

U.S. FISH AND WILDLIFE SERVICE
ROCKY MOUNTAIN ARSENAL FIELD OFFICE
FISCAL YEAR 1989 ANNUAL PROGRESS REPORT

Prepared in Partial Fulfillment of the
Cooperative Agreement for Conservation and
Management of Fish and Wildlife Resources at
Rocky Mountain Arsenal, U.S. Fish and
Wildlife Service and U.S. Army.

by

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INTRODUCTION

The Rocky Mountain Arsenal (Arsenal) is located in Adams County, Colorado, just north of Stapleton Airport. The Arsenal was used for the production of nerve agents by the U.S. Army (Army) beginning in 1942, and was later leased out to private companies for the production of commercial pesticides. All productions at the Arsenal have ceased and the area is now a Superfund site undergoing cleanup.

The Arsenal is 27 square miles in size, and is largely undeveloped, open grassland. This, combined with the fact that the Arsenal is only a fifteen minute drive away from downtown Denver, makes the Arsenal a rare island of wildlife habitat in the midst of urbanization.

Arsenal Background

The area now known as the Rocky Mountain Arsenal was originally short-grass and sand prairie habitat, which are dominated by blue grama grass, western wheatgrass, sand bluestem grass, needle and thread grass, and sand sagebrush (Cooper 1988). Most native vegetation was lost through conversion of the lands to agricultural practices (Ebasco, Applied Environmental, CH2M Hill, Data Chem, Stollar 1989). Before the Arsenal's establishment in 1942, the primary land uses of the area were agricultural and rural residential. Ornamental vegetation on the facility was originally introduced around homesteads (Turner 1975). Lake Ladora and Lower Derby Lake were constructed to store irrigation water in 1919 (Ebasco 1989).

With the advent of World War II in 1942, Denver was selected as a location for a chemical munitions factory (anonymous 1980). Construction of the Rocky Mountain Arsenal began in June 1942, and production started in December 1943. Originally, the Arsenal encompassed 19,918 acres (Turner 1975), but presently is approximately 17,000 acres in size. During its World War II history, the Arsenal produced approximately 87,000 tons of chemical, intermediate, and toxic products as well as 155,000 tons of incendiary munitions.

In 1945, the Arsenal was placed on standby status and portions of it were leased to private industry for the manufacture of commercial pesticides. The Colorado Fuel and Iron Corporation was the first to lease the Arsenal for the production of DDT. The Julius Hyman Company assumed the lease in 1950 and was subsequently bought out in 1951 by the Shell Chemical Company for the continued production of pesticides.

The Arsenal was reactivated during the Korean War to produce incendiary and chemical munitions. From 1959 to 1962, the Arsenal's facilities were used to produce wheat rust (TX), a

biological anti-crop agent. During this period, a hydrazine facility was constructed for blending rocket fuels used in the Titan and Apollo projects (RIC publication 84324R04 1980). From 1965 to 1969, operations at the Arsenal supported warfare in Southeast Asia.

Contamination History

Production of military and commercial chemical products before 1956 resulted in considerable chemical waste by-products (Trautmann 1980). Liquid by-products were sometimes held in settling ponds in the south plants area or placed in Basin A, a natural depression centrally located within the Arsenal (Section 36). Basins B, C, D, and E were utilized to store overflow from Basin A. Solid wastes were burned or buried in pits in Sections 4, 9, 20, 30, 33, and 36. In 1955, Arsenal neighbors complained that ground water used for irrigation was contaminated. In 1956, Basin F was constructed and used to store all subsequent liquid waste disposal. Unlike the other disposal basins which were simply natural depressions, Basin F was asphalt lined.

In 1962, Basin F reached its storage capacity. As an alternative disposal method, the Army Corps of Engineers drilled a 12,045 foot injection well, and pumped 150 million gallons of liquid wastes into deep earth strata from 1962 to 1966. The well was dismantled after it was identified as the source of seismic disturbances in the Denver area in 1966. Some subsequent liquid disposal was conducted by spray evaporation, carrying aerosol droplets of hazardous liquid waste downwind from the Arsenal.

