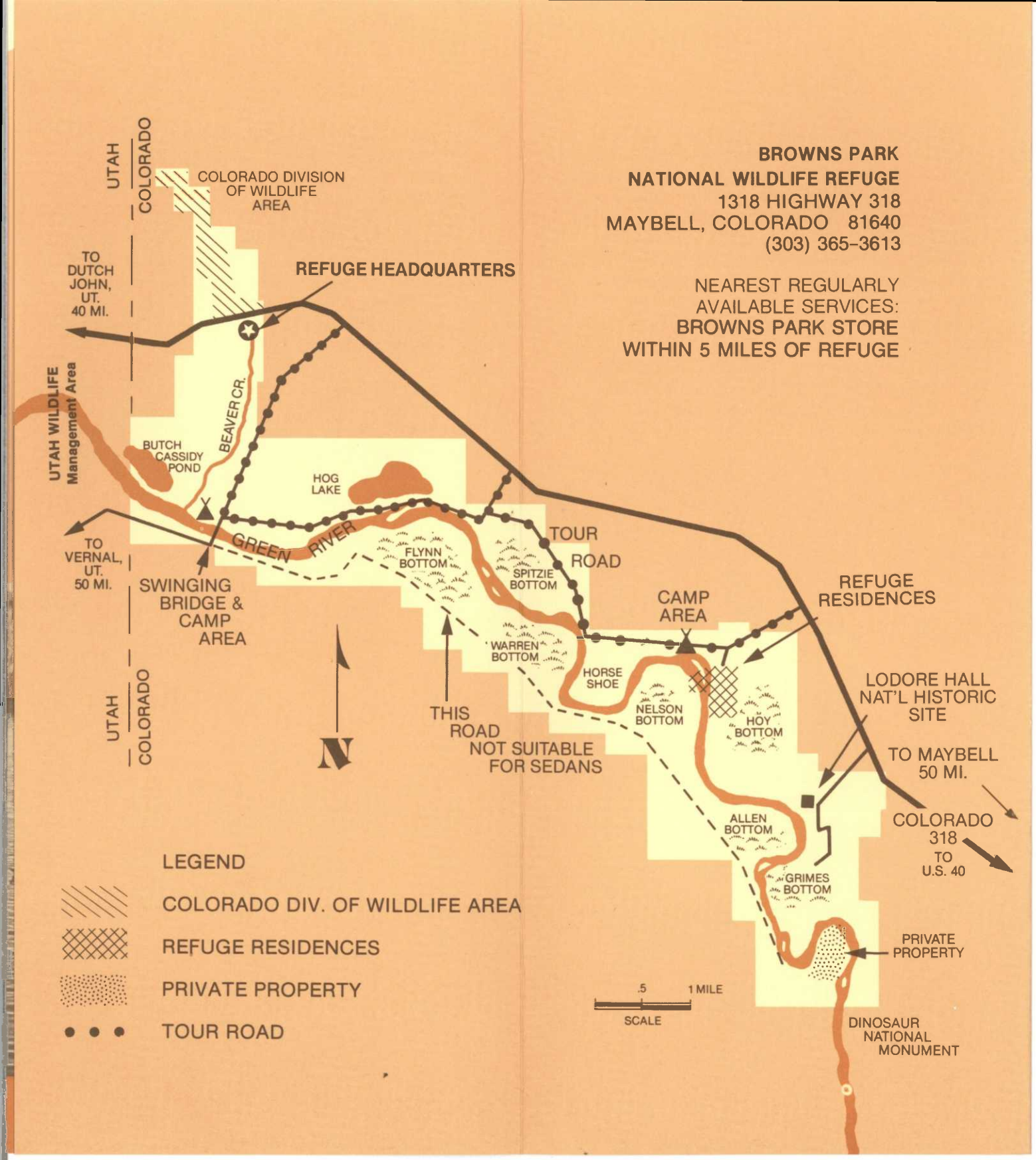
ENJOYING BROWNS PARK

Hikers, sightseers, and photographers are welcome year round. A graveled tour road provides ample opportunities to view wildlife and wildlife habitat.

