HART MOUNTAIN

NATIONAL ANTELOPE REFUGE

Plush, Oregon

ANNUAL NARRATIVE REPORT

Calendar Year 1992

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

HART MOUNTAIN NATIONAL ANTELOPE REFUGE

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Review and Approvals

Submitted By — Date 5/16/94

Refuge Manager — Date 5-13-94

Associate Manager
ID/OR/WA — Date 9/28/94

ARD
Refuges and Wildlife — Date 11/3/94

INTRODUCTION

The Hart Mountain National Antelope Refuge is a unit of the Sheldon-Hart Mountain Refuge Complex. Refuge Headquarters is situated 65 miles northeast of Lakeview, Oregon, location of the complex office.

Concern about overgrazing and the future of pronghorn antelope and sage grouse in Oregon led to the establishment of the Refuge in 1936 as a "..range and breeding ground for antelope and other species of wildlife." The effort was characterized by high public interest, which continues to this day. An area of about 240,000 acres was originally purchased from private owners or was withdrawn from public domain by Executive Order. The Shirk Ranch, located in the Catlow Valley, was purchased in 1945 under the Migratory Bird Conservation Act.

Located in the northern Great Basin, the 277,893 acre Refuge straddles Hart Mountain, a volcanic fault-block, which reaches 8060 feet elevation at Warner Peak. The escarpment of western Hart Mountain consists of canyons, cliffs, steep slopes and knife-like ridges which ascend 3,600 from the floor of the Warner Valley. Rock Creek and Guano Creek, the two primary watersheds, emanate from the gentler eastern flanks of Hart Mountain. East of the mountain, elevation declines; hills, low ridges, and plains comprise the relief.

Climate at Hart Mountain is characterized by temperate, continental, and semi-arid conditions. Precipitation is generated primarily from eastbound Pacific storms. Winters are generally cold and dry and summers are warm and dry. Precipitation pattern is bimodal; annual peaks occur during late fall and spring. Precipitation that falls between November-March builds snowpack above 6000 feet elevation and supports spring, creek, playa, and marsh water supplies. Initiation of herbaceous growth ranges from early March in lower elevations to late April along the mountain top. Cessation of herbaceous growth ranges from mid-June in lower regions to late July on the top of Hart Mountain. Herbaceous plants resume growth in fall when substantial precipitation occurs in August and September.

Vegetation of the Refuge is typical for moderate size mountains of the northern Great Basin. Prominent cover types include low sagebrush, big sagebrush, juniper woodland, mountain brush, playas, aspen, and meadow.

Like other isolated ranges, Hart Mountain acts as a critical source of wildlife habitat in the Great Basin based on its inherent diversity of habitats and consistent availability of water. Even during the pre-European era, Hart Mountain was prized by Native Americans as a source of game for hunting. Early homesteaders not only valued Hart Mountain for its game, but also as a preferred range for their livestock. Antelope and sage grouse were the featured species at the time of Refuge establishment and still command a great deal of public interest. The California bighorn sheep is another very popular species on Hart Mountain and represents a successful wildlife management story with its re-establishment in 1956 on this historic range. Bighorn sheep from Hart Mountain have been used to re-establish sheep populations throughout Oregon. The Refuge's mule deer, long known for trophy bucks,

continue to draw many visitors and hunters. While established and principally known as a big game Refuge, Hart Mountain provides abundant habitat for many other types of wildlife, including waterfowl.

Outdoor recreationists increasingly covet the same features wildlife value at Hart Mountain. The Refuge has long been known as a bird-watcher's mecca, but other types of recreation also are developing. Horsebackers and mountain bike riders are discovering the Refuge in greater numbers. Campers and hikers have always used Hart Mountain and their ranks are increasing. The Mountain offers something for all and the public continues to enjoy the variety that it offers.

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-Drought conditions continue for the sixth year in a row.

-Hart Mountain EIS/Comprehensive Management Plan continues.

-The Nature Conservancy acquires key Kiely inholdings.

B. CLIMATIC CONDITIONS

Drought conditions continued throughout much of 1992 and a Regional drought emergency was declared by the state of Oregon. Precipitation in the form of both rain and snow provided much needed relief during the latter part of the year. Precipitation for the months of September, October, November and December comprised 53% (6.79") of the year's total precip (12.76"). The year's total precip of 12.76" is 1.36" above our 51 year average. This much-needed moisture recharged many waterholes, creeks and springs. Rock Creek at headquarters had ceased flowing on June 22, 1992 and commenced flowing again on November 18, 1992.

Quarters 1 in snow. DA

Table 1. 1992 Hart Mountain temperature data

Month	High	Low	Average temperature (F) 1992	1940-91
January	56	5	34	27
February	66	16	36	31
March	61	21	38	32
April	74	13	44	38
May	85	18	53	45
June	93	26	60	53
July	94	32	61	63
August	95	25	65	62
September	86	22	56	55
October	79	12	49	46
November	64	3	34	37
December	43	-1	25	32

Table 2. 1992 Hart Mountain precipitation data

	Precipitation		Average Precip(in)
Month	Rain/Melted Snow(in)	Snow(in)	1940-1991
Jan	.65	1.5	.83
Feb	.08	1.7	.73
March	1.50	6.5	1.12
April	.47	-	1.10
May	.70	-	1.67
June	1.85	-	1.45
July	.69	-	.41
Aug	.03	-	.46
Sept	1.11	-	.67
Oct	2.24	-	.96
Nov	1.46	2.0	1.02
Dec	1.98	9.1	.98
Total	12.76	20.8(in)	11.40

C. LAND ACQUISITION

1. Fee Title

The Nature Conservancy acquired six tracts of private inholding, formerly owned by Kiely Brothers Ranch, totalling 2,985.83 acres. These six tracts of land lie within the executive boundary of the Refuge

and will be turned over to the Refuge as funds become available. The acquisition of these tracts will greatly facilitate Refuge management objectives.

An additional 2,773.66 acres of the Kiely estate, outisde of Refuge executive boundaries, were acquired by the Bureau of Land Management.

Table 3. Fiscal year 1992 The Nature Conservancy acquired tracts

Tract Name	Tract Number	Acres Acquired	Date Acquired
Stone Corral	568a	1068.34	9-29-92
Enquest	568i,j,k,m	720.95	"
Willow Creek	568c	160	"
Degarmo	568d	240	"
Barnhardy	568g	159.64	"
Homestead	568f	636.9	"

D. PLANNING

2. Management Plan

Much progress was made on the Draft Environmental Impact Statement (DEIS)/Comprehensive Management Plan (CMP) in 1992. The following is a chronology of the progress made on the document.

FEBRUARY: Completed an outline on Hart Mountain EIS.
Completed a draft of Chapter 1 (Introduction).
Drafted an introdu tion and several section for Chapter 2.
Developed outline of Chapter 3 Affected Environment.

MARCH: Developed outline for Management Plan.
Worked on Chapter 3 (Affected Environment) of EIS.
Started Chapter 1 of Resource Management Plan (RMP).

APRIL: Developed alternatives and objectives for EIS.
Held numerous IDT meetings.

MAY: Completed a draft of Refuge-wide objectives.
Five alternatives were decided on.

JUNE: The preliminary alternatives and objectives for Hart Mountain were revised and rewritten and sent to the consultants.

JULY: Revised EIS alternatives based on comments received from contractors.
Revised Refuge objectives based on comments from

contractors.

Revised timeline for Hart EIS (FEIS to be signed 12-93).

AUGUST: Began writing the biological and physical environment portion of the Affected Environment chapter.
Completed draft of Chapter 1 of the EIS.
Worked on Chapters 1 and 2 of the Management Plan.
Refuge objectives were re-evaluated and revised.

SEPTEMBER: Revised alternatives based on summer meetings information and 14 September IDT meetings.
Completed drafts of EIS Chapters 1,2 and 3.
Completed preliminary drafts of Chapters 1 and 2 of the Management Plan.

OCTOBER: Revised Chapters 1 and 2 of EIS.
Completed draft of the Mitigation Section of the EIS.

NOVEMBER: Continued writing on the physical and biological components of Hart Mountain for Chapter 3.
Work on the wildlife needs matrix for the EIS and Management Plan continued.

DECEMBER: Work on Chapter 3 of the EIS continued.
EIS alternatives were revised and incorporated livestock grazing recommendations submitted by the Liaison Committee.
Digitizing of upland and wetland vegetation cover types, watersheds, soils and roads for EIS maps continued.

3. Public Participation

A variety of federal, state, local, private entities, and individuals were contacted to participate in the NEPA process. Planning Updates were mailed to people on the mailing list. These meetings and mailings were designed to inform interested publics of the planning process (timeline, data gathering and results), and to obtain comments and suggestions from people. The following is a chronology of public participation activities leading up to the preparation of the EIS.

FEBRUARY: Planning Update #7 sent to public-identified significant issues and described results of campground workshop.

JULY: Meeting at Hart Mountain with Jim Yoakum (Wildlife Consultant), Dr. David Dobkin (Ecological Consultant), and Boone Kaufman (Range Ecologist, OSU)- to provide site specific information on wildlife-habitat relationships and habitat problems, and recommendations regarding management actions to improve or maintain specific habitats.

Meeting with former managers of Hart Mountain NAR- they provided Refuge staff with historic perspective of Refuge management and suggestions for future management.

AUGUST: Meeting with members of the Liaison Committee, OSU Department of Rangeland Resources, The Wilderness Society, Oregon Natural Resources Council, Oregon Natural Desert Association, and ODFW- to provide site specific information for use in alternative development.

SEPTEMBER: Meeting with Lakeview District BLM- obtained information on their concerns and on planning activities in which they would be interested in being involved.

OCTOBER: Planning Update #8 sent to public- identified new issue (wilderness and research natural areas), Refuge goals, and data collection.

Meeting with Liaison Committee, upon their request, to give them an update on progress being made on the EIS, and to provide suggestions on types of information and recommendations that could be used by the Service in developing the EIS.

Meeting with Lake County Chamber of Commerce- discussed progress being made on EIS and answered related questions.

DECEMBER: Chamber of Commerce submitted livestock grazing recommendations.

Former Hart Mountain managers' meeting on Hart Mountain. BLB L - R: Mike Smith - current Assistant Complex Manager, Bruce Wiseman, Mike Fisher, Earl Kisler, Ken Voget, Marv Kaschke, Pete Carter, Barry Reiswig - current Complex Manager, Alicia Cox - current Administrative Support Assistant, Rod Blacker, Bill Pyle - current Complex Biologist

Meeting with Liaison Committee, OSU, ODFW, ONRC,
The Wilderness Society, ONDA

5. Research and Investigations

Hart Mountain NR92 - "Habitat Use and Population Characteristics of Bighorn Sheep on Hart Mountain National Antelope Refuge, Oregon"; David C. Payer, M.S.; OSU.

Thesis Abstract: I studied habitat use, productivity, and sex and age structure of California bighorn sheep (*Ovis canadensis californiana*) on Hart Mountain National Antelope Refuge, Oregon, from 7 April 1990 to 31 August 1991. The population included >300 sheep and has provided a source of animals for transplant and hunting. I identified 2 ewe ranges and 1 ram range on Hart Mountain (HM), and 1 range each on Poker Jim Ridge (PJR). Ram and ewe ranges overlapped, but sheep segregated sexually during spring and summer. In 1990, herd ranges were smaller in spring ($\bar{x}$ = 31.2 and 7.63 km^2 for rams and ewes, respectively) than summer ($\bar{x}$ = 71.3 and 11.45 km^2 for rams and ewes, respectively). Ram ranges were always larger than ewe ranges. Ewes on PJR migrated to a HM range in June 1990 and July 1991, resulting in greater sheep density on this range (24.5 and 34.7 bighorn/km^2 in 1990 and 1991, respectively) than the other HM ewe range (5.3 and 8.9 bighorn/km^2 in 1990 and 1991, respectively). These ewes returned to PJR by November of both years. the other sheep herd expanded into contiguous areas in summer. Fidelity to specific ranges appeared high.

Water was a limited resource on PJR, and its availability affected sheep distribution there. I observed PJR rams at water sources $\leq$7 km from escape terrain. Water and escape terrain were interspersed and not limited on HM. Seasonal changes in ewe distribution on JM reflected

changing physiographic requirements associated with lambing. Rams on both ranges used habitats including western juniper (*Juniperus occidentalis*); ewes seldom did.

There were 76.8-85.4 rams:100 ewes, and 45.3-52.2% of rams had ≥3/4 curl horns. Twenty-one rams aged 3-9 yr were radio-collared and monitored ≤3 yr in this and a related study. Only 4 mortalities occurred, all from hunting. Ram harvest could be increased without affecting productivity.

Lamb:ewe ratios did not differ between summer 1990 and 1991 ($\bar{x}$ = 51.8 lambs:100 ewes and 53.3 lambs:100 ewes in 1990 and 1991, respectively, P = 0.76), and did not differ between ranges in either year (P = 0.14 and 0.26 in 1990 and 1991, respectively). Only 50% of lambs alive in August 1990 were still alive the following summer).

Maintaining high productivity in this population will require continued removals of animals from all sex and age classes. Habitat protection and improvement is also indicated; special attention should be given to water availability and vegetative structure.

Hart Mountain NR92 - "Habitat Use by Female Sage Grouse During the Breeding Season in Oregon"; Final Report; John A. Crawford, Ph.D., Michael A. Gregg, M.S., Martin S. Drut., M.S., Anita K. DeLong., B.S.,; OSU.

Executive Summary: This study was initiated in 1988 and completed in 1992. Objectives were: (1) to determine use and selection of cover types and habitat components by sage grouse hens during nesting and brood rearing in

southeastern Oregon and (2) to compare habitat use and selection between successful and unsuccessful hens for nesting and brood rearing. The project used 2 study areas, Hart Mountain NAR, and Jackass Creek, a BLM area in western Harney County. Sponsoring organizations included the Bureau of Land Management, Oregon State University, and the Fish and Wildlife Service.

Study results disclosed that the amount of grass cover and height differentiated successful sage grouse nests from unsuccessful nests. Successful sage grouse nests had significantly more grass cover >18 cm in height than depredated nests, $\bar{x}$=18% and $\bar{x}$=5%, respectively. The relationship between the grass component of the habitat and sage grouse nesting success implied that removal of grass cover may negatively influence sage grouse productivity. Inadequate grass cover at nests may result in reduced nest concealment and increased nest predation. The principal land management practice on HMNAR that affects grass cover and height is grazing by domestic livestock.

Hart Mountain NR92 - "Habitat Use and Reproductive Success of Female Sage Grouse in Relation to Livestock Grazing at Hart Mountain Antelope Refuge, Oregon; Annual Report; John A. Crawford, Ph.D., and Anita K. DeLong, B.S.; OSU.

Annual Report: In 1992, the Refuge contracted OSU to continue sage grouse research on HMNAR. The goal of this research was to provide a

better understanding of the influence domestic livestock grazing on sage grouse productivity on HMNAR. The objectives were: 1) to compare the use and selection of cover types and habitat characteristics within cover types (particularly grass cover) by breeding female sage grouse during 1989 and 1990 (years of domestic livestock use at HMNAR) with 1991 and 1992 (years of no domestic livestock use at HMNAR), and 2) to compare reproductive success of sage grouse during 1989 and 1990 with 1991 and 1992.

Twenty-eight sage grouse hens, 9 yearlings and 18 adults, were trapped and equipped with radio transmitters during the spring of 1992. In 4 field seasons, 167 hens were radio-collared at Hart Mountain. Hens were trapped near Hilltop lek, Swede lek, Flook lek, Lookout lek, Paxton's lek, and Spanish lek.

In 1992, 13 of 22 (59%) radio-collared hens initiated nests; of these, 2 (15%) hens renested after initial losses. Of 15 nests, 3 (20%) nests were successful, 11 (73%) nests were depredated and 1 (7%) incomplete nest was abandoned. Of 3 hens that successfully hatched a brood, 1 hen with a brood 2 weeks of age was found dead (probably killed by a great-horned owl) and 1 hen successfully recruited a brood into the August population. Radio contact was lost with a third hen in June when her brood was 4 weeks of age. Consequently, this hen was omitted from analysis of brood success.

Hart Mountain NR92 - "Relationships between Vegetation Structure and Predation Rates of Artificial Sage Grouse Nests"; John A. Crawford, Ph.D. and Anita Kang DeLong, B.S.; OSU.

Summary of Annual Report: Objectives were: (1) to compare relative predation rates of artificial sage grouse nests in 6 structural types that differed in amounts of nest concealment provided by shrub and grass cover and (2) to identify predators of sage grouse nests. Field work was concluded in 1992.

Artificial nests were placed throughout the sage grouse nesting area defined by nest locations of the radio-equipped hens. Nests were placed in 6 structural types defined by: nest shrub height (low <40 cm and medium 40-80 cm) and grass cover (sparse <12%, medium 12-25%, and dense >25%). These cover types conformed to nesting criteria used by Mike Gregg, who described the relationship between nesting success and herbaceous cover of radio-fitted hens.

One-hundred-eighty nests were set between April and July 1992 in three 21-day periods, representing early, late, and renesting periods of sage grouse. Nests were systematically located near roads. Nest sites were selected during the day; eggs and timers were placed at night. Shrub intercept cover, grass and forb cover, grass and shrub height, and concealment were sampled at nests after the 21-day period had elapsed. Nest predators were assessed with hair catchers and automated cameras places near nests.

Preliminary results suggested that nests placed in medium shrub cover within dense grass cover were less likely to be depredated than nests placed in other cover types. In short shrub cover, nest survival was

independent of grass cover. These results paralleled Mike Gregg's results (undepredated nests had greater cover of tall grass genera and shrub cover of medium height than undepredated nests).

Hart Mountain NR92 - "Response of Brood-rearing Habitat of Sage Grouse to Prescribed Burning in Oregon"; Bill Pyle, M.S.; OSU-FWS.

Thesis abstract: Decline of western sage grouse (*Centrocercus urophasianus phaios*) in Oregon may be related to the reduced availability of foods in upland sagebrush (*Artemisia*)-grasslands used for brood-rearing. The goal of this study was to determine primary foods of chicks and the short-term response of brood-rearing habitat to prescribed burning at Hart Mountain, Oregon.