In 1965, the Shell Chemical Company entered into an agreement with the Army to pay a negotiated rate per 1,000 gallons of waste produced. The Arsenal began accepting waste for disposal from Lowry Air Force Base and Fitzsimons Army Medical Center in 1966. Solid and slurry waste were often disposed of in the most convenient manner, sometimes without regard to its hazardous nature.

In 1968, the U.S. Army Material Command requested recommendations from the National Academy of Sciences on chemical agent disposal methods. Beginning in 1975, the primary mission of the Arsenal was to demilitarize and dispose of obsolete chemical munitions. In 1980, the mission of the Arsenal was further refined to direct the disposal of chemical agents and hazardous materials, and decontamination and cleanup of the installation (Sheely 1980). In 1989, the Arsenal was decommissioned as a military installation and became a Superfund Site for contamination cleanup and land restoration.

Fish and Wildlife Resource Background

The Arsenal was designed with substantial buffer zones surrounding chemical production facilities. These lands have remained largely undisturbed. Vegetation succession, the removal of livestock grazing, and limited human access since 1942 have resulted in a wildlife habitat of extraordinary diversity and area value. Surrounding urbanization and the expansion of agricultural practices have isolated the Arsenal, thereby magnifying its overall importance to local wildlife communities. Construction of the new Denver Airport, the E-470 beltway, and associated development will continue to isolate wildlife habitat within the Arsenal.

That habitat mostly supports a western plains/prairie wildlife community. Principle species in this community include black-tailed prairie dog, cottontail rabbit, black-tailed jackrabbit, mule and whitetail deer, coyote, badger, bald eagle, and ferruginous and red-tailed hawks. Pronghorn antelope historically lived in this area as well, but are no longer found here. The other principle community on the Arsenal is the wetland community. The Arsenal contains four lakes, a number of ponds, and several prominent canals that support this community. Species include ducks, such as mallard and pintail, and shorebirds, including sandpipers, plovers, and great blue herons.

U.S. Army regulation 420-74, Natural Resources - Land, Forest, and Wildlife Management, establishes policies and procedures for the conservation, management, and restoration of lands and renewable resources on certain Army installations (U.S. Army 1986). Chapter 5 of regulation 420-74 outlines fish and wildlife protection responsibilities, and provides for the coordination and implementation of fish and wildlife management plans with appropriate Federal or State agencies.

On March 23, 1989, the Army and the U. S. Fish and Wildlife Service (Service) signed and implemented the cooperative agreement, Conservation and Management of Fish and Wildlife Resources at Rocky Mountain Arsenal (Conservation Agreement). Under provisions of the Conservation Agreement, a Service Field Office was established on the Arsenal to provide centralized coordination of wildlife resource management.

The purpose of the Arsenal Service Field Office (RMA-FOFW) is to centrally manage wildlife resources at the Arsenal during the cleanup process. Specific responsibilities of the RMA-FOFW include the development of a 5-year management plan, annual management plans and budgets, annual progress reports, technical review of Arsenal programs and documents, public relations support, and law enforcement assistance (Cooperative agreement for conservation and management of fish and wildlife resources at Rocky Mountain Arsenal, Program Manager, RMA and USFWS, 1989).

This document satisfies the requirement of an annual progress report for fiscal year 1989.

LITERATURE CITED

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U.S. Fish and Wildlife Service 1984. U.S. Fish and Wildlife Service Refuge Manual. National Wildlife refuge System. Release: 011.

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MANAGEMENT PLAN

Nothing to report. The Service's 1-year and 5-year Management Plans for FY90 and FY90-FY95, respectively, are currently being written and should be completed in FY90.

PUBLIC PARTICIPATION

NRCC Meetings

The Natural Resources Conservation Committee (NRCC) was formed to deal with public participation issues. Meetings were held quarterly in Fiscal Year 1989 and are planned to continue into FY90. Bonnie Lavelle, from the Rocky Mountain Arsenal Program Managers Office, chaired the meetings.