Primitive camping facilities are provided at Swinging Bridge and Crook Campgrounds. This is remote country. Maybell, Colorado, and Vernal, Utah, are 50 miles away and Dutch John, Utah, is 40 miles. The Browns Park Store is within 5 miles of the refuge.

Hunting and fishing are allowed on the Refuge under State and Federal regulations. Deer and cottontails may be hunted in all areas except those posted, "Area Closed". Ducks, coots, and geese may be hunted along the Green River channel and within 100 yards of each bank. Hog Lake and Butch Cassidy Bottoms are open to waterfowl hunting in areas designated by green "Public Hunting Area" signs.

Left: Canada Goose - U.S.F.W.S. photo - Rex Gary Schmidt. Pronghorn Antelope - U.S.F.W.S. photo - Jim Creasy.
Below: Cattle Crossing Swinging Bridge - U.S.F.W.S. photo - Jim Creasy.


BROWNS PARK
NATIONAL WILDLIFE REFUGE
1318 HIGHWAY 318
MAYBELL, COLORADO 81640
(303) 365-3613
NEAREST REGULARLY AVAILABLE SERVICES:
BROWNS PARK STORE
WITHIN 5 MILES OF REFUGE
UTAH
COLORADO
COLORADO DIVISION OF WILDLIFE AREA
TO DUTCH JOHN, UT. 40 MI.
REFUGE HEADQUARTERS
UTAH WILDLIFE Management Area
BEAVER CR.
BUTCH CASSIDY POND
HOG LAKE
GREEN RIVER
TO VERNAL, UT. 50 MI.
SWINGING BRIDGE & CAMP AREA
FLYNN BOTTOM
SPITZIE BOTTOM
TOUR ROAD
CAMP AREA
REFUGE RESIDENCES
WARREN BOTTOM
HORSE SHOE
NELSON BOTTOM
HOY BOTTOM
LODORE HALL NAT'L HISTORIC SITE
TO MAYBELL 50 MI.
THIS ROAD NOT SUITABLE FOR SEDANS
ALLEN BOTTOM
COLORADO 318
TO U.S. 40
GRIMES BOTTOM
PRIVATE PROPERTY
.5 1 MILE
SCALE
DINOSAUR NATIONAL MONUMENT
LEGEND
COLORADO DIV. OF WILDLIFE AREA
REFUGE RESIDENCES
PRIVATE PROPERTY
TOUR ROAD

BIRDS OF BROWNS PARK NATIONAL WILDLIFE REFUGE

COLORADO

Most birds are migratory, therefore their seasonal occurrence is coded as follows:

SEASON

s	- Spring	March-May
S	- Summer	June-August
F	- Fall	September-November
W	- Winter	December-February

RELATIVE ABUNDANCE

a	- abundant	a species which is very numerous
c	- common	certain to be seen or heard in suitable habitat
u	- unusual	seen only a few times in a season
r	- rare	seen at intervals of 2 to 5 years
acc	- accidental	seen only once or twice

* Nesting has occurred on the refuge

LOONS-GREBES-CORMORANTS-HERONS-IBISES

	s	S	F	W
Common Loon	acc			
Horned Grebe	c	c	r	
Eared Grebe*	c	c	c	
Western Grebe*	u	u	u	
Pied-billed Grebe*	c	c	c	
White Pelican	u			
Double-breasted Cormorant	r			
Great Blue Heron*	c	c	c	
Cattle Egret	u	u		
Snowy Egret	u	c		
Green Heron	u			
Black-crowned Night Heron	u	u	u	
American Bittern*	c	c	c	
White-faced Ibis*	c	c	c	