Analysis revealed that food use by 44 chicks and availability at collection locations differed ($P > 0.001$) among for and insect taxa. Eleven forb and insect genera were used selectively (primary foods) and collectively composed 58% of the diet by aggregate mass. Primary foods included Cichorieae (*Crepis* sp., *Agoseris* spp., *Taraxacum* sp.), milkvetches (*Astragalus* spp.), microsteris (*Microsteris* sp.), desert-parsley (*Lomatium* spp.) and ground-dwelling beetles (Scarabaeidae, Tenebrionidae). Compared with 1-5 week-old chicks, 6-10 week-old chicks consumed less ($P < 0.05$) annual forbs (36 and 14%) and ground-dwelling insects (32 and 16%) but more perennial forbs (30 and 55%) and sagebrush (2 and 16%) by aggregate mass.

Response of brood-rearing habitat to prescribed burning was evaluated in sagebrush-bitterbrush (*Purshia tridentata*) communities with a randomized block design established in stands where shrub cover exceeded 35%. Within blocks, habitat response was evaluated for 2 growing seasons on 4 plots used as controls, 3 plots burned in November 1987, and 4 plots burned in March 1988. Fall burning increased ($P < 0.05$) frequency of Cichorieae. Other primary foods, including microsteris, desert-parsley, and ground-dwelling beetles, were not influenced by burning. Additionally, spring and fall burning reduced shrub cover and increased total forb cover and diversity, but grasses and insect orders were not substantially influenced.

Although prescribed burning increased habitat heterogeneity, its utility may be limited as a food enhancement practice. Primary forbs and insects responded inconsistently and sagebrush, which serves as both food and cover, responded negatively. Evaluation of brood-rearing habitat should be based on several criteria including an understanding of the interaction between land-use practices and availability of primary foods of chicks.

Hart Mountain NR92 - "Avian Use and Habitat Condition of Riparian Habitats at Hart Mountain National Antelope Refuge, 1991-92"; Progress Report II to P.O. 10181-3-1083; David S. Dobkin, The High Desert Ecological Institute.

Executive Summary: This report presents a further analysis of riparian avian communities and populations in relation to vegetation in riparian habitats on Hart Mountain National Antelope Refuge during the 1991 and 1992 breeding seasons. The data contained herein are derived from 46

permanent plots established in 1991 and surveyed repeatedly throughout the breeding seasons of 1991 and 1992. Multivariate analyses of complete vegetation data and of avian species in relation to riparian vegetation provide a finer discrimination of species/habitat affinities.

In addition, this report summarizes comparison between eastside and westside avifaunas based on foot surveys of entire drainages. A significant number of species were detected only on east or west sides of Hart Mountain. Most such species are associated with habitat characteristics (canyon walls, higher gradient streams, juniper woodland, pines, riparian meadows) that are largely or entirely restricted to the immediate vicinity of riparian areas on only one side of Hart Mountain.

There are striking differences in the relative abundances of several obligate riparian species found in eastside and westside riparian avifaunas. MacGillivray's Warbler and Lazuli Buntings are relatively abundant in westside riparian habitats but nearly absent on the east side, while Yellow Warblers are abundant on the east side but relatively sparse in westside riparian areas. These differences correspond to the distribution of dense, riparian shrub thickets. This high-quality riparian habitat is almost completely absent from eastside drainages but is relatively abundant in westside canyons.

Hart Mountain NR92 - "Evaluation of Resource Condition of Riparian Areas of Hart Mountain NAR"; Bill Pyle and Blythe L. Brown; FWS.

Summary: Riparian habitats increasingly are evaluated as barometers for management because of their natural resource values including fish and wildlife habitat. We evaluated resource condition of Refuge riparian habitats in 1992 because of the growing concern about the health of riparian areas, general absence of baseline data, and need to collect information for the Hart Mountain EIS process.

Each valley unit of a stream was walked in its entirety; riparian conditions were observed, described, and photographed. After each valley unit was traversed and riparian characteristics were described, an observer evaluated resource condition. Assessment of riparian condition involved evaluation of 5 categories of information and selection of the rank value that best fit observed and expected riparian condition described within categories. Development of categories used in the rating was based on a synthesis of information described in Fish and Wildlife Service, Forest Service, and Bureau of Land Management technical reports.

A total of 3867 acres was surveyed, representing about 95% of the area of stream-associated riparian zone and 57% of the area of riparian habitat of the Refuge (Table 4). Within this area, potential dominant vegetation of valleys comprised sedge-rush-bluegrass (33%), quaking aspen (18%), willow (18%), mixed deciduous shrub (15%), bluegrass-ryegrass (14%), and other (2%) by percentage miles. Resource condition differed within and among riparian vegetation types (Table 5). Low and moderate resource conditions were prevalent among all vegetation types, except mixed deciduous shrub. Low and moderate conditions comprised 72% of quaking aspen, 79% of willow, 87% of bluegrass-ryegrass, and 79% of

sedge-rush-bluegrass, but only 39% of mixed deciduous shrub. Low and moderate conditions are characterized by streambank erosion, deformation of stream channels, lowered water tables, reduction in establishment, growth, and structural diversity of herbaceous and woody wetland vegetation, and increase in upland vegetation such as sagebrush. Management actions that reestablish riparian vegetation, raise water tables, and increase habitat diversity will increase wildlife diversity in riparian settings.

Table 4. Characteristics of principle riparian systems of Hart Mountain NAR.

Stream	Watershed (acres)	Valley riparian (acres)	Valley riparian (miles)	Valley units (no.)
Rock Creek	79,254	1,641	60	65
Guano Creek	21,887	1,848	23	47
Deer Creek	13,717	35	3	6
Warner Creek	7,219	230	4	8
Degarmo Creek	3,924	57	7	9
Hart Creek	2,147	17	4	5
Potter Creek	1,178	17	3	7
Juniper Creek	836	12	2	5
Cooper Creek	546	10	1	4
Total	130,708	3,867	107	156

Table 5. Percentage miles of resource condition classes of vegetation types, Hart Mountain NAR.

Resource condition	Vegetation type[a]					
	QA	MDS	W	BR	SRB	O
Low	41	19	58	78	50	82
Moderate	31	20	54	9	29	0
High	17	11	7	13	47	0
Very high	11	50	14	0	8	18

[a] Expected potential dominant vegetation of site in very late stage of site progression: QA = quaking aspen/graminoid-forb; MDS = mixed deciduous shrub/graminoid-forb; W = willow/graminoid-forb; BR = bluegrass-ryegrass; SRB = sedge-rush-bluegrass; O = other (mountain shrub/grass, grass-forb/willow, and grass/sagebrush).

Hart Mountain NR92 - "Upland Vegetation Cover on Hart Mountain National Antelope Refuge, 1989-1992"; Don DeLong; FWS.

Summary: An assessment of upland vegetation condition was needed for developing a new management plant/Environmental Impact Statement for Hart Mountain National Antelope Refuge. A total of 411 plots were randomly established and sampled to assess cover characteristics in 7 vegetation types including wyoming big sagebrush, low sagebrush, mountain big sagebrush, basin big sagebrush, wheatgrass, black greasewood and western juniper. Of the total 411 plots, 304 were sampled by OSU personnel (Gamebird Research Program) and 107 were sampled by FWS personnel.

Analysis of 1989-92 data indicated that high shrub cover (18-38%) characterized late succession conditions in wyoming big sagebrush, low sagebrush, mountain big sagebrush, and sagebrush-bitterbrush, even after differences in site potential were factored in. Comparison of cover data collected in 1968 (23 plots) and 1992 (88 plots) disclosed that shrub cover has not changed substantially between years in these vegetation types (Table 6). Apparently, this amount of shrub cover is considered excessive for late succession stands because such levels of shrub cover limit establishment, growth, and cover of perennial grasses and forbs due to competition. Land-use practices that restore the balance of forb, grass, and shrub cover in late succession stands will improve the availability of food and cover for wildlife.

Table 6. Shrub, grass and forb cover of four vegetation types (in late succession) on Hart Mountain NAR, Oregon in 1968 and 1992.

	Shrub Cover		Grass Cover		Forb Cover		Sample Size	
Vegetation Type	68	92	68	92	68	92	68	92
Wyoming Big Sagebrush	25	23	10	5	2	2	7	38
Low Sagebrush	24	25	9	11	10	8	8	37
Mountain Big Sagebrush	31	31	43	18	13	11	4	9
Sagebrush-bitterbrush	45	40	28	15	10	31	4	4

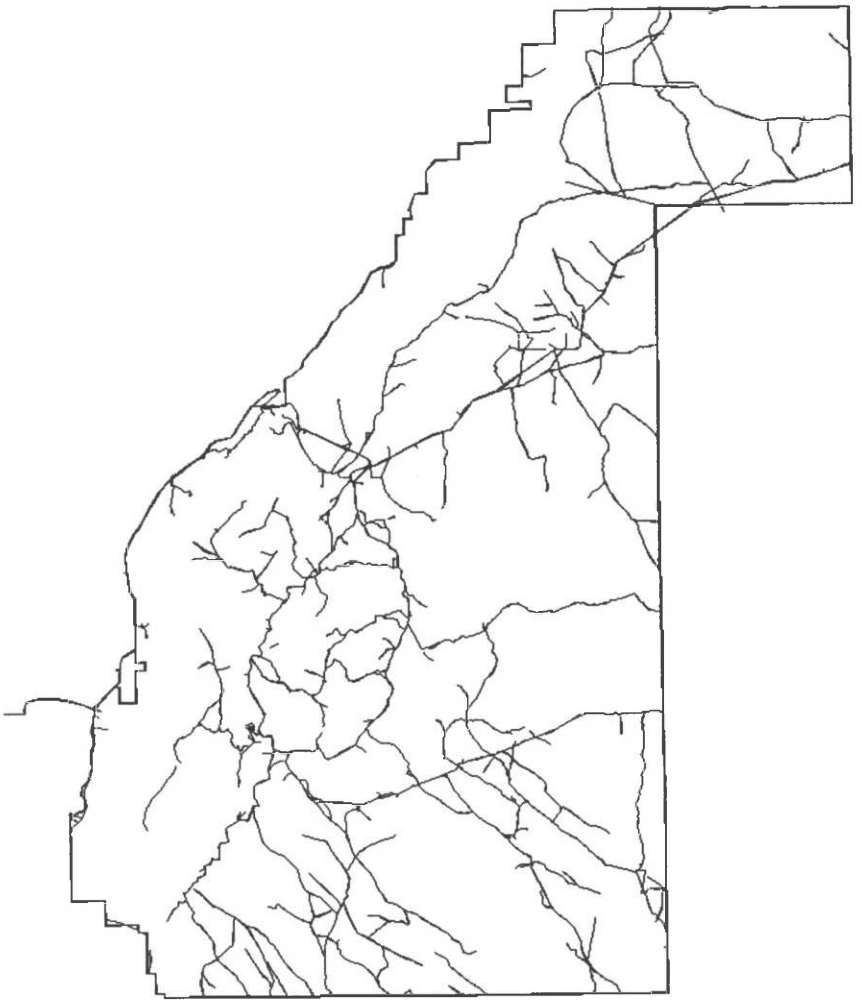
Hart Mountain NR91 - "Riparian habitat condition and distribution of fish species in Guano Creek at Hart Mountain National Antelope Refuge"; Kim Jones and Pam Dupee, M.S.; ODFW.

Summary: The Oregon Department of Fish and Wildlife conducted quantitative habitat and fish surveys in Guano Creek, as part of a statewide program to establish a baseline for monitoring fish populations and habitat in Oregon. The information is used for habitat protection activities, stream restoration projects, basin management plans, and habitat and fish population monitoring. An assessment of the condition of riparian habitat and the fishery of Guano Creek was needed to foster development of the Management Plan and EIS for the Refuge.

The objective of this project was to determine riparian habitat condition and fish species occurrence an distribution in the upper 10 miles of Guano Creek (Refuge Boundary to Blue Sky).

The Guano Creek Survey used methods developed by Restoration & Enhancement Aquatic Inventory Project of ODFW. Segments of stream, each with similar physical attributes (eg. valley forb, channel form, gradient, etc.), were sampled. Single-pass electro-shocking without blocknets was the method used to sample fish. Fish numbers and sizes of each species captured were recorded.

A total of 16 miles of Guano Creek was surveyed between the Refuge Boundary and headwaters during 17 June-July 1992. The stream was dry or puddled in reaches 1-3 (to Green Springs). In reaches 4 and 5, Lahontan cutthroat trout were the only fish species found between stream units 156-483. The trout averaged 8 inches (2-12 in) in length. Silt and organics were the dominant substrate type in reaches 1-4 and gravel was the dominant substrate type in reach 5. Although livestock grazing had not occurred in any reach since 1990, only reach 4 had good undercut bank cover. Reach 5 was the only reach that contained wood in the active channel but the number of pieces and volume of wood/328 feet was poor. Habitat and fish data collected have been entered into a database and analysis of the data is presently underway.



Road map of Hart Mountain NAR (includes open and closed roads).

6. Other

A comprehensive road inventory was conducted using aerial photos and ground surveys. Roads were then mapped using the new AutoCad computer program. There are approximately 363 miles of roads on the Refuge (see above map). 243 miles are open to public vehicle travel, either seasonally or year round. 78 miles are closed to all vehicle travel and 42 miles are reserved for administrative use. Only 40 miles of the open roads are maintained by grading. Most Refuge roads are rough jeep trails and require high clearance four-wheel drive vehicles. Many are in locations which are damaging to wildlife habitat. The Hart Mountain road system is one of the items being considered for the EIS and new management plan.

E. ADMINISTRATION

1. Personnel

1. Betsy L. Couch, Refuge Manager, GS-9 PFT, promoted to GS-11 12/3-91, transferred 5-23-92.
2. Daniel M. Alonso, Refuge Manager, GS-9 PFT, EOD 9-28-92.
3. Doug Leehman, Engineering Equipment Operator, WG-8 PFT.
4. Mike Webster, Laborer, WG-3 TFT, EOD 4-6-92.
5. Bill Pyle, Wildlife Biologist, GS-9 PFT.
6. Blythe Brown, Biological Technician, GS-5 TFT promoted to Wildlife Biologist, GS 7. Acting Refuge Manager 8 & 9-92.
7. Adam Rich, Wildlife Biologist, GS 7 TFT seasonal EOD 5-18, departed 11-27.
8. Ron Lange, Biological Technician, GS 3 TFT, and volunteer TFT.
9. Anita DeLong, Co-op Student through Oregon State University.

Table 7. On Board Strength.

Fiscal Yr	Permanent Full-time	Temporary Full-time	Total FTE
1992	2	4	4.7
1991	1.8	6	4.6
1990	2	5	5.2
1989	2	3	3.0
1988	2	3	2.9
1987	2	1	2.4
1986	2	1	2.4
1985	2	1	2.3

The Complex experienced an increase in staff in 1991 and 1992 to assist in the preparation of Hart Mountain's Environmental Impact Statement. An addition of eight temporary full-time position were added to the Complex office, Hart Mountain and Sheldon.

Mike Smith, Assistant Complex Manager, suffered massive head injury on November 26, 1992 in a motor vehicle accident. Mike underwent surgery for his injuries and entered a rehabilitation program to aid in his recovery.

Lakeview Complex Office Administration. HN

Blythe L. Brown, Biologist, GS 7, TFT.
Barry Reiswig, Complex Manager, GS 12, PFT.
Don C. DeLong, Jr., Fish & Wildlife Biologist, GS 9, TFT.
William H. Pyle, Wildlife Biologist, GS 9, PFT.
Vicki M. Rosette, Office Automation Clerk, GS 4, TFT.
Ruth Anne Miller, Outdoor Recreation Planner, GS 5, TFT.
Anita Kang DeLong, Student Trainee (Wildlife Bio), GS 7, PFT.
Alicia D. Cox, Administrative Support Assistant, GS 5, PFT.
Gina Proctor, Purchasing Agent, GS 5, PFT.
Michael F. Smith, Assistant Complex Manager, GS 11, PFT (not pictured).
John Morton, Fire Management Officer, GS 11, PFT (not pictured).

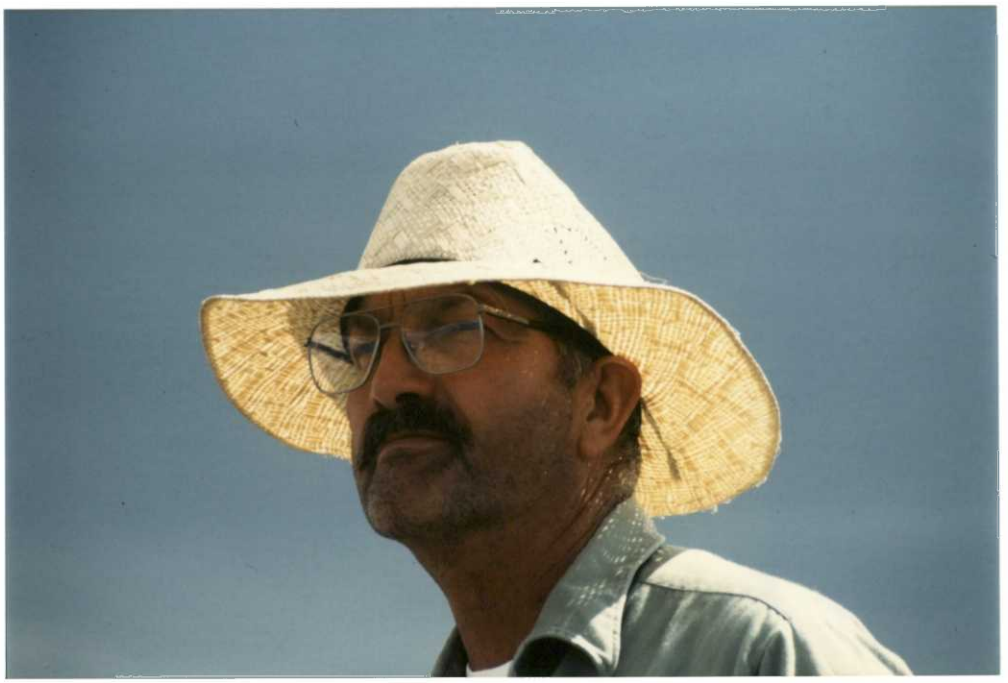
4. Volunteer Program

Volunteers contributed 2,778 hours in FY '92. The major emphasis was directed toward collecting biological baseline data for the management plan. Approximately 450 hours of maintenance activities, primarily in the way of fence removal, were also contributed.