Interests represented in the NRCC meetings were as follows:

- Program Managers Office, RMA
- U.S. Fish and Wildlife Service
- Environmental Science and Engineering, Inc.
- Environmental Protection Agency
- U.S. Army
- Facilities Maintenance, RMA
- Colorado Division of Wildlife
- Shell Oil Company
- Ebasco
- MK -- Environmental Services
- Acumenics
- GeoTrans
- Colorado AGO
- CDH

Topics covered during the meetings were USFWS management activities, RMA facilities maintenance, biota collection and analysis, the comprehensive monitoring program, and MKE programs.

Ad Hoc Committee Meetings

The Fish and Wildlife Ad Hoc Committee was formed in September 1989. Its purpose is to inform/update non government entities on the status of wildlife management and cleanup activities at the Arsenal and to allow them an opportunity to comment on these activities.

Entities represented at these meetings include the following:

- U.S. Fish and Wildlife Service
- Program Managers Office, Rocky Mountain Arsenal
- Urban Wildlife Photo Club
- Denver Audubon Society
- Denver Field Ornithologist

Prairie Dog Rescue
Loveland Prairie Dog Action
Federation of Fly Fishers
Denver Museum of Natural History
National Audubon Society
Colorado Wildlife Federation
National Wildlife Federation
Colorado Wildlife Society
Urban Design Forum
Environmental Defense Fund
Sierra Club
Citizens Concerned for Wildlife
Greeley Wildlife Committee
Field Dog Trial Club

PERSONNEL

The following is a list of all personnel employed, hired, promoted, or transferred in Fiscal Year 1989.

NAME	TITLE	HIRE DATE/ PROMOTION DATE	T P	INITIAL/ CURRENT GRADE
Donald Gober	Coordinator-RMA Field Office	-----	P	GS-401-11
James Lockhart	Fish & Wildlife Biologist	-----	P	GS-401-12
Annette Ursini	Office Assistant	07-30-89	P	GS-303-4
Lisa Langelier	Park Ranger Wildlife Biol.	10-30-89	T	GS-025-7
Jeff Trousil	Wildlife Biol.	10-08-89	T	GS-486-5
Frank Hein	Wildlife Biol.	10-30-89	T	GS-486-7
Greg Hughes	Wildlife Biol.	09-10-89	T	GS-486-5

TITLE: Land use, mitigation, and habitat management at Rocky Mountain Arsenal.

PERSONNEL: Bruce Hastings, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

Mike Lockhart, Fish and Wildlife Biologist, USFWS , Rocky Mountain Arsenal.

INTRODUCTION

The Cooperative Agreement for Conservation and Management of Fish and Wildlife Resources at Rocky Mountain Arsenal was signed during FY 1989. The agreement established the Rocky Mountain Arsenal (RMA) Field Office of the U.S. Fish and Wildlife Service (Service). The agreement also defined a variety of Service responsibilities related to land use at RMA, including wildlife enhancement and planning (including mitigation), technical input on contaminant issues relevant to fish and wildlife management, fisheries management, public affairs relating to wildlife, and endangered species management.

The Service also entered into a separate cooperative agreement during FY 1989 that set aside a portion of the Arsenal as the Bald Eagle Management Area (BEMA). This agreement was entitled Cooperative Agreement between the U.S. Fish and Wildlife Service and Rocky Mountain Arsenal with respect to the Rocky Mountain Arsenal Bald Eagle Management Area and was initiated in response to an expansion of Stapleton International Airport. The BEMA was to be protected and enhanced as much as possible as bald eagle habitat to compensate for losses due to the airport expansion.

METHODS

The Service RMA Field Office initiated a general program during FY 1989 to meet the Cooperative Agreement requirements. A small staff varying from two to five Service employees were designated to review documents and make recommendations related to wildlife management and land use at the Arsenal.

The Service initiated a program to reduce human use within the BEMA during the winter months (October 15 - April 15). This program was approached by (1) installing gates and signs on roads into the BEMA, (2) requiring Service permission for BEMA entrance, (3) requiring magnetic cones to be displayed on vehicles allowed into BEMA, (4) requesting enforcement of BEMA regulations by RMA Security, and (5) recording information relevant to human use in the BEMA.

The Service, in conjunction with RMA Facilities Engineers and MK-Environmental Services (MK-ES) personnel, initiated habitat manipulations at seven sites in the BEMA. Vegetation was altered

to produce shortgrass prairie, tallgrass prairie, sand prairie, mixed grass prairie, and additional vegetation for lagomorph habitat.

RESULTS AND DISCUSSION

The Service provided guidance to the U.S. Army (Army) on numerous wildlife management issues including, but not limited to, contaminant issues. The Service also planned for expansion of the RMA wildlife program to better manage wildlife related issues in the future.

The BEMA access program was successful in reducing human use in the BEMA and assessing some of the degree and type of permitted use. Preliminary data analysis demonstrates that human use varied considerably by month and by contractor. The analysis also revealed that some contractors had more visits than others but may have impacted bald eagles and other wildlife less than other contractors due to spending less time on-site regardless of number of trips.

Habitat manipulations were not as successful as hoped (see report by Cooper and Mackey in Appendix A). Many of the problems can be attributed to Facilities Engineering's workload and high priority projects that were unrelated to this program. The Service and MK-ES made recommendations for improvements for FY 1990.

ACKNOWLEDGEMENTS

The Service would like to acknowledge the significant help that was received from Carl Mackey and Dr. David Cooper. In addition, Jim Green and Greg Hughes provided valuable assistance and suggestions.

TITLE: The potential effects of Rocky Mountain Arsenal cleanup activities and Denver metropolitan area transportation development on wintering bald eagles.

PERSONNEL: Mike Lockhart, Fish and Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

Pete Gober, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

Greg Hughes, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

Jeff Trousil, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

In December of 1896, a winter bald eagle communal roost was discovered on First Creek along the eastern side of the Rocky Mountain Arsenal. The Arsenal roost, supporting more than fifteen bald eagles for two weeks or more, is classified as "essential habitat" for recovery of the species. Concern over the effects of various development and cleanup activities on this wintering population led to the initiation of an intensive three year study by the U.S. Fish and Wildlife Service and funded by the U.S. Army, City and County of Denver, State of Colorado (Department of Highways) and E-470 Authority.

The winter period of 1988 - 1989 represented the second year of the "Denver area cooperative bald eagle study". A total of 26 bald eagles were trapped and fitted with transmitters and intensively tracked throughout the wintering period to ascertain key habitat use areas and specific foraging locales. Data obtained during the second year of study demonstrated that the Arsenal is a highly important destination wintering ground for bald eagles in eastern Colorado. The minimum maximum daily count of bald eagles on the roost reached 29 birds in December of 1989. However, the degree of Arsenal dependance and bald eagle distribution on the Arsenal differed significantly between 1987-88 and 1988-89. Moreover, population turn over, as evidenced by radio-telemetry and roost age composition data was very high over the course of the winter. It should be noted that changes in Arsenal presence and distribution was likely attributed to a sylvatic plague outbreak which effectively destroyed raptor prey base in the eastern half of the Arsenal.

As part of the Service's bald eagle study, seasonal and annual population trends of other raptors were also investigated. The findings of this aspect of the research were incorporated into a draft annual progress report for the bald eagle study. Ferruginous hawk populations were exceptionally high over the winter of 1988-89. However, ferruginous hawk distribution was very concentrated and lumped into western portions of the Arsenal where prairie dog populations continued to survive.

TITLE: Relocation and recovery of black-tailed prairie dog populations on the Rocky Mountain Arsenal.

PERSONNEL: Greg Hughs, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

Jeff Trousil, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

Lou Hannebury, Wildlife Biologist, Fish and Wildlife Research, Fort Collins, Colorado.

INTRODUCTION

During the summers of 1988 and 1989, 95% of the existing black-tailed prairie dog, Cynomys ludovicianus, population on the Rocky Mountain Arsenal (Arsenal) was destroyed by sylvatic plague. In August 1989, the Fish and Wildlife Service (Service) initiated a prairie dog reintroduction project. The purpose of this project was to assist the recovery of these prairie dog colonies decimated by sylvatic plague and to develop procedures for relocating prairie dogs.

METHODS

Prairie Dog Relocation Project

The release areas chosen had lost their prairie dog populations in 1988 (Map 1). The areas were mowed and the burrows were dusted for fleas to prevent the prairie dogs brought onto the Arsenal from contracting plague from surviving fleas or from spreading plague in the event that they inadvertently brought it onto the Arsenal. All prairie dogs released onto the Arsenal were sprayed with flea spray for the same reason. The sex and age class were recorded and new prairie dogs were eartagged for future identification so that the project could be evaluated. They were then released into vacant prairie dog burrows, 4-5 to a burrow.

The prairie dogs relocated onto the Arsenal came from two different sources. Service Personnel trapped and moved prairie dogs from other areas on the Arsenal (Map 1). Tomahawk live traps baited with oats were used to capture the prairie dogs for relocation. The traps were wired open for 2-3 days to prebait. While actually trapping, traps would be set in the morning and checked several times a day. Any captured prairie dogs would be placed in a kennel for transportation and released using the methods described above. The other source of prairie dogs was a private relocation organization called Prairie Dog Rescue (PDR). This group primarily uses soap and water to flush prairie dogs

out of their burrows for capture in development areas in the Denver-Metro area. They also do some live trapping and have borrowed traps from the Service.

Prairie Dog Telemetry Study

A prairie dog telemetry study was initiated in August by Lou Hannebury from the Fish and Wildlife Research Office in Fort Collins, Colorado. A study plot in Section 19 (Map 1) was marked out, mowed and dusted for fleas. On August 11, forty-six prairie dogs were released in the plot. Twenty-nine had radio collars. The other 14 prairie dogs were released August 16. The telemetry work began on August 13. Two methods were used to locate the radio collared prairie dogs. Triangulation techniques, using a fixed tower and a known mobile site, were used to document the prairie dogs movements after their release. The plot was also walked with a hand held antenna to locate the burrow of an individual prairie dog.

RESULTS AND DISCUSSION

Prairie Dog Relocation Project

A total of 714 prairie dogs were relocated on the Arsenal during the 1989 fiscal year. Service personnel trapped 134 on the Arsenal. PDR brought 534 from various sites in the Denver-Metro area. The remaining 46 were trapped at Green Valley Ranch by Lou Hannebury for his telemetry study. Most of the prairie dogs (534) were released in Sections 29 and 32. Sixty were released in Section 19 and the remaining 120 were released in Section 35. Prairie dog relocation will continue through the next fiscal year.

Prairie Dog Telemetry Study

Twelve days of telemetry data were collected this fiscal year. The study will continue through December.