SWANS-GEESE-DUCKS

	S	S	F	W
Whistling Swan	u		c	u
Canada Goose*	a	c	a	a
White-fronted Goose	r		r	
Snow Goose	u		u	u
Mallard*	a	a	a	c
Gadwall*	a	a	a	c
Pintail*	c	c	c	u
Green-winged Teal*	c	c	c	
Blue-winged Teal*	c	c	c	
Cinnamon Teal*	c	c	c	
American Widgeon*	c	c	c	u
Shoveler*	c	c	c	u
Wood Duck	r			
Redhead*	c	c	c	u
Ring-necked Duck*	c	c	c	u
Canvasback*	c	c	c	u
Greater Scaup	u		u	
Lesser Scaup*	c	c	c	u
Common Goldeneye	c	u	c	c
Barrow's Goldeneye	u		u	u
Bufflehead	c		c	u
White-winged Scoter			r	
Ruddy Duck*	c	c	c	u
Hooded Merganser	u		u	
Common Merganser*	c	c	c	c

VULTURES-HAWKS-QUAIL-RAILS-COOTS

Turkey Vulture*	c	c	c	
Northern Goshawk*	u	u	u	
Cooper's Hawk	u	u	u	
Sharp-shinned Hawk	u	u	u	u
Red-tailed Hawk*	c	c	c	
Swainson's Hawk		r		
Rough-legged Hawk				u
Northern Harrier*	c	c	c	u
Ferruginous Hawk	u			
Golden Eagle	c	c	c	c
Bald Eagle	c		c	c
Osprey	u	u	u	
Prairie Falcon	u		u	
Peregrine Falcon	r	r	r	
Merlin	u	u	u	
American Kestrel	c	c	c	

	s	S	F	W
Sage Grouse*	c	c	c	
Gambel's Quail*	u	u	u	u
Red-necked Pheasant	u	u	u	u
Chukar*	u	u	u	u
Sandhill Crane	c		c	
Virginia Rail*	u	u	u	
Sora Rail*	u	u	u	
American Coot*	c	c	c	

PLOVERS-SNIPES-SANDPIPERS-AVOCETS-PHALAROPES

					s	S	F	W
Semipalmated Plover	u		u	Wilson's Phalarope	c	c	u	
Killdeer*	c	c	c	Northern Phalarope	c	u		
Black-bellied Plover	acc							
Mountain Plover	u		u					
Common Snipe*	c	c	c					
Long-billed Curlew	r	r	r					
Spotted Sandpiper*	c	c	c					
Solitary Sandpiper	c		c					
Willet	c		c					
Greater Yellowlegs	u	u	u					
Lesser Yellowlegs	u	u	u					
Long-billed Dowitcher	c	c	c					
Marbled Godwit	u	r	u					
American Avocet	c	c	c					
Black-necked Stilt	r		r					

GULLS-TERNS-DOVES-OWLS-NIGHTHAWKS

	s	S	F	W
California Gull	u	u	u	u
Ring-billed Gull	u	u	u	u
Franklin's Gull	u	u	u	u
Bonaparte's Gull	u	u	u	u
Forster's Tern	c	u	u	u
Black Tern	u			
Rock Dove	r	r	r	r
Mourning Dove*	a	a	a	
Barn Owl	r			
Western Screech Owl		r		
Great Horned Owl*	c	c	c	c
Pygmy Owl	r			
Burrowing Owl	r	r		
Short-eared Owl	u	u	u	
Common Poorwill*	u	c	u	
Common Nighthawk*	a	a	a	