Operation and administrative costs of the program totaled $7,480, a salary savings of $17,357 (based on a GS-5 level). See Table 8 for a list and hours of volunteers.

Table 8. FY 1992 Volunteers on Hart Mountain.

Name	Work Dates	Hours	Days
Jennifer Pretare	5-21 - 8-11	656	82
Jeff Aherns	5-18 - 8-13	512	64
Mike Sevigny	6-29 - 9-18	440	55
Jennifer Neat	6-29 - 9-18	440	55
George Reynolds	Feb - Sept	240	55
Ron Lange	10-1 - 10-30	160	20
Barb Smith	April	30	3
Jennifer Smith	April	30	3
Joshua Smith	April	30	3
BLM	Oct - Nov	240	30



Volunteer George Reynolds
An inexhaustable resource.

Seasonal Biologists and Volunteers in Hot Springs.
Jeff Aherns, Adam Rich, Jenny Pretare, Ron Lange.

Full staff meeting at Little Sheldon, former manager's residence on Sheldon NWR. BS

1st row, L-R: Kate Rice, Gina Proctor, Vicki Rosette, Ruth Anne Miller, Jenny Vincent. 2nd row: Beth St. George, Doug Leehmann, Barry Reiswig, Bill Pyle, Adam Rich, Jeff Ahrens, Mike Smith, Anita DeLong, Alicia Cox. 3rd row: Dale Fink, Lane Slover, Hugh Null, Dave St. George, Tom Puetz, Jenny Pretare, Blythe Brown, Ron Lange, John Morton, Don DeLong, Mike Webster, Gary McFadden, Gina Simontacchi, Bob Crumrine. 4th row: Steve Lightle, Dan Shanklin, Cindy Shanklin, Pat Goehring.

5. Funding

Funding again increased slightly (1.9%) over the last fiscal year (see Table 9). A total of 117k was received for Complex wetlands projects and an additional 200k for management plans at Hart and Sheldon.

Table 9. Budget breakdown for the complex (in thousands).

	Fiscal year		
Item	FY 90	FY 91	FY 92
1261	402	202	599
1262	157	402	202
6860	55	50	50
8610 (spent)	-	3	4
Challenge Grant	-	43	-
Main Man	118	200	-
9110	118	200	-
9120	314*	50	48
1230	-	2	232
Total	1046	1114	1135

*Includes all fire funding.

6. Safety

Jim McNulty and Gary Wilson, RO Safety, visited the Refuge on the 22nd of May. They reviewed and made safety recommendations on the bunkhouse, office basement and generators.

Numberous safety measures were carried out throughout the year:

-All chimney flues were cleaned.
-Furnaces were inspected and cleaned.
-Vehicles were checked monthly for safety equipment.
-Smoke alarms were tested routinely.
-Fire extinguishers were checked and recharged, as needed.
-The office basement was cleaned out and flammable liquids moved to the oil/paint shed.

F. HABITAT MANAGEMENT

1. General

a. Habitat Conditions

Severe drought was caused by the dry winter, spring and summer. A regional drought emergency was declared by the state of Oregon. At Hart Mountain, the growing season was short and plants showed reduced productivity. Few playas, such as the Cat Lakes, were flooded in the spring. Between August and October, perennial water on Rock Creek was limited to headwater springs and one mile of stream flow between the Barnhardi and Hot Springs campground. Flow on Guano Creek was limited to headwater springs and Post Meadows between August and September. Consequently, availability of food, water and cover for wildlife was diminished in 1992, compared with 1991.

Bill Pyle - Extensive riparian evaluation, Rock Creek, 6-92. BLB

b. Habitat Classification and Aerial Extent

In response to information needs of the EIS, vegetation types and other land features (syn.u wildlife habitat) were mapped at a 7.5' scale, map data was digitized on computer, and acreages were determined by analysis with a Global Information System. Although we considered using data from previous mapping efforts, review of this information indicated that important riparian habitats and habitat interspersion were not adequately characterized, primarily because of the large map scales used.

Therefore, we described 18 vegetation types in uplands and 11 vegetation types in wetlands based on potential vegetation and existing site conditions. Other land features such as rock outcrops (terrestrial non-vegetated, stream channels (aquatic non-vegetated), and sediment-laden water of playas (aquatic non-vegetated) also were described.

In uplands, 95% of area of vegetation comprised shrub-dominated low sagebrush, Wyoming big sagebrush and mountain big sagebrush (Table 10). A total of 64 succession stages were described for the 19 upland habitats. Analysis disclosed that shrub and tree-dominated stages of late succession comprised 93% of Refuge upland (non-vegetated areas not included). Within areas of very late succession, 79% comprised habitats that were encroached by western juniper, most of which was less than 100 years old. Consequently, landscape and habitat diversity are relatively low because of the dominance of late stages of succession. This situation resulted mainly because of direct and indirect (i.e., livestock grazing) suppression fire spread.

Table 10. Acres of succession stages of upland vegetation types, Hart Mountain NAR.

Wildlife habitat	Early	Mid	Late	Very late	Total
Basin big sagebrush	0	0	3,168	-	3,168
Big sagebrush-bitterbrush	2,430	1,748	3,486	3,242	10,096
Black greasewood	0	0	701	-	701
Black sagebrush	0	0	648	-	648
Fescue	0	-	149	-	149
Low sagebrush	6,900	1,182	89,328	7,466	105,506
Mountain big sagebrush	528	1,857	19,003	2,475	23,863
Mountain shrub	87	40	2,194	629	2,950
Mountain mahogany	0	0	0	1,449	1,449
Ponderosa pine	0	0	69	0	69
Salt desert shrub	0	0	1,546	-[a]	1,546
Spiny hopsage	0	0	374	-	374
Squirreltail	0	-	163	-	163
Western juniper	0	0	0	4,890	4,890
Wheatgrass	0	-	2,800	1,330	4,130
White fir	0	0	0	13	13
Winterfat	0	0	1,199	-	1,199
Wyoming big sagebrush	1,489	0	88,087	1,552	91,128
Terrestrial non-vegetated	5,366	-	-	-	5,366
Total	11,434	5,457	218,281	23,046	258,218

[a] Dash indicates that the succession stage is not represented in that vegetation type.

Twelve riparian and playa wetland vegetation types were described and comprise 6% of the Refuge land area (Table 11). Mixed deciduous shrub, willow bluegrass-ryegrass, and sedge-rush-bluegrass are associated mainly with riparian areas. Quaking aspen is associated with riparian areas and northern exposures of Hart Mountain. Other wetlands are associated with seasonally-inundated playas where pondweed, rush-spikerush-arnica, and poverty-weed primrose habitats are prevalent. Thirty-nine progression stages were described for wetland habitats. "Progression" refers to characteristic dominant vegetation associated with different flooding regimes in playas and different levels of water tables in riparian wetlands.

In riparian vegetation types, progression stages comprised 46% late stages, 42% early-mid stages, and 11% very late stages. Very late stages of progression characterize the resource potential of healthy riparian areas. Early, mid and late stages of progression are characterized by various levels of change in morphology of stream channels that lower water tables, reduce wetland vegetation, and foster encroachment of upland vegetation. Progression stages of playa vegetation types comprised 5% early-mid, 91% late, and 4% very late. Although late stages characterize the site potential of most playa habitats, vegetation composition changes in response to climatic variation such as periodic drought. In managed wetlands such as the Shirk Ranch, potential vegetation and habitat are regulated by control of water supply and distribution.

Table 11. Acres of progression stages[a] of wetland vegetation types, Hart Mountain NAR.

Wildlife habitat	Early	Mid	Late	Very late	Total
Playa wetlands					
Aquatic non-vegetated	234	-[b]	-	-	234
Cattail-bulrush	0	454	15	-	469
Pondweed	615	-	132	-	742
Poverty weed-primrose	14	-	2394	-	2408
Rush-spikerush-arnica	0	0	1919	-	1919
Saltgrass	0	0	19	-	19
Silver sagebrush	0	126	2320	106	2552
Riparian wetlands					
Bluegrass-ryegrass	0	648	223	82	953
Mixed deciduous shrub	10	24	88	90	212
Sedge-rush-bluegrass	383	791	2286	285	3745
Quaking aspen	622	124	456	263	1465
Willow	134	128	57	36	355
Total	2012	2295	9909	862	15078

[a] Progression is defined as the change in structure of vegetation type associated with a change in water availability to plants.

[b] Dash indicates that the progression stage is not represented in that vegetation type.

c. Plant List

All historic records of plants reported from the Refuge were reviewed, a database was developed, and data was summarized for use in the EIS process (Table 12). A total of 475 vascular plants are known to occur on the Refuge, including 9 new species of grasses and sedges identified by Dr. Karl Holte, Idaho State University, and added to the herbarium in 1992. A complete list would likely yield 600-700 species. Forbs and graminoids are the dominant lifeforms. Most of the introduced species are not aggressive and exist in isolated populations. Those that represent the largest threat to native species include cheatgrass (*Bromus tectorum*) and white-top (*Cardaria draba*).

None of the species known to occur is federally threatened and endangered, and *Eriogonum prociduum* is the only candidate species under review for possible classification. The single site that harbored prostrate buckwheat on the Refuge was identified by The Nature Conservancy in 1991, and afforded protection by development of a barricade of rocks to prevent vehicle-related impacts.

Table 12. Summary of lifeforms of vascular plants of Hart Mountain NAR, 1992.[a]

Lifeform	Native	Introduced	Total
Ferns	2	0	2
Forbs	314	18	332
Grasses	47	10	57
Rushes	4	0	4
Sedges	23	0	23
Shrubs	49	0	49
Trees	6	0	6
Vines	2	0	2
Total	447	28	475

[a] List does not include introduced ornamentals and fruit trees.

2. Wetlands

a. Habitat Conditions

Wetland habitat was in shorter supply in 1992 than any time since 1976-77. Spring runoff was inconsequential, and consequently, few springs were recharged and few playas were flooded in 1992. The Shirk Ranch had no water. It was a good year to assess the distribution of the most perennial "bottom-line" water resources.

b. Willow Restoration

A total of 1120 cuttings of Booth's and Lemmon's willows was planted by refuge staff between March 11 and April 2. The north branch of Willow Creek from Buck Pasture downstream was planted with 300 cuttings, Rock Creek in Rockhouse Flat received 640 cuttings, and 180 were established on Rock Creek immediately downstream from the crossing of the Frenchglen Road. Objective of the Willow Creek planting was erosion control. Objective of the Rock Creek plantings was re-establishment of willow habitat, which formerly formed a corridor along the stream channel. Willow habitat, one of the most limited in extent and threatened by secondary uses, is a critical source of food and cover for refuge wildlife. Survival rates will be evaluated after the 1993 growing season.

Restoration of willow habitat by planting of willow cuttings, March 1992.

c. Surveys

Three study efforts were organized to provide information on habitat conditions and wildlife use of wetlands. These included assessments of resource condition of riparian areas, riparian bird-habitat relationships, and fish distribution and habitat condition (see Research and Investigation).

Five surveys of wildlife were conducted at Big Flat between June-September. Pronghorn intensively used the Flat in June, July, and August. Use peaked at 231 animals in late July. The period of maximum use of the Flat coincided with cessation of forb growth in uplands, but before cessation of forb growth on the lakebed. Surveys conducted since

the mid-1980s have indicated that wildlife values differ between years when the Flat is temporarily-flooded and when it is permanently-flooded. Survey information will provide a basis for management of this unique wetland.

3. Forests

Juniper has encroached into riparian areas surrounding several springs and creeks along the lower southwestern flanks of Hart Mountain. Juniper is an upland species which readily occupies riparian habitat and adjacent uplands where periodic fires are excluded. Because of juniper's transpiration rate and growth habit, it can inhibit the natural functioning of riparian areas. Consequently, the Service contracted the cutting of 20 acres of juniper in the vicinity of Big Flat to improve watershed conditions and wildlife habitat. Seventeen permanent plots were established in three areas to monitor vegetation response before and after juniper reduction, which occurred in November. Sampling of these 17 plots consisted of photopoints of eight plots and photopoints and assessment of vegetation characteristics of nine plots.

7. Grazing

No livestock grazing occurred on the Refuge in 1992.

9. Fire Management

Hart Mountain employs one fire engine crew from May 1st through October 15th. The crew consists of two to three seasonal firefighters who operate a 250 gallon light wildland fire engine. The crew is stationed at the headquarters on the Refuge and provides initial attack fire response for the Refuge as well as surrounding public lands.

The fire crew is part of a Lakeview Interagency Fire Center that has cooperative agreements with BLM, USFS, and Oregon Department of Forestry. Since no agency has all the equipment, personnel and material to suppress all fires, this interagency agreement is advantageous to the Refuge based upon the extent of land area subject to fire and the limited fire management resources of the Refuge. Fire management resources are coordinated, assigned, and dispatched to wildfire emergencies on public land regardless of land administration.

The Refuge employs a seasonal fire dispatcher who is stationed at LIFC from June 1st to September 30th. This dispatcher works closely with the other agencies in times of fire emergencies to coordinate and assist in the response of fire resources. In times of no fire activity the dispatcher assists in the daily operation of LIFC.

In addition to the fire crew on Hart Mountain and the fire dispatcher located at LIFC, the Refuge employs two additional firefighters who are assigned to the BLM's fire helicopter (helitac) four-person crew. The helitac crew is primarily funded by Lakeview BLM and is stationed at

Fort Rock Guard Station which is approximately 100 miles northwest of Hart Mountain.

The 1992 fire season was one of the Hart Mountain crew's most active seasons. With six plus years of drought, the Refuge and surrounding public lands were tinder dry. The wildfire season began in early May and lasted until October. The crew participated in over 15 major project fires throughout Oregon, California and Nevada. The crew's urban interface fire training was put to the test on more than one occasion when wildfire threatened structures and homes. Even though the 1992 fire season saw some of the biggest fires on record in Oregon, the Refuge was fortunate to have only one lightning-caused fire on the west face of Hart Mountain. This fire was in a very remote section of the mountain and our helitac crew made quick work of it.

Office Automation Clerk, Vicki Rosette, Firefighters Tanner Rosette and Pat Goehring (Smokey Bear), assisted in providing fire safety information to the local elementary classes, in conjunction with Fremont National Forest and Oregon Department of Forestry. The program was received with enthusiasm from the students and faculty.

Prescribed burning on Hart Mountain began in mid-October and lasted until mid-November. Twelve hundred acres were prescribed burned in four areas. Even though the total acreage is not that much, these burns were conducted in upland sagebrush communities where no control lines (black lines) were constructed. The burns were using natural fuel types, temperature, and relative humidities as controlling factors. Even burning late in fall, the Bond Creek burn "spotted" and jumped the major access road to Hot Springs campground and burned an additional five acres not scheduled for burning. There was no damage to the campground or Hot Springs except a sign and post will need to be replaced.

Again in 1992, the Complex fire crew was requested by the Regional Office to assemble five new light fire engines for the Region in conjunction with Lakeview BLM. This assembly includes fitting the boxes to the cab chassis, construction of roll bars, and fitting of pumps, tanks, and storage racks. Assembly will be completed by May 1993.

Carl Holte's botany class establishing a monitoring plot in Bond Creek prescribed burn area.

Interagency helitac crew and fire dispatcher: Tom Puetz, Gina Simontacchi, and Bob Crumrine.

Gina in the "hot seat" at Lakeview Interagency Fire Center.

Heavy helicopter (chinook) laying down retardant around structure in advance of fire spread on Lone Pine Fire.

Thankful public on Lone Pine Fire, which burned over
30,000 acres of forest and numerous homes.

Prescribed burning South Mountain.
Natural breaks are used as control lines, October 1992.

Results of prescribed burning in Bond Creek, October 1992, where primary objective was to foster aspen regeneration, increase aspen distribution and improve habitat interspersion.

G. WILDLIFE

1. Wildlife Diversity

a. Summary of Diversity

A total of 302 wildlife species are known to use the Refuge on seasonal, annual, and long-term basis. This total includes 5 fish species, 16 herptile species, 228 bird species, and 41 mammal species. Of the 302 species, 87 are permanent residents, 103 are summer residents, 100 are transients, and 12 are winter residents.

b. Wildlife-habitat Relationships in Uplands

Wildlife use of upland and wetland wildlife habitats (*syn.* vegetation type) was analyzed for the EIS. Analysis revealed that total species richness is highest in upland wildlife habitats where a mosaic of different succession stages are interspersed (Table 7). Mosaics of succession stages have the most breeding species in 14 of 18 wildlife habitats and the most feeding species in 17 of 18 wildlife habitats. Compared to late succession stages, mosaics average 9 more breeding species and 27 more feeding species in the 4 upland habitats that dominate area (low sagebrush, big sagebrush-bitterbrush, mountain big sagebrush, and mountain shrub).

Consequently, maximum species richness is associated with sites where a diversity of wildlife habitats occur in combination with a diversity of succession stages within habitat. It should be stressed that management for mosaics in uplands is a relevant management goal in habitats that cover large areas; it is less relevant in upland habitats that occur in limited quantity (ponderosa pine at Blue Sky). In such areas, management should emphasize first, maintenance of ecosystem processes (e.g., low-intensity surface fire) and second, maintenance of the most structurally diverse succession stage (e.g., old-growth ponderosa pine).

Table 13. Number of wildlife species associated with succession stages[a] of upland habitats for primary breeding and feeding purposes, Hart Mountain NAR.

	Breeding			Feeding		
Wildlife habitat	Early, mid, and late	Late	Very late	Early, mid, and late	Late	Very late
Basin big sagebrush	43	21	-[b]	72	35	-
Big sagebrush-bitterbrush	24	12	15	43	17	30
Black greasewood	16	9	-	38	16	-
Black sagebrush	3	3	-	18	15	-
Fescue	11	9	-	24	20	-
Low sagebrush	19	17	11	61	46	51
Mountain big sagebrush	26	13	19	67	24	44
Mountain mahogany	40	30	22	84	56	37
Mountain shrub	19	11	13	54	28	38
Ponderosa pine	41	27	35	85	50	49
Salt desert shrub	24	16	-	37	20	-
Spiny hopsage	17	8	-	25	7	-
Squirreltail	5	5	-	8	8	-
Terrestrial non-vegetated[c]	37	-	-	30	-	-
Western juniper	48	27	27	105	58	56
Wheatgrass	3	3	5	29	24	37
White fir	33	26	23	67	43	44
Winterfat	6	6	-	18	17	-
Wyoming big sagebrush	30	18	15	58	24	38

[a] Based on single and multiple succession stages: early, mid, late = mosaic of those stages; late = dominated by late stages; and very late = dominated by very late stages.
[b] Dash indicates succession-progression stage was not represented in habitat.
[c] Examples include rock outcrops and buildings.

c. Wildlife-habitat Relationships in Wetlands

In wetlands, maximum richness of breeding and feeding species usually is associated with occurrence of late and very late stages of progression (Table 14). Progression is defined as the change in the structure and composition of a habitat associated with a change in water availability to plants (e.g., the influence of level of water table level on distribution of wetland community types in an alluvial floodplain). Species richness averages 13 breeding species in early-mid stages, 17 in

late stages, and 37 in very late stages in riparian wetlands. Increased species richness during later stages of progression is attributed to increased biological productivity and increased complexity of terrestrial and in-stream habitat (e.g., more species with broad and narrow habitat requirements are supported). Consequently, management for maximum species richness in riparian wetlands should emphasize restoration and maintenance of stream channels, wetland vegetation, and wildlife habitat associated with later stages of progression.

Species richness in playa wetlands differs from riparian areas. Except for Shirk Ranch and Jacob's Reservoir, water supply on playa wetlands is determined by short-term variation in climate, which consequently influences vegetation composition associated with different progression stages. Late stages of progression average more breeding and feeding species compared to early stages in poverty weed-primrose, rush-spikerush-arnica, cattail-bulrush. However, early, mid, and late stages of pondweed tend to support fewer breeding and feeding uses than late stages. Difference in wildlife use among habitats is associated with difference in water regimes and vegetation that characterize progression stages.

Table 14. Number of wildlife species associated with progression stages[a] of wetland habitats for primary breeding and feeding purposes, Hart Mountain NAR.

	Breeding			Feeding		
Wildlife habitat	Early-mid	Late	Very late	Early-mid	Late	Very late
Playa wetlands						
Aquatic non-vegetated[b]	11	-[c]	-	92	-	-
Cattail-bulrush	14	25	-	110	101	-
Pondweed	19	7	-	117	92	-
Poverty weed-primrose	0	5	-	0	14	-
Rush-spikerush-arnica	3	17	-	16	109	-
Saltgrass	6	2	-	19	13	-
Silver sagebrush	5	4	17	20	49	53
Riparian wetlands						
Bluegrass-ryegrass	19	18	15	21	57	64
Mixed deciduous shrub	6	11	34	42	101	112
Quaking aspen	10	26	50	45	96	83
Sedge-rush-bluegrass	27	14	37	60	81	100
Willow	15	22	33	65	124	119

[a] Based on single and multiple stages of progression: early and mid = dominated by both stages; late = dominated by late stages; and very late = dominated by very late stages.
[b] Examples include water within stream channels and sediment-laden water found on some playas.
[c] Indicates progression stage was not represented in habitat.

2. Endangered and Threatened Species

Databases were reviewed for vertebrate species considered sensitive, threatened, or endangered by federal, state, and refuge standards (Table 15). Small numbers of bald eagle and peregrine falcon, federal and state listed species, use the Refuge during migration, primarily in spring and fall. Thirteen other species are C2 candidates federal threatened and endangered status.

For planning purposes (i.e., EIS), species classified as sensitive included those listed as legally threatened and endangered at the state and federal level; C1 and C2 candidates for review as threatened and endangered species; and species considered rare, threatened, or endangered at the refuge level. Thirty-eight species, other than those already described, were classified as sensitive at the refuge level based on an analysis of species' distribution, abundance, and habitat requirements. Most of these species depend on single or few habitats for primary breeding and feeding purposes. The lists should provide managers with a basis for assessing information needs on species and for planning habitat management activities.

3. Waterfowl

In 1992, available waterfowl habitat was limited by drought. Production areas available included upper Rock Creek, upper Guano Creek, and the Petroglyph Lake Chain. No systematic surveys were done to assess habitat use and populations size because of the lack of habitat. Water from Jacob's Reservoir was not released to promote development of water management structures at Shirk Ranch.

A wood duck was observed in Petroglyph Lake on October 12 by Jenny Pretare. The species is observed in Refuge wetlands at a rate of 1 bird/2 years.

7. Other Migratory Birds

a. Investigations

Dr. David Dobkin continued to inventory birds and habitat in riparian areas (see Research and Investigations). Bird communities subject to study are comprised summer-residents and transients, most of which are considered long-distance migrants. The study should provide a valuable baseline for assessing long-term changes in composition of bird communities and associated with changes in condition of riparian habitat.

Table 15. Sensitive, threatened, and endangered wildlife of Hart Mountain NAR.[a]

Federal threatened/endangered	
Transients	
Peregrine falcon (x)	Bald eagle (r)
C2 candidates for T & E status	
Permanent residents	
Catlow tui chub	Sheldon tui chub
Catlow redband trout	Western toad
Northern goshawk (r)	Western sage grouse (u)
Pygmy rabbit	California bighorn sheep
Preble's shrew	
Summer residents	
Ferruginous hawk (f)	Black tern (u)
Loggerhead shrike (f)	White-faced ibis (u)
Refuge sensitive	
Permanent residents	
Canyon wren (u)	American dipper (u)
Beaver	Raccoon
Summer residents	
Virginia rail (f)	Long-billed curlew (r)
Western burrowing-owl (r)	Calliope hummingbird (r)
Red-naped sapsucker (c)	Red-breasted sapsucker (x)
Western wood peewee (c)	Cordilleran flycatcher (r)
Ash-throated flycatcher (u)	Western kingbird (u)
Tree swallow (c)	Pygmy nuthatch (c)
Blue-gray gnatcatcher (f)	Swainson's thrush (u)
Warbling vireo (c)	
Transients	
Upland sandpiper (x)	Yellow-billed cuckoo (x)
Flammulated owl (f)	Black-chinned hummingbird (r)
Willow flycatcher (f)	Eastern kingbird (x)
Clark's nutcracker (u)	Winter wren (f)
Western bluebird (f)	Veery (x)
Gray catbird (x)	Red-eyed vireo (x)
Ovenbird (x)	Northern waterthrush (r)
Wilson's warbler (f)	Yellow-breasted chat (r)
Rose-breasted grosbeak (x)	Lincoln's sparrow (c)
Winter resident	
Common redpoll (x)	

[a] Expected frequency of observation described for birds as c (common-abundant); f (fairly common); u (uncommon); r (rare); and x (extremely rare). Classification of abundance follows DeSante, D., and Pyle, P. 1988. Distributional checklist of North American birds. Artemisia Press, Lee Vining, CA.

Adam Rich and Ron Lange count aspen stems and aspen dbh on permanent plots established to monitor populations of riparian-dependent birds.

b. Breeding Bird Census

Plant and breeding bird communities were examined on two study plots one year before and seven years after an August 1985 wildfire. Plots, each 328-656 yards in length, were located along the eastern foothills of the Intermediate Hills where elevations ranged from 6102-6119 feet. Birds were annually censused on seven to ten dates between April-July of 1985-92. Vegetation was sampled prior to the fire in 1985, and post-burn in 1986 and 1989. Before the fire, study plots comprised low sagebrush-bitterbrush communities and big sagebrush-bitterbrush communities, respectively. After the fire, study plots were characterized by naturalized cheatgrass, native forbs and grasses, and resprouting shrubs.

Total bird densities fluctuated substantially from year to year. Although normal variation probably accounted for a portion of yearly difference in density of birds, change in habitat conditions and habitat suitability also likely influenced year to year variation in density (Table 16). On plot A, 30% fewer territories were found during 1986-92 than in 1985. On plot B, 5 % more territories were found in 1986-92 than in 1985. Difference in bird density between plots before and after burning was attributed mainly to difference in post-burn response of vegetation (e.g., plot B had substantially greater variety of shrubs, and greater cover and variety native herbaceous species than plot A).

Total bird diversity also fluctuated among years, and averaged slightly higher on both plots in the years after burning. Absence of pronounced change in diversity was attributed to the pattern of change in composition of bird communities. Although fewer total species occurred on plots after fire, abundance (density) was more evenly distributed

among species than before fire. Green-tailed towhee and sage thrasher were prominent breeding species before fire but afterwards, vesper sparrow and horned lark assumed prominence. Brewer's sparrow was the numerically dominant breeding bird on both plots before and after fire. Plans for 1993 include sampling of bird and plant communities on census plots.

Table 16. Change in density (territories/100 acres)[a] and diversity (H')[b] of breeding birds after an August 1985 wildfire in low sagebrush-bitterbrush (A) and big sagebrush-bitterbrush (B), Hart Mountain NAR, 1985-92.

	Territories/100 acres		Species diversity (H')	
Year	A	B	A	B
1985	107	106	0.95	1.38
1986		105		1.64
1987	122	138	1.05	1.45
1988	77	122	1.19	1.68
1989	87	115	1.14	1.51
1990	88	111	1.11	1.34
1991	68	77	1.10	1.47
1992	81	106	1.11	1.18
1986-92 ($\bar{x}$)	75	111	1.12	1.45

[a] Expansion factor of 2.25 used to determine territories/100 acres.
[b] Shannon's index.

c. Christmas Bird Count

The 19th annual Hart Mountain Christmas Bird Count was held on December 30th. Thirteen observers in six parties collectively expended 41 hours of effort and counted 1224 individual birds of 35 species. One black-capped chickadee was observed in Guano Creek by ARM Alonso. Hart Mountain apparently is one of the very few places that black-capped chickadees are periodically observed in winter in northwestern Great Basin.

Although heavy snow limited access to the southwest quarter of the count area (including Blue Sky), coverage of the remaining area was minimally adequate. To increase utility of count data, future counts should strive to maintain a minimum coverage of eight to ten parties who expend 60-80 party hours.

d. Noteworthy Observations of Migratory Birds

A number of rare-uncommon migratory species were observed on the Refuge in 1992. A merlin was seen 0.9 miles south of Warner Peak on April 7 by Marc Commadatore. Red-breasted sapsucker was periodically reported from riparian habitat along Rock Creek near Hot Springs Campground during the summer. The species commonly nests in the Warner Mountains to the southeast of Hart Mountain, and has been observed with increased frequency on the Refuge since the mid-1980s. Two American redstarts, including and adult male and an individual of unknown age and sex, were seen in riparian habitat of the north fork of Degarmo Canyon on August 31 by Ron Lange. Redstarts have been observed in small numbers on an annual basis since the mid-1980s. A black-and-white warbler was observed in riparian habitat of upper Rock Creek 1 mile south of the Barnhardi on July 21 by Blythe Brown. Since the mid-1980s, one to two individuals of this species have been observed on an annual basis. Individual Harris' sparrow are reported during fall about 1/3 years. One was seen by Ron Lange and David St. George at Blue Sky on November 4. An adult male rose-breasted grosbeak was observed in aspen of upper Guano Creek on May 25 by Jenny Pretare. Individual rose-breasts are reported every two to three years on the Refuge. Pine grosbeak apparently use the willow and pine habitats on the Refuge every three to five years, which perhaps coincide with reduced availability of mast in montane forest north of the northwestern Great Basin. One was observed on November 4 at Blue Sky by St. George and Lange; others were seen in the vicinity of headquarters between mid-November and December.

8. Game Mammals

Drought conditions reduced food, cover, and water available to game mammals in 1992, but improved winter-survival of juveniles because of open conditions. Our expectation is for reduced ungulate productivity in 1993 based on the nutritional stress induced by drought.

a. Pronghorn

Pronghorn herd composition was assessed in the Hart Mountain Biological Unit, established in the mid-1950s, on 2-3 August 1991. Two observers staged a ground survey and counted 616 pronghorn (Table 17). Sex/age ratios were 44 fawns/100 does and 54 bucks/100 does. Fawn and buck ratios were above average in 1992 compared to short-term (1987-92) and long-term averages (1955-92).

For the second consecutive year, pronghorn were surveyed on a monthly basis from a Cessna 206 to determine use of geographic areas and vegetation types. Results revealed no major differences in pattern of use of geographic areas and vegetation types between years except for increased use of playa wetlands during summer-fall 1992. Snowpack during both winters was light, and pronghorn were widely distributed on transition and winter ranges (i.e., the area between Swede Knoll and Desert Lake served as a major winter range for the Hart Mountain population).

Although pronghorn seasonally used a variety of habitats, low sagebrush was the primary habitat used. Seasonal use of low sagebrush ranged from 62-99% in 1991 and 26-97% in 1992. Other habitats that assumed seasonal importance included playa wetlands and grasslands (recently burned areas). Use of these habitats ranged from 35% in summer 1991 to 72% in 1992. Conclusions drawn from the survey include: (1) Hart Mountain has become an important use area during mild winters; (2) low sagebrush, playa wetlands, and seral grasslands are key pronghorn habitats; and (3) pronghorn have not abandoned Hart Mountain Refuge since reduction of cattle grazing in 1990.

Ron Garner, ODFW biologist, conducted an aerial survey of pronghorn in January 1992. Garner reported a total of 1538 pronghorn on the Refuge and 652 on BLM lands south and east of the Refuge within the Biological Unit (Table 18). Results from ODFW survey data clearly indicate the value of the Refuge as a principal winter range for pronghorn of the biological unit.

Table 17. Late-summer composition of the pronghorn population, Hart Mountain NAR, 1955-92.[a]

Period	Total number counted	Fawns/100 does	Bucks/100 does
1955-59	347	66	35
1960-64	348	66	37
1965-69	292	33	41
1970-74	316	30	29
1975-79	503	35	19
1980-84	712	23	40
1985-89	816	42	39
1990-91	1763	23	43
1992	616	44	54

[a] Surveys except 1992 were done from aircraft and covered >90% of pronghorn habitat.

b. Mule Deer

Spring herd composition was surveyed via helicopter by 3 observers on 12 March 1992 (Table 19). A total of 277 deer was counted including 242 adults and 35 fawns. The 14 fawns per 100 adults ratio compares to the fall count of 19 fawns per 100 adults for a 26% over-winter loss of fawns. More than half the mule deer found on the spring survey were located in ecotonal habitats (juniper-low sagebrush) along the toe-slope of Poker Jim Ridge. Other groups were counted east of Desert Lake, south of Big Flat, and between lower Schuster and Degarmo Canyons.

Table 18. Number of pronghorn seen during mid-winter aerial survey of Sheldon-Hart Mountain Biological Unit, 1972-92.

Period	Sheldon NWR	Sagehen	Hart Mt. NAR	West Beatty's	Unit total
1972-76	1008	522	172	--	--
1977-81	1359	490	287	--	--
1982-86	1998	245	587	0	2919
1987-91	1604	1226	1096	258	4019
1992	408	1532	1538	652	4130

Table 19. Overwinter loss (%) of fawn mule deer at Hart Mountain NAR, Sheldon NWR, West Beatty's area (BLM), 1992.

Area	November 1991	March 1992	Overwinter loss (%)
	Fawns/100 does	Fawns/100 does	
Hart Mt. NAR	19	14	26
Sheldon NWR	42	29	31
West Beatty's	42	21	50

A ground survey of post-hunt herd composition was conducted by six observers in two to four parties between November 4-5 (Table 20). This data is used mainly to determine herd productivity and overwinter loss of fawns. A total of 328 deer was counted including 50 bucks, 210 does, and 68 fawns. Although the fawn ratio was >50% below the long-term average (1967-91), the buck ratio was near normal. Analysis of historical data indicates that fewer fawns have survived until fall during the last five years compared with average productivity rates of the 1970s-1980s.

During 1992, plans were made and actions were taken to maintain the deer herd. Riparian zones were rested from livestock use, aspen stands in Bond Creek were prescribed burned to stimulate renewed growth, and willows were planted to restore willow as a source of food and cover.

Table 20 . Fall composition of the mule deer herd, Hart Mountain NAR, 1967-92.

Period	Total number counted	Bucks/ 100 does	Fawns/ 100 does	Fawns/ 100 adults
1967-71	145	39	46	64
1972-76	185	28	65	83
1977-81	233	27	50	63
1982-86	259	28	54	70
1987-91	379	24	29	36
1992	328	24	32	26

c. Bighorn Sheep

Hart Mountain NAR supports an estimated 500 bighorn sheep, which is substantially larger than other Oregon populations of California bighorn sheep. As of 1992, the Refuge population was evaluated as "increasing" in size. Low rates of productivity (@45 lambs/100 ewes) reportedly indicate that the population is approaching carrying capacity (ODFW. 1993. Oregon's bighorn sheep management plan 1992-97).

ODFW and Service personnel have maintained a high level of interest in the status of bighorn sheep at Hart Mountain NAR. Principal values include opportunities for recreational harvest and use in re-establishment of the subspecies to other places within the historic range of the subspecies. More tags are issued for harvest and more sheep are involved in translocation programs at Hart Mountain than other areas where the animal has been re-established in Oregon.

ODFW and FWS cooperate on inventories of bighorn herd status. Population size and productivity are assessed in June; population size is sampled again in October. Sheep are surveyed in March to index population size and overwinter survival of lambs. Another survey is done in June to assess population size and productivity (Table 21). In 1992, ODFW surveyed the sheep herd on June 24. A record 404 sheep was observed on the Refuge. Productivity was within the "average" range (45-50 lambs/100 ewes). Although the sex ratio did not substantially differ between 1992 and the average for the previous five years (80 and 84 rams/100 ewes), it was higher than the long-term average (72 rams/100 ewes). Larry Conn with ODFW attributed the recent changes in sex ratio (more rams) to the low ram harvest and increase in removal of ewes by trapping.

Table 21. Composition of the bighorn sheep herd in June, Hart Mountain NAR, 1955-92.

Period	Total number counted	Lambs/100 ewes	Rams/100 ewes
1955-59	46	54	51
1960-64	71	64	63
1965-69	93	44	65
1970-74	79	44	116
1975-79	155	51	70
1980-84	339	34	65
1985-89	328	46	74
1990-91	343	40	67
1992	404	45	80

Dave Payer, who researched the bighorn of Hart Mountain during 1990-91, completed his graduate thesis in 1992. Findings are reported in research and investigations.

d. Elk

Few elk were reported in 1992, in contrast to the 19 sightings made in 1991. A single cow was observed near Alger Cabin on south Hart Mountain by Curtis Edwards (ODFW) during the June survey of sheep. Adam Rich saw a single cow and spike bull in the Barnhardi region of upper Rock Creek in November. Remains of four dead bulls (cause unknown) were reported by hunters in fall 1991. It is appears likely that one or several groups of elk had emigrated from the Warner Mountain to Hart Mountain in the past two years. Such movements were fostered, perhaps, by increased populations in the Warners, close proximity of the Warners to Hart Mountain, and the lack of barriers along a movement corridor (e.g., the Warner Lakes were dry north of Crump Lake between 1990-92).

10. Other Resident Wildlife

a. Sage Grouse

Findings from research of factors influencing productivity of sage grouse are reported in Research and Investigations.

Sage grouse leks were censused between March 31 and April 27 (Table 22). Census results indicated (1) that the abundance of males declined 31% at five leks between 1992 and 1987-91 and (2) that the decline probably is related to the low productivity rates of 0.45 and 0.26 chicks/hen observed in 1990 and 1991, respectively.

An analysis of lek density done in 1991 indicated that the 21 known leks were distributed over 191 square miles (47% of the Refuge) at a density of 1 lek/9 square miles during 1990-91. Size of the sage grouse population was estimated at 800-1000 birds during spring 1991.

Table 22. Annual maximum count of sage grouse males at leks, Hart Mountain NAR, 1980-92.

Year	Lek					Pooled total
	Hilltop	Blizzard	Snake	Swede	Lookout	
1980	18	30	17	-[a]	-	-
1981	23	26	35	76	-	-
1982	5	28	31	88	-	-
1983	10	20	8	84	-	-
1984	8	12	9	110	-	-
1985	4	13	8	57	38	-
1986	-	7	-	80	33	-
1987	21	13	38	96	25	193
1988	31	5	46	101	44	227
1989	29	0	40	94	45	208
1990	39	0	27	107	66	239
1991	30	0	20	107	27	184
1992	18	5	22	95	7	147

[a]Dash indicates no census done (individual leks) or inadequate data to estimate pooled total.

Surveys of sage grouse hens were conducted between May 26 and July 6 to assess productivity rates. Of the 311 birds observed, 21 were unclassified and 290 were classified, including 113 hens, 117 chicks, and 60 cocks (Table 23). The 1.03 chick/hen ratio estimated in 1992 was 23% lower than the short-term average (1.33) and 49% lower than the long-term average (2.03). The percentage of hens with broods was 50% lower in 1992 than the short-term average, and 51% lower than the long-term average. However, chicks/brood was 43% greater in 1992 than the short-term average, and 12% greater than the long-term average. Increased survival of chicks is attributed to the mild, dry spring.

Surveys conducted by ODFW also showed below average productivity in Lake County (0.38 chicks/hen) and Harney County (0.29 chicks/hen) in 1992. Analysis of long-term trend indicated that productivity of sage grouse has declined on the Refuge during 1952-61 and 1982-92.

Table 23. Average productivity of sage grouse, Hart Mountain NAR, 1952-92.

Period	Characteristic					
	Hens w/ broods	Dry hens	Total chicks	Chicks/ hen	% hens w/broods	Chicks/ brood
1953-62	72	106	350	2.63	53	4.64
1963-72	42	34	169	1.89	50	3.96
1973-82	18	13	65	2.07	58	3.33
1983-92	28	42	94	1.42	46	3.07

b. Diurnal Predators

Hart Mountain NAR, Sheldon NWR, and Malheur NWR initiated annual surveys of diurnal predators to provide an index of relative abundance. The method used was developed by Alan Sargaent of Northern Prairie Wildlife Research Center. Field data is collected incidental to other duties. Development of this dataset will afford a baseline for evaluation of long-term trend in relative abundance of predators. Because predators kill some game, they are a perennial concern among some hunters, who indicate that reduced productivity of featured game species is mainly attributed to predation. This survey will address concerns about the possible influence of predators on productivity of featured wildlife species (e.g., a long-term inverse relationship between sage grouse productivity and abundance of ravens).

A total of 1130 hours of time was recorded between April and August on the 1992 predator survey. The five most frequently observed species included kestrel, ground squirrel, redtail hawk, raven, and northern harrier. With the exception of kestrel, the same species also were the most commonly observed predators on Sheldon NWR (Table 24). Abundance of predators on the Refuge did not differ substantially among nine management areas (e.g., Intermediate Hills). Because of the absence of a comparative baseline data, results of the 1992 survey were reported to Sargaent at Northern Prairie. Sargaent said that none of our data indicated a potential "overpopulation" of any predator species. Observation rates of coyotes apparently are higher than the average rates Sargaent has observed in the prairie potholes.

Coyote hunting for mice and voles. BLB

Table 24. Average number of places/100 hours (observation rate) where one or more individuals of each predator species was seen in Hart Mountain NAR and Sheldon NWR, April-July, 1992. A place is defined as one acre.

	Places/100 hours	
Predator taxa	Hart Mountain	Sheldon
American kestrel	19	2
Ground squirrel	16	22
Redtail hawk	14	22
Raven	11	29
Northern harrier	9	23
Coyote	4	10
Prairie falcon	3	6
Golden eagle	3	7
Loggerhead shrike	2	15
Great-horned owl	2	1
Total predators	93	83

c. Small Mammals

Two transects, each 11 miles in length, are surveyed by vehicle on a quarterly basis to index population trend of small mammals, primarily rabbits (Table 25). The east boundary route traverses through mainly Wyoming big sagebrush. The south boundary routes traverse through mainly big sagebrush/bitterbrush. Black-tailed jackrabbits are the principal rabbit on the east route, and black and white-tailed jackrabbits occur on the south route. Ord's kangaroo rat is the primary rodent species observed on both transects. Rabbits and rodents are important prey of carnivores including coyotes and raptors. Managers have speculated that increased predation of ungulates by carnivores is associated with decline in jackrabbit populations.

Results from the survey indicate that numbers of rabbits and rodents have fluctuated substantially among years (Table 25). Rabbits, primarily black-tailed, peaked in abundance in 1988 on the east route and on both routes in 1992. Changes in rabbit numbers are moderately correlated (0.7) for the two routes. Black-tailed jackrabbits apparently exhibit a 9-11 cycle of population abundance in the intermountain west. Numbers of white-tailed jackrabbits showed no pattern of change in abundance. Rodents comprised fewer observations than rabbits and exhibited no inter-annual pattern of change in abundance.

Table 25. Leporids/100 miles and rodents/100 miles on vehicle transects in July, Hart Mountain NAR, 1986-92.

	Leporids/100 miles		Rodents/100 miles	
Year	East	South	East	South
1986	123	17	17	0
1987	237	53	17	17
1988	395	-	8	14
1989	231	71	58	23
1990	29	80	23	5
1991	78	14	2	20
1992	392	158	46	5

Go forth and multiply.

d. Noteworthy Observations of Resident Wildlife

A desert horned lizard was found on May 5 located near lower Black Canyon by Marc Commandatore, who was assisting with sage grouse research. This is the first record of occurrence reported for the Refuge. Northern alligator lizard was reported from two locations: Commandatore observed one basking on talus east of Big Flat; several were observed in the riparian area of Box Creek on September 11 by Pyle. Prior to 1992 observations, the only sighting was of an individual seen on the mountain slope in the vicinity of Big Flat in the late 1960s. A camper at the Hot Springs reported observing a cougar for a half hour in the canyon of Rock Creek south of the campground over 4th of July weekend. Pyle observed a Douglas' squirrel in the dense mahogany-juniper woodland of lower Warner Creek on September 11. Apparently, Douglas' squirrels occur in a small, isolated population; fewer than 10 have been observed on the southwestern flanks of Hart Mountain. Two new locations of pika colonies were reported in 1992. One site was along the rimrock adjacent to the north mountain plateau and the other was a @1 acre talus patch located between the forks of Bond Creek, Intermediate Hills. Pika are a common inhabitant of talus, which is found in abundance on the Refuge.

11. Fisheries Resources

The trouts of Hart Mountain NAR consist of one naturalized population of cutthroats in Guano Creek and one endemic population of redbands in Rock

Creek. These fish are valued for their educational, scientific, and recreational benefits. Additionally, trout are hyper-sensitive to change in habitat conditions and water quality. These fish are therefore considered featured species whose population status reflects in part the quality of land management. Hart Mountain fisheries were operated under general trout regulations since 1955. Assessment of field conditions indicates that trout are limited by habitat loss associated with drought and overgrazing by cattle. In 1992, ODFW surveyed habitat and fish in Guano Creek (Research and Investigations). Findings from ODFW's baseline surveys will be reported in the 1993 NR.

H. PUBLIC USE

1. General

The monitoring of visitor numbers continued in 1992 with the installation of a new "wire loop" traffic counter. The counter was installed in May at headquarters just south of the Rock Creek bridge. The new counter replaced an older counter also located at headquarters.

The years cummulative traffic counter totals equaled 11,530 vehicles (includes staff, approximately 10%).

The visitor register was also continued and a record number of 4032 people registered (1539 entries, 2.6 people per party). See Tables 26 and 27 for origin of visitors and reasons most often identified for visiting Hart Mountain. Comparison of counts from the register and traffic counters indicated that 26% of all visitors signed the register. This collective data was also used in formulating a mathematical formula to provide the most accurate estimation of total visitation to Hart Mountain.

The total public use for 1992 was estimated at 16,188 visitors. This figure was calculated by taking the traffic counter total, subtracting 10% for staff use and 20% from that for traffic to and from Frenchglen (traffic which trips counter once), then taking the remaining 80% figure and dividing by 2 (counter tripped twice by 80%), then adding the 20% traffic to and from Frenchglen and multiplying by 2.6 (the visitor register average of visitors per car). Hence the formula: $(JC-10\%)-(20\%)+(\underline{ATC})(2.6)=TV$. TC = traffic count. ATC = adjusted traffic count. TV = total visitors.

Inaccuracies in this formula may exist in the way of over or under estimating the percentage of traffic counts made by staff and visitors traveling to and from Frenchglen. The percentages given were derived by conducting random daily observations and talking to visitors and staff.

Other methods of more accurately counting visitors are currently under consideration.

Table 26. Origin of visitors to Hart Mountain NAR.

Residence of Visitors	Percent of Total Visitors 1990	1991	1992	3 Year Average
Lake or Harney County	6.4	7.7	6.2	6.8
Other Oregon	68.6	67.1	68.3	68.0
California	11.5	11.1	9.5	10.7
Washington	5.5	5.7	6.1	5.8
Nevada	0.6	0.8	1.0	0.8
Other U.S.	5.7	4.9	6.2	5.6
Foreign Countries	1.5	2.6	2.7	2.3

Table 27. Reasons most often identified for visiting Hart Mountain NAR.

Motivation	Rank of Motivation 1990	1991	1992
Enjoying nature/wildlife	2	1	1
Camping	1	2	2
Hunting	3	3	4
The Hot Springs	4	4	3
Photography	5	5	6
Hiking and backpacking	6	6	5

2. Outdoor Classrooms - Students

The University of Nevada, Reno held their second annual archaeological field school on Hart and utilized the CCC camp as their base of operations for approximately ten weeks. The school consisted of 30 students who surveyed the Warner Wetlands and the west face of Hart Mountain.

Dr. Steve Herman, The Evergreen State College, used the Hot Springs campground as a base of fieldwork for students of Advanced Ornithology during late July and early August. Dr. Herman has used the Refuge as an outdoor classroom since the mid-1970s and has introduced hundreds of students to natural values of the Refuge.

8. Hunting

The hunting of mule deer, antelope, bighorn sheep and chukar continued in 1992. A total of 177 hunters participated in one of the five big game hunts on the mountain. Of the 177 hunters, 65 harvested game for an overall success rate of 37% (see Tables 28-32).

New in 1992 was an either-sex antelope bowhunt, a 67% reduction (150 to 100) in mule deer archery tags, a 50% reduction (100 to 50) in mule deer muzzleloader tags and the elimination of the antelope hunt orientation and antelope Boone and Crockett scoring conducted by Hart Mountain staff.

a. Pronghorn

Table 28. 1991 antelope rifle hunt results.

Season	# Tags	# Hunters	# Harvested	#Wounded	% Success
8/15-8/21	20	20	19	0	95%

A rather exceptional antelope buck was harvested by Joe Eoff of Salem, Oregon while guided by Leon Flick and Chuck Messner. The animal is believed to be the next Oregon state record and is pending measurement by an official Boone and Crockett scorer.

1992 Pronghorn hunt - Joe Eoff. JP

The first annual antelope archery season resulted in an overwhelming 50% success rate. The high success rate is partly attributed to the concentration of antelope around the few remaining waterholes and the hunters setting up blinds around waterholes.

Table 29. 1991 antelope bowhunt results.

Season	# Tags	# Hunters	# Harvested	# Wounded	% Success
8/1 - 8/14	20	20	10	0	50%

b. Mule Deer

In an effort to alleviate some of the hunting pressure on our drought stressed mule deer population, Oregon Department of Fish and Wildlife and U.S. Fish and Wildlife agreed to reduce the total number of tags from 250 to 150 (60%).

Table 30. 1991 mule deer bowhunt results.

Season	# Tags	# Hunters	# Harvested	# Wounded	% Success
8/29 - 9/7	100	74	6	3	8%

Table 31. 1991 mule deer muzzleloader hunt results.

Season	# Tags	# Hunters	# Harvested	# Wounded	% Success
10/10 - 1/18	50	49	16	2	33%

c. Bighorn Sheep

The 1992 bighorn sheep season underwent no significant changes from the previous year. The voluntary hunter orientation was attended by five of fourteen hunters. The two seasons occurred on 9/9 - 17 and 9/19 - 27. The two hunts on Hart Mountain consisted of three tags each while the two hunts on Poker Jim consisted of four tags apiece for a total of fourteen tags. All fourteen tags were filled for 100% success and an average Boone and Crockett score of 157 (high score 170 3/8, low score 136 4/8).

Table 32. 1991 Boone and Crockett bighorn sheep scores.

Hart Mountain	Poker Jim
151 0/8	154 7/8
169 0/8	159 1/8
150 6/8	143 3/8
158 6/8	156 5/8
168 1/8	162 2/8
158 6/8	158 6/8
	136 4/8
	170 3/8

What a trophy.

d. Chukar and California Quail

The west face of the mountain (north of the grade road and south of Hart Lake bar) remained open for gamebird hunting. Hunter reports indicated chukar populations are depressed and quail populations are virtually non-existant.

9. Fishing

Cutthroat trout and Catlow redband trout are the principal sport fish at Hart Mountain Refuge. Warner Pond, a one acre wetland, is stocked annually with fingerling rainbow trout by ODFW. The redbands (Oncorhyncus mykiss ssp.) endemic to Rock Creek are classified as C2 candidates for federal protection as an endangered species.

Fishing became a legally established use on the Refuge in 1955. Since 1955, all Refuge waters operated under general trout regulations whereby:

(1) method of take could include bait and artificial lures and flies, and,
(2) daily bag limit was not to exceed 5 fish/day greater than a six inch minimum length.

During the late 1980s, length of season was liberalized from 6 months to year-round.

A proposal was developed by the Service in 1991 for modification of angling regulations on Rock Creek and Guano Creek. The proposal as approved by the state Fish and Wildlife Commission, and instituted in 1992. The new regulations stipulate that (1) method of take is restricted to the use of artificial flies and lures only, and (2) daily bag limit is not to exceed two fish between six to ten inches. The purpose of the regulation change was to emphasize management of natural, self-sustaining trout populations and to reduce the impact of angler harvest, which emphasized harvest of the largest, most reproductively important fish.

After observation of stream conditions and consultation with Service fisheries experts, Rock Creek and Guano Creek were temporarily closed to minimize impacts to fish populations stressed by severe drought. For example, trout populations were limited to 1-1.5 miles of active stream during August-September 1992. The closure will continue until stream conditions improve substantially and fish have had three years of adequate water supply to reproduce, grow, and increase in numbers and distribution.

13. Camping

Camping ranked second among reasons most often identified for visiting Hart Mountain (based on visitor register). High use periods continue to occur around holidays and hunting seasons. A total of 41 backpack

permits were issued in 1992. The majority of backpacking occurred in the area of North and South Mountains.

In an effort to eliminate driving through the wet meadow in the Hot Spring campground, a barricade was erected along its perimeter. Another barricade was constructed north of the Hot Springs bathhouse on the east side of Rock Creek and the area designated a walk-in tent camp only.

Three Special Use Permits were issued to the Catherine Freer Survival School of Portland. The School lead 26 troubled youths on a wilderness therapy expedition throughout the mountain.

14. Picnicking

All picnicking is assumed to be in conjunction with other activities.

16. Other Non-wildlife Oriented Recreation

Deliberation between FWS and the Order of the Antelope over legal concerns related to the use of alcohol and sexual discrimination came to an end in 1992. It was decided the Order would no longer be granted Special Use Permits which allowed massive (500 men) annual get-togethers at Blue Sky. The Order was given until October 15, to remove their belongings (buildings, tables, etc.) and return the area to a natural condition. The Order reluctantly complied.

17. Law Enforcement

Numerous law enforcement patrols during hunting seasons and holidays were conducted. During the absence of a manager on Hart (May - September), Project Leader Barry Reiswig and Assistant Project Leader Mike Smith filled in.

No violations were issued in 1992.

I. EQUIPMENT

1. New Construction

A flight of wooden stairs was added to the barn to facilitate accessing the loft. The wooden stairs were constructed by the maintenance crew to replace an unsafe metal ladder.

Drinking water was once again made available to the public at headquarters with the installation of a faucet at the southwest corner of the shop. The public had been allowed access to a faucet by the outdoor shower but the area was closed to the public in 1991.

Installation of waterline and faucet for public use.

The maintenance crew and the TD-20 crawler were made available to Oregon Department of Fish and Wildlife for the new construction of an island in Crump Lake. The cooperative effort was made possible due to drought conditions which adequately dried the lake bottom. The island is located on the east side of the lake (outside of the Refuge executive boundary) and will benefit waterfowl, shorebirds and, primarily, American white pelicans.

2. Rehabilitation

The septic tank system to Quarters 1 was replaced due to the old tank rupturing. A new tank and lines were purchased and installed by the maintenance crew.

Rehabilitation of Septic System in Quarters 1

The doublewide trailer was fitted with larger windows to facilitate emergency evacuation in case of fire. The Regional Safety Officer thought the original windows were too small and would not allow an individual to exit the trailer in an emergency.

The doublewide trailer wood stove was moved and fitted with a brick base to enhance safe operation.

The Jacob's Reservoir spillway was rehabilitated to improve its damming properties.

3. Major Maintenance

The first year of a proposed three year project to revitalize the Frenchglen road was started. Approximately one third of the Frenchglen road was resurfaced, ditches pulled and graded. The road gravel was obtained from our barrowpit on the Frenchglen road.

Drought conditions allowed for revitalization of water holes. Approximately ten waterholes were cleaned and deepened.

4. Equipment Utilization

A new walk-behind mower was purchased to replace the old mower which was in need of costly repair. A new refrigerator was purchased for Quarters 2. A used belly dump trailer was picked-up for our temporary use from Salton Sea NWR and later forwarded to the Malheur NWR. New smoke alarms and liquid propane detectors were purchased and installed in the doublewide and trailers.

One third of Frenchglen Road received a facelift.

J. Other Items

4. Credits

Sections A, B, D, E, H, I, J	Dan Alonso
Sections F, G	Bill Pyle
Section E5	Barry Reiswig

Photo credits:

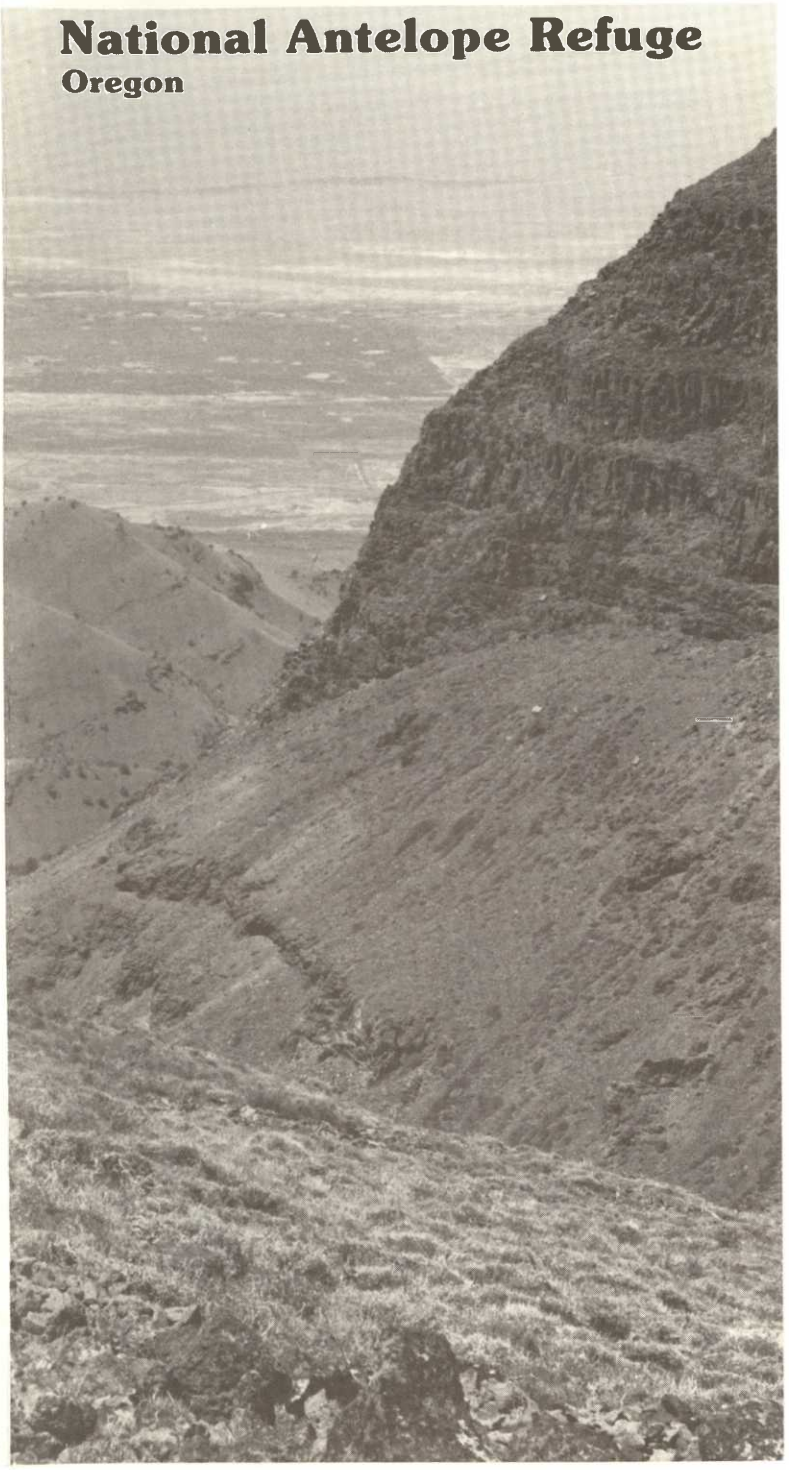
Name	Initials
Blythe L. Brown	BLB
Gina Proctor	GP
Carolyn Reeb	CR
Vicki Rosette	VR
Bill Stormont	BS

Sage Grouse

Hart Mountain

National Antelope Refuge

Oregon



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical place, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

U.S. Department of the Interior
Fish and Wildlife Service

RF 14622

January 1993

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The Refuge

The 275,000-acre Hart Mountain National Antelope Refuge was established in 1936 to provide spring, summer, and fall range for remnant antelope herds. These herds usually winter in Catlow Valley, to the east, and on the Sheldon National Wildlife Refuge about 35 miles southeast in Nevada.

Since then, the purpose of the refuge has been expanded to include management of all wildlife species characteristic of this high-desert habitat, and to preserve natural, native ecosystems for the enjoyment, education, and appreciation of the public.

The Landscape

Hart Mountain is a massive fault block ridge rising high above the surrounding rangelands to an elevation of 8,065 feet above sea level. The west side is precipitous, ascending abruptly some 3,600 feet from the floor of Warner Valley in a series of rugged cliffs, steep slopes, and knifelike ridges. The face of the mountain is cut by several deep gorges. Hart, Potter, and DeGarmo canyons, the most rugged, extend from the valley floor to the top of the main ridge.

The east side of the mountain is less precipitous, descending in a series of hills and low ridges to the sagebrush-grass ranges typical of southeastern Oregon.

Hart Mountain has been called an oasis in the desert. It is well-watered by many fine springs. Rising near the middle of the mountain, Rock Creek traverses a deep canyon in a northeasterly direction, emerging on the open range just above refuge headquarters. Guano, Stockage, and Goat creeks, rising on the south end of the mountain, flow south and east into Guano Valley. Deer Creek, rising from the intermediate hills, flows east, gradually disappearing into the semiarid rangeland soils.

Pronghorn Antelope

Uncle Jacob's Homestead

Information. Hart Mountain is located 65 miles northeast of Lakeview, Oregon. It can be reached by county roads from U.S. Highway 395 and Oregon Highway 140. The refuge is remote. Gasoline and groceries are available at Plush, 25 miles and Adel, 45 miles. All tourist facilities are available in Lakeview. Mid-May through October is the best season to visit the refuge. Even then, road conditions may limit access to parts of the area.

Special regulations regarding public access and use are in effect. Please contact refuge headquarters for applicable regulations and current road conditions.

For further information, contact:

Refuge Manager
Hart Mountain National Antelope Refuge
P.O. Box 111
Lakeview, Oregon 97630
(503) 947-3315

Wildlife

The higher elevations of Hart Mountain are typified by several steep canyons, rock bluffs, and cliffs with snowbrush, wild gooseberry, chokecherry, and aspen thickets. Here we find mule deer, bighorn sheep, golden eagles, prairie falcons, and numerous smaller bird species.

In contrast, the lower country to the east with the shallow intermittent lakes, is the preferred area of the antelope, kangaroo rats, burrowing owls, and sage sparrows, and such reptile as rattlesnake, bull snakes, yellow-bellied racers, and sagebrush lizards.

Between these extremes, among the big and short sage, mountain mahogany, and numerous kinds of bunch grasses, are the animals for which the mountain is so well known. Bands of antelope roam the gently-sloping east face. California bighorn sheep have been reestablished along the steep and rugged west wall and nearby Poker Jim Ridge. Also living in this vast area are mule deer, coyotes, bobcats, jackrabbits, cottontails, marmots, ground squirrels, night-hawks, northern flickers, and many other species of mammals and birds.

Mule Deer

Recreation

For those interested in wildlife and nature-oriented recreation, Hart Mountain offers a variety of opportunities.

Wildlife Observation and Photography are the most popular recreational activities on the refuge. Early morning and evening are the best times to observe wildlife. Many big game animals can be seen from the improved roads around the headquarters and south to the Blue Sky area during the summer and fall months.

Fishing is available in Rock and Guano creeks in accordance with Oregon State regulations. An Oregon license is required. Please be aware of current regulations in effect as these may change slightly each year.

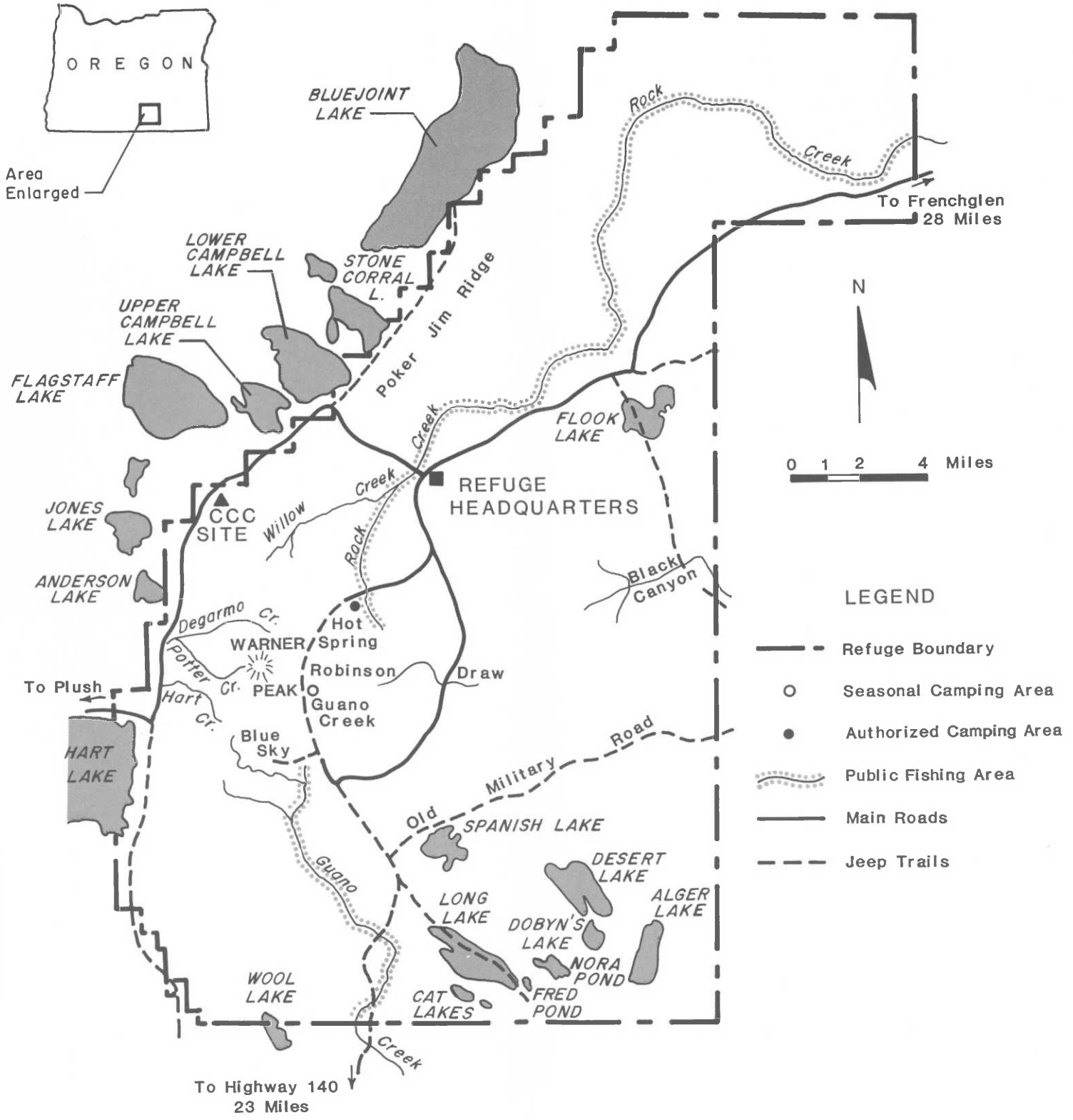
Camping is allowed year round at the Hot Springs Camp, 4 miles south of refuge headquarters. Winter snows or spring thawing may close this road periodically and visitors should check on the condition of this road during those times before planning a camping trip. The area is accessible by cross-country skiing during the winter. Other camps are open during special refuge hunting season. Conditions at all camps are primitive, with no improvements or facilities. Campfires are prohibited during periods of high fire danger.

Rockhounding is popular on Hart Mountain as it is in most of southeastern Oregon. Collections of rock specimens are limited to 7 pounds per person per day. Blasting and digging are prohibited. All items of antiquity (including arrowheads) are protected.

Hiking and Backpacking in the more remote areas of the refuge are gaining in popularity as this generally affords the refuge visitor unique opportunities to observe and photograph the area and wildlife.

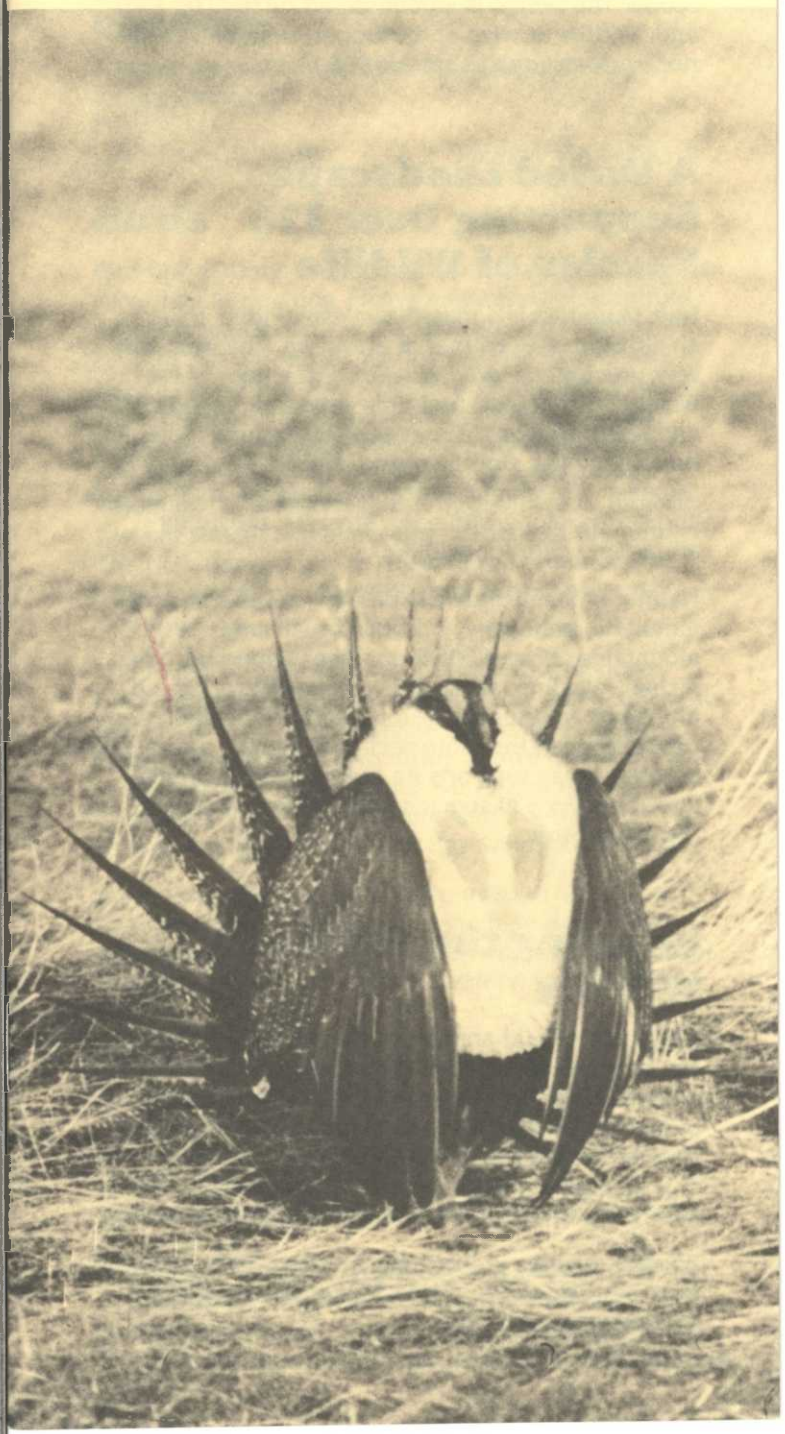
Overnight backpack camping is permitted by a free special permit obtained at refuge headquarters. Some areas of Hart Mountain may be excluded from hiking during critical times of the year to prevent undue disturbance; for example, when bighorn sheep are lambing.

Hunting. Hunting is permitted in accordance with applicable Federal and Oregon State regulations. Special hunting seasons for partridge, quail, deer, antelope, and bighorn sheep are held with emphasis placed on quality hunting experiences. The need to preserve some of the finer traditions of the sport and the fostering of man's appreciation of wildlands and its wildlife species is stressed in hunter orientation programs.


OREGON
Area Enlarged
BLUEJOINT LAKE
LOWER CAMPBELL LAKE
STONE CORRAL L.
UPPER CAMPBELL LAKE
FLAGSTAFF LAKE
Poker Jim Ridge
Rock Creek
To Frenchglen 28 Miles
N
0 1 2 4 Miles
FLOOK LAKE
Creek
REFUGE HEADQUARTERS
JONES LAKE
CCC SITE
Willow Creek
Rock Creek
ANDERSON LAKE
Black Canyon
Degarmo Cr.
Hot Spring
WARNER PEAK
Potter Cr.
Robinson Draw
To Plush
Hart Cr.
Guano Creek
Blue Sky
HART LAKE
Military Road
Old
SPANISH LAKE
DESERT LAKE
Guano
LONG LAKE
ALGER LAKE
DOBYN'S LAKE
NORA POND
WOOL LAKE
CAT LAKES
FRED POND
Creek
To Highway 140 23 Miles
LEGEND
Refuge Boundary
Seasonal Camping Area
Authorized Camping Area
Public Fishing Area
Main Roads
Jeep Trails

Wildlife

Hart Mountain National Antelope Refuge



Welcome to Hart Mountain Refuge

Hart Mountain National Antelope Refuge in south-central Oregon was established in 1936 for the preservation, management and study of pronghorn antelope and other wildlife species. Today's goals include the original intent but are currently much broader in scope. The refuge is administered by the U.S. Fish and Wildlife Service of the Department of the Interior, and includes about 240,000 acres.

A Varied Landscape Supporting Over 330 Species of Wildlife

Hart Mountain is a massive volcanic ridge, rising to an altitude of 8,065 feet in elevation. The west side is very precipitous, ascending from the floor of the Warner Valley (4,500 feet) in a series of rugged cliffs and steep canyons. The east side features more gentle rolling hills, sloping toward the Catlow Valley to the east. The mountain features several small springs and seeps, along with a few streams, providing abundant water for wildlife.

Habitat types include big and low sagebrush areas, mountain mahogany and bitterbrush areas in the mountains above 6,000 feet. Other important types include alkaline lakes, marshes, grassy spring-fed meadows, juniper covered uplands, and aspen and pine stands in the more secluded canyon areas. Each of these areas supports its own particular wildlife species. Over 330 species have been recorded to use the refuge area.

Enjoying the Refuges' Wildlife

The study of wild animals in their natural habitats has become an increasingly popular pastime for many people. Viewing of wildlife can be greatly enhanced by a pair of binoculars or spotting scope, due to the large expanse of the Hart Mountain area. This equipment enables visitors to observe all wildlife from a distance without disturbing the animals.

Wildlife species in this brochure have been grouped into four categories: Birds, Mammals, Amphibians and Reptiles, and Fish.

For Your Safety

Because of the isolation and vastness of the refuge, inquiries should be made at Refuge Headquarters about current road conditions before traveling to the more remote portions of the refuge especially during the winter and spring months.

For information, please contact:

Hart Mountain National Antelope Refuge
Refuge Manager
PO Box 111
Lakeview, OR 97630 Phone (503) 947-3315

Birds

Bird populations vary greatly in numbers and species according to seasons. Heavy migrations of waterfowl and waterbirds occur in the Warner Valley, partially included in the refuge, during the spring and fall. Many species remain to breed on the valley's lakes and meadows. Throughout the warmer months a wide variety of smaller birds and birds of prey are present, attracted to the numerous rugged cliffs adjoining isolated spring-fed riparian areas and the vast sagebrush and grassland portions of the refuge. The best opportunity to observe the greatest diversity of bird life on Hart Mountain is from May to October.

The following list contains 264 species that have been recorded on Hart Mountain and in the adjacent Warner Valley. It is not considered final as observations by many people continue to add to the list and the accuracy of its notations. We encourage and appreciate these observations and ask that they be reported to the Lakeview or Hart Mountain offices.

A few abbreviations have been used to assist the observer in determining status and seasonal abundance. Names are in accordance with the *Sixth* (1983) *American Ornithologist's Union Checklist of North American Birds.*

Status

pr - permanent resident - Species is present the entire year, usually nests in the area.
sr - summer resident - Migratory species which usually nests in the area.
wr - winter resident - Migratory species which winters in the area.
m - migrant - Usually present spring and fall only, but occurrences may extend into other seasons.
tv - transient visitor - Irregular species or vagrants occurring sporadically and usually in small numbers.

Seasons

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

Abundance

a - abundant - Common, usually numerous, certain to be seen in proper habitat.
c - common - Occurring in smaller numbers, should be seen in suitable habitat sites.
u - uncommon - Present, but in few numbers, not certain to be seen.
o - occasional - Seen infrequently during a season.
r - rare - Seen at intervals of two to five years.

Nesting

● - birds known to nest in area
○ - birds thought to nest in area
* - indicated birds more commonly see in Warner Valley

endangered species

COMMON NAME	STATUS	Sp	S	F	W
LOONS					
Common Loon	tv	o		o	
GREBES					
* Pied-billed Grebe ●	s	r	c	c	c
* Horned Grebe	m		o		o
* Eared Grebe ●	sr	c	c	c	
* Western Grebe ●	sr	c	c	c	
* Clark's Grebe ●	sr	c	c	c	
PELICANS AND CORMORANTS					
* American White Pelican ●	sr	c	c	c	
* Double-crested Cormorant ●	sr	c	c	c	
BITTERNS, HERONS AND EGRETS					
* American Bittern ●	sr	u	u	u	
* Least Bittern ○	sr	r	r	r	
* Great Blue Heron ●	pr	c	c	c	u
* Great Egret ●	sr	c	c	c	
* Snowy Egret ●	sr	c	c	c	
* Cattle Egret	tv	r	r		
* Green-backed Heron ○	sr	r	r	r	
* Black-crowned Night-Heron ●		sr	c	c	c
IBIS AND SPOONBILLS					
* White-faced Ibis ○	sr	o	o	o	
WATERFOWL					
* Tundra Swan	wr	a		■	c
* Lesser White-fronted Goose	m	u		u	
* Snow Goose	m	u		u	
* Ross' Goose	m	o		o	
* Canada Goose ●	pr	c	c	a	c
Wood Duck	tv			r	
* Green-winged Teal ●	pr	c	c	c	o
* Mallard ●	pr	c	c	a	c
* Northern Pintail ●	pr	a	c	a	c
* Blue-winged Teal ●	sr	o	o	o	
* Cinnamon Teal ●	sr	c	c	c	r
* Northern Shoveler ●	pr	c	c	c	o
* Gadwall ●	pr	c	c	a	u
* Eurasian Wigeon	m	o		o	
* American Wigeon ●	pr	c	o	a	u
* Canvasback ●	pr	c	u	c	o
* Redhead ●	pr	c	c	a	c
* Ring-necked Duck ●	wr	u	o	u	o
* Lesser Scaup ○	pr	c	u	c	o
* Common Goldeneye	wr	u		u	u
* Barrow's Goldeneye	wr	r		r	r
* Bufflehead	wr	c	r	c	c
* Hooded Merganser	m	r		r	
* Common Merganser	wr	u		u	u
* Ruddy Duck ●	pr	c	c	c	o
VULTURES					
Turkey Vulture ○	sr	c	c	c	
OSPREY, KITES, EAGLES AND HAWKS					
* Osprey	m	o		o	
Bald Eagle	wr	u		o	u
Northern Harrier ●	pr	c	c	c	u
Sharp-shinned Hawk ○	sr	u	o	u	o
Cooper's Hawk ●	sr	u	o	u	o
Northern Goshawk ●	sr	o	o	o	
* Swainson's Hawk ●	sr	o	o	o	
Red-tailed Hawk ●	pr	c	c	c	u
Ferruginous Hawk ○	pr	o	o	o	r
Rough-legged Hawk	wr	u		u	c
Golden Eagle ●	pr	c	c	c	c
FALCONS					
American Kestrel ●	pr	a	a	a	u
Merlin	wr	o		o	o
Peregrine Falcon	m	o		o	
Prairie Falcon ●	pr	c	c	c	o
GALLINACEOUS BIRDS					
Chukar ●	pr	c	c	c	c
* Ring-necked Pheasant ●	pr	o	o	o	o
Sage Grouse ●	pr	c	c	c	c
* California Quail ●	pr	c	c	c	c
RAILS					
* Virginia Rail ●	sr	u	u	u	
* Sora ●	sr	u	u	u	
* American Coot ●	sr	a	c	a	o
CRANES					
* Sandhill Crane ●	sr	c	c	c	
PLOVERS					
* Black-bellied Plover	m	o		o	
* Snowy Plover ○	sr	r	r	r	
Semipalmated Plover	m	u		u	
Killdeer ●	sr	c	c	c	o
STILTS AND AVOCETS					
* Black-necked Stilt ●	sr	u	u	u	
American Avocet ●	sr	■	c	■	

COMMON NAME	STATUS	SP	S	F	W
SHOREBIRDS					
* Greater Yellowlegs	m	u		u	
* Willet ●	sr	c	c	c	
Spotted Sandpiper ●	sr	u	u	u	
* Long-billed Curlew ●	sr	u	u	u	
* Marbled Godwit	m	o		o	
* Western Sandpiper	m	o		c	
* Least Sandpiper	m	u		c	
* Baird's Sandpiper	m	r		o	
* Pectoral Sandpiper	m	r		o	
* Dunlin	m	o		u	
* Long-billed Dowitcher	m	c		c	
SNIPE					
Common Snipe ●	pr	c	c	c	u
PHALAROPES					
Wilson's Phalarope ●	sr	c	c	a	
* Red-necked Phalarope	m	u		u	
GULLS AND TERNS					
* Franklin's Gull ○	sr	o	r	o	
* Bonaparte's Gull	m	u	r	c	
* Ring-billed Gull ●	sr	a	a	a	o
* California Gull	m	o	r	o	
* Caspian Tern ●	sr	u	u	u	
* Forster's Tern ●	sr	c	c	c	
* Black Tern ●	sr	c	c	c	
DOVES					
Band-tailed Pigeon	tv	o		o	
Mourning Dove ●	sr	c	c	a	o
OWLS					
* Common Barn-Owl ●	sr	o	o	o	
Flammulated Owl ○	sr	c	u	c	
Western Screech-Owl ●	pr	o	o	o	o
Great Horned Owl ●	pr	c	c	c	c
Northern Pygmy-Owl	wr	r		r	r
Burrowing Owl ●	sr	o	o	o	
Long-eared Owl ●	pr	c	c	c	o
Short-eared Owl ●	pr	c	c	c	o
Northern Saw-whet Owl ○	pr	u	u	u	u
GOATSUCKERS					
Common Nighthawk ○	sr	o	c	c	
Common Poorwill ●	sr	o	c	c	
SWIFTS					
Vaux's Swift	m	o			
White-throated Swift ●	sr	u	u	u	
HUMMINGBIRDS					
Black-chinned Hummingbird ○	sr	o	o	o	
Calliope Hummingbird ●	sr	u	c	u	
Broad-tailed Hummingbird ○	sr	o	o	o	
Rufous Hummingbird ○	sr	u	c	c	
KINGFISHERS					
* Belted Kingfisher	m	o		o	r

COMMON NAME	STATUS	SP	S	F	W
WOODPECKERS					
Lewis' Woodpecker	tv	o	o		
Yellow-bellied Sapsucker ●	sr	c	c	c	
Red-naped Sapsucker ●	sr	u	u	u	
Red-breasted Sapsucker ○	sr	u	u	u	
Williamson's Sapsucker	tv	o	o	o	
Downy Woodpecker ●	pr	u	u	u	o
Hairy Woodpecker ●	pr	u	u	u	u
Northern Flicker ●	pr	a	a	u	
FLYCATCHERS					
Olive-sided Flycatcher ●	sr	u	o	u	
Western Wood-Pewee ●	sr	u	c	c	
* Willow Flycatcher ○	sr	u	u	u	
Least Flycatcher	tv	r		r	
Hammond's Flycatcher	m	r		o	
Dusky Flycatcher ●	sr	c	a	a	
Gray Flycatcher ●	sr	c	c	c	
Western Flycatcher	m	c		c	
Say's Phoebe ●	sr	u	u	u	
Ash-throated Flycatcher ○	sr	o	o	o	
Western Kingbird ●	sr	u	u	u	
Eastern Kingbird ○	tv	o	o		
LARKS					
Horned Lark ●	pr	a	a	a	c
SWALLOWS					
Tree Swallow ●	sr	c	c	c	
Violet-green Swallow ●	sr	c	c	c	
* Northern Rough-winged Swallow ●	sr	u	u	u	
* Bank Swallow ●	sr	u	u	u	
Cliff Swallow ●	sr	a	a	a	
Barn Swallow ●	sr	a	a	a	
JAYS, MAGPIES AND CROWS					
Gray Jay	tv			o	o
Steller's Jay ○	pr	o	o	u	o
Scrub Jay ●	pr	u	u	u	o
Pinyon Jay	tv		o	o	
Clark's Nutcracker	tv		o	o	
Black-billed Magpie ●	pr	c	c	c	c
American Crow ●	pr	u	u	u	o
Common Raven ●	pr	c	c	c	c
CHICKADEES AND TITMICE					
Black-capped Chickadee	wr		o	o	
Mountain Chickadee ●	pr	c	c	c	c
Plain Titmouse ●	pr	o	o	o	o
BUSHTITS					
Bushtit ●	pr	u	u	u	u
NUTHATCHES					
Red-breasted Nuthatch ●	pr	c	r	c	c
White-breasted Nuthatch	m			o	o
Pygmy Nuthatch ●	pr	c	c	c	c
CREEPERS					
Brown Creeper	m	o		o	o
WRENS					
Rock Wren ●	pr	c	c	c	o
Canyon Wren ●	pr	o	c	c	o
Bewick's Wren ○	pr	o	o	o	o
House Wren ●	sr	a	a	a	
Winter Wren	wr	o	r	o	o
Marsh Wren ●	sr	u	c	c	r

COMMON NAME	STATUS	SP	S	F	W
DIPPERS					
American Dipper ●	pr	u	u	u	o
KINGLETS, BLUEBIRDS AND THRUSHES					
Golden-crowned Kinglet	wr	u		u	o
Ruby-crowned Kinglet ●	pr	a	c	a	u
Blue-gray Gnatcatcher ●	sr	u	u	o	
Western Bluebird ○	sr	u	r	u	
Mountain Bluebird ●	sr	c	c	c	o
Townsend's Solitaire ○	pr	o	o	c	c
Veery	tv	r		r	
Swainson's Thrush ●	sr	c	c	c	
Hermit Thrush ○	m	c	r	c	
American Robin ●	sr	a	a	a	o
Varied Thrush	m	u		u	
MOCKINGBIRDS AND THRASHERS					
Sage Thrasher ●	sr	a	a	a	
WAGTAILS AND PIPITS					
Water Pipit ○	m	u	r	u	
WAXWINGS					
Bohemian Waxwing	tv				o
Cedar Waxwing	m	u		u	o
SHRIKES					
Northern Shrike	wr			o	u
Loggerhead Shrike ●	pr	c	c	c	u
STARLINGS AND MYNAS					
European Starling ●	pr	c	c	c	u
VIREOS					
Solitary Vireo ●	sr	u	u	u	
Warbling Vireo ●	sr	u	c	c	
Red-eyed Vireo	tv	o	o	o	
WARBLERS					
Orange-crowned Warbler ●	sr	u	u	u	
Nashville Warbler ●	sr	o	o	o	
Yellow Warbler ●	sr	a	a	a	
Chestnut-sided Warbler	tv	r	r		
Yellow-rumped Warbler ●	sr	a	o	a	
Black-throated Gray Warbler ●		sr	u	u	o
Townsend's Warbler	m	u		u	
Hermit Warbler	m	o		o	
Black-and-white Warbler	m	r		r	
Ovenbird	tv	r	r		
Northern Waterthrush	tv	r		r	
MacGillivray's Warbler ●	sr	c	c	c	
Common Yellowthroat ●	sr	u	u	u	
Wilson's Warbler	m	c	r	c	
Yellow-breasted Chat ○	sr	o	o	o	
TANAGERS					
Western Tanager ●	sr	c	c	c	
GROSBEAKS AND BUNTINGS					
Rose-breasted Grosbeak	tv	r	r	r	
Black-headed Grosbeak ●	sr	c	c	c	
Lazuli Bunting ●	sr	u	c	c	

COMMON NAME	STATUS	SP	S	F	W
TOWHEES AND SPARROWS					
Green-tailed Towhee ●	sr	c	c	c	
Rufous-sided Towhee ●	sr	c	u	c	o
American Tree Sparrow	wr			o	o
Chipping Sparrow ●	sr	c	u	c	
Brewer's Sparrow ●	sr	a	a	u	
Vesper Sparrow ●	sr	a	a	a	
Lark Sparrow ●	sr	c	c	c	
Black-throated Sparrow ●	sr	u	u		
Sage Sparrow ●	sr	c	c	c	r
* Savannah Sparrow ●	sr	c	c	c	
Fox Sparrow ●	sr	c	c	c	
Song Sparrow ●	sr	c	c	c	
Lincoln's Sparrow	m	u		u	
Golden-crowned Sparrow	m	o		u	
White-crowned Sparrow ●	sr	a	c	a	o
Dark-eyed Junco ●	pr	c	u	a	u
Snow Bunting	tv			o	o
BLACKBIRDS, MEADOWLARKS AND ORIOLES					
Red-winged Blackbird ●	sr	c	c	c	o
Western Meadowlark ●	pr	c	c	c	o
* Yellow-headed Blackbird ●	sr	c	c	c	
Brewer's Blackbird ●	sr	a	a	a	o
Brown-headed Cowbird ●	sr	c	c	c	
Northern Oriole ●	sr	u	c	c	
FINCHES					
Rosy Finch	wr	c		c	c
Pine Grosbeak	tv		o	o	
Purple Finch	m	o	o		
Cassin's Finch ●	sr	a	a	a	o
House Finch ●	sr	u	u	u	
Red Crossbill ○	tv	o	o	o	o
Common Redpoll	tv				o
Pine Siskin ●	sr	u	u	u	
Lesser Goldfinch ●	sr	u	u	u	
American Goldfinch ○	sr	o	u	u	
Evening Grosbeak	tv	u	u	u	
WEAVER FINCHES					
House Sparrow ●	pr	c	c	c	u

Accidental Species

Birds listed here have been recorded only once or twice on the refuge and in very few numbers.

White-winged Scoter
Gyrfalcon
Parasitic Jaeger
Yellow-billed Cuckoo
Snowy Owl
Pileated Woodpecker
White-headed Woodpecker
Gray Catbird
Brown Thrasher
Prothonotary Warbler
Tennessee Warbler
Virginia's Warbler
Black-throated Blue Warbler
Bay-breasted Warbler
American Redstart
Tricolored Blackbird
Common Grackle
Scarlet Tanager
Summer Tanager
Lapland Longspur
Upland Sandpiper
Mountain Quail
Northern Hawk-owl
Grasshopper Sparrow
Harris' Sparrow
White-throated Sparrow

Mammals

All mammals listed are considered resident species with the exception of the bats which migrate on a seasonal basis much like some of the birds. Other mammal populations fluctuate on a cyclical basis due to hibernation or seasonal movements between summer and winter ranges. Hart Mountain is a highly desired summer range for antelope to raise their young. They arrive here in the spring after spending the winter months on the Sheldon National Wildlife Refuge, 40 miles to the south.

The following is a listing of mammals, by family, that occur or are thought* to occur on Hart Mountain. Families follow that of A *Field Guide to the Mammals* by Burt and Grossenheider.

SHREWS
Malheur Shrew*
Merriam Shrew
Trowbridge Shrew*
Vagrant Shrew
Northern Water Shrew

PLAINNOSED BATS
Little Brown Myotis
Yuma Myotis
Long-eared Myotis
Fringed Myotis*
California Myotis*
Small-footed Myotis
Silver Haired Bat*
Western Pipistrel
Big Brown Bat*
Hoary Bat
Western Big-eared Bat*
Pallid Bat

FREETAIL BATS
Big Freetail Bat*

RACCOONS
Raccoon

WEASELS, SKUNKS AND BADGERS
Shorttail Weasel*
Longtail Weasel
Mink
Badger
Spotted Skunk*
Striped Skunk

DOGS
Coyote

CATS
Mountain Lion
Bobcat

SQUIRRELS, CHIPMUNKS AND MARMOTS
Yellowbelly Marmot
Townsend Ground Squirrel
Belding Ground Squirrel
Golden-mantled Squirrel
Whitetail Antelope Squirrel
Least Chipmunk
Yellow Pine Chipmunk
Chickaree

POCKET GOPHERS
Townsend's Pocket Gopher*
Northern Pocket Gopher*

POCKET MICE, KANGAROO MICE AND KANGAROO RATS
Little Pocket Mouse*
Great Basin Pocket Mouse
Dark Kangaroo Mouse
Ord Kangaroo Rat
Great Basin Kangaroo Rat*

BEAVER
Beaver

HARVEST MICE
Western Harvest Mouse

WHITE-FOOTED MICE
Canyon Mouse*
Deer Mouse
Pinon Mouse

GRASSHOPPER MICE
Northern Grasshopper Mouse

WOOD RATS
Desert Woodrat
Bushytail Woodrat

VOLES AND MUSKRATS
Mountain Vole*
Longtail Vole
Sagebrush Vole
Muskrat

OLD WORLD RATS AND MICE
House Mouse

JUMPING MICE
Western Jumping Mouse*

PORCUPINES
Porcupine

PIKAS, HARES AND RABBITS
Pika
Whitetail Jackrabbit
Blacktail Jackrabbit
Mountain Cottontail
Pygmy Rabbit

DEER
Mule Deer

PRONGHORN
Pronghorn (Antelope)

SHEEP
Bighorn Sheep (California)

Amphibians and Reptiles

The following is a listing of amphibians and reptiles that occur or are thought* to occur on the Hart Mountain Antelope Refuge.

Amphibians

FROG-TOADS
Great Basin Spadefoot Toad
Pacific Tree Frog
Western Toad
Spotted Frog*

Reptiles

LIZARDS
Leopard Lizard*
Western Fence Lizard
Sagebrush Lizard
Side-blotched Lizard
Desert Horned Lizard
Short Horned Lizard
Western Skink
Western Whiptail
Northern Alligator Lizard*

SNAKES
Rubber Boa
Racer
Striped Whipsnake
Gopher Snake
Western Terrestrial Garter Snake
Western Rattlesnake

Fishes

Fish on Hart Mountain Antelope Refuge are limited to two drainages supporting year-round stream flows, Guano Creek and Rock Creek. Three native fish species and one introduced species are present in these areas.

Warner Valley Sucker
Lahontan Cutthroat Trout
Rainbow Trout (introduced)
Redband Trout
Tui Chub

The lakes and reservoirs surrounding the Hart Mountain Refuge support introduced fisheries of a greater variety. Fishes there include:

Rainbow Trout
Largemouth Bass
White Crappie
Brown Bullhead

Notes

Date _____ No. Species _____

Time Afield _____

Observers _____

Weather _____

Remarks _____

_____

_____

_____

_____

_____

_____

Department of the Interior
U.S. Fish and Wildlife Service

14622
★ GPO 1988-593-358

February 1988

HART MOUNTAIN NATIONAL ANTELOPE REFUGE

VISITOR INFORMATION

What is the Camping Like?

Currently, all camping is located at the Hot Springs Campground, four miles south of Refuge Headquarters (see map). Located within the campground is the Hot Springs Bathhouse, which consists of a hot spring enclosed in a cement building for year-round use.

Seasonal camping is provided along Guano Creek from August 1st through November 1st to accommodate extra campers during hunting season.

Conditions of the camping areas at Hart Mountain are primitive. Both areas have pit toilets, however none of them are currently handicap accessible. Neither of the campgrounds have any RV hook-ups, drinking water, firewood, or fire rings. There is no camping fee for the campgrounds.

Where are the Nearest Facilities?

There is one restroom adjacent to the visitor room at Headquarters. The visitor room is open 24 hours a day. This building is not yet handicap accessible.

The Refuge does not provide or sell gas, phone service, food, or auto repair service. The nearest town from Headquarters is Plush, located approximately 25 miles west.

In Plush you will find gas, a phone, water, and food at a small convenience store. Further away in Lakeview (65 miles southwest of Hart Mountain) you will find lodging, auto repair stations, gas, several stores, and tourist information.

Frenchglen is 49 miles east from Headquarters on your way to the Steens Mountain, and Burns.

Where Can I Drive and When?

The roads on Hart Mountain range from graded roads to jeep trails. There are no paved roads on the Refuge so travel is slow. The graded roads include the main road from the base of the Mountain through Headquarters and on to Frenchglen, the road to the Hot Springs Campground, and the road to Blue Sky. All of these roads, except the Blue Sky Road, are open year round. The road to Blue Sky is closed in the winter and spring to reduce disturbance to wildlife, and because of hazardous road conditions. The road will be opened on May 25th this year.

Jeep trails include all secondary roads open to public access. These can be very rough, requiring four-wheel drive and high clearance vehicles. Some jeep trails are

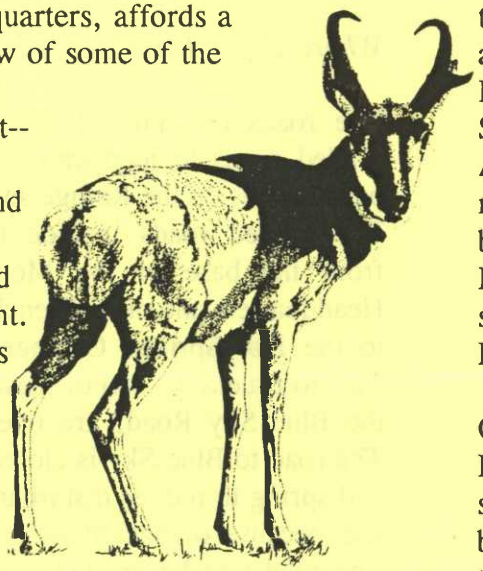
permanently closed, while others are seasonally closed to reduce wildlife disturbance and road damage.

Where are the Antelope?

Antelope are best viewed at three locations: (1) in the vicinity of Refuge Headquarters, (2) from Lookout Point, located along the Blue Sky Road, and (3) the road between Blue Sky and the south Refuge boundary. Early morning and late afternoon are the best times to spot antelope and other wildlife.

Around Headquarters, locate antelope while driving the Fenchglen Road. Another excellent place to see antelope is the Petroglyph Lake Road. During spring, the road can be impassable, but hikers are often rewarded by observation of pronghorn, mule deer, and occasionally bighorn sheep.

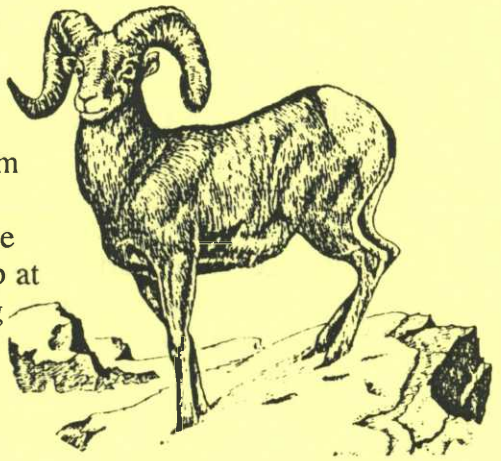
Lookout Point, located seven miles south of Headquarters, affords a big picture view of some of the most important antelope habitat--nearly 80% of pronghorn found on the Refuge occur south and east of the Point. Fawning occurs during May and June and is a principal value of the area.



The largest concentrations of antelope found at Hart Mountain Refuge occur during summer and fall in the plateau and lakebed country south of the Blue Sky Road.

Although pronghorn can be located anywhere along the South Boundary Road, concentrations usually occur in Spanish Flat, about two miles from the South Boundary Road. Please restrict all of your vehicle travel to roads to avoid disturbing animals.

How about Bighorn Sheep?



The best area to locate and observe bighorn sheep on a year-round basis is from the base of Hart Mountain, near the CCC Camp. Stop at any location along the road and scan with binoculars for herds of sheep. You are more likely to observe ewes and lambs, especially in the spring and summer because the primary nursery at Hart Mountain occurs along the extensive cliffs of the upper slope. Hiking is the best way to see sheep. Suggested day trips include Degarmo and Arsenic Canyons, areas extensively used by rams during summer and early fall. The best way to spot sheep is to be above them. For an excellent overnight trip and good sheep viewing try the southern 1/2 of Hart Mountain during summer.

On Poker Jim Ridge and the northern 1/2 of Hart Mountain, the best way to observe sheep is to hike to the top and use your binoculars or scope to spot the sheep along the cliff areas. If you are quiet and walk slow, you may be able to see sheep without the aid of binoculars. Please refrain from entering cliff areas during May and early June so as not to disturb sheep lambs.

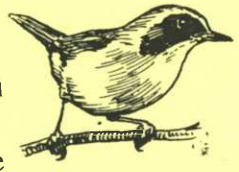
What Other Wildlife Can I See?

There are approximately 800 mule deer on the Refuge, and most of them can be found on Hart Mountain and the Intermediate Hills. Although deer can be seen at anytime of the year, spring and summer are the best.

The best way to see mule deer is to climb any ridge overlooking good deer habitat and watch for movement. Otherwise, walk or drive along the Skyline trail in early morning or late afternoon during July.

Mule deer are usually seen in or near junipers and aspen. Does tend to stay around riparian areas during summer. Bucks range further and are most active at night. They spend their days under rims and in mahogany groves.

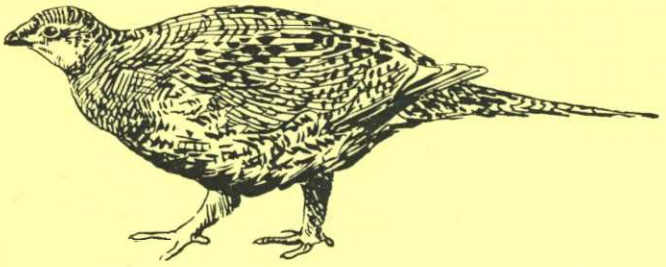
About 200 resident and migratory bird species use the Refuge. Riparian areas, such as the Hot Springs Campground, are especially good areas to find birds. Riparian areas on the Refuge include areas along natural springs and along streams on Hart Mountain and the Intermediate Hills.



Another outstanding area, Blue Sky, supports a unique group of birds because it is an isolated stand of ponderosa pine. Mornings between May and October are the best times to observe birds. During this time, migrants are passing through and summer residents are busy raising young.

Sage grouse are most easily seen during spring, summer, and fall. One of the many wildlife events occurring on Hart Mountain during the spring is the breeding season of sage grouse. During late March and April, hen grouse visit strutting grounds where roosters congregate and display.

Between July and October, sage grouse gather around meadows in the areas around Headquarters to the top of Hart Mountain. We suggest the following ways to see sage grouse during summer and fall: (1) walk or drive along the Skyline Trail before sunset, (2) an early evening walk along any meadow edge, and (3) watching the areas around natural springs, and around waterholes in lakebeds during sunrise.

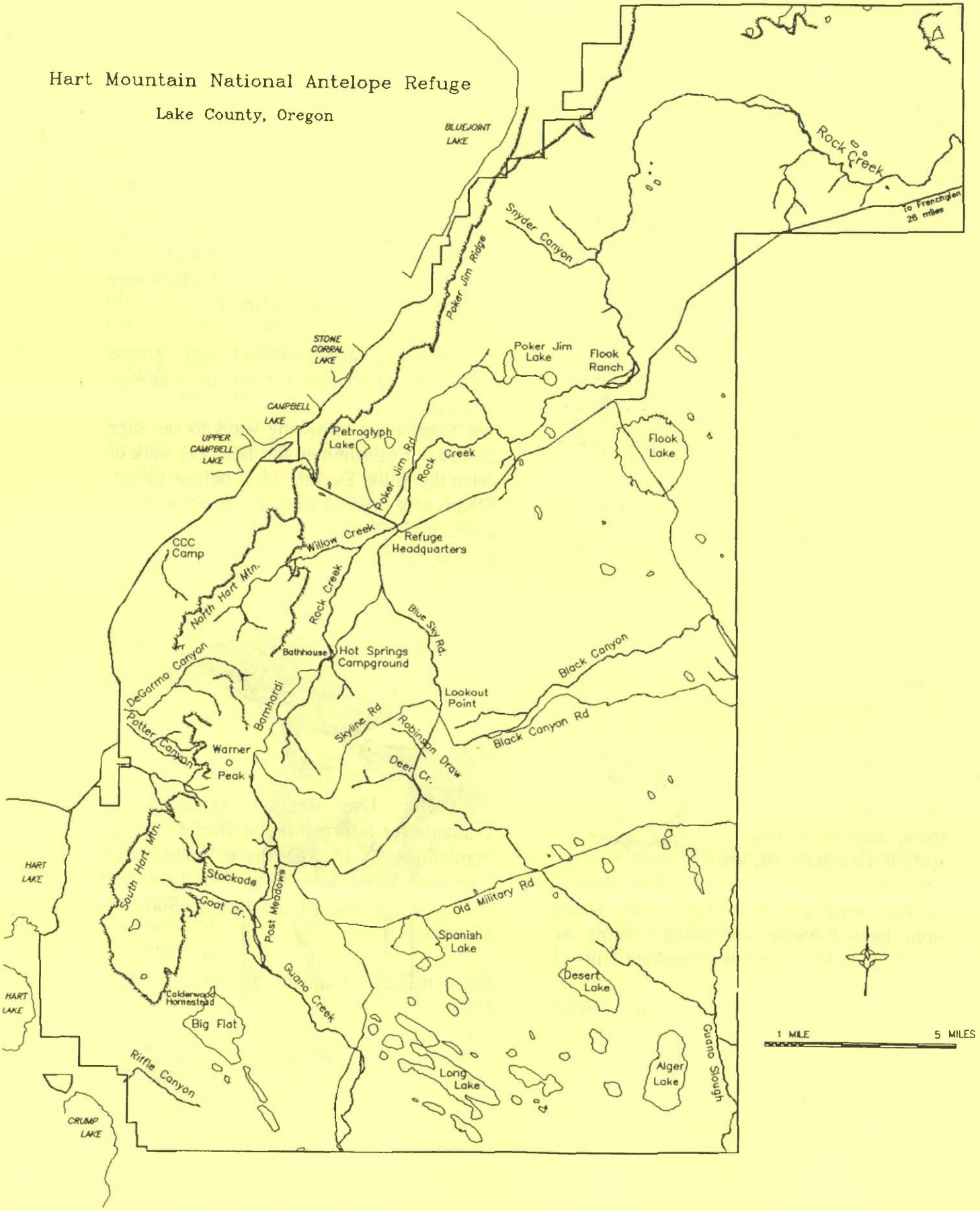


A **Public Use Regulations** leaflet is available for information on Hart Mountain regulations. If you have unanswered questions about a specific activity please contact a member of the Refuge Staff for answers.

Sheldon-Hart Mountain National Wildlife Refuges
P.O. Box 111
Lakeview, OR 97630
(503) 947-3315

Hart Mountain National Antelope Refuge

Lake County, Oregon



Hart Mountain National Antelope Refuge
Public Use Regulations

Camping is permitted at the Hot Springs Campground only. During special authorized Refuge hunts, other areas may be open. Camping equipment left unattended for more than 24 hours is subject to impoundment.

The use of portable electric generators and power saws is prohibited. All motor vehicles must be equipped with approved mufflers capable of preventing excessive noise. Quiet camps must be maintained between 10:00 p.m. and 6:00 a.m.

Backpacking is permitted; a Backcountry Permit is required for overnight and extended use. Free permits are issued at Refuge Headquarters and at the Lakeview office.

Campfires are permitted during times of low fire hazard. Inquire at Headquarters for current regulations. It is unlawful to leave any campfire which has not been thoroughly soaked. Be sure your fire is out.

Firearms- Possession of firearms on the Refuge is prohibited except during authorized Refuge hunting seasons, and only by those with the required hunting permit.

During these special hunts, the discharge of firearms in camping areas is prohibited. Only those game animals for which the hunt has been established may be taken. All other animals are protected. Spotlighting of any type is not permitted.

Motor Vehicles are required to remain on established roads and trails. You may pull off the road to park, but the distance cannot exceed the length of your vehicle.

All motorbikes, ATVs, etc. must be properly registered, and operators must be properly licensed and have all safety equipment as required by State law. More information is available in the visitor room at Refuge Headquarters. The use of all motorized vehicles in the campgrounds is limited to entering and leaving the area.

Rockhounds are permitted to collect rock specimens not to exceed 7 pounds per person per day. Digging and blasting are prohibited. The removal of Indian artifacts is prohibited.

Destruction of Property- It is unlawful to destroy, damage, or remove any live vegetation. Please prevent children from chopping or carving on live trees.

Hang gliding is prohibited on the Refuge.

If you have any questions, inquire at Headquarters or the Complex Office in Lakeview, (503) 947-3315:

Hart Mountain National Antelope Refuge
P.O. Box 111
Lakeview, OR 97630

HART MOUNTAIN NATIONAL ANTELOPE REFUGE
Lake County, Oregon
RECREATIONAL USE MAP