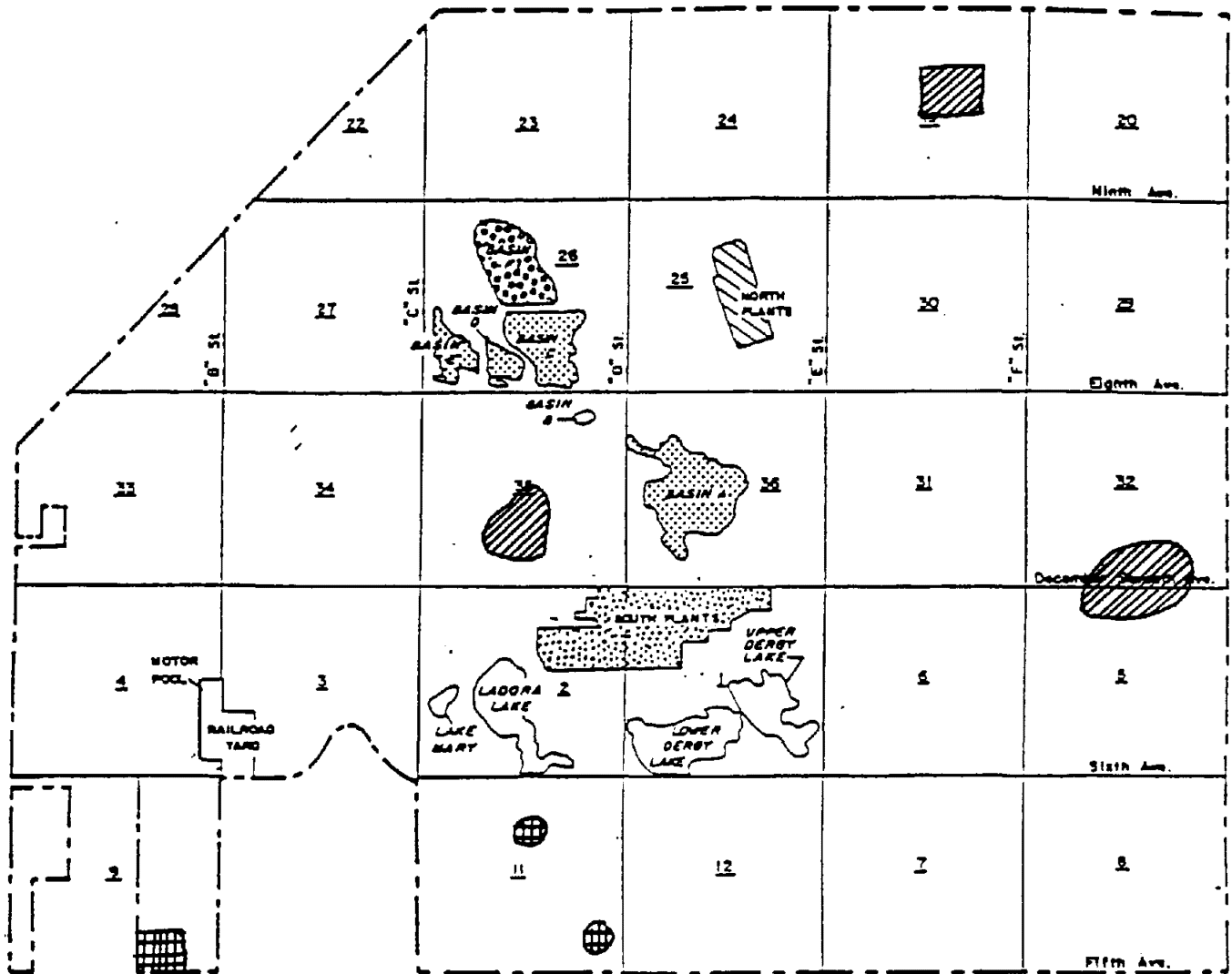
ACKNOWLEDGEMENTS

The Service would like to thank Prairie Dog Rescue and its volunteers for their work relocating prairie dogs onto the Arsenal.

FISH AND WILDLIFE SERVICE
FISH AND WILDLIFE ENHANCEMENT
ROCKY MOUNTAIN ARSENAL FIELD OFFICE

Rocky Mountain Arsenal
Commerce City, Colorado

Map 1. 1989 Prairie Dog Projects



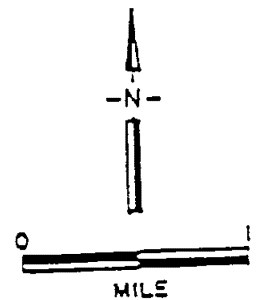
LEGEND



Prairie Dog Release Area



Prairie Dog Trapping Area



TITLE: Habitat improvement and relocation of lagomorphs on the Rocky Mountain Arsenal.

PERSONNEL: Greg Hughs, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

Jeff Trousil, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

INTRODUCTION

When the prairie dog population crashed in the summers of 1988 and 1989, the decision was made to diversify the prey source for raptors on the Rocky Mountain Arsenal (Arsenal). Projects were initiated to improve habitat for rabbits and relocate rabbits into these improved areas.

METHODS

Attempts were made to trap black-tailed jackrabbits, Lepus californicus, in the southeast quarter of Section 9 to relocate onto the Arsenal. Large live traps baited with oats were placed near shrubs and other vegetative cover. Cottontail rabbits were also incidentally caught in prairie dog traps. Both species were eartagged and relocated to the southwest quarter of Section 5.

Plans were also initiated to pile shrubs and trees that needed to be removed for remediation project purposes into brush piles to provide cover for rabbits.

RESULTS AND DISCUSSION

The capturing of rabbits for relocation was rather unsuccessful. Only 3 jackrabbits and 8 cottontails were relocated to Section 5 in August. There were no lagomorph relocations in September.

TITLE: Population monitoring of the ring-necked pheasant at the Rocky Mountain Arsenal.

PERSONNEL: Donna Rieckmann, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

Wendy Van Matre, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

Jeff Trousil, Wildlife Biologist, USFWS, Rocky Mountain Arsenal.

INTRODUCTION

Establishment of successful ring-necked pheasant populations in America were made in 1881 at Willamette Valley in Oregon (Prince et al 1988). Ring-necked pheasant were introduced to the Arsenal by the Rod and Gun Club. Approximately 1,500 pheasants were released each year from the early 1960's to 1970's. Currently, pheasant population numbers are declining both in Colorado and nationwide.

Pheasant surveys were done as part of the Denver Area Cooperative Bald Eagle Study. Populations were monitored with the following objectives in mind: 1) to maintain, enhance, and protect population; 2) to determine habitat use seasonally; 3) to access status and structure; 4) to minimize loss of critical habitat; and 5) to monitor contaminate levels in pheasants.

METHODS

Pheasant road transects were conducted from 50 minutes before to 10 minutes after sunrise to coincide with highest crowing intensity. Each survey started at different listening locations (Figure 1) to reduce bias. Every survey contained 10 stops.

RESULTS AND DISCUSSION

Transects were conducted 24 times from December 7, 1988 to September 29, 1989. High numbers of pheasants were observed in late winter, early spring and declined as the year progressed. A total of 119 pheasants were observed during the study (See Table 1).

**TABLE 1. Pheasant Road Transect, Rocky Mountain Arsenal,
1988-1989.**

Date	Rooster	Hen	Total
Dec. 07, 1988	0	1	1
Dec. 23, 1988	0	3	3
Feb. 01, 1989	6	1	7
Feb. 10, 1989	26	17	43
Feb. 11, 1989	11	11	22
Feb. 28, 1989	5	1	6
Mar. 01, 1989	5	0	5
Mar. 02, 1989	6	0	6
Apr. 04, 1989	2	1	3
Apr. 10, 1989	3	2	5
Apr. 11, 1989	2	1	3
Apr. 12, 1989	3	0	3
May 29, 1989	3	0	3
May 30, 1989	2	1	3
May 31, 1989	1	0	1
Jul. 06, 1989	1	0	1
Jul. 07, 1989	0	0	0
Jul. 08, 1989	0	0	0
Aug. 16, 1989	0	0	0
Aug. 17, 1989	0	0	0
Aug. 18, 1989	0	0	0
Sep. 27, 1989	0	0	0
Sep. 28, 1989	1	0	1
Sep. 29, 1989	0	0	0
Total	77	42	119
Mean	3.20	1.75	4.95

COMMUNICATION SYSTEMS

All telephones used by the Service on the Arsenal are the property of the U.S. Army. Radios currently in use are on loan from the Army as surplus radios. Radios will be purchased in Fiscal Year 1990.

COMPUTER SYSTEMS

Computers are used for virtually all memo and report writing, as well as for storage and analysis of project data by all staff. Standard computer training to all employees includes WordPerfect 5.0, DOS, and dBASE IV training. Special training, such as for GIS, is arranged for specific employees on a need basis.

The following computers and related equipment were purchased in FY89:

<u>QT</u>	<u>Equipment</u>	<u>Price</u>
2	COMPAQ DESKPRO COMPUTER	\$ 6142.72
1	DELL COMPUTER	\$ 4391.00
1	ZENITH LAPTOP COMPUTER	\$ 3050.00
1	COMPAQ LAPTOP COMPUTER	\$ 4818.00
2	EPSON LQ950 PRINTER	\$ 1166.00
1	HEWLETT PACKARD SP501 PRINTER	\$ 2202.00
1	FUJITSU DL4400 PRINTER	\$ 744.00

	TOTAL	\$22866.72

This list does not include the software purchased with each computer system. Computer systems and software are upgraded annually.

LIST OF APPENDICES

Appendix A

Implementation of the vegetation management plan
for the bald eagle management area of RMA:
evaluation of results for 1989

APPENDIX A