SWIFTS-HUMMINGBIRDS-KINGFISHERS WOODPECKERS-FLYCATCHERS LARKS-SWALLOWS

White-throated Swift*	c	c	c
Black-chinned Hummingbird*	c	c	c
Broad-tailed Hummingbird*	c	c	u
Calliope Hummingbird		r	r
Rufous Hummingbird		c	u
Belted Kingfisher*	c	c	u
Northern Flicker*	c	c	c c
Red-headed Woodpecker	r		
Lewis' Woodpecker	u		u
Red-naped Sapsucker	u		
Hairy Woodpecker	u	c	u
Downy Woodpecker	c	c	c
Eastern Kingbird	c	c	c
Western Kingbird*	c	c	c
Cassin's Kingbird	u	u	
Gray Flycatcher		u	
Ash-throated Flycatcher	r	r	r
Say's Phoebe*	c	c	c
Western Wood Pewee*	u	u	u
Olive-sided Flycatcher*	u	u	u
Horned Lark*	c	c	c a
Violet-green Swallow*	c	c	c
Tree Swallow*	c	c	c
Bank Swallow*	c	c	c
Northern Rough-winged Swallow*	c	c	c
Barn Swallow*	a	a	a

	s	S	F	W
Cliff Swallow*	a	a	a	

MAGPIES-CROWS-JAYS-TITMICE NUTHATCHES-WRENS

Black-billed Magpie*	c	c	c	c
Common Raven	u		u	
American Crow	c	c	c	c
Pinon Jay*	c	c	c	c
Scrub Jay				u
Clark's Nutcracker	u		u	u
Black-capped Chickadee				u
Mountain Chickadee				u
Plain Titmouse				u
White-breasted Nuthatch				u
Red-breasted Nuthatch				u
Dipper	u	u	u	
House Wren*	c	c		
Long-billed Marsh Wren*	c	c	c	
Canyon Wren	u			
Rock Wren	u			

MOCKINGBIRDS-THRUSHES-GNATCATCHERS-WAXWINGS

Mockingbird	u		u	
Gray Catbird	u	u	u	
Sagethrasher*	c	c	c	
American Robin*	c	c	c	c
Western Bluebird	u	u	u	
Mountain Bluebird*	c	c	c	
Townsend's Solitaire	u	u		
Blue-gray Gnatcatcher	u	u		
Ruby-crowned Kinglet	u			
American Pipit	u	u	u	
Bohemian Waxwing				r
Cedar Waxwing	u	r	u	u

SHRIKES-WARBLERS-BLACKBIRDS-TANAGERS

	s	S	F	W
Northern Shrike				u
Loggerhead Shrike	c	c	c	c
European Starling*	c	c	c	
Yellow Warbler*	c	c	c	
Yellow-rumped Warbler	c	c	c	
Black-throated Gray Warbler	u	u		
Northern Waterthrush	u			
MacGillivray's Warbler	u			
Common Yellowthroat*	c	c	c	
Yellow-breasted Chat*	c	c	c	
Wilson's Warbler	c	c	c	
House Sparrow	r	r	r	r

	s	S	F	W
Bobolink	u			
Western Meadowlark*	c	c	c	
Yellow-headed Blackbird	a	a	c	
Redwinged Blackbird*	a	a	c	
Tri-colored Blackbird	c	c		
Bullock's Oriole*	c	c	c	
Brewer's Blackbird*	c	c	c	
Common Grackle*	u	u	u	
Brown-headed Cowbird*	c	c	c	
Western Tanager*	u	u	c	

GROSBEAKS-SPARROWS-BUNTINGS

Black-headed Grosbeak		r		
Blue Grosbeak	u	u		
Lazuli Bunting	u	u		
Lark Bunting	r			
Snow Bunting				u
House Finch*	c	c	c	
Gray-crowned Rosy Finch				u
Pine Siskin*	c	c	c	
American Goldfinch*	c	c	c	
Green-tailed Towhee	r	r		
Rufous-sided Towhee*	c	c	c	
Savannah Sparrow*	c	c	c	
Vesper Sparrow*	c	c		
Lark Sparrow*	c	c		
Sage Sparrow*	c	c		

Tree Sparrow	u		u	u
Chipping Sparrow	c	c	c	
Harris' Spaarrow				r
White-crowned Sparrow*	c	c	c	
Lincoln's Sparrow	u	u	u	
Song Sparrow*	c	c	c	
Dark-eyed Junco	u	u	u